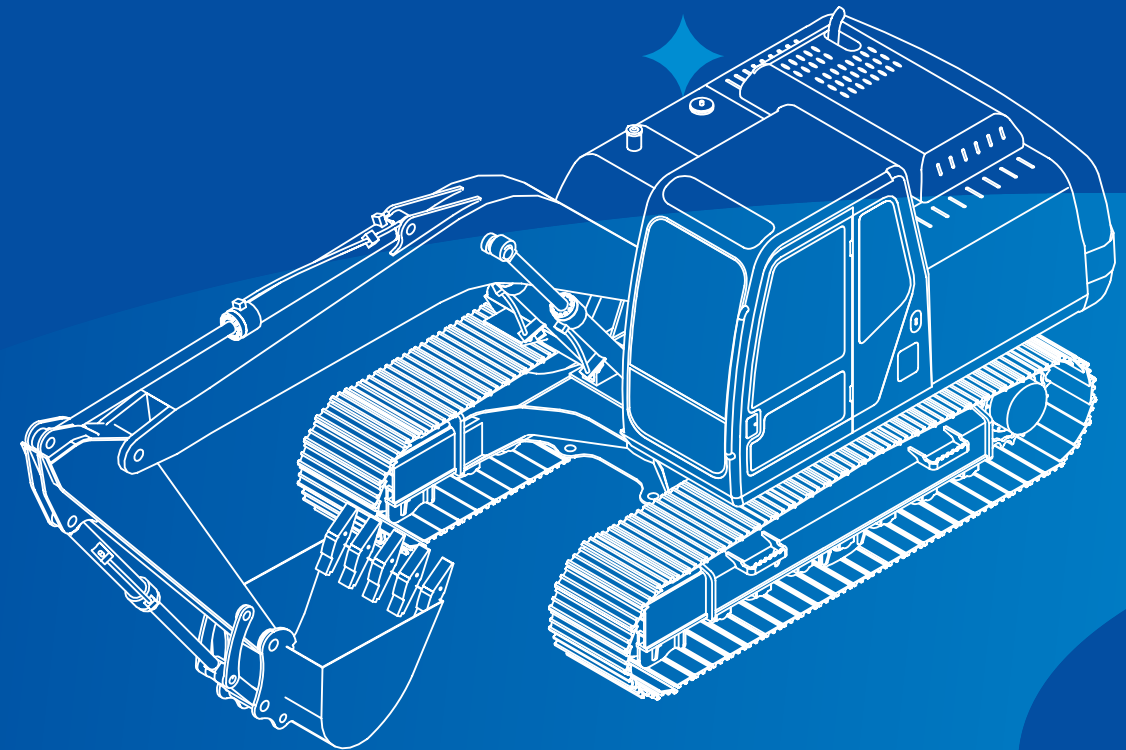


YUCHAI MACHINERY



HYDRAULIC EXCAVATOR

YC135-8

OPERATION AND MAINTENANCE MANUAL

GUANGXI YULIN YUCHAI ENGINEERING MACHINERY COMPANY LIMITED

SJ008/870E(E)-2008

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Caution

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

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

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Attachment:

Instruction of the product certificate

1

Prolegomenon

TO USER

Dear users,

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

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

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

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

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

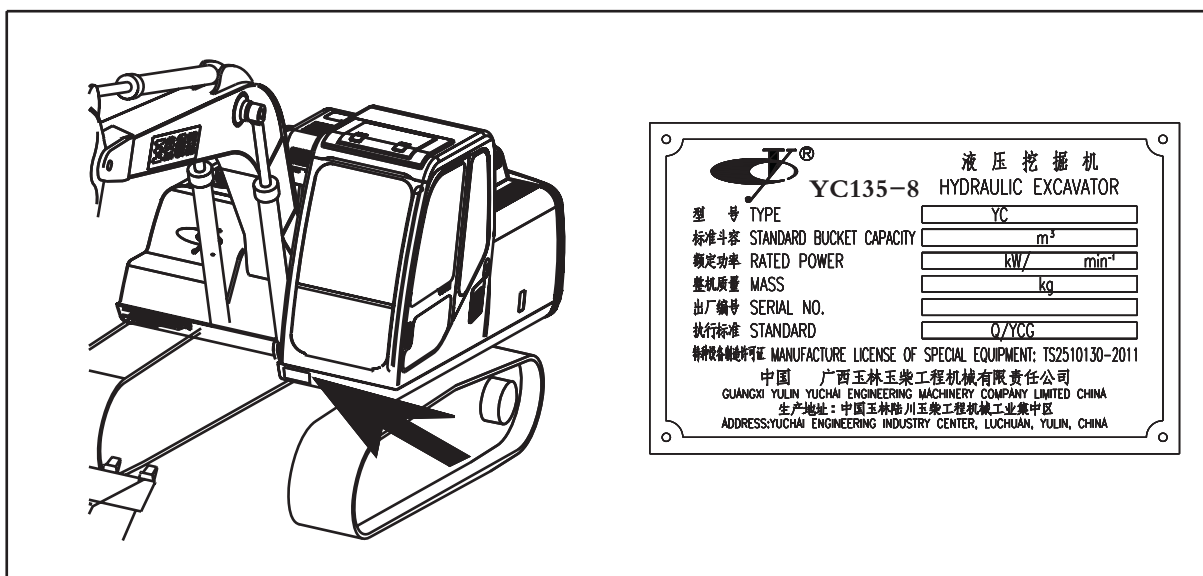
According to the principle of "The customer is god", we will keep improving the machine for supplying the product to the user as best as we can. The improvement will be take in any minute, we will not responsible for sending the new manuals for the selling products and giving the notice in advance.

Hope this machine can supply the comfortable operating condition.

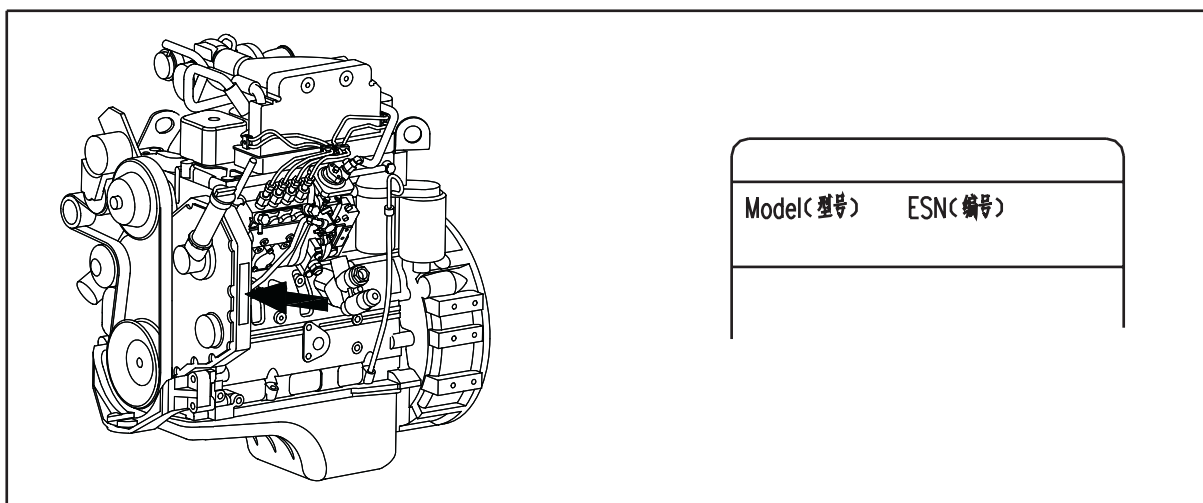
Product information

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

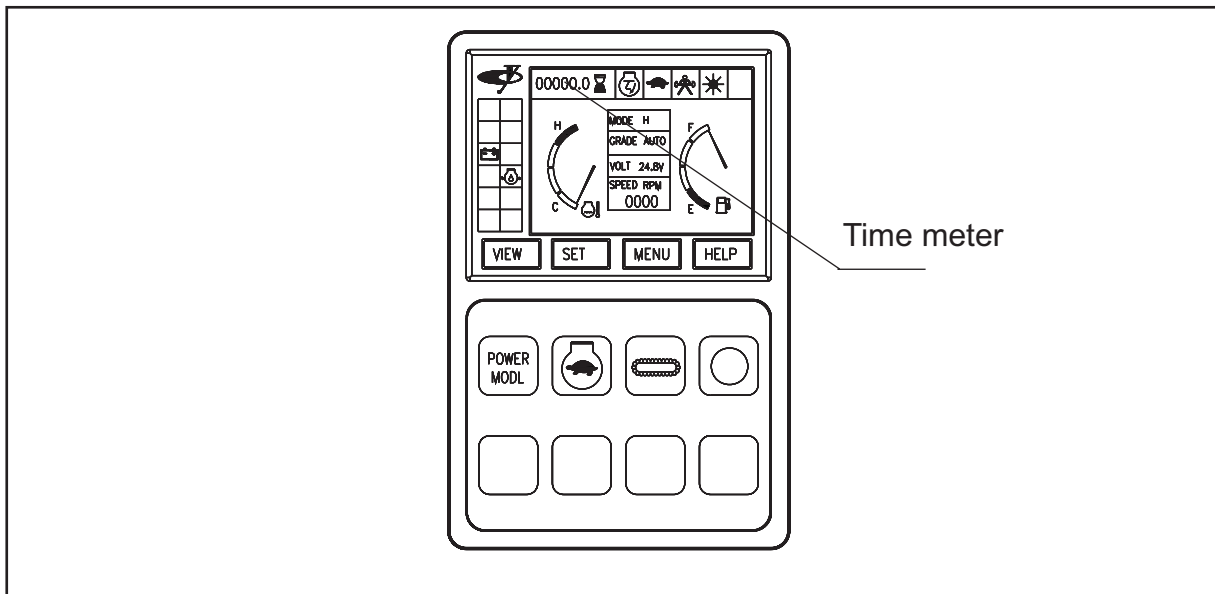
● **Machine Information**(The nameplate is on the left-front side of the platform)



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



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



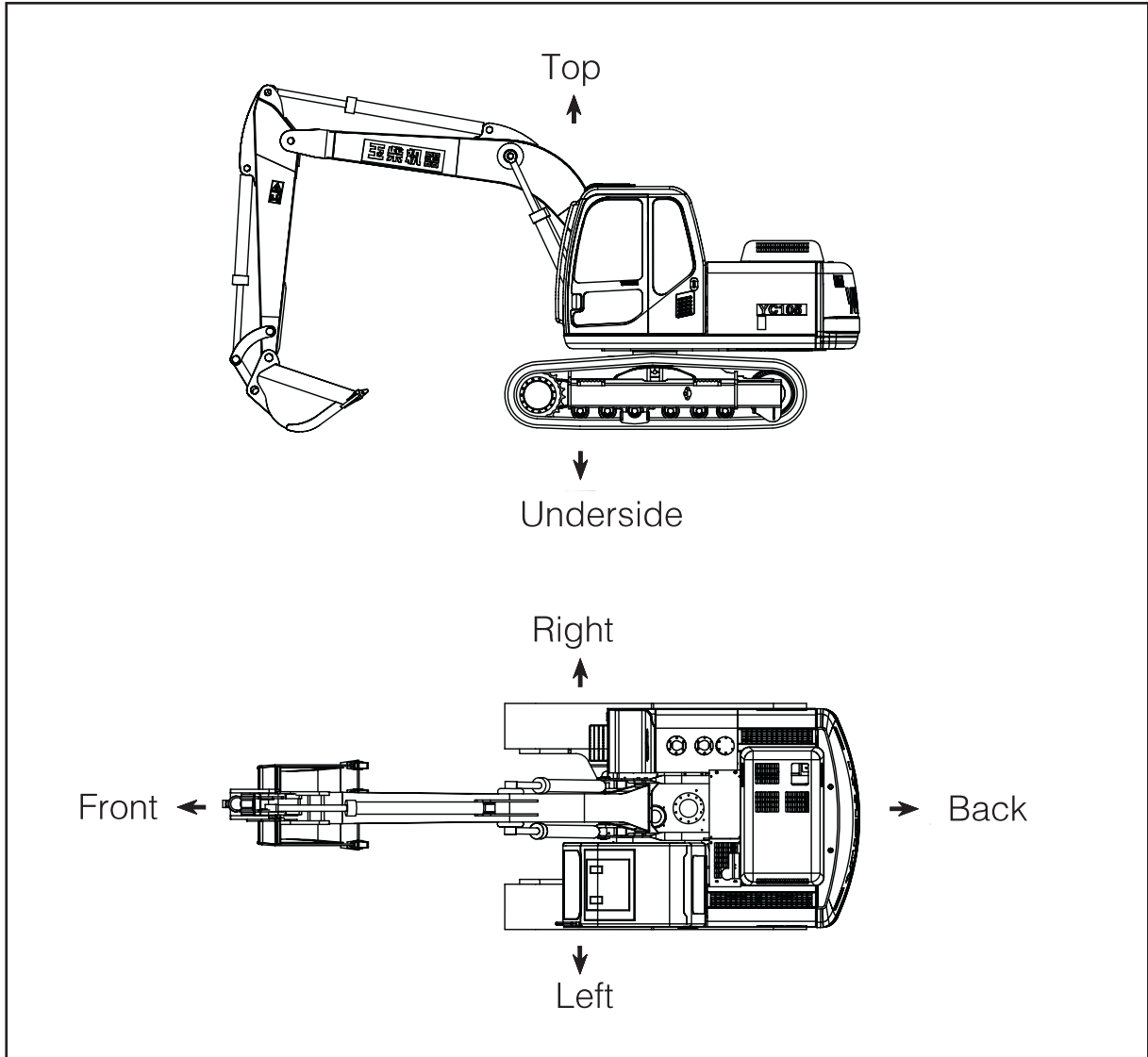
Machine record

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

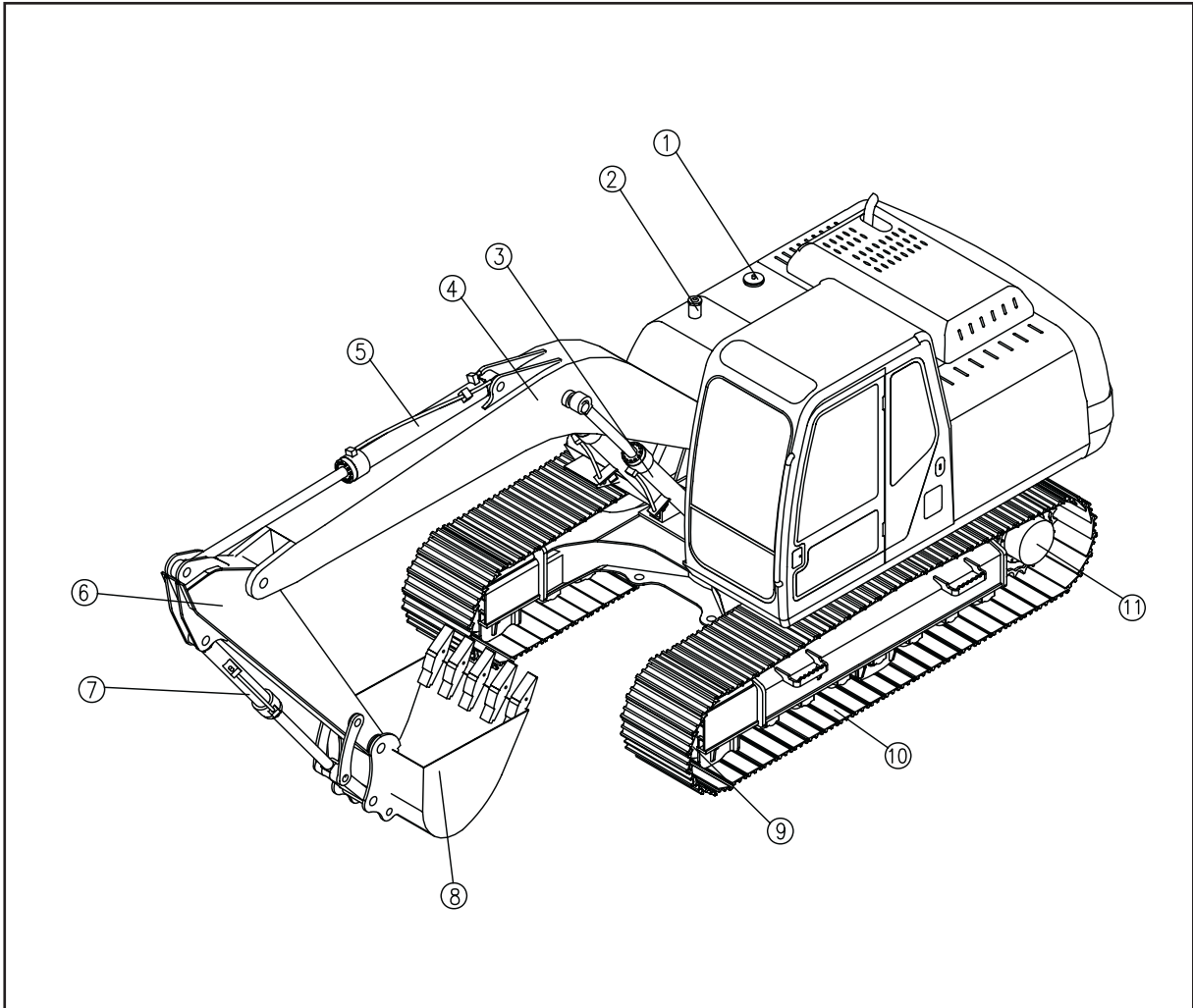
	<ul style="list-style-type: none"> ● Model: _____ ● Machine No: _____ ● Engine No: _____ ● Dealer Information: _____ _____ _____ _____
--	---

Machine Direction

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



Machine Configuration



- 1. Tank of Hydraulic oil
- 2. Fuel tank Arm cylinder
- 3. Arm cylinder
- 4. arm
- 5. arm cylinder
- 6. arm

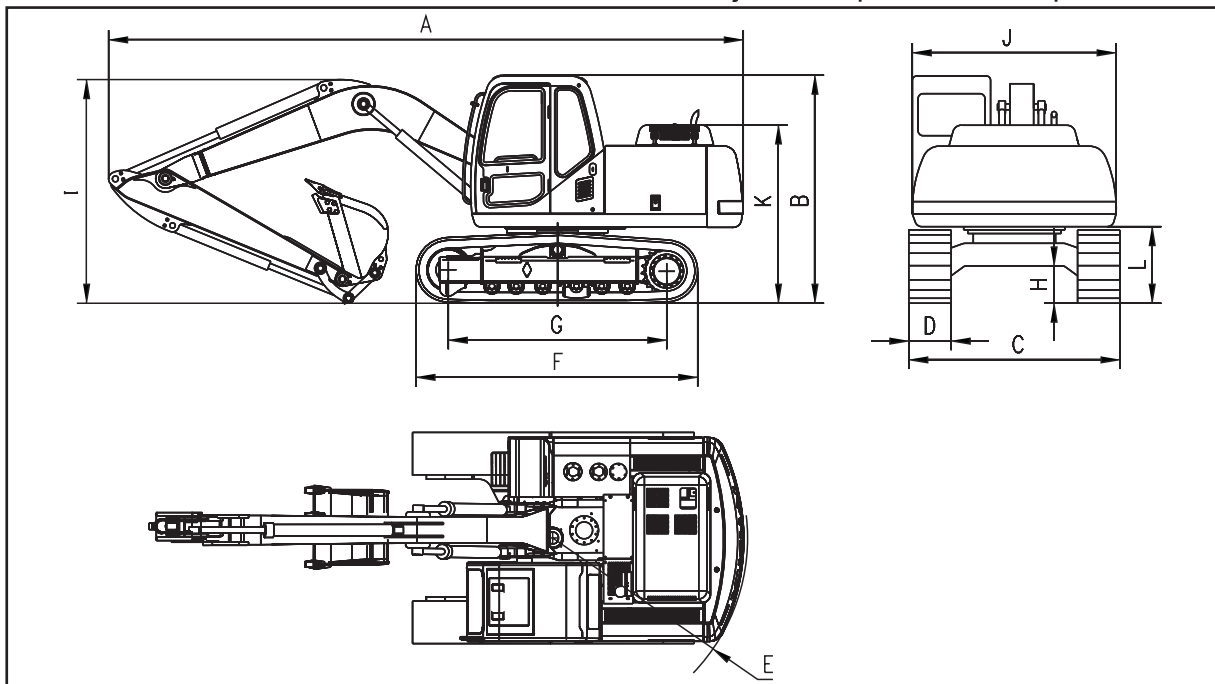
- 7. Bucket cylinder
- 8. Bucket
- 9. Idle
- 10. Crawler
- 11. Font Idle

Technical Data

1.Dimension parameter

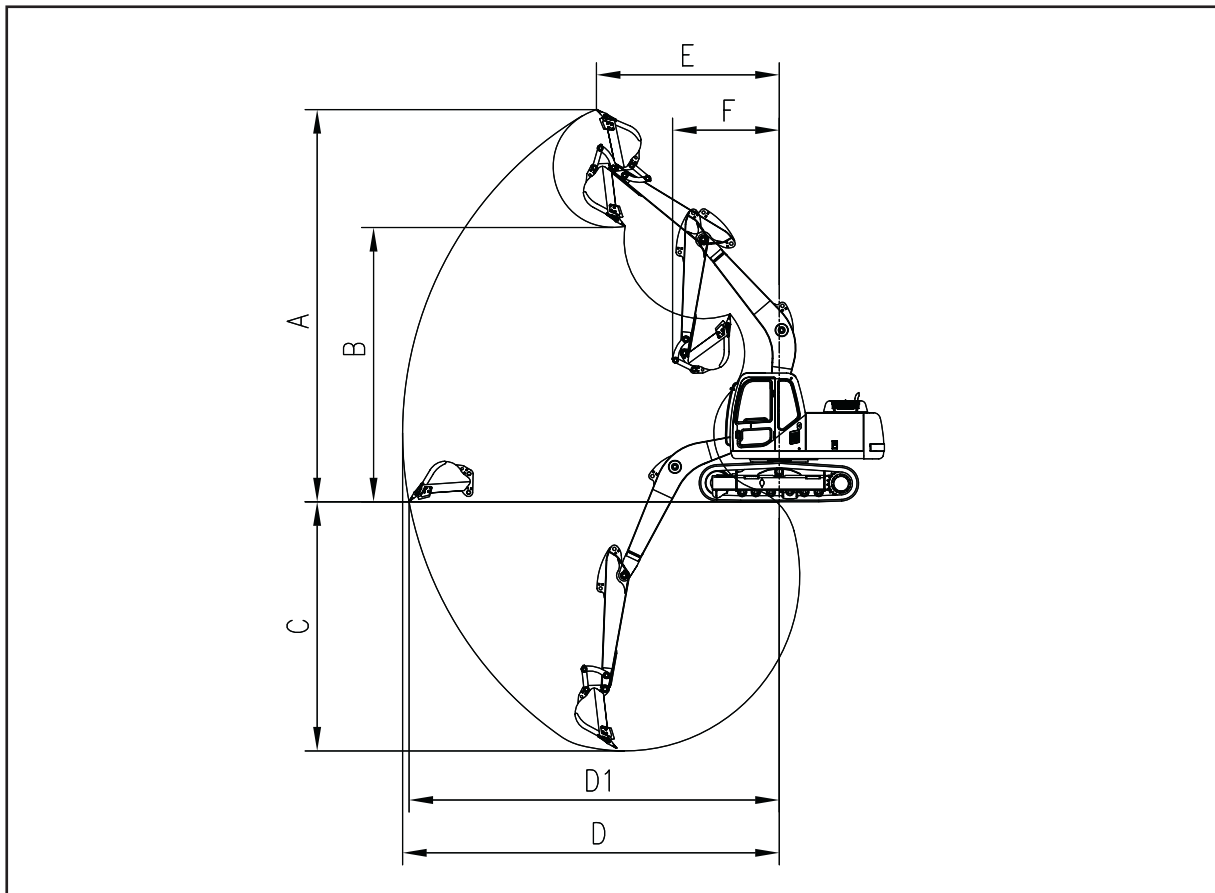
CODE	DESCRIPTION	UNITS	YC135-8	
			870E	870F
	Operating Weight	Kg	13300	13300
	Standard bucket capacity	m ³	0.52	0.852
	Name of engine		CUMMINS QSB4.5	YUCHAI YC4112ZG
	Power of engine	KW/rpm	82/2200	82/2200
A	Machine length	mm	7745	7745
B	Machine height	mm	2713	2713
C	Overall width	mm	2600	2600
D	Crawler width	mm	600	600
E	Platform slewing radius	mm	2293	2293
F	Crawler length	mm	3696	3696
G	Wheel-base	mm	2950	2950
H	Min ground clearance	mm	438	438
I	Overall height	mm	2860	2860
K	Height of engine hood	mm	2410	2410
L	Height from floor to platform	mm	815	815
	Width of platform	mm	2090	2090
	Width of Bucket	mm	910	910
	Walking speed(low/high)	Km/h	4.6	4.6
	Platform slewing speed	rpm	11	11

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



2. Operating parameters

CODE	DESCRIPTION	UNITS	YC135-8	
			870E	870F
A	Max. digging height	mm	8285	
B	Max. Dumping height	mm	5900	
C	Max. digging depth	mm	5245	
D	Max. digging radius	mm	8050	
D1	Max. horizontal digging length	mm	7920	
E	Max. digging height radius	mm	4110	
F	Max. digging force	KN	84.9	



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

3.Traveling system

Buckets	Digging Bucket							加强斗	Ditch cleaning bucket	
Capacity (m ³)	0.18	0.26	0.43	0.46	0.52	0.66	0.53	0.52	0.46	0.94
Width (mm)	470	600	900	995	1034	1034	1034	982	1600	1800
Wight (kg)	324	352	434	397	424	537	492	540	504	537
Number of bucket tecth	2	3	4	4	4	4	4	4	0	0

4.Working environment for buckets

Buckets			Digging bucked							加强斗	
Bucket capacity (m ³)			0.18	0.26	0.43	0.46	0.52	0.66	0.53	0.52	
Standard boom 4600mm)	Standard arm (2250mm)	standard equipments	C	C	C	C	C	C	C	D	
		quick hitch with spring	X	X	X	X	X	X	X	X	X
	Lengthened arm (2745mm)	standard equipments	C	C	C	C	C	C	C	C	D
		quick hitch with spring	X	X	X	X	X	X	X	X	X

Buckets			Ditch cleaning bucket	
Bucket capacity (m ³)			0.46	0.94
Standard boom 4600mm)	Standard arm (2250mm)	standard equipments	B	X
		quick hitch with spring	X	B
	Lengthened arm (2745mm)	standard equipments	A	X
		quick hitch with spring	A	A

Code	A	B	C	D	E	X
Capacity of working object	≤1200kg/m	200kg/m~1600kg/m	1600kg/m~1800kg/m	1600kg/m~1800kg/m	1900kg/m~2000kg/m	Unusable
Soil grade	Grit and silt ground slurry, planting ground	light loam gravel, slurry, planting ground	mild clay, gravel, loess	heavy concentrate, hard loess loam(with block)	hard loess, lightweight marl, frail shale	

5. Hydraulic Rock breaker

Type	Improued breaket	Normal breaker
Long(mm)	2251	1939
Impact Rate(bpm)	350 ~ 700	350 ~ 700
Weight(kg)	890	765

	Type of attachment		Improued breaket	Normal breaker
	Standard boom 4600mm)	Standard arm (2250mm)	standard equipments	★
quick hitch with spring for sweden			★	X
Lengthened arm (2745mm)		standard equipments	★	★
		quick hitch with spring for sweden	★	X

Note: ★ It is used for breaking high class road surface(such as express way)and public road surface,it's also used in small house breaking,worn rock breaking and second breaking of low rigidity and small stones.

X Can not be used.

6. 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	4.6	63	58%(30°)
Low speed	2.5	104	

7. Hydraulic system

Load Sense control system

Main Valve: Import Multiple Valve

Max Flow:260L/min

Pressure: 31.9

Oil return filter: 10 um

Oil intake filter: Metal

8. Electric system

Voltage: 24V

Battery: 120AH X 2

9. Environment condition

Environment temperature: -15~40°C

Environment humidity: <85%

Altitude: 870E≤3894m

870F≤2000m

Temperature for transport and stock: -15~40°C

2

Safety Rules

General Rules

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

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

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

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

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

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

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

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

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

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

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

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

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

Safety Tips

1.Warning sign



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

2. Safety Tips

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

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

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

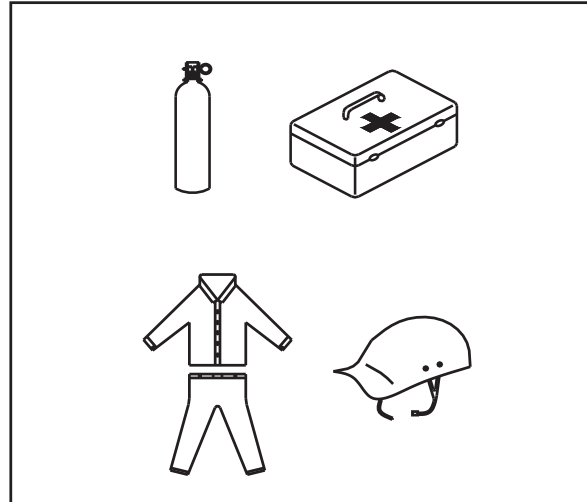
***Caution:** It indicates that it can lead to casualty and serious hurts if the potential danger happens.

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

Safety Equipment

1.The safeguard for the operator

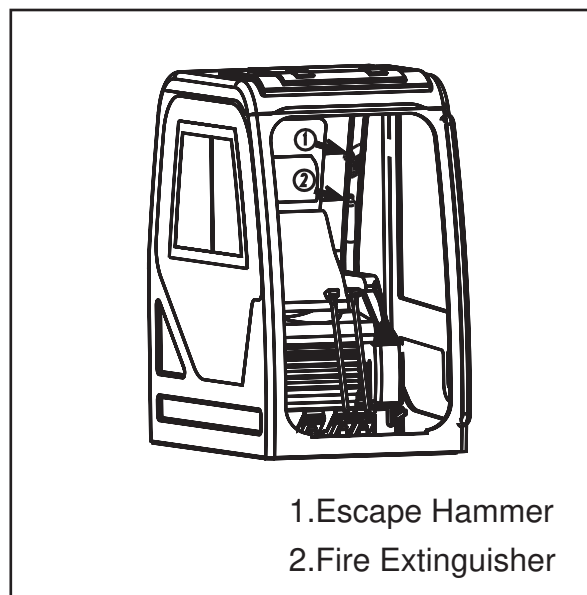
1) Operators should wear the skintight and suitable work clothes, safety helmets, work shoes and other related protective equipment before operation and maintenance work. (For example: Protective earplugs, grooves, protective glasses, safety belts and so on)



- 2) Long hair should be fastened and covered with safety helmets to prevent entanglement with any rotating.
- 3) Users should arrange the first aid medicines in the machine, check them periodically, and arrange more medicines if necessary.
- 4) It is required to check if the protective equipment are in normal before operation and maintenance work.

2. Escape Hammer and Fire Extinguisher

Escape hammer and fire extinguisher shall be installed in the driver's Cabs. It is required to hit the glass with hammerhead if the driver is trapped in cabs, under this condition, the driver shall notice to protect the eyes and face. It is required to put out the fire with the fire extinguisher if there is fire in cabs. It is required to read the users' manual of fire extinguisher carefully, and follow the requirements strictly. It is required to check and maintain fire extinguishers periodically.



Safety Signs



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

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

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

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

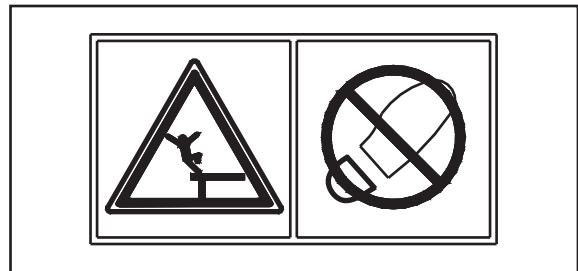
The signs shall be replaced if they are damaged, lost or unclear. New signs shall be attached on the new parts replaced. It can ask Yuchai agents for new safety signs.

1. Classifications of Safety Signs

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

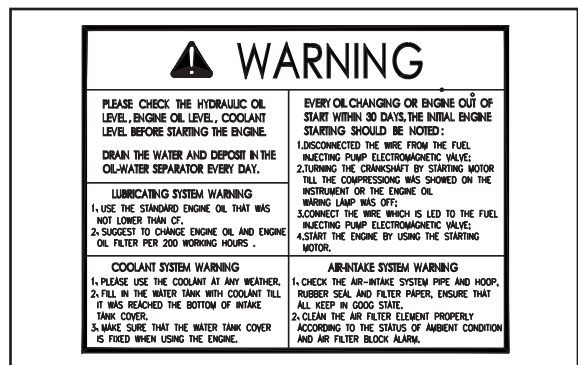
A. Safety Signs with Picture

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



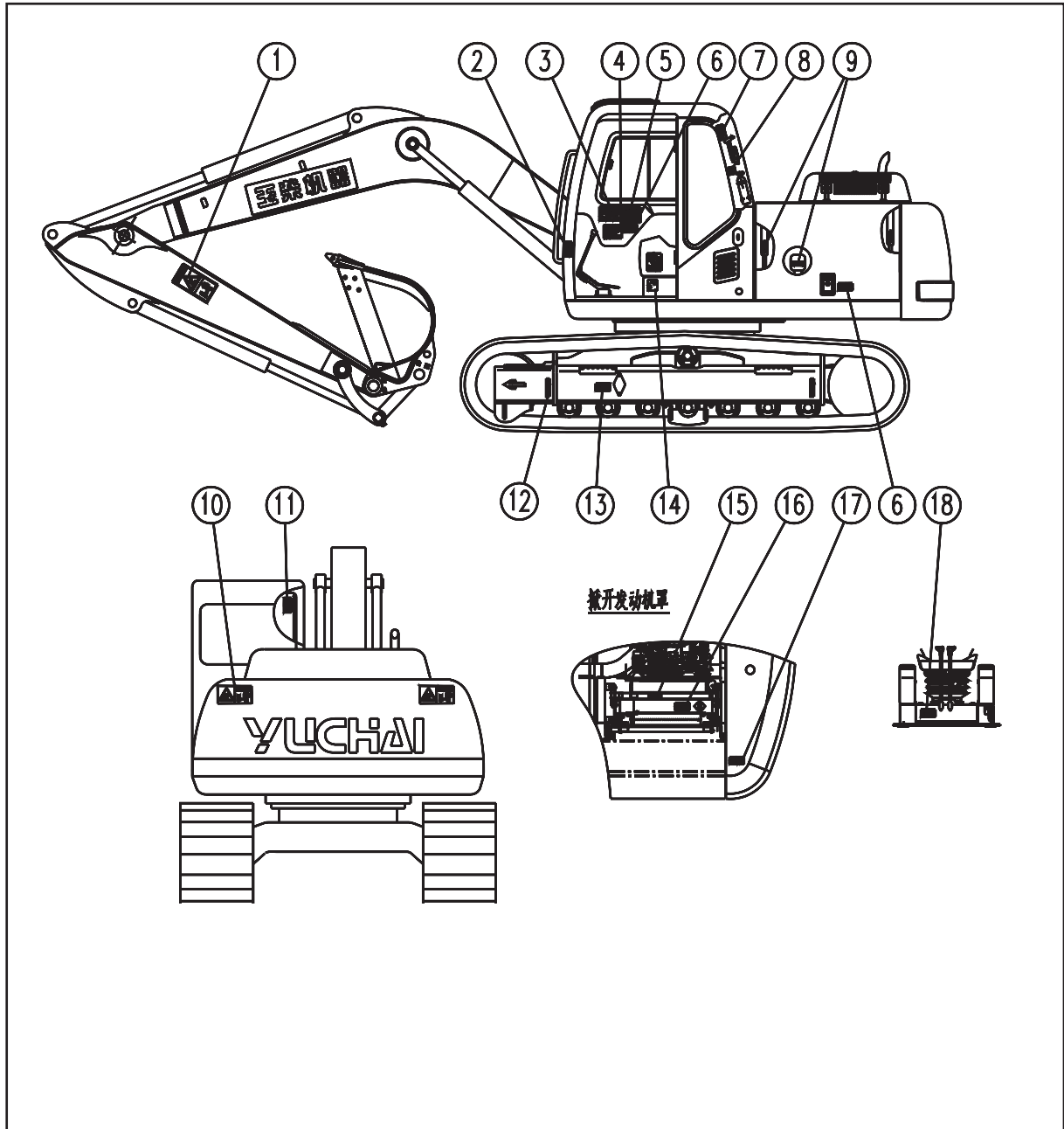
B. Safety Signs with Picture & Character

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



2.The way of the safety sign

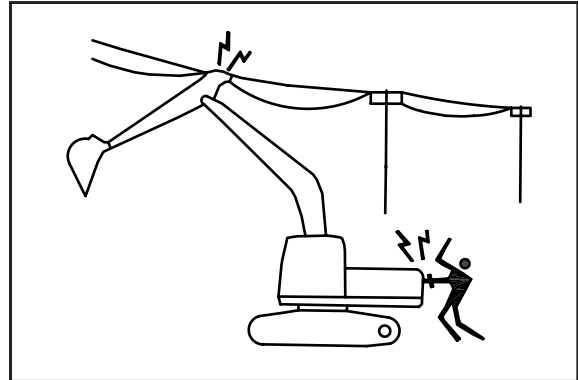
The sign is the picture only show the “Safety sign” part of the sign,other will show in next section.



Safte of Work Area

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

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



10: Dust, thick smoker, thick fog.

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



Warning: Please contact the local public establishment department and system

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

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



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

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



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

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

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

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

Operation Safety

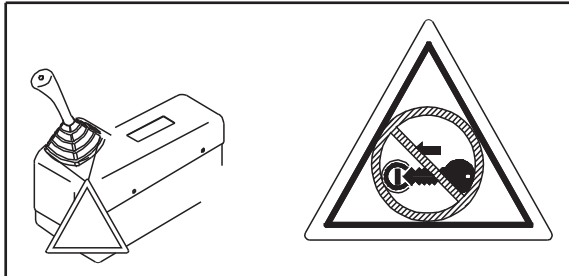


Warning: Before start work, check the seat belt and ring the trumpet.
Make sure there is nobody under working zone and after that
the operator can begin to work

1: Start the Engine

A: the detail of safety start engine

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



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

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

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

2: Traveling & Slewing

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

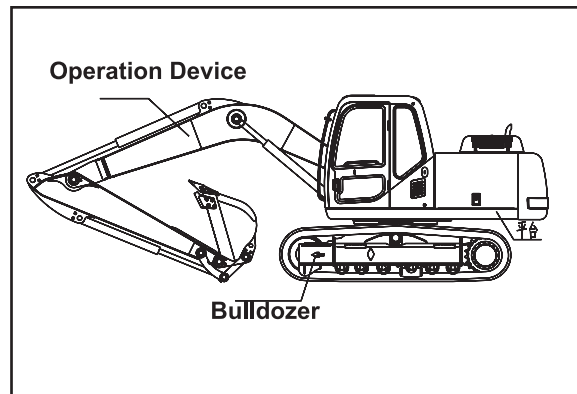
2) please do ring the trumpet when traveling and slewing the machine.

In order to warn the people who under working zone.

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

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

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



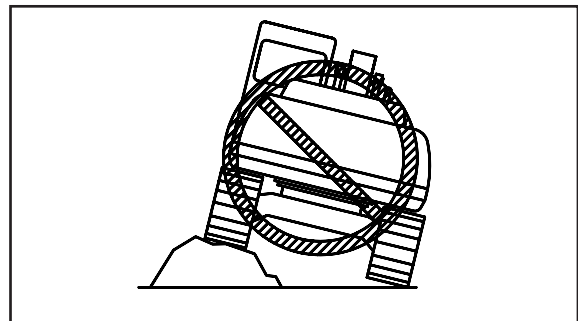
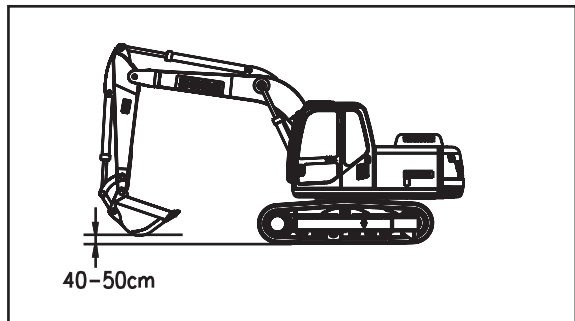
3: The safety rules when traveling

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

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

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

4) Please make sure keep the safe distance between the machine and human, building, when traveling or operating the machine.



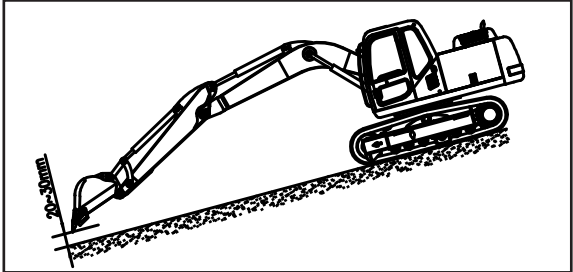
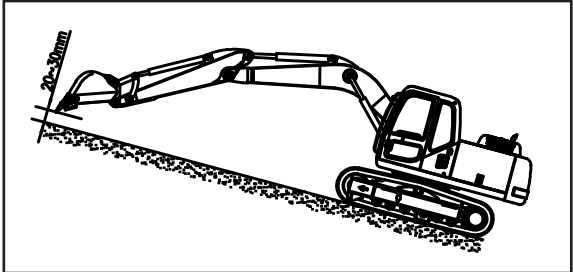
- 5) when across the passage, bridge and some place where is limited the high, please make sure there are gesticulation from the guide. At the same time, precaution keep the safety distance
- 6) the platform must be lock when across the slopes.
- 7) when the machine across the bridge and building please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

3. Traveling on slopes.

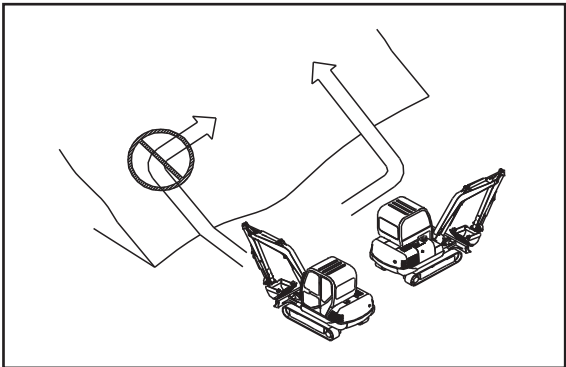
Please be careful when the excavator traveling and working on the slopes

- 1)It's suggest that not motion up and down the hill with severe Slope more than 20 degree..
- 2)When the machine is working, please make sure tie the seat belt, especially, the machine is working on the slopes.
- 3)When the machine is up to the slopes, please make sure the drive wheel are in down slopes direction. And lower the bucket to a height from 20 to 30 CM off the ground..
- 4)When the machine is down to the slopes, please make sure lock the platform and drive wheel on the up slopes direction. And lower the bucket to a height form 20 to 30 CM off the ground..

- 5) Do not change the directions or cross slopes sideways.
Return to a flat surface before redirect the machine.



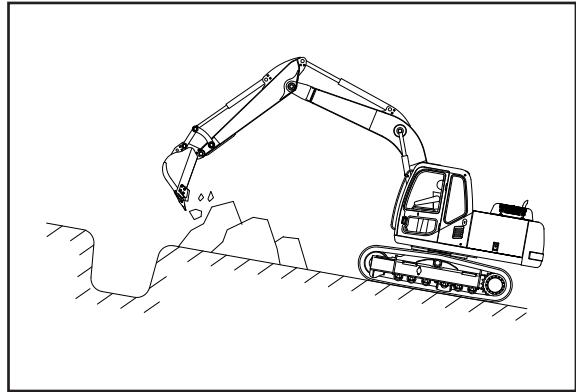
- 6) When the machine working on the slopes, please make sure it works from the top of slope and the dozer should push down the ground.



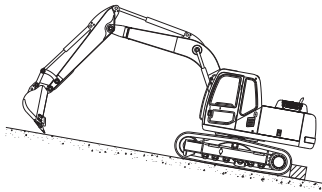
7) Machines should travel on grass, dead leaves and wet metal with low speed as the machine may slide sideways even on very gentle slopes.

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

9) When the machine stop on the slopes, please make sure the dozer and bucket are inserted to the earth. And then stop the engine and get down from the machine.

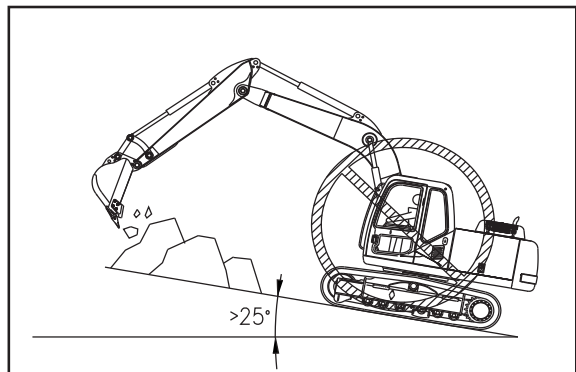


Danger

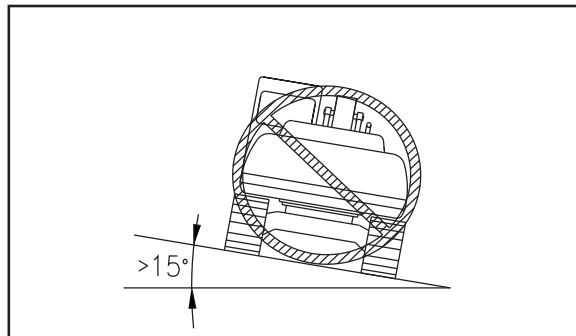


It's very dangerous to stop the machine on the slopes. If the machine have to stop on the slopes please do as following ways: If the engine stop suddenly, remember put the bucket and dozer on the surface of the ground. And make sure all the handle are in middle position. After restart the engine. Even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

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



11) No driving or operating on the slope which the landscape orientation gradient more than 15°



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

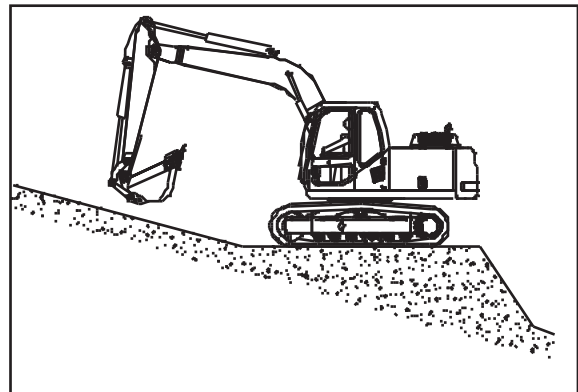
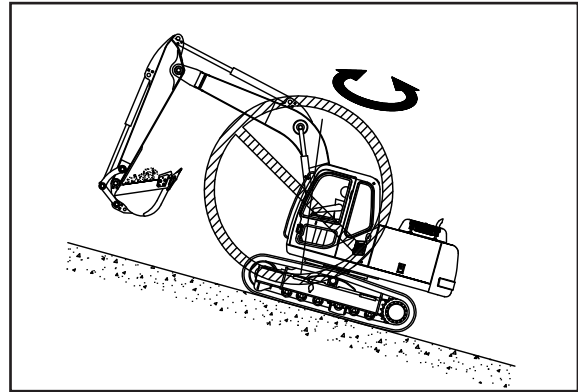
13) Don't swerve on the slope.

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

15) When the angle between the crawler and the slope is 90° , the machine will be very dangerous

if it rotating. If the machine must rotate, the bucket should close the ground, near the machine body, the crawler towards the top of the slope, and rotate with lower speed.

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



4. Safe to operation



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



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

1)Before operating,it should remove all the things and the people.

2)To confirm the workplace can bear the machine,then let the machine enter.

3)As far as possible the two pedrails in the same plane,then it can operate.

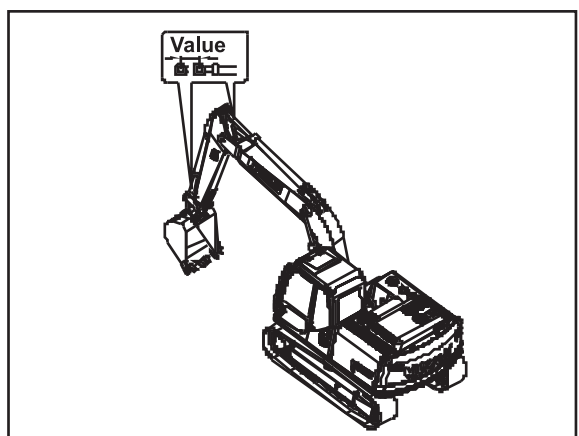
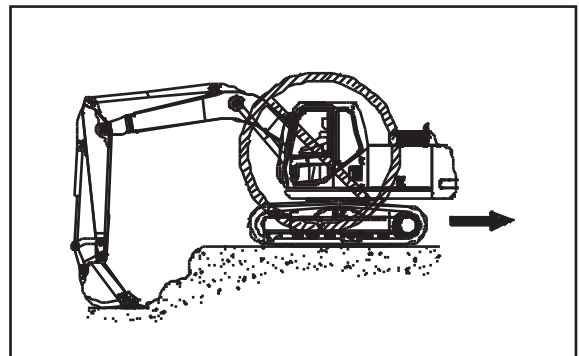
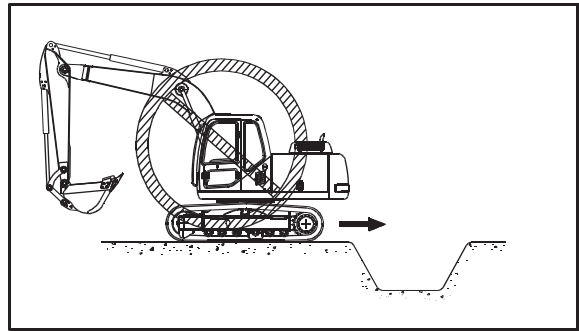
4)To confirm the workplace no cable、 no windpipe、 no water pipe,the machine starts

5)When the machine back off,it should observe whether the moving line regular, whether it has the roadblock

6)When the bucket has the special resistance,it doesn't allow to driving or rotating.Otherwise,the machine broken.

7)When the machine operated,if the hydraulic oil tank reach the end–point of the driving,the power will act on the limit ring of the oil tank.It will reduce the use life of the machine.To avoid the case,when the hydraulic oil tank operated,it should have a little value.

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

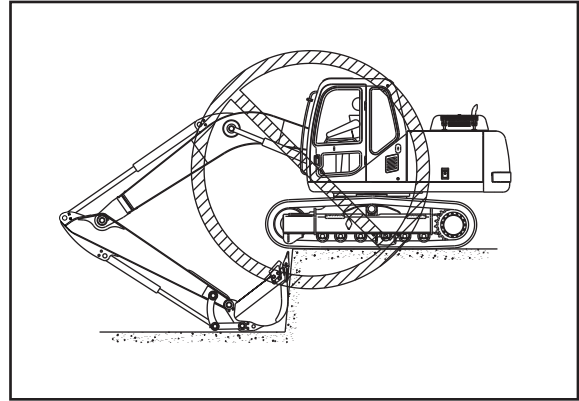


9)When the machine operated,it need to avoid the moving–arm、 the lever、 the bucke、 the cab(lookum) touch the nonego.

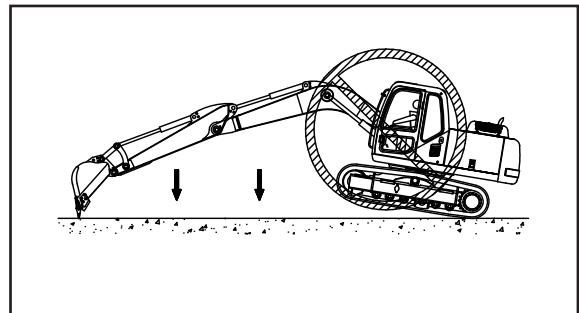
10)When the machine rotated,it need to avoid it touch the cover of the engine.

11)When the moving–arm reduced,it doesn't stop unexpected

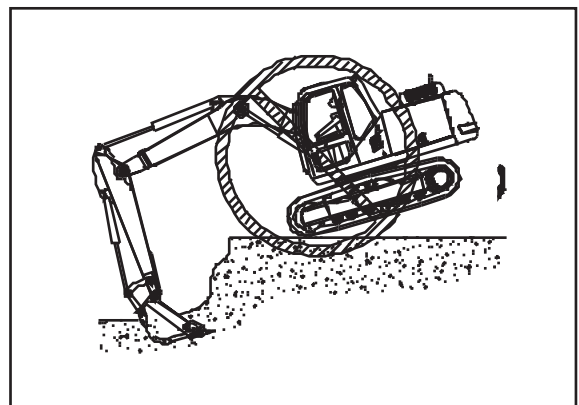
12)Not dig to the machine body.



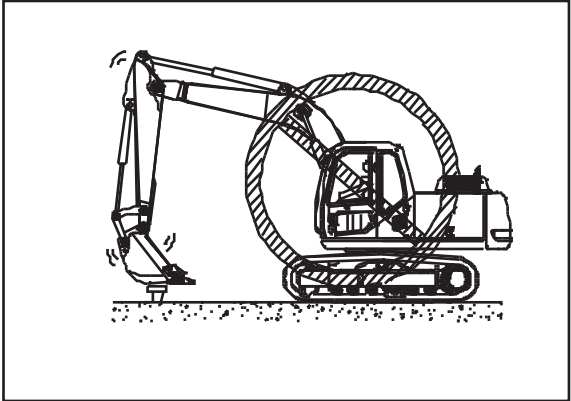
13)When the pedrail leave the ground,it doesn't dig.Otherwise,the machine and the frame will break.



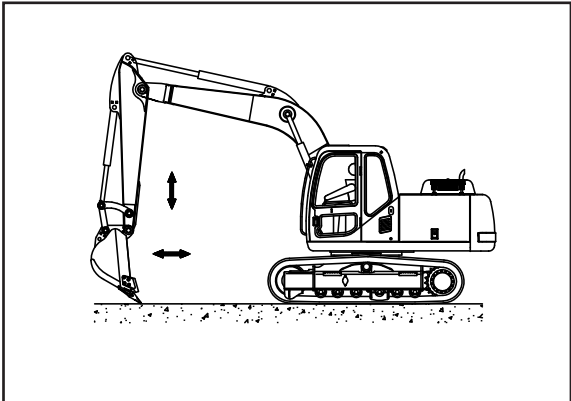
14)Not use the deadweight of the machine to increase the digging power.



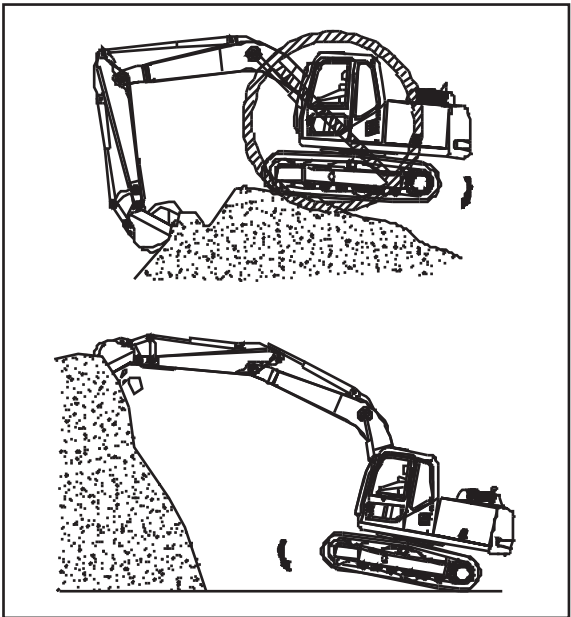
15)Not use the falling power of the bucket regard the handle、 the knapper、 the monkey.It will make the back of the machine bear over weight.



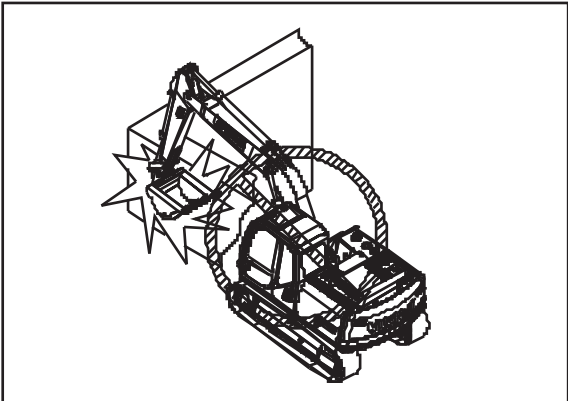
16)Not use the bucket to dig the road surface more.Otherwish,the parts will over load and break.



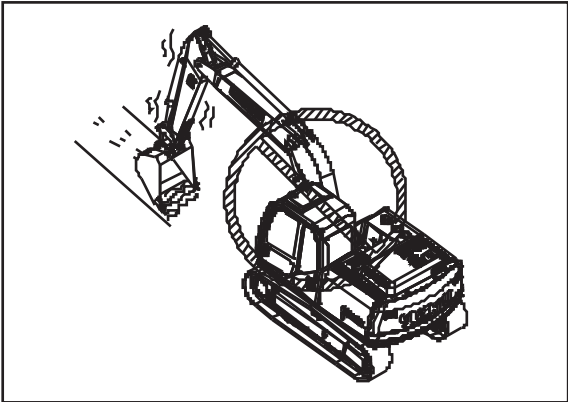
17)Not use the falling power of the machine. Otherwise,the machine broken.



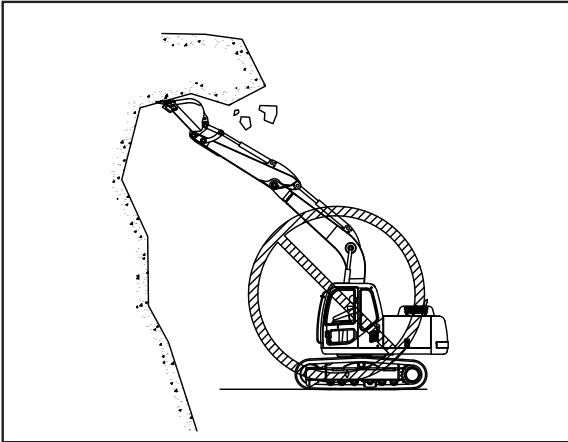
18)Not use the power of rotating to press the soil or destroy the rideau and the wall.When the machine rotates,it doesn't make the gear of the bucket into the soil.



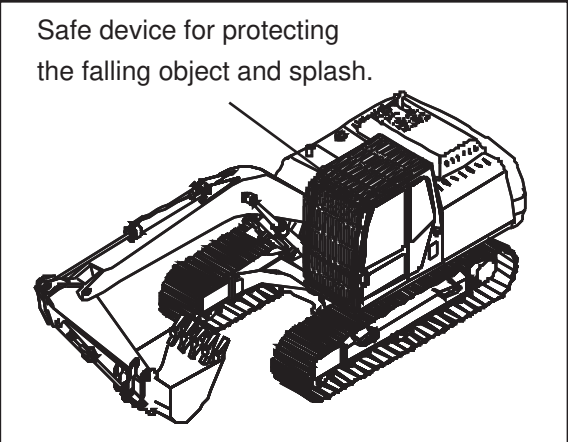
19)Not make the bucket into the soil,and not use the driving power to dig.It makes the back of the machine beat over weight.



20)Not dig the working plane which under the hanging part.It maybe have the danger of the rockfall or the hanging part collapse.



21)It is needed to intall the safe device for protecting the falling object and splash if the machine is working in the place of the danger of existing falling object or splash.



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

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

5. Prevent dumpage、ntiskid and the resolvent



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

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

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

Following,the machine is easy to overturn:

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

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

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

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

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

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

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

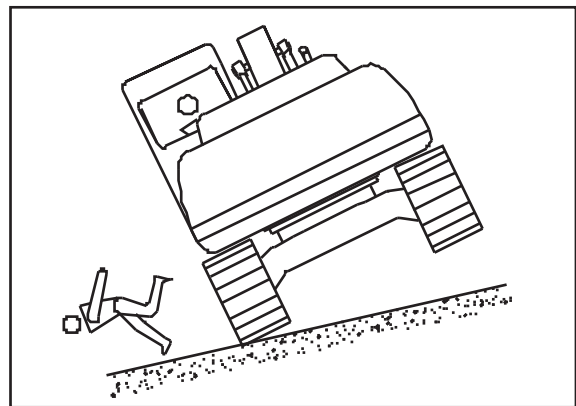
8)When the machine turn adown about 180° .

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

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

11)The machine moves on the frost road.

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



6.Stop the machine

See it at the chapter of parking machine.

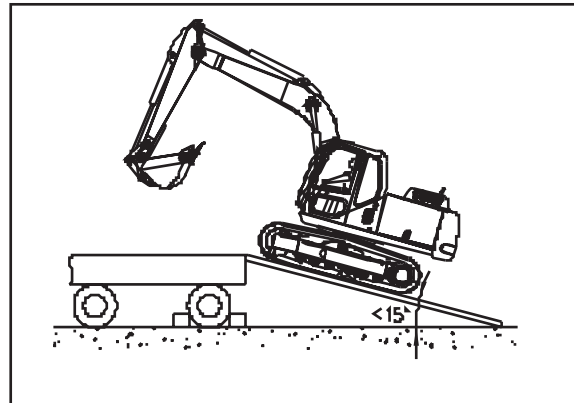
Transport & Load and Unload

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 1.2-1.5 times 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.

Maintain



Warning: When the machine is maintained, there should be warning sign "No operation" hanging on the operation handle.

- Machines should stop on the smooth and hard road.
- After the excavator stops, it must put down the bucket, and run the engine 3 minutes with low speed, then stop it and pull out the key.
- Release all the power of the hydraulic system.
- If the machine should stop on the slope, there should be enough road-block under the crawlers.
- There should be enough distance between other machines when the machine stops.
- When the electric system or electric welding is maintained, it should take-down the cathode cable of the accumulator. Do avoid the current movement.
- Before maintain the machine, if it should support the machines or attachment, make sure the support is good solid the machine or attachment. Do not work under the machine just with a jack supporting.
- 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.

Fire-proof、 Explosion-proof& Antigas

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

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

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

Tightening the loose connector or hoop.

Repairing the damaged wire.

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

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

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

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

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

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

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

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

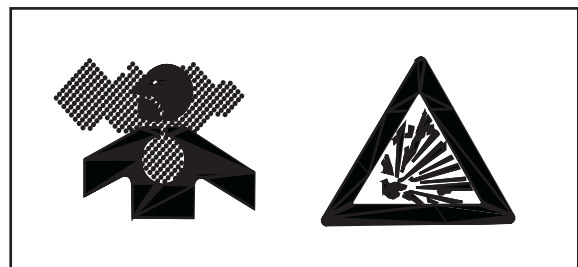
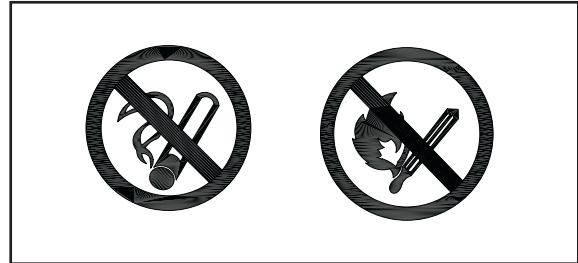
●Do avoid the fire caused by the hydraulic pipeline. Check all the soft pipe and the fastener*the cover*the block whether they fixed firmly.

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

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

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

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



Battery

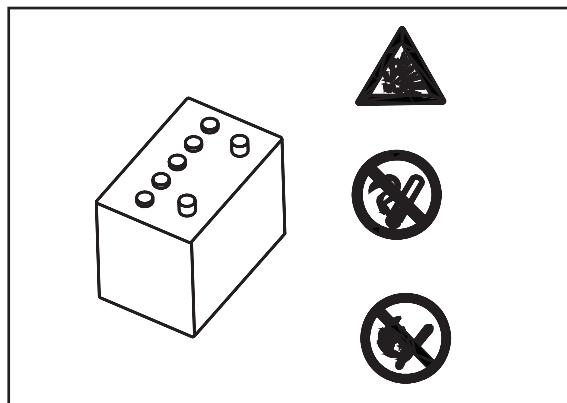
Safety rules of the accumulator

The electrolyte of the accumulator includes the vitriol and the hydrogen which is flammability and explosive.

The wrong operation leads hurt or fire. Do as follow:

Indicator showing battery chamber is equipped in the cover of battery. When it shows green, the battery can be used normally. When the it shows black, the battery should be recharged in time. When it shows white, the battery should be replaced immediately.

- Do wear the safety glass and the rubber gloves when operate the accumulator.
- Do not smoke or fire near the accumulator.
- If the eyes、 cloth、 skin are bespattered by the vitriol, do use lots of water to wash and go to the hospital.
- Before operating the accumulator, it should turn the key to "OFF".
- Do stop the starting system when use the electric torch to check the electrolyte of the accumulator.
- The end of the sealed accumulator dilates, it show the accumulator freezing. When the accumulator freezing, do not electricize or connect the starting engine. The temperature should be less than 15°C when heat up the freezing accumulator. Otherwise it explodes.



Explosion-proof of the accumulator



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

- 1) Before cutting off the cable of the accumulator, 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 accumulator.
- 4) Don't weld*grind*smoke near the accumulator.

Because it has danger of spark, do as follow:

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

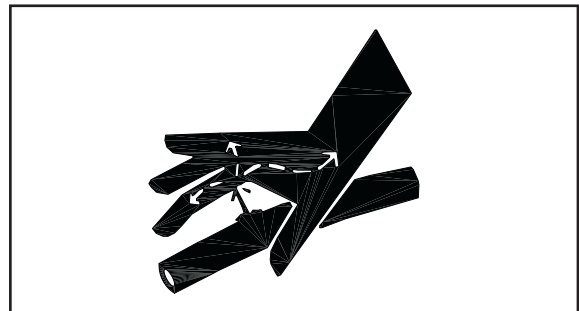
Caution: When maintaining the electric system or weld, it should remove the cathode port to avoid the current flowing.

Hydraulic System

1. Safety rule of high-pressure oil

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

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



2. Safety operation of the high-pressure soft pipe

If the high-pressure leaks, it will make the fire or the operation trouble and lead the serious hurt or destroy. If 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.

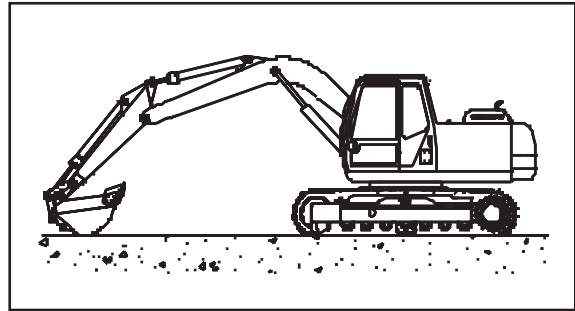
3. Safety rules of the high-temperature oil

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

Release the pressure as following:

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

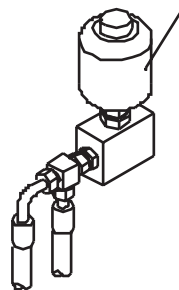


Warning: The accumulator is the part which is full of the high-pressure nitrogen gas. Using wrongly will lead to explode. Do not take-down the accumulator, no drilling and welding. Do not close to the fire. Avoid collision and impact. It should be managed by professional person.

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.

The danger of high-pressure nitrogen gas



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

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

Material safety list and lifting capacity

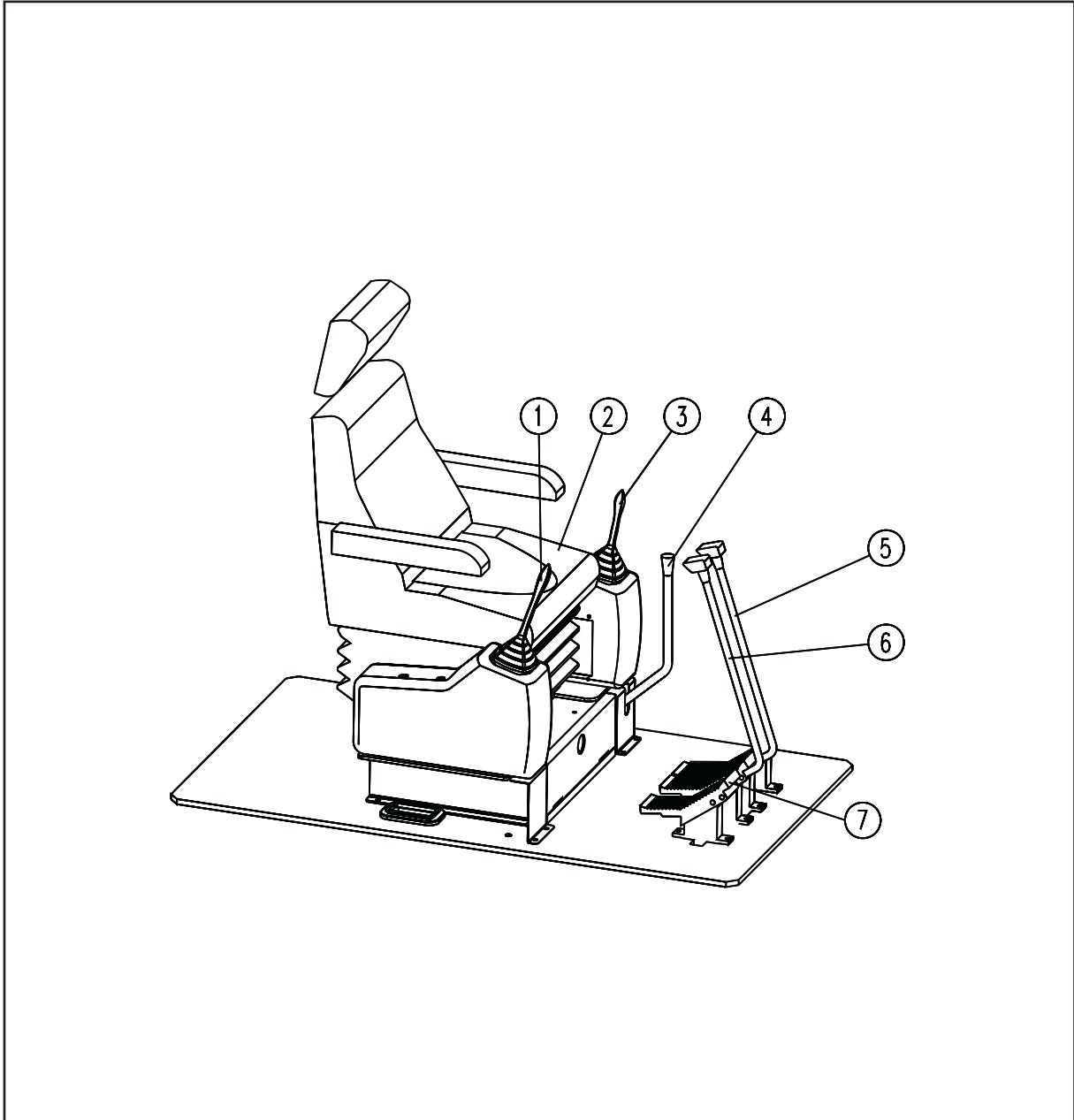
Material safety please refer to Attachment 2

Lifting power please refer to Attachment 3

3

Parts introduction

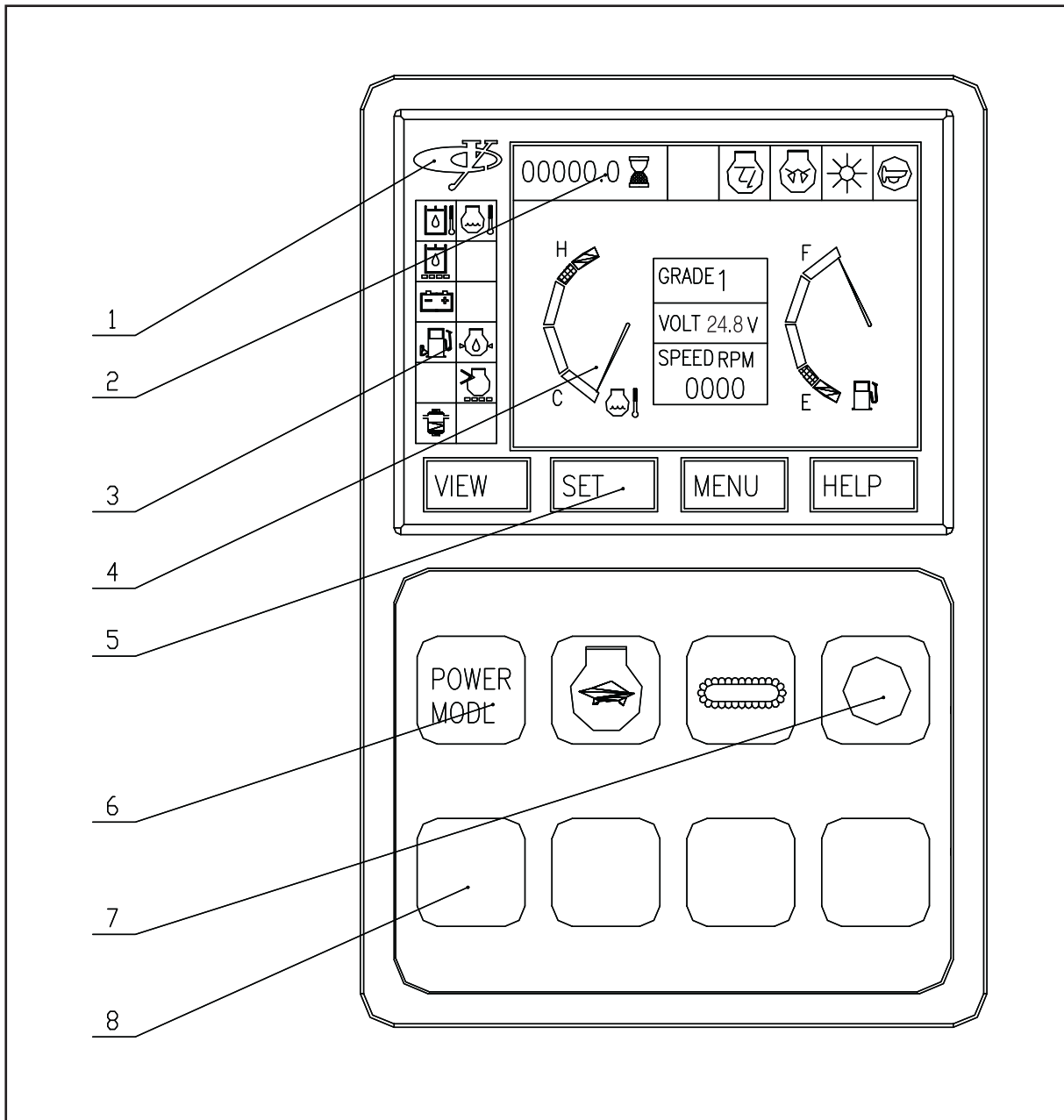
Operating device



1. Right operator lever
2. Seat
3. Left operator lever
4. Security lock lever

5. Left travel speed lever
6. Right travel speed lever
7. Accessories pedal control

Digital instrument



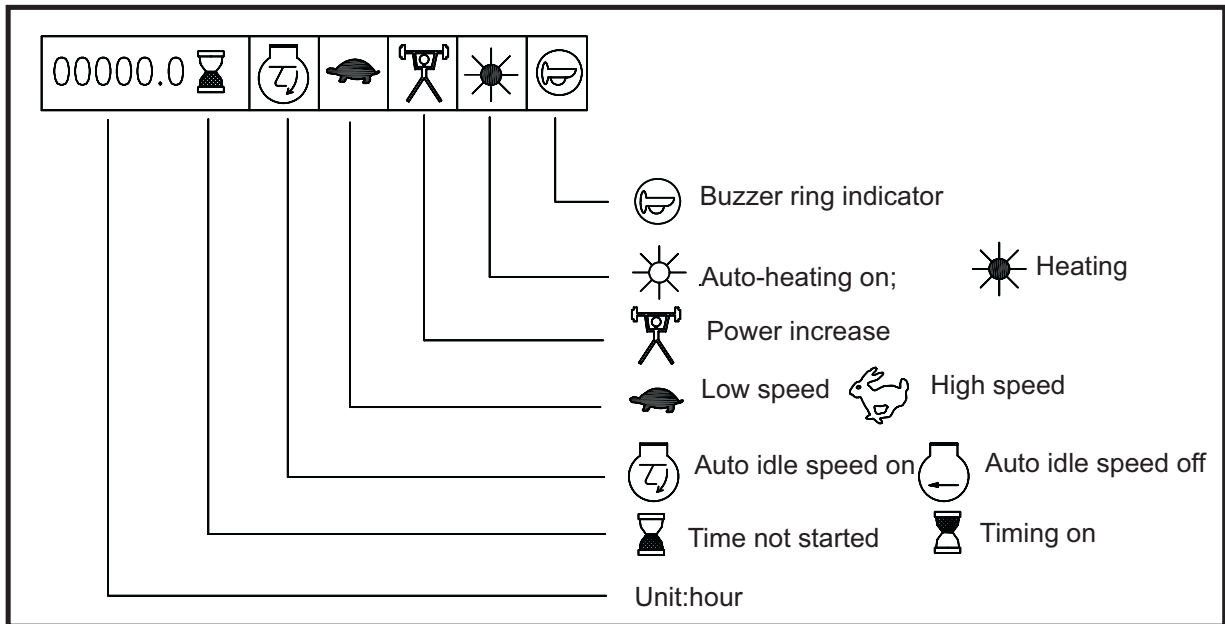
- | | | |
|--------------------------|------------------------------|-----------------------------|
| 1. Machine Scutchen | 2. Machine Condition Display | 3. Alarm Indication Display |
| 4. Main Display | 5. Soft Keys | 6. Selection Key |
| 7. Alarm Indicator Light | 8. Keys | |

Main control Box and operation

1.Yuchai Machine Scutchen



2.Machine Condition Display

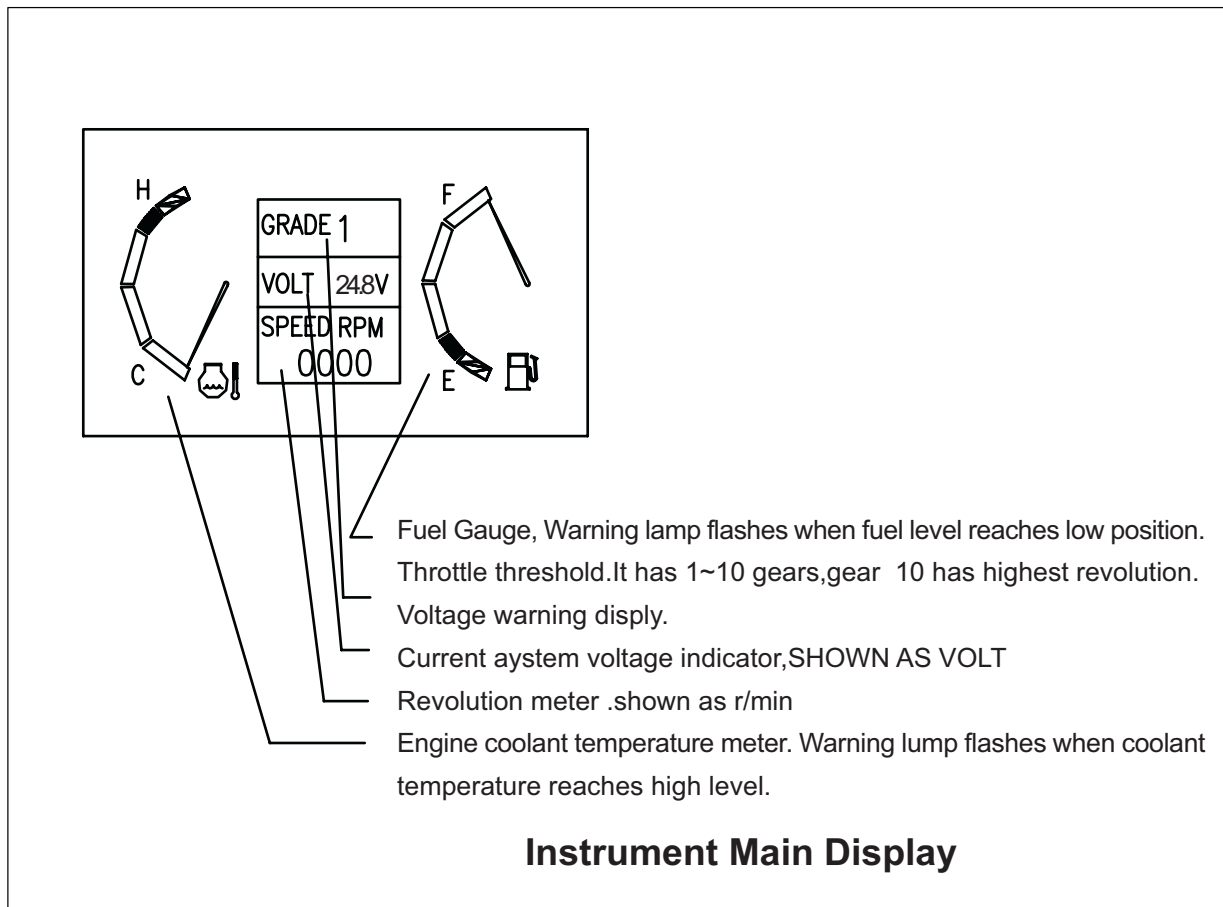


3. Alarm Indication Display

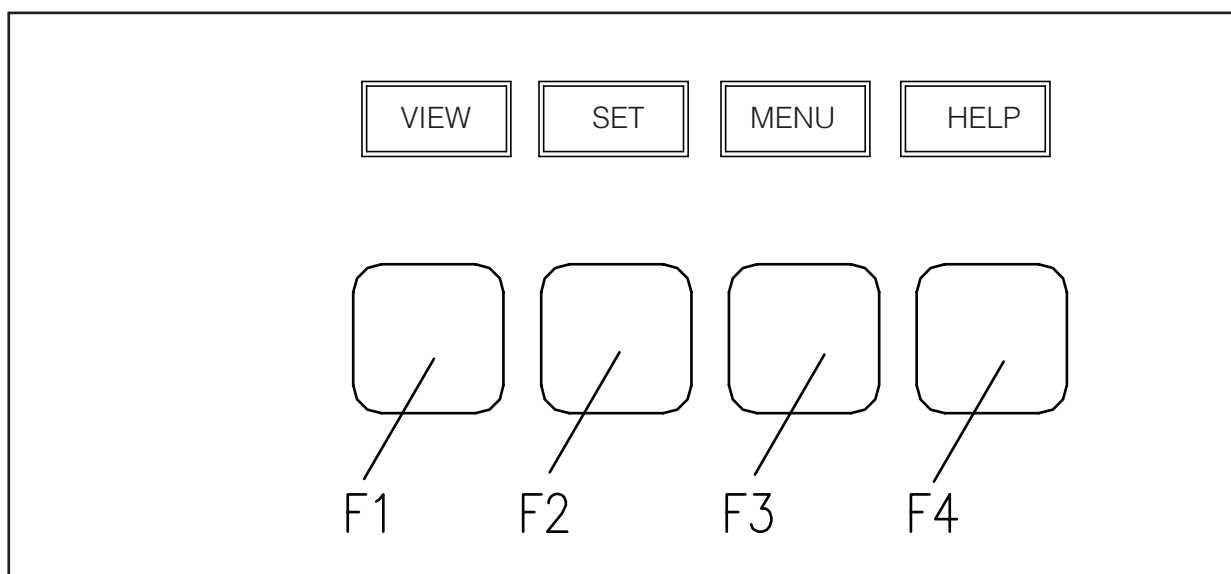
- Hydraulic oil temperature warning lamp
- Coolant high temperature warning lamp
- Hydraulic oil return filter obstruction warning lamp
- System power voltage warning lamp.It will flash the system AC voltage is too low or too high.
- Low fuel level warning lamp
- warning lamp for low pressure of engine lubricating oil
- Engine air filter obstruction warning lamp
- Oily water separator warning lamp

4.Main Display

There will be a different information display in the Main Display when you press the button of MENU.



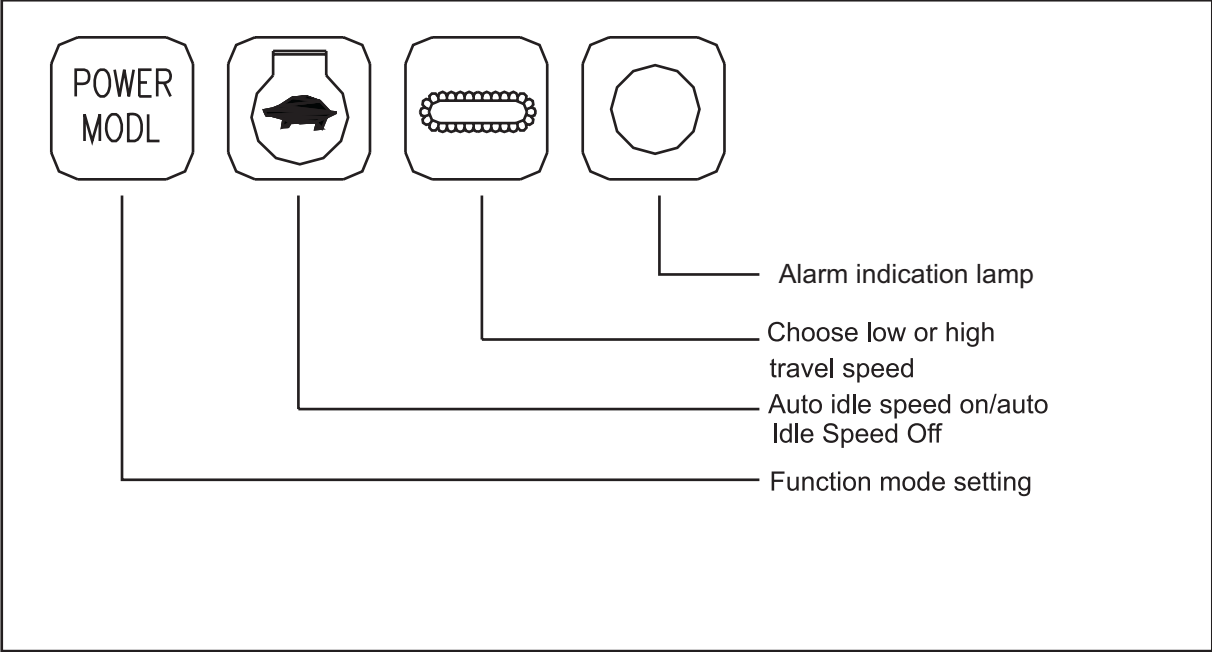
5. Soft key (MENU) on screen matches the key F1-F4. The function of Soft Keys (MENU) are defined by specific menu definition.



6. Function selection keys and alarm indication lamp

When operating function selection keys, user could check the Machine Condition Display to confirm the selection.

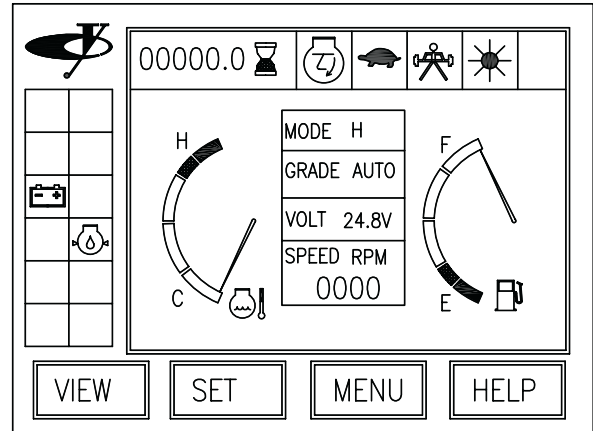
Alarm indication lamp: red indication lamp flashes if alarm is on monitor.



Display of Monitor

Switch on the power, under the normal condition, main picture of the monitor is shown as figure on the left.

When engine starts, power voltage alarm and engine lubricating oil low pressure alarm disappear. Timing starts.



Select "Parameter" by keys, display the operate data of machine on Monitor.

ENGINE OIL	0000	KPa
FULL LEVEL	100	%
ENGINE SPEED	0000	RPM
COOLANT T	040	°C
HYD OIL T	025	°C
ENGINE H	00000.0	h
PART WORKING H	0000.0	h

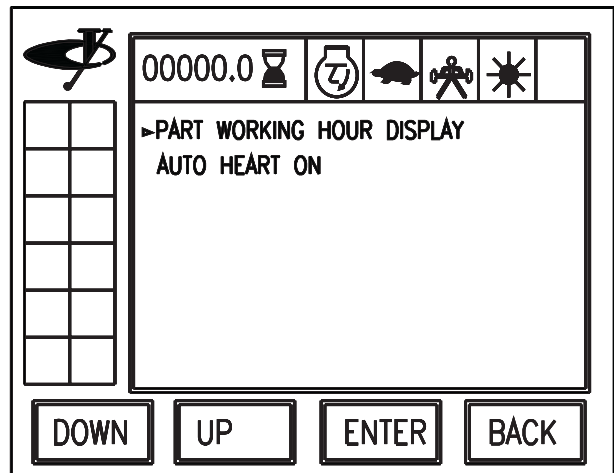
Select "SET" through keys, settings menu is displayed on Monitor.

Use "UP" and "DOWN" to select menu. Use "ENTER" to change options, which include:-

1.ENGINE HOUR DISPLAY / PART WORKING HOUR DISPLAY

2.AUTO HEART ON/ AUTO HEART OFF; if select auto warming-up off, warm-up condition icon will not be displayed.

(Press "BACK" to main menu of monitor)



Select "MENU", system settings menu is displayed on monitor screen.

Select menu options through "UP" and "DOWN", change options by "ENTER", which include:-

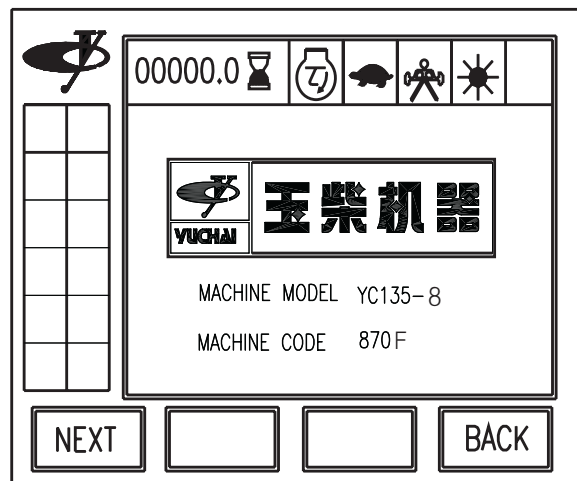
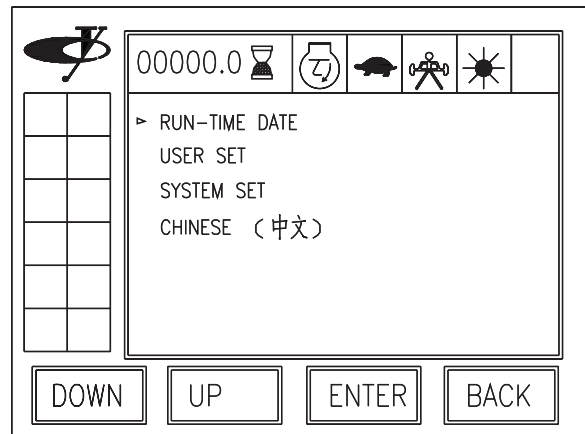
Select "RUN-TIME DATE" to show machine operating data.

Select "USER SET" to enter into user setting menu, which includes: user password setting, stage timing reset.

Select "SYSTEM SET" to enter into system setting menu, which is only for factory debugging use.

Select "CHINESE(中文)", using "ENTER" to change option - English/Chinese to set the Chinese or English display mode.

Select "HELP" to display system help information. The information includes machine model and machine code. "NEXT" displays version No. of monitor's hardware and software.



OPERATION MODE SELECTION

There are two Operation Mode to select that is HAND or AUTO mode. It is better to perform the Machine Operation Function through choosing the right Operation Mode. It can be changed the mode by using the Power Mode button of the Main display board.

HAND		AUTO	
The engine rev can be change from 1 to 10 through using the Accelerograph knob.	The user can choose the reight engine rev according his experience in this Hand mode.	H	Heavy load operation mode, the biggest productivity.
		S	Standard operation mode, place emphasis upon the productivity
		L	Light load, place emphasis upon the control accuracy.
Auto-Idle speed mode	Then engine rev will be in the standard Idle speed after stopped 5 second. The engine rev will be in the lowest rev after 200 second stopped. When after operating the machine, the machine will come back in the operation mode like before Auto-idle speed. But if canceling the Auto-Idle speed mode, there will not be these function.		
Increase digging force mode	To increase the digging force when operating, it can be pressed the button of the left operation lever, then the digging force of machine will be increased the 10% after eight second. And all these action will be in the H, S mode or in the sixth speed threshold. But this mode can not be as the standard digging operation.		
Security mode	After starting the engine, the engine rev will be in the lowest rev wherever the Accelerograph knob in. And only when turning the Accelerograph knob or changing the controlling mode, the engine rev can be changed. This security mode can not be canceled.		



Warning: It should be canceled the Auto-speed mode when the machine is traveling.

Safety Lock Lever Equipment

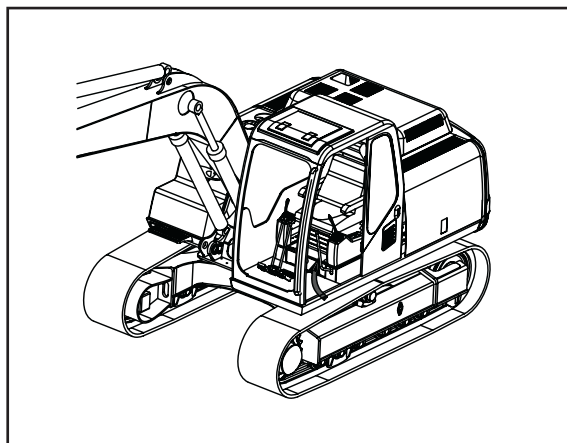
1. Safety lock lever



Warning: The Safety lock lever is an important part of the machine security system. Must lie down the bucket then put the safety lever lock in lock position when the driver leave the machine. If the machine have not in lock position, the control handle will control the work device and platform to work then the accident will happen

LOCK

Please lift the left controlling box up to lock position. Therefore Pilot system does not supply hydraulic oil, working equipment and platform slewing do not work which can protect the machine.



UNLOCK

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

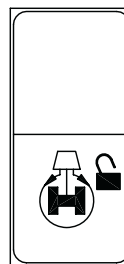
2. Chassis lock framework



Warning: Chassis lock framework is one important part of the machine. It should be locked when the machine travel, park or park on the slope.

Platform Lock and Unlock

Press the identified side of switch (as the right picture) to unlock the platform; The opposite side is to lock.



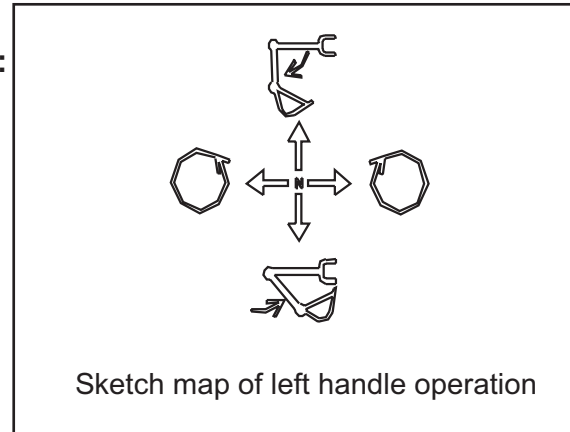
Work Equipment and Swinging Control

1. Operating working equipment and platform

A. Left servo handle of working equipment:

Operating arm: Pushing the left handle forwards, the arm spreads forwards. Drawing back the handle, the arm draws backwards.

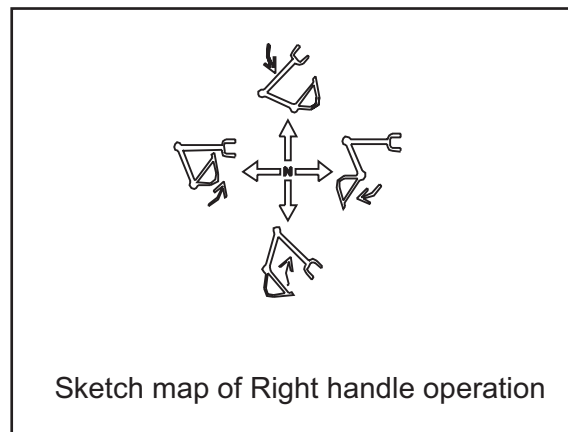
Operating platform slewing: Putting the left handle to the left side, the platform swings to the left. Pushing it to the right side, the platform swings to the right.



B. right servo handles of working equipment:

Operating boom: Pushing right handle forwards, the boom drops down. Drawing back the handle, the boom lifts up.

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



In order to protect the capability of machine and security, it should be operate the Operation Handle equably, not suddenly.

2. Operating accessories (select)

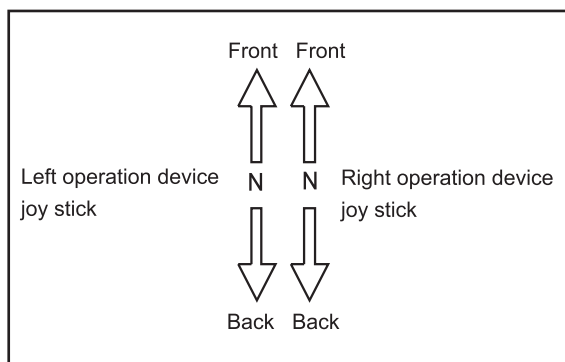
When the machine has equipped with accessories, open the cover on the control pilot valve pedal and step the pedal in order to connect the assistant oil supply.

Travelling Operation

Directional Control

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

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



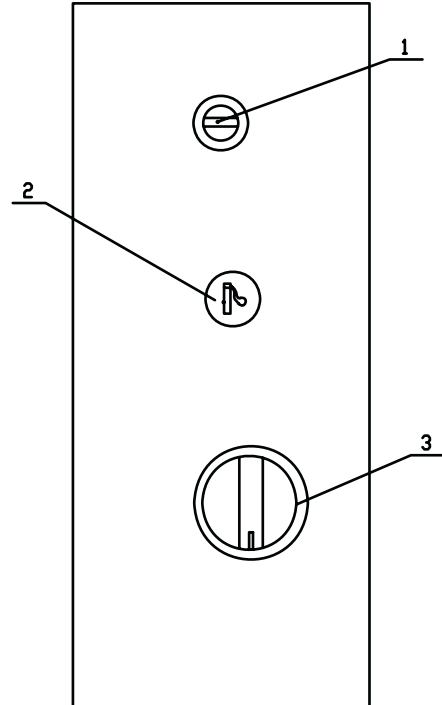
Right Control Board

1. Engine switch

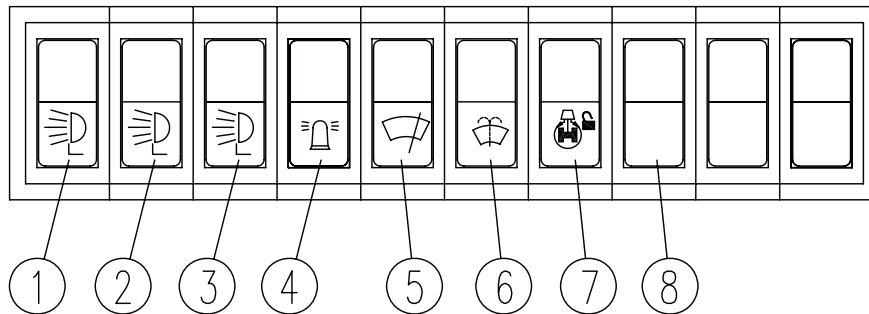
2. Cigarette lighter

3. Accelerograph knob

Turn the accelerograph knob to the left side, then the oil volume diminish; Turn the accelerograph knob to the right side, then the oil volume increase.



Key board



1. Boom light, Front light switch

Press the switch identifier side to turn on the light; Press the other side to turn off the light.

2. Front light of the cab switch (Optional)

Press the switch identifier side to turn on the light; Press the other side to turn off the light.

3. Rear light of the cab switch (Optional)

Press the switch identifier side to turn on the light; Press the other side to turn off the light.

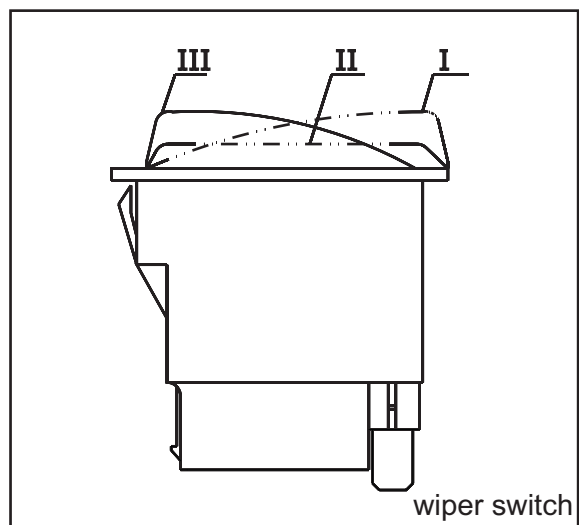
4. Warning Lamp switch (Optional)

Press the switch identifier side to turn on the light; Press the other side to turn off the light.

5. Window wiper switch

Press the switch identifier side to turn on the light; Press the other side to turn off the light.

- I low speed step
- II Medium speed step
- III High speed step



6.Wiper blowhole switch

Press the switch identifier side to turn on the blowhole; Press the other side to turn off the blowhole.

7.Platform lock switch

Press the switch identifier side to unlock the platform; Press the other side to lock the platform.

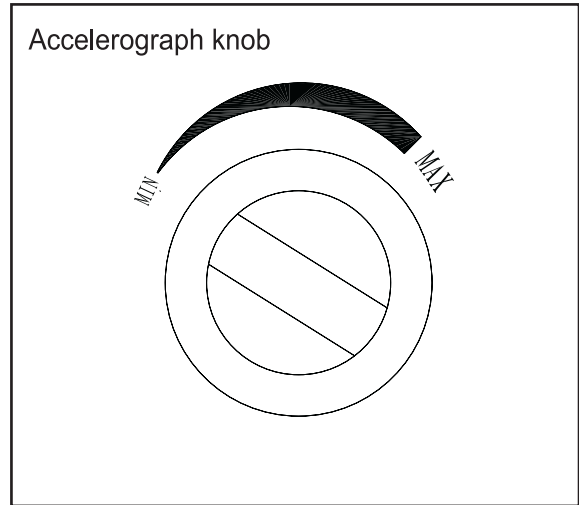
8. Cover board

The cover board is used for standby. When it needs to add other function keys, please open the cover board, then it can add the key in it.

Accelerograph control

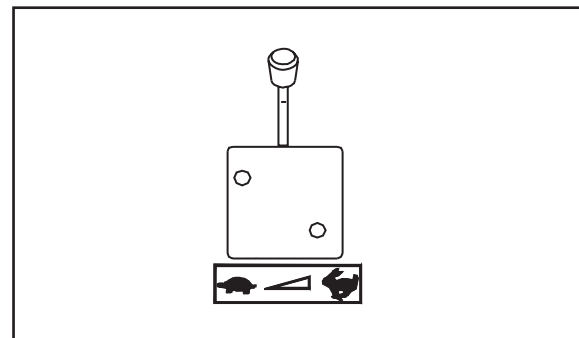
Accelerograph knob

Turn the accelerograph knob to the left side, then the oil volume increase; Turn the accelerograph knob to the right side, then the oil volume diminish. It should be diminishing the volume before you wanna park the machine.



Accelerograph handle

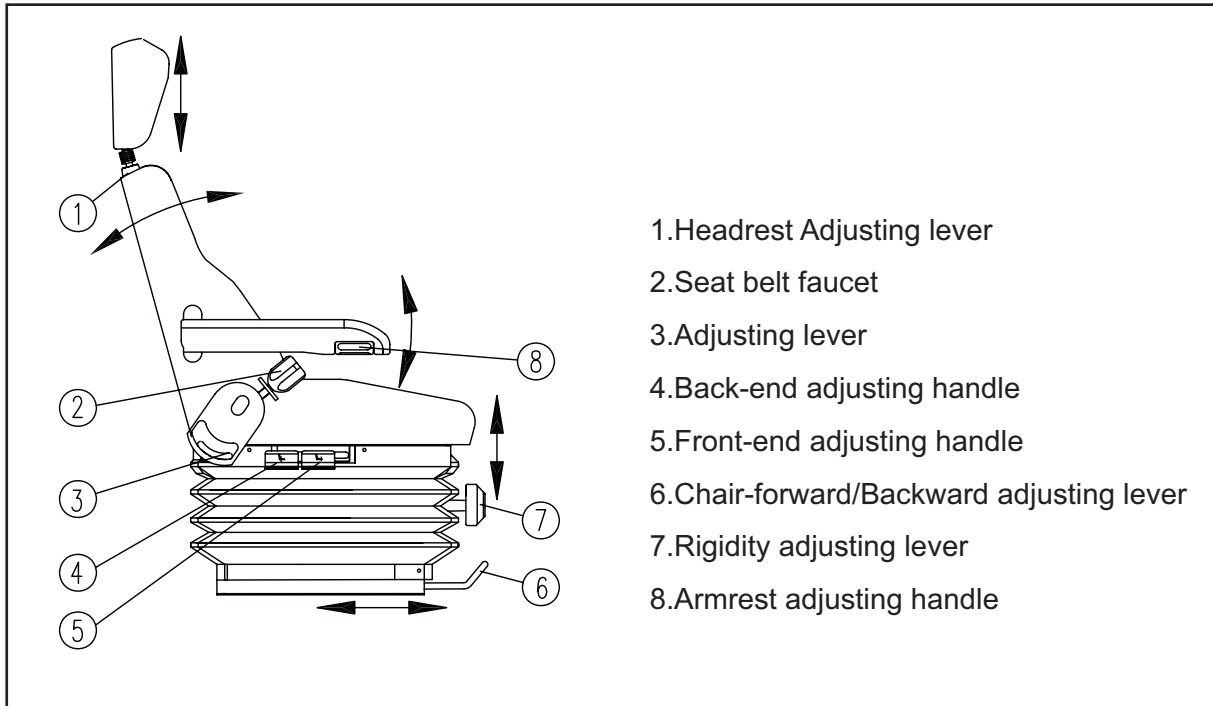
Pull the handle back, then the oil volume increase; And on the opposite, it is diminished. It should be pull the handle back to diminish the volume before you wanna park the machine.



Operator Seat



Warning: Before start job or every time change the operator be sure that the seat is in suitable position for you figure.



- Seat-Forward/Backward Adjust: Control the Seat-Foarward/Backward Adjusting Lever and the rang of activity are $0\sim\pm 75\text{mm}$, five shift. The seat in lock position when uncontrol the lever.
- Backrest Adjust: Pull the Backrest Adjusting Lever up and the rang of activity have 5 position.. The backrest in lock position when uncontrol the lever.
- Headrest Adjust: Pull backward the Headrest Adjusting Lever ,push and pull the headrest in a proper place
- Armrest-Incline Adjust: Control the Armrest-Incline Adjusting Lever and 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 an important part of the machine safety system. Before operation the machine , make sure to belt up. If the belt down, the cab or the machine will hurt you when the machine overturned



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

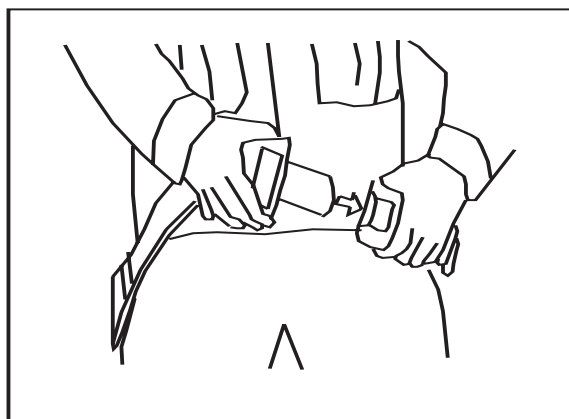
- Must change the Seat Belt every three years without any problem. The date of production is mark on the label of the Seat Belt.
- While working , make sure to belt up.
- Don't let the belt twisted.

1.Fasten Seat Belt.

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

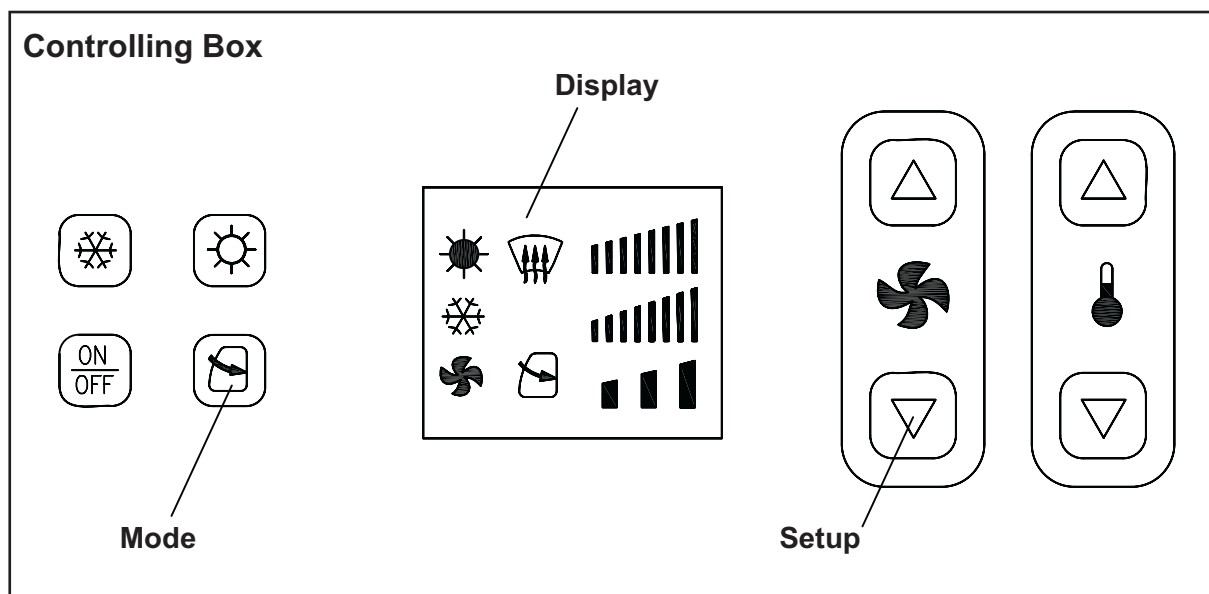
2.Unfasten Seat Belt

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



Air-Conditioning Control

The Air-Conditioning Controlling panel on the Panel of Left



1.Function and Operation



Power Switch









Push it to turn on the air-conditioning and screen backlight. Fan is operating in low gear for 3sec. (not to operate within these time), then to return the state of last operation. Turn on the air-conditioning and press again that keys, memory the current working status (cooling/heating /defrosting , wind-speed, cooling and heating capacity setting), turn off the air-conditioning.

Cooling button




The system will turn into cooling mode after pressed this button under ventilation mode, memory current state (wind speed). The system will turn into last ventilation state(cooling capacity, wind speed) after the mark   (middle) on display screen will disappeared.


Press cooling button for canceling cool mode, and memory current state (cooling capacity, wind speed). The system will turn into last ventilation state(wind speed) after the mark   (middle) on display screen will disappeared.



The system will turn into defrosting mode after press this button under heating mode, and memory current state (heating capacity, wind speed). The screen display    (up),  (middle), and recover last defrosting state (heating capacity, wind speed).


Warming button




The system will turn into heating mode after pressed this button under ventilation mode, memory current state (wind speed). The system will turn into last ventilation state after the mark  (up) on display screen will disappeared.

The system will turn into defrosting mode after press this button under cool mode, and memory current state (cooling capacity, wind speed). The system will turn into last ventilation state after the mark  (up) on display screen will disappeared.

The system will turn into defrost mode after press this button under cooling mode, and memory current state (cooling capacity, wind speed). The screen display  (up),  (middle), and recover last defrost state (heating capacity, wind speed).



The system will turn into cool mode after press defrosting button for canceling defrosting mode, memory current state (heating capacity, wind speed). The system will turn into last cooling mode (cooling capacity, wind speed) after the mark  (up) on the screen disappeared.

CircleVentilation button

The system will turn into outside circle ventilation mode after press ventilation button. The screen display  in the condition of outside circle ventilation mode, and press the button again, and the function will be cancel, and the sysetem enter inside circle mode, and disappeared.



Aggrandizement Setting Button






It means increasing the cooling capacity under cool mode, the lattices of the mark  (middle) on the screen will be increased. It means increasing the heating capacity under warm mode or defrost mode (refrigeration and heating running at the same time), it means the heating capacity is increasing if the lattices of the mark  (up) on the screen is becoming more. It will increase one lattice for each pressing on this button.


Minish Setting Button



It means reducing the cooling capacity under cool mode, the lattices of the mark  (middle) on the screen will be reduced. It means reduce the heating capacity under heat mode or defrost mode (refrigeration and heating running at the same time), it means the heating capacity is reducing if the lattices of the mark  (up) on the screen is becoming lest. It will reduce one lattice for each pressing on this button.

  Press this button if need to increase the wind speed, the lattices of the mark  (middle) on the screen will increase too. It will increase one lattice for each pressing on this button.



Press this button if need to reduce the wind speed, the lattices of the mark  (middle) on the screen will reduce too. It will less one lattice for each pressing on this button.

4

Operation Manual

Precaution before operating the machine

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



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

Engine Operation



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

Checking before engine start

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

2.Start the engine



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



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



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

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

A.Engine Starting in Normal Temperature

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

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



Caution:

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

B. Assistant power for starting machine



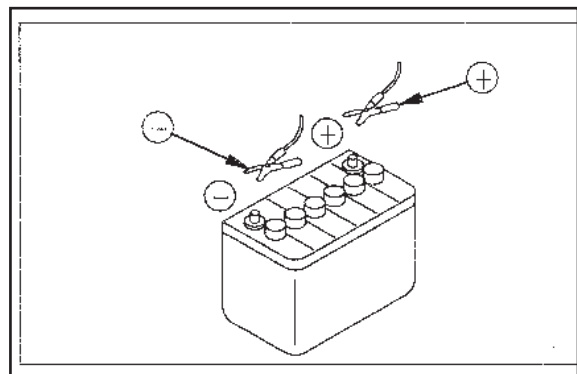
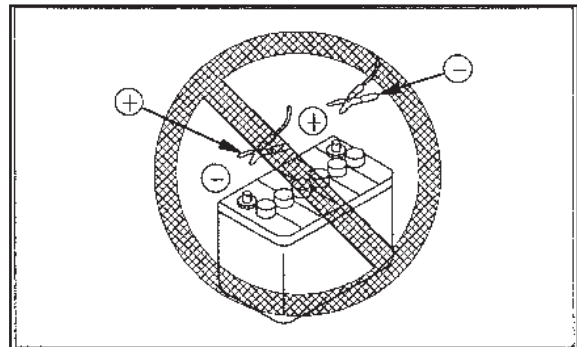
Caution: when electrolyte is frozen, DO NOT start the engine, DO NOT charge the battery, it may cause the battery explode. In order to avoid electrolyte freezing, always keep the battery on full charge.



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

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

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



3. Engine starting

A. Engine preheating

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

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

B. Check the starting machine

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

4. Turing of the engine

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

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

- 1) Let the engine cool down by operating it at a medium working speed.
- 2) Push the accelerator to the end (most slowly); draw the stop handle back to the end.
- 3) Rotate key to OFF position, engine stop and all instruct light black out.
- 4) Take out the key.

5. Check the machine after it is stop

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

Enter the cabin

- 1) Hold the door rail according to the right picture.
- 2) Make sure step on the flat crawler.
- 3) Do not hold the operate hand to enter or exit the cabin.
- 4) Check the door rail and crawler if there is oil or slurry, clean it.

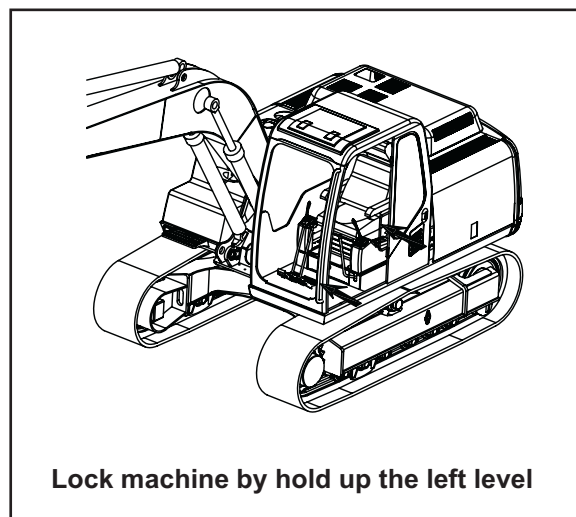
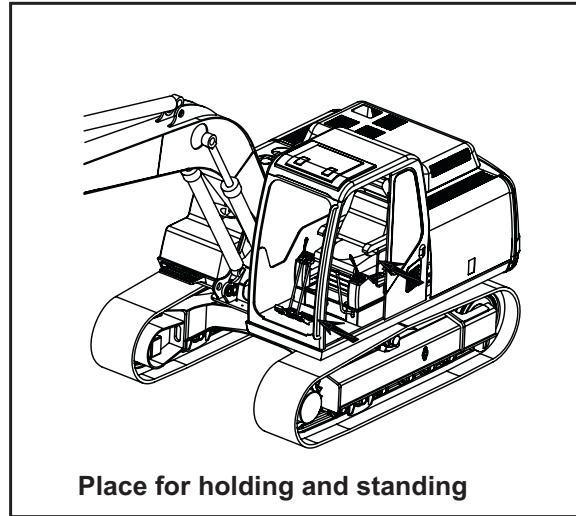
5) Do not jump up and down of the machine, do not enter or exit the machine when it is moving.

6) Before getting out of the machine, lower down the boom, bucket and dozer blade on the ground, draw up the LOCK handle, now the machine is on LOCK condition, turn off the engine. Keep this situation to the next machine start.

Notice: Lock all doors and windows when leaving the machine.

It is not allow climbing up onto the fuel tank, engine cover and cabin.

People are not allowed staying on the bucket, boom, arm, and attachment.



Machine travel

1. Safety concept for moving the machine

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



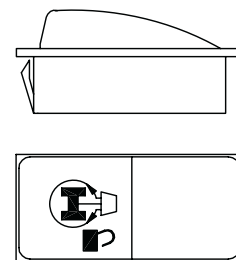
Caution: When machine moving at a high speed, do not suddenly change the movement.

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

2. Prepare for moving machine

- 1) Press down the slewing button of the NO SIGN side to lock the platform (see the picture).
- 2) Turn the fuel handle to a accelerate position to increase the engine speed.

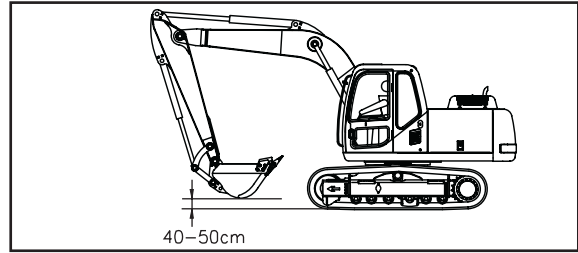
Slewing button



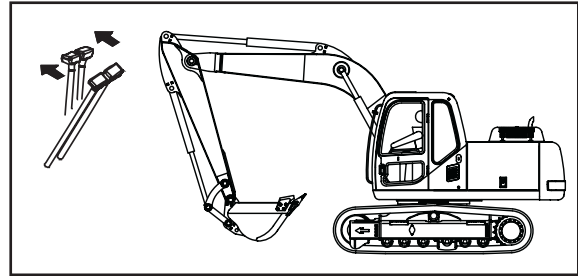
3. Machine moving forwards

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

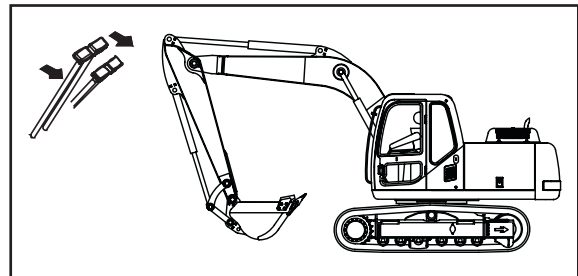
When dozer blade is in front, slowly push travel levers to have the machine move forwards.



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



Notice: When in the cold weather, if the machine does not move normally, check the preheating operation. In addition if the crawler is block by stone or earth, machine moving speed could be abnormal, clean the stone and earth on the undercarriage.



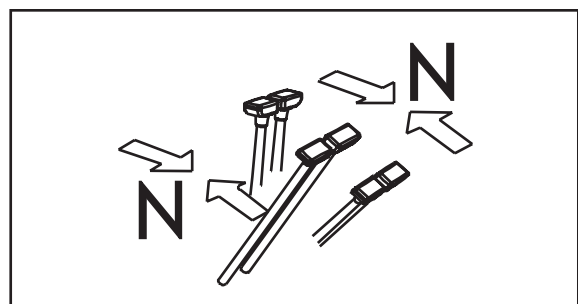
4. Machine move backwards

- 1) Lay down the safety lever, life up all working equipment from the earth 40~50mm

5. Stop machine

Let both traveling lever to the middle position the machine could be stop.

Notice: Avoiding suddenly stop the machine, it should have enough space for shopping the machine.



Rotate the machine

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

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

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

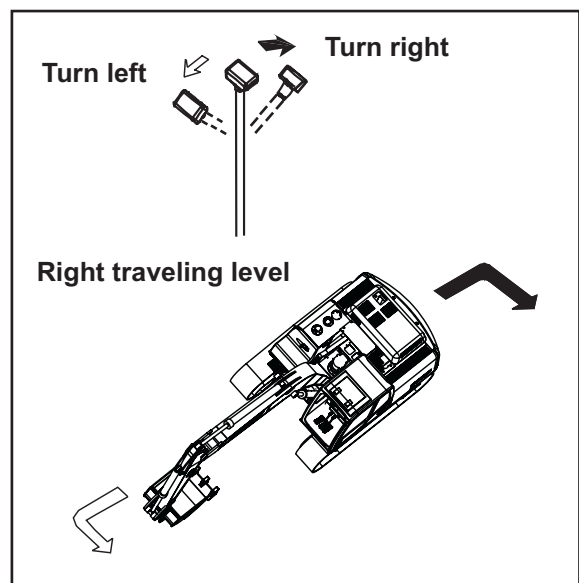
1. Turning machine when machine is stop

Turning to the left:

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

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

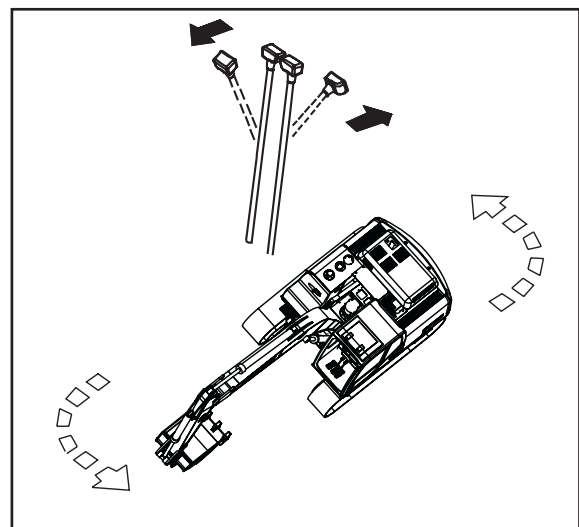
When turning machine to the right, operate it as the same method of turning to the left.



Rotate the machine

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

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

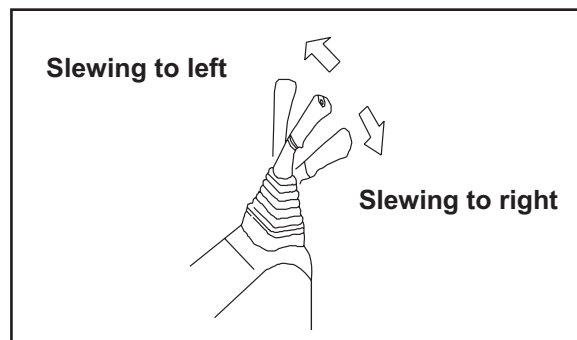
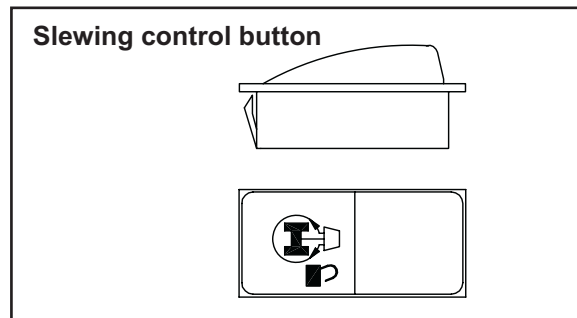


Swing the Platform

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

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

- 1) Before slewing the platform, press the slewing control button to the sign side, the platform will be unlocked.
- 2) Operate left handle to swing the platform as the pictures show.
- 3) When do not use the slewing faction, press the slewing control button to the NO SIGN side, the platform will be locked.



Operating working equipment

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

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

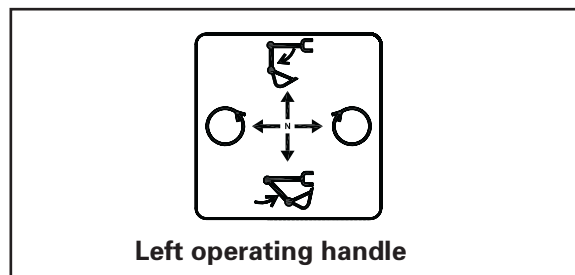
Let the handle return to the middle position, equipment will stop action and keep position.

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

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

1. Operating arm

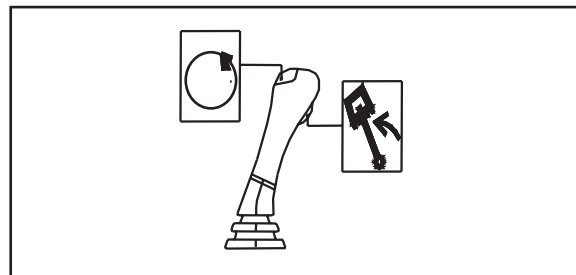
Push the left handle forwards, the arm spread forwards. Draw back the handle, the arm draw backwards.



2. Operating swing.

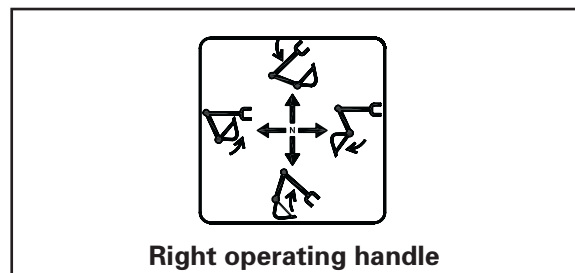
Put the left handle to the left side, the platform swing to the left. Push to the right, the platform swing to the right.

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



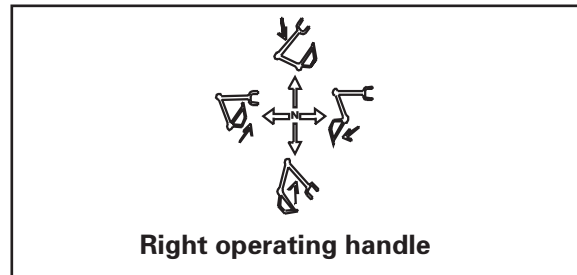
3. Operating boom

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



4. Operating bucket

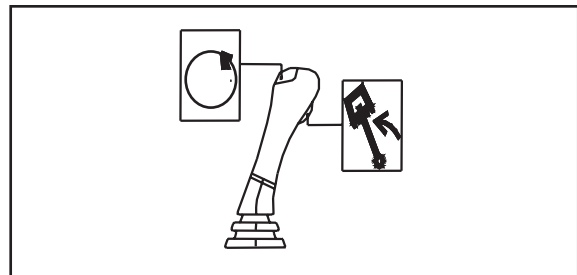
Push right handle to the right, bucket spread up, push the handle to the left, bucket draw down.



5. Operating boom slewing

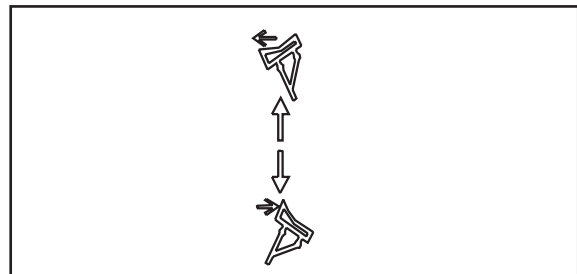
Push right handle to the left, boom will swing to the left. Push the handle to the right, the boom swing to the right.

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



6. Operating dozer blade

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



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

Machine working on slope or in water



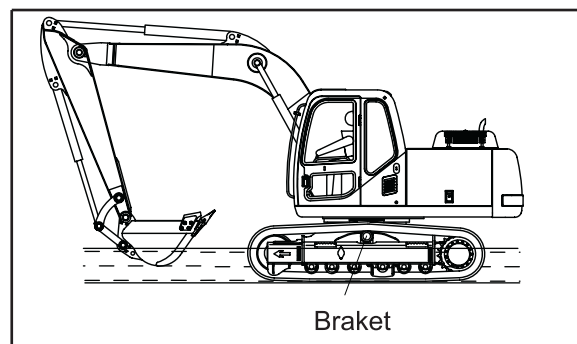
Caution: working on following condition is dangerous. On the slope, muddy ground, snow ground, frozen ground, sandy and loose ground. When working in such condition, operator has to judge the condition, whether it is available to work.

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

Allowed water deep

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

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



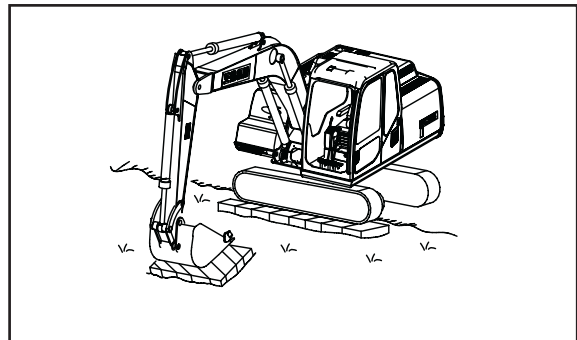
Escape from the slushy condition

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

A. One side of the crawler sinks into the mud

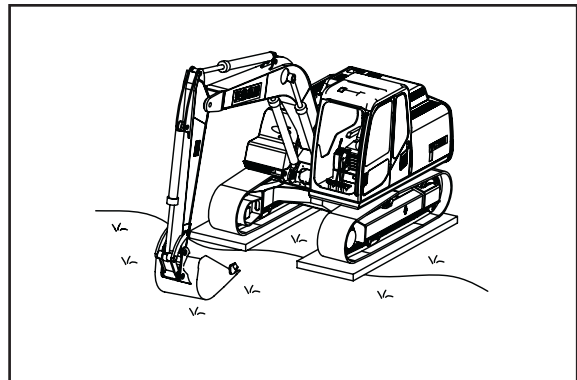
Notice: when lift up the machine with the arm, using the bottom of the bucket to touch the ground (do not use the teeth). Arm and boom keep an angle of 90~110 degrees.

When only one side of the crawler sinks into the mud, use the bucket to lift the crawler, fill with boards under the crawler, then drive the machine out of the mire. If it is necessary, put boards under the bucket.



B. both sides of crawlers sink into the mud

If both of the crawlers sink, fill board with above method. Dig the bucket into the earth as the picture shows. Use the bucket to drag the machine, meanwhile push forwards the travel lever to drive the machine out.

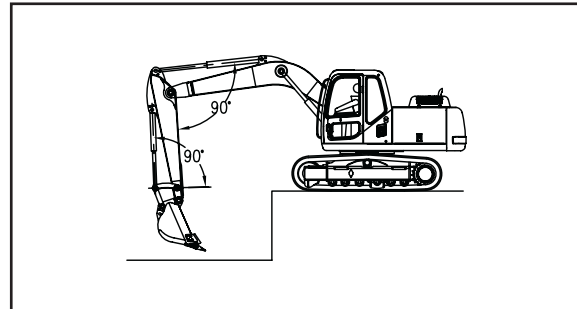


Working Operate guide

1. Backhoe work

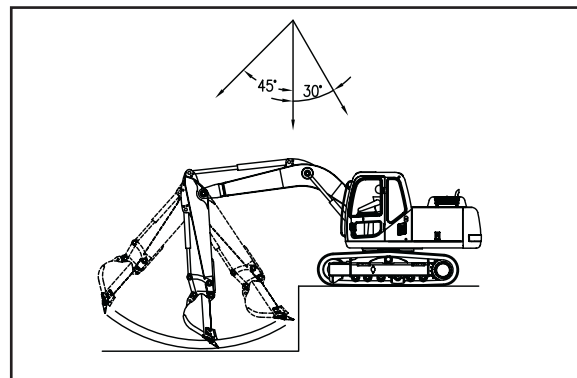
Backhoe is suitable on the position lower than the machine.

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



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

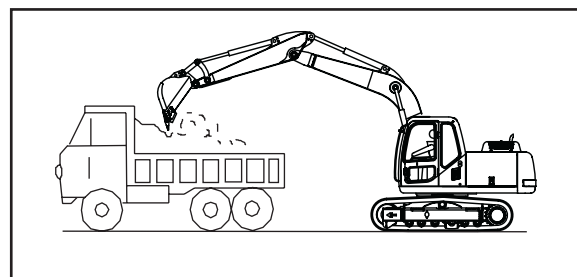
There may be some differences depending on the excavation depth, but try to use within the above range rather than going all the way to the extreme end of the cylinder stroke.



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

2. Loading work

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



3. Ditching work

Cut the dozer blade into the earth.

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

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

Notice:

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

4. Backfill and smoothing work.

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

5. Shake down the soil and sand from the bucket

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

6. Notice for relevant parts

A. Notice for crawler

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

BUCKET ASSEMBLING AND REMOVING

Safety regulation

- When you hit the pins with hammer to extract them, splinters may be produced and hit you, it may cause severe injury 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 bump your hands
- Don't put your hands in the pin which is aimed at the o-rings directly.

Bucket assembling

Stop the machine on a firm and solid ground.

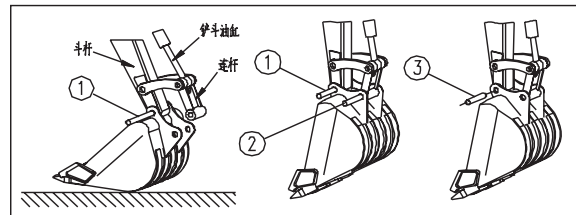
Start the machine then operate the arm till the hole of the arm and bucket in a line, then put a 300mm steel bar into ①.

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 inside the bucket hub, then take out the ① steel bar, insert the pin ③

Bucket removing

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 ② bucket pins and ③, in this order.



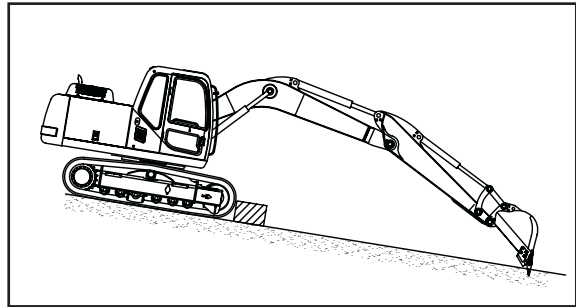
MACHINE STOP AND PARK

Safety regulation

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

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

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



Machine stop

1) Put all levers in neutral position.

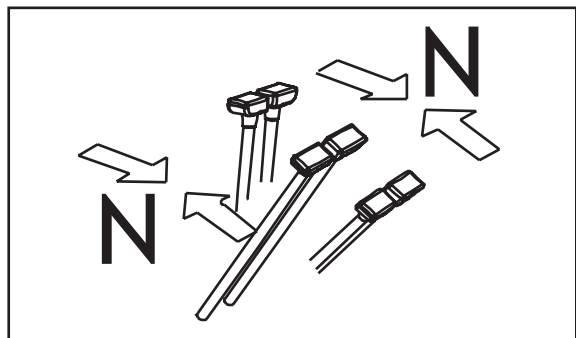
2) Don't stop the engine abruptly before it is cool enough. If the engine is over heated let it run at low speed for 5mins then stop it.

3) Lower bucket and dozer blade on the ground.

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

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

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



CHECK AFTER COMPLETION 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 work , make sure the follow compartment is locked.

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

2)Refuel port.

3)Hydraulic oil filing port.

4)Battery-box cover

5)Engine hood

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

Loading and transportatipn of machine

1.Safety regulation for loading machine

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

2 . Loading precaution

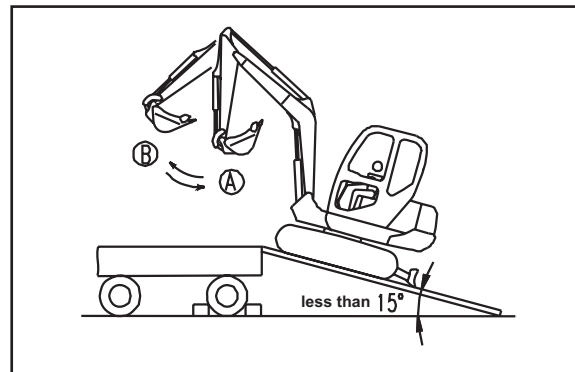
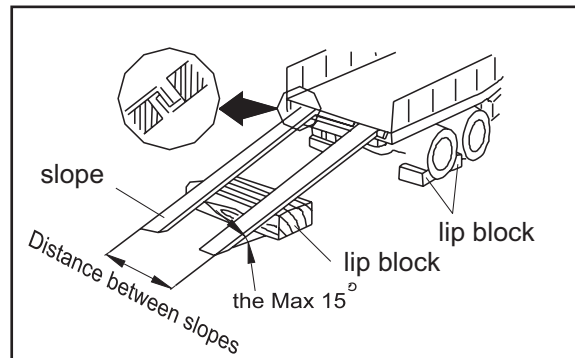
1)When loading or unloading the machine, park the trailer on a flat, firm road. Keep a fairly long distance between the road shoulder and the machine.

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)Make sure lock the flat slew.

5)Let the excavator and the ramp in the line, the bulldozer stay in the backside, for safety reason, the excavator should drive slowly when climbing the ramp until reach to the end of the ramp.



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

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

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

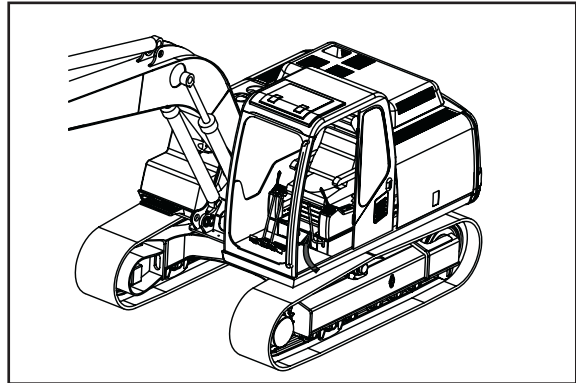


WARNING: After completing work or operating, before leave the seat, the operator should lift the safety lock lever at first to make the pilot operating oil circuit is cut off. For in case that somebody impact the operating lever accidentally what cause the machine move.

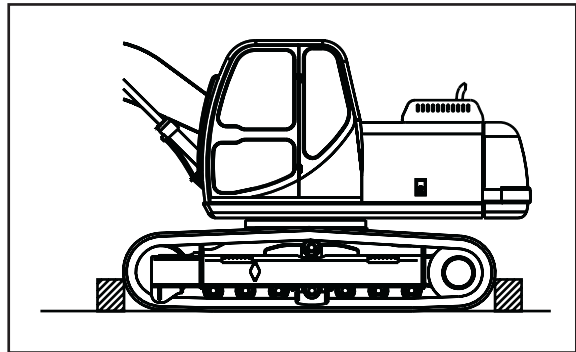
NOTICE: Choose the trailer to match the machine in weight and size offered in this manual

3. Fix the machine on the trailer

- 1) Lower the work equipment correctly
- 2) Stop the engine and remove the start key.
- 3) Lift the safety lock lever up
- 4) Lock the door and engine hood



- 5) Place rectangular timber underneath the front and rear crawler to prevent the machine from moving about. Also, hold it down with chains or ropes. Be particularly careful to ensure that the machine does not slip sideways.



4. Unload the machine from the trailer

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

5. Suspend the machine

A. safety regulation

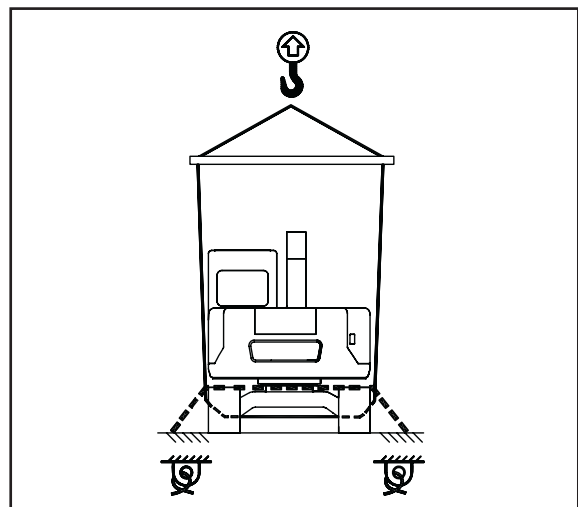
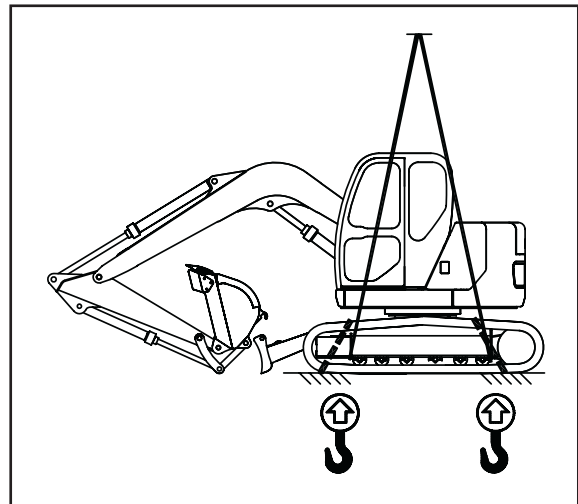
- 1) Don't suspend the machine when there is somebody on it.
- 2) It must be sure the chain that use to suspend the machine have the enough intensity to carry the weight of the machine.
- 3) In order to avoid the machine's unbalance, it must do just like following provided steps.
- 4) Don't suspend the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

B. Suspending procedure

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

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

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



COLD / HOT WEATHER OPERATION

1. Cold weather operation

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

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

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

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

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

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

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

2. Hot weather operation

To avoid the machine is damaged, follows these rules:

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

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

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

4)Check the fan belt.

5)Use the lubricant in moderate viscosity.

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

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

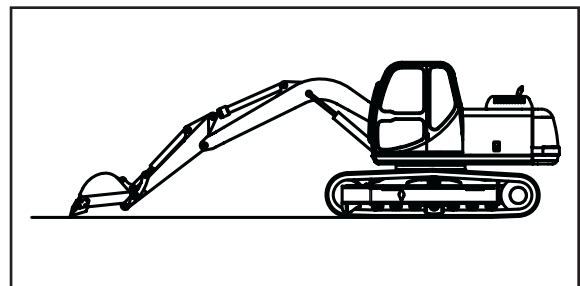
1.Before storage

LONG TERM STORAGE

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

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

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



2. During storage

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



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

3. After storage

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

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

NOTICE: 1) According the normal 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.

Reason for the Technical Trouble & Resolve

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

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

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

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

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

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

5

Maintenance

Maintenance Information

Break-in of the new machine

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

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

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

Working in the dusty worksites

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

- To check whether the air filter is clogged or not with the sensor and frequent cleaning of filter core is required.

- Clean the radiator core frequently to prevent the clogging.

- Frequent cleaning and change of fuel filter are required.

- Clean the electrical equipment, especially the starting motor and alternator in order to avoid the blocking of the dust.

- Move the machine to a clean ground for preventing dust from oil when checking and changing the oil.

Oil and the filter core

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

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

Never mix different kinds of oil.

The hour meter

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

Use the original spare parts

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

Environment protection

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

Do not drop anything into the machine

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

Periodical maintenance

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

Counter checking

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

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

Maintenance Outlines

Lubricants

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

Fuel

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

Grease

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

Coolant

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

Filter

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

Hydraulic system

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

Electrical system

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

Compel lent replacement of parts

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

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

Oil choosing list

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

	Lube or Fuel	Use temperature	Viscosity	Fill-in
Lube of the engine	Chilliness area:CD10W/30 General area:CD15W/40	-20°Cupwards -15°C upwards	9.3-12.5 centipoise 12.-16.5 centipoise (when it is 100°C)	
Hydraulic oil	Low temperature:L-HS46 General area:L-HM68	-25°C upwards -4°C upwards	61.2-74.8 centipoise (When it is 40°C)	
Lube of the driving reducer	Overload use the gear oil (GL-5)	Winter/summer		SAE80W/90
Lube of the rotating reducer	Overload use the gear oil (GL-5)	Winter/summer		
Lube of the guide wheel/carrier wheel	Vehicle oil Hz-23	All the temperatures	20-25 centipoise (When it is 50°C)	
Lubricating oil	Lubricating grease	-20°C-160°C		
Fuel	Summer:0# light dies fuel Winter:-10# light dies fuel -20# light dies fuel	>0°C 0-5°C -5°C-15°C		
Coolant	Antifreeze (50%water and50%---Ethylene glycol)	>-32°C		

● The capacity of the Oil

Sort	Unit	Value
Fuel tank	L	180
Machine oil of the engine	L	19
Hydraulic oil tank	L	120

The Tighten Moment

Refer to the value to install the bolts、the nuts.

The tighten moment of the general parts

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

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

The tighten moment of hydraulic soft pipe

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

The tighten moment of hydraulic soft pipe

BSP Thread and Rotating Nut		
	Nm	
BSP Thread	Metric System Moment	Min./max
G1/4	20	15~25
G3/8	34	27~41
G1/2	60	42~76
G5/8	69	44~94
G3/4	115	95~135
G1	140	115~165
G1.1/4	210	140~280
G1.1/2	290	215~365
G2	400	300~500

ORFS Rotating Nut			
		Nm	
UNF Thread	Specs of the lineation	Min	Max
9/16~18	- 4	14	16
11/16~16	- 6	24	27
13/16~16	- 8	43	47
1~14	- 10	60	68
1.3/16~12	- 12	90	95
1.3/16~12	- 14	90	95
1.7/16~12	- 16	125	135
1.11/16~12	- 20	170	190
2~12	- 24	200	225

Maintenance List of Time-Check

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

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

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



Routine period to do



Maintenance of the first time to do



Every spring and Autumn

Routine Check

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

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

Fuel System of Engine

Maintenance manual

Capacity of the oil tank-----	180L
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-----	500h

1. Check the level of the oil and immit

It can see the instruction sheet of the combination instruction sheet to check the level of the oil. Do it everyday or every 10 hours.

It should immit the oil tank after working to avoid have the hydrometeor.

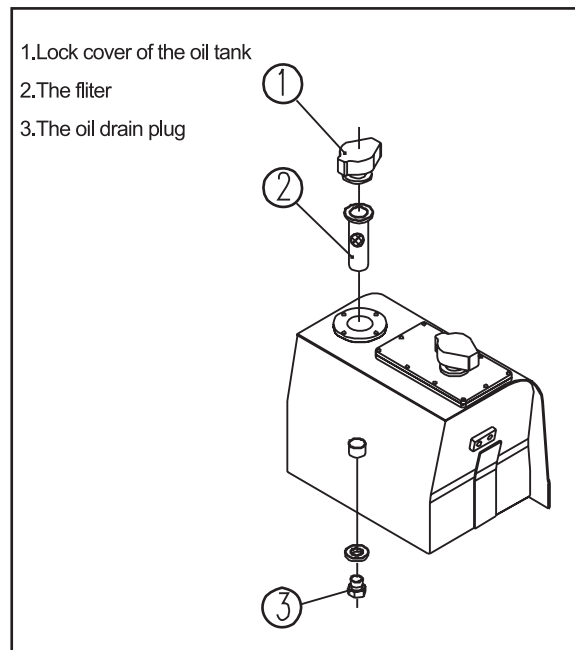
The gun stay front of the fuel-hydraulic oil tank

2. Vent the water and the impurity from the tank

3. Clean the oil tank

Clean it every 250hours

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



Caution: Don't use the trichlene to washing the inside of the oil tank, it only use the diesel oil

4. Exhaust of the fuel-return circuit

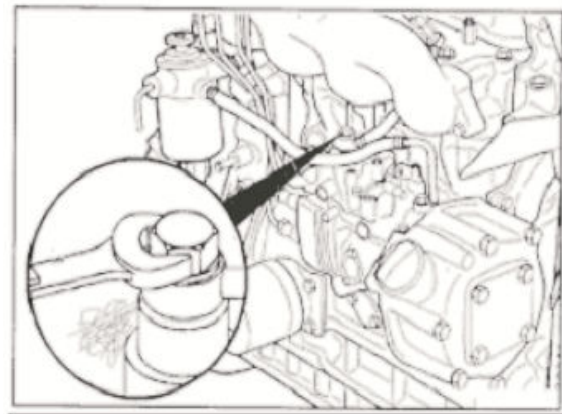
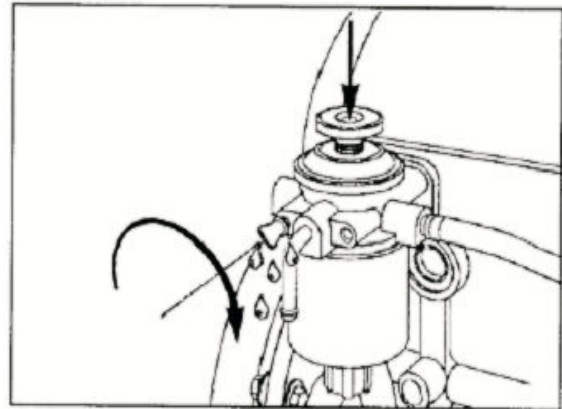
It need to exhaust the air before start the engine when it replaces filter core of the fuel 、 cut off the pipe of the fuel、 clean the filter of the fuel and make the air into the fuel-return circuit.

5. Air-draining of fuel-return circuit

1) Fulfill the fuel tank and turn on the control lever if fuel filter

2) Loose the drain plug screw of fuel filter

3) Tighten the plug screw when there is no air bubble in the fuel draining from draining bolt.



6. Pre-filter of engine oil

Change the filter core every 500 hours (can see the following chapter of changing the filter cores)

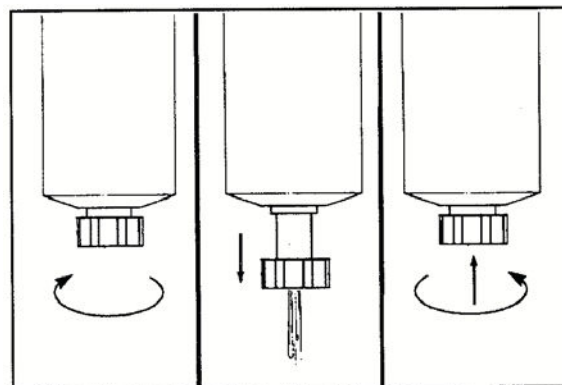
Drain the water and sediment from the separator.

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

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

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

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



Turn the valve counter clockwise

Down the valve

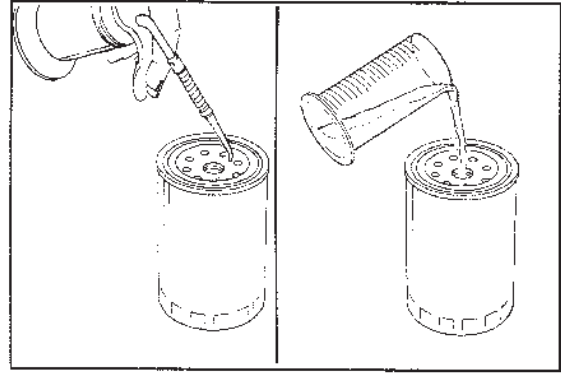
Turn the valve clockwise

7. Replace the filter core of the fuel

Replace it every 200 hours or every 3 months.

It must use the sterling filter core

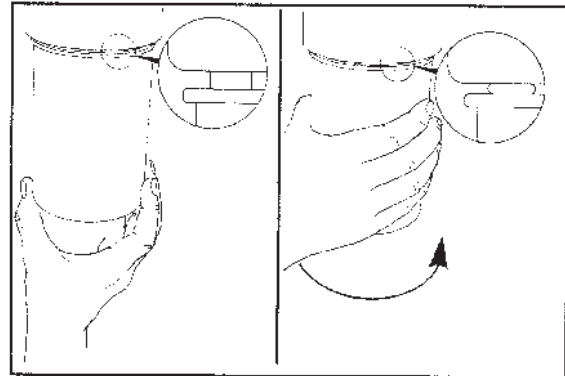
- 1) Take-down the filter of the fuel
- 2) Use the cloth which not cottony to clean the surface of the sealing gasket.
- 3) Disuse the "O" ring
- 4) Install the new "O" ring



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

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

- 6) Install the filter as the manufacturer's order



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

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

Cooling System of Engine

Maintenance manual

Check the level of the coolant-----Everyday or 10h
Check the rubber soft pipe and the clip-----Everyday or 10h
Clean the vane of the radiator-----500h
Replace the coolant-----Spring and Autumn
Check the consistency of the coolant -----Everyday or 10h

1.Check the level of the coolant

When a new machine has been started, you must check the level of the coolant first.

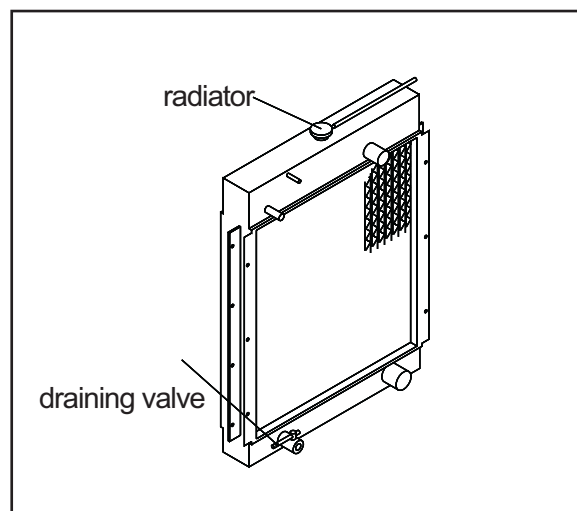
And check the level of the coolant everyday or every 10hours.

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

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

Observe the position of the level in the balance tank.

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



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

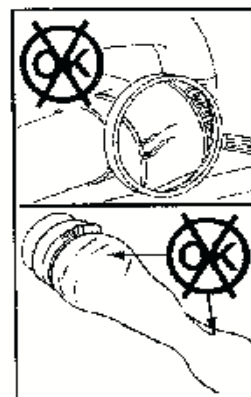
The way to open the cover: Open the cover little after the system cooled .Then wait it release the pressure.

2.Check the rubber soft pipe and the clip

Check it everyday or every 10hours.

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

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



2. Check the rubber soft pipe and the clip

Check it everyday or every 10 hours.

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

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

3. Clean and Check the vane of the radiator

Clean it every 500 hours.

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

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



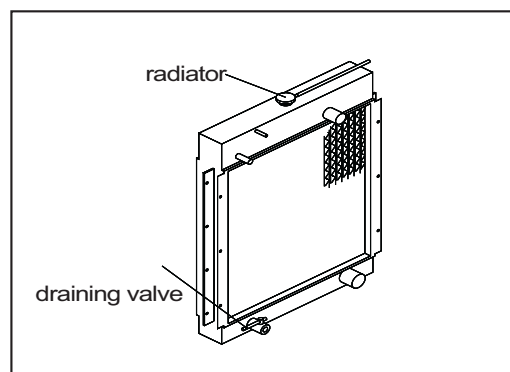
Warning:It is dangerous when the compress air、 the high-pressure water、 the steam hit the body.It must use the glasses、 the veil and so on

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

4. Replace the coolant

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

- 1)Take down the cover of the radiator (water tank), open the vent valve to make the coolant out.
- 2)Clean the cooling loop, close the draining valve valve. Immit the coolant, then start the engine to make the engine run about 10 minutes with the low-speed. Then stop the machine and blow off the coolant.
- 3)Close the vent valve again
- 4)Immit the coolant, let the engine run several minutes with the low-speed to make the coolant permeated the loop.
- 5)Check the level of the coolant and supply the coolant.





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

5. Check the consistency of the coolant

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



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



Warning: It must use the coolant in any weather.

No use the water instead of the coolant.

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

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

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

Lubricating System of the Engine

Maintenance manual

Capacity of the radiator-----7L

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

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

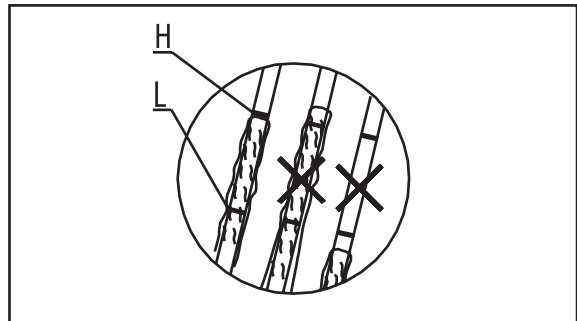
1.Check the oil level

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

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

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

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



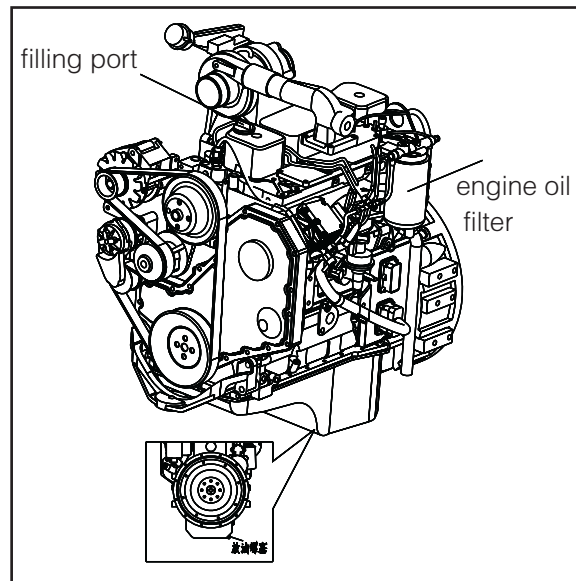
Warning:After stop the engine,the parts and the oil are the high-temperature.They will hurt the body.It need wait the temperature reduce when it start to maintenance.

2.Replace the engine oil

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

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

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



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

3)Clean the vent bolt and install,if the seal ring has broken,it need replace it.

4)Open the sprue.

5)Immit the new machine oil till the oil arrive the “Max” of the oil leveler

6)Close the cover of the sprue,and run the engine about 5 minutes.

7)After stop the engine about 10–20 minutes,check the level of the machine oil. It immits the machine oil if it necessary.

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

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

Replace the filter of the engine oil

1)Clean the area which around the base of the filter,take–down the filter of the machine oil,clean the surface of the base.

2)Lubricate two seal gaskets which lie in the right of the filter

3)Before install the filter,it need wipe the machine oil on the surface of the seal gasket.

4)Install the filter as the manufacturer's request

5)Run the engine with the low–speed,check whether the filter leaks the oil

6)Stop the engine and wait 15 minutes to make the engine oil return

7)Check the level of the oil.Immit the machine oil to the"H" sign if it necessary.

Air Intake System of The Engine

Maintenance manual

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

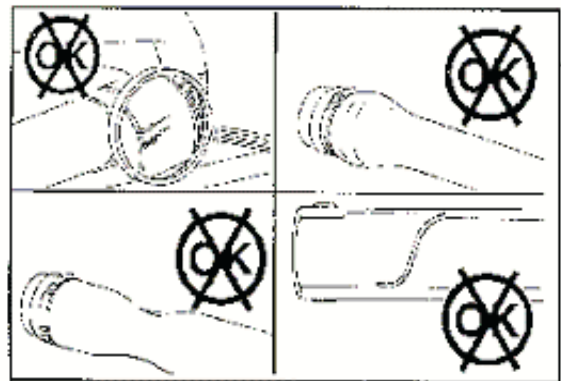
1. Replace the air filter core

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

2. Check the air intake pipe

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

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



Other Maintenances of Engine



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

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

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

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



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

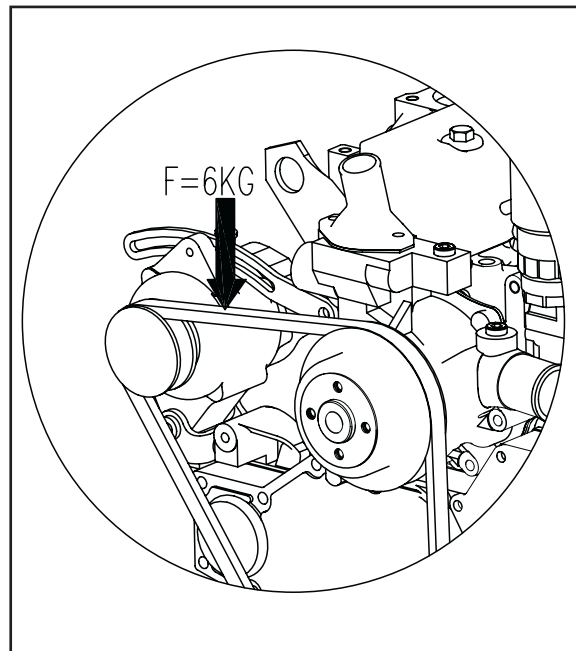
●Check the belt of the fan' tension

After 50 hours do the first checking.

Then check it every 100hours.

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

For the right tension belts, between the belt wheel of fan and belt wheel of generator, add 6kg on the belt vertically and the subquality product on the belt is about 5-10mm.



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

Hydraulic System

Maintenance manual

Capacity of the hydraulic oil tank-----	120L
Check the level of the oil-----	10h
Replace the filter-----	500h
Replace the hydraulic oil-----	1000h
Check the pressure system-----	500h



Warning: The hydraulic oil can bring serious damage to the body, so don't touch the pressure oil leaking area by your hand, use the cardboard or paper to check oil leaking. People should be sent to hospital immediately if skin jetted by hydraulic.



Warning: Never do the maintenance when the hydraulic oil is in high temperature. For avoiding the hydraulic oil spurting out please turn the cover slowing to release the pressure when removing the oil flange cover.

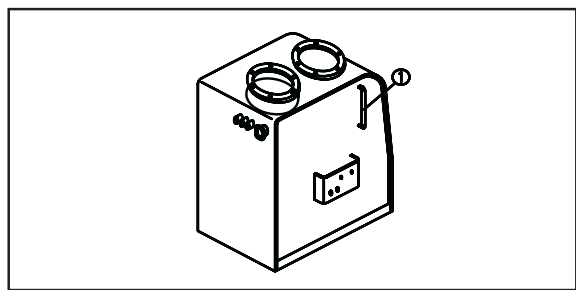
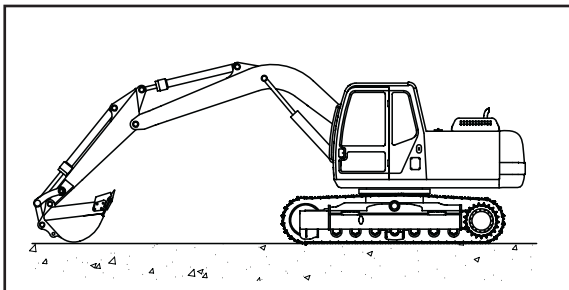
1. Check the level of the oil

Check it every 10 hours.

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

Observe the oil level through the oil scale(see ①).

Request the oil level can be see on the range of oil scale, don't fill too much oil over the oil scale range, that damage the hydraulic circuit or the oil spurting out. If the oil is over full, please stop the machine then drain the oil from the drain plug after the oil is cold. When the oil level is too low and can't see from the oil scale, please filling immediately.

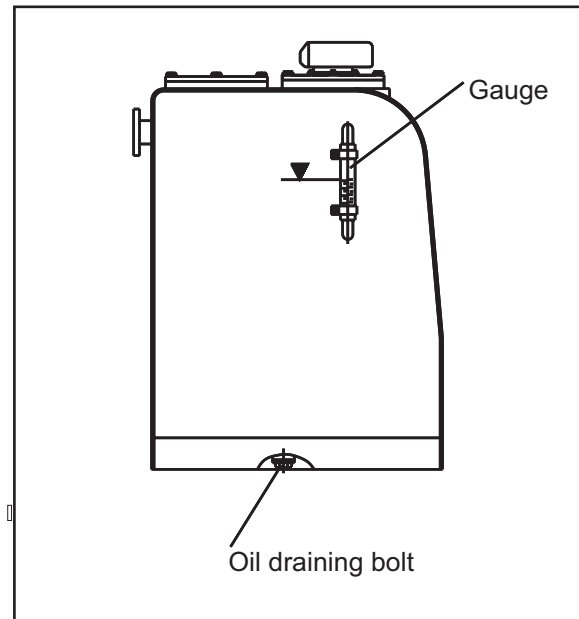


Caution: The level of the hydraulic oil will change when the temperature is changed. Before operating, the level lie the middle of the gauge, and when the temperature is going up, the level will reach to the top of the gauge.

2. Drain the water and the dust in the oil tank

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

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



3. Replace the hydraulic oil and clean the filter

Replace and clean it every 1000 hours.

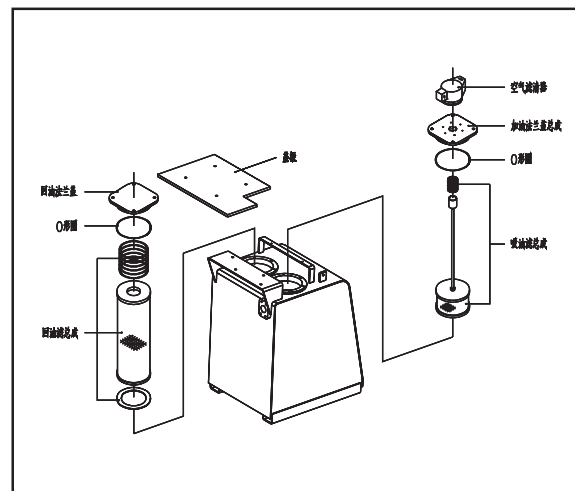


Warning: 1) Never drain the oil when it is in high temperature 2) When Take-down the flange cover of the sprue, turn the cover slow and release the pressure to avoid the oil spurt out.3)No allow the water、 the dust or the soil into the oil tank when replace the oil.

Steps for replace the oil:

- 1)Park the machine on a level and solid ground.
- 2)Release the air filter on oil filling flange to reduce the pressure in the oil tank.
- 3) Use the oil pump to draw out the hydraulic oil into a empty oil barrel.
- 4) Lose the oil draining plug under the oil tank to drain the hydraulic oil completely.

- 5) Take down the oil intake filter.
- 6) Clean the inside of the tank.
- 7) Clean the draining bolt and fit it back.
- 8) Clean the oil intake filter.
- 9) Fill the regulated hydraulic oil, filling the new oil until the oil level arrived the middle of the oil scale.
- 10) Install the oil intake filter and air filter.



4.Drain the air in the hydraulic system.

A.Take out the air in the pump.

- 1)Loosen the bleed bolt in the drain plug.
- 2)Screw the bolt.

Caution: Do not run the pump before fulfill the oil, it can cause damage to the pump.

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

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

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

C.Drain the air in the cylinder.

- 1)Run the engine in low idling and flex the cylinder to a position which is 100mm from the end four to five times. (Do not reach to the end of the cylinder)
- 2)Operate every cylinder to the end for 3 to 4 times.
- 3)Operate every cylinder to the end for 4 to 5 times in order to drain the air completely.

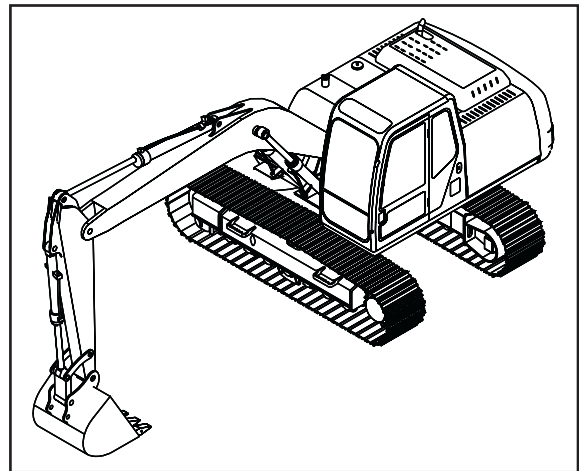
Caution: If running the engine in a high idling or operating the cylinder to the end immediately after starting the machine, the piston seals will be broken.

D.Drain the air in the slewing motor.

Caution: Do not slew the machine when draining.

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

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



F. Drain the air in the attachments.

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

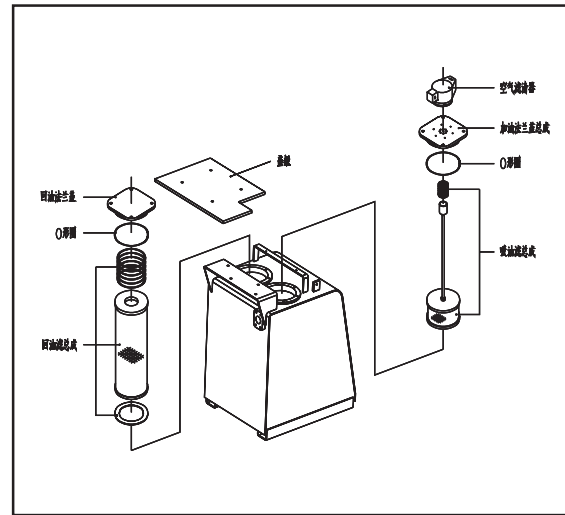
Caution:

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

5. Change the oil intake filter core.

Replace the filter core after every 500 Hours, the oil return filter is inside the Hydraulic oil tank, so replace as followsteps :

- 1)Remove cover on the top of the oil tank.
- 2)Take the spring, valve and oil return filter from inside of oil tank.
- 3)Clean the filter core or replace the new filter core. Clean the spring and the valve and then reinstall.
- 4)Install the oil tank cover

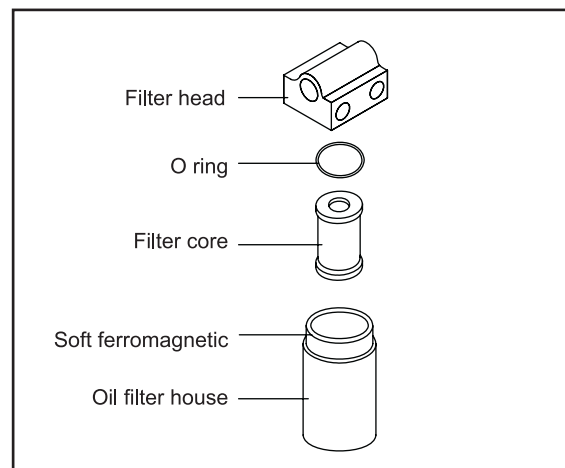


6. Replace the filter core of the guide pipe laying

Replace it every 500 hours.

Caution: It must vent the pressure of the hydraulic oil tank before take-down the filter core

- 1)Screw down the filter shuck.
- 2)Take out the filter core
- 3)Install the new O ring into the groove of the filter head
- 4)Before install the new core, it needs to wipe the hydraulic oil on the surface of the seals, and put the core into the filter head.



- 5)Clean the filter shuck and soft magnet. Do not allow the impurities and the water into the filter shuck.
- 6)Screw down the filter shell and the filter head with the torque 25-35 Nm.
- 7)Connect the pipeline, start the engine in a slow idling and run 3-5 minutes to drain the air
- 8)Park the machine on a level and solid ground, check the level of the oil. Refill the oil if it is necessary. Do not let the oil exceeds the highest limit.

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

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

Working rate of the hydraulic hammer	Replace period of the hydraulic oil	Replace period of the filter core
50%	700	250
100%	500	250

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

Battery



Warning: 1) It has liquid vitriol inside the battery, this kind of liquid is with strong causticity, please keep children away, when the user operating the battery, please wear the protecting glasses and rubber glove, if there are some vitriol splash into your eyes, skin or close, please cleaning by water, any worse condition must go to hospital.
2) It will produce the hydrogen and oxygen when the battery is being charged, once the gas mix with fire or the vent is blocked will cause explosion, so please keep the battery far from fire and avoid short circuit.
3) Battery house was made by polypropylene, it is tinderbox and should be kept far from fire.

1.Storage of Battery

- 1)This is liquid flow battery and should to be deposited in the circumstance with 5~25°C dry, clean and ventilative, and should not to be sunned straightly, far from the heat sources above 2m at least. It will greatly influence the capability of battery if the temperature is too high.
- 2)The battery don't to be upended or lied on the ground, also should not to be struck or pressed by any kind of machine.
- 3)The storage period for this battery is 6 months, it is needn't to charge the battery during storage period, after deposited exceeding 6 months, please charge before used.

2.Charge of Battery

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

2.1 Battery recharging

2.1.1) Constant current charging method

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

2.1.2) Constant voltage charging method

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

2.2 Normal charge of Battery

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

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



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

3.Installation of Battery

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

4.Maintain of battery

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

Reducer

Instructions of maintenance

Check the lubricant oil level and refill-----every 250 hours

Replace the lubricant-----every 1000 hours

Check the tightening torque of reducer connecting bolt-----every 500 hours

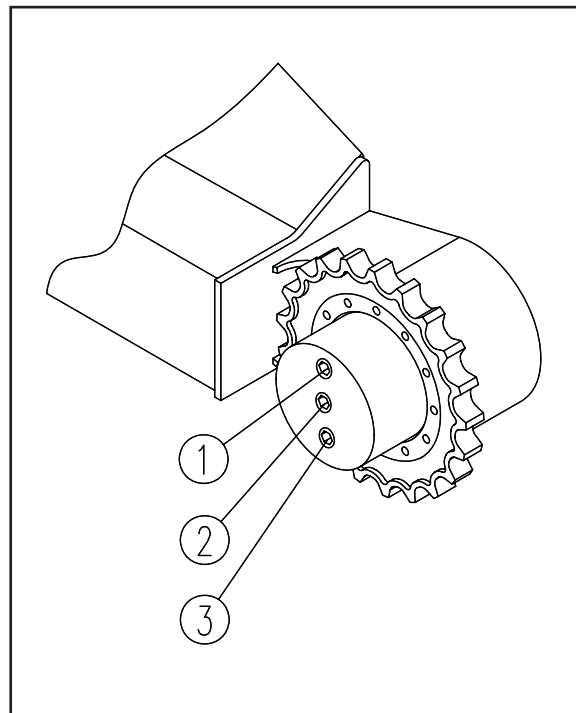
1.Check the level of the lube for the driving reducer and put on steam



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

Check it every 250 hours

- 1)Prepare a inside hexagon spanner.
- 2)Stop the Excavator on the level road.
- 3)Turn the driving reducer make the 3 outside bolts is apeak on the ground, then stop the machine
- 4)Open the bolt ①,check the position of the level. The height of the level should arrive the bottom of the bolt hole.
- 5)Refilling oil if necessary (as the Following steps of lube replacing method).
- 6)Clean the bolt ①, and reinstall.



2. Replace the lube (For each reducer)

Replace it every 1000 hours

- 1) Prepare an inside hexagon spanner.
- 2) Stop the Excavator on the level ground
- 3) Turn the driving reducer make the 3 outside bolts is apeak on the ground, then stop the machine

Caution: Don't let the hot oil scald

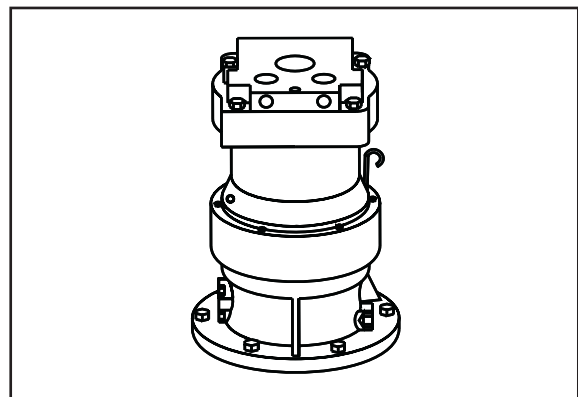
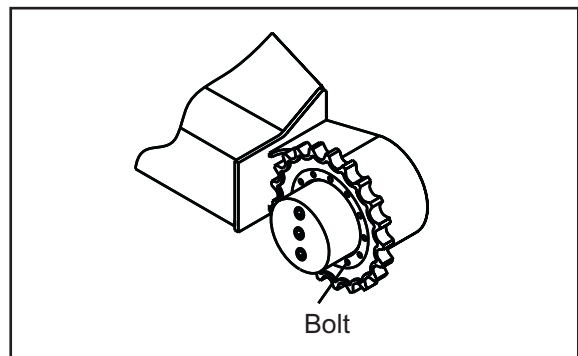
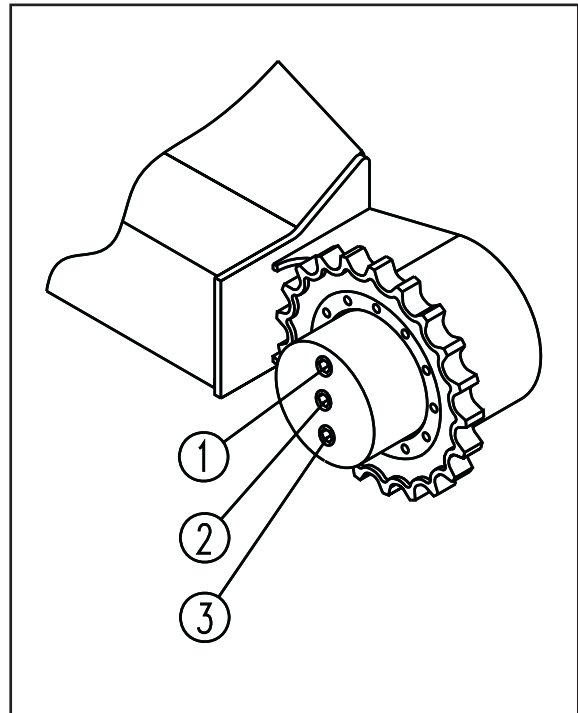
- 4) Vent the oil when the reducer is hot. Loosen the bolt ② for venting oil, and loosen the bolt ① for venting oil completely.
 - 5) Clean the bolt ② and reinstall.
 - 6) Fill the oration lube from ① until the oil level arrived the lower edge of the bolt hole.
 - 7) Clean the bolt ① and reinstall.
3. Check the tighten moment for the connected bolts which are connecting the driving reducer with the slewing reducer

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

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

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

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

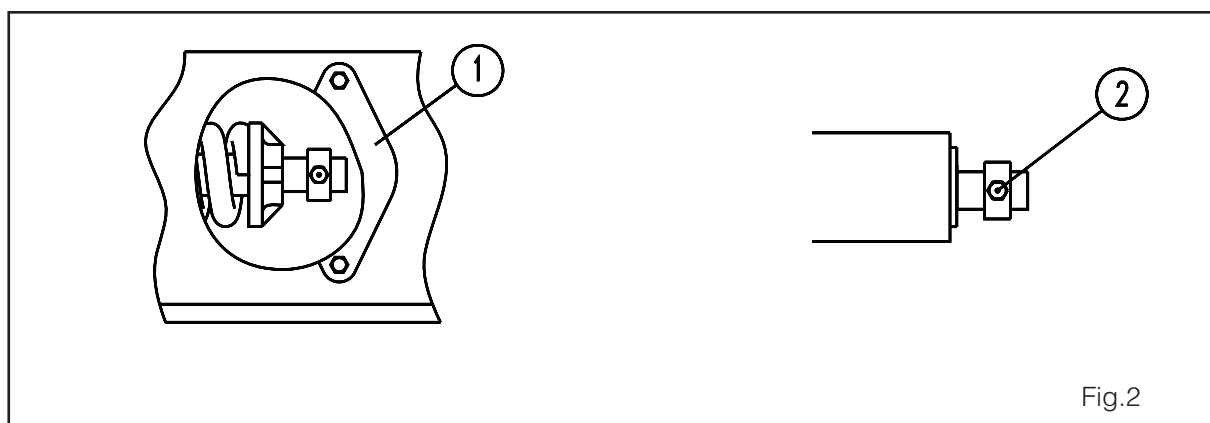
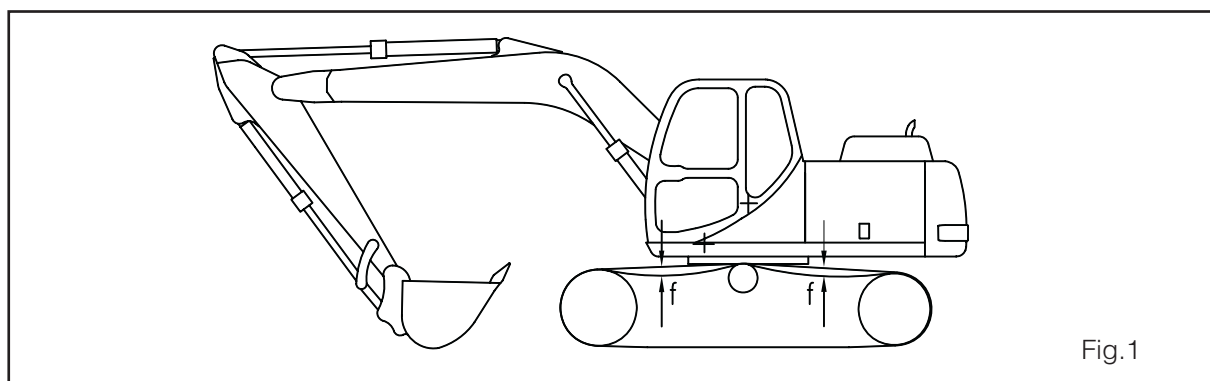


Crawler

Check and adjust the tension state of the crawler

Check it every 10 hours.

- 1) Place the excavator on the smooth and hared road.
- 2) Take down each cover of the crawler frame (1 in the picture 2), show up the sprue of the tension device (① in fig. 2)
- 3) For loose the crawler, first loose the tie-in ② (fig. 2) to make the lube out and make the flexibility of each branch f is 2–4cm (fig. 1), then screw up tightly.
- 4) For adjust the crawler, connecting the tie-in of the butter gun with the tie-in ② (fig. 2). Then use the butter gun filling the grease the flexibility of each branch f is 2–4cm (fig. 1)



Warning: Don't beat the tension spring in order to prevent the hazard caused by broken spring.

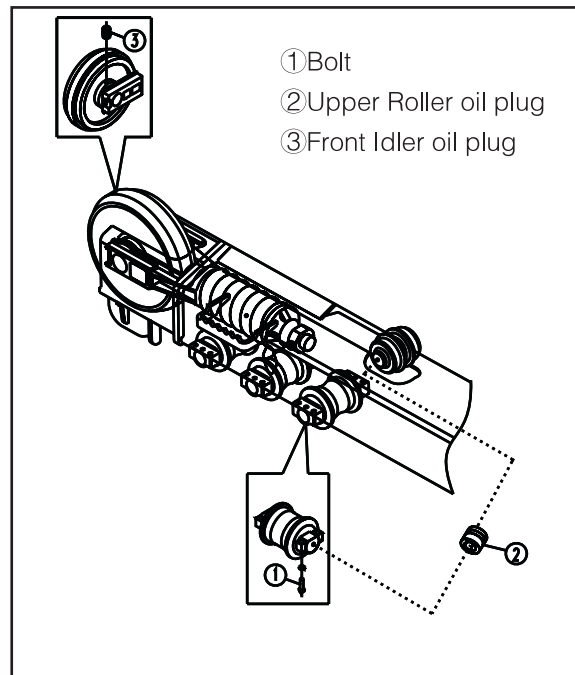
Idler, Upper roller and Front idler

1. Check the tighten torque of the idler

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

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

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



2. Check the level of the machine oil for the upper roller and front idler

Check it every 1000 hours.

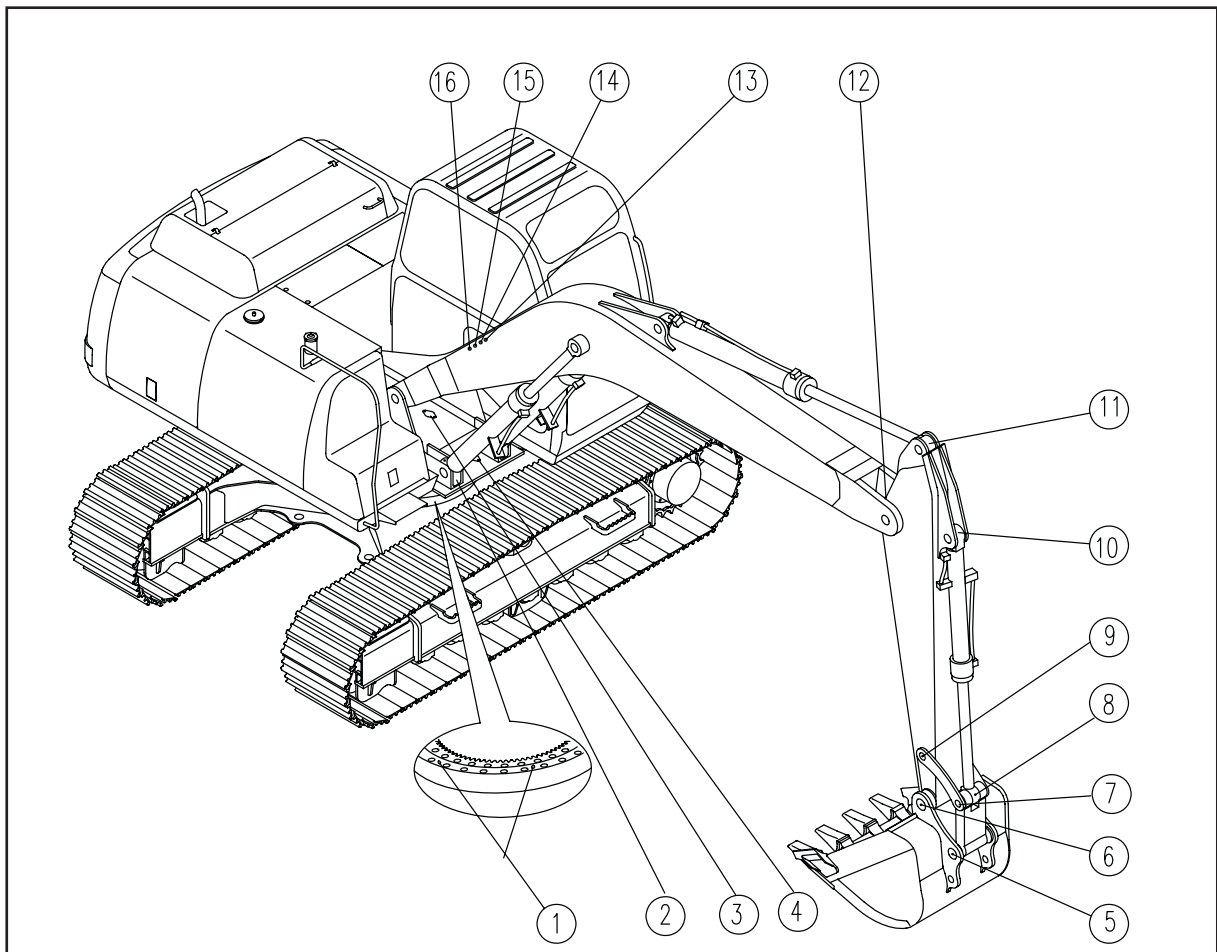
- 1) Take out the nut ②、③ of the carrier roller and leading roller
- 2) Immerse the oil
- 3) Until the sprue has the oil out, screw up the nut ②、③

Lubricate

Lubricating the parts which need every 50 hours

The steps:

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



- | | |
|--|--|
| 1. lubricating point of slewing rolling track | 9. connecting point of rocker and arm |
| 2. lubricating point of end of boom cylinder. | 10. lubricating point of end of bucket cylinder. |
| 3. lubricating point of slewing reducer bearing | 11. lubricating point of arm cylinder head |
| 4. lubricating point of the slewing support teeth ring | 12. connecting point of arm and boom |
| 5. connecting point of rocker and bucket | 13. lubricating point of boom cylinder head |
| 6. connecting point of arm and bucket | 14. lubricating point of end of arm cylinder. |
| 7. connecting point of rocker and connecting-rod | 15. connecting point of boom and platform |
| 8. lubricating point of bucket cylinder head | 16. connecting point of boom and platform |

Air conditioner (optional)

The main makeup of the air-condition as the following picture. The operation switch in the plane of the control box.

About the operation and 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

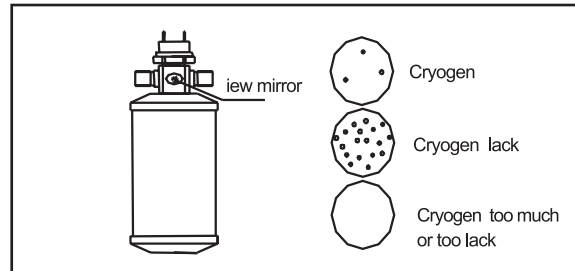
- 1) If the figure is glinting  , it shows that there is problem in cooling system pressure. Please contact professional person to fix this.
- 2) If the machine stop automatically during running or if the figure is glinting  (about 5 seconds), it shows that there is abnormal power off in last operation. If the figure  stop glinting after 5 seconds, the air conditioner can be used again.
- 3) For protecting the air compressor, the machine was set about 15 seconds interval for each two times of air compressor startup.
- 4) The dust screen of air-condition assembly must to be cleaned often. Otherwise, the dust and reif will stop the dust screen and make the air can not thought the heat exchanger smoothly, effecting the air condition effect.
- 5) If run the AC on refrigeration under the especial conditions (like wet, hot, use the outside circulation ventilation, run fan at low speed, dust screen is plugged, air return port is plugged etc.) , you will feel the air flow is smaller and smaller at some time, even almost no air, that's evaporator is frosting and stop the air circulation ventilation channel, making a bad refrigeration effect, this is not a AC system trouble, just stop the refrigeration, clean the frost and use the "strong wind" for a minutes, and then put on the refrigeration again, it will be work normally again, please do not choose the combined model of "weak win", "strong refrigeration" and "outside circulation ventilation" at the same time, use the "weak refrigeration" or "medium refrigeration" if possible.
- 6) Please use the heating system only after the engine water temperature was rose.
- 7) The core of the Cali duct connect to the water tank of the engine, if the core leaks, it will lead the water of the water tank lack, and make the engine overheat. In winter, it same to protect core not freeze as the water tank. Avoid the coolant freeze to make the core or the water tank freeze, please use the coolant which the manufacture requests, which produce the main machine. Please let out the coolant if the machine stops long time in winter when it maybe freezes.
- 8) Avoid contacting the refrigerant, it may be harmful to skin. If the refrigerant meets fire, it will produce poisoned air.

2. Check the value of the refrigeration



The refrigerating agent is easy to frostbite the skin. And it emits the poisonous gas and light when the refrigerating agent is near the fire. It needs to make sure the refrigerating agent does not spray to the skin and the eyes when it needs to take-down the refrigeration system. It should let it out then take-down it. No fire.

If the machine is short of the refrigeration agent, that the cooling performance will be worse. Check the value every month or every 250 hours. According to the view mirror of the desiccators, whether it has the air bubble to judge the value when the engine runs high-speed and air-condition stay the refrigeration state.



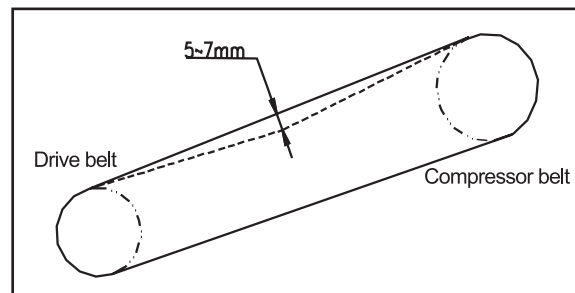
3. Check*adjust the belt tension of the compressor

Check it every 250 hours

A. Check

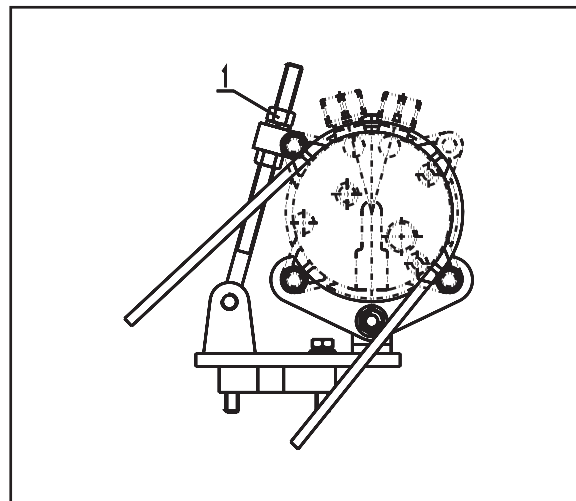
Use the finger about 12N power to press the middle part which is between the drive belt wheel and the compressor belt wheel and check the deflexion about 5-7 mm

Check whether the belt is destroyed. It needs to be replaced when the belt is pulled, no adjust value or the belt has the rift.



B. Adjust

Loosen the bolt ①, adjust bolt ② until the belt is suitable tension, then screw up bolt ①.



4.Items of the time-ckeck

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	Line	If fray、 burn	★	
7	Condensator	If has the dust stop		★
8	Electromagnetism clutch	If slip	★	
9	Compressor	If has the noise		★
10	Value of refrigeration agent	If the view mirror has the air bubble	★	
11	dust screen	If stop	★	

Replace Bucket teeth

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



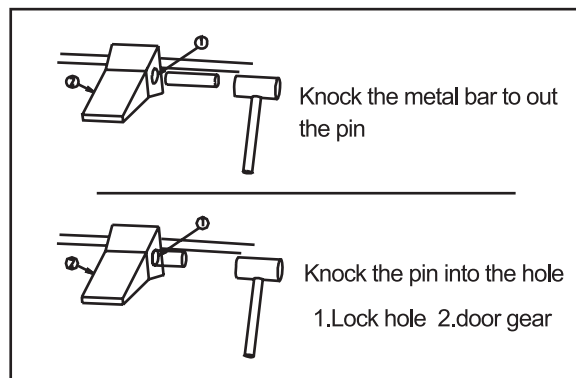
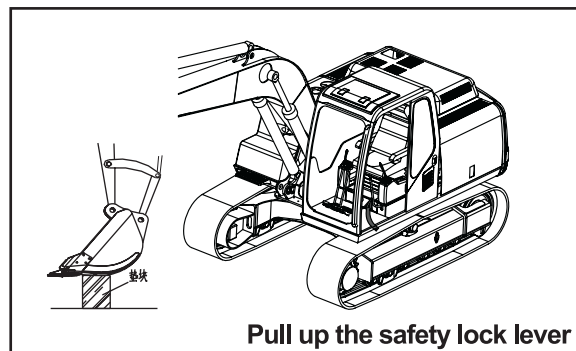
Warning: If the operation device because of the wrong operation and lead it moving, it very dangerous when replace the gear. Before replace the gear, it should make the operation device locked, then stop the engine and let all the joy stick locked. It need use the guard to avoid the axes out.

Replace the teeth of bucket

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

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

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



Washing the cushion on the floor

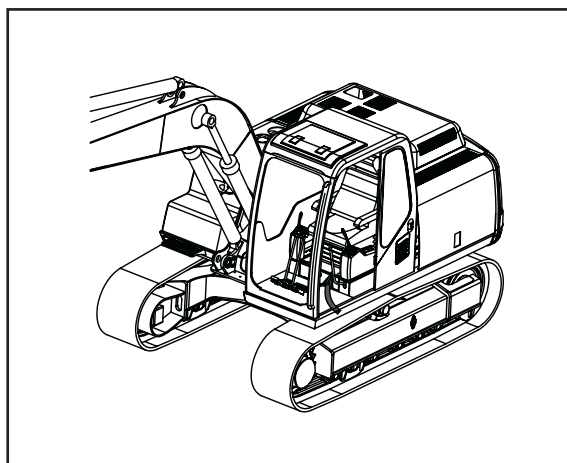
Avoid the floor slip*tumble to make the accident, please wash it at any moment if it dirty.



Warning: If it touches the joy stick unguarded, the operation device or the machine will move, and lead the accident. So it must place the machine on the hard and smooth road before take down the plastic cushion. It must uplift the guide safety handle and the top control box to lock the guide system before the operator leaves the seat.

The step for washing the plastic cushion:

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



MATERIAL SAFETY PLEASE REFER

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

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

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

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

Part I. Name of Chemicals

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

Part II. Information of consisting

Hazard Ingredient	Content	CAS No.
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Part III. Hazard Information

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

Part IV Emergency Treatment

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

Part V. Fire fighting

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

Part VI. Emergency treatment of leaking

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

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

Part VIII. Contacting control/ Individual protection

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

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

Part IX. Physical and Chemical characteristics

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

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

Part X. Stability and reacting activation

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

Part XI. Toxicology

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

Part XII. Ecology

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

Other hazard information	
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Part XIII Discarding

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

Part XIV. Transportation

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

Part XV. Rules and laws

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