



YC60-9 液压挖掘机

使用说明书

YC60-9 EXCAVATOR
OPERATOR'S MANUAL



广西玉柴重工有限公司

GUANGXI YUCHAI HEAVY INDUSTRY CO., LTD.

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Caution

Improperly use the machine may cause hazards and death, please do as follows before operating:

- Remember the safety Measures and correct use criterion.
- Read & understand the content about safety operating in the manual.
- Understand & familiar all the safety labels on the machine
- Keep any other person or object out of the work area.
- It should have a safety operation training before you operate the machine

You have the duty to observance the ordinance and the law, follow the directions of YUCHAI operation and maintenance regulations.

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 unoriginal 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.

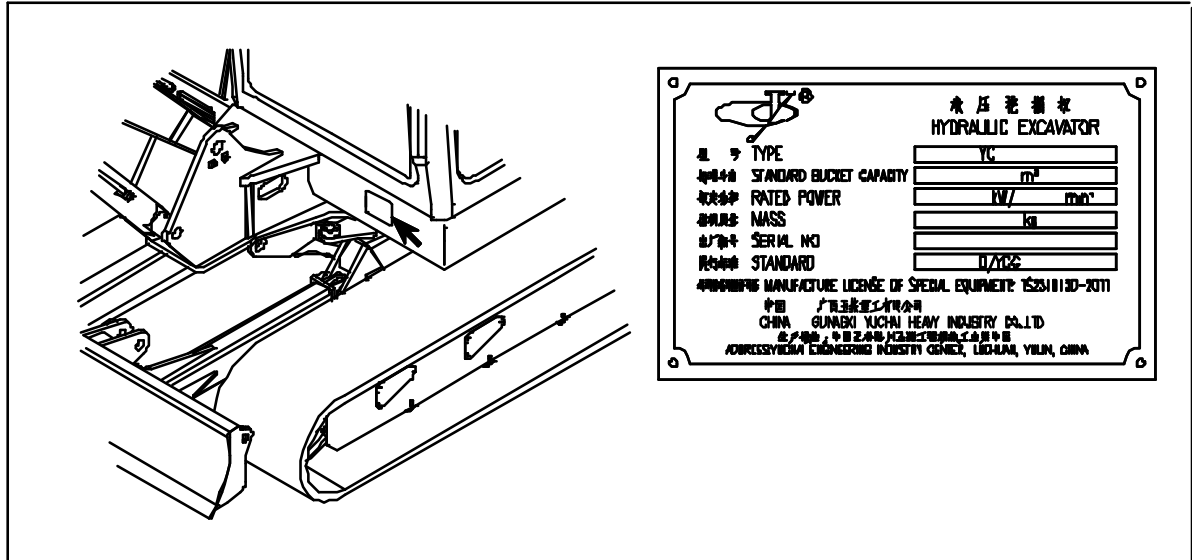
According to the principle of "The customer is god", we will keep improving the machine for supplying the product to the user as best as we can. The improvement will be taken in any minute, we will not responsible for sending the new manuals for the selling products and giving the notice in advance.

Hope this machine can supply the comfortable operating condition.

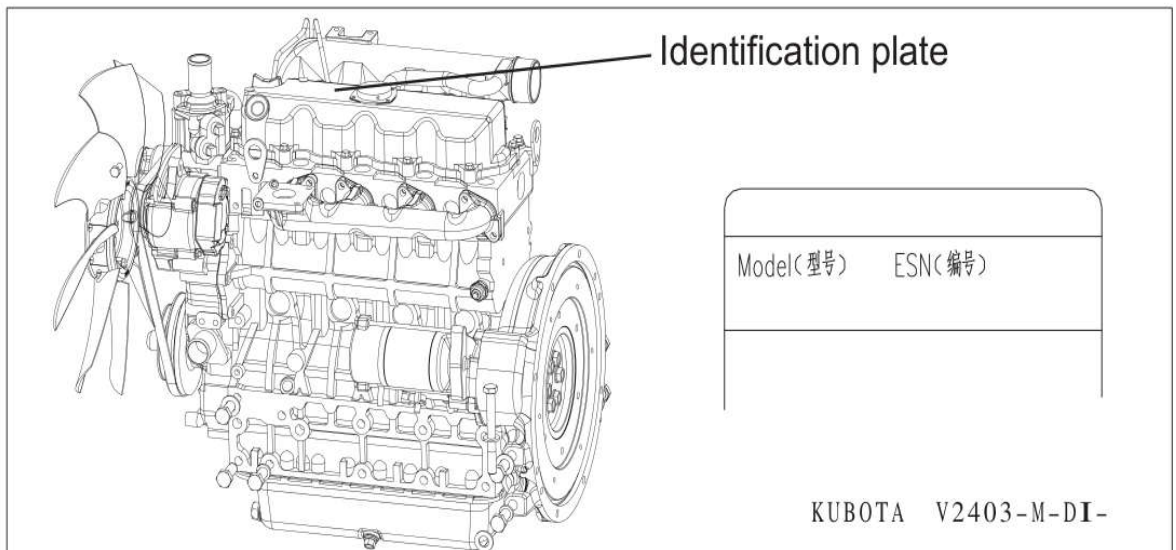
Product information

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

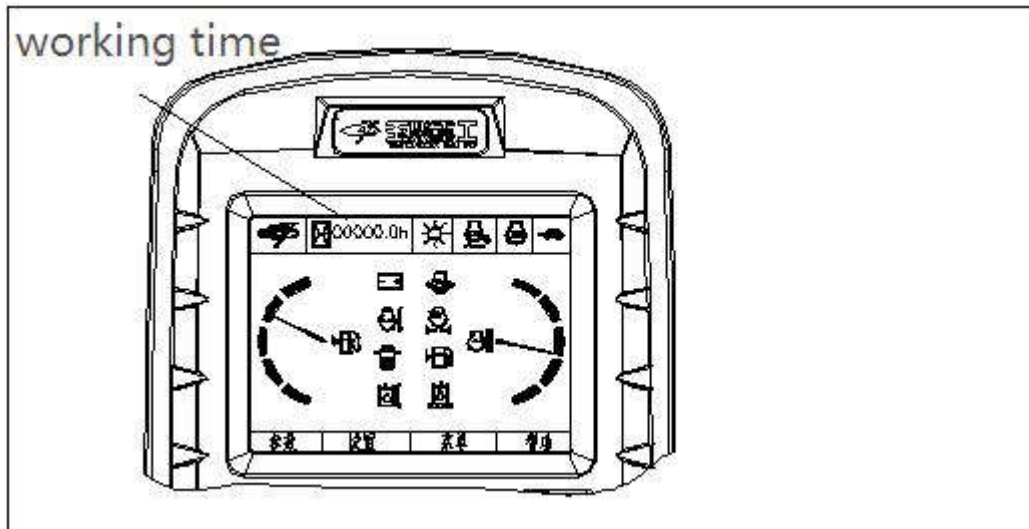
- Machine Identification plate(The nameplate is on the left-front side of the platform)



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




- Machine running Information (working times is showing on instrument which is inside the cab)



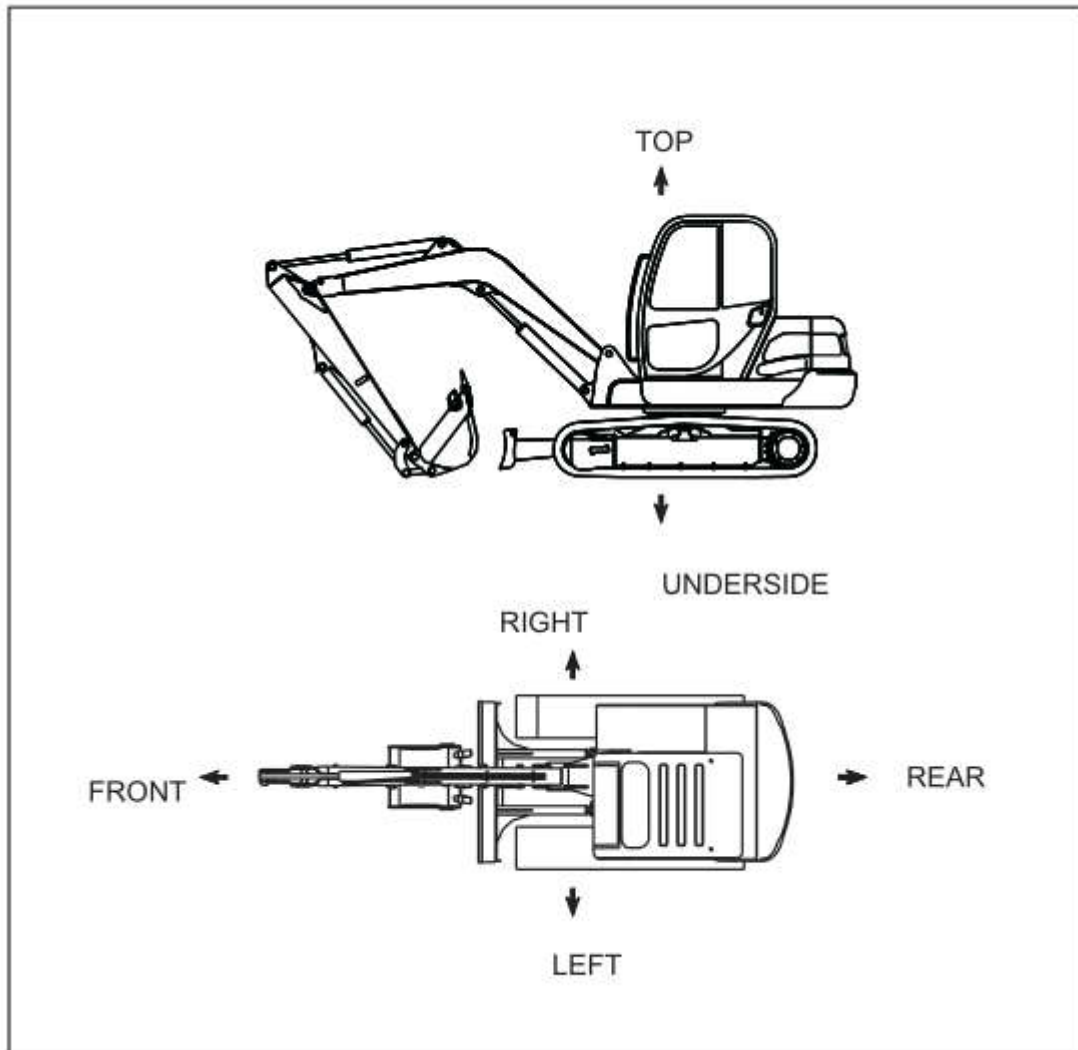
Machine record

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.

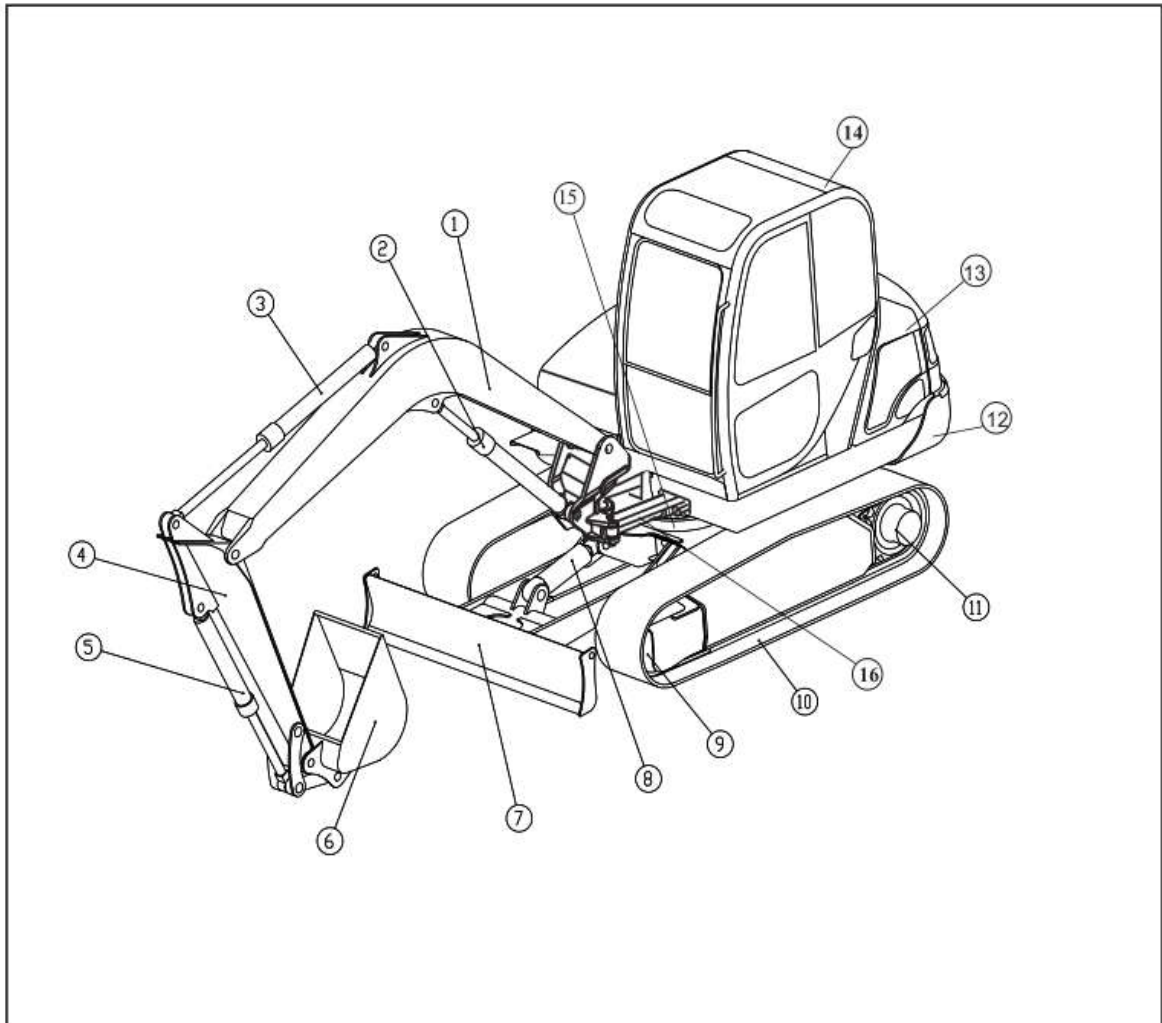
	● Model : _____
	● Machine No. : _____
	● Engine No. : _____
	● Dealer Information: _____

Machine Description

Front, rear, left, right, top, underside in this manual are same as the direction as follow:



Excavator main parts



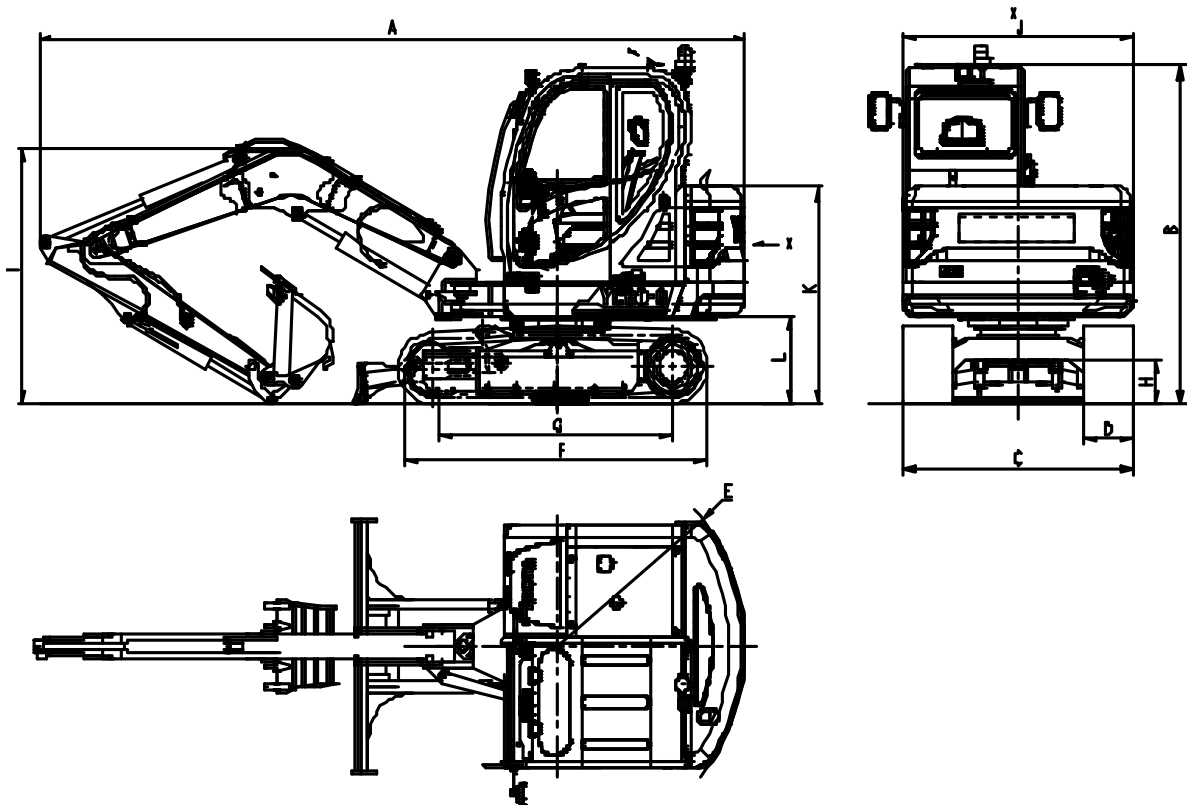
- | | | | |
|---------------------|------------------|--------------------|-------------------|
| 1. Boom | 2. Boom cylinder | 3. Arm cylinder | 4. Arm |
| 5. Bucket cylinder | 6. Bucket | 7. Dozer blade | 8. Dozer cylinder |
| 9. Front Idler | 10. Track | 11. Travel motor | 12. Platform |
| 13. Covering panels | 14. Cabin | 15. Swing cylinder | |

Data sheet

1. Dimension parameter

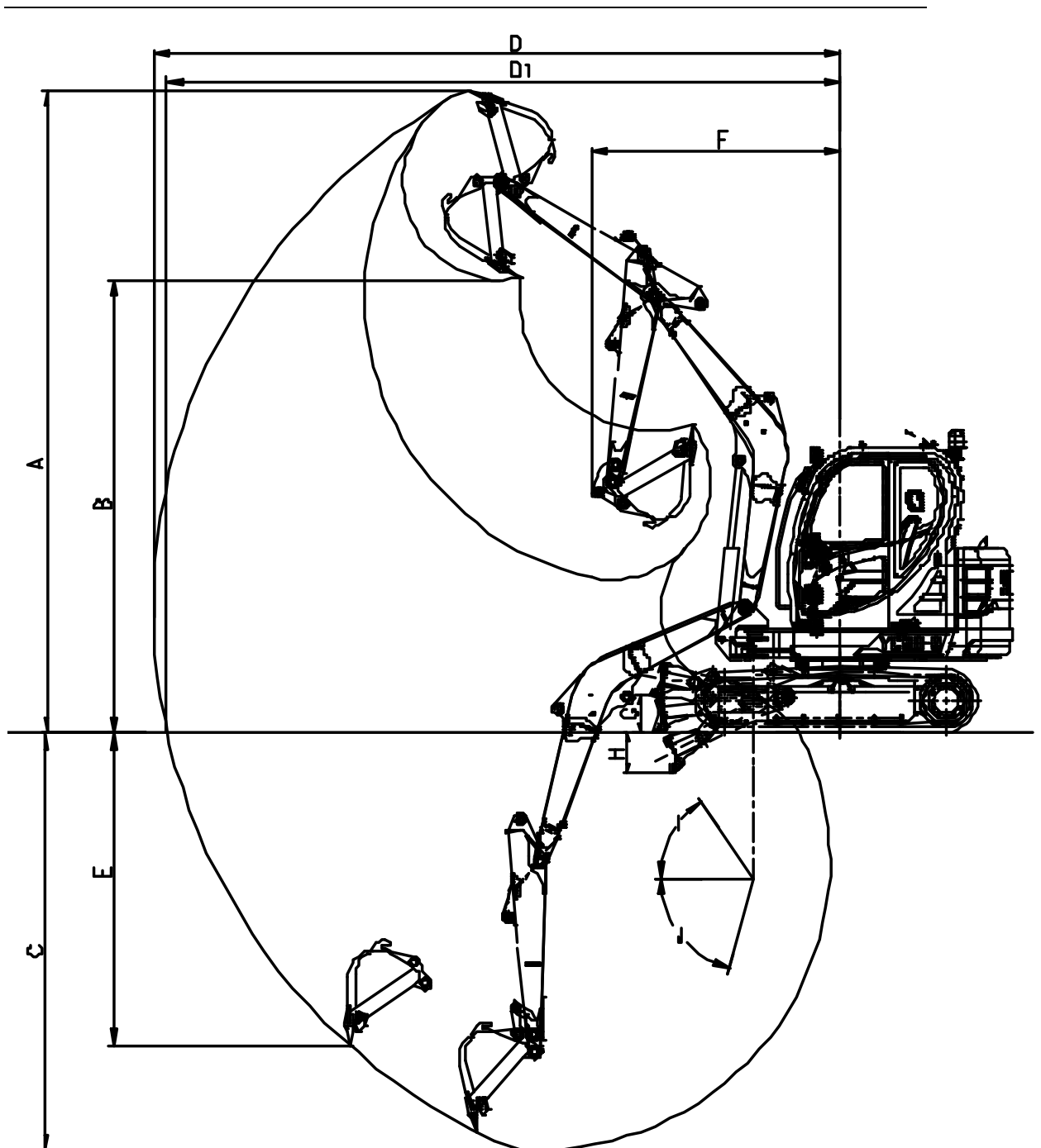
Code	Item	Unit	YC60-9
			E60F51
	Operating Weight	Kg	5700
	Standard bucket capacity	M ³	0.21
	Name of engine		KUBOTA V2403-M-DI-E3B
	Power of engine	Kw/rpm	30.7/2200
A	Machine length	Mm	5656
B	Machine height	Mm	2585
C	Overall width	Mm	1920
D	Crawler width	Mm	400
E	Platform slewing radius	Mm	1520
F	Crawler length	Mm	2494
G	Wheel-base	Mm	1960
H	Min ground clearance	Mm	316
I	Overall height	Mm	1943
J	Width of platform	Mm	1865
K	Height of engine hood	Mm	1650
L	Height from floor to platform	Mm	670
	Width of bucket	Mm	742
	Walking speed(low/high)	Km/h	2.2/3.6
	Platform slewing speed	Rpm	9~11
	Cab		•
	With swing boom		•

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



2. Operating parameters

Code	Item	Unit	YC60-9
			E60F51
A	Max. digging height	Mm	5740
B	Max. Dumping height	Mm	4040
C	Max. digging depth	Mm	3720
D	Max. digging radius	Mm	6065
D1	Max. horizontal digging length	Mm	5945
E	Max. digging height radius	Mm	2750
F	Min. slewing radius	Mm	2175
G	Max. depth of Bulldozer	Mm	330.2
H	Max. height of Bulldozer	Mm	363.8
I	Boom swing angle (Right)	°	55
J	Boom swing angle (Left)	°	75
	Max. digging force	kN	36.6



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

3. Buckets

SN.	Capacity(m ³)	Bucket Width(mm)	Bucket Weight(kg)	Bucket teeth .
1	0.21	742	181	4

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	3.6	27.5	70%(35°)
Low speed	2.2	47	

5. Hydraulic system

Advance throttle hydraulic system

Pressure (mpa): 24mpa

Oil return filter: 10 μ m

Oil suction filter : Metal

6. Electric system

Voltage: 12V

Battery: 120AH

7. Environment condition

Temperature: -15~40 °C

Humidity: <85%

Temperature of transportation and storage : -15~40 °C

8. When the excavator equipped with some other accessories, it may interfere with the boom cylinder or it's protecting cover, so if you install some other accessories, please pay attention to the retracted angle of the arm and boom for avoiding the damage of the boom cylinder.

Bucket	Install on the arm
	Used with Quick hitch
Breaker	Install on the arm
	Used with Quick hitch
Auger	Install on the arm
	Used with Quick hitch
Grappler	Install on the arm

Safety general information

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 contents of safety operation in this book show the possible situation during normal operation and maintenance, as well as the possible disposal method.

The contents of safety operation are distributed in chapters that constitute a comprehensive guide for safety operation.

The safety information in this book can't cover all potential risks and relevant countermeasures. Operator must take necessary measures to ensure safety if taking any method or action not recommended or permitted by 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.

Please check all the functions of the machine before starting work. If you found the machine work improperly, please stop immediately and check it. Don't continue working before troubleshooting.

Please check, maintain and operate the machine according to this book's operating and safety instruction by qualified personnel.


Do not operate or maintain the machine if it is under the influence of alcohol or drugs, which can make you and the people around in dangerous.

Please understand the content of relevant signals and gestures.

Please be familiar with and strictly abide by the relevant laws and regulations of the country or region where you are located.

Safety Tips

1. Warning Symbols

	This warning symbol indicates important security information in this book. When you see this symbol, please read the relevant information and advice carefully to avoid possible casualties.
---	--

3. Safety Tips

This book provides tips, symbols and description of potential dangerous situation of machine operation. Operator should read this book and the warning symbols on the machine carefully, and follow the relevant working procedure before operating, maintaining and repairing work.

Words “danger”, “warning” and “attention” are used to indicated safety tips. Their explanations are as follows:

●⚠ **Danger:** It means the consequence of danger will cause death or severe injury if not evading, only applicable to the few places where the most serious danger exists

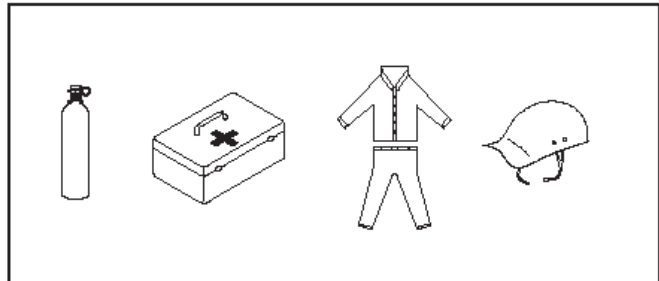
●⚠ **Warning:** It means the potential consequences of danger could cause death or severe injury if not evading.

●⚠ **Attention:** It means the potential consequences of danger could cause low or medium level injury if not evading. Also, it could be indicated the unsafe operation that could cause personal injury

Protection devices

1. Protective device for Operators

1) Operator must wear snug fitting work suit, safety helmet, footwear and the other relevant safety equipment (protective earplug, gloves, goggle, and safety belt etc.)



2) Please tie up your hair and cover it with helmet if your hair is too long. This measure will keep your hair from being entangled by the machine.

3) The first-aid kit must be stocked in the machine and make regular check; increase emergency medicine if necessary in case of an urgent need.

4) Please check all safety equipment in normal function or not before operating or maintaining.

4) Please check all safety equipment in normal function or not before operating or maintaining.

2. Flee hammer and fire extinguisher

Escape hammer is on the left doorpost.

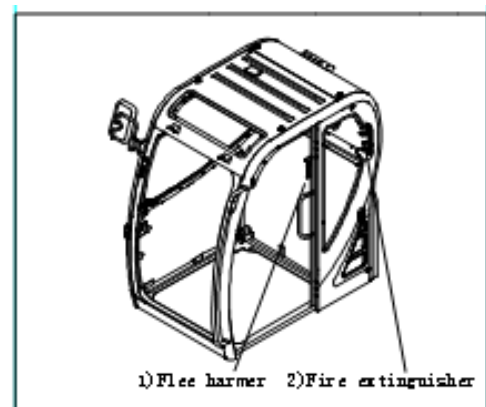
If you are trapped in the cabin and can't open the door, please use the hammer tip against the glass until the glass shattered; then escape from cabin. Please hit the glass eyes and face

Fire extinguisher shall be installed in the driver's Cabs, we designed a spare installation seat for fire extinguisher at left rear post of the cabin.

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

Please check and maintain fire extinguisher at regular intervals.

Please contact factory for repair or replacement if there are any deformation or cracking on TOPS structure.



Safety Labels



Warning: casualties could be caused by wrong understanding safety labels, or missing of safety labels. Please replace the missing or damaged safety labels in time and keep them clean and easy to be distinguished

Always read the operation manual and safety instruction before operating, maintaining carefully, fully understood the content, and work according to the relevant procedures.

Check safety label before starting machine. Clean the safety labels if it is stained.

Please do not clean safety labels with organic solvent or gasoline which will damage safety labels. Cotton, water and detergent are recommended.

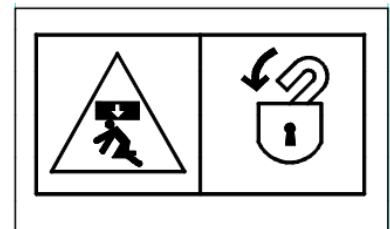
If safety labels need to be replaced due to broken, missing or stained, please contact Yuchai for new safety labels.

1. Safety labels classification

The “graphics-text safety labels” and “graphics-symbol safety labels” are adopted in this book, as well as on the machine.

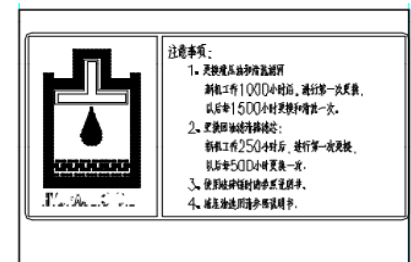
A. Graphics-symbol safety labels

Safety warning information is illustrated by graphics symbol, and easy to understand Safety Signs with Picture & Character



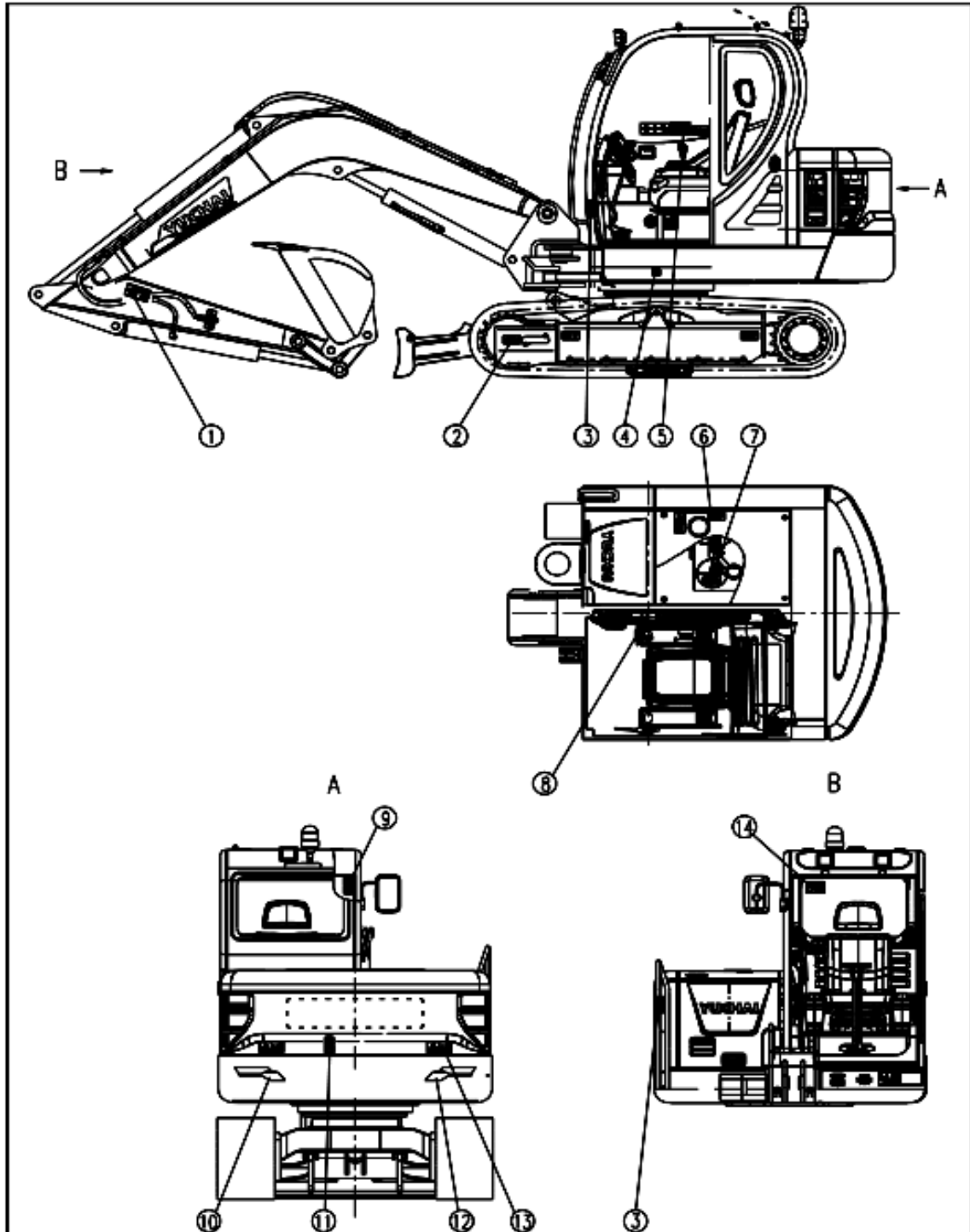
B. Graphics-text safety labels

This kind of safety labels match graphics with relevant text, fully explain the potential hazards.



2. Safety labels sticking position

The following labels are just part of the all safety labels, the rest of them will be introduced in the following chapters.



3. Safety labels graphic symbol and illustration

1). Be careful and stay away from working device

Moving working device might cause physical injury. Please keep safety distance from moving zone of working device.



2). Please stay safe when going up and down from machine

When you go up and down from machine, please move slowly, grab handrail, and face the machine, use the stepping staircase and the crawler board on the machine.

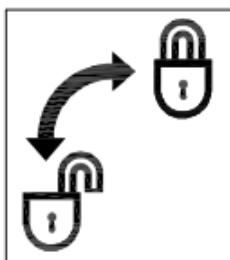


3). Read operation manual carefully

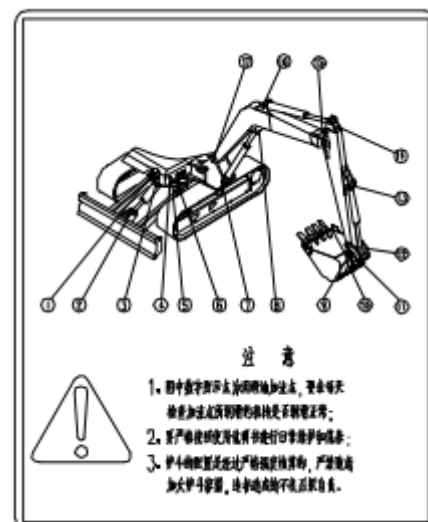
Read operation manual carefully before operating, maintaining, dismantling, assembling and transportation.



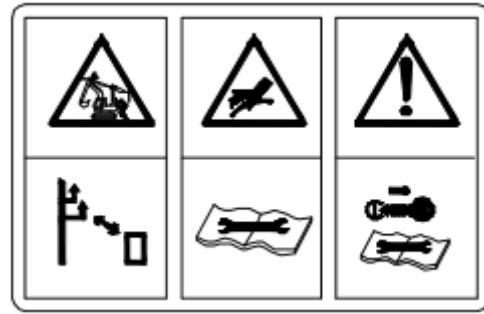
4). Locking mark



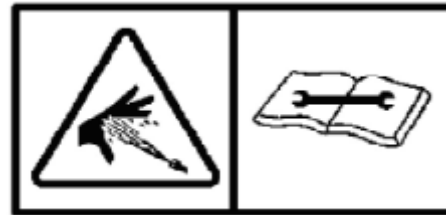
5). Grease filling mark



6). Safety information of operation and maintenance



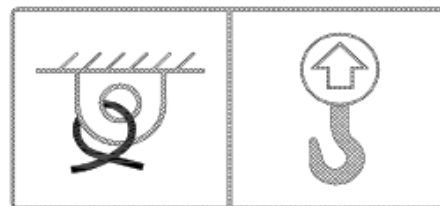
7). Please pay attention to the danger of high pressure oil spraying when adjusting crawler tension



8). center of Rotation

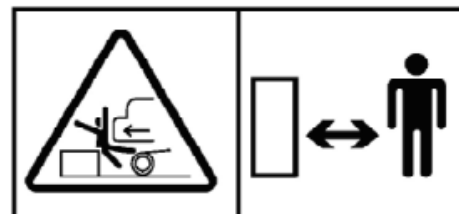


9). Cable and crane combination



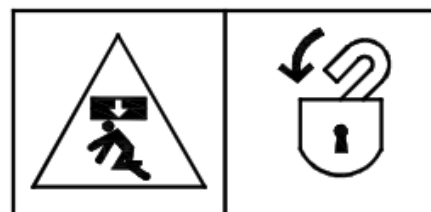
10). Please stay away from working machine

Rotating excavator might cause physical hazard to the people in rotating zone, please keep away from the rotating zone.

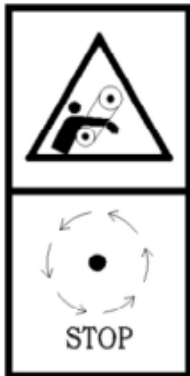


11). Please lock front window after opening

Unlocked front window might fall down suddenly due to vibration or outside force and cause physical injury.



12). Please shut down engine before internal checking and adjusting.



14). Fireproof mark



13). Fuel injection mark

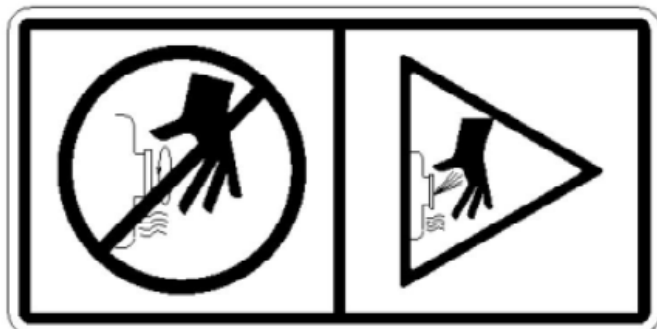


15). Hydraulic oil injection mark



16). Don't open lid of hydraulic oil or coolant container at high temperature

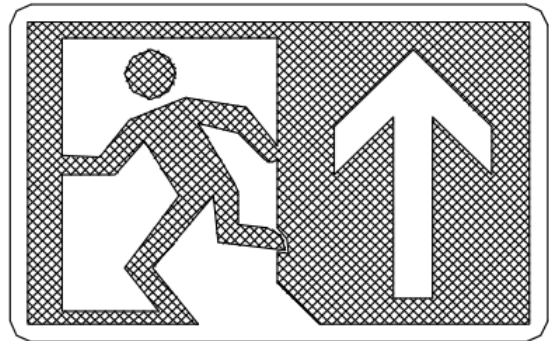
The hydraulic oil and coolant at high temperature have high pressure, might cause physical injury. Please don't open the lid until hydraulic oil and coolant cooling down.



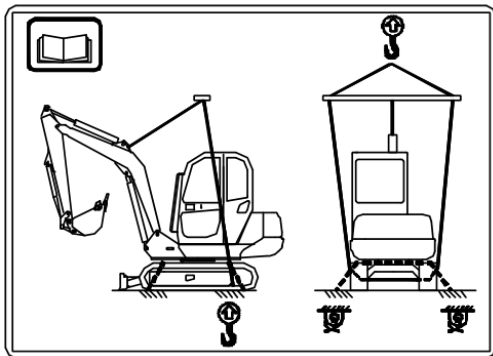
17). Manual throttle label



18). Sign of attention and direction of escape

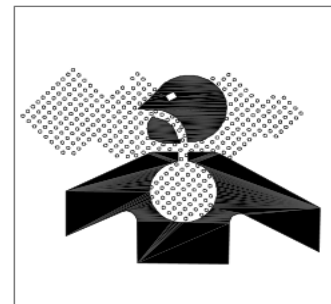


19). Lifting mark

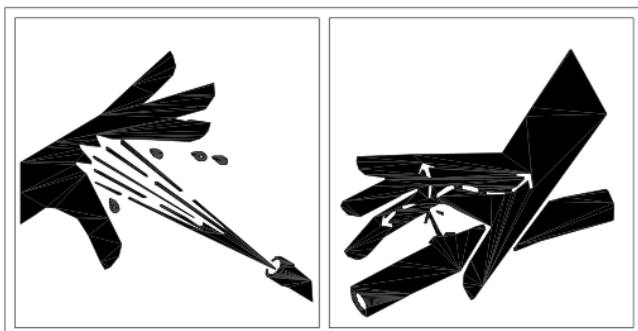


20). Beware of toxic gases

Toxic gas or toxic smoke may
Cause suffocation

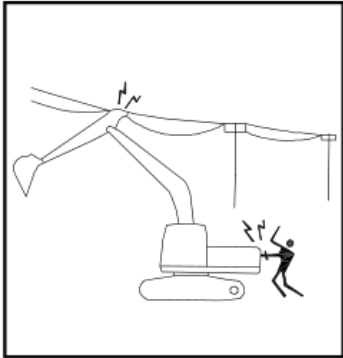


21). High-pressure fluid (injection, leaking/squirting) danger



Don't try to block or cover high-pressure fluid leaking point by any part of your body,
or being squirted by high-pressure fluid.

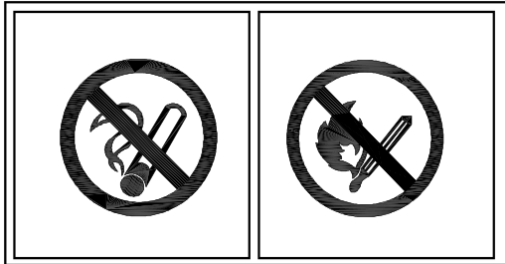
22). Pay attention to the overhead electric wire



23). Fire extinction



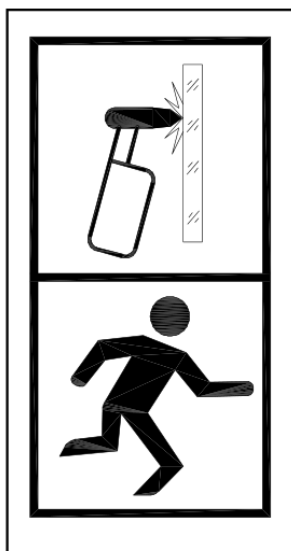
24). No Smoking



25). Warning. Risk of explosion

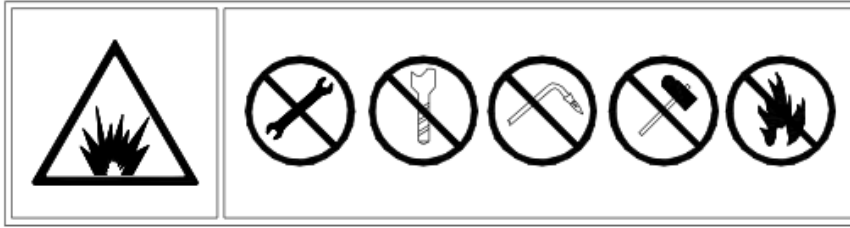


26). Emergency hammer



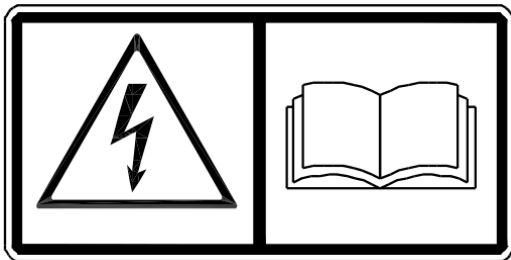
Read and remember in case of emergency situation

27). The high-pressure parts, such as Accumulator, gas spring etc., are prohibited to dismantle, drilling and cutting; and kept away from fire or high temperature.



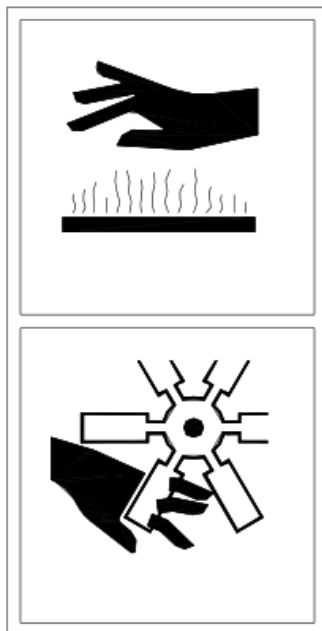
These parts contain high-pressure gas may cause physical injury.

28) .Please make reference to operation manual or related instruction.



Electronic system is prone to electric shock, please follow maintenance instruction.

29). Beware of the physical injury may caused by high-temperature parts, such as engine, radiator and muffler etc.

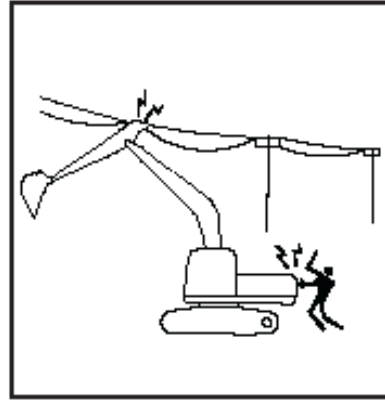


Please don't touch these parts during running. Maintenance must be waited until machine is shut down and parts temperature is lowed.

Working area safety

Learn the area you are going to work in advance. Please check following items:

1. Position of slope
2. Ditch
3. Falling or suspension object
4. Soil type (soft or hard)
5. Puddle and swamp
6. Rock and stub
7. Buried foundation, root piles or boundary of wall
8. Buried rubbish or the boundary of the fill
9. Hole, obstacle, mud or ice.
10. Traffic
11. Heavy dust, heavy smoke and thick fog
12. Learn the precise position of buried or hung electric, gas, telecom, sewage or other public pipeline. If necessary, ask the utility company to mark, shut down or move these utilities before starting working.



Warning: please contact local utility service department or company before starting working

13. Please be aware of the clearance of overhead, porch, aisle, as well as the load-bearing capacity of floor and ramp if you work inside building. Make sure adequate ventilation in the building. Inadequate preparation might harm you.
14. Please be aware of the precise distance between machine and electric telecom wire, between machine and floor. Please shut down power supply if possible. Otherwise, please ask signaler guiding



Warning: It may cause electric shock when the excavator touch or closed to the power source or power source connecting equipment , please keep the machine away from electric wires except the safety precaution has been made.

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



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

16. Prohibition of use inside the hole or underground.
17. Prohibition of use in slurry, morass and swamp
18. Prohibition of use in the area of harmful substances
19. Prohibition of use in the area of explosive substance

Safety Operation



Warning: Do not transport or lift people by excavator. Do not hoist heavy object like crane.

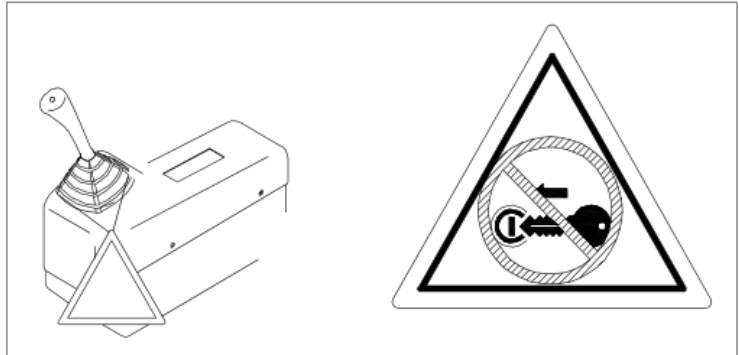


Warning: before working, please fasten safety belt, honk, and make sure there is nobody in the working zone..

1. Starting machine

A. Safety rules for engine starting

- 1) Please honk before starting engine
- 2) Don't hitch any other person on machine except for operator.
- 3) It is only allowed to operate the machine when sitting on the seat.
- 4) Please don't start engine by shout circuit starting.
- 5) Please preheat the machine in cold weather



Warning: please do not starts engine when a warning board of prohibiting is hung on joy stick.

B. After engine starting

The following items must be checked after the engine is started.

- 1) Buckle up or not
- 2) Working device, dozer device, traveling, rotating and slewing device works properly or not.
- 3) Noise, vibration, smell or instrument is normal or not
- 4) Check Engine oil or fuel leaking or not.

2. Traveling & Slewing

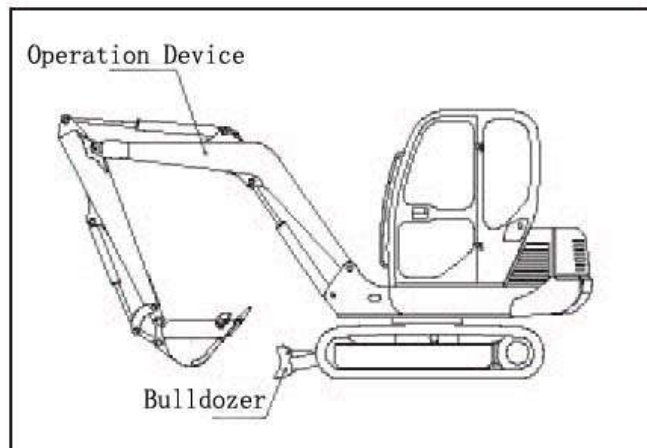
1) Please rotate excavator platform to proper position. If working device consists with the stick of forward direction, push traveling rod and move; if working device is contrary to the stick of forward direction, operation contrary.

2) Beep before traveling or rotation, and warn the people in the working zone.

3) Excavator must travel or work on the solid ground size that is 1.5 times width of itself.

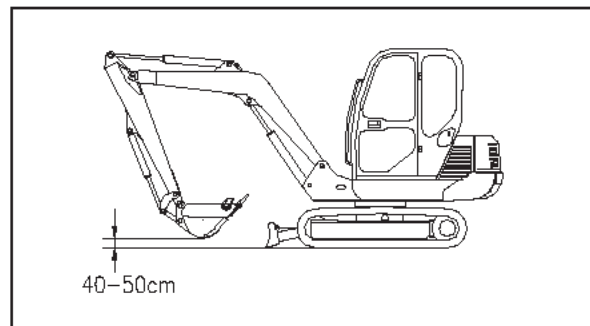
4) Please close door of cabin and lock it. Window of cabin, front window and top window is allowed to open, but they must be locked.

5) Before excavator moving back or rotating, an assistant is necessary for blind spot.



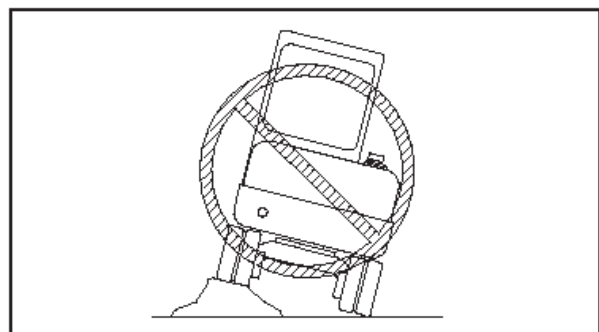
● The safety rules for traveling

1) When traveling on level surface, excavator's boom must be lowed, and arm must be drawn back and kept the best position of centre of gravity. The bottom of bucket is kept 40-50cm from ground surface.



2) When excavator traveling on rough surface, please travel on low speed and do not turn around suddenly. Otherwise, it might cause machine overturning and jeopardize personal safety.

3) Please do not drive excavator traveling on obstacle inclined to one side, it might cause machine overturning.



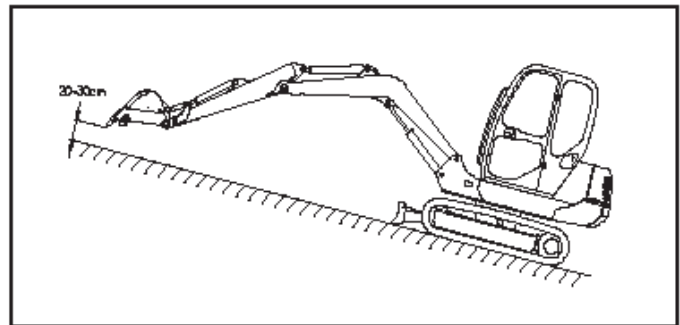
-
- 4) When driving and operating excavator, please keep distance from personnel, building and the other machines.
 - 5) When driving through underground tunnel, under bridge or under electric wires, gestures directing from outside must be ensured. And be careful to keep a safe distance from it.
 - 6) Please lock platform of excavator when going uphill or downhill.
 - 7) When driving over bridge, building or support, please ensure they can support the weight of machine
 - 8) Before driving on road, please consult your local traffic administration and get approval from them before driving on road.

3. Travel or work on slope

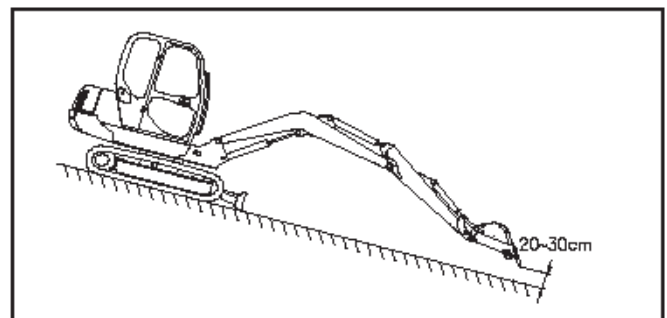
It is dangers for excavator travel or work on slope, please be especially careful.

- 1) It is recommended not to climb uphill or downhill on long slope over 20 degrees.
- 2) Please ensure buckle up when working on danger zone of uphill or downhill.

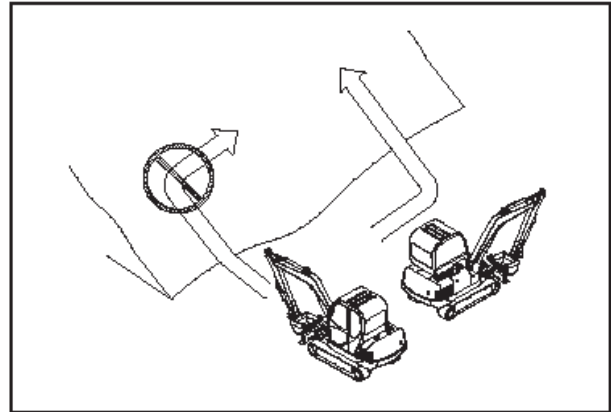
- 3) When excavator is uphill, the driving wheel should be in the downhill direction; and keep boom and arm extending out in the parallel with the slope. At the same time, keep the bucket teeth 20~30 cm away from the ground; locking the platform, driving at turtle speed..



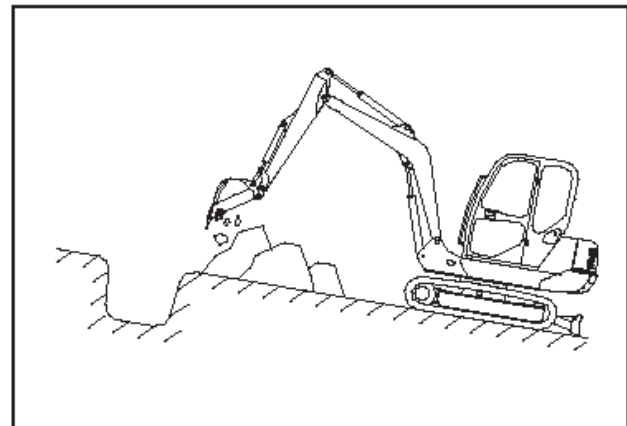
- 4) When excavator is downhill, the driving wheel should be in the uphill direction; and keep boom and arm extending out in the parallel with the slope. At the same time, keep the bucket teeth 20~30 cm away from the ground; locking the platform, driving at turtle speed. CM off the ground..




- 5) Do not change directions or cross slopes sideways.



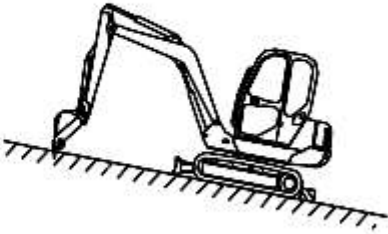
- 6) When excavator works on slope, it must be started from the height and gradually dig to downhill. The unloading position is in the direction of uphill.



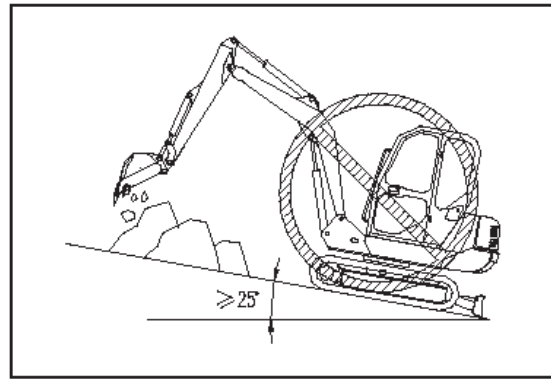
- 7) Please driving excavator on low speed when traveling on meadow, dead leaves or wet steel plate. The excavator might slip even in the case of small gradient.
- 8) It is forbidden to turn excavator sharply when going uphill or downhill, otherwise the machine will tip over.
- 9) When stop the machine on the slopes, please make sure the dozer has been inserted into the earth, as well as the bucket. and it's no allow to stop the engine if the machine is not safe standing on the slopes.

 **Dangerous**

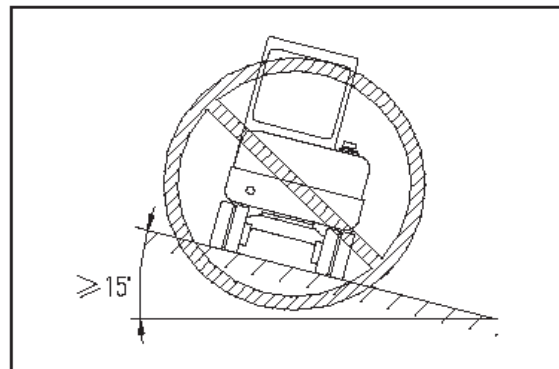
It is very dangerous to stop the machine on the slope, if have to do that, please do as follows:
If the engine shunt down on the slope, please put the bucket and dozer blade onto ground, put all joysticks in neutral position, then start the engine again. Even just stop on the slope shortly, you also need to place the bucket and the dozer blade on the ground and put all joysticks in neutral position. And put a block at the rear of tracks.



10) It is forbidden to travel or work on slope with a longitudinal gradient greater than 25 degrees



11) It is forbidden to walk or work on slopes with a lateral gradient greater than 15 degrees

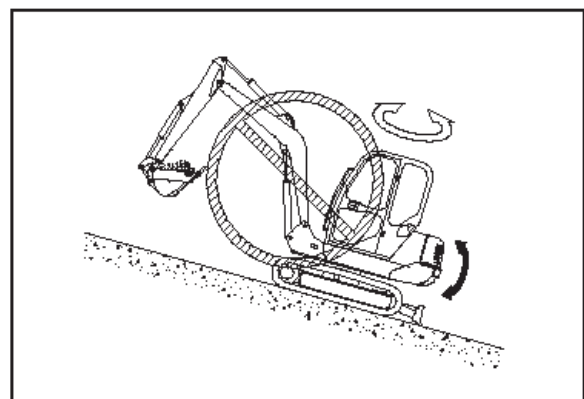


12) Please keep the excavator balance, and it is forbidden to travel on rock or obstacles.

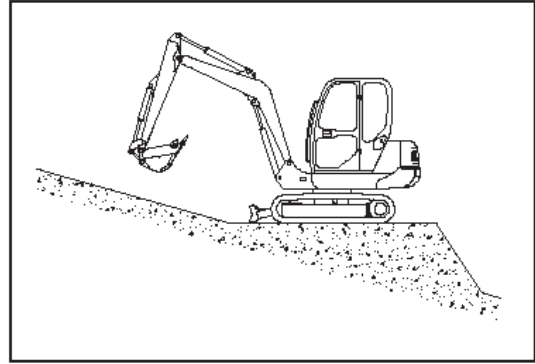
13) It is forbidden to change direction on slope

14) When climbing uphill, make sure that the engine and hydraulic oil are properly warmed up, otherwise it may cause accidents.

15) Please do not turn from upslope to down slope side when the machine is full load, it will cause tip-over.



16) When working on a slope, the machine might lose its balance and tip over during operating the swing or working device. This can cause serious injury or damage to the equipment. Therefore, it is necessary to use a pile of earth to build a solid platform that will keep the machine when during these operations.



4. Safety excavating work

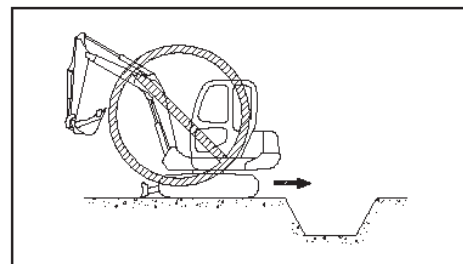


Warning: the operator must remember the fountains of each operating handles to avoid the wrong operation.



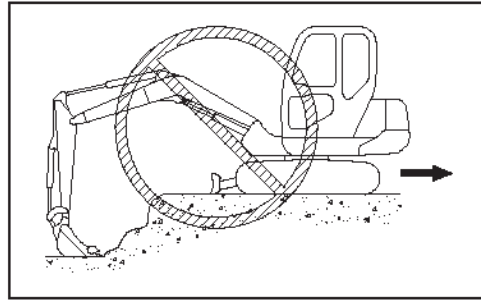
Warning: Wrong operation will make machine overturn, learn this section will help you to keep personal security

- 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.

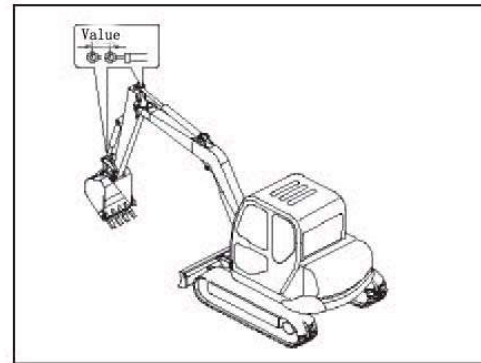


- 6) When the bucket has the special resistance, do not allow to drive or rotate. Otherwise, the machine will be broken.

7) Please move the machine to the place which is a right-angle of berme or cliff and keep the driving wheel at rear direction, this can help you to escape from dangerous situation.



8) Please don't operate the hydraulic cylinders to the end-point of the piston during operation, this will reduce the using life of the machine, keep a small distance of the piston for each operation.



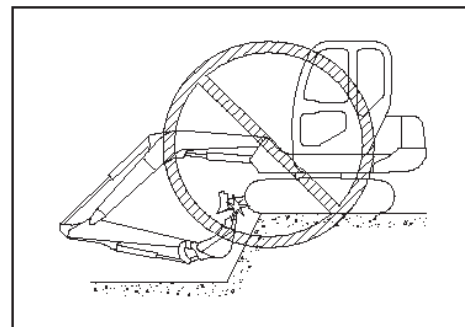
9).When the machine digs deep, it needs to avoid the hoses at bottom of the boom or bucket cylinder touch the ground.

10)To avoid the boom, arm, bucket, and cabin (canopy) collide with any nonego .

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

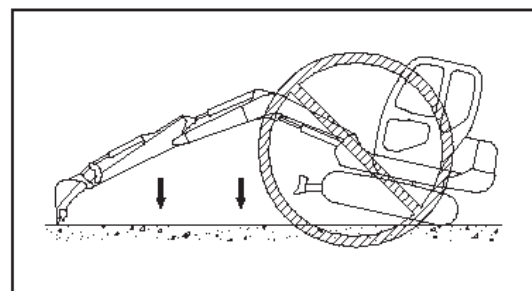
12)Don't stop operating suddenly during descending the boom to avoid machine damage.

13) Do not dig to the machine body.

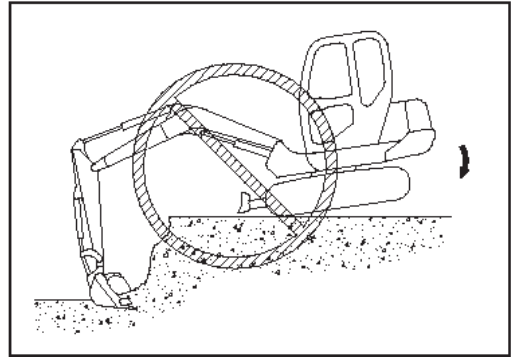


14)Don't dig too deep at front of the machine, it may cause the ground collapsing and machine falling .

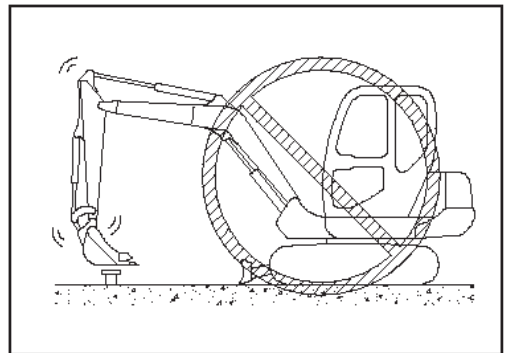
15) Don't dig when the crawlers leave the ground, otherwise the machine and the frame will be broken.



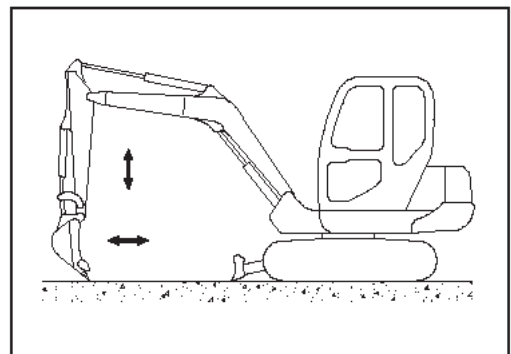
16) Do not use the deadweight of the machine to increase the digging power.



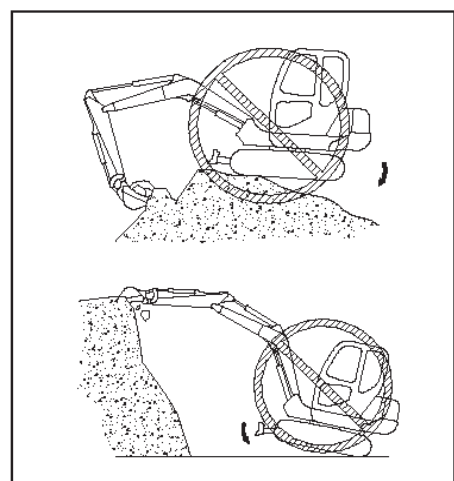
17) Do not use the falling power of the bucket as the handle, the knapper or the pile driver. It will make the back of the machine bear over-weight.



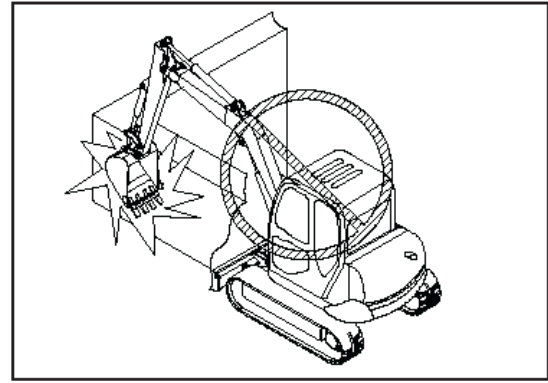
18) Do not use the bucket to dig the road surface more. Otherwise the parts will be overload and broken.



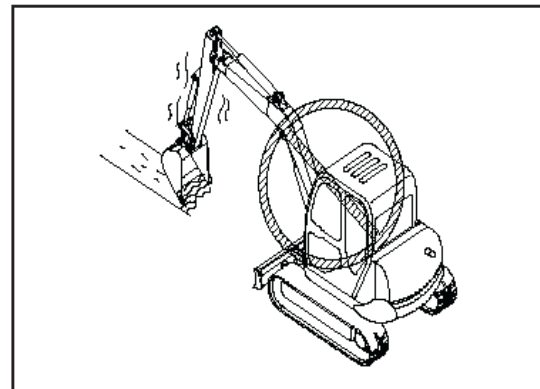
19) Do not use the falling power of the machine. Otherwise the machine will be broken.



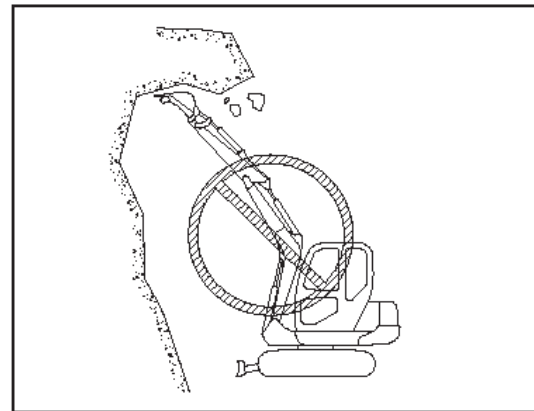
20) Do not use the power of rotating to press the soil or destroy the rideau and the wall. When the machine rotates, do not insert the teeth of the bucket into the soil.



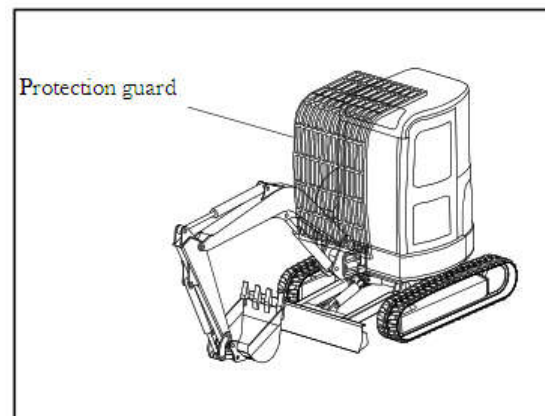
21) Do not make the bucket into the soil to use the driving power to dig. It makes the back of the machine bear overweight.



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



23) Protection guard is requested if the operating site have the danger of falling objects or splashing objects.



24) Operating on soft ground or swampland is prohibited.

25) Don't use the excavator to draw objects.

26) Don't use the excavator to lift objects.

27) Don't make demolition operations under the machine.

28) Please check the strength before operated on the top of building or other structure.

29) Don't break by the impacting force of the working device.

30) It is prohibited to use the dozer blade to increase the stability of the machine during operation.

5. Operating in snowy day


1) Don't operate the control stick suddenly in snowy day, otherwise the machine could be overturned, because the freezing surface is slippery, especially working on slop.

2) The freezing surface will became soft as temperatures rise, the machine could be overturned under this situation.

3) The machine could be overturned or buried when travel into deep snow, don't leave the road shoulder.

4) When cleaning the snow, the road shoulder and the objects which was buried in snow is invisible, machine could be overturned or buried, so be careful during operation.

6. Prevent overturning、sliding and the solution

	<p>Warning: 1) If it needs to swerve on the slope, it can only swerve with big radian. When the machine turns right, turn the lever of the boom to left. When the distance to the ground is about 30cm, lock the platform.</p> <p>2) When the machine slips, it needs to press the bulldozer and the bucket to the ground.</p> <p>3) When the machine dumpages, the operator must fist the handrail or the pillar of the cab, do not jump off.</p>
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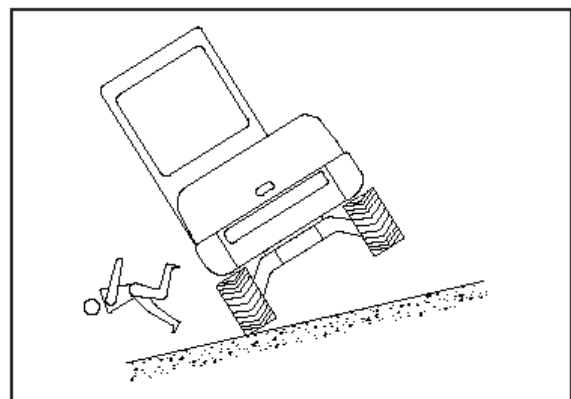
Following, the machine is easily to overturn:

1) The machine moves on the uneven road, when the one of crawlers is higher than another side low or one of crawlers hangs.

2) One of the crawlers touches the soft soil, another touches the hard soil.

3) One side of the machine is on the limestone cave or the slime.

4) The machine operates on the slope



-
- which the portrait gradients more than 250, the thing towards the downgrade.
- 5) The machine operates on the slope which the landscape orientation gradient is more than 15°, the thing is towards the downgrade.
 - 6) On the slope, it is 90° between the two crawlers and the gradient, the rotating platform is more than 90°.
 - 7) The machine operates on the slope, it swerves, the platform rotates fast or stops unexpected.
 - 8) When the machine turns down about 180°.
 - 9) It is the uneven road for the back operation
 - 10) The machine digs the underside of the machine when it deeply digs.
 - 11) The machine moves on the frost road.
 - 12) The two crawlers are with the oil or the lube.

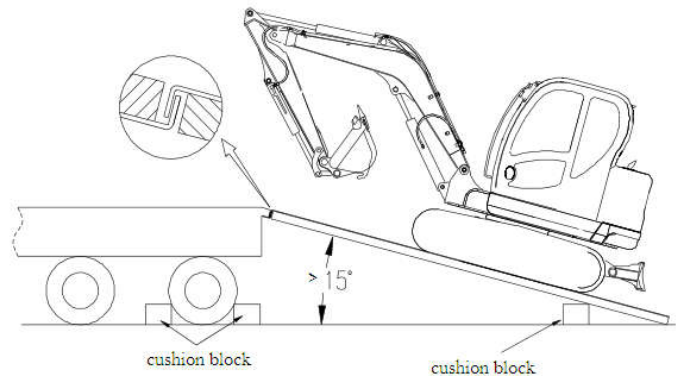
7. Stop the machine

See it at the chapter of machine parking.

Transport, Load and Unload

Transporting (unloading) the excavator must obey the safety rules strictly:

- When the excavator transported, it must obey the safety transport rules of the country (local) trade or the good habit.
- When the excavator transported, the cab can't hitch anybody or anything.
- When the excavator loaded & unloaded, there can't be anything or anybody within the moving radii area of the sling.
- When the excavator loaded & unloaded, there can't be anybody or anything within the traveling area of the loaded & unloaded excavator.
- Except using the sling or drives it from the port, it can use two laths which are strong enough to put in the transporter. The gradient of the laths should be less than 15° , The length of the gradient is 3.5 times of the height. The width of the lath is 1.2-1.5times of the crawlers.
- Do not put down the orientation handle to avoid the platform rotates when it is up or down the slide.
- When the machine drives up or down the slide, do not operate any handle except for the driving handle.
- The machine should be unloaded on the smooth road.
- There should be the flags、lights、warning signs when the machine drives on the road. And make sure the other people can see them. Make sure the car after it can see the sign of "Drive slowly".
- The machines with crawlers may destroy the road. Please use truck to transport.



Repair



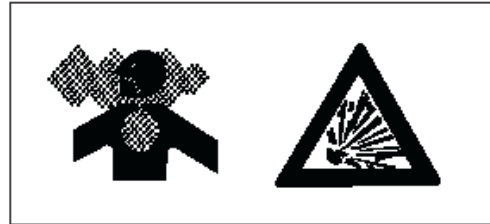
Warning: Please handing “No operation” sign on the operation handle during repair.

- 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.

Prevent fire, blast and poisoning

- When the excavator transported , driving、 digging, it shouldn't touch the wire. Otherwise, it causes the casualty.
- The wiring and the line needs to check frequently. If it finds the broken、 aging part, it must be replaced to avoid the fire.
- Keep the line linker clean and fix it firmly. Check the line everyday.
- Do not put the thing which is flammability or explosive into the excavator.
- Do stop the engine when it oils, and keep away from the fire and do not leave the machine.
- When it is oiling , the fuel can't overflow to the surface which is super heated or the parts of the electric system.
- After oiling, do clean the fuel or machine oil which overflow, and screw down the cover of the fuel or the machine oil.
- Clean out the slip、 spill、 lamina and other flammability thing which is in the engine、 the vent-pipe、 the muffler、 the engine room.
- Do not put the dishcloth which is with the oil into the cab.
- There should be fire extinguisher in the cab, and put it on the place where can be easily to take from.
- When the machine is welded, do segregate the pipeline of the hydraulic oil and the fuel.
- Do avoid the fire caused by the hydraulic pipeline. Check all the soft pipe and the fastener、 the cover、 the block whether they fixed firmly.
- Accumulator should be far away from the fire. Do avoid the high temperature. Otherwise it will explode.
- The excavator with cabin should be checked with the sealed center clapboard. Do avoid the exhaust gas into the cab to cause the operator poison.

- Do not operate the machine on the area where the airiness system is not good.
- When the fire happens, do not use the water to put out the fire. Should use the powder extinguisher or the sand, or use the slipcover.

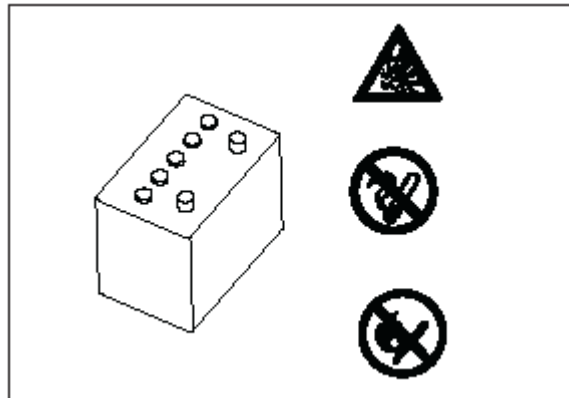


Battery

Safety rules of the Battery

The electrolyte of the Battery 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 Battery is lower than the “low level” line, do not use the Battery.
- Do wear the safety glass and the rubber glove when operate the Battery.
- Do not smoke or fire near the Battery.
- 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 Battery, it should turn the key to “OFF”.
- Do stop the starting system when use the electric torch to check the electrolyte of the Battery.
- The end of the sealed Battery dilates, it show the Battery freezing. When the Battery freezing, do not electricize or connect the starting engine. The temperature should be less than 15°C when heat up the freezing Battery. Otherwise it explodes.



Explosion-proof of the Battery



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

- 1) Before cutting off the cable of the Battery, do cut the cathode cable first.**
- 2) Before connecting the cable, do connect the cathode cable first.**
- 3) Don't use the metal element to connect the port of the Battery.**
- 4) Don't weld、grind、smoke near the Battery.**

Because it has danger of spark, do as follow:

- Please fix the Battery to the right place.
- The tool or other metal can't touch the port of the Battery. Do not fall the tool or other metal near it
- Connect or cut off the sign of the Battery follow the right order. The port of

the Battery should fix fast.

- When the Battery electricized, it produces flammability hydrogen. So before electricized, it should unload the Battery from the machine, and put it to the draughty place and remove the cover.
- Screw down the cover of the Battery.

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

Hydraulic System

1. Safety rules 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 the bolt is loose, stop the machine, and screw it down. Do not weld the machine when the hydraulic oil pipeline (soft pipe) is not separate. If the soft pipe is broken, do stop operate, and contact us.

If any problems as follow happen, do replace the soft pipe:

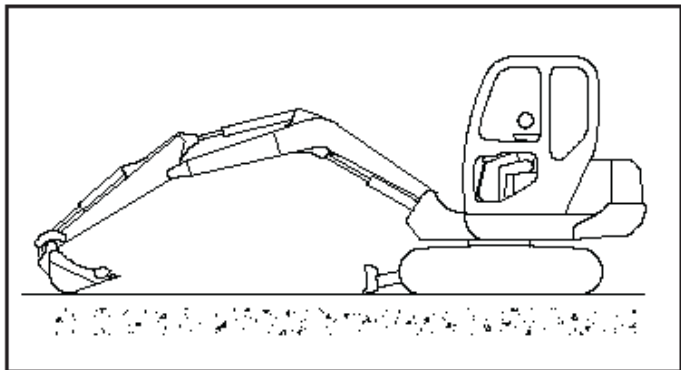
- 1) The tie-in of hydraulic pipe leaks or is destroyed.
- 2) The envelope is broken or apart, or the steel wire of the reinforcement is out.
- 3) Some parts of the envelope dilate.
- 4) The mobile parts contort.
- 5) The envelope has impurities.

3. Safety rules of the high-temperature oil

The hydraulic oil which is cooling on working or after working is high-temperature and high-pressure. Do avoid the oil squirting or touching the hot parts. Before operating, the oil should be cooling. Do loosen the cover or staff before unload them even if the oil has been cooling.

4. Release the pressure of the hydraulic system

The excavator just stops working, the hydraulic oil of the hydraulic pipeline is in the state of high-temperature and high-pressure. When take down the nozzle, the oil may squirt. So do turn the cover of the nozzle before take down it to release the pressure.



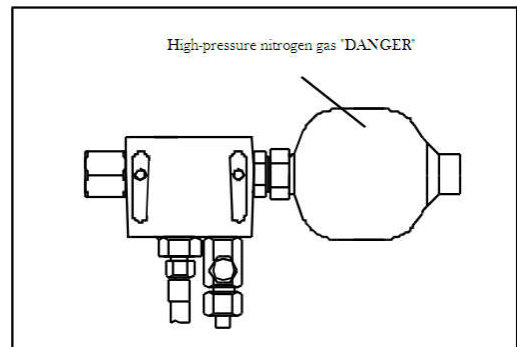
- 1) If the working equipment doesn't locate the state as the picture, it needs to start the engine and runs slowly, hold out the bucket cylinder, draw back the arm cylinder. Then put down the bucket and the bulldozer on the ground, stop the engine.
- 2) Within 15 seconds after stop the engine, turn the switch to "ON" and operates the joy stick to all directions (working equipment、driving) to release the pressure.

5. Safety operation of the Accumulator



Warning: Warning: The Accumulator is the part which is full of the high-pressure nitrogen gas. Using wrongly will lead to explode. Do not take-down the Battery, no drilling and welding. Do not close to the fire. Avoid collision and impact. It should be managed by professional person.

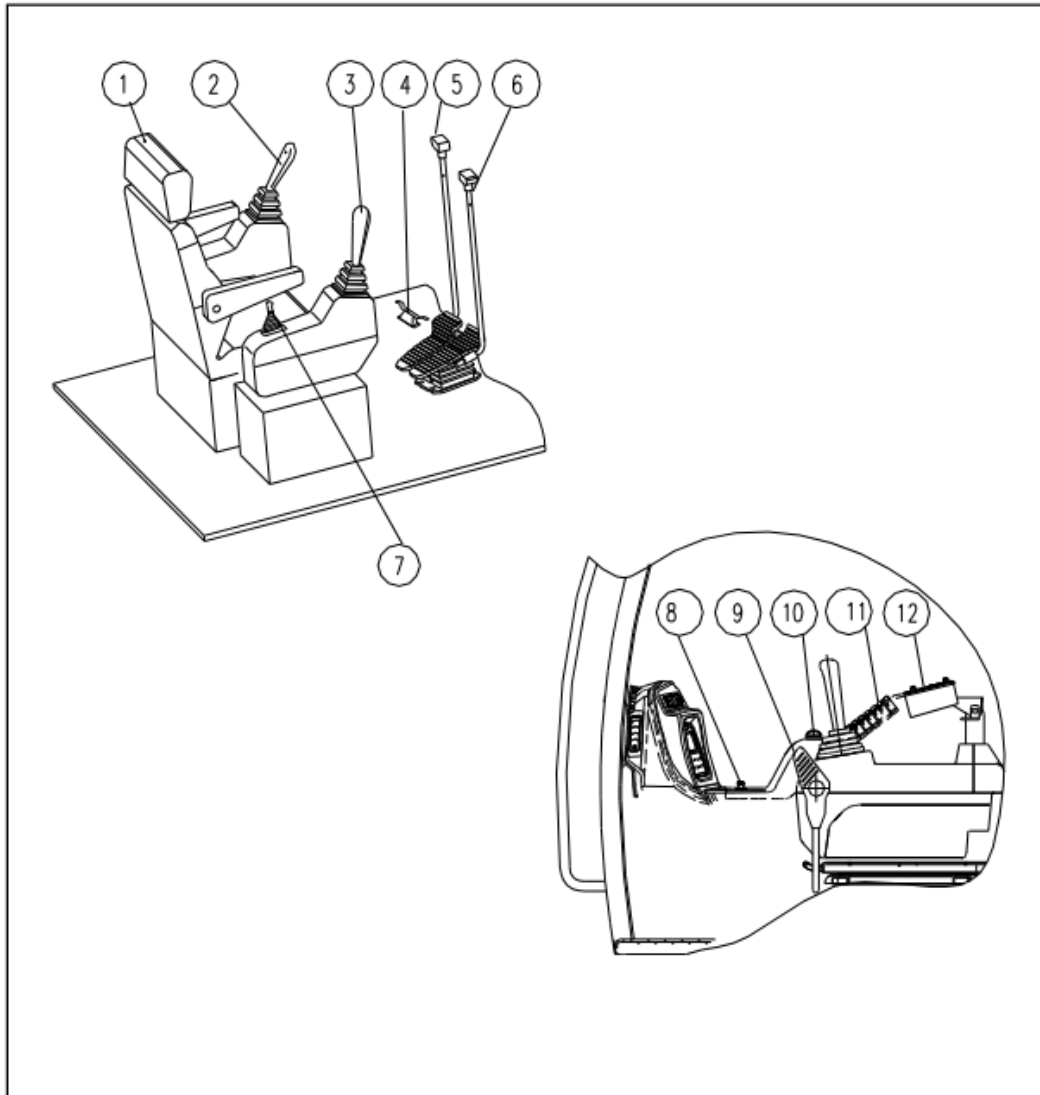
The machine is installed Accumulator in the control pipeline. It is a device which stores the pressure. It can operate the control pipeline for a short time after the engine stops. Operating the joy stick can put down the working equipment by the deadweight.



Releasing pressure methods of hydraulic pipes for the excavator which is with accumulator:

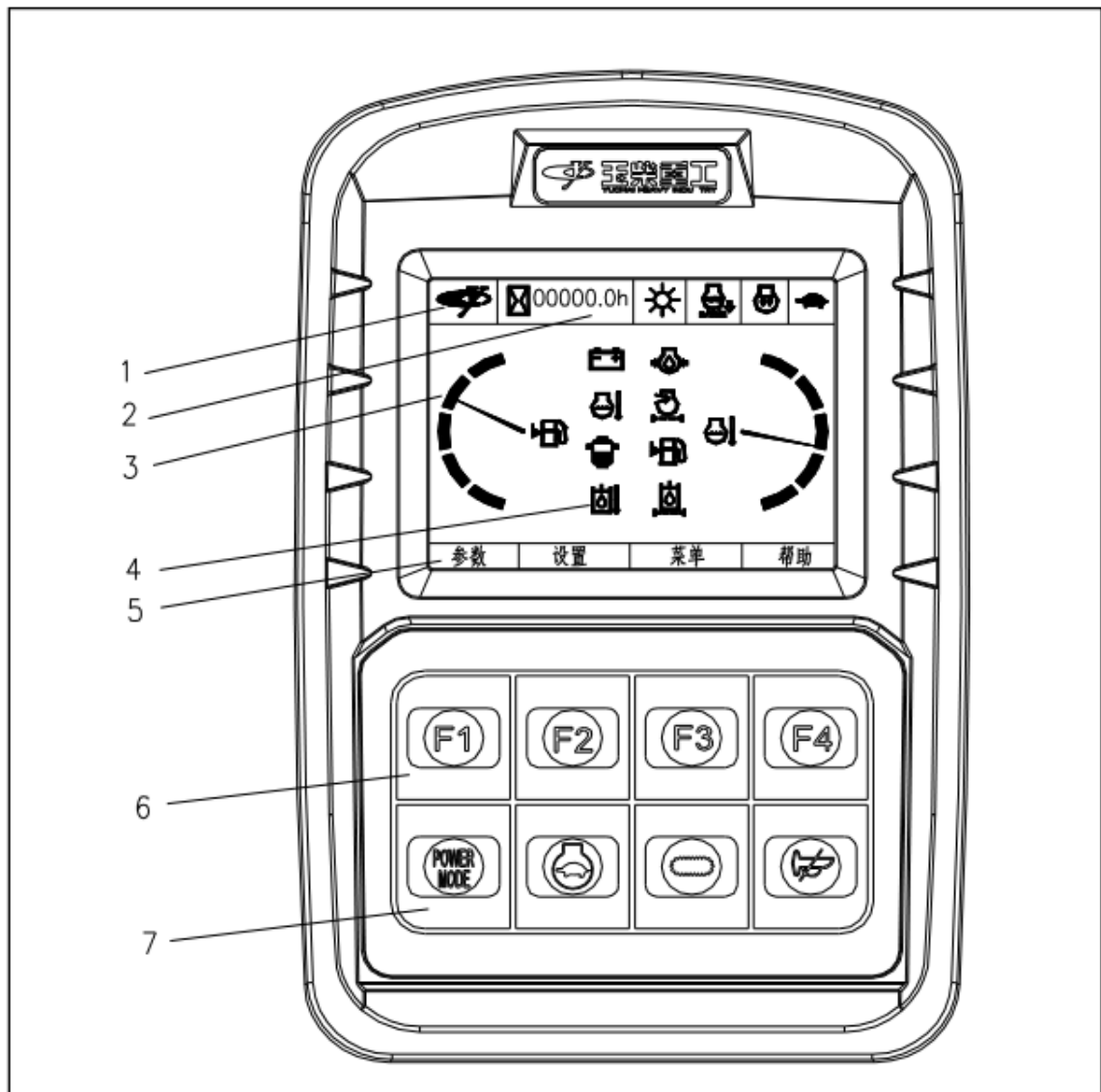
- 1) Put down the working equipment to the ground, and stop the rock breaker or other attachments.
- 2) Stop the engine.
- 3) Turn the start key to "ON" to make the current of the circuit moves.
- 4) Turn the safety lock joy stick to the free place, driving the joy stick of the working equipment to front、back、left、right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

Description of operation device



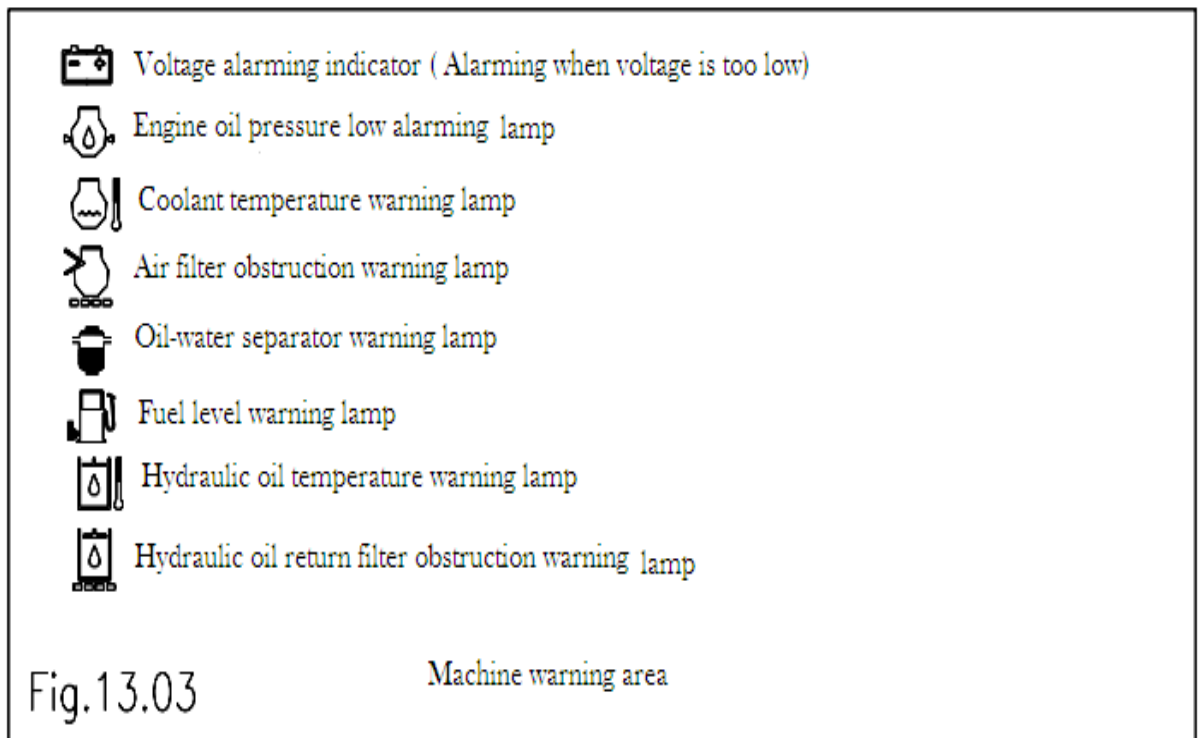
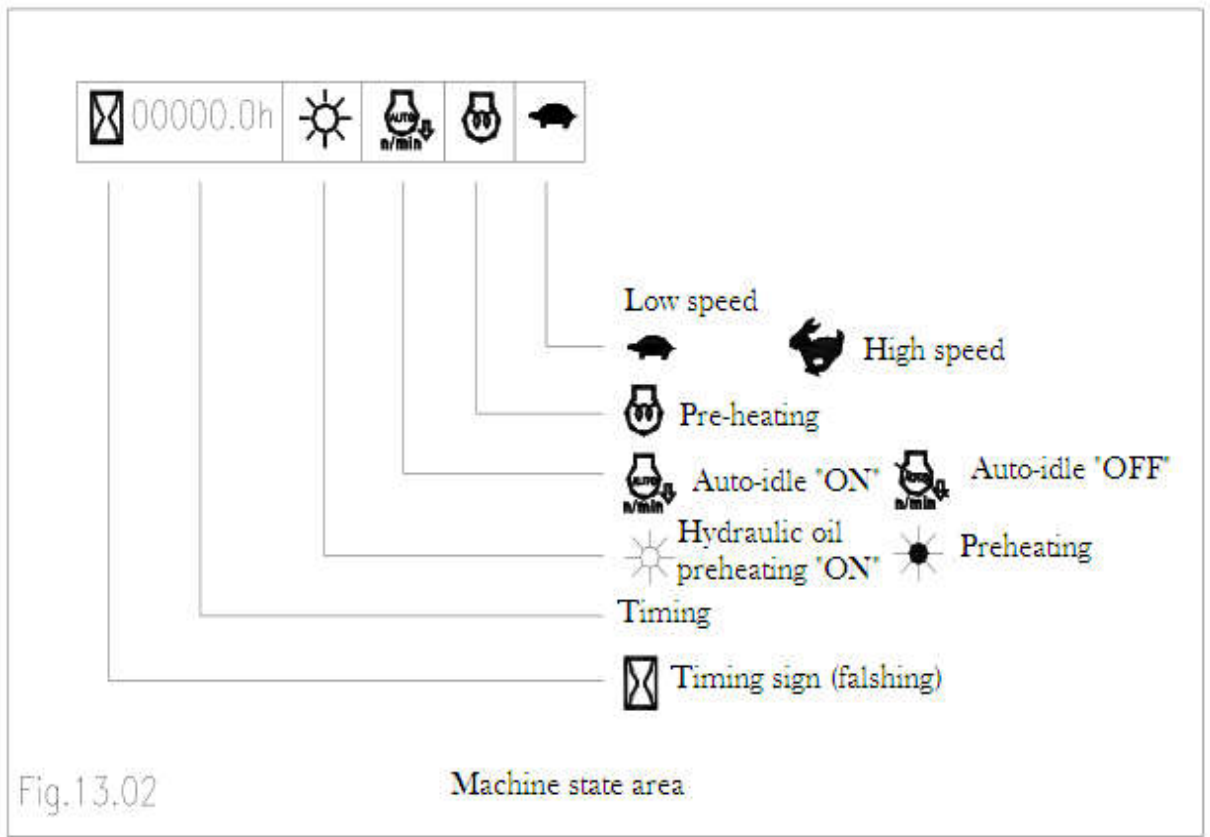
- | | |
|-------------------------------|-------------------------|
| 1. Operator Seat | 7. Dozer control lever |
| 2. Left joy stick | 8. Cigar lighter |
| 3. Right joy stick | 9. Safety locking valve |
| 4. Accessories control pedal | 10. Manual throttle |
| 5. Left travel control lever | 11. Switches panel |
| 6. Right travel control lever | 12. Radio |

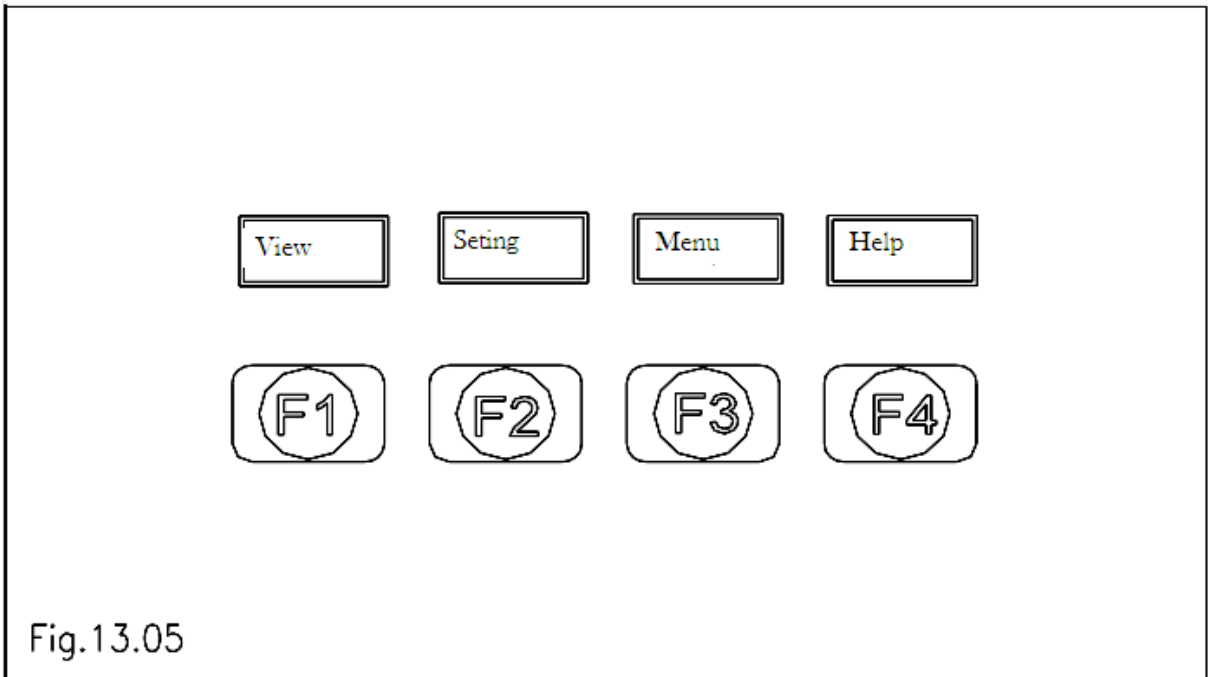
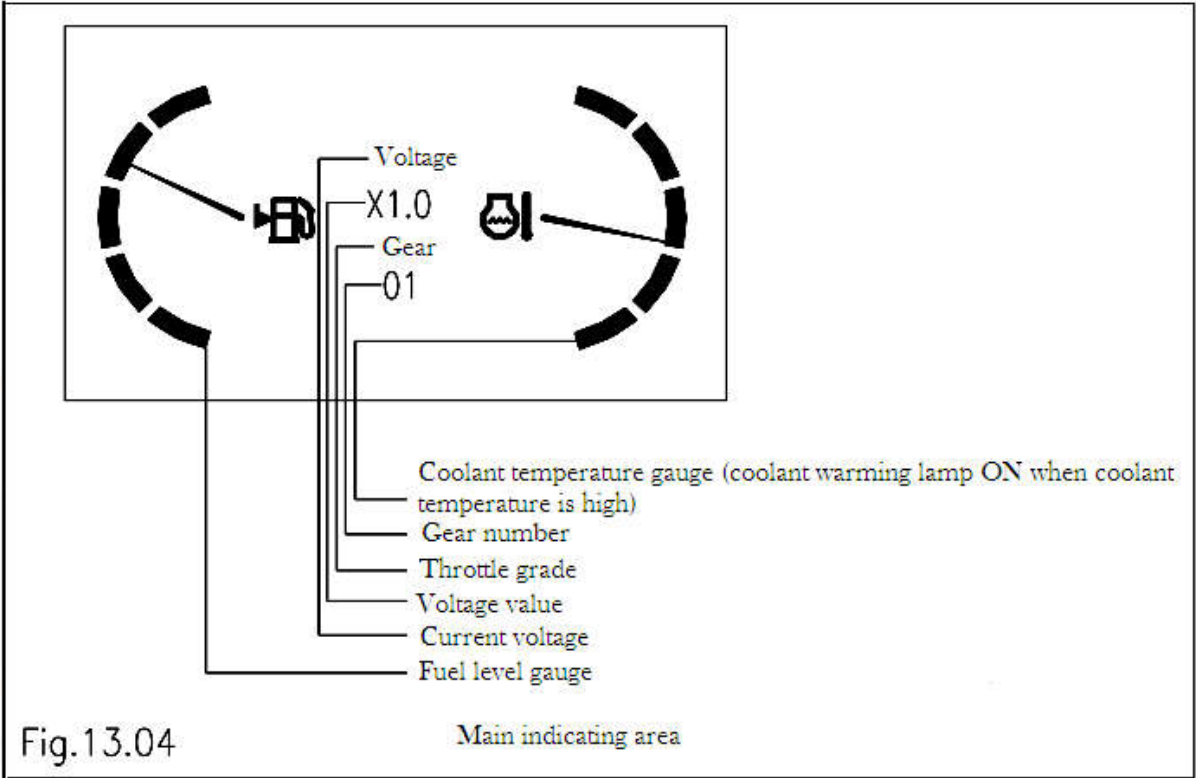
Instrument

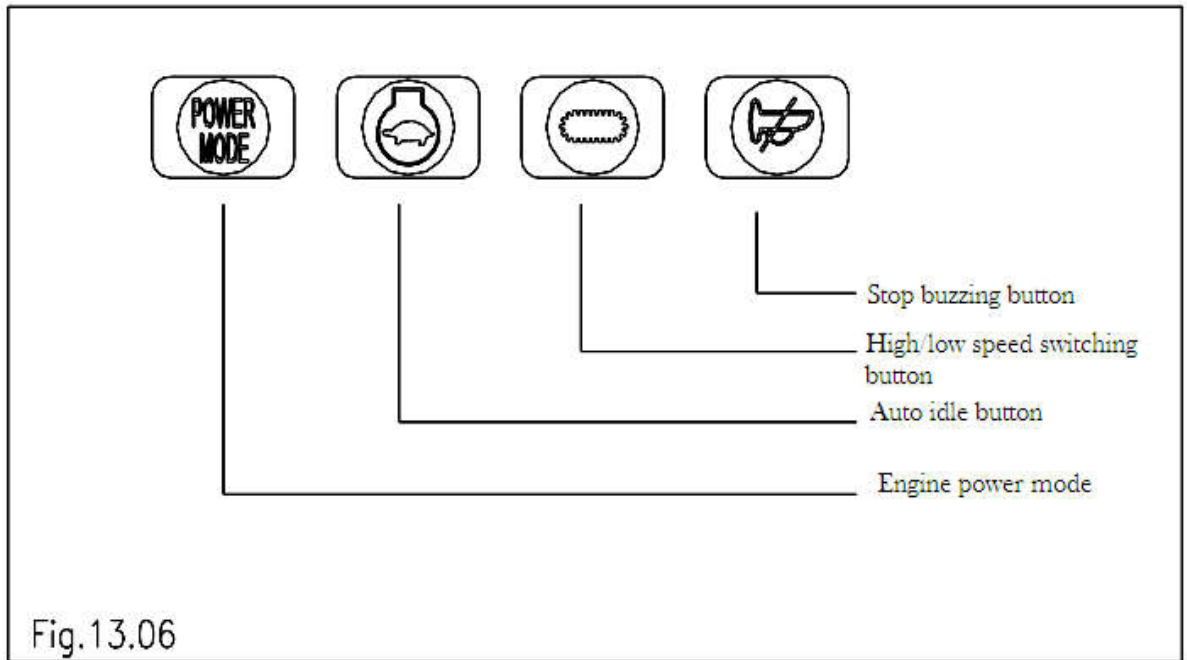


1. Brand name
2. Hour meter
3. Main indicating Area
4. Alarm indicating area
5. Softkey
6. Push buttons
7. Fountain button

A. Instrument Display



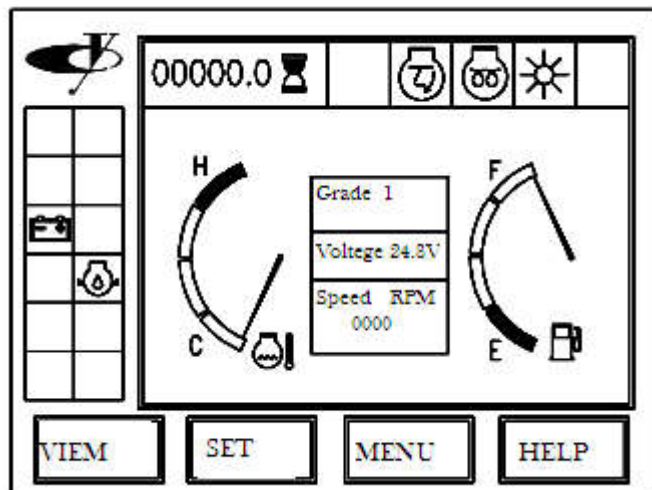




Function selecting buttons and Alarm indicating lamps

You can select functions as the indicating on Machine state area.
 Alarming lamp will indicate in red if machine have alarm

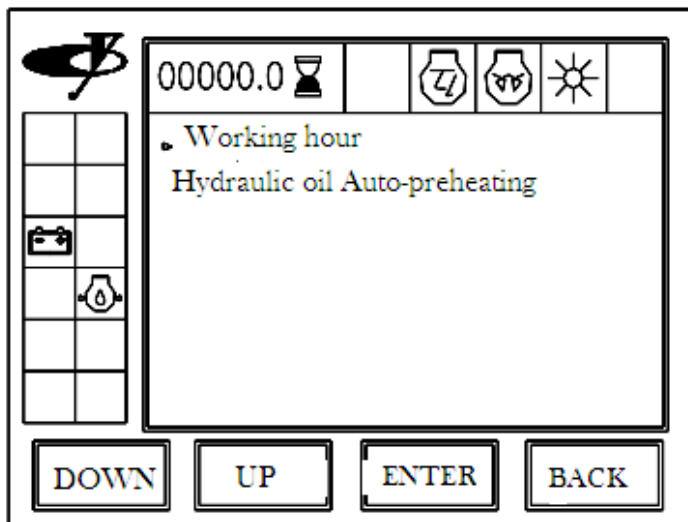
B. Instrument indications during operation



Instrument indicating as above after turn on, Voltage alarming lamp and Engine oil pressure alarming lamp will disappear after started the engine.

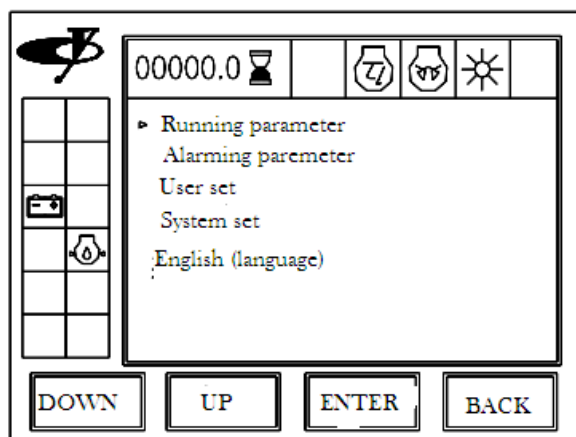
Engine oil pressure	0700	KPa
Fule level	100	%
Engine speed	1015	RPM
Coolant tampareture	040	°C
Hydraulic oil tampareture	025	°C
Working hour	00000.0	h
Stage time	0000.0	h

Press “VIEM” button can see running data



Click “SET”, Click “DOWN” or “UP” to choose the menu which you want, click “ENTER” to change.

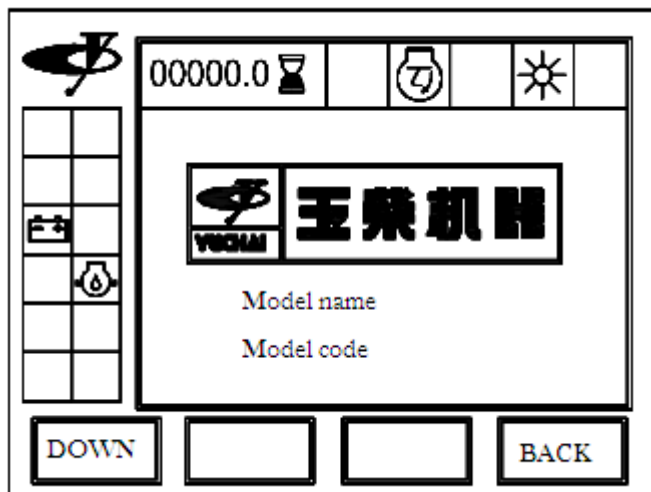
1. Working hour / Stage time
2. Hydraulic oil auto-preheating function turn on or off, the Hydraulic oil auto-preheating sign will not show on the instrument when it is off.



1. "User set" is for password reset and clean stage time.
2. "System set" is for factory setting.

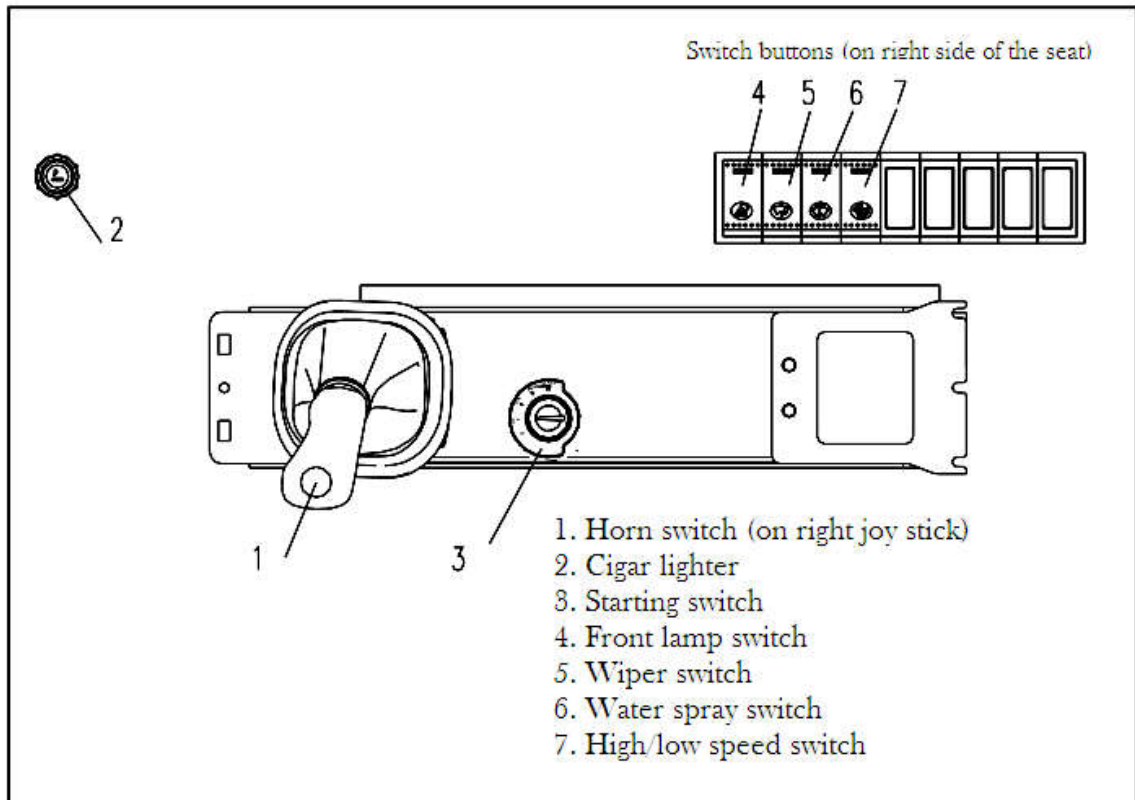
Engine oil pressure alarm	100	KPa
Fuel level alarm	015	%
Coolant temperature alarm	103	°C
Hydraulic oil temperature alarm	090	°C
High voltage alarm	28.6	V
Low voltage alarm	26.1	V
Fly wheel set	130	

Alarming parameters are set by factory



Click "HELP" to see Model name and Model, and click "DOWN" to check the version no. of hardware and software of Controller

Right control box switch panel



1. Horn

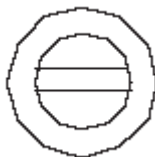
The horn will sound while you push it.



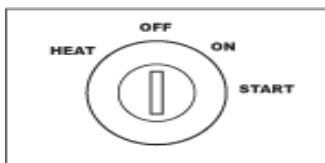
2. Cigar lighter

Directly connect the Cigar lighter, or use the cable of cigar lighter to supply the power for the other electrical equipment.

Notice: current capacity less 10A



3. Starting switch



OFF Position:

Insert or pull out the key, the machine is no power in this position, the engine is stop.

ON Position:

Keep the key in ON position when the engine is running

Start Position:

Turn the key to Start position to start the engine, and keep the key in this position while starting, and release the key immediately after started, it will back to "ON" position.

Heat Position:

Turn the key to "HEAT" position for preheating in winter, the Preheating lamp is flashing when the key in "HEAT" position. Release the key after preheated and it will back to "ON" position, turn to "START" position to start the engine.



4. **Working lamps switch**

Switch for boom lamp and front lamp on top the cab.

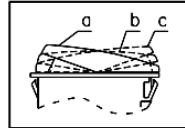


5. **Wiper switch**

"a" OFF

"b" ON (wiper moving in low speed)

"c" ON (wiper moving in high speed)



6. **Front window washing switch**



7. **High/Low speed switch**



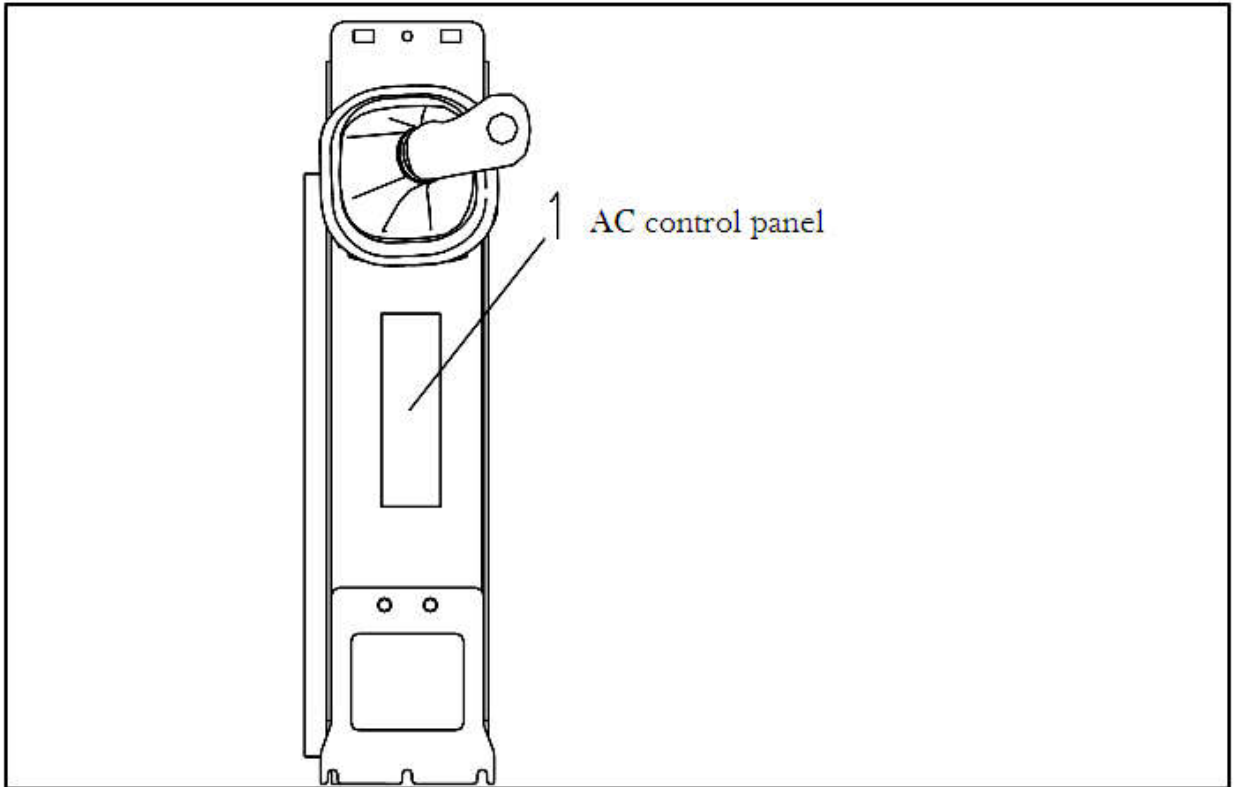
8. **Taillight switch (Accessories)**



When the start key is in ON position, each switch will control the Taillight on the roof ON/OFF.

Attention: Do not turn on all of lamps at the same time.

Left control box switch panel



AC control panel (see AC control section)

Safety Lock Lever

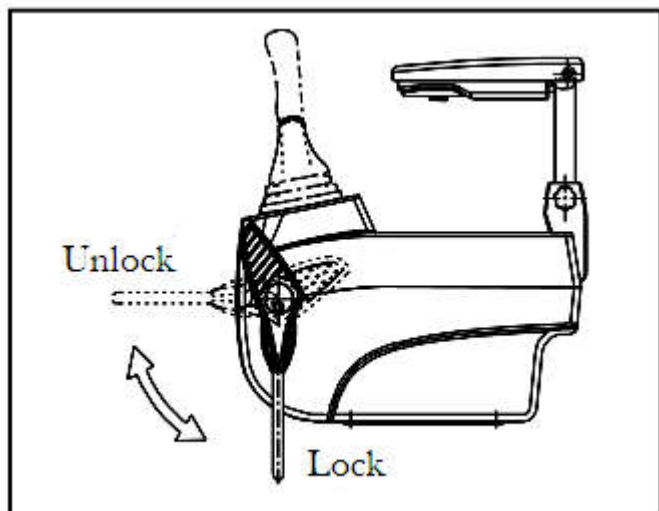
1. Safety lock lever



Warning: The Safety lock lever is an important part of the machine security system. Put the safety lever lock in lock position before you leave. If the system haven't been locked, the joy stick could be moved and make the movement of working device or platform, and causing accidents.

LOCK: Turn the safety lock lever to vertical position with the control box, no hydraulic oil supplying from pilot system when the safety lock lever in lock position, working device and the platform are not work.

UNLOCK: Turn the safety lock lever to horizontal position with the control box, pilot system and the hydraulic oil system will be connected, machine can work normally.



Operation of working device and slewing part

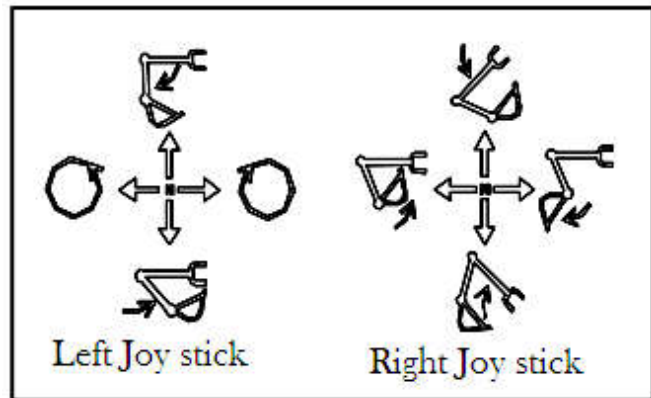
1. Digging and Platform swing Control (Without Boom Swing)

Control by right/left joy stick, as show in right figure

A. Left Joy stick

Digging arm movement: Push forward to extend the arm; Push backward to draw back the arm.

Platform Swinging movement: Push the Joy stick to left, platform will slew to left side, push the Joy stick to right, platform will slew to right side.



B. Right Joy stick

Boom movement: Push forward to lower the boom; Push backward to rise the boom.

Bucket movement: Push to right, bucket extend out; Push to left, bucket draw back.

2. Digging and Platform swing (With swing head)

A. Left joy stick

Digging arm movement: Push forward to extend the arm; Push backward to draw back the arm.

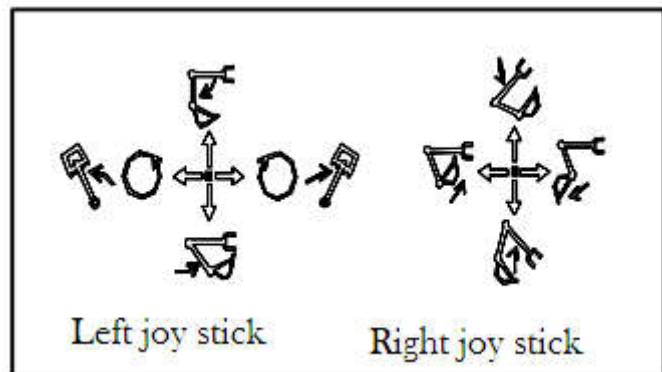
Platform slewing movement: Push the Joy stick to left, platform will slew to left side, push the Joy stick to right, platform will slew to right side.

Boom Swing movement: Push the Joy stick to left, the boom will swing to left, push the joy stick to right, the boom will swing to right.

B. Right joy stick

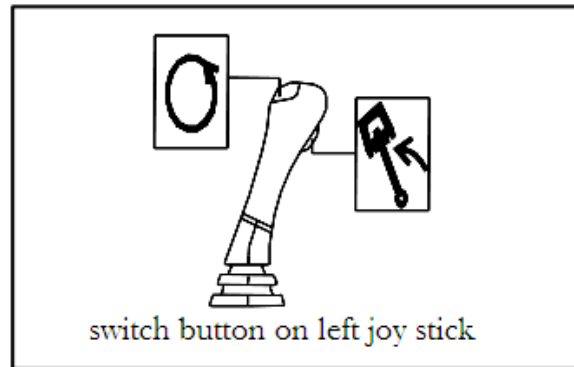
Boom movement: Push forward to lower the boom; Push backward to rise the boom.

Bucket movement: Push to right, bucket extend out; Push to left, bucket draw back.



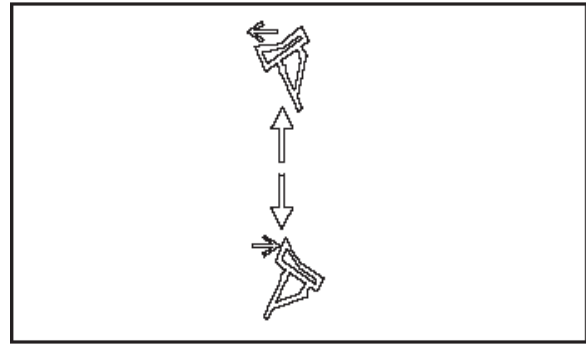
●**Platform slewing and boom swing Selector and control**

Press the button on left joy stick to switch the function of boom swing and platform slewing. It is platform slewing function in normal condition, press the button switch to boom swing function.



3. Blade control Lever

Push the lever down, the blade lower;
Pull the lever up, blade lift.



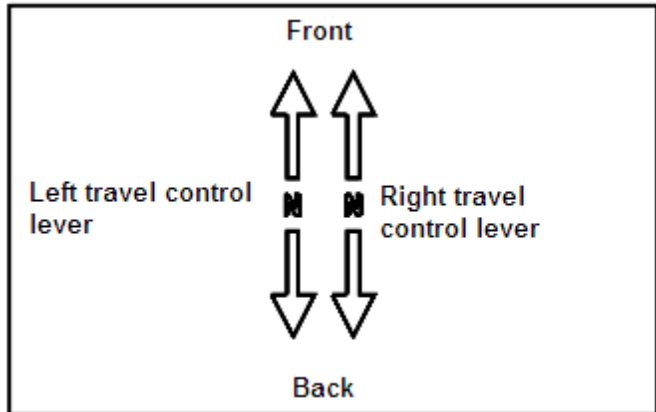
4.Operation of accessories.

Use the pilot pedal to control the accessories if the machine with some other accessories.

Travelling Operation

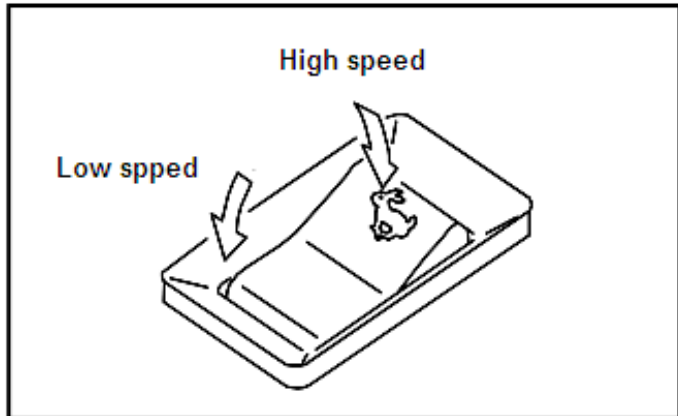
1. Directional Control

The left and right lever control the left/right rubber crawler
Push one side lever to make one-sided steering of the machine



2. Speed Control

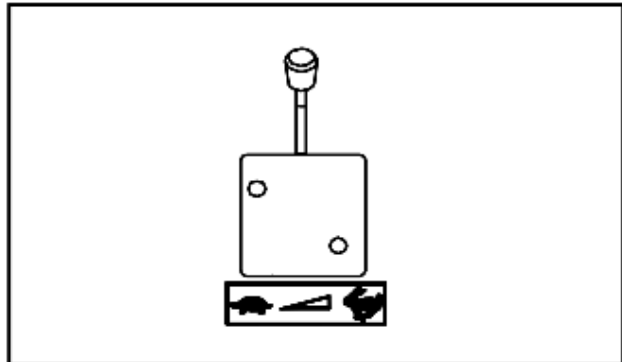
Press this switch to change between low speed and high speed



Manual Throttle and Electric throttle

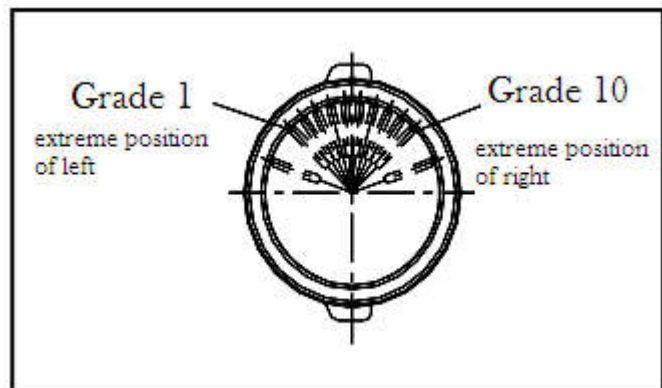
1. Manual throttle

Push the lever backward to accelerate, push the lever forward to extreme position before the engine stop.



2. Electric throttle

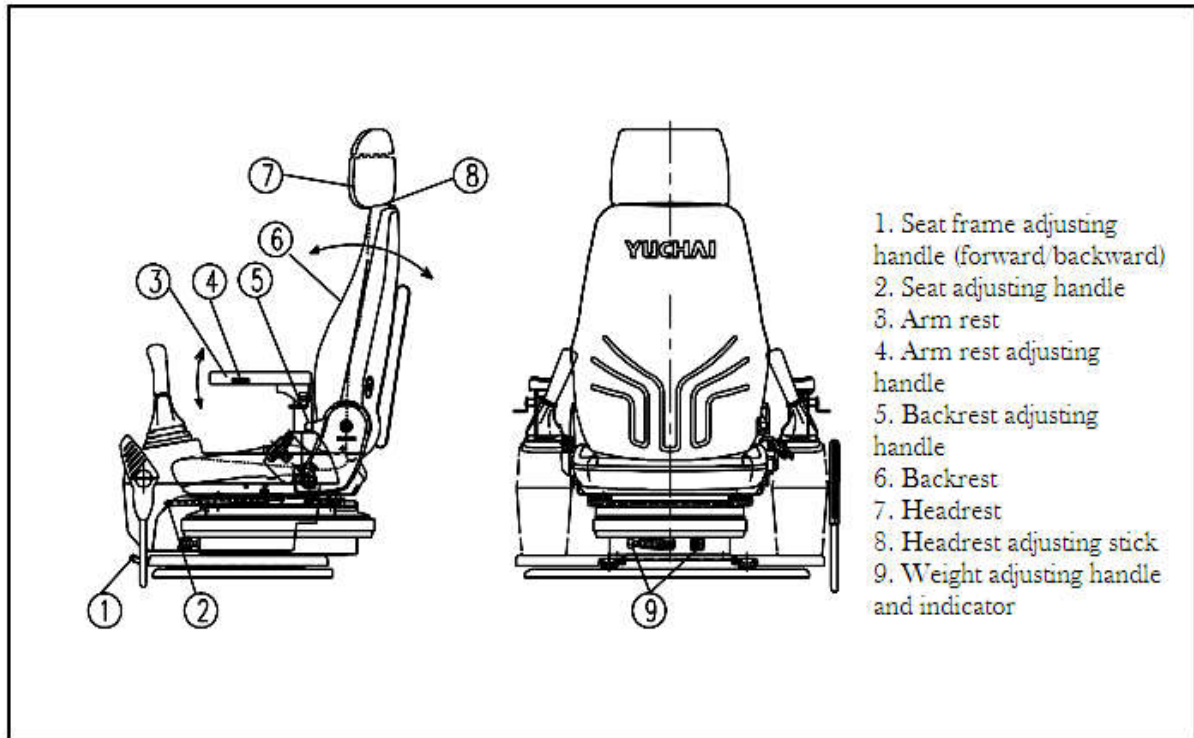
Turn the throttle knob to right to accelerate, push the knob to left to extreme position before the engine stop.



Operator Seat



Warning: The accidental tipping or abrupt movement of a machine may cause injury or death, remember to fasten seat belts and adjust seats before the machine starts for safety.



● **Seat-Forward/Backward Adjust:** Control the Seat adjusting handle, the range of movement is 0~±75mm, five shift. The seat is in lock position when release the handle.

● **Backrest Adjust:** Pull the Backrest Adjusting handle up to adjust the Backrest, have 5 adjusting position. The backrest is lock after released the handle.

● **Headrest Adjust:** Pull backward the Headrest Adjusting handle, push and pull the headrest in a proper place

● **Armrest-Incline Adjust:** Turn the Armrest Adjusting handle, adjusting the incline of the armrest.

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

Seat Belt



Warning: Seat belt is the main part of safety system, the accidental tipping or abrupt movement of a machine may cause injury or death, remember to fasten seat belts and adjust seats before operating.



Warning: Check the seat belt before using, replace if it is wear or damage.

● Replace the seat belt every 3 years, date of manufacture is printed on the label of safety belt.

● Fasten the seat belt during operation.

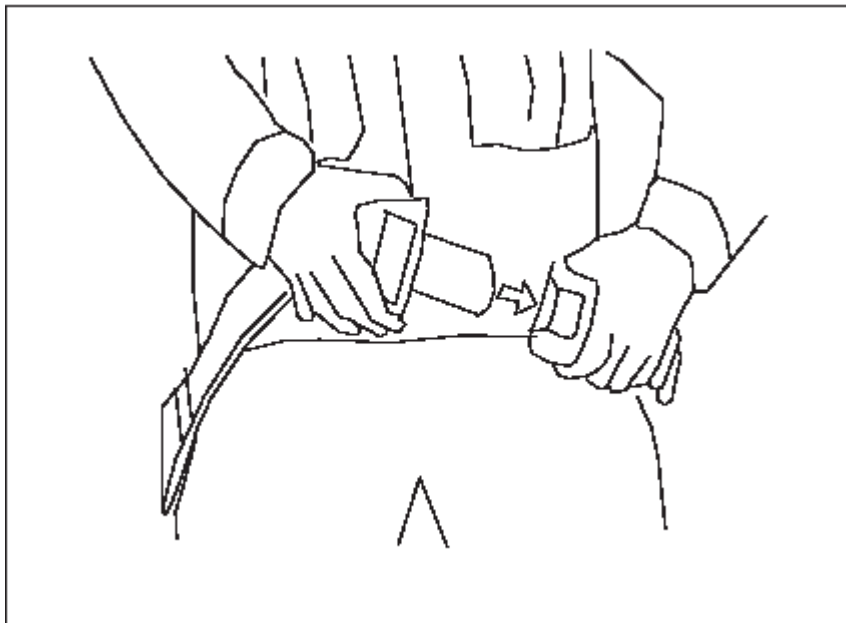
Don't twist the seat belt when fasten the seat belt

1. Fasten Seat belt

Hold the seat belt clip, check if it is twisted, adjust the length, then buckle up. Pull the seat belt to check if it is locked.

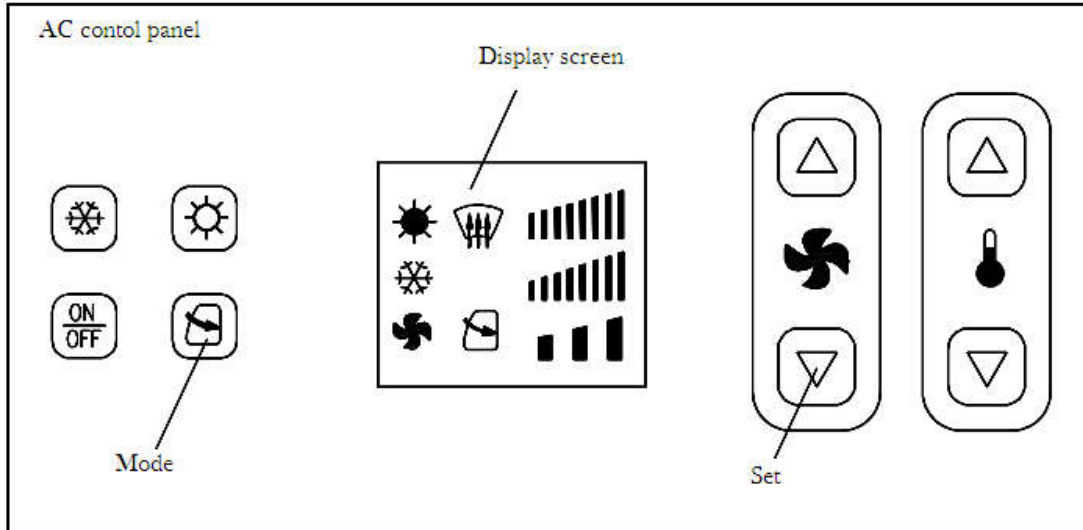
2. Unfasten Seat Belt

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



Air-Conditioning Control

The Air-Conditioning Control panel is on Left Control Box



1. Button function and operation



Power switch

When power on, A/C system is standby, screen light up, Air-blower running about 3 seconds (can not make any other operations during this time), then the system will restore to the state of last shutdown.



Cooling button

Cooling mode will be started when press this button, this fig. indicating on screen, restore to the value of last shutdown.

Press this button under cooling mode, system into ventilation mode,

this fig. disappear, memorize current status.


The system into defrosting mode when press this button under Heating mode, and appear on the screen, and restore to the value of last shutdown


The system into Heating mode (restore to the value of last shutdown) when press this button under defrosting mode, and disappear, system



memorize current status (Heating value and Wind speed).




Heating button

System into heating mode when press heating button under ventilation mode, memorize current status (Wind speed),  this fig. disappear, system is in last ventilation mode status.



System into defrosting mode when press this button under cooling mode, memorize current status (cooling value, wind speed),  this fig disappear, system is in last ventilation mode status.

System into defrosting mode when press this button under cooling mode, memorize current status (cooling value, wind speed), ,  appear on screen, system is in last defrosting mode status.

System into cooling mode when press this button under defrosting mode, memorize current status (heating value, wind speed), defrosting mode is canceled,  this fig disappear, system is in last cooling mode status (cooling value, wind speed).





Circulating button

System into outer loop mode when press this button,  appear on screen, and press this button under outer loop mode, system into inner loop mode,  disappear.







Increasing button



Press this button under cooling mode, the cooling capacity will be increased and the vertical bar  is increasing accordingly. Press this button under defrosting mode, the heating capacity will be increased and the vertical bar  is increasing accordingly, each time this button is pressed, one vertical bar will be increased.





Reducing button

Press this button under cooling mode, the cooling capacity will be reduced and the vertical bar   is reducing accordingly. Press this button under defrosting mode, the heating capacity will be reduced and the vertical bar   is reducing accordingly, each time this button is pressed, one vertical bar will be reduced.



Press this button to increase the wind speed, and the vertical bar   is increasing accordingly, each time this button is pressed, one vertical bar will be increased.



Press this button to reduce the wind speed, and the vertical bar   is reducing accordingly, each time this button is pressed, one vertical bar will be reduced.

2. Special operation

1) rapid cooling operation

In extreme hot climate, the operator should select this kind of special operation to low the temperature in cabin rapidly. The method is as follows: choose cooling mode, press “wind speed increasing button”, select the max. wind speed; press “TEMP”button by the downward arrow and select the lowest temperature value.

2) Normal cooling operation

In normal hot climate, the operator should select this kind of operation after the A/C has work for certain time and the temperature inside cabin is comfortable or a little be cold. The method is as follows: choose cooling mode, press wind speed button by downward arrow to min. speed; press “TEMP” button by upward arrow, increase the temperature.

3) rapid heating and defrosting operation

In extreme cold climate, the operator should select this operation to get rid of the frost on the window. The method is as follows: press wind speed button by upward arrow and select the max. wind speed; press “TEMP”button by upward arrow and select the max. temperature.

4) Normal heating operation

In normal cold climate, especially heating function is working for a while and the temperature is increased, the operator can press wind speed button by downward arrow to min. wind speed; then, press “TEMP”button

by downward arrow to lower setting temperature.



5) Dehumidification/demisting operation

There will be mist on the cabin glass when the humidity (the humidity from climate or human being normally) is high. To get rid of the mist, operator should follow the instruction:


A . Choose normal heating operation under normal cold or warm climate (please make reference to above-mentioned “4) Normal heating operation”

B. In extreme cold climate, choose heating and cooling at the same time (defrosting mode). Under defrosting mode, cooling value is preset, nonadjustable and not disappeared on the screen. Heating value will be set according to operator’s need.

3. Other statement

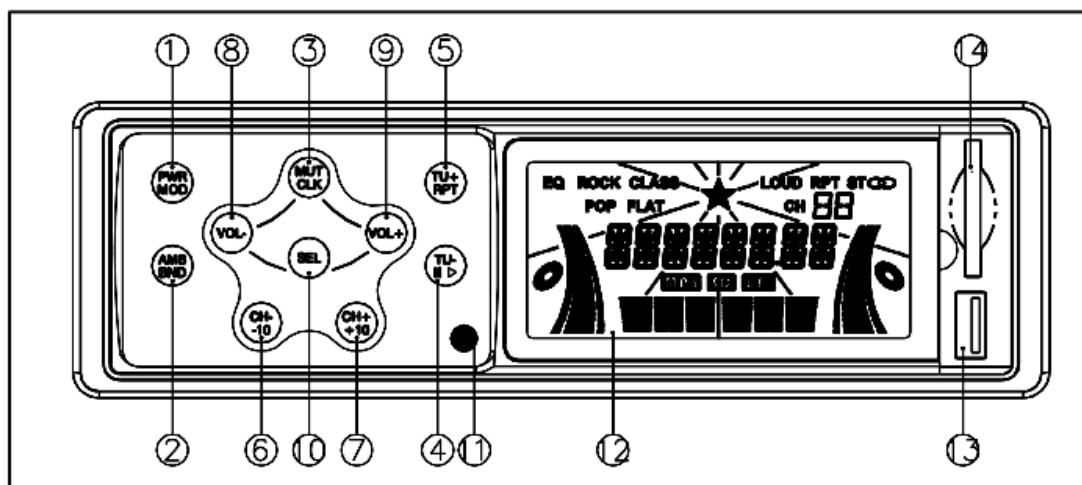
- 1) In inner loop mode (no this  on screen), the fresh air can’t go into cabin. In outer loop mode ( appear on screen), heating or cooling efficiency will be affected. Please choose the suitable mode according to different working condition.

Default setting on this machine: once the system running mode is changed or system shutting down, the A/C system will close outer loop automatically.

If the operator try to use outer loop after the system running mode is changed or just starting the machine, please press outer loop button  to activate this function.

- 2) The A/C system on this machine is automatic A/C. The A/C system will be in cooling mode automatically when the machine is start, wind speed is at 4. Under the auto control mode, A/C system adjusts wind speed, temperature, and wind direction automatically by the setting temperature; the operator can adjust wind speed manually.

Radio



Radio Operation

1. PWR/MODE:

When the radio is OFF, press this button or insert SD/MMC card, USB flash dish, the radio will be turn on.

After the radio is turn on

Press this button more than 4 seconds, the radio will be turn off.

Press this button shortly, you can switch between radio, MP3(USB/SD card) function.

2. AMS/BAND

Automatic search/storage and FM/AM switch, MP3 information and music selection.

Radio mode:

Press this button shortly, switch between FM/AM.

long press this button, the radio searches and save frequency automatically. (31 AM or FM frequencies could be saved)

MP3 status

Press this button shortly, information of song displayed (only western character supported)

Long press this button and enter into song search mode. Press key-8 (VOL-) or key-9 (VOL+) to select previous/next song. Press key-6(CH-) or key-7 (CH+) to move to 10 songs ahead or after. Press key-5 (TU+) or key-4 (TU-) to select the first or final song. After the song is selected, press this button to confirm.

3. CLK/MUTE—mute, time displaying and adjustment

Radio/MP3 status

Press this button shortly, mute mode.

Long press this button, time displayed. Long press this button to enter into time adjustment mode. Under time adjustment mode, the minute will be twinkled.

Press this button shortly again, the hour will be twinkled, then press key-8(VOL-) or key-9(VOL+) to have the time set.

4.TU-/-- manual frequency setting, searching automatic, MP3 song selection, play or pause

Radio status:

Shortly press this button, manual frequency setting downward; long press this button, automatic searching frequency downward.

MP3 status:

Shortly press this button, play previous song; long press this button, play or pause MP3 song.

Search MP3 song combined with Key-2(AMS/BAND)

5.TU+/RPT—manual frequency setting, searching automatic, MP3 song selection, play or pause

Radio status:

Shortly press this button, manual frequency setting upward; long press this button, automatic searching frequency upward.

MP3 status:

Shortly press this button, play next song; long press this button, “RPT”icon is displayed on the radio screen, it means single song repeat playing; if the “RPT”icon is not displayed, it means all song repeat playing.

Search MP3 song combined with Key-2(AMS/BAND)

6. CH-/10---frequency selection, save and MP3 quick search.

Radio status:

Shortly press this button to select previous saved frequency.

Long press this button, enter into saving mode. The frequency number is twinkled, then press key-7(CH+) or key-6(CH-) shortly to increase or decrease the frequency.

Or, long press key-7 or Key-6, select the frequency which will be saved, the frequency will be saved automatically after 3 seconds.

MP3 status

10 songs backward from current song.

7. CH+/+10—f frequency selection, save and MP3 quick search

Radio status:

Shortly press this button to select next saved frequency.

Long press this button, enter into saving mode. The frequency number is twinkled, then press key-7(CH+) or key-6(CH-) shortly to increase or decrease the frequency.

Or, long press key-7 or Key-6, select the frequency which will be saved, the frequency will be saved automatically after 3 seconds.

MP3 status

10 songs forward from current song.

8. VOL+--volume increasing, function selection

Press this button to increase volume.

Long press this button to adjust volume continuously.

Function setting accompany by “SEL”button.

Search MP3 accompany by key-2(AMS/BAND)

9. VOL_--volume decreasing, function selection

Press this button to increase volume.

Long press this button to adjust volume continuously

Function setting accompany by “SEL”button.

Search MP3 accompany by key-2(AMS/BAND)

10 . SEL—function setting (accompany by key-8 VOL- and key-9VOL+)

Shortly press this button to select sound effect menu. Cycle switch VOL—BASS—TEE—BAL, then use key-8 VOL- and key-9VOL+ to adjust value.

Long press this button to select sys menu, then shortly press key-SEL to switch menu, and use key-8 VOL- and key-9VOL+ to adjust value.

11. Remote control window

12. Information screen

13. USB port—insert USB flash memory, search song on flash memory and play.

14. SD/MMC port—song on SD/MMC card start playing after the card is inserted in the port

Attention: 1) No Clock on the radio

2) The operation will be a little different for different models of Radio.

Door and Windows

1. Cabin door

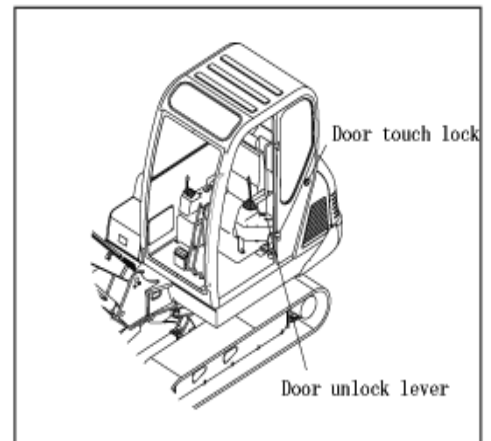
The cab door is the only way to entry or exit. Lock the door after the driver left the cab.

When the door opened, fix the door with the lock on the right of the door to avoid hurting peoples.

Pull Door Unlock Lever to close the door.

2. Rear window

Rear window can be an emergency exit. If the cabin door can't be opened, the operator should use emergency hammer to break rear window and then escape.

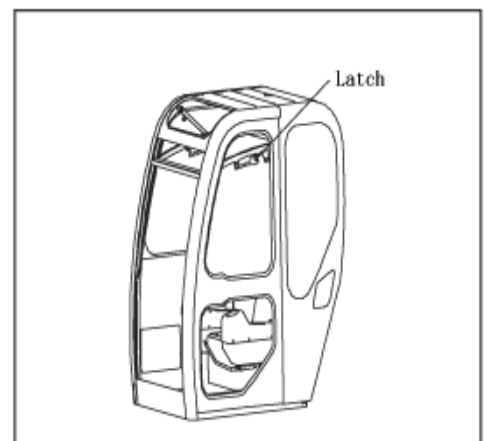


3. Front window (overturn window)

If the overturn window is opened, operator have better vision and fresh air.

How to open overturn window(front window).

Unlock the hand lock on both side of overturn window, slide the overturn window to the top of cabin, release the hand lock on both sides, lock the window.



Preparation before working

- 1) The excavator operator should qualify for local construction machinery operation requirement, and being trained before using the machine.
- 2) Operator should read operation manual before starting work.
- 3) Operator should wear suitable working suit and proper safety protection device, for example, safety helmet, working boots, glove, safety belt etc.
- 4) Please check your machine carefully before beginning every day's work.
- 5) Check working device, cylinder, and rubber hose and make sure if they are damaged or not.
- 6) Clean dust and dirties around engine, radiator and battery.
- 7) Check hydraulic device, oil tank, rubber hose and hose connector leaking or not (stop the machine, and check if any oil mark on the ground).
- 8) Check bolts on chassis parts (crawler, driving wheel, idler wheel) fixed or not; as well as the bolts that connects chassis and turrets.
- 9) Check instruments, monitor works or not
- 10) Clean and check rear mirror, adjust its angle that the operator can have right rear vision.
- 11) Check safety belt on seat.
- 12) Make sure the machine has been maintained according to regulations.



Warning: before operating excavator, please make sure operator has understand and remember the contents of safety operation in “safety rules” of the operation manual.

Engine operation





Warning: please read carefully all safety instruction in this manual and safety labels on the machine before starting the engine. There should be no other unrelated person in the working field. Studying and learning of safety operation is necessary before starting working. Understand and follow the instruction of operation and maintenance, abide by the corresponding law.


1. Checking before engine start

- 1) Check seat belt is buckled up or not, hoot, make sure there is no body around, or on/under the machine.
- 2) Check the vision of rear window, rear mirror.
- 3) Check if there is dust or dirties around engine, battery and radiator and make cleaning.
- 4) Check working device, cylinder, linkage or rubber hose for any crack, wearing or clearance. Please change the parts if anything unusual found.
- 5) Check hydraulic device, hydraulic tank, rubber hose and connector for leaking.
- 6) Check chassis (including track shoe, driving wheel and idler wheel) for possible damage, wearing, loosing and leaking.
- 7) Check instruments and working light, as well as the electric cable for any short cut or damage.
- 8) Check coolant level, fuel level, hydraulic oil level and engine oil level in normal position or not.
- 9) During extremely cold weather, please check coolant, fuel, hydraulic oil, battery electrolyte, engine oil and lubrication oil is frozen or not before starting the engine. If these liquids are frozen, please start the engine only after these liquids are thawed.
- 10) Please check if the hydraulic safety lock level is on “locked” status.
- 11) Check working condition, direction and location and make corresponding working method.

2. Starting engine

	Warning: Do not start the engine when a warning plate of forbidden starting is hung on the joystick.
---	---

	Warning: Make sure safety lock level is on “locked” status before starting engine, in case unforeseen event caused by accidentally touch to the joystick.
---	--


	Warning: Do not charge or start the engine by alternative power supply if the battery electrolyte is frozen. That might cause the battery on fire. Before charging or start the engine by alternative power, the battery electrolyte must be unfrozen. And, please check battery electrolyte is frozen or leaked or not.
---	---

Insert the ignition key into start switch, turn it to position “ON”, check all status lamps on instrument. If any alarm information is found, please debug and then start engine.


A. Start engine in normal temperature


Turn the ignition key to position “ON”, engine can be started normally if alarming light off. Turn the ignition key to position “START”, keep it in this position less than 10 seconds. After the key is released, it will be back to position “ON”. If the engine can't be start successfully, the next start needs to be 1 minute later.

Notice: the continuously starting time must be less than 10 seconds. The interval time of 2 starting should not less than 60 seconds. If the engine fails to start for three consecutive times, check whether all systems of the engine are normal.

	Warning: 1) Do not turn the key when the engine is running, the engine could be damaged. 2) Do not start the engine while towing the excavator. 3) Do not start engine by starter short circuit.
---	--

● Start the engine with an assistant electric cable

	Warning: while the battery electrolyte is frozen, the following operation might cause battery explosive: (1) Attempt to charge the battery; (2) Start the engine by short connection
---	---

	Warning: batteries can produce explosive gas. Keep away from sparks, flames and fireworks. When charging or using battery in the closed area, please keep the ventilation. And, please wear eye mask while working near the battery
---	--

Wrong connection to battery by assistant electric cable might cause blast. Please follow the instruction below:

1) When an assistant electric cable is adopted for starting, there must be 2 persons to operate it. (one on operator's chair, another one for the battery connecting)

2) While using another excavator to start the engine, keep 2 machines separating..

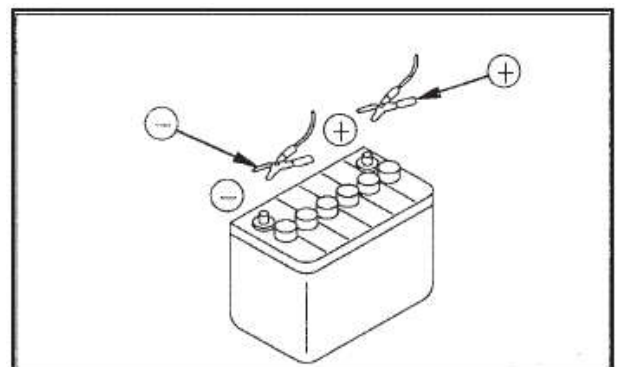
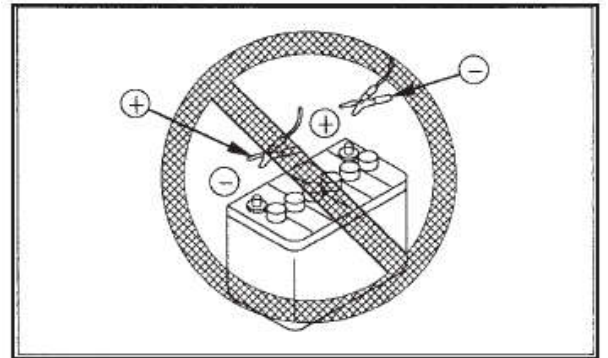
3) Turn both 2 machine's ignition start to position "OFF" when the assistant electric cable are connected incase the machine moved suddenly.

4) While connecting the assistant electric cable, the negative pole must be connected finally. While disconnect the assistant electric cable, the negative pole cable must be disconnected first.

5) While disconnect the assistant electric cable, do not touch the 2 cable clamps each other, or do not touch the machine by cable clamps.

6) Please wear an eyeglass and rubber glove when Start the engine with an assistant electric cabl

7) While connecting normally machine and faulty machine, please make sure both machines has same battery voltage.



3. After the engine started

A. Engine preheating excavator warm up

The normal working temperature of hydraulic oil is 50°C~80°C. Operating excavator while hydraulic oil temperature is too low (especially if hydraulic oil temperature is lower than 20°C) will cause hydraulic part damaged. Please warm up the machine before working while the hydraulic oil temperature is lower than 20°C.

- 1) Start engine and run it with rotate speed more than 200rpm for 5 min.
- 2) turn the throttle control knob on middle position and run 5~10 minutes.
- 3) during this stage, entrench each hydraulic cylinder several times, rotate turret and travel in short distance by low speed to warm up the hydraulic oil. Then, start to work only after the hydraulic oil temperature above 20°C. If necessary, extend or retract the bucket cylinder to the end of travel, warm up the hydraulic oil in full loading. Be careful please, this action must be last less than 30 seconds.

B. Check engine after started

- 1) Check whether all status lights are off.
- 2) Check whether any liquid (hydraulic oil, fuel and water) leaking.
- 3) Check machine's sound, vibration, heat, smell and instruments normal or not. If any abnormality is found, repair it immediately.

4. Engine shout down

Attention: If the engine is shut down suddenly before it cools down, the service life of the engine will be greatly shortened. Therefore, do not shut down the engine suddenly except in an emergency

If the engine is overheating ,do not shut it down suddenly even. Keep the engine running in middle RPM and cooling down, then turn off.

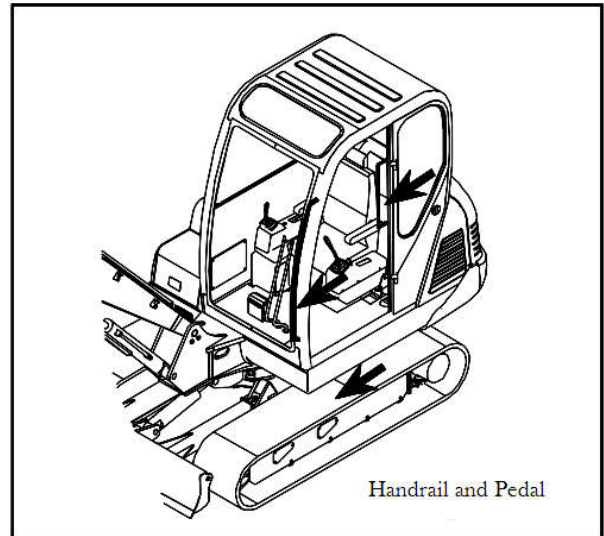
- 1) Run the engine in idler speed for 5 minutes around, and cool it down.
- 2) Push the accelerator to the min. position, pull the parking handle back to the end.
- 3) Turn the ignition key to position "OFF", shut down the engine.
- 4) Take out ignition key.

5. Inspection after shutting down the engine

- 1) Inspect working device, chassis and platform for any liquid leaking. If any abnormality is found, repair it immediately.
- 2) Refuel the tank.
- 3) Check engine cabin for any flammable items. Please remove any flammable items inside the engine cabin, in case of firing accidents.
- 4) Get rid of mud on chassis

Enter and exit machine

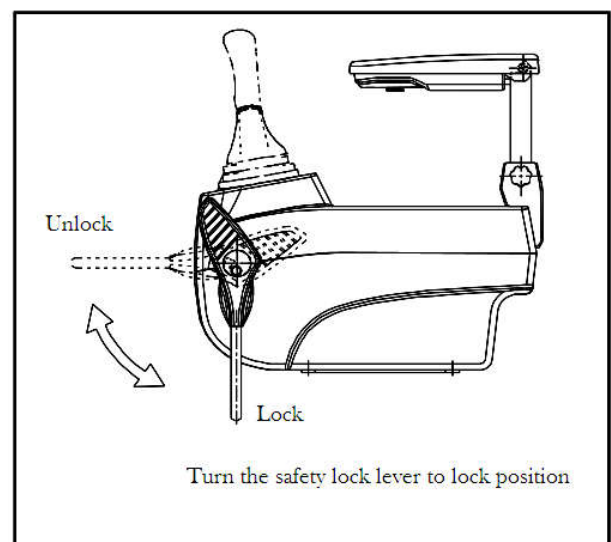
- 1) hold the door handrail on cabin door tightly (arrow toward in the picture)
- 2) Step on crawler stably.
- 3) Do not use operator joystick as a handrail for getting in or off the excavator.
- 4) If any mud, greasing oil on handrail or crawler, there might be a risk of slipping. Please clean handrail and crawler in time.
- 5) Do not jump up or down the excavator. While the excavator is moving, do not get in or off the excavator.



- 6) If the operator planned to left the machine, please low down the working device to the ground and turn the safety lever to locking position, shut down the engine and keep the status to next starting.

Attention: please take out the ignition key and lock all door and window before leaving the machine.

Do not climb to the top of engine hood and cabin.



It is prohibited to stand on working device (for example bucket, arm, boom and attachment at any circumstance.

Machine moving

1. Safety rules for moving excavator

- 1) Please check the working site and surrounding environment, obstruction, endurance of ground etc. before starting the excavator.
- 2) Honk to warn the people around the excavator before starting.
- 3) Do not start or operate excavator while the operator is not on the seat.
- 4) Working or walking of excavator or must be on the solid ground which width is at least 1.5 times of the width of excavator.
- 5) There must be gesture command for excavator travels through underground tunnel, bridge and high-voltage electric cable.
- 6) While excavator traveling, the boom and arm must be lowed down to keep the center of gravity on optimal position.
- 7) Do not carry any other person except for the operator while the excavator is moving.
- 8) Check chassis direction before turning the excavator's direction.
- 9) When the doze blade is at rear of the machine, the operation the travel stick contrarily.
- 10) Keep unrelated people from working site.
- 11) Remove obstacle from the traveling route of excavator.
- 12) It is the blind area at the rear of the machine, be carefully while reversing.

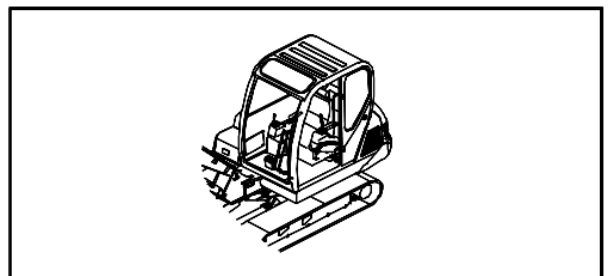


Warning: there will be dangerous to change direction while the excavator traveling on high speed.

- 1) Do not change direction suddenly.
- 2) Do not change traveling direction reversely in short time.
- 3) Do not stop the excavator suddenly while the machine is traveling on high speed.

2. Prepare for moving machine

- 1) Turn the safety lock lever to unlock position.
- 2) Pull the throttle lever close to the high speed position.



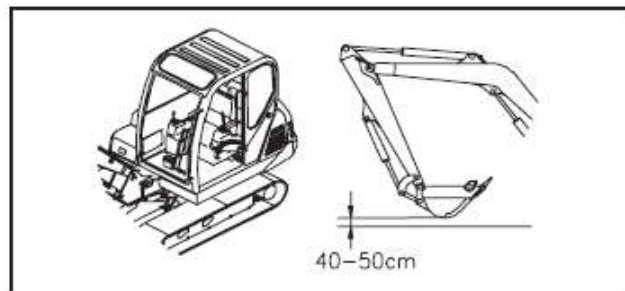
3. Machine moving forwards

1) Turn the safety lock lever to position of unlock, lift working device 40~50 cm from the ground.

2) Operate left and right traveling lever according to following steps.

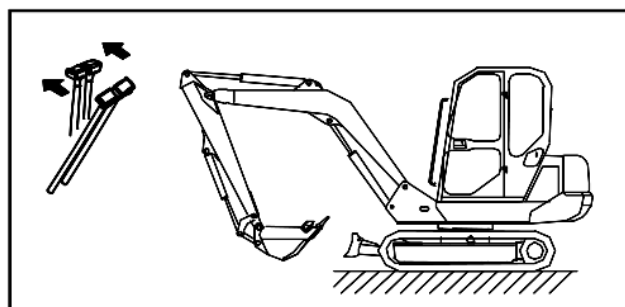
When the forward sign is ahead:

Push the traveling lever slowly and move forward.



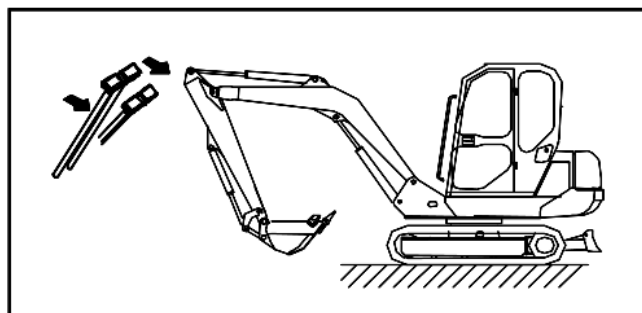
When the forward sign is behind:

Pull the traveling lever slowly and move forward.



Notice: 1). When operate in the cold weather, if the machine does not move normally, please warm up the machine. Clean the chassis if the crawler is blocked by mud.

2). The platform maybe moved because of inertia when you take a sudden turn under high speed.



4. Machine move backwards

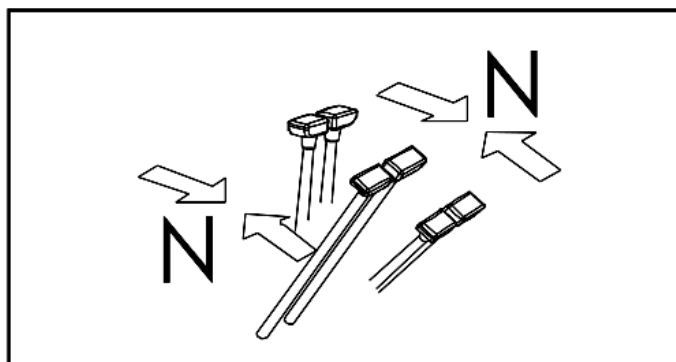
1) Turn the safety lock lever to position of unlock, lift working device 40~50 cm from the ground.

2) Operate opposite to forward.

5. Stop machine

Release the traveling lever, then stop the machine.

Attention: avoid stopping machine suddenly while the machine is traveling. There should be enough space for parking.



Machine steering

Attention: please check forward direction before operating traveling lever. If the forward sign is behind, operate opposite to forward.

Change traveling direction by left and right traveling lever.

Try to avoid changing direction while traveling. Especially for opposite direction turning, please stop the machine before operation.

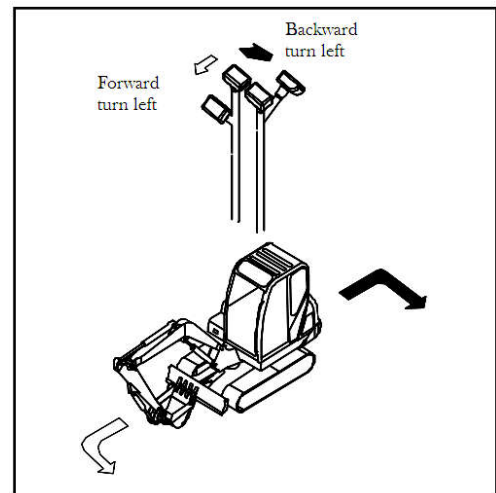
1. Turning direction while excavator stop

Turn left:

When traveling forward, push right traveling lever, then the excavator turns left. When traveling backward, pull right traveling lever, then the excavator turns left.

Turn right:

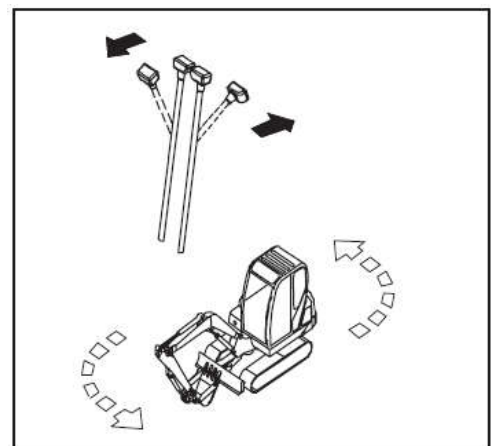
Operate left traveling lever by same method.



Turn in place

When the machine turn in place, pull left traveling lever and push right traveling lever.

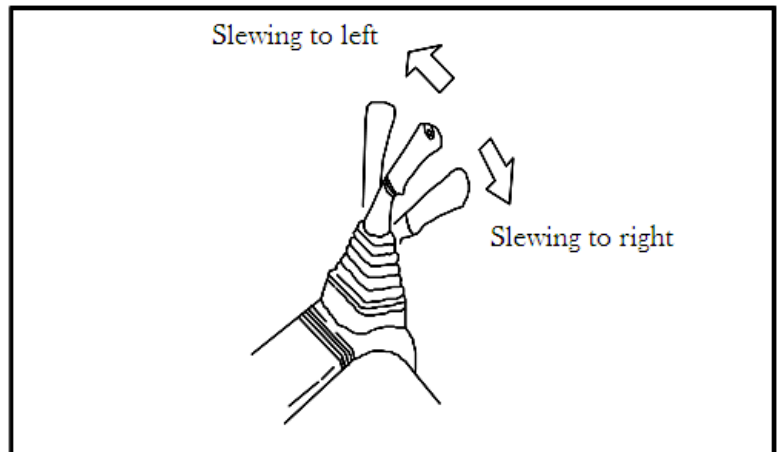
When the machine turn in place, pull left traveling lever and push right traveling lever.



Machine slewing

- Please check whether the surrounding area is safe before turret rotating.
- When operating the joystick of rotating quickly, turret will rotate quick. If the joystick is operated slowly, turret rotates slowly.

- 1) If the machine with the boom swing function, push the button on the left Joystick, make sure the machine is under slewing fountain.
- 2) Left joystick is responsible for turret rotating.



Operation of working device

Joystick operating speed will determine working device working speed.

Working device is controlled by left and right joystick. Left joystick is responsible for arm and rotating function. Right joystick is responsible for boom and bucket function.

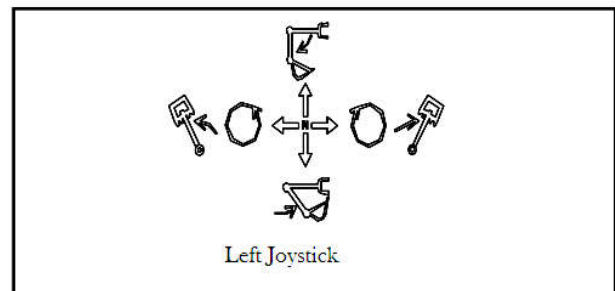
When the joystick is released, they will be back to central of pilot valve and working device remains in original place.

If the joystick is operated in 15 minutes after the engine is shut down, the working device could be lowered down to the ground.

And, by operating joystick after shutting down the engine, remaining pressure inside hydraulic circuit can be released, boom of excavator can be lowered down after loading on the truck.

1. Operating digging arm

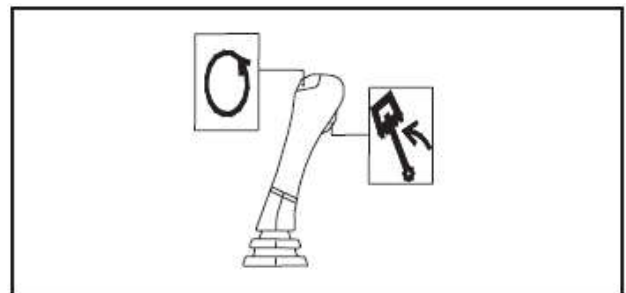
Push left joystick, arm extends out;
pull left joystick, arm is taken back.



2. Operating platform slewing

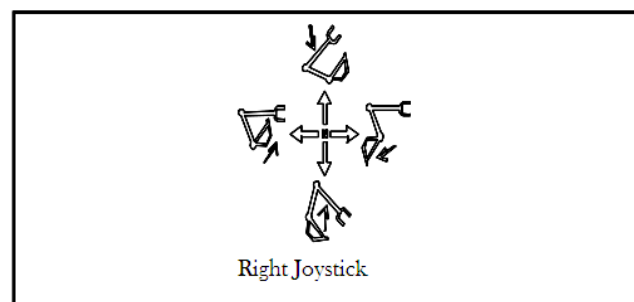
Push left joystick to left direction,
turret turns left; pull left joystick to
right direction, turret turns right.

If the machine with the boom swing
function, push the button on the left
Joystick, make sure the machine is
under slewing fountain.



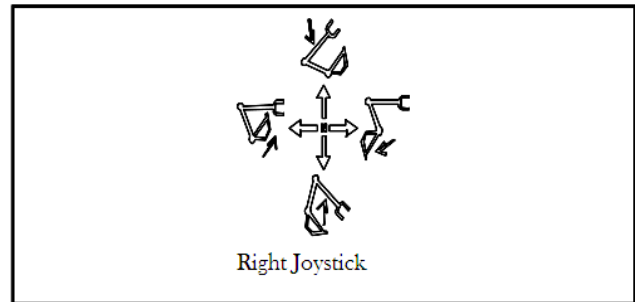
3. Operating boom

Push right joystick, boom is low down;
pull right joystick, boom is lifted up.



4. Operating bucket

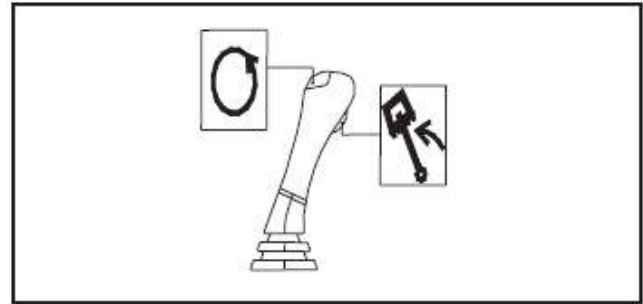
Push right joystick to right direction, the bucket extends out; pull right joystick to left direction, the bucket is taken back.



5. Operating boom swing

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

If the machine has boom swing function, make sure the machine is under boom swing fountain.

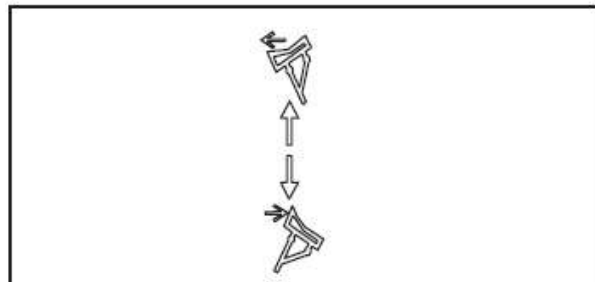


6. Operating dozer blade

Push the dozer control lever down, the dozer blade down. Draw up the control lever, dozer blade 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



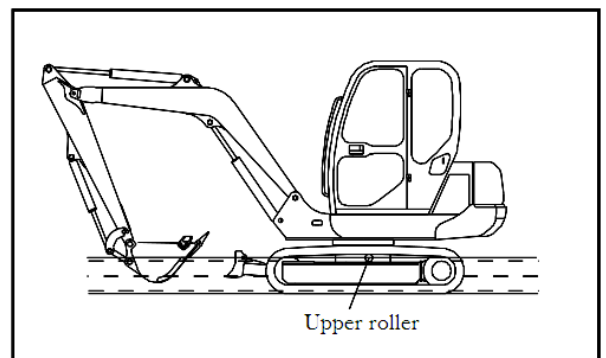
Warning: work near piedmont slope is danger. Raining, mud, snowy, icy, sand and soft soil ground will cause potential risk. Please take proper working method when working on piedmont slop area.

- when excavator traveling, lift the bucket 20~30 cm up from the ground.
 - Do not travel backward and downhill.
 - When excavator travels on hump or other obstacles, low the working device close to the ground and travel slowly.
 - Do not make a turn on slope or cross slope. Drive the machine to a flat ground and make a turn.
 - Make a turn or operate working device of excavator might cause excavator turnover due to imbalance. Especially when the machine is with load, it is very dangers to rotate the machine toward downhill direction.
If the rotation is inevitable, please pile up a working platform by soil to keep the machine working in balance.
-
- Do not travel up or down steep slope, it might cause turnover.
 - When the excavator travels uphill, its crawler might be slipping due to weak power. Do not use arm force to pull the machine uphill, it might cause turnover.
 - please make sure engine and hydraulic oil is preheated properly.

Water depth for working

Permitted water or mud depth for excavator working is under the central of up idler wheel.

The immersed part of excavator need to be greased often.



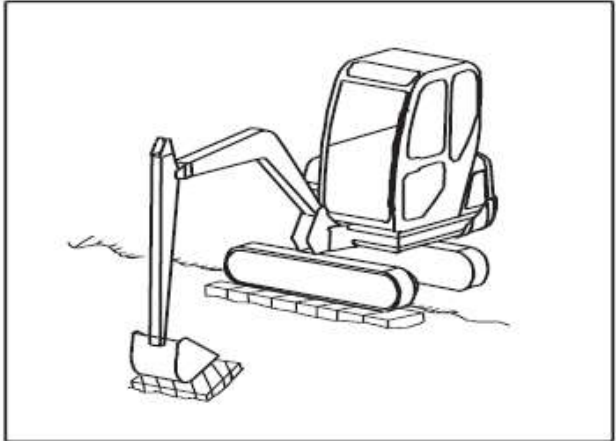
How to escape from Mud

Keep away from muddy environment during excavator operation. If the machine sunk into mud, drive the machine out of mud according to following steps:

A. One side track sinking into mud

Attention: when lifting excavator by boom or arm force, bucket bottom must touch ground (do not use bucket teeth as support). Angle between arm and boom should be 90~110 degree.

If only one side of tracks sunk into mud, lift the machine by bucket, put boar or log under the track, drive it out. If it is necessary, put a boards under the bucket.



B. Both tracks sinking into mud

If both tracks sunk into mud and slipping, put boar or log under the tracks by the same method mentioned above. Insert the bucket into the ground in front of the excavator, manipulate the arm in the same manner with digging, and push the traveling lever to forward direction to pull out the machine.

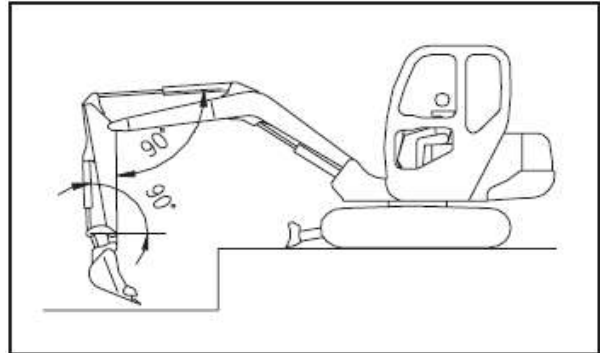


Operating guide

1. Backhoe work

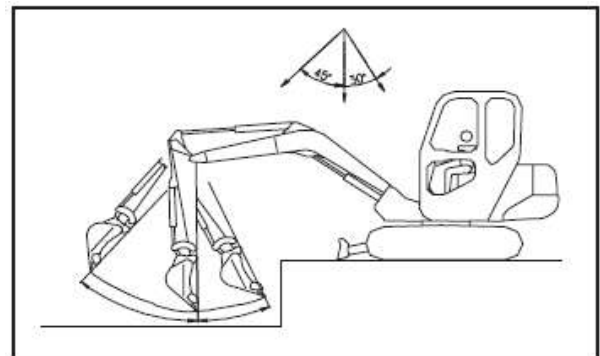
Backhoe is suitable for digging job which position is lower than the machine..

Bucket will have the biggest digging force if the machine is in the state that bucket cylinder and linkage, arm cylinder and arm are all at 90°.



The effective use of the angle will optimize the work efficiency.

Digging range of arm is 45° outward and 30° inward.

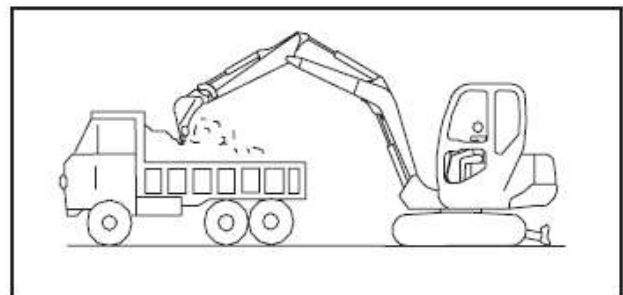


Please operate the arm in proper digging range as possible as you can, do not pull or push the cylinder to the end of its moving distance.

Attention: before digging on hard rocky ground, please break the ground by other means first to ease off damage and save cost.

2. Loading work

In narrow working site, it will have better working efficiency to park the dumping truck in the place that excavator operator can see it clearly.



It is more convenience and higher efficiency to load a dumping truck from rear part then from sides.

3. Ditching work

Keep the dozer blade at rear of the machine, and insert the blade into the earth.

Stretch out boom and arm, insert bucket tooth in to ground.

While digging by arm cylinder, adjust bucket angle of cutting over and loading; or change to dig by bucket cylinder. Do not insert bucket into soil too deep to cause overloading of hydraulic system. If the bucket can't move soil, lift the boom properly will change the situation. When the bucket is full loaded, lift boom and bucket to proper height, rotate turret to the right dumping place and unload soil in the bucket

Attention:

- 1) Never touch electric wire in the air.
- 2) Get to know underground pipeline and electric wire in working site before start digging job in case damaging underground pipeline and electric shock.
- 3) In case of electric shock, please remain on seat, and warn the others not to come close the machine. Drive the excavator to safety area first, leave the machine after electric is cut off.

4. Backfill and smoothing work.

To fill up a ditch, cut over dozer blade into soil to certain depth, then release dozer blade operating lever, drive the excavator perpendicular to ditch, push soil in to the ditch by dozer blade.

5. Clean the soil and sand from the bucket

Keep the arm at almost horizon status and bucket at unloading status. If sand and soil can't be unloaded, move right joystick from left to right several times, sand and soil will be shaken off. Do not push or pull bucket cylinder to end of its moving distance to shake off sand and soil.

6. Notice for relevant parts

A. Notice for crawler

- 1) Too much varies inside tracks will increase tracks' working strength and accelerate wearing.
- 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.

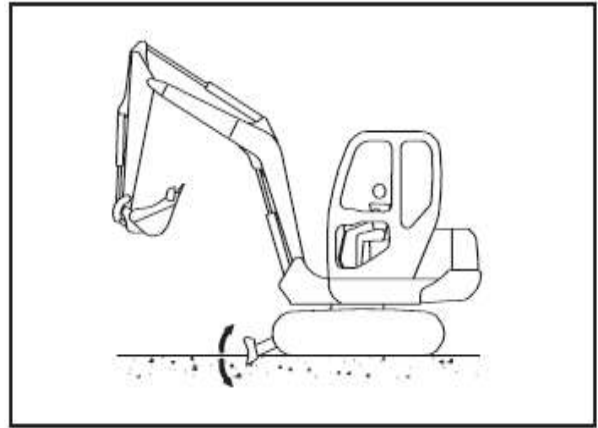
B. Notice for dozer blade.

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.



Dismantling or installation of bucket

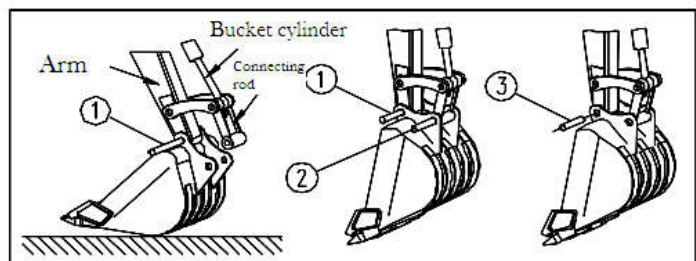
Safety rulers

- When you hit the pins with hammer to extract them, splinters may be produced and hit you, it may cause severe injure and permanent damage in your eyes. So use protective eyeglasses and heavy gloves.
- When remove the bucket from the working equipment put it in a stable position.
- Be sure that people standing around working zone, keep clearance from the bucket range when you hit the pins, because if you hit hard, the pins may fly off to result in the damage.
- Don't put any part of the body or stand underneath the bucket when removing the bucket.
- Be careful not to bumps your hands
- Don't put your hands in the pin which is aim at the o-rings rightly.

Bucket installation

Stop the machine on a firm and solid ground.

Start the machine then operate the arm till the hole of the arm and bucket in a line, then put a steel bar into it.



Raise the arm and bucket, dozer the blade

Extend the bucket cylinder to align the hole of the arm and bucket. Insert the pin (2), then take out the steel bar (1), insert the pin (3)

Dismantling bucket

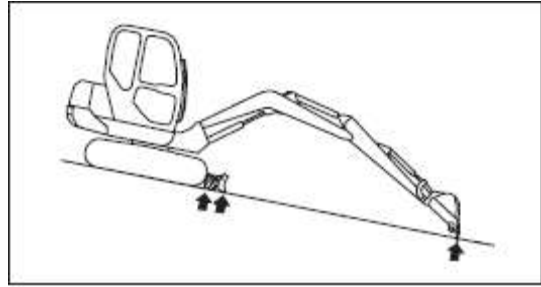
Stop the machine on a firm and solid ground. Lower the arm until the bucket touches the loader face softly, or else more is ground contact pressure more difficult is remove the pins from bucket.

Remove the split-pin from pins, the spacer and then the o-ring anti clearance. Remove bucket pins and (3), in this order.

Parking

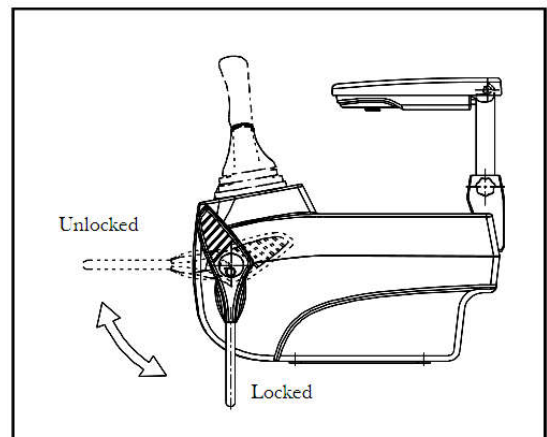
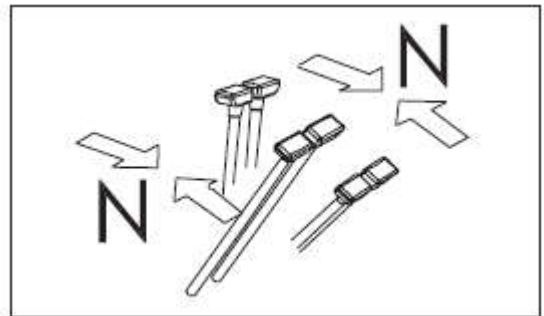
Safety rulers

- 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) 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.



Parking

- 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) Push the throttle handle forward to the end, lower the engine speed to idle speed.
- 5) Rotate the start key in "OFF" until the warning lamps go out.
- 6) Turn the Safety lock handle to Lock position.



Check after completion of work

1. Check

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

2. Lock

After completion of work , make sure the follow compartments are locked.

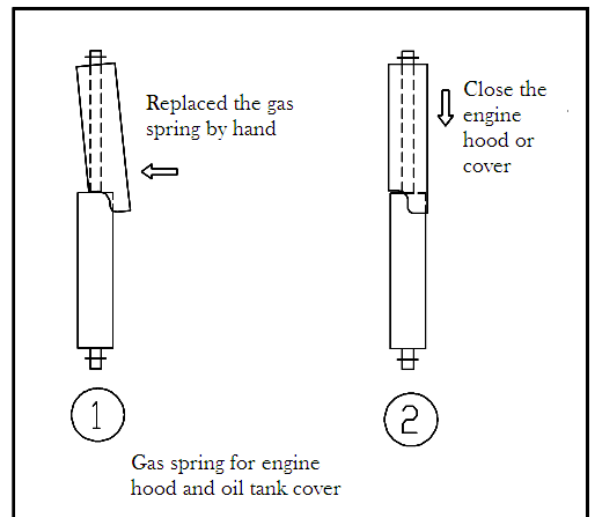
1) Cab's door. (And don't forget the windows). In any condition, if you want to open the front windows, using the handle , can pull the front window up and down to slide the roller inside the guide, then lock it to upthrust till the lock position, whereas, put the front windows down.

2) Fuel filling port.

3) Hydraulic oil filing port.

4) Battery-box cover

5) Oil tank and Engine hood
Before close the Oil tank and Engine hood, please replaced the gas spring by your hand.



Attention: Make sure that there is nobody around the engine hood when opening the engine hood to avoid hurt.

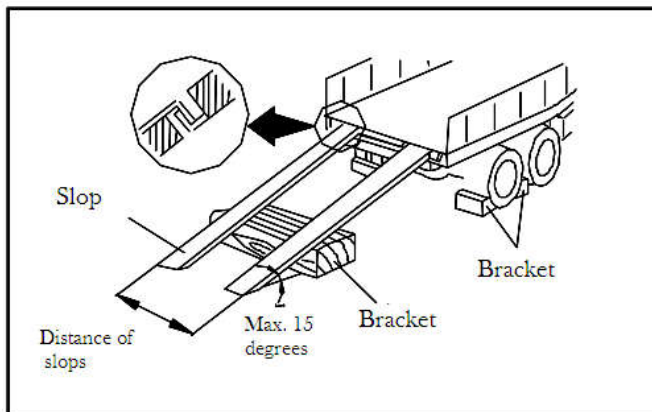
Loading, unloading and transportation

1. Safety rulers of 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

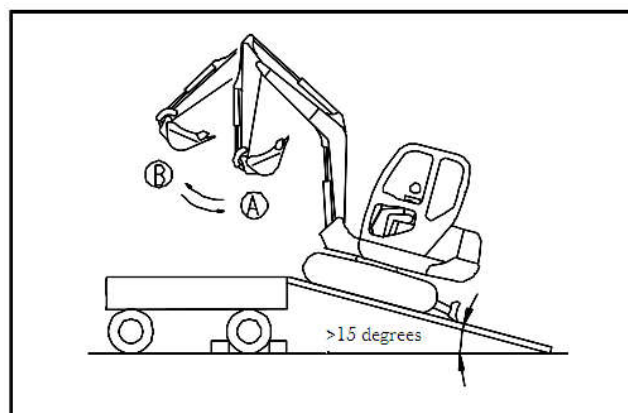
- 1) When loading or unloading the machine, park the trailer on a flat, firm road. Keep a fairly long distance between the road shoulder and the machine.
- 2) Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move.




- 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) 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.

Attention: when you are on the slops don't operate any other fountions besides the travel.

- 5) 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.



- 6) 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.

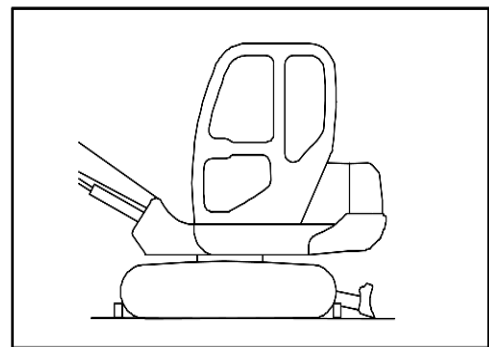
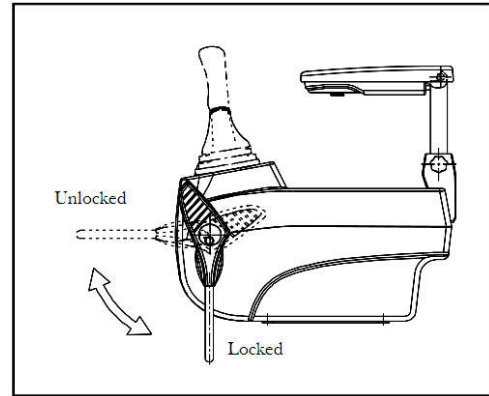


WARNING: After completing work or operating, before leave the seat, the operator should lift the safety lock lever at first to make the pilot operating oil circuit is cut off. For in case that somebody impact the operating lever accidentally what cause the machine move.

Attention: 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) Turn the safety lock handle to Locked position.
- 4) Lock the door and engine hood
- 5) 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. 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) Turn the safety lock handle to Locked position.
- 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. Lift the machine

A. safety rulers

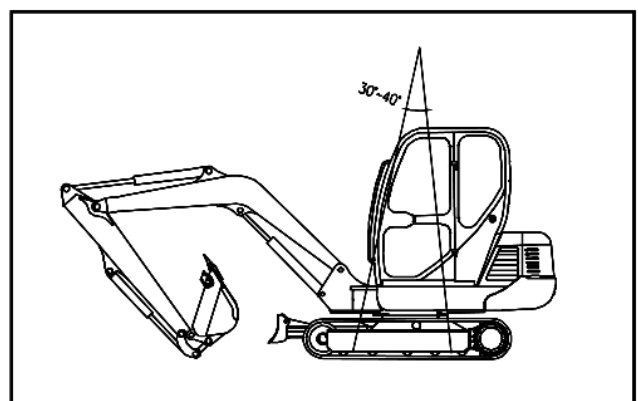
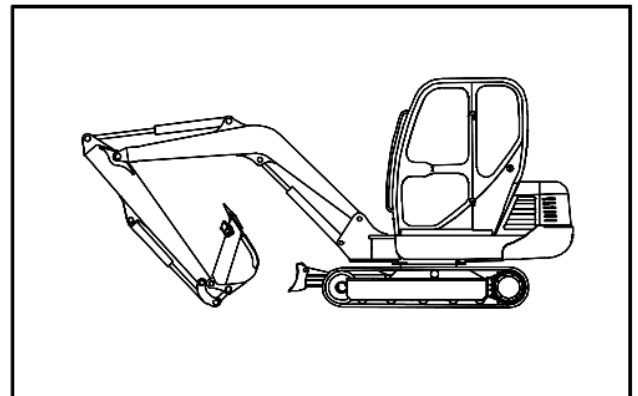
- 1) Don't lift the machine when there is somebody on it.
- 2) It must be sure the chains that use to lift the machine have the enough intensity to carry the weight of the machine.
- 3) In order to avoid the machine's unbalance, it must do just like following provided steps.
- 4) Don't lift the machine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

Attention: the lifting procedure is used for the standard machine. According to different configurations, the size, the weight and the barycentre are different, so the lifting procedure also will be different.

When lifting the machine, it must be on the smooth floor and do as the following procedures:

- 1) Slew the platform of the machine, keep the working device at front of Front idler wheel.
- 2) Extend the bucket cylinder and arm cylinder completely, and use boom cylinder to lower working device on the ground.
- 3) Shut down the engine, make sure there is nothing else in the cabin, Close the door and the window, then leave the machine.
- 4) One tightwire have to pass through between first and second bottom rollers, and another tightwire have to pass through between the fourth and fifth bottom roller.
- 5) Adjust the rising angle of the tightwire to 30 or 40 degree, then we lift the machine slowly.
- 6) When the machine lifted above the floor, check the balance of the machine, then lift it up slowly.



Precautions of working in cold or high temperature area

1. Working in cold weather

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. Working in hot weather

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.

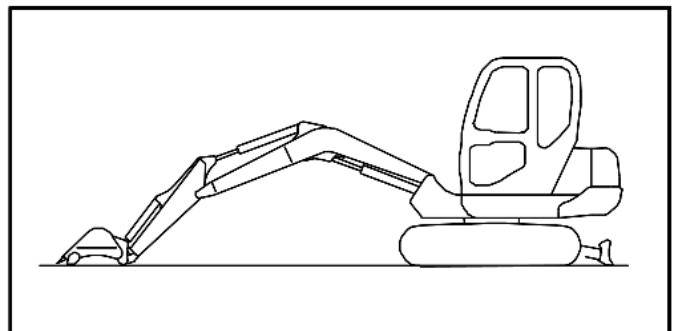
Long time storage

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) Keep the machine clean, and place it in a dry space.
- 11) Lock the cut-off valve which for install the attachment, and installing a bolt in the elbow.

Attention: When the machine is not being used, set the work equipment as showed in beside figure. This will prevent the cylinder piston 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) Running the crawler.



WARNING: When storage machine in the building, the antirust operation should be done, and open windows and doors to improve the ventilation for preventing gas poison.

3. Operation After long time storage

When you start the machine after a long time 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.

Attention: 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.

Trouble shooting

Trouble	Cause	Solution
1. Engine can't be started or started difficulty	<ul style="list-style-type: none"> ● There is some trouble with starter 	<ul style="list-style-type: none"> ● Replace or repair starter
	<ul style="list-style-type: none"> ● Battery isn't charged enough 	<ul style="list-style-type: none"> ● Charge or replace the battery
	<ul style="list-style-type: none"> ● Pre-heating line or glow plug is incorrectly used 	<ul style="list-style-type: none"> ● Repair or replace the glow plug
	<ul style="list-style-type: none"> ● Injection timing is incorrect 	<ul style="list-style-type: none"> ● Check the injection timing
	<ul style="list-style-type: none"> ● Fuel supply circuit is plugged 	<ul style="list-style-type: none"> ● Clean or replace the fuel circuit
	<ul style="list-style-type: none"> ● Fuel filter is plugged 	<ul style="list-style-type: none"> ● Clean or replace the fuel filter
	<ul style="list-style-type: none"> ● There is water, dust or air in fuel system 	<ul style="list-style-type: none"> ● Get rid of air, clean fuel circuit
	<ul style="list-style-type: none"> ● Injection nozzles is dirty or injection pressure is too low 	<ul style="list-style-type: none"> ● See your authorized dealer for repair
	<ul style="list-style-type: none"> ● Injection pump is trouble 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Fuel is empty 	<ul style="list-style-type: none"> ● refuel
<ul style="list-style-type: none"> ● Air intake and exhaust system is plugged 	<ul style="list-style-type: none"> ● Unblock the air intake and exhaust system 	
2.Engine shock, runs irregularly or stops	<ul style="list-style-type: none"> ● A lot of air run about 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Fuel filter is plugged 	<ul style="list-style-type: none"> ● Clean the filter
	<ul style="list-style-type: none"> ● There is dirt or air in fuel system 	<ul style="list-style-type: none"> ● Exhaust and clean fuel circuit
	<ul style="list-style-type: none"> ● Oil filter is plugged ,injector is dirty or trouble 	<ul style="list-style-type: none"> ● See your authorized dealer for repair
	<ul style="list-style-type: none"> ● High-pressure pipe is damaged 	<ul style="list-style-type: none"> ● Replace the high-pressure pipe
	<ul style="list-style-type: none"> ● Fuel is absent 	<ul style="list-style-type: none"> ● Refuel
	<ul style="list-style-type: none"> ● Accelerator joining can't be adjusted 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Injection pump is trouble 	<ul style="list-style-type: none"> ● Consult with agent
3.Engine power rate lowered	<ul style="list-style-type: none"> ● Get rid of the air 	<ul style="list-style-type: none"> ● Air gets into the fuel system
	<ul style="list-style-type: none"> ● Fuel circuit supply is blocked 	<ul style="list-style-type: none"> ● Check and clean
	<ul style="list-style-type: none"> ● Injection timing changed 	<ul style="list-style-type: none"> ● Readjust according to specification
	<ul style="list-style-type: none"> ● Injector badly work 	<ul style="list-style-type: none"> ● Check work pressure and injection vapors
	<ul style="list-style-type: none"> ● Air filter is plugged 	<ul style="list-style-type: none"> ● Clean filter cartridge
	<ul style="list-style-type: none"> ● The gap of the intake and 	<ul style="list-style-type: none"> ● Adjust the gap of the valve or

	exhaust valve is incorrect or valve isn't sealed	polishing
	<ul style="list-style-type: none"> ● Cylinder cushion is damaged, gas leakage 	<ul style="list-style-type: none"> ● Replace the cylinder cushion
	<ul style="list-style-type: none"> ● Injection pump work badly 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Engine is over heats 	<ul style="list-style-type: none"> ● Check if the coolant is correctly used, and if pump and belt is loosen, if so ,repair or replace and get rid of the block object of the watercourse
4.Engine over heat	<ul style="list-style-type: none"> ● The lever of the coolant is too low 	<ul style="list-style-type: none"> ● Refill the coolant
	<ul style="list-style-type: none"> ● Temperature sensor is trouble 	<ul style="list-style-type: none"> ● Replace the sensor
	<ul style="list-style-type: none"> ● Air filter is plugged 	<ul style="list-style-type: none"> ● Clean the air filter
	<ul style="list-style-type: none"> ● The belt of the fan is loosen or trouble 	<ul style="list-style-type: none"> ● Retighten or replace
	<ul style="list-style-type: none"> ● There is dirty in the lines of the cooling system 	<ul style="list-style-type: none"> ● Clean the lines
	<ul style="list-style-type: none"> ● Bad lubricant or lubricant is too much 	<ul style="list-style-type: none"> ● Replace the lubricant or drop the lubricant till the standard level
5.Engine oil pressure is too low	<ul style="list-style-type: none"> ● The lever of the lubricant is too low 	<ul style="list-style-type: none"> ● Refill the lubricant
	<ul style="list-style-type: none"> ● Lubricant filter is plugged 	<ul style="list-style-type: none"> ● Clean the lubricant filter
	<ul style="list-style-type: none"> ● Oil is leak in the circuit 	<ul style="list-style-type: none"> ● Tighten or replace
	<ul style="list-style-type: none"> ● The cooling water temperature of the engine is too high 	<ul style="list-style-type: none"> ● Make up the mixture of cooling water or consult with the agent
6.Black smoke come out from exhaust tube	<ul style="list-style-type: none"> ● Bad fuel 	<ul style="list-style-type: none"> ● Use better fuel
	<ul style="list-style-type: none"> ● Air filter is plugged 	<ul style="list-style-type: none"> ● Replace the filter cartridge
	<ul style="list-style-type: none"> ● Injection timing is incorrect 	<ul style="list-style-type: none"> ● Readjust according to specification
	<ul style="list-style-type: none"> ● Injector vapour is bad 	<ul style="list-style-type: none"> ● Check and replace the unit
7.white smoke come out from exhaust tube	<ul style="list-style-type: none"> ● Bad fuel 	<ul style="list-style-type: none"> ● Use better fuel
	<ul style="list-style-type: none"> ● Engine oil is too much 	<ul style="list-style-type: none"> ● Drop to the standard level
	<ul style="list-style-type: none"> ● Injection timing is incorrect 	<ul style="list-style-type: none"> ● Readjust
	<ul style="list-style-type: none"> ● There is water in cylinder and fuel 	<ul style="list-style-type: none"> ● Check ,change the fuel
8.Battery can't be charged	<ul style="list-style-type: none"> ● Joining is loosen or get rusty 	<ul style="list-style-type: none"> ● Clean and tighten
	<ul style="list-style-type: none"> ● Generator belt is loosen or 	<ul style="list-style-type: none"> ● Tighten or replace

	trouble	
	● Generator can't be charged	● Consult with agent
	● The electrolyte of the battery is expired	● Replace
	● The electrode plate of the battery is failure	● Replace
9.starter doesn't work or run slowly	● Terminals loosen or get rusty	● Clean or tighten
	● Battery isn't charged enough	● Replace
	● Wire is damaged	● Consult with agent
10.the engine running but alternator warning lamp light	● The engine is trouble	● Consult with agent
	● Wire is damaged	● Consult with agent
	● Electronic adjustor is trouble	● Replace
11. Hydraulic components move slowly	● Hydraulic oil is too cold.	● Operate with hydraulic equipments to increase the oil temperature
	● The hydraulic pump speed is too slow	● Consult with agent
	● Hydraulic oil is used incorrectly	● Use the right hydraulic oil.
	● The speed of engine is too slow	● Consult with agent
12. The temperature of hydraulic oil is too high.	● Hydraulic oil is used incorrectly	● Use the right hydraulic oil.
	● Oil circuit is blocked	● Consult with agent
	● Hydraulic oil filter is plugged	● Clean or replace
	● Oil pump is damaged	● Consult with agent
	● Oil cooler is blocked	● Clean the oil cooler
	● Oil cooler is trouble	● Consult with agent
	● The pressure of the main safety valve or slewing relief valve is too high	● Consult with agent
	● Oil is too dirty	● Drain the oil and refill the oil
	● The sensor is trouble	● Correct the oil level
13.Hydraulic oil is emulsified or there is foams in the oil	● Leakage between oil tank and pump	● Check and tighten pipe connection
	● Hydraulic oil is used incorrectly	● Use the right hydraulic oil.

	<ul style="list-style-type: none"> ● There is water in the hydraulic oil 	<ul style="list-style-type: none"> ● Replace oil
	<ul style="list-style-type: none"> ● Oil level is too slow 	<ul style="list-style-type: none"> ● Refill the oil till the normal level
14. Hydraulic Oil pressure is too slow or no pressure	<ul style="list-style-type: none"> ● Hydraulic pump is damaged 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Oil level is too slow 	<ul style="list-style-type: none"> ● Refill the oil
	<ul style="list-style-type: none"> ● Safety valve is trouble 	<ul style="list-style-type: none"> ● Consult with agent
15. All the Components are not run	<ul style="list-style-type: none"> ● Hydraulic pump is damaged 	<ul style="list-style-type: none"> ● Consult with agent
A. Oil pump make noises	<ul style="list-style-type: none"> ● Lack of hydraulic oil 	<ul style="list-style-type: none"> ● Refill oil
	<ul style="list-style-type: none"> ● Air sucked for oil-intake pipe 	<ul style="list-style-type: none"> ● Repair or replace
B. oil pump noises is normal	<ul style="list-style-type: none"> ● Auxiliary pump is damaged 	<ul style="list-style-type: none"> ● Replace
	<ul style="list-style-type: none"> ● Hydraulic safety control unit can't 	<ul style="list-style-type: none"> ● Check and repair
16. Every cylinder or motor running weakly or can't run	<ul style="list-style-type: none"> ● Hydraulic pump is damaged 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Main safety valve pressure turns low 	<ul style="list-style-type: none"> ● Readjust the pressure.
	<ul style="list-style-type: none"> ● Oil pressure and level is too low 	<ul style="list-style-type: none"> ● Refill oil
	<ul style="list-style-type: none"> ● Oil suction filter is plugged 	<ul style="list-style-type: none"> ● Clean oil filter
	<ul style="list-style-type: none"> ● Oil seal is damaged 	<ul style="list-style-type: none"> ● Repair or replace.
	<ul style="list-style-type: none"> ● Piston rod is damaged which cause oil leakage 	<ul style="list-style-type: none"> ● Repair or replace.
	<ul style="list-style-type: none"> ● Pilots valve is trouble 	<ul style="list-style-type: none"> ● Replace
	<ul style="list-style-type: none"> ● Pilots pipe damaged or oil leakage 	<ul style="list-style-type: none"> ● Repair or replace
17. Both travel motor don't work	<ul style="list-style-type: none"> ● Oil mixed in the center slewing joint 	<ul style="list-style-type: none"> ● Consult with agent
18. One of the travel motor doesn't work	<ul style="list-style-type: none"> ● Travel unit is damaged 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Controller is damaged 	<ul style="list-style-type: none"> ● Check and repair
19. Travel unmorally	<ul style="list-style-type: none"> ● Crawler is too tight or loosen 	<ul style="list-style-type: none"> ● Readjust crawler tension
	<ul style="list-style-type: none"> ● Capability of the oil pump lowered 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Crawler frame is damaged 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● There is rock or crushed in crawler chain 	<ul style="list-style-type: none"> ● Remove foreign parts
	<ul style="list-style-type: none"> ● Oil leakage in control valve 	<ul style="list-style-type: none"> ● Consult with agent

	<ul style="list-style-type: none"> ● Capability of motor lowered 	<ul style="list-style-type: none"> ● Consult with agent
20.Slewing abnormally	<ul style="list-style-type: none"> ● Capability of oil pump lowered 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Slewing motor is damaged 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Pilot valve can't work 	<ul style="list-style-type: none"> ● Consult with agent
21.Air condition make noises	<ul style="list-style-type: none"> ● Appliances joint is loosen which cause the air condition clutch make abnormal noise 	<ul style="list-style-type: none"> ● Consult with agent
	<ul style="list-style-type: none"> ● Belt is loosen 	<ul style="list-style-type: none"> ● Tighten the belt. if damaged, replace it.
	<ul style="list-style-type: none"> ● The blower leaf is loosen 	<ul style="list-style-type: none"> ● Retighten.
	<ul style="list-style-type: none"> ● The blower work abnormally 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● The fan work abnormally 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● Compressor axletree is damaged 	<ul style="list-style-type: none"> ● Replace
	<ul style="list-style-type: none"> ● The tension unit axletree is damaged 	<ul style="list-style-type: none"> ● Replace
23.Air condition can't refrigerate	<ul style="list-style-type: none"> ● Electric circuit is damaged 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● Air condition switch is damaged 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● There is no refrigerants 	<ul style="list-style-type: none"> ● Check if the refrigerants leakage, repair it and refill.
	<ul style="list-style-type: none"> ● The air condition system is blocked 	<ul style="list-style-type: none"> ● Clean or replace
	<ul style="list-style-type: none"> ● Belt is loosen or broken 	<ul style="list-style-type: none"> ● Readjust or replace
	<ul style="list-style-type: none"> ● Compressor work abnormally 	<ul style="list-style-type: none"> ● Repair or replace
	<ul style="list-style-type: none"> ● Pressure switch is damaged 	<ul style="list-style-type: none"> ● Replace
24. Sometimes without air conditioning.	<ul style="list-style-type: none"> ● The circuit keeps in touch badly 	<ul style="list-style-type: none"> ● Check and repair
	<ul style="list-style-type: none"> ● Belt is loosen 	<ul style="list-style-type: none"> ● Readjust the belt moderately
	<ul style="list-style-type: none"> ● the air conditioner switch isn't properly adjusted 	<ul style="list-style-type: none"> ● Readjust
	<ul style="list-style-type: none"> ● There is too much water in air condition system, and some ice block inside 	<ul style="list-style-type: none"> ● Replace the desiccators
	<ul style="list-style-type: none"> ● The fan or relay is damaged 	<ul style="list-style-type: none"> ● Repair or replace

General information of Maintenance

Break-in of the new machine

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

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

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

Working in the dusty worksites

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

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

Oil and the filter core

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

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

Never mix different brand of oil. If you need to fill different brand of the oil, please emptying the old 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 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, impregnate, 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 Summary

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.

5-5

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.
- When install tubes, don't contort or bend the tubes.

Easy wear parts

Seal ring, Filter elements, Bucket tooth and Cutters are easy wear parts, Please do periodic inspection and maintains, replace on time if they are wear to avoid the influence of machine performance.

Periodical replacement of safety critical parts

Safety critical parts are the hydraulic hoses, the hoses can be perished or worn, and affect the normal functioning, It's also a potential safety hazard. These parts must be replaced compulsively after the stipulated duration of use.

Replace immediately if there are any abnormality on these parts even it is not due yet. When replacing the hose, replace the seals at the same time.

Oil choosing list

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

	Lube or Fuel	Suitable temperature	Viscosity	Recommendation
Engine oil	CH4 15W/40 CH4 5W-30	-15°C ~ +40°C -25°C ~ +30°C		
Hydraulic oil	Low-temperature area: HS46+ normal temperatures area: HMP46+	Above -35° C Above -12° C	46 ± 4.5 (mm ² /s) (When it is 40°C)	
Lube of the Traveling reducer	Overload use gear oil (GL-5)	Winter and summer use the same lube		SAE80W/90
Lube of the slewing reducer	Overload use gear oil (GL-5)	Winter and summer use the same lube		
Lube of the Front Idler, bottom roller and upper roller	SAE85W-140	All the temperatures	20-25 (mm ² /s) (When it is 50°C)	
Grease	Molybdenum disulfide lithium-based Grease No. 3	-20°C--160°C		
Fuel	Summer:0# light dies fuel Winter:-10# light dies fuel -20# light dies fuel -35# light dies fuel	>0°C 0°C-5°C -5°C-15°C -15°C ~ -28°C		
Coolant	JT 225-1996 -25# -35# -45#	>-32°C		

● **Oil capacity**

Sort	Unit	Value
Fuel tank	L	102
Engine oil	L	7.6
Hydraulic oil tank	L	76

Standard torque list

Tighten torque of bolts and nuts are as following table. The tightened parts or connected parts will lose and be damaged if the bolts and nuts don't tight to the stipulated torque, and will cause machine faulty or affect the operation.

The torque list for general parts

Intensity of The Bolt	Yield Intensity N/mm ²	Diameter of The Bolt mm							
		6	8	10	12	14	16	18	20
		The Tighten torque Nm							
8.8	640	9-12	22-30	45-59	78-104	124-165	193-257	264-354	376-502
10.9	900	13-16	30-36	65-78	110-130	180-210	280-330	380-450	540-650
12.9	1080	16-21	38-51	75-100	131-175	209-278	326-434	448-697	635-847

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

The tighten torque of hydraulic hose

The Metric Thread Nut			
Metric Thread	Outside diameter of steel tube	Nm	
		torque	Min./max
M12*1.5	6	20	15-25
M14*1.5	8	38	30-45
M16*1.5	8/10	45	38-52
M18*1.5	10/12	51	43-85
M20*1.5	12	58	50-65
M22*1.5	14/15	74	60-88
M24*1.5	16	74	60-88
M26*1.5	18	105	85-25
M30*2	20/22	135	115-155
M36*2	25/28	166	140-192
M42*2	30	240	210-270
M45*2	35	290	255-325
M52*2	38/42	330	280-380

The tighten torque of hydraulic hose

BSP Thread and Nut		
BSPP Thread	Metric torque (Nm)	Min./max (Nm)
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 Nut			
UNF Thread	Specification	Min (Nm)	Max (Nm)
9/16-18	-4	14	16
11/16-16	-6	24	27
13/16-16	-8	43	47
1-14	-10	60	68
1.3/16-12	-12	90	95
1.3/16-12	-14	90	95
1.7/16-12	-16	125	135
1.11/16-12	-20	170	190
2-12	-24	200	225

Periodic Maintenance schedule

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

No.	Page	Checking Items	Maintenance intervals (Total Working Hour)					
			10	50	100	250	500	1000
1	5-14	Routine Check						
		●Oil、 water、 fuel leakage	▲					
		●Appearance of the parts and hoses	▲					
		●Fastening of bolt and hydraulic connections	▲					
		●Controlling parts、 work lamp and warning light	▲					
		●Engine condition	▲					
2	5-15	Fuel System of Engine						
		●Check fuel oil level and refueling	▲					
	5-16	●Vent water and impurity			▲			
		●Clean the fuel tank				▲		
	5-17	●Check oil injecting pressure					▲	
	5-18	●Replacing filter core		☆		▲		
3		Cooling System of Engine						
	5-19	●Check the rubber pipe and clamps	▲					
		●Check coolant level	▲					
	5-21	●Cleaning radiator fans					▲	
		●Replacing coolant		☆				■
		●Check coolant consistence	▲					

Periodic Maintenance schedule (continuous)

No.	Item	Period of Maintenance (Total of the Working Hour)						
		10	50	100	250	500	1000	2000
4	Lubricate System of Engine & Others							
	●Check engine oil level and refueling if needed	▲						
	5-22 ●Replacing engine oil		☆		▲			
	5-23 ●Replace engine oil filter core		☆		▲			
	5-25 ●Check tension of fan belt		☆	▲				
	●Check gas valve clearance					☆	▲	
	●Check fastening of the cylinder cover					☆	▲	
●Check fastening condition of the engine support		☆			▲			
5	Engine Air Intake System							
	5-24 ●Empty the dust collector	▲						
	●Cleaning air filter core			▲				
	●Replace the air filter core					▲		
6	Hydraulic System							
	5-26 ●Check hydraulic oil level and refueling if need	▲						
	to ●Cleaning hydraulic oil tank				▲			
	5-31 ●Replace the hydraulic oil, clean the suction filter							☆▲
	●Replace hydraulic oil-return filter core and pilot filter core						☆▲	
●Check pressure of system					▲			
7	5-32 Battery							
	5-33 ●Check electrolyte level		▲					

		● Check electrolyte density and Charge					▲		
8	5-34	Reducer							
		● Check oil level and refueling				▲			
	5-35	● Replacing engine oil						☆▲	
		● Check tighten torque of connecting bolt		☆				▲	
9	5-36	Crawler							
		● Check and adjust the tension of crawler	▲						
10	5-37	Idler, upper roller and front Idler							
		● Check the tighten torque of Idler		☆				▲	
		● Check the oil level of front Idler and upper roller							▲
11	5-38	Lubricate							
		● Immit lube to Lubricating point		▲					

▲: Ordinary maintenance

☆: First maintenance in breaking-in period

■: One time in each Spring and Autumn

General Check

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

- 1) Check whether the machine leak oil、 water or the fuel leaks
- 2) Check whether the parts and the attachment have the rupture、 the nick or the distortion
- 3) Check the hydraulic device's fix and connect
- 4) Check the appearance of the parts
- 5) Check the working condition of the working device, light , warning light.
- 6) Check the working condition of the engine, the color of exit gas, noise etc.

Engine Fuel System

Maintenance illustration

Capacity of the oil tank-----	102L
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
Replace the filter core of the fuel-----	250h

1. Check the oil level filling

Check the oil level every day for every 10 hours from Instrument.

Fill the oil tank full after working to avoid have the hydrometeor. The filling port is at front of the fuel tank.

2. Drain water and the impurity from the oil tank

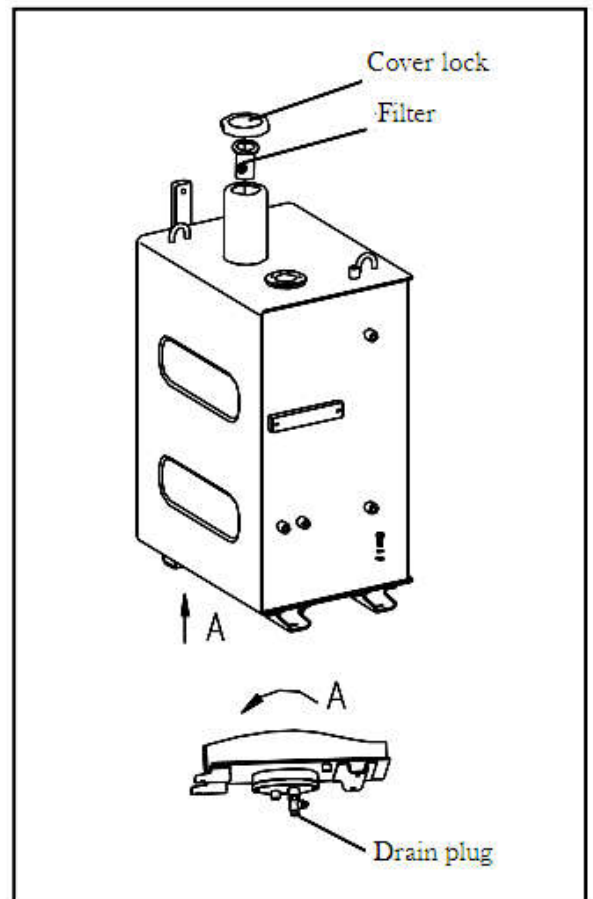
Drain condensation water and the impurity every 100 hours.

Loose the drain plug to make the condensation water and the impurity out. When the fuel out, then reinstall the drain plug as soon as the fuel is out. Users can adjust the period to vent the condensation water according to the quality of the fuel,

3. Clean the oil tank

Clean it every 250hours

- 1) Drain the fuel to the container
- 2) Take-down the drain plug, take out the filter.
Fill up half of the oil tank, and drain it again.
- 3) Clean the filter then put in back.
- 4) Install the drain plug, fill oil through the filter inside the filling port.
- 5) Vent the air of the pipes.



Caution: Don't use the ethylene trichloride to washing the oil tank, use the diesel oil only.

4. Check fuel injection pressure

Check every 500 hours

Do the periodic inspection for fuel injection pressure as the Maintenance schedule, the fuel injection pressure is 22.56Mpa, adjust if necessary, the adjustment should be done by YUCHAI authorized distributor.

The working efficiency of the engine is depended on the working condition of the spray nozzle, so have to do periodic inspection to keep it working normally.

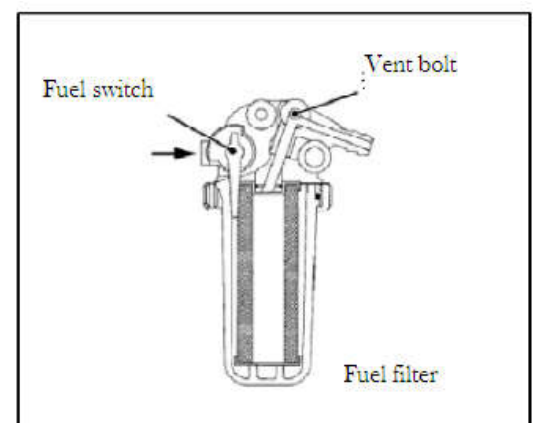
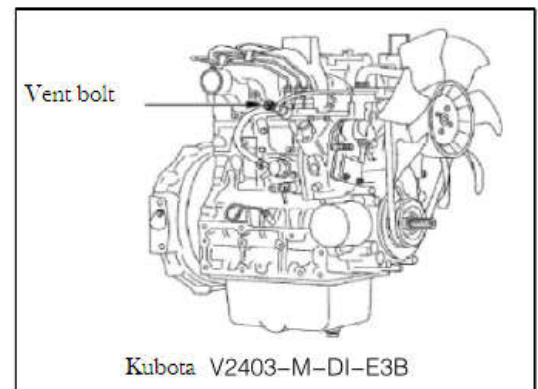
The operator should make attention to every indication of poor performance of the spray nozzle:

- A. Clash from engine cylinder;
- B. Engine overheat;
- C. Fuel filter is damaged or dirty;
- D. Poor quality of the fuel
- E. Water in the fuel
- F. Air filter is dirty or plugged

5. Exhaust of the fuel loop (for Kubota V2403-M-DI-E3B)

It need to exhaust the air before start the engine when it replaces filter core of the fuel, cut off the pipe of the fuel, clean the filter of the fuel and make the air into the fuel loop.

- 1) Turn on the fuel switch
- 2) Loose the vent bolt of the fuel filter
- 3) Tight the vent bolt t after no bubble come out
- 4) Loose the vent bolt on top of the fuel injection pump.
- 5) Push the Stalling handle to STOP position, start the engine through start motor and keep it run about 10-15 seconds.
- 6) Tight the vent bolt.



6. Fuel pre-filter

Replace the filter element after 50 hours for new machine, after that replace it after every 250 hours.

Drain the water and the precipitate from the oil and water separator everyday.

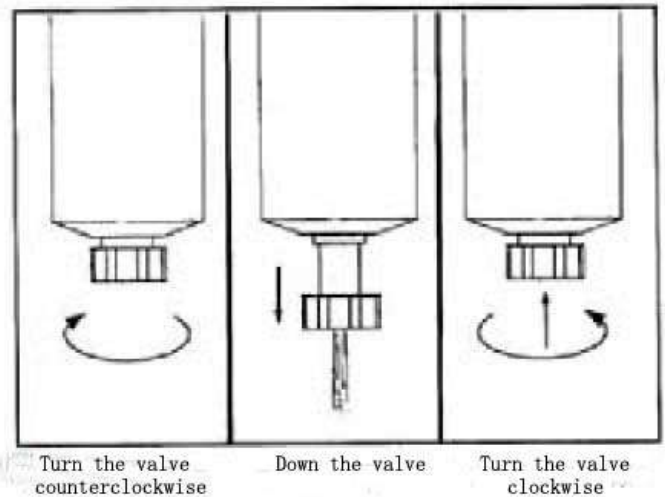
1) Stop the engine, open the outlet valve, and turn the valve widdershins

about three circle 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 come out.

3) Close the outlet valve, screw the valve clockwise until tight

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



7. Replace fuel filter element

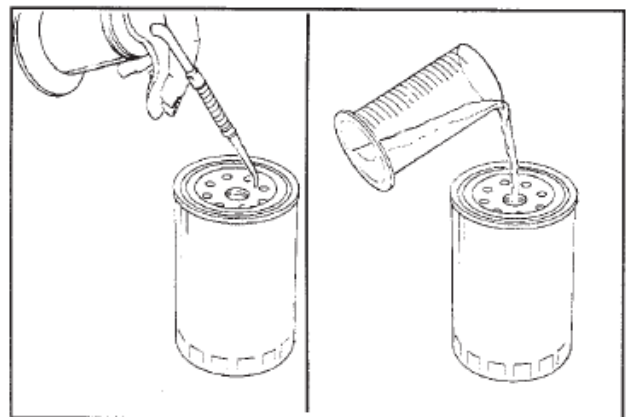
Replace it after 50 hours for new machine, after that replace it every 250hours or every 3 months. It must use the original parts.

- 1) Take-down the fuel filter
- 2) Use the cloth which not cottony to clean the surface of the sealing gasket.
- 3) Disuse the "O" loop
- 4) Install the new "O" loop

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

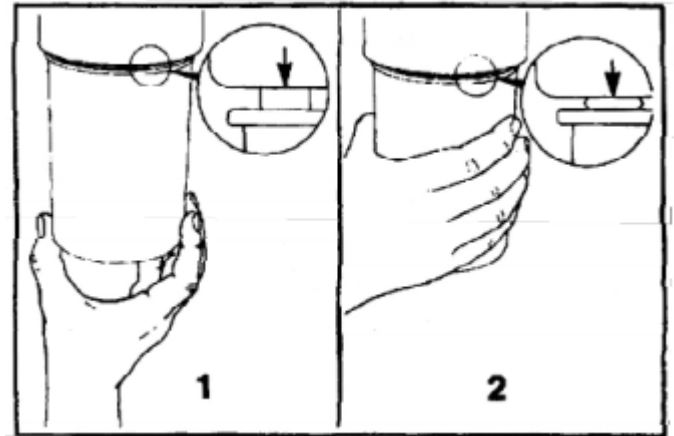
5) Use the new fuel to fill up the new filter, and use the cleanly engine oil to lubricate the "O" seal ring.

6) Install the filter as the instruction of the filter manufacturer.



Attention: For reduce the feasibility of the fuel leaks, make sure to install the filter fixed but on too tight, the fuel filter could be damaged if it is too tight.

7) Start the engine after replaced fuel filter element, and check if it is leaking.



Engine Coolant system

Maintenance illustration

Capacity of the radiator-----5.7L

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

Check the hoses and the clips-----Everyday or 10h

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

Replace the coolant-----Spring and Autumn

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

1. Check the level of the coolant

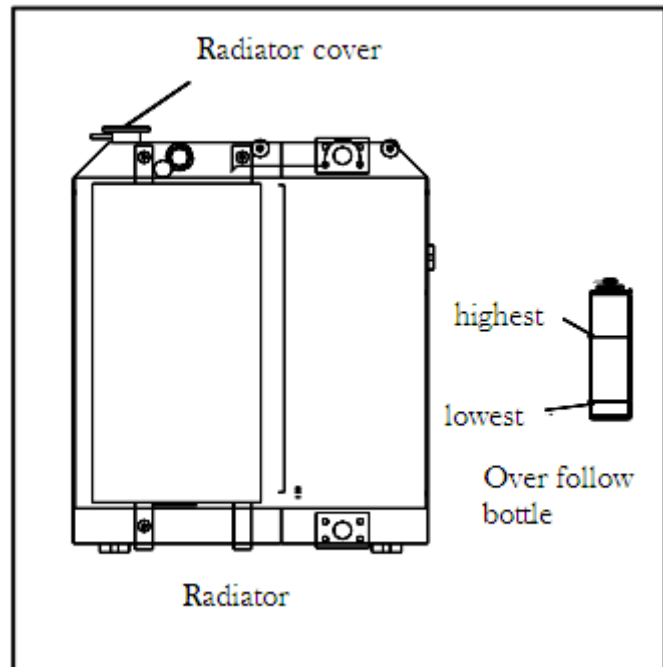
Check the coolant level firstly before start the new machine, after that, check the level everyday or every 10hours.

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

The level of the coolant should under the water filling port about 20mm when the engine is cold.

Observe the coolant level in the radiator overflow bottle, the level should be at the middle of the highest and lowest mark when the engine is cold.

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



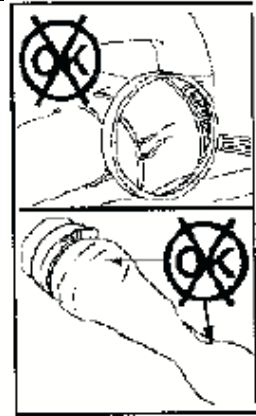
Warning: The hot coolant will spurt when open the cover of the radiator. The way to open the cover: Wait until the system is cold, loose the cover to release the pressure before take it off.

2. Check the hoses and the clips

Check it everyday or every 10 hours.

Replace the hose if it is crack or become hard because of the aging.

Check the clips, replace if it is loose or damaged.



3. Clean and Check the vane of radiator

Clean it every 500 hours.

Clean the radiator in time, because the dust on the radiator (water tank) will affect the cooling.

Open the engine hood, use the high-pressure water or the compress air to clean the radiator. Clean the protecting screen at front of the cooler also. And clean the condenser if the machine is with AC system.



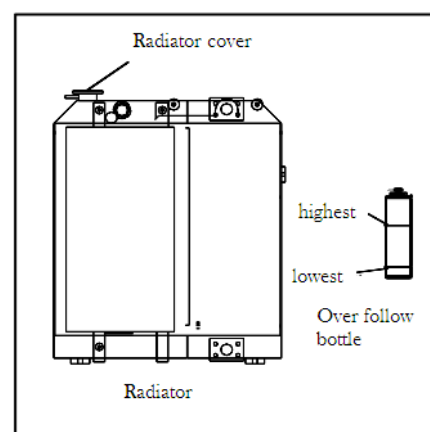
Warning: It could be injured if the body hit by compress air, high-pressure water or the steam, so please wear the protective goggles or other protection device.

Attention: The distance between the Radiator and the nozzle of high-pressure water or the compress air should be or more then 500mm to avoid the damage of the radiator. Damage vane of the radiator can cause the leaking water or overheat. Check the radiator everyday in dusty working site.

4. Replace the coolant

Replace the coolant after first 50 hours, after that replace it twice in one year, in Spring and Autumn.

- 1) Take down the cover of the radiator (water tank), loose the vent valve to drain the coolant.
- 2) Clean the cooling loop, Tight the vent valve. Immit the special cleaning fluid, then start the engine and run about 10 minutes at low-speed.



Then stop the engine and drain the cleaning fluid.

- 3) Tight the vent valve.
- 4) Immit the coolant, run the engine several minutes at idle to make the coolant fill the entire cooling loop.
- 5) Check the level of the coolant and fill if necessary.



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

5. Check the consistency of the coolant

It need to check the consistency of the coolant before winter. The coolant should can be suitable for the weather -20°C. please increase the proportion of the anti-freeze fluid If the temperature is lower then -20°C.



Warning: The coolant is the toxicant. Avoid the children and the pet touch the coolant. Please deal as the local law for no longer used coolant.



Warning: use anti-freeze fluid in any weather
Don't use the water instead of coolant. If not the parts of coolant system could be cankered and damaged.

Lubricating System of the Engine

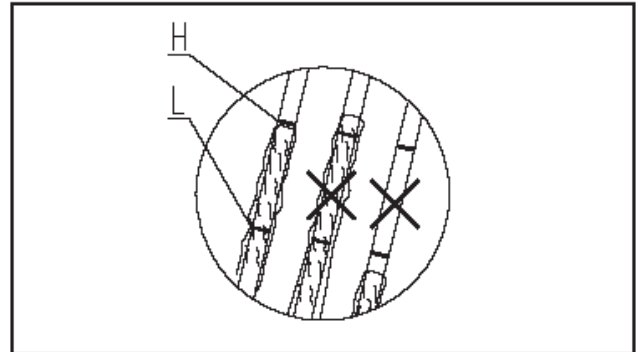
Maintenance illustration

Capacity of engine oil-----	7.6L
Check engine oil level-----	Everyday or 10h
Replace the oil or filter element-----	Every 250 hours

1. Check the engine oil level

Check the oil level for first time, after that check it every 10 hours.

- 1) Parking on the flat ground, and stop the engine.
- 2) Open the engine hood, and take out the engine oil gauge, observe the oil value, the level of the oil should be in the middle of the lowest (L) and the highest (H).
- 3) Filling if it is necessary.



Warning: After stop the engine, the parts and the oil are in high-temperature which could be caused the injury, please wait until the temperature is low before start to maintenance.

2. Replace the engine oil

Replace the engine oil after first 50 hours, after that replace it every 250 hours.

- 1) Parking on the flat ground.
- 2) Take-down the vent bolt to drain the engine oil.



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

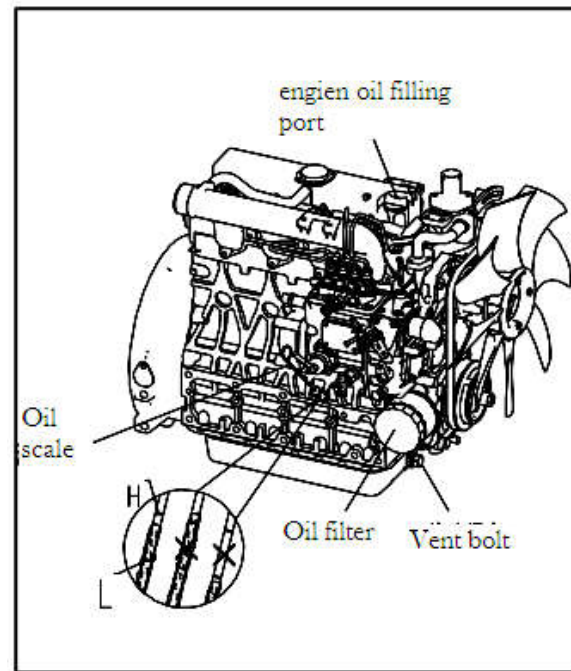
- 3) Clean the vent bolts and reinstall, replace the seal ring if it is wear.
- 4) Open the sprue.
- 5) Immit the new engine oil till the oil level arrive the "H" marking.
- 6) Close the cover of the sprue, and run the engine about 5 minutes at idle.
- 7) Stop the engine, and check the oil level after 10-20 minutes, fill the oil if it necessary.

3. Replace engine oil filter element

Clean the filter element after first 50 hours, after that clean or replace it every 250 hours.

Replace engine oil filter

- 1) Clean filter seat and the around area, take-down the filter, clean the surface of the seal gasket of the filter seat.
- 2) There are 2 seal gaskets on the filter, lubricate both seal gaskets.
- 3) Please wipe the engine oil on the seal gasket before install the filter.
- 4) Install the filter as the instruction of filter manufacturer.
- 5) Run the engine with idle, check if the oil filter is leaking.
- 6) Stop the engine and wait 15 minutes.
- 7) Check the oil level, Immit the engine oil to the "H" marking if the oil level is too low.



Air Intake System of Engine

Maintenance illustration

Period of cleaning dust-----Every 10hours or everyday

Period of cleaning Air filter-----Every 100 hours

Period of replacement of Air filter element-----Every 500 hours

1. Clean and replace the Air filter element

Clean the Air filter every 100hours or when the Air filter warning Indicator light.

Clean the Air filter frequently will affect it's performance.

2. Replace the filter element

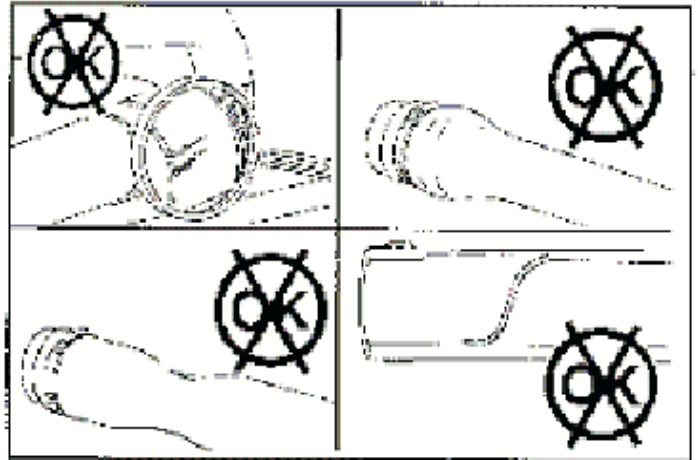
Replace the filter element every 500 hours or after cleaned over 6 times.

When the Air filter warning indicator light very soon after install the cleaned filter element, replace it even it is not cleaned over 6 times.

3. Check the air intake pipes

Check the air intake pipes every day, and replace it if the pipes are wore or damaged.

Tight the clips if it is loose.



Other Maintenances of Engine



Warning: No maintenance when the engine is running. If the maintenance have to do during engine running, please do it at least by two persons and follow the regulations:

One person stays in the cabin, and prepares to stop the engine in any time. And all people must keep in touch.

Make attention to rotation parts like the Fan, Fan belt etc., It maybe has the danger of stucked .

Don't insert the tools or other objects into the fan or the fan belt. Otherwise, the part can be damage or the objects fly out.



Warning: It will cause temporary or everdurning audition problem if the noise is too high. It need wear the earplug when do the maintenance of the engine and in the noise long time.

● Check the tension of the Fan belt

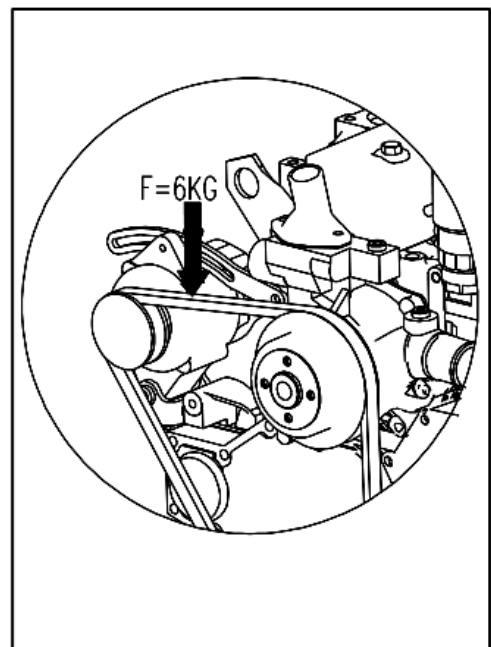
Check the tension of the Fan belt after first 50 hours, after that check it every 100hours.

It must make the right tension of the belt to assure the alternator working normally and the belt's use life

About the right tension of the belt, Press the belt vertically at the place between the fan belt wheel and the alternator belt wheel by 6kg force, and the belt can be sank about 5-10mm.

Replace the Fan belt if it is damaged.

Please see—— 《User Manual for The Diesel Engine》 for the maintenance period of the other parts of engine and the ways.



Hydraulic System

Maintenance illustration

Capacity of the hydraulic oil tank-----77L

Check the hydraulic oil level-----every 10h

Replace the filter element-----every 1000h/2000h

Replace the hydraulic oil-----every 2000h

Check the pressure system-----every 500h



Warning: It brings the serious hurt and death if the hydraulic oil or the axunge rip into the skin. Avoid your hand or body close to the leaking area. It should use the paper to check the leaking. Go to the hospital if you splashed by the oil.



Warning: For avoid scalded, please only do the maintenance after the hydraulic oil is cool or before working everyday. When Take-down the flange cover of the sprue, it need turn the cover slow and release the pressure to avoid the oil spurt out.

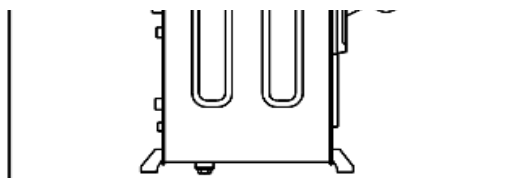
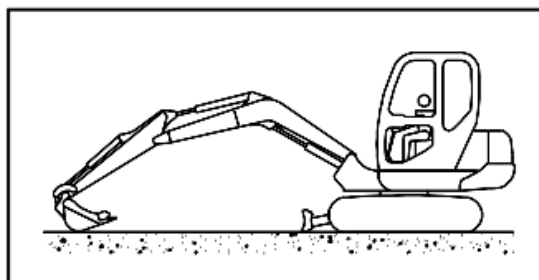
1. Check the hydraulic oil level

Check it every 10 hours.

- 1) Parking on the flat ground.
- 2) Start the engine and operate the working device to make each cylinder reciprocating motion.
- 3) Draw back the arm cylinder, extend the bucket cylinder and drop the bucket on the ground, put the dozer blade on the ground, then stop the engine, see the fig.
- 4) Observe the level of the hydraulic oil thought the oil scale on the hydraulic oil tank (see ①)

It requests the level can see in the area of the oil scale. Drain the oil after it is cold if the oil level is too high, because it could damage the hoses and spray out, and filling if oil level is too low.

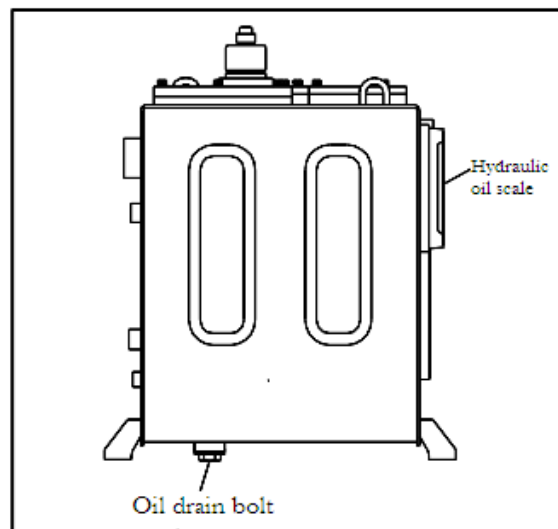
Attention: The level of the hydraulic oil will change when the temperature up. The oil level lie the middle of the oil scale before operation, and it may close to the top of the scale when the temperature up during operation.



2. Vent the water and the dirt from hydraulic oil tank

Vent the water and the dirt every 250 hours.

- 1) Vent the air from the oil tank after the oil is cold or before starting every day.
- 2) Loose the oil drain bolt (see the picture)
- 3) Vent the water and the dirt until see the limpid hydraulic oil come out. Screw the drain bolt up.
- 4) Fill the oil if necessary.



3. Replace the hydraulic oil, clean the oil tank and replace the oil intake filter element

Replace and clean it every 2000 hours.



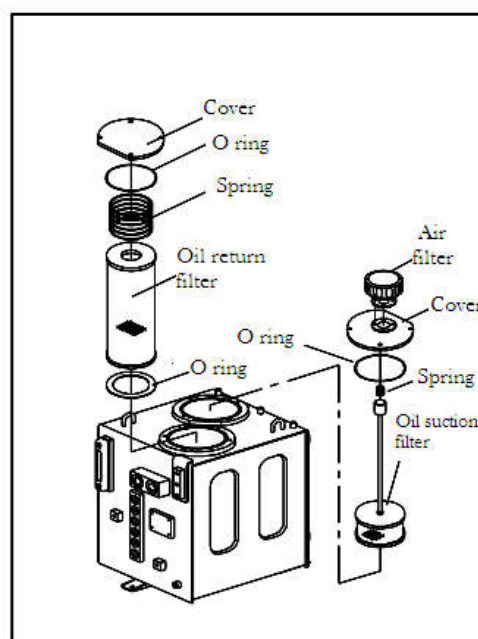
Warning: 1) To avoid the scald, only vent the oil it is cool or before start the machine everyday.

2) Turn it slowly to release the pressure when Take-down the flange cover of the sprue to avoid the oil spurt out.

3) Not allow water, the dir or soil into the oil tank when it replaces the hydraulic oil.

Replacement steps of Hydraulic oil:

- 1) Parking on a flat ground.
- 2) Press the pressure relief button on the air filter to loose the pressure from Oil tank.
- 3) Prepare a container, use a defueling pump or a clean pipe to draw out the hydraulic oil.
- 4) Same as the way which vent the water and the dirt, loose the oil drain bolt which is at the bottom of the oil tank to drain the oil completely.
- 5) Take down the Oil suction filter , remove the filter element and put the new one on, adjust the spring seat to make the gap between the Oil suction filter and the flange cover bigger then 10mm, tight the nut, press the boss of the cover into the spring hole on the top of the lever. Tight the bolt.
- 6) The steps of removing Oil return filter and Oil suction filter (see P5-30) .



-
- 7) Clean the inner of the oil tank.
 - 8) Install the oil suction filter and oil return filter into the flange, then immit the new qualified hydraulic oil (see oil choosing list), the oil level should be at the middle of the oil scale, and install the cover.

4.Vent the air which in the hydraulic system

A. Vent the air from the pump

- 1) Loose the drain bolt of the vent, and stop draining after it has the oil out.
- 2) Screw tight the bolt.

Attention: It will cause the pump run at high temperature and reduce the use life if there are no enough oil in the pump.

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 working device slowly about 5 minutes to vent the air

Attention: If it has air between the pump and the hydraulic oil, the engine will overheat and could be damaged when it is running at high speed.

C. Vent the air from cylinders

- 1) Run the engine in low speed, operate the working device to make the each cylinders to extend or draw back 4-5 times, but don't extend or draw back the cylinder completely, keep the piston come out about 10mm for each movement.
- 2) Then operate the cylinders to extend and draw back completely about 7~10 times.

Caution: The seal kit of the cylinder could be damaged if run the engine at high speed and operate the cylinders to extend or drawback completely from the beginning.

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

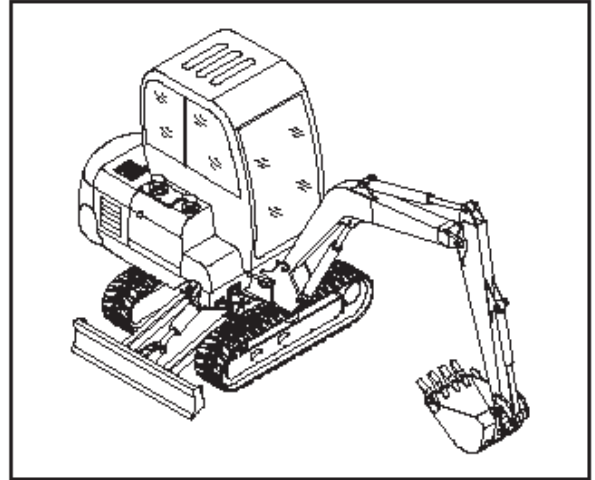
Attention: Don't slew the machine at any time during vent the air

- 1) Run the engine with low-speed, loose the vent bolt, 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 up the drain bolt
- 4) Runs the engine with the low-speed, and turn the platform of the machine to left/right about two times.

Attention: The slewing motor could be damaged if the air haven't been vented.

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

- 1) Run the engine with low-speed, loose the drain bolt. If it has the oil outflow, screw up the bolt.
- 2) Run the engine with low-speed, make the working device rotating 90°, and let it lie in one side of the track. (See the picture)
- 3) Use the working device uplift the machine, make one side of the track away the ground litter, and run the track 2 minute. Repeat to do for both side of the tracks, and turn the track forwards and backwards evenly.



F. Vent the air from accessory pipes.

If the machine has the Accessory, please operate the accessory control pedal about 10 times under engine idle to vent the air from accessory pipes.

Attention:

1. **If the manufacturer has the way for vent the air, it should do it as the way**
2. **After finish the operation of venting air, stop the engine about 5 minutes to clear the air bubble of cylinders before restart.**
3. **Wipe the oil which spill over, and check if it has oil leaking.**
4. **After the operation of venting air, check the oil level and fill if it is necessary.**

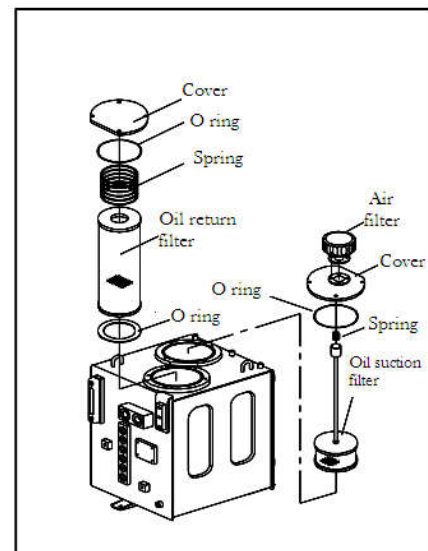
5. Replace oil return filter element

Replace it every 1000 hours.

- 1) Press the pressure relief button on the air filter to loose the pressure from Oil tank. Loose the bolt and take down the cover.
- 2) Take out the oil return filter, replace the filter element and make sure the oil seal gasket still at the bottom of the filter, then reinstall the filter.

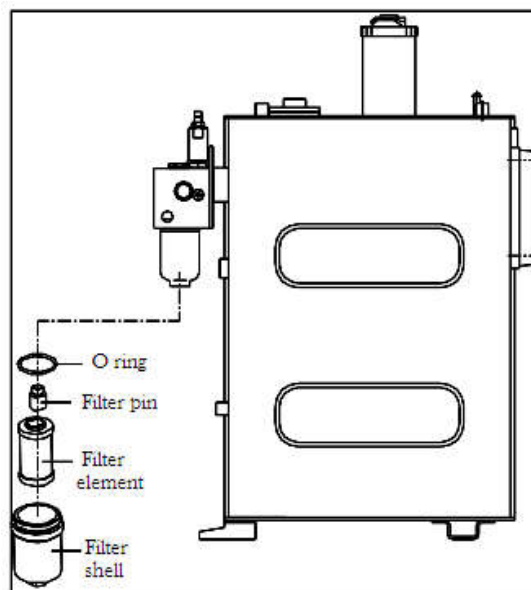
6. Replace the pilot filter element

Replace it every 1000 hours.



Attention: It must vent the pressure of the hydraulic oil tank before take-down the filter.

- 1) Screw down the filter shell.
- 2) Take-down the filter element.
- 3) Install the new "O" ring into the groove of the filter head.
- 4) Wipe the hydraulic oil on the surface of the seal kit before install the new filter element, and put the filter element into the filter head.
- 5) Clean the filter shell and the pin. Not allow the dirt, dust or water into the filter shell.
- 6) Screw up the filter shell and the filter head with the torque of 25-35Nm.
- 7) Connect the pipeline, and run the engine in low speed about 3-5 minutes to vent the air.
- 8) Park on the level ground, check the oil level and fill if it is necessary. Not allow the oil over the highest limit.



■ **The replace period of the hydraulic filter element when the machine is installed the accessory (Rock Breaker).**

It increase the pollution of the hydraulic system when use the Rock breaker, The replaced period of the hydraulic oil and the filter element need to be reduced accordingly to avoid destroying the hydraulic pump and other hydraulic elements. The suggested replaced periods as follow:

Working rate of Rock breaker	Replace period of the hydraulic oil	Replace period of the filter element
50%	1000h	Oil return filter 750h, oil suction filter 1500h
100%	500h	Oil return filter 500h, oil suction filter 1000h

Attention: Please adjust the pressure of hydraulic system as the request of the Rock breaker.

Battery



Warning: 1) It has sulphuric acid liquid which is strong corrosive in the Battery, please keep away from Child, wear the protective glasses and rubber gloves when during Battery maintenance. Washing by water if the liquid splashes into your eye, skin or cloth. Go to the hospital if necessary.
2) The battery produces hydrogen and oxygen when charged, so keep away from the fire and avoid short circuit to avoid the explosion.
3) The battery case is made by polypropylene which is the flammable substance, please kept away from fire.

1. Storage of battery

- 1) Please store in 5~25°C dry, clean and well ventilated house, keep away from heat source 2m at least, it will affect the performance of the Battery if the temperature is too high.
- 2) Batteries shall not be inverted or lying, shall not be impacted or pressed.
- 3) The storage time of the Battery on Yuchai excavator is 6 month, it can be use directly during 6 months, but it need to be charged if the storage time is more than 6 months.

2. Charge the battery

The battery produces hydrogen and oxygen from electrolyte during charge, the lower the charging voltage, the more water is lost. There is no need to add water to the Battery which is on Yuchai excavator, therefore constant voltage charging is recommended, to avoid constant current charging as far as possible.

1). Constant current charge

Charge the battery 2~4 hours by the electrical current (A) of 10% of rated capacity of the Battery.

2). Constant voltage charge

Charge the battery 16 hours by 16V charger (Max. electrical current $\leq 25A$)



Warning: 1) The battery produces gas when charged, check the exhaust hole of the battery to avoid clogging and cause the explosion.
2) When charging the battery, the positive electrode of the charger should be connected with the positive electrode of the battery, and the negative electrode of the charger is connected to the negative electrode of the battery. Not reverse charging.
3) Reduce the charging voltage or electrical current if the temperature of electrolyte is too high during charge.
4) Don't charge for the frozen batteries, move the frozen battery into the warm house and wait until it is unfrozen.

3. Installation of Battery

- 1). Read the safety mark carefully before install the Battery, to prevent the accidents.
- 2). Wipe a small amount of Vaseline on the end of connecting posts to prevent corrupted. Connecting wires should be secure and reliable. Not tap on the end of connecting posts to avoid the leaking.
- 3). The positive electrode of the charger should be connected with the positive electrode of the battery, and the negative electrode of the charger is connected to the negative electrode of the battery.
- 4). Fasten the Battery on the frame, avoid battery damaged due to loosening.

4. Maintenance of Battery

- 1). It has an indicator of Battery capacity on the cover, when it indicating green, the battery for normal use. When it indicating black, the battery need to be charged. When it indicating white, the battery need to be changed.
- 2). Please charge the battery in time when it lost electricity during use, to prevent battery degradation due to sulfation.
- 3). Don't overcharge the battery, to avoid battery failure earlier due to excessive water loss, grid growth and lead paste shedding.
- 4). Please remove the battery from the machine and store in a ventilated and dry place if the machine need to be park for a long time (more than 15 days), and check the battery termly (about 3-6 months), charge the battery if necessary (if the indicator is black).
- 5). If there are any problems, please contact with YCUHAI distributor.

Reducer

Maintenance illustration

Lube capacity of the slewing reducer -----1.6L

Lube capacity of the travel reducer -----1L (each side)

Check the level of the lube and oil filling-----every 250h

Replace the lube ----- 1000h

Check the torque of the connect bolt of the reducers-----500h

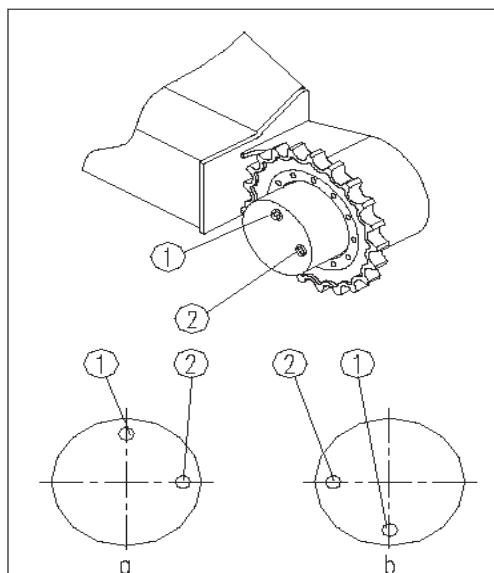
1. Check the level of the lube for the travel reducer and fill



Warning: The oil of the reducer will be heat when the machine is travelling. The travel reducer and the oil are in the high-temperature which could be caused scald after stop the engine. It must wait the oil is cool before start maintenance. Loose the vent bolt to release the air pressure before take it down, It is dangerous to take-down the bolt fast without release the air pressure.

Check it every 250 hours

- 1) Prepare an inside hexagon spanner.
- 2) Parking excavator on a flat ground.
- 3) Turn the travel reducer make the two bolt of the outboard in "a" position as the picture, then stop the machine.
- 4) Loose the bolt ① after the oil is cool.
- 5) After release the air pressure, use 12-15Nm torque to screw up the bolt①
- 6) Remove the bolt②,check the oil level. The oil level should be at the bottom of the bolt hole.
- 7) Supply the oil if it necessary (as the way of filling oil)
- 8) Clean the bolt②,install to the reducer again. The qorque is 12-15Nm.



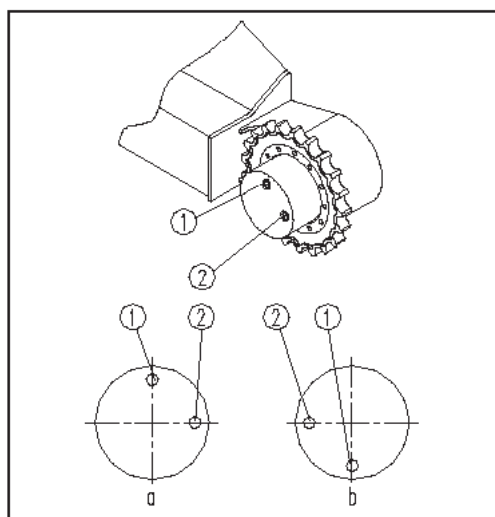
2. Replace the lube (For each reducer)

Replace it every 1000 hours

- 1) Park on the level ground.
- 2) Turn the travel reducer make the bolt① in "b" position (see the picture)
- 3) Vent the oil when it is hot.

Attention: Don't scalded by the hot oil

- 4) Loose the bolt① and vent the oil, and loose the bolt② make vent the oil completely.



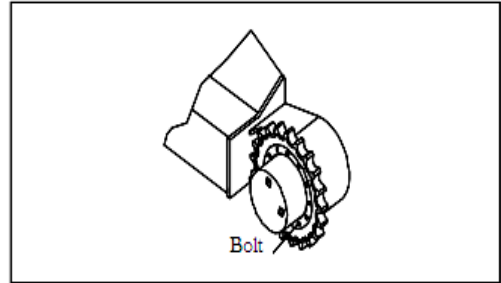
- 5) Turn the travel reducer make the bolt in "a" position
- 6) Fill the lube thought ① till the hole ② has the oil out.
- 7) Screw up ① and ②, the torque is 12-15Nm.

3. Check the torque of connected bolts of travel reducer and slewing reducer

A . Check the fastness of the connected bolts of travel reducer

Take the first check it after 50 hours, after that check it every 500 hours.

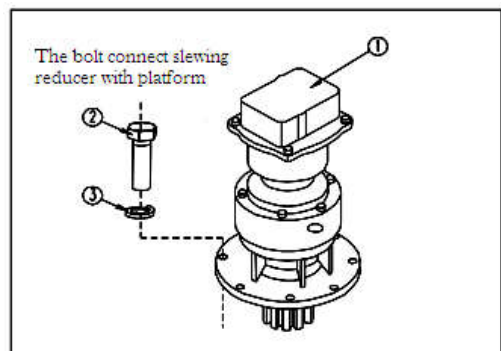
The torque is $150 \pm 10\text{Nm}$ for the bolt which connect the reducer with Chassis and the driving wheel.



B. Check the fastness of the connected bolts of slewing reducer

Take the first check it after 50 hours, after that check it every 500 hours.

The torque is 195-250Nm for the bolt connect the slewing reducer with the platform.

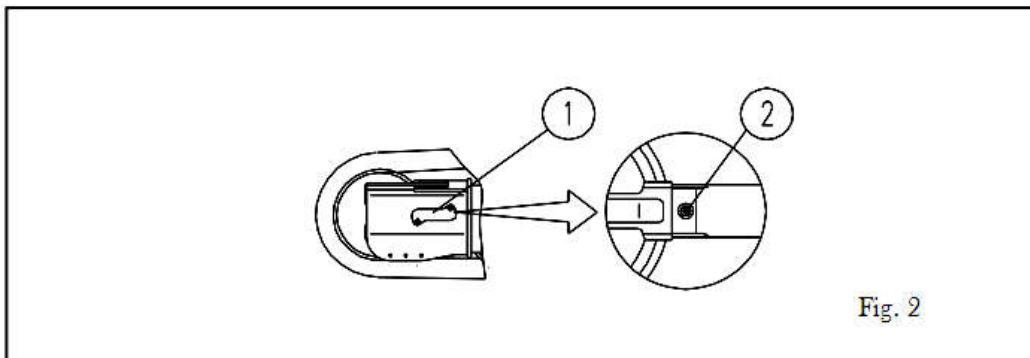
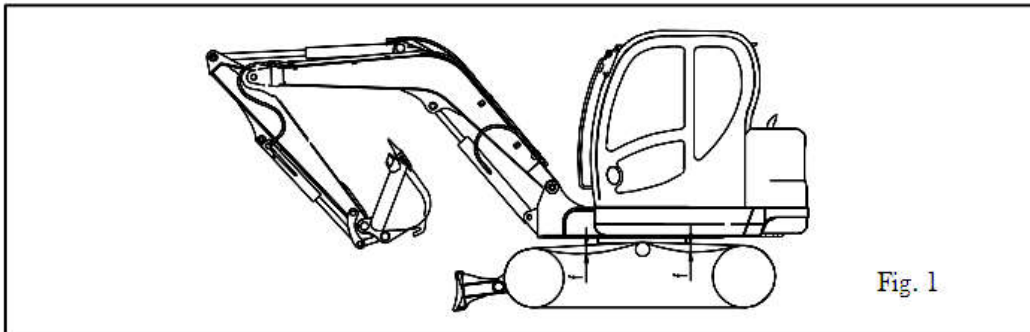


Tracks

Check and adjust the tension of the Tracks

Check it every 10 hours.

- 1) Park the Excavator on flat ground.
- 2) Take down the cover ① (Fig. 2), expose the lubricating nipple of the tension unit.
- 3) Loose the tie-in ② (Fig. 2) make lubricating grease come out, and the track will became loose, make the branches f (Fig. 1) at 2-4 cm deflections, then tight the bolt again.
- 4) For adjust the track, connet the tie-in of the greasing gun(as the tools sent with machine) and the tie-in② (Fig. 2).Then use the greasing gun immit till the branches f (Fig. 1) at 2-4 cm deflections.
- 5) Clean the mud on the tracks every day after work.



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

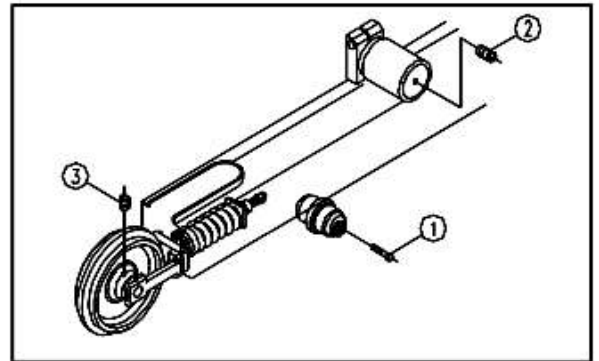
Warning: Don't screw the big nut in Fig. 2, it can cause the vale come out and hurt person.

Bottom roller, upper roller and Front idler

1. Check the torque of the bottom roller

Check the torque of bottom roller after first 50 working hours, after that check it every 500hours.

If the bolt is loose, it need to screw the bolt down and clean the thread additive which for lock and fix of the bolt. And wipe the additive again, then screw up with the regular torque.



1. Bottom roller bolt
2. Oil plug for upper roller
3. Oil plug for Front idler

2. Check the oil level of Upper roller and Front idler

Check it every 1000 hours.

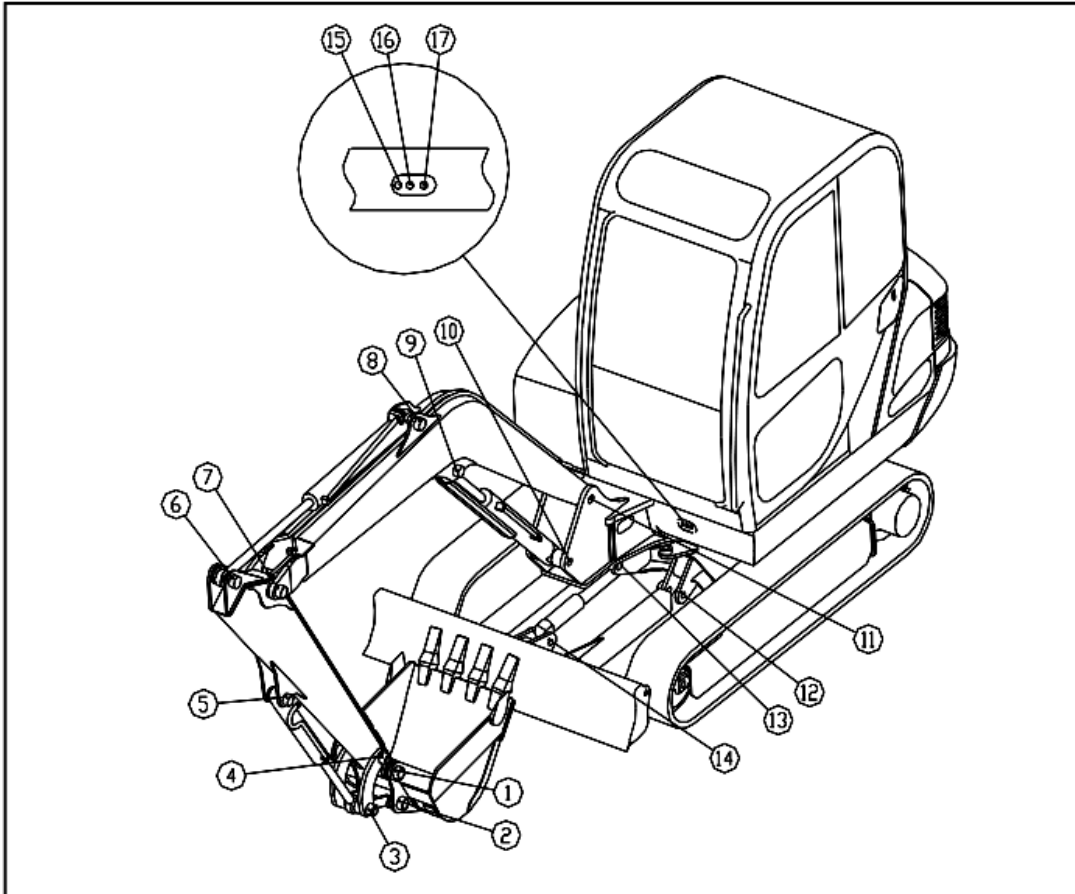
- 1) Take out the bolt ②、③ from upper roller and Front idler
- 2) Immit the oil
- 3) When the nipples has the oil out, screw up bolt ②、③ again.

Lubricate

Lubricating every 50 hours

Lubricating steps:

- 1) Start the machine and place the bucket on the ground
- 2) Put the bulldozer down to the ground
- 3) Stop the engine
- 4) Clean the nipples and the oil cup.
- 5) Lubricating the parts and wipe nipples.



- | | |
|--|---|
| 1. panel point of arm and bucket | 11. Panel point of boom and platform |
| 2. panel point of Linkage rod and bucket | 12. Panel point of dozer and chassis |
| 3. panel point of Linkage rod and connected rod | 13. Lubricating point on the end of dozer cylinder |
| 4. panel point of Linkage rod and arm | 14. Lubricating point on the head of dozer cylinder |
| 5. lubricating point on the end of bucket cylinder | 15. Rollaway lubricating point I |
| 6. lubricating point on the head of arm cylinder | 16. Rollaway lubricating point II |
| 7. panel point of arm and boom | 17. Rollaway lubricating point III |
| 8. lubricating point on the end of arm cylinder | |
| 9. lubricating point on the head of boom cylinder | |
| 10. lubricating point on the end of boom cylinder | |

Air-condition

This excavator is with AC, and the operation switches are placed on the panel of left control box.

About the maintenance of the air-condition, please see the user manual and the air-condition user manual.

1. Caution items of the air-condition maintenance

- 1) The refrigeration system is failure if “❄️” is flashing, the compressor don't work and no refrigeration, please find the specialized persons to repair.
- 2) If the Ac system auto-stop (the screen light up then off), or “❄️” is flashing (about 5 seconds), an abnormal power off is occurring or occurred in last time (shut down without turn off the AC switch, fuse is burned during AC system is working, AC wire is poor connection). The AC system can be used if “❄️” stop flashing after 5 seconds. Please check the connection if AC system can not to be started or auto-stop after turn on.
- 3) For protecting the compressor, this machine sets 15 seconds of interval time between two operations of the compressor. so the compressor will not run even you push the cooling button if the interval time is shorter than 15 seconds, but your instruction will be accepted after 15 seconds.
- 4) The dust screen of the AC box must be cleaned often, clean it in every month. Otherwise, the dust will block the dust screen and the air not thought the heat exchanger smoothly, then effect the Air Conditioning.
- 5) Under special conditions (humidity, hot weather, outer loop, blower running in low speed, dust screen is dirty, return tuyere is blocked etc.), some time you will find the air outlet is getting smaller after used the rapid cooling function for a long time, even almost no wind, this is because the evaporator is frosting. But this is not a malfunction, just stop rapid cooling, clean the dirt, and choose high wind function, then choose the cooling function after few minutes, it will run normally. Don't choose low wind, rapid cooling and outer loop function at the same time at this time, you can choose normal cooling or mid cooling.
- 6) If you need to use heating system in winter, please wait until the water temperature is increased.
- 7) The core of the heating is connected to the water tank of the engine, the water tank will be short of water and cause the engine overheat if the core leaks. So it is very important to protect the heating core from frost crack, same as the water tank. To avoid the coolant freezed to make frost crack to the heating core or the water tank, please use the coolant as the request of the manufacture. Drain the coolant if you need to park

the machine for a long time in winter. It is not under the if the heating part is frost crack in winter. If the parts are corrupted or the Warm Water Valve is damaged because nonuse the coolant as the request of the manufacture.

- 8) The cryogen can cause cold injury, special for the eyes. Furthermore, the cryogen will releases toxic gases when it is on fire, so protect your eyes and the skin when dismantle the cooling system, drain the cryogen before dismantlement, and make sure there are no fire during operation.

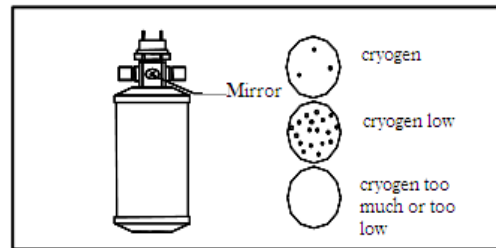
2. Check the value of the cryogen



The cryogen can cause cold injury, special for the eyes. Furthermore, the cryogen will releases toxic gases when it is on fire, so protect your eyes and the skin when dismantle the cooling system, drain the cryogen before dismantlement, and make sure there are no fire during operation.

The cooling performance will worse if the machine short of the cryogen, Check the value of the cryogen every month or every 250 hours.

To do rapid cooling operation when the engine is running at high-speed, and judge the value of cryogen according the air bubble in the mirror of the desiccators.

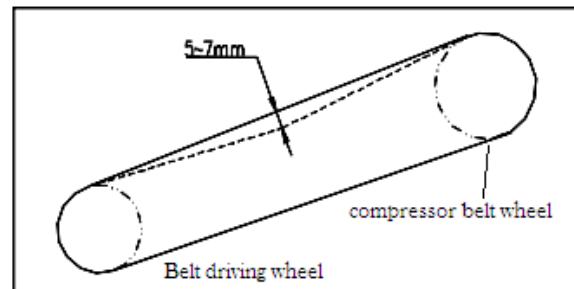


3. Check and adjust the tension of AC belt

Check it every 250hours

A. Check

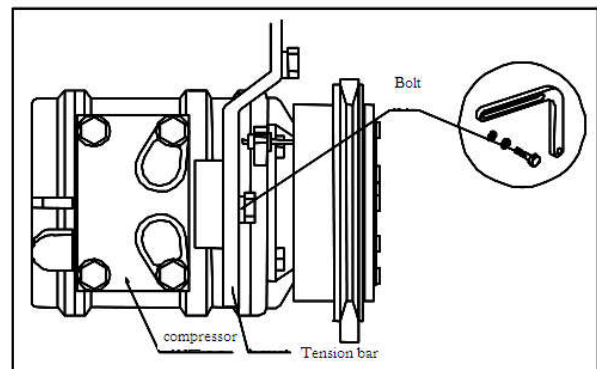
Use about 6kg finger force to press at the middle of the belt (between belt driving wheel and compressor belt wheel), and deflexion should be about 4-5 mm



Check the belt and replace if the it is wear or has been elongated.

B. Adjust

Loose the bolt (see the picture), use a bar to lever the compressor a little, adjust the belt to the suitable tension. And screw up the bolt. (If it necessary, it can loose the two fixed bolts under the compressor).



4. Items of the time-check

No.	Check Item	Check Content	Check Periods	
			Every Month	Every Quarter
1	Fastener	If loose、fall off	★	
2	Belt of air-condition	The tension and fray	★	
3	Pipeline	If fray or rupture	★	
4	Tie-in	If fray of leak		★
5	Electric fan	Whether run normal	★	
6	Wires	If fray、burn	★	
7	Condensator	If has the dust stop		★
8	Electromagnetism clutch	If slip	★	
9	Compressor	If has the noise		★
10	Value of cryogen	If the view mirror has the air bubble	★	
11	dust screen	If stop	★	

Replace Bucket and the Teeth

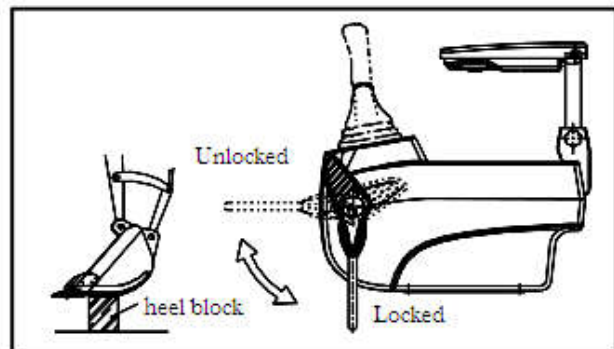
Replaces the bucket teeth before the teeth seat is fray.



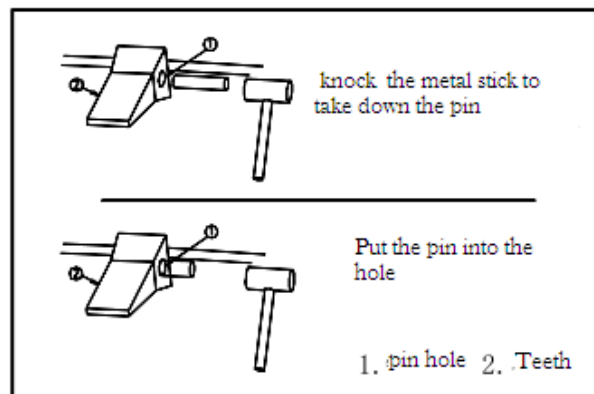
Warning: it is very dangerous if the working device move because of the wrong operation when replace the bucket teeth. Please lock the working device, stop the engine and lock all operation levers before replace the teeth. The teeth pin could pop out in any time, so wear the protection device to avoid the injury.

Replace the Bucket teeth

1) Place the bucket on a heel block for take-down the teeth pin. Check the stability of the working device, and make the bucket place in level. Turn the safety lock handle to the lock position, then shut down the engine.



2) Put the metal stick which the diameter is smaller than the teeth pin on the head of the pin, use the hammer knock the stick to take out the pin, then take-down the teeth.



3) Clean the installing surface. Install the new teeth into the teeth seat, use the hand push the pin into the hole, then use the hammer knock the pin to lock the teeth on the teeth seat.

Washing The floor mat

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

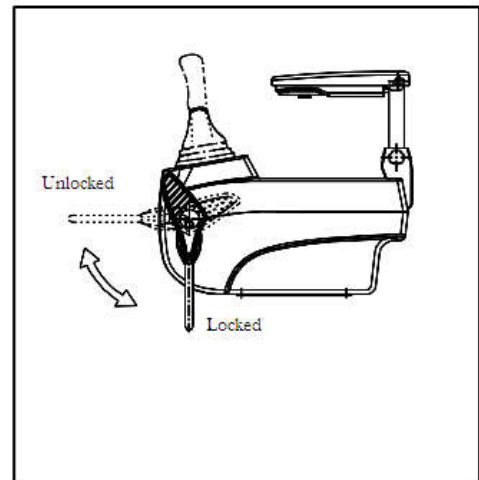


Warning: If it touches the joy stick unguarded, the working device or the machine will move and lead the accident.

So it must place the machine on the flat ground before take down the floor mat. Please turn the safety lock handle to locked position before you leave the seat.

Washing steps:

- 1) Take floor mat out from the cab
- 2) Use the brush to washing the dirt or use the water washing it.
- 3) Use the dry mop to clean the floor inner the cab.
- 4) Take floor mat back to the cab after it is dry.



Maintenance of electrical system

Electrical system is a main part of the excavator, please do the maintenance strictly as the regulations in this manual. Turn off the power before checked and maintain the electrical system.

1. Firstly, check the connection of the battery, battery is the power sources of the system, so please make sure the connection of the battery is tight.
2. The electrical circuit must be dirt after used a long time, this can lead to the short circuit or broken circuit, so please check and clean the circuit for every 15 days.
3. Check the appearance of the circuit, and replace by professional people if it is wear or aging.
4. When the machine is no power, please check the fuse firstly, and replace if the fuses are burned, do not use the iron wire or other conductors to replace the fuse.
5. It is very dangerous if the electrical parts become damp or electrical insulation is damaged, it can cause electricity leak, so please don't wash the inner of the cab by water. And please don't let the water touch electrical parts.
6. Do not install any electronic components other than those specified by Yuchai.
7. Electrical system can be failure if it has external electrical interference, please contact with YUCHAI distributor if you need to install radio or other wireless equipment.
8. When working on the beach, clean the electrical system carefully to prevent corrosion.
9. When installing the cooler in the cab or other equipments, it should be connected to a special power supply, must not be connected to the fuse, starting switch or relay.

Safety precaution

If equipped with the accessories or optional parts without YUCHAI permission, Not only effect the using time of the machine, but also can cause some safety problem. Please contact YUCHAI distributor if equipped with the accessories.

If you do not confirmed with YUCHAI before installation, we will take no responsibility for any accident or damage.

1. Safety operation of accessory

- Accessory has powerful assistant function. To prevent serious injury or damage, please use accessory correctly.
- Please study the accessory's operation manual carefully, please do not use accessory until you know the manual absolutely. If you lost the manual , please ask the manufacture of the whole machine or the manufacturer of the accessory for a new one.
- It is necessary to equipe the front protection fence according to the situation of accessory.
- According to the situation of accessory, It is possible to make your staff difficult transfer operation manual to you because of the shaking noise, please arrange a guider before operation , certaining what signals you will use.
- Please do not act the function of swing side's rotate ,especial on slope. This is very dangerous.
- Comparing with the machine with bucket, the machine with rock breaker has even heavier burden in front of working part, also not stabilization. Please do not operate when the accessory turned to side to prevent overturn.
- The machine's rotate radius and barycenter is different under the condition that machine with accessory, the machine will move by accident. You must to know the machine's situation appropriate.
- Please set a alertness line around the machine before operation to prevent someone getting in .Please do not operate machine when there has someone nearby.
- Please do not put your leg on pedal except when you operate the pedal to prevent the serious accident by wrong operation.

2. Dismantle or Install Accessory

When dismantle or install accessory, you must follow the following steps to make sure safety of operation.

- The operation of dismantle and install must be carried out on the firm and smooth groud.
- Please make sure the signal when there have more than one people operating and obey these signals in operation.

-
- Please must use crane when lift or delivery the object more than 25 Kgs.
 - When dismantle the heavy component , please sustain that part before dismantle. Please be more care about the barycenter when using crane lifting.
 - It is dangerous to operate crane when lifting heavy thing .please prepare Bracket and make sure of it safely.
 - When place the dismantled accessory or install accessory, please make sure it is stabilization and will not turn over.
 - Please do not walk the place where under the crane which is working, you should stay in the safety please even the load dropped can not be hurt.

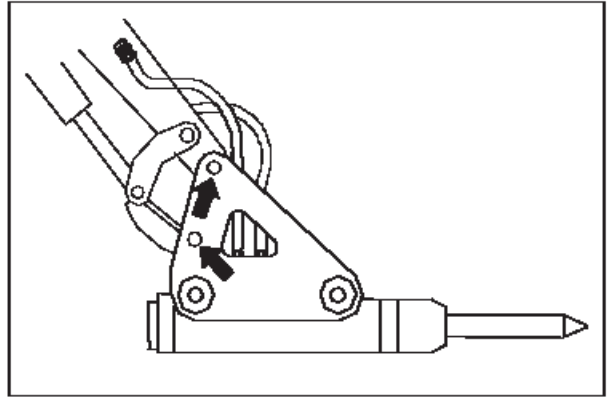


Warning: The license for operator is very important .It is forbidden to operate the machine without license. Please contact yuchai agent regarding the details of operation when dismantle or installation .

Installation and dismantle steps of Accessory

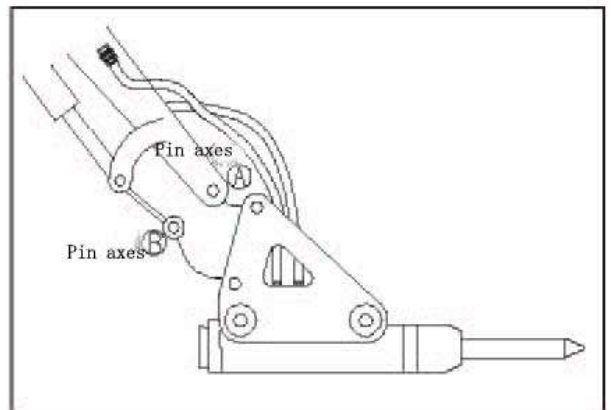
1. Step of dismantle

- 1) Put the accessory on the ground and turn off the machine.
- 2) Turn start switch to ON and the left control box to free position.
- 3) Full operate all working equipment which are control stickers and control pedal of accessory in all directions which are forward, behind, right and left about 2-3 times to eliminate inner pressure of hydraulic oil system.
- 4) Confirm the temperature of oil lowed down, then lock the valve which is connecting inlet and exit pipes beside the sticker.
- 5) Dismantle the soft pipe on the side of accessory, Screw the plug which is with combined seals to the inlet and outlet tightly.
- 6) Dismantle the accessory by the way of dismantle two shafts, and then install the bucket.
- 7) Use clean plastic bag enswathe the two hydraulic breaker's rubber pipes to prevent dust. Put the accessory well.



2. Step of installation

- 1).Dismantle bucket
- 2).Put the accessory to a flat place, please use shaft A connect sticker and hydraulic breaker, use shaft B connect and hydraulic breaker.
- 3).Make sure the oil cooled down, dismantling the bolt from inlet and outlet please take care of preventing dust and earth attached on the mouth of the soft pipes. Please replace new one if combines seals damaged.
- 4).Connect the rubber pipe which besides the accessory. Must check the direction of oil flowed and make sure do not make mistake when connecting.
- 5).Please unlock the change valve which is connecting accessory side's inlet and outlet rubber pipe.
- 6).Please make sure that hydraulic oil in a reasonable quantity in hydraulic tank after the installation of accessory.



Operating Guide of Accessory

This section will introduce what you should pay attention when you operate the excavator with accessory.

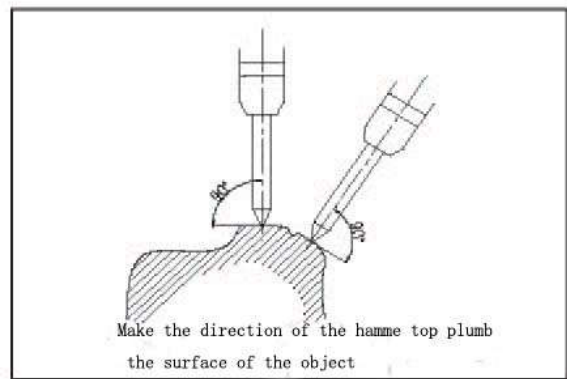
Attention : Choose the optimum accessory for machine,. The model for machine which can be equipped with accessory is different, Regarding the machine and accessory's model ,please contact yuchai agent.

Hydraulic Rock Breaker

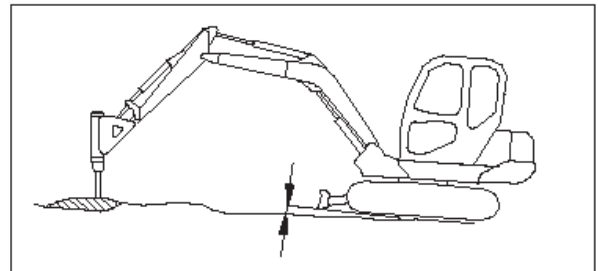
1. Operation guide of hydraulic rock breaker.

Hydraulic rock breaker is a normal accessory, which is abroadly used in backout building , broken road, tunnel working, break steal , break rock and break working in rock mine.

1).When breaking , please make sure the top of rock breaker's sticker is plumb with the surface of rock and keeping all the time, or the rock breaker's sticker will slip , the sticker will be damages under this condition.

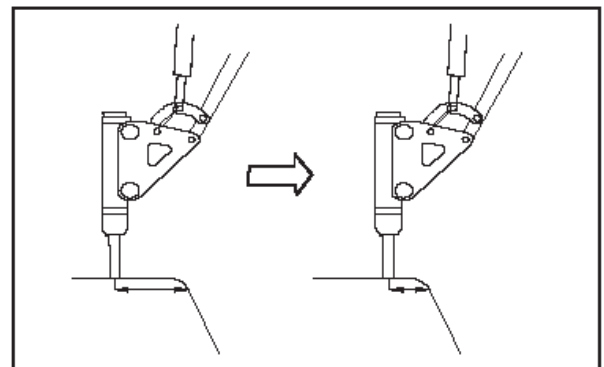


Please choose the best break point and make sure that the sticker is firm when working.



The cylinder of sticker must be adjusted all the time when working to keep the force direction of the rock breaker's sticker lines with the direction of rock breaker's noumenon.

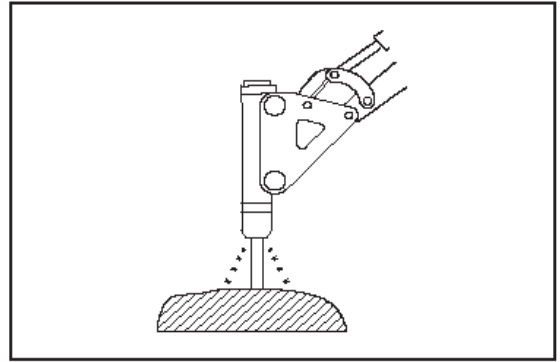
2) When actualize strike, please put the rock breaker's sticker on the surface of strike, making about 5cm distant between ground and frame and do not let the machine leave the ground too much .



3) When make a continuous strike on a surface, If the sticker can not breaker the surface of the object in one minute, please change the position of

strike where near the side of the object.

- 4) Use rock breaker to impact the surface suitable, avoid no resistance use the wallop stop use the to impact when the rock breaker or the objet crushed crushed. If not stop, it will lead the bolt of the main body loose and mangle.

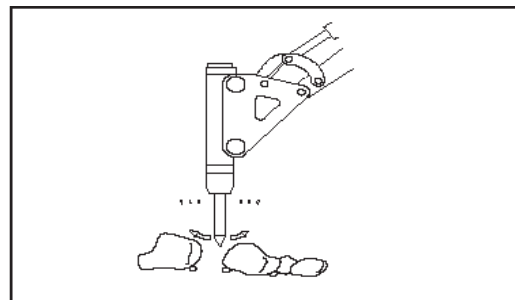


2. Operate tabu of the hydraulic rock breaker

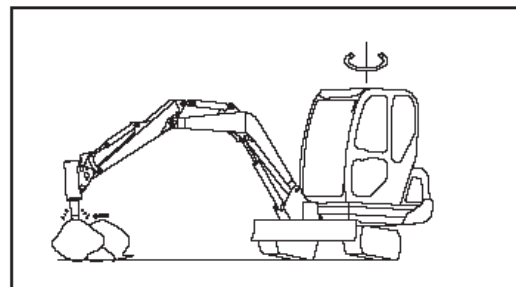
For the machine has long use life and the safety operation, no operate as follow:

Caution: No operate the cylinder to the end of the driving, it should keep the rest about 5cm.

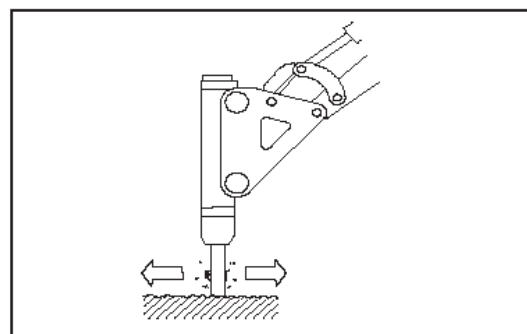
- 1) Push the heavy thing or the big block use the rock breaker



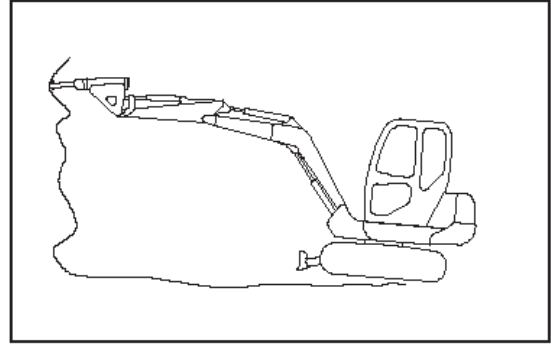
- 2) Use the rotating operation



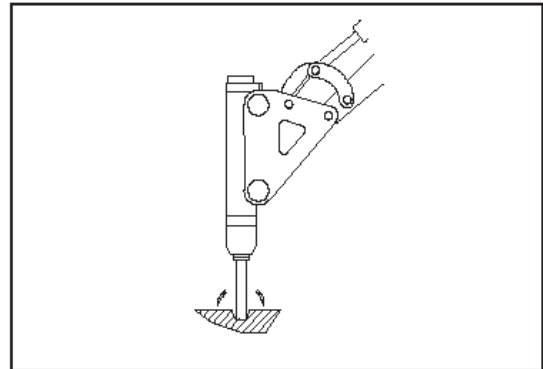
- 3) Move the rock breaker when do the impact operation



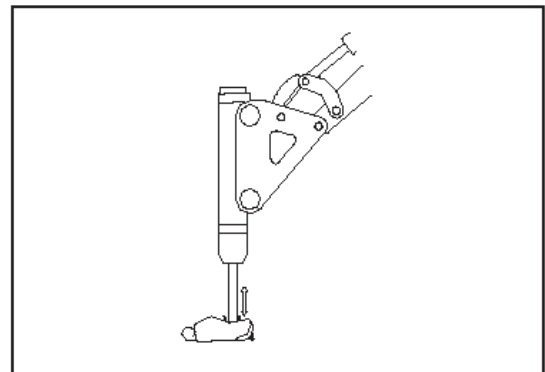
4) Inflict the wallop on the level ground or upwards



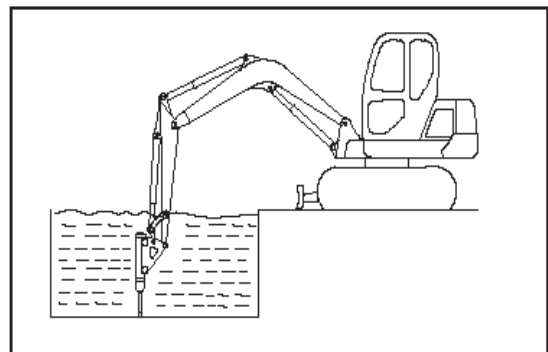
5) Waver the rock breaker when it penetrate the rock



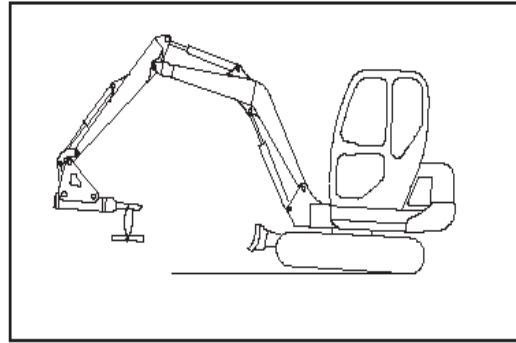
6) Peck operation



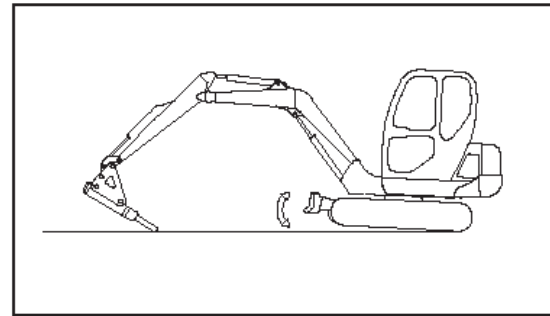
7) Operate it in the water or the muddy ground



8) Use the rock breaker hang the heavy thing



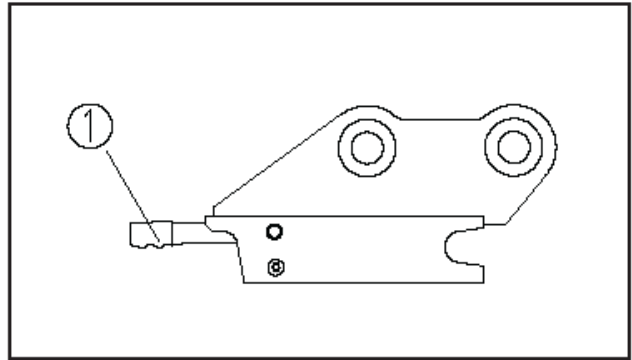
9) Throw out the cylinder of the bucket to make the machine leave the ground



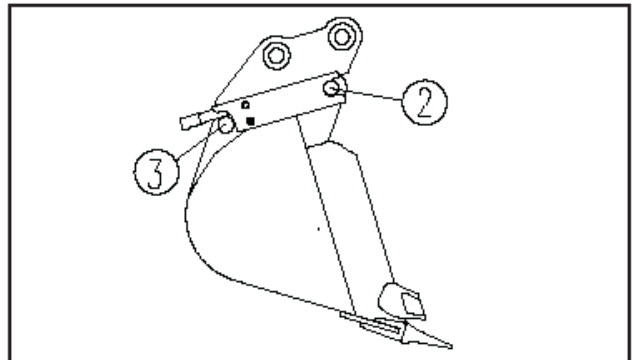
Quick hitch

1. Install the bucket

1) Use the tommy bar to prize ①



2) Put the axes of the bucket into the ②③, down the tommy bar and the bucket installed.

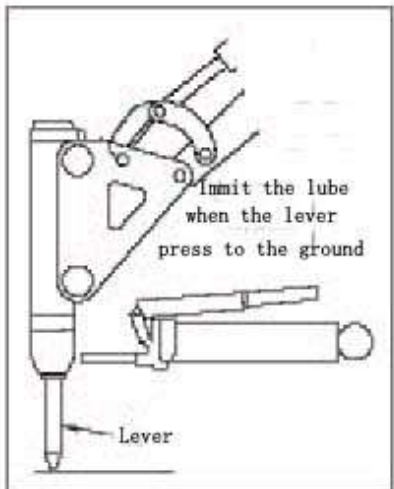


2. Take down the bucket

1) Use the tommy bar to prize ①

2) Take down the bucket.

Daily Check of Hydraulic rock breaker

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