



CFG40UF
Crawler-type Hydraulic Excavator
Operation & Maintenance
Manual

CFG INDUSTRIAL Ltd.

November, 2022

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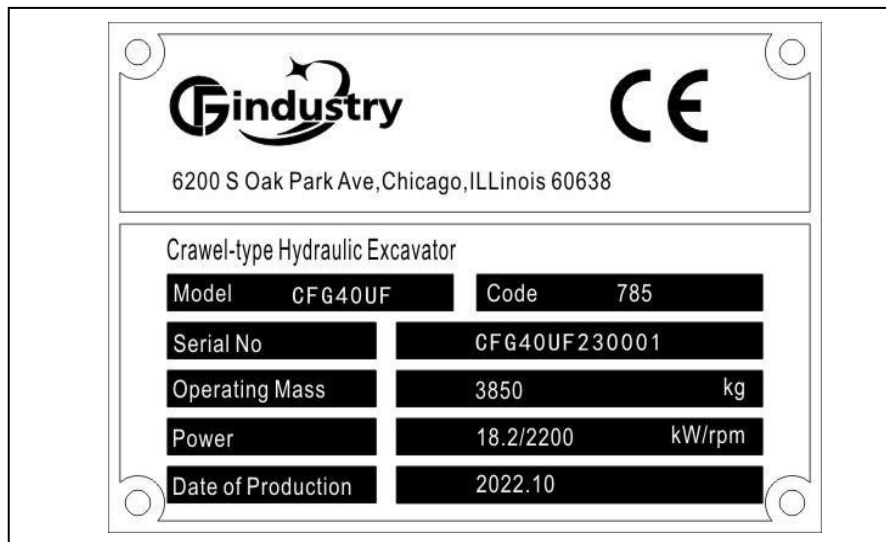
Note for Service Request

Dear Customers:

Thank you sincerely for purchasing our products. We will provide you timely service of good quality, so as to bring you more fortune with our equipment.

It's essential to provide us enough clear failure information, thus, we can analyze that and offer you effective service on time. If any support is requested from CFG or our authorized agents, failure details should be provided as much as possible, mainly including following items:

- ① A clear and full photo of the equipment nameplate, which locates on the right outside of the cab, as below figure:



- ② A photo of equipment working hours.
- ③ A photo of the entire machine, in which the whole equipment and its working condition should be clear and complete.
- ④ A photo of possible failure component, which can help us to analyze the accurate location of malfunction.
- ⑤ A close-up photo of failure component, in which show the malfunction details or damage clearly.

If you estimate that the failure may be caused by valuable components, such as, engine, hydraulic pump, main control valve, motor, hydraulic cylinder, controller, display screen, radiator and track chain, photos of these component nameplate or stencil seal are also needed, which locates on the top or side. Please distinguish that carefully.

Please send us service request by email or other method, thanks for your support.

<h2>EC Declaration of Conformity</h2>	
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The undersigned, representing the following:

Manufacturer and	the authorized representative established within the European Economic Area:
Company name: CFG INDUSTRIAL LTD. Address: 6200 S Oak Park Ave, Chicago, Illinois 96938, United States	CFG INDUSTRIAL LTD 6200 S Oak Park Ave, Chicago, Illinois 96938, United States
Business name: CFG INDUSTRIAL LTD.	
Name and address of person/Company authorized to compile the technical file established in the EU Community: CFG INDUSTRIAL LTD. 6200 S Oak Park Ave, Chicago, Illinois 96938, United States	

herewith declare that the following safety component/s:

Description of machine
Generic denomination: Hydraulic Excavator
Function: Widely used in projects like earth & stone construction, municipal construction, road maintenance, layout of cables and pipes, garden cultivation, trenches clearance, and etc.
Model/s: CFG40UF
Series:

Fulfil the relevant provisions of European Directive 2006/42/EC. The harmonized standards used in order to obtain compliance to 2006/42/EC (MD) are the following:

EN 474-1: 2006+A4:2013/AC: 2014 – Earth-moving machinery-Safety - Part 1. General requirements;

EN 474-5:2006+A3:2013 – Earth-moving machinery - Safety - Part 5: Requirements for hydraulic excavators;

EN ISO 4413:2010 – Hydraulic fluid power - General rules and safety requirements for systems and their components;

EN ISO 12100:2010 – Safety of machinery - General principles for design - Risk assessment and risk reduction

FOREWORD

It is particularly important that the operator should read these instructions carefully in order to operate and maintain the excavator safely and correctly. Otherwise accidents or damage may occur.

The manual supplies safety rules and labels which have been fixed on the machine so as to provide the instructions of potential danger and the ways to avoid it. Please follow that strictly during operating and maintenance. The forbidden usages or operations that mentioned in this manual cannot be engaged in any circumstances.

CFG cannot predict all kinds of potential danger may occur in the process of operation and maintenance. Therefore, the related instructions in this manual and on the machine only concern the basic safety rules. It is the operator's duty to take necessary measures to protect safety if there is no corresponding method recommended in this manual.

CFG will provide customers who purchase this machine with warranty service within the warranty period. The service details are showed in Maintenance Card supplied by distributor. In order to receive the warranty service from CFG, make sure genuine CFG parts are used and all instructions given in this manual is complied with strictly for operation and maintenance. If any personal injury, death and property loss is caused by failure to obey above instructions, CFG will not take any responsibility for that, and has rights to refuse to provide and to terminate warranty service in advance.

The excavator is designed according to the metric system, all the data presented are metric and only metric parts and tools can be used.

The manual should be regarded as the permanent part of excavator and kept at the easy reading place for consultation at any time. If it is damaged or lost, please contact CFG or agents for ordering. The manual should be attached when the excavator is transferred or sold.

Only trained, qualified and experienced operators can operate, check and maintain the machine. The equipment covered by this manual meets the applicable technical specifications effective as of its date of issue. The manufacturer CFG reserves the right to make any modifications from time to time without prior notices to any excavator components.

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1 SAFETY RULES



Warning

Please thoroughly read and make sure that all precautions described in this manual or safety labels are understood completely. Follow all instructions when operating or servicing this machine.

1.1 SAFETY LABELS

1.1.1 Location of Safety Labels

- Fully understand the correct position and contents of safety labels in this machine.
- To ensure that the content of labels can be read properly, be sure that they are in right place and always keep them clean. When cleaning them, do not use solvents or gasoline. It may cause labels to peel off.
- There are also other labels in addition to warning labels. Handle these labels in the same way.
- In case the labels are damaged, lost or not legible, replace them with new ones. For details of the part number, refer to parts manual or actual label, and place an order with CFG or our authorized distributors.

1.1.2 Safety Labels Instructions

(1) Safety Operation Label

- Please read all safety precautions carefully written in labels and all information concerning safety, prior to operate machine.
- Maintenance frequently and replace safety label if required. In case that safety labels or manual are damaged or lost, you can place an order with our distributors. The procedure of ordering them is identical with that of the other parts and components. You must specify model of the machine when ordering.
- Use only trained and qualified personnel to operate this machine. Follow all safety precautions and instructions in this manual to keep your machine in good condition.
- Do not alter or modify machine rashly, this may impair function and effect service life or jeopardize personal safety.
- Caution: all safety information described in this manual covers only basic safety information of this machine. It's



not possible to predict every circumstance which might involves potential hazards. So it's necessary to ask for instruction from your superior before attempting any operation or maintenance procedure.

(2) Engine Operation Label

Diesel engine inspection

- Stop machine on level ground, inspect engine oil level (stop engine for longer than 15 minutes to allow engine oil to go back to the bottom), inspect dipstick to make sure oil level must be between the lines of "MIN" and "MAX". For engine maintenance procedures, please refer to the "diesel engine maintenance manual" enclosed with the other literature of the machine.

Pre-start inspection

- Keep control lever of pilot valve in LOCK position, pilot handle and travel pull link are in normal position (neutral position), operator sit over seat.
- While switching the key to ON position, except engine hour meter and LCD module, all indicators of test system must light up. Buzzer must sound as well. Self-test is finished in 2 seconds to indicate test system is or is not properly functioning.

Start the engine

- Keep control lever of pilot valve at LOCK position.
- Switch key to ON position.
- Honk the horn to alert the persons around.
- Turn the key to the right; hold it in START position until engine runs. Then release the key, switch will automatically. Return to ON position.



Caution

- ◆ **Do not operate motor for longer than 5 seconds ever time to avoid damage to machine. In case of failure to start engine, switch the key back to OFF position, wait 2 minutes before a new attempt. Incorrect start may damage to starter.**

Engine daily inspection

1. Before starting engine, please check engine oil gauge, the oil level between H and L is correct.
2. Before starting engine, please check coolant level, and fill up if necessary. The coolant must be clean.
For -32° C or higher, choose the compound of 50% vinyl glycol and 50% water as coolant.
For -32~ -51° C, choose the compound of 60% vinyl glycol and 40% water as coolant.
3. Please choose diesel oil as follows:
0# diesel oil for 4° C or higher.
-10# diesel oil for -5° C or higher.
-20# diesel oil for -15° C or higher.
The diesel oil should be clean. Never use impure fuel.
4. If any air bubble in fuel system, please exhaust it before starting engine.
5. Without fuel, engine will stop running. After filling up fuel, please exhaust air by hand oil pump. (If no hand oil pump, use starter motor to exhaust air automatically.)

Engine start and stop

Start

1. Ensure the handle is in the neutral position.
2. Pull the accelerograph handle to a position a little higher than that of "lowest idle speed".
3. When it is around 0° C or even lower, preheat the engine before startup, turn the ignition key widdershins to "preheat" position and keep it there for 10 to 15 seconds, then turn it right to "start" position, engine is now started. After that, release the key, which will automatically return to "ON" position. Don't run the starter motor for more than 5 consecutive seconds. If the engine fails to be started, wait for 30 seconds and then try again to start the engine. If engine fails to work after being started for three times, check the oil supply system.
4. After starting engine, pull the accelerograph handle from low speed to middle speed position, warm up the engine for 5 minutes.

Engine in operation

1. Only thermometer pointer is in green range, the engine can run.
2. Check that the warning lamps are off.
3. If warning lamp is lit or warning sound is made, stop engine immediately and check concerned position as per light lamp.

Stop

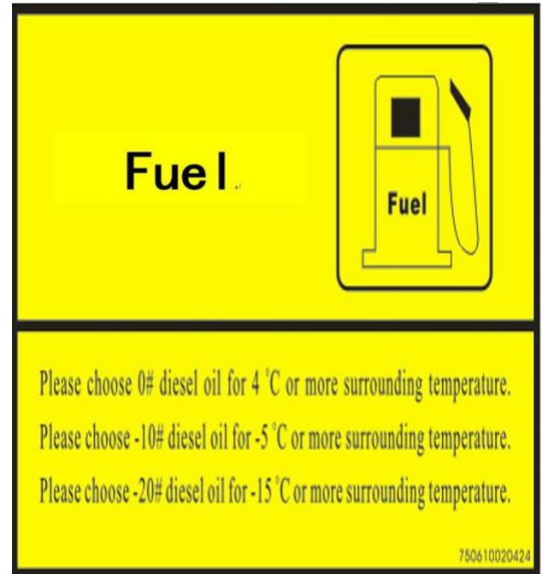
1. Run the engine at low rev for about 5 minutes to gradually let it cool.
2. Turn the key to the "OFF" position to stop the engine.

(3) Diesel Label



Caution

- ◆ Refilling fuel with extra care. Stop engine before refilling fuel. Do not smoke while refilling to fuel tank or operating around fuel system.
 - ◆ Select proper fuel according to different ambient temperature.
- Refer to “stop engine” section for properly parking machine and stopping engine.
 - Inspect fuel gauge on monitor, top up is required.
 - Prevent dirt, dust, water and other foreign matter from entry into oil tank and fuel system.
 - While refilling at the end of daily work-shift, do not spill, drip any fuel to machine or ground to avoid fuel clotting.
 - After refilling fuel, fasten cap securely.



(4) Machine Posture Label

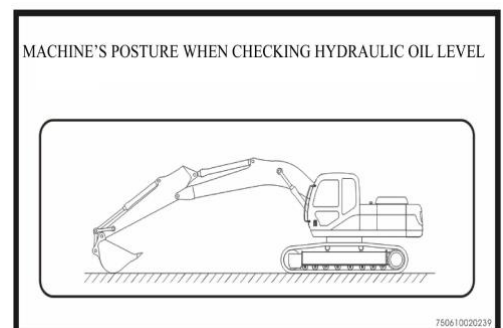


Caution

- ◆ Do not start engine when hydraulic oil tank runs out of oil.

Inspect hydraulic oil level.....every day

- Park machine on level ground.
- Completely retract arm cylinder and extend bucket cylinder to full length.
- Lower bucket down to the ground.
- Run engine at low speed for 5 minutes.
- Shut down engine, remove the key.
- Place pilot control lever to LOCK (up) position.



- Open right side door to check oil level gauge. Located on hydraulic oil tank, oil level must be within level marks. Drain oil if level is higher than MAX mark, refill if level is below MIN mark.
- Fill oil:
- Remove upper breather screw cap by rotating anticlockwise.
- Refill oil through strainer. Recheck oil level gauge.
- Fasten cap securely.

(5) Maintenance and Lubrication Label

Proper procedure of maintenance and inspection

Learn about how to properly service machine. Perform proper maintenance and inspection procedure in accordance with this manual. Inspect machine before starting machine.

- Check monitor.
- Check each liquid level.
- Check hose and piping for leakage, twist, wear out or damage.
- Check surrounding the machine for any signs of noise, heat etc.
- Check parts for looseness and lost.



Caution

◆ **If any problems are detected, repair prior to operation, or contact our authorized distributor.**

- Use recommended fuel, hydraulic oil and lubricant.
- Use only genuine CFG components.
- The warranty is not applicable for any damages arising

Maintenance and lubrication diagram

項目	4	10	100	1000	10000	20000	項目	項目
1. 燃油系統	●						21. 潤滑系統	●
2. 液壓系統	●						22. 空氣濾清器	●
3. 潤滑系統	●						23. 液壓濾油器	●
4. 液壓油位	●						24. 液壓油質	●
5. 液壓油質	●						25. 液壓油位	●
6. 液壓油質	●						26. 液壓油質	●
7. 液壓油質	●						27. 液壓油質	●
8. 液壓油質	●						28. 液壓油質	●
9. 液壓油質	●						29. 液壓油質	●
10. 液壓油質	●						30. 液壓油質	●
11. 液壓油質	●						31. 液壓油質	●
12. 液壓油質	●						32. 液壓油質	●
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15. 液壓油質	●						35. 液壓油質	●
16. 液壓油質	●						36. 液壓油質	●
17. 液壓油質	●						37. 液壓油質	●
18. 液壓油質	●						38. 液壓油質	●
19. 液壓油質	●						39. 液壓油質	●
20. 液壓油質	●						40. 液壓油質	●

注意事項：

1. 設備名稱：CFG40UF
2. 液壓油：SAE46 (ISO VG46)
3. 液壓油：SAE46 (ISO VG46)
4. 液壓油：SAE46 (ISO VG46)
5. 液壓油：SAE46 (ISO VG46)
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40. 液壓油：SAE46 (ISO VG46)

5

from failure to use CFG recommended fuel, lubricant, hydraulic oil and genuine CFG components.

- Do not adjust engine speed limiter or safety valve of hydraulic system.
- Do not allow water or vapor to reach electrical equipment.
- Do not disassemble components such as engine pump controller, sensor etc.

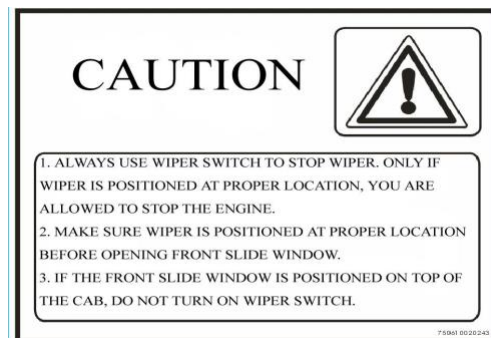
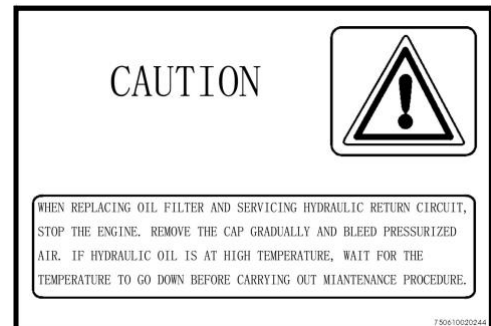
(6) Wiper Label

Use the wiper properly.

(7) Filter Element Maintenance Safety Label

Replace pilot oil filterevery 1000 hours

- Stop machine on firm level ground.
- Lower bucket to the ground.
- Run engine at low-speed for 5 minutes.
- Shut down the engine, remove the key.
- Release inner pressure in the hydraulic system by operating left and right pilot handles.
- Set pilot control lever in LOCK (UP) position.
- Use wrench for filter to remove filter housing off the filter head cover by rotating counterclockwise.
- Remove filter core and used O-ring.
- Clean the area in contact by head cover and O-ring.
- Apply a new layer of fresh hydraulic oil, and place it in position.
- Lubricate new filter core with a thin layer of clean hydraulic oil on the ring section. Push filter core



upward while moving it forward and backward alternately to install it.

- Clean filter housing.
- Rotate clockwise to tighten filter housing to head cover. Tighten at torque: 19.5—29.5Nm (2-3 kgf.m).



(8) Engine Hood Label



Warning

- ◆ Shut down engine before opening engine hood.
- ◆ Be cautious of scalding after opening engine hood.

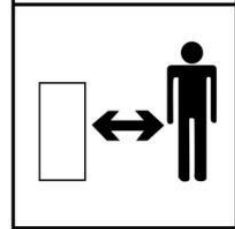


(9) Work Device Label



Warning

- ◆ Stay clear of working device.

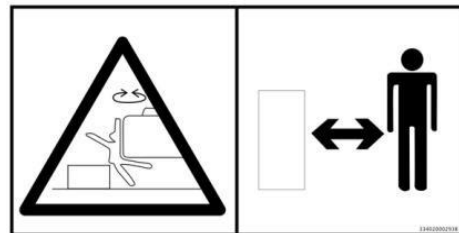


(10) Swing Label



Warning

- ◆ Keep clear of swing area.



(11) Tail Warning Label

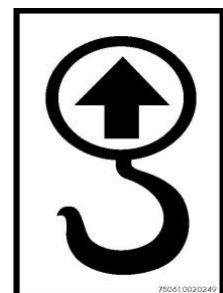


Warning

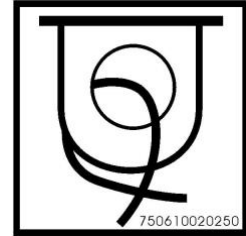
- ◆ Stay clear of machine while it is running.



(12) Lifting Direction Label



(13) Traction Hook



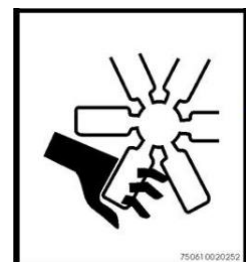
(14) Anti- scald Label

- After running operation, engine oil, gear oil and hydraulic oil is getting hot, so do engine, hoses, pipelines or other components. Be cautious of scalding.
- Attempt inspection and maintenance procedure, after machine components and oil cool down.
- There is pressure in hydraulic oil tank. Relieve pressure before opening cap to avoid oil spurt.
- There is pressure which builds up in hydraulic piping. Relieve pressure prior to repair or replacing.



(15) Preventing Hands from Being Clamped by Fan

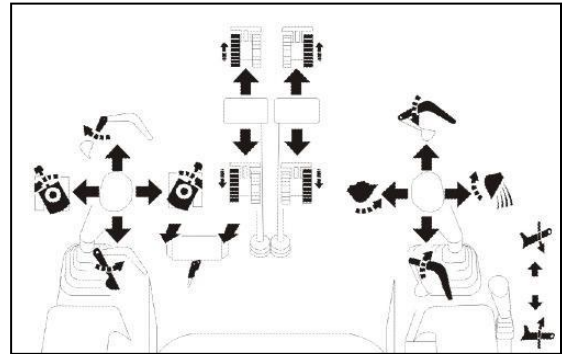
- Fan would run at high speed while engine is active. Pay much attention to prevent hand, foot, hair and clothing being caught in fan blade, when attempting any inspection and maintenance procedures on machine.



(16) Operation Label

- This machine is equipped with two pilot control handle and two travel control lever which control working device motion, swing action of upper structure, machine travel accordingly.

- The right pilot handle controls motions as below:
 - a. boom rise
 - b. boom fall
 - c. backhoe bucket load, or clamshell bucket load
 - d. backhoe bucket dump, or clamshell bucket dump
- Left pilot handle controls motion as below:
 - e. upper-structure rotate anticlockwise
 - f. upper-structure rotate clockwise
 - g. arm out
 - h. arm in
- Operation together with two pilot handles can also take compound motion. In addition, horn switch button is fixed on the handle.
- Two travel control lever control forward motion, reverse motion and steering of the machine.



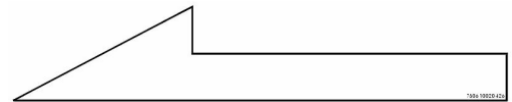
(17) Direction Label

- This label indicates travel direction of machine when “travel control lever is pushed forward”.



Warning

In case that driving wheel is located underneath cab, machine will travel rearward when pushing “travel control lever” forward. (On this occasion, symbol indicates backward).

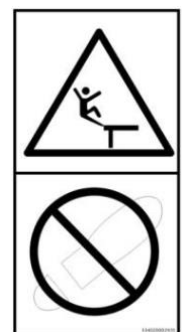


(18) No Stepping Label



Warning

- ◆ **Stay clear of operation area of working device.**



(19) Pilot Safety Lock Label

(20) Fuel Label

Warning

- ◆ **Handle fuel with extra care because it's highly flammable. In case that fuel is ignited, this can cause explosion or fire, and even death or injury to person.**
- Always refilling fuel at outdoor. Before refilling, the engine should be shut down.
- Do not refill fuel while smoking or near fire or sparks.
- All fuel and most of lubricants are flammable.
- Flammable liquid should be stored at proper place far from fire.
- Do not burn out or stab at pressurized container.
- Do not store rags containing oil. This can cause self-ignition and can be lighted up.
- Fasten cap of filling opening.

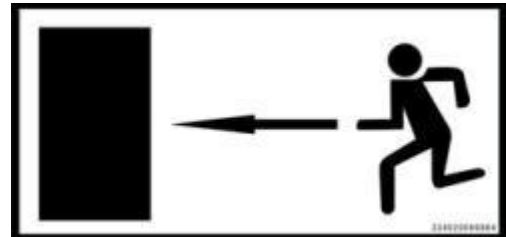


(21) Emergency Exit Hammer



(22) Emergency Exit Label

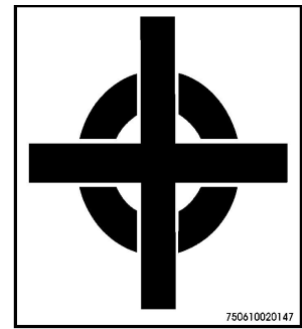
- When accidents happen, and operator is trapped in cab, operator can use life hammer located on the side of cab to destroy window labeled with exit mark to get out of the machine.
- The safety structure being damaged is beyond repair. But you could have it replaced with a new one.



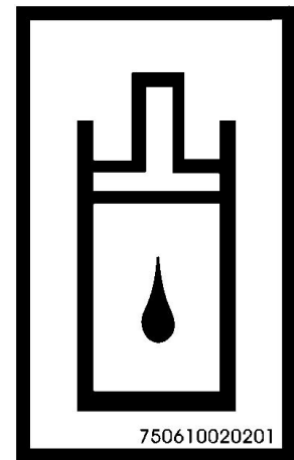
Caution

- ◆ Pay attention to the flying pieces while breaking out emergency exit way. For better protection of your safety, please keep sufficient distance from exit way being damaged.
- ◆ Exit hole must be big enough for operator to get out. Make sure your safety.

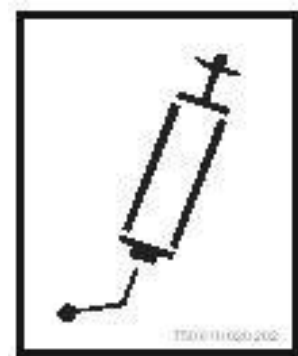
(23) Center of Gravity Label



(24) Hydraulic Oil Label



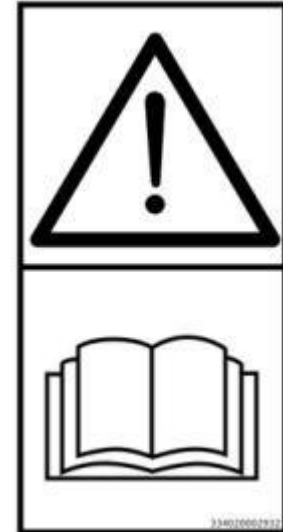
(25) Grease Label



1.2 GENERAL SAFETY RULES

1.2.1 Observing Safety Rules

- Thoroughly read, understand and follow all safety precautions and procedures found in this manual.
- Regularly affix, maintenance and renew new safety labels, so that they are legible, conspicuous and affixed firmly.
- In case safety labels and manual are damaged or lost, contact us or our authorized distributor to order new ones (when ordering, please specify machine model, and serial NO).
- Learn about how to properly and safely operate machine and its controlling device.
- Use only trained and qualified person to operate on this machine.
- Keep machine at good working condition.
- Unapproved modification on this machine can impair function, effect service life and jeopardize personal safety.
- Note: all safety information described in this section covers only basic safety information of this machine. It's not possible to predict every circumstance which might involves potential hazards. So it's necessary to ask for instruction from your superior before attempting any operation or maintenance procedure.



1.2.2 Meaning of Safety Label

Different safety labels containing safety messages are located on different position. All message of safety are identified by words “DANGER” “WARNING” and “CAUTION”(see fig), Their significations are as follow:

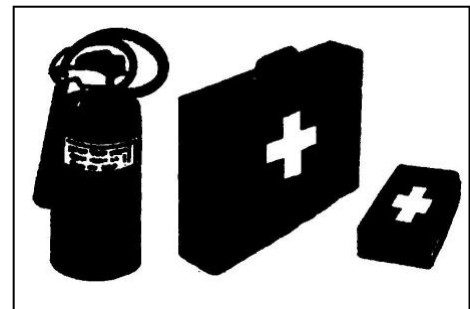
- DANGER ---indicates an imminent hazard, if not avoided, will result in death or serious injury.
- WARNING---indicates a potential hazard, if not avoid it, death or serious injury may incur.
- CAUTION--indicates a potential hazard. If not avoid, may result in minor or moderate injury.

Label of “DANGER” “WARNING” and “CAUTION” are placed in specific position in which involves a possible hazard. General safety related items are listed in “CAUTION” labels, In this manual, “CAUTION” may also be used to invite attention to safety instructions.



1.2.3 Emergency Protective Measures

- Be cautious of fire and accidents: make sure there are fire extinguishers ready for emergency, thoroughly read and understand all instructions on fire extinguisher and know how to operate it.
- Carry out maintenance and inspection procedure regularly to make sure fire extinguisher is available at all time.
- Have a kit ready for emergency. Be sure that all drugs are still in effective period.
- Prepare beforehand the communication means of doctor, ambulance, hospital and fire brigade. Take note of their telephone numbers for emergency contact.

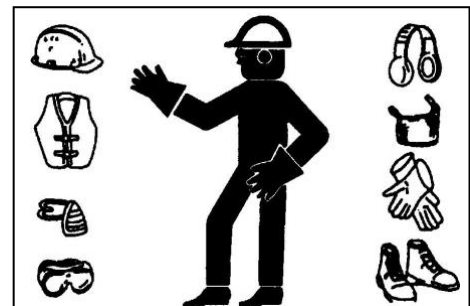


1.2.4 Wearing Protective Devices

- Do not wear accessories or loose clothing. Always wear close fitting clothing and protective articles suited for operation.

They cover the following items:

- Close fitting clothing
- Hard hat
- Thick gloves



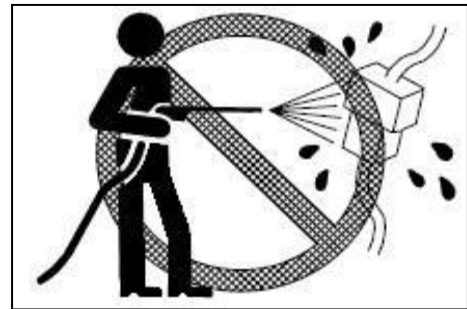
- Protective glasses, goggles or face mask
- Mask or filter face mask
- Ear plug or earcap
- Safety belt and rain-proof

1.2.5 Safety Devices

- Make sure that all guards and covers are properly positioned. Repair immediately if they are damaged.
- Understand how to use safety devices and use them properly.
- Never remove any safety devices, keep them in good operating condition.

1.2.6 Keeping Machine Clean

- Do not use water or vapor to flush electrical circuit, connector of machine to avoid electrical system failure.
- Remove all mud, oil dirt and other foreign matter. Keep machine clean at all times.



1.2.7 Checking before Start-up

- Inspect surrounding machine daily or before each work shift.

Be sure to follow the instruction described in “pre-start inspection” section during patrol inspection process.



1.2.8 Precautions of Entering Cab

- Remove all mud, oil adhered to your shoes prior to access into cab. Failure to do so, your foot may slip and this may cause serious accidents.
- Do not leave parts or tools around operator’s console.
- Do not store flammable and explosive items in cab.
- Do not use radio or cell phone during operation on the machine.
- After smoking, be sure to extinguish dog-end, secure ash tray cover to prevent fire.
- Don’t place transparent bottle and other convex stuff in cab to prevent fire as a result of solar light focusing.



- Don't leave lighter in cab. There is a possibility that lighter may explode along with the increase of temperature.

1.2.9 Correct Entering/Leaving Machine

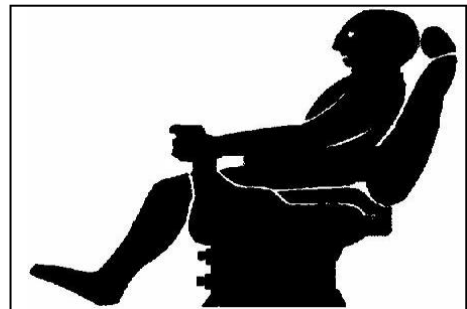
- Always face the machine, maintain a secure three point contact to mount or dismount machine by means of steps or handrails to avoid falling off.
- Do not grip any control levers as a substitute of handrails to mount or dismount the machine.
- Keep all handrails, gangway clean and free of oil and mud to prevent slip.
- Never mount or dismount the machine while it's under the operation of tramping, swing, and digging.
- Do not mount or dismount machine while holding tools in your hand.
- Do not jump on or off the machine.



1.2.10 Adjustment of Operator's Seat

A comfortable posture can alleviate operator's fatigue. You may adjust seat for your comfort in relation to your weight, height and arm length.

- Distance from hand-lever: for ideal hand operation posture, adjust distance of upper slide rail as well as armrest angle and backrest tilting.
- Position of pedal: for desired pedal operation posture, adjust distance of lower slide rail as well as seat height.
- Weight support adjustment: adjust load bearing capacity of seat in relation to your weight for better damping effect.



1.2.11 Fastening Seatbelt

- Check seatbelt for damage or wear out before starting machine.
- Fasten your seat belt prior to operation.
- Change seat belt every 3 years to ensure the safety performance of seat belt can meet the requirements for use.



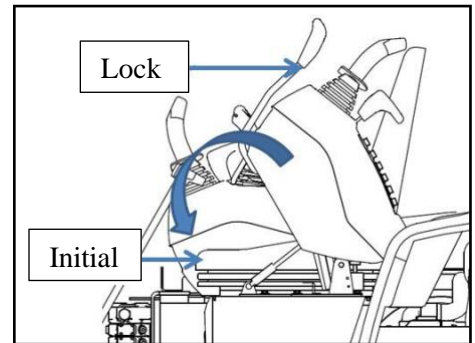
1.2.12 Ensuring Perfect Visibility

- Stop the machine if the fog, rain, snow or dust has negative effects on your visibility.
- To work at dark, make sure the lighting device can function normally.

1.2.13 Leaving Operation Seat Safely

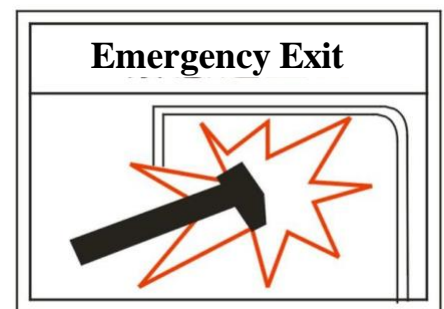
⚠ Warning: Unexpectedly touching unlocked pilot safety control lever can result in sudden movement of the machine and cause injury or damages to the machine.

- When operator tends to leave or stand up off the seat(to open or close front or upper windows, remove or install front lower windows, adjust seat), please lower the work equipment to the ground, set pilot safety control lever to LOCK position securely, then stop the engine.



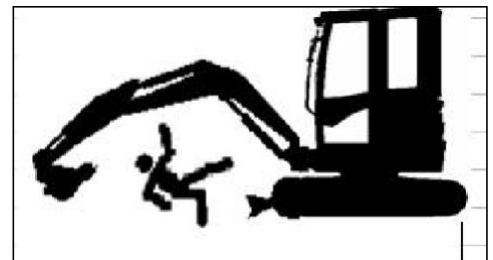
1.2.14 Emergency Exit

- If the door cannot be opened for some reason, you may open the back windows, and use it as an alternative exit way for emergency. For details refer to the instructions in “emergency exit label”.



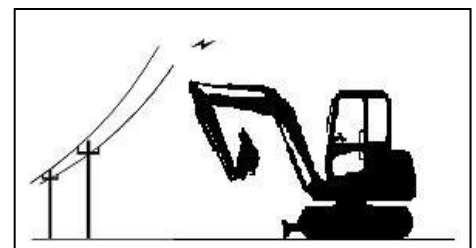
1.2.15 No Passengers Allowed

- When machine is in the process of operation or traveling, do not allow anyone to ride on the machine other than the operator. Because there is a hazard that passengers may fall off or get hit by foreign body.
- Passenger may block operator’s sight to result in unsafe operation.
- Do not allow anyone to sit on bucket or other front attachments. Serious injury can occur to person.



1.2.16 Worksite Safety

- Thoroughly inspect worksite for any abnormal danger situations prior to operation.
- Operate with extra care for any operation in vicinity of flammable materials such as thatched roof, dry leaves or dry grass.
- Survey terrain and ground condition around worksite. Determine a safest operation method in a safe manner.
- Do not operate in vicinity of the area in which there is a risk of landslide or falling rock.
- At the work around place of water or gas lines, or cables underground. Contact relevant utility to identify their locations. Pay attention not to rupture or damage any of these lines.
- Take necessary measures to prevent any unauthorized person from entry into work area.
- In the event of operation over soft ground or in shallow water, it’s necessary to check type and condition

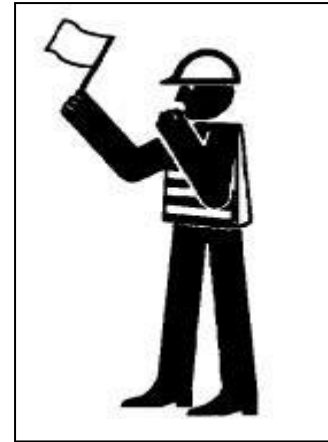


of rock bed, and take water depth, flow speed into account prior to operation.

- In the event of operation in vicinity of over bridge or overhead stuff, be cautious not to collide with front working device of machine.

1.2.17 Operation on Loosened Area

- Do not operate around cliff, shoulder of road or ditch. In this area, the ground is loosened. There is a possibility of getting into danger of ground sinking with vibration and weight of the machine. Bear in mind that the soil is loosened in this area after heavy rain, explosion operation or earthquake.
- When working on a dike or around ditch, there is a possibility of getting into danger of ground sinking resulting from vibration or weight of the machine. It's necessary to take measures to secure safety against tip-over and falling off.



1.2.18 Signals and Gestures from Flagman

- Provide caution plates when working on shoulder of road or loosened ground. Provide a flagman if necessary. Operator must pay much attention to caution plates and follow flagman's instruction.
- Use only one flagman to instruct.
- Make sure all signals and gestures are understood by the personnel prior to operation.
- It's necessary to offer a flagman to organize operation during multi-machine operation. Be sure all his signals are understood and followed by operators.

1.2.19 Distance to High Voltage Cables

- Severe injury or death can occur to person due to any contact of any parts or load of machine with electric cables. Always keep safe distance:

	Voltage	Minimum safe distance
Low voltage	100V 200V	2m
	6,600V	2m
High-voltage and extra high voltage	22,000V	3m
	66,000V	4m
	154,000V	5m
	187,000V	6m
	275,000V	7m
	500,000V	11m



- If it's inevitable to operate in vicinity of high voltage utilities, contact your local utility company to shut off power supply, always wear proper electrical insulated shoes and gloves.
- If it's inevitable to pass by utilities, provide a flagman to secure safe distance and warn operator in time.



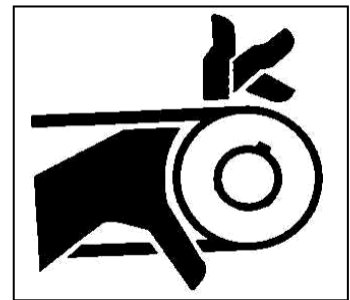
1.2.20 Preventing Scald

- Be cautious of coolant burn during inspection or discharging coolant. Hot fluid or vapor can erupt from check port or discharging port and scald. Allow cool before opening.
- Before attempting any inspection or oil discharging operations, wait to prevent scald until oil is cool and internal pressure is released.



1.2.21 Keeping Away From Running Parts

- Use extreme care to operate in vicinity of driving parts to prevent hands, feet, hair and clothing being caught in machine.



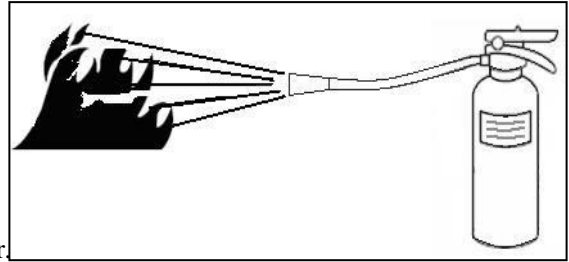
1.2.22 Preventing Fire and Explosion

- No smoke or using naked flame around fuel and engine oil.
- Stop engine before refilling.
- Do not spill oil to hot surface or electrical equipment of machine.
- Secure and lock oil cap after adding oil.
- Wipe off oil dirt; remove all flammable or explosive material.
- Do not weld or cut pipelines that contain flammable fluids.
- Keep wire terminals secured and clean.
- All leads must be free of damage. Prevent fire due to short circuit of damaged leads and machine.
- Prevent spark due to static electricity or friction.



1.2.23 Measures for Fire Fighting

- Switch starting key to “OFF” position to stop engine.
- Remove fire extinguisher in cab.
- Get out of machine by utilizing handrail and steps.
- Contact fire department and colleagues and superior
Extinguish fire with fire extinguisher.



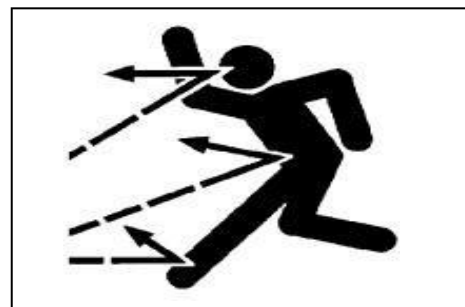
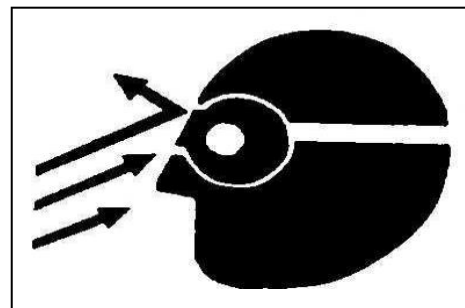
1.2.24 Preventing Splashing or Falling Objects

- Wear protection glasses or goggles to avoid injury resulting from fly-out and falling object (such as metal particles or sand rock).
- When hitting, make working area off-limits to the other person.
- Machine must be fitted with falling object protective structure (FOPS) and front protective structure. If machine is used in mining area or quarry where there is a risk of falling rocks.



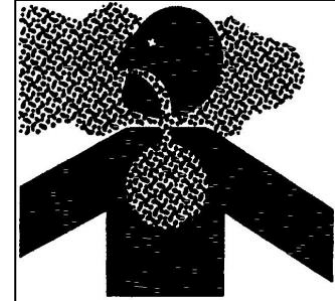
1.2.25 Prevention of Flying-Out Parts

- Bear in mind that lubricating grease in track tension device is under high pressure. Do not remove parts such as oil cup or valve etc to avoid injury.
- Moreover, keep face and body away from valve block in case that part will fly out.
- There is some pressure build up in travel redactor. Gear oil temperature will increase after operation. Keep face and body away from air bleeding plug.
- With gear oil cooled, gradually loosen air bleeding plug to release pressure.



1.2.26 Preventing Asbestos Dust Inhalation

- Asbestos dust is known to cause pulmonary cancer. When handling elements containing asbestos fibers, be cautious not to inhale asbestos dust generating by those elements.
- To avoid dust, do not use pressurized air to clean machine. Do not scrub or grind material containing asbestos. Always wear approved respirator and use recommended dust collector to remove asbestos during maintenance. If you can not find them, wet asbestos material with water or oil. Follow rules and regulations at operational site. Observe relevant laws and regulations in reference to asbestos disposal. Do not allow other person to access working area.

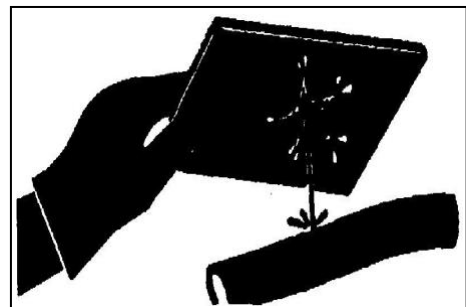
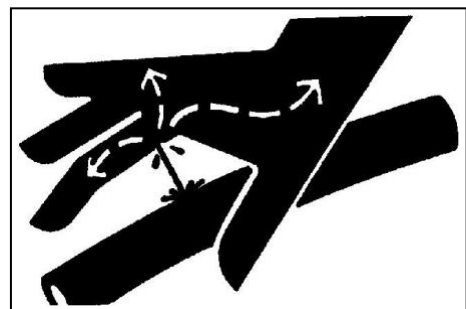


1.2.27 Preventing Inhalation of Smoke or Exhaust Gas

- If exhaust gas is inhaled, this can cause diseases and even death.
- If machine is operated at indoor, it's necessary to open door and windows to ventilate. Or you can also use lengthened discharge pipe to discharge exhaust gas to outside.

1.2.28 Be Cautious of High Pressure Liquids

- High pressurized fluid can penetrate leading to severe injury.
- Always release pressure before separating fluid or other pipelines.
- You may release pressure by means of operating control lever.
- Fasten all connector parts prior to pressurizing.
- Use cardboard to locate leakage. Keep your hand and body away from pressurized fluid.
- In case of accidents, consult a doctor experienced in this kind of injury for medical care.



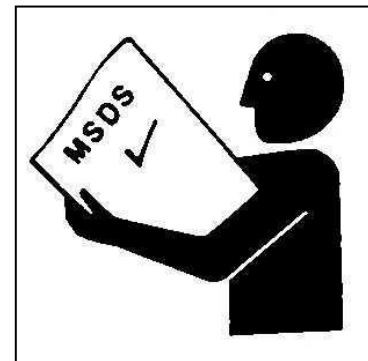
1.2.29 Safe Disposal of Liquids

- Considering that fuel is highly flammable, handle them with extra care. In case that fuel is ignited, injury or death may occur to persons.
- Always add fuel at open-air. Be sure to stop engine before refilling fuel.
- Do not refill fuel while smoking or around naked flame or spark.
- All fuel and most lubricant and coolant are flammable.
- Keep flammable fluid away from the area involves fire hazards.
- Do not burn out or stab at pressurized container.
- Do not restore rags containing oil. They may be ignited or self-ignited.
- Secure cap on refilling opening.



1.2.30 Safe Disposal of Chemicals

- Serious injury can occur by allowing hazardous medical to make direct contact with person. Medicals being used in the machine such as lubricant, coolant, and binding admixture may be harmful.

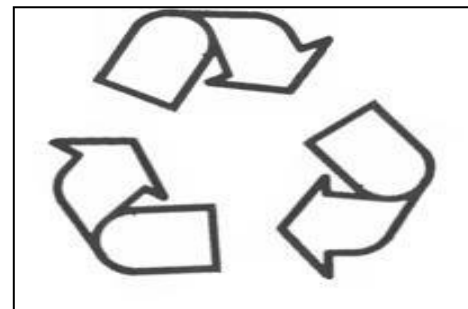


1.2.31 Waste Material Disposal

- Observe local laws and regulations to dispose of waste material, such as fuel, coolant etc.

1.2.32 Prohibition of Unauthorized Modification on Machine

- Any unauthorized modification to machine may involve hazards.
- CFG disclaim any responsibility for damage, injury or accidents arising from unauthorized modification.



1.2.33 Preventing Objects Falling From High Altitude

Object falling from high altitude mainly refers to the falling of buildings, structures or other facilities and hanging objects, which may cause personal injury, heavy losses of possessions. Prior to operating nearby high buildings, carefully inspection of surrounded environment should be taken to eliminate the hidden danger of objects falling from high altitude or other hidden safety hazard.




1.3 SAFE OPERATION INSTRUCTIONS

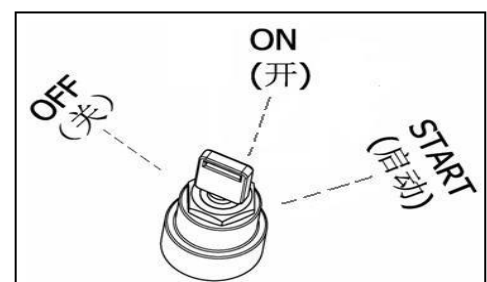
1.3.1 Inspection before Starting Engine

Before starting daily routine inspection, carry out the following checks.

- Wipe off dust on glass window to secure visual field.
- Wipe off dust on the surface of front light and working lamp, check to ensure they are properly functioning.
- Check coolant level, fuel level and oil level in engine oil pan. Check air filter for clogging, check wiring for damage.
- Adjust operator's seat to a position where it is easy to carry out operation. Check seat belt or mounting clamps for damage or wear.
- Check meters to ensure they are functioning properly. Check working lamp angle. Make sure control levers are at neutral position.
- Check safe lock control levers to ensure they are in LOCK (UP) position before starting engine.
- Adjust rear view mirror to a certain position where a clear visual field of back machine is secured.
- Check upper or lower machine to ensure there is no other persons or obstacles surrounding machine.
- In case there are any warning tags posted on control lever, do not start or touch control lever.

1.3.2 Correct Engine Start-up

 **Warning:** Inappropriate engine start can cause machine out of control leading to severe injury or death.



- Make sure all control levers are set in neutral position, and honk the horn to alert, before starting engine.
- Start the engine only if operator is in seated position. Do not start machine while standing on the track or ground.
- Never ride on the machine, the machine is for operator only.
- Do not attempt to start engine by short circuiting the engine (including terminal starting), this action is dangerous, beyond dangerous, it will cause damages to equipment.



1.3.3 Starting Engine in Cold Weather

- Carry out a complete warm-up operation before operating control lever. Failure to do so, machine will lag in response, this may result in accidents.
- If the battery electrolyte is frozen, do not charge battery or use a different power source to start the engine. Failure to do so may cause battery to be ignited.
- Melt battery electrolyte and check electrolyte for leakage or freezing before charging battery or using different power source to start machine.

1.3.4 Safe Operation

- Before excavation operation, thoroughly check the underground line conditions. Precisely identify location of individual underground utility line such as cables, gas pipeline, water pipeline etc.
- Keep jobsite off-limits to all no operating person.
- Make sure the condition of worksite is stable and capable of supporting the machine.
- To make it easy to escape if there is any collapse, set the tracks at right angle to the pit with sprocket at the rear when carrying out operation near pit.
- When digging the work face under an overhang, the overhang may collapse and fall on top of the machine.
- Do not place bucket above the head of person or operator cab. Falling objects from bucket or collision with bucket can cause serious injury or death or damage to machine.



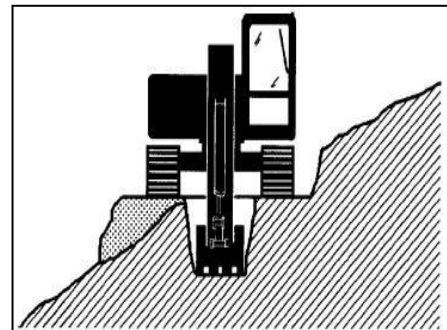
- When using breakout hammer or other heavy working equipment, there is a hazard of losing its balance and tipping over.
 - ◆ Do not lower, swing or stop working device all of sudden.
 - ◆ Do not extend or retract boom cylinder suddenly, There is a risk of machine tipping over due to impact force.

1.3.5 Precautions for the Use of Rubber Track

- Don't use the machine on macadam or hard coarse rock base, and don't use it at the edge of steel plates or steel bars.
- Make sure that there's no foreign matters in the rubber track, because it will result in excessive abrasion and breakage;
- Keep rubber track away from oil. Besides, clean off any oil attached on the rubber track, such as fuel and hydraulic oil;
- Don't travel on ground with high temperature, such as road with fires, and steel plates with sunlight exposure.
- Don't turn suddenly when travelling on asphalt road or concrete pavement with high friction;
- Never use the machine on the sea if not necessary, otherwise, it will accelerate the corrosion of the core iron of rubber track.

1.3.6 Operation on Slopes


- When operating swing or working device during operation on slopes, there is a risk that the machine may lose its balance or tip over. This may cause serious injury or damage to machine. So it's necessary to provide a flatness area for the machine and operate carefully.
- Do not swing machine from uphill side to downhill side, when bucket is fully loaded. This dangerous act can cause machine to tip over.
- If the machine has to be used on a slope, pile the soil to make a platform which can keep machine as horizontal as possible.



1.3.7 Operation on Snowy Ground

- Snow coated or frozen ground is slippery. So pay extreme attention when tramping or operating machine. Do not operate control lever suddenly. Pay much attention when operating on a slope even a slight slope.
- Frozen ground will become soft along with the increase of ambient temperature. This may cause machine to tip over.
- In case of access to deep snow, there is a hazard that machine may tip over or be buried in the snow. Be cautious not to leave the road shoulder or get trapped in snow.
- When clearing snow, the road shoulder and objects placed beside the road are buried in the snow and can not be seen. There is a hazard of the machine tipping over or hitting covered objects, so always carry out operation carefully.

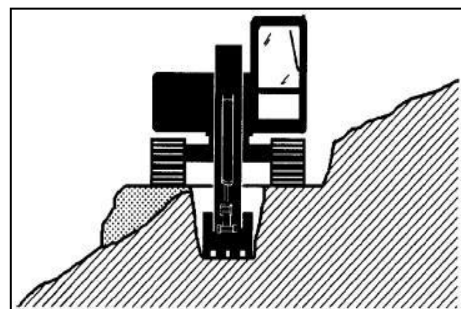
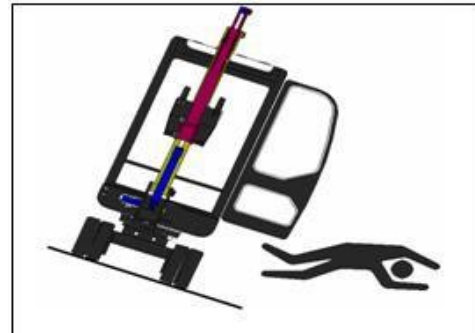
1.3.8 Avoid Tipping-Over

 **Warning: Do not attempt to jump off a tipping over machine; this may cause severe accidents of injury and death.**

Machine will tip over before you jump off the machine.

Fasten seat belt.

- There is a possibility of tipping over when machine is operated on a slope. To avoid tipping over:
 - Smooth jobsite of machine.
 - Lower bucket to ground, keep it close to machine.
 - Lower operation speed to prevent machine from tipping over.
 - Do not change direction when tramping on a slope.
 - Decrease slewing speed of upper-structure, when bucket is loaded.
- Be alert that ground surface becomes soft arising from increase of ambient temperature. This may affect the stability of machine.

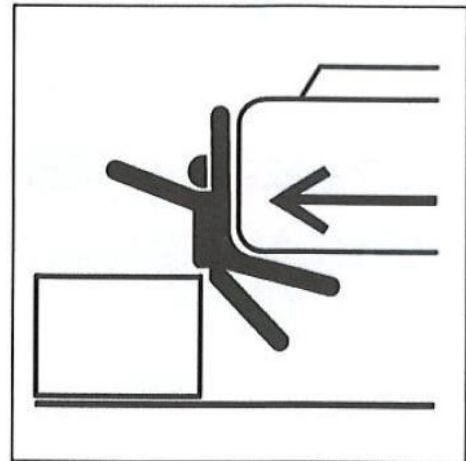


1.3.9 Preventing Accidents while Reversing or Swinging

Warning: There is a possibility to crush or hit person around to cause severe accidents of injury or death, when swing or reversing the machine.

Follow the following instructions to prevent accidents during swing or reversing operation.:

- Check surrounding area to ensure there is no other person around before swing and reversing the machine.
- Ensure that bystanders are out of swing area.
- Ensure that travel alarm is functioning properly. Be alert that no bystander accesses to jobsite. Sound horn or use other alarm to warn people.
- When machine travels in reverse, provide a flagman to assist in case operator's sight is limited. Keep the flagman with operator's sight
- When signal is needed during working, signal man be suppose to use hand signal. Only when the signals are understood by both signal man and operator, the machine can be operated to tram or swing.
- Understand all flags, signs and signals being used during operation. Select the person who is responsible to signal.
- Keep windows, mirrors and light fittings clean.
- In case of improper visibility arising from dust, rain, or fog etc. use appropriate lighting device.
- Please read and understand all safety rules described in this manual.

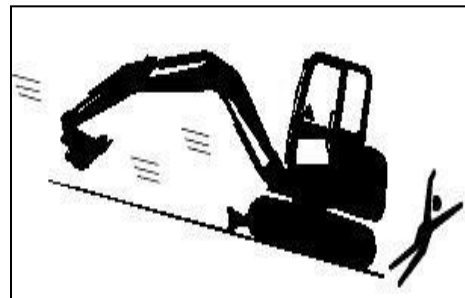


1.3.10 Avoiding Accidents Caused By Control Failures

Warning: When the machine is out of control, any attempt to mounting or to stop a moving machine can result in severe injury or even death.

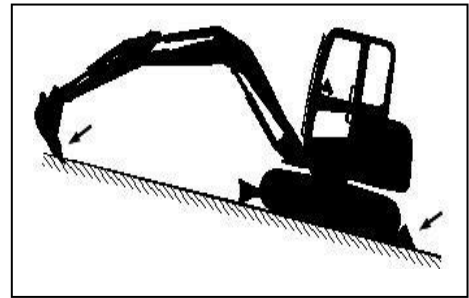
To avert runaway, it's necessary to park machine properly.

- Always park the machine on level ground, do not park the machine on a slope.
- Lower the bucket to the ground.
- Disable the auto-idle speed switch and power selecting



switch.

- Allow the engine to idle at low speed for 3 minutes to cool down the machine.
- Stop the engine, remove the key.
- Turn off the pilot control switch.
- When the machine is to park on a slope, chock the machine on both side of the track, lower bucket to dig the teeth into the ground.
- Position the machine to avoid unexpected movement. Keep proper distance from the other machine.



1.3.11 Moving Machine Safely

- Before moving the machine, check travel control lever (pedal) to ensure the relationship between operation direction and machine movement direction.
- Before moving the machine, make sure the working area is free of other persons and obstacles, and sound the horn to alert.
- Bypass any obstacles during traveling.
- When traveling, swing, operating working device in confined area, position a signal person and define the meaning of the signals beforehand.

1.3.12 Safety Rules During Traveling

- During operation of machine, do not operate exceeding max load capacity or performance to avoid stall and damage to working device.
- When traveling on flat ground, fold the working device and keep 400 to 500mm high above the ground.
- When traveling on rough ground, travel at low speed. Do not steer sharply, there is a risk of machine turning over. The work device may hit the ground and cause machine to lose its balance or damage the machine or structures.
- When traveling on rough ground or on slope, disable the auto-reduction switch(if present), if auto-reduction switch is on, engine revs may increase. This may cause machine to speed up abruptly.
- Avoid traveling on obstacles if possible. if the machine has to travel on obstacles, lower the working device

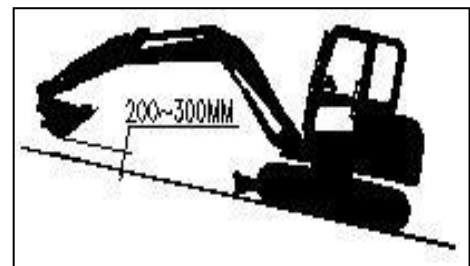
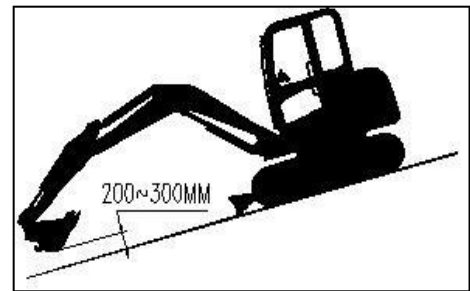
close to the ground at low speed. Do not travel over obstacles which involve risk of tilting machine to one side.

- When traveling or operating, keep a safe distance from people, structure or other machine to avoid making contact with them.
- When passing over bridges or structures, check first structure is strong enough to support the weight of the machine. When traveling on road, contact relevant authorities and follow their instructions.
- When operating in tunnel, under bridges, under electric wires or other height-limited area, operate slowly and pay much attention not to hit anything.

1.3.13 Traveling on Slopes

To prevent machine from tipping over or side sliding, follow the instructions below.

- When travel on slopes, keep working equipment 20 to 30cm high above ground. In case of emergency, lower the working device to ground to help stop the machine.
- When traveling uphill, set the cab facing uphill direction. For downhill, set the cab facing downhill direction. When traveling, always check the firmness of the ground in front of machine.
- When traveling uphill, extend the working device to the front to improve the balance, keep the working device 20 to 30cm and travel at low speed.
- When traveling downhill, lower the engine speed, keep the travel lever close to the neutral position, and travel at low speed.
- When traveling on slopes, operate machine straight up or straight down, steering or crossing on the slope is very dangerous. Always descend to a flat area to change direction, then travel uphill again.
- When traveling on grass, fallen leaves or wet steel plates always travel at low speed because there is a risk of slip even if traveling on a slight grade.
- In case that engine stops when traveling on a slope, place control lever to neutral position immediately, and re-start the engine.



1.3.14 Safety Rules During Towing

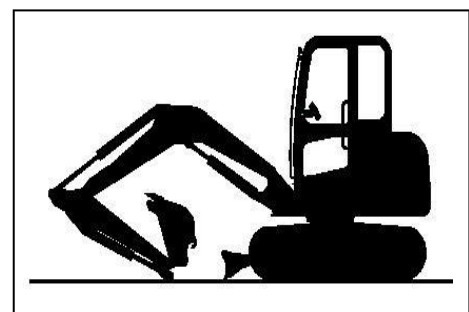
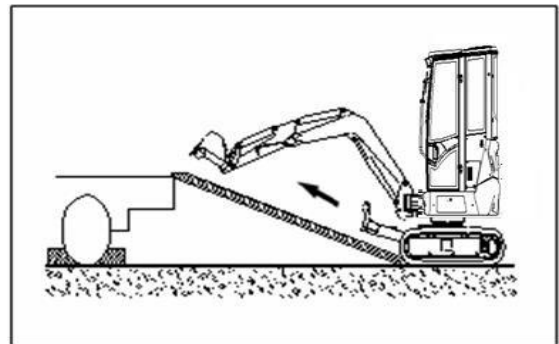
Warning: Improper towing may damage machine, any mistake on selecting steep rope or inspection can result in serious injury or death.

- Always wear gloves when handling steel ropes.
- Secure steel ropes to track frame.
- During towing operation, do not stand between the towing machine and the machine being towed.
- Do not tow machine on slopes.
- Never use a wire rope which has cut strands, reduced diameter, or kinks. There is danger that the rope may break during the towing operation.

1.3.15 Machine Transportation

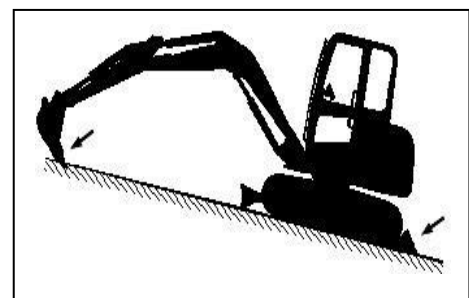
Warning: When loading or unloading the machine, there is a hazard of tipping over or falling.

- During transportation on road, follow the local laws and regulations. Study all local laws or regulations concerning limiting load weight, width and length. Dismantle the machine if necessary. Select proper route or means of transportation according to the width, height or weight of the load.
- Provide proper truck or trailer for road transportation.
- When crossing bridges or private structures, check first to ensure that the ground is firm enough and capable of supporting the weight of the machine. When the machine has to travel on road, it's necessary to contact relevant authorities to follow their instructions.
- For any instructions concerning loading or unloading machine, refer to the chapter 2 (transport and storage).



1.3.16 Parking Machine Safely

- Parking machine on a firm, level ground.
- Select a place without hazard of falling rocks or landslides, or flooding.
- Lower the working devices completely to the ground.
- When leaving machine, place the pilot safety lever to LOCK position, and then stop the machine.
- To prevent unauthorized person from operating the machine, always close the cab door, use the key to lock




all the equipment. Then remove the key, and keep the key with you, and leave the key in a prescriptive place.

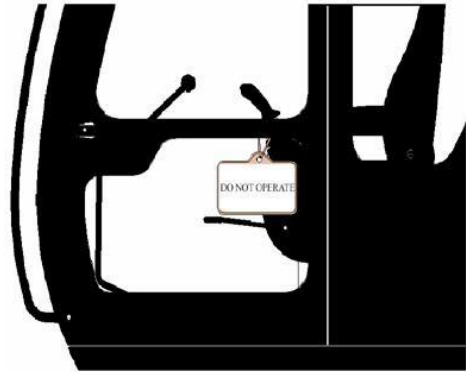
- If the machine has to park on slopes, follow the instruction below:
 - ◆ place the bucket to the downhill side, then dig it into the ground.
 - ◆ chock the track to prevent machine from moving.

1.4 SAFETY MAINTENANCE INFORMATION

1.4.1 Using Warning Signs

 **Warning:** During maintenance or service procedure, any attempt to start the engine, have access or operate control lever of working device can result in serious injury or damage.

- Always post “DO NOT OPERATE” tag to the control lever in the cab to alert the other person that you are carrying out maintenance or service.
- Set the other warning signs around the machine if necessary.



1.4.2 Parking Machine Prior to Maintenance

- Park the machine on firm level ground.
- Lower the bucket to the ground.
- Switch off the idle, run the machine at low speed for 5 minutes.

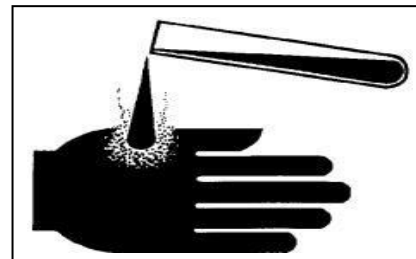
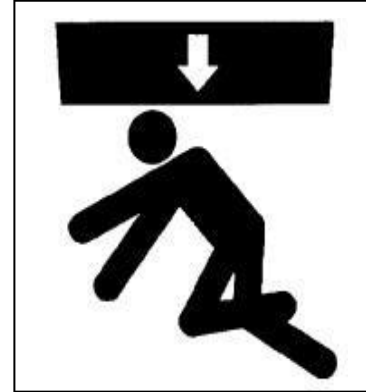
Set the key switch to OFF position to stop the engine.

- Operate each control lever, release internal pressure of hydraulic system.
- Remove the key from the switch, set the pilot lock lever to LOCK position.
- Post “DO NOT OPERATE” sign to the controls.
- Cool the engine.
- Chock the track to prevent machine from moving.



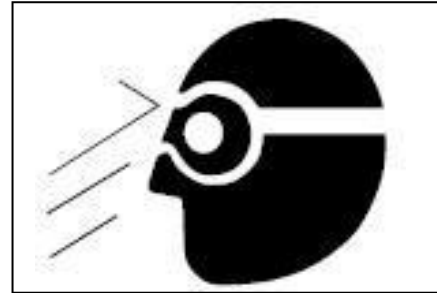
1.4.3 Safety Maintenance Rules

- Understand all maintenance instructions prior to operation.
- Keep the working site clean and dry.
- Do not spray water and vapor in cab.
- When the machine is moving, do not lubricate the machine or perform any maintenance operation.
- Prevent any parts of the body from reaching moving parts of the machine.
- If the maintenance procedure has to be carried out when the engine is running. Position a person in operator seat to stop the engine at any moment. All persons keep each other in touch.
- Do not operate under the machine which is supported by boom. If you have to service the machine with boom supported, use bracket or block strong enough to support the machine and working device securely.
- Dispose of replaced parts in time; remove any accumulated lubricating grease, oil or debris.
- Always disconnect negative terminal from battery before testing on electrical system or welding on the machine.
- Provide complete lighting device for jobsite. When working under the machine or inside the machine, always use maintenance work light with protective hood. Or broken bulb pieces may ignite flammable fluid e.g. spilled fuel, engine oil, anti-freezing fluid etc.
- Do not make contact with coolant, in case of contact; there may be some hazards of blindness, for the skin, cold injury may occur.
- When using pressed air to clean up, injury or damage can occur due to flying-out particles. When using pressed air to clean up filter core or radiator, always wear goggles, dust-preventive mask, gloves and other protective items.



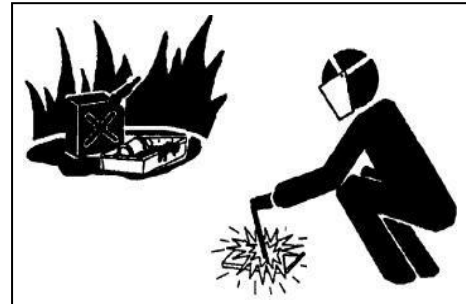
1.4.4 Tips for Using a Hammer

- When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury, always do as follow.
- ◆ When using a hammer to hit hard metal parts, say pins, bucket teeth, cutting edges or bearings. There involves some hazards that pieces may be scattered and lead to injury. Always wear goggles and gloves.
- ◆ When hitting pins or bucket teeth, there may be some hazards that broken pieces may fly out causing injury to surrounding persons. Make sure the surrounding area is off limits to the other people.
- When hitting the pins with tough force, there are some hazards that pins may fly out causing injury to surrounding people.



1.4.5 Precautions of Welding and Polishing


- Welding operation can generate flame and gas. Operate must be therefore carried out in well-ventilating area with complete preparation.
- Store flammable substance in safe place prior to welding operation.
- Use only qualified person to carry out welding operation, never allow any unqualified personnel to carry out welding operation.
- Sparks may occur during grinding. Place flammables in safe place prior to grinding operation.
- With welding and grinding operation is made, recheck worksite and its surrounding area for any abnormal signs e.g. spark, smoke etc.



1.4.6 Avoiding Heating Pipes Containing Flammable Liquids

- Do not carry out welding or gas cutting operation to any pipelines containing flammable liquids.
- Use non-flammable solvent to remove all flammable liquids prior to welding or gas cutting.

1.4.7 Avoiding Heating near Pressure Oil Pipes

 **Warning: Heating around hydraulic pressure pipe cause flammable spray causing serious scald to yourself or bystanders.**

- Do not carry out any welding, gas welding, gas cutting or heating operation around hydraulic pressure pipe or other flammable material.
- While heat power is beyond the working area, the pressure pipe may be cut off at any time. Prior to welding or gas cutting, the fireproofing covers should be placed temporary to protect the pressure pipe or other materials.



1.4.8 Removing Paint Before Welding or Heating

Paints might be heated during welding or gas cutting operation and generate harmful gases. Inhaling these gases may cause nausea.

- Avoid generating any potential harmful gas and dust.
- Carry out painting operation outdoor or in ventilating area. Dispose of paint solvent properly.
- Remove paints prior to welding or heating operation.
- When using grinder or sand paper to remove paints, always wear proper inhaler to avoid inhaling dust.
- In case of removing paints with solvent, use soap to remove solvent prior to welding as well as to clear all solvent and its container or other flammables. Offer at least 15 minutes for volatilization prior to welding or heating.

1.4.9 Attachments

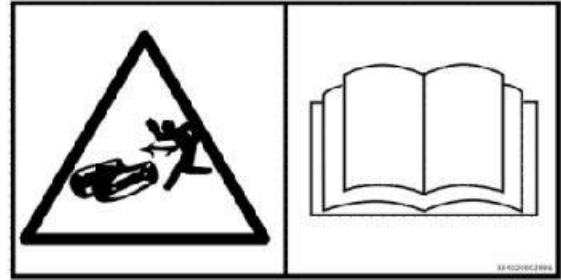
There are some hazards that those stored accessories say bucket, breakout hammer might fall off to cause serious injury.

- Store accessories and equipment to avoid falling off. Take necessary measures to prevent children and unauthorized personnel from entering storage area.



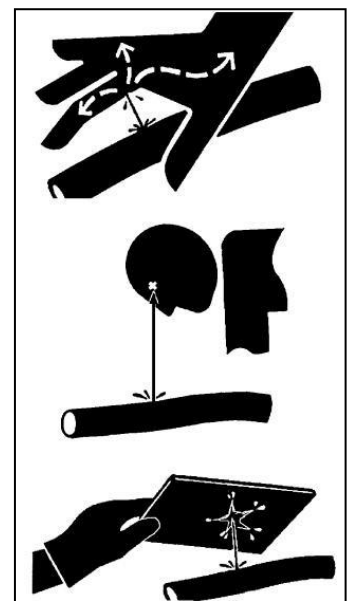
1.4.10 Maintenance Precaution of Track Tension Mechanism

- Grease is being pumped into track tension adjustment system under high pressure. During adjustment operation, if the specified maintenance procedures are not followed, the lubricating grease drain plug (1) may fly out leading to serious injury and damage.
- When loosening grease drain plug (1) to loosen the track tension. Never loosen it more than one turn. Loosen the grease drain plug slowly.
- Never put your face, hands, feet, or any other part of your body close to grease drain plug (1).
- Recoil spring assembly contains a compression spring which serves as a shock absorber for the idler. If it is disassembled improperly, spring may fly out and cause serious injury and even death. Do not disassembly recoil springs.



1.4.11 Safety Rules for High-pressure Oil

- Hydraulic system is always under internal pressure. When inspecting or replacing piping or hoses, always check that the pressure in the hydraulic circuit has been released. If the circuit is still under pressure, it will lead to serious injury, so always do as follow.
 - ◆ Never attempt any inspection or replacing operation if hydraulic system is under pressure.
 - ◆ If there is any leakage from piping or hoses, the surrounding area is wet, so check for cracks or swelling in the hoses. When carrying out inspection, wear goggles and leather gloves.
 - ◆ High pressure oil leaking from small holes may penetrate your skin or cause blindness if it contacts your eyes. If you are hit by a jet or high pressure oil and suffer injury to your skin or eyes, wash the place with clean water, and consult a doctor immediately for medical attention.



1.4.12 Safety Operation for High-pressure Hoses

- If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to serious injury. If any loose bolts are found, stop work and tighten to the specified torque. If any damaged hoses are found, stop operations immediately and contact your CFG distributor.
 - ◆ Damaged hose, deformed mouthpiece, damaged O-ring.

- ◆ Frayed or cut covering or exposed reinforcement wire layer.
- ◆ Covering swollen in places.
- ◆ Twisted or crushed movable portion of hose.
- ◆ Foreign material embedded in covering.

1.4.13 Accumulator

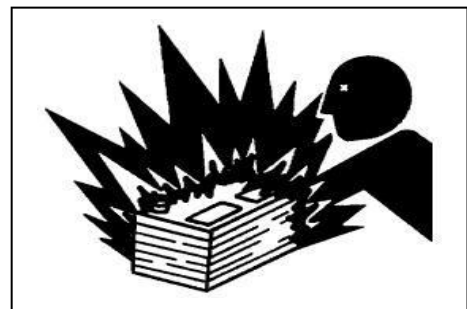
Accumulator is charged with pressurized nitrogen. When handling accumulator, careless operation may lead to explosion and cause serious injury or damage. Always follow the following instructions.

- Do not disassemble accumulator.
- Do not keep accumulator close to fire or expose it under flame.
- Do not drill holes, weld or heat up on accumulator.
- Do not hit or roll accumulator to avoid any shock on it.
- When handling accumulator, bleed the air.
- Please contact CFG dealer to get assistance with this work.



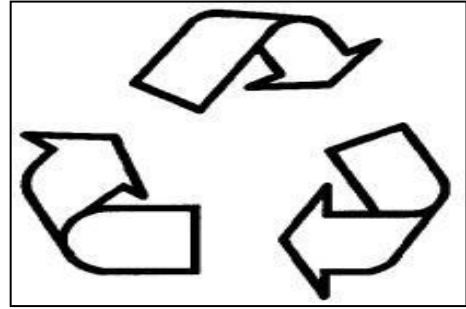
1.4.14 Preventing Accumulator Explosion

- Do not allow any lightened matches or other flame to approach accumulator upper side. Failure to do so may cause explosion.
- Use voltmeter or hydrometer to measure electricity; do not measure the electricity of battery by short circuiting.
- Do not use or charge the battery if the battery electrolyte level is below specific volume. Failure to do so will cause battery explosion.
- Do not charge frozen battery, failure to do so may cause explosion. Heat the battery up to approx. 16°C.
- The electrolyte is toxic. In case of explosion, electrolyte may splash into eyes and cause blindness. When inspecting electrolyte density, always wear protective goggles.



1.4.15 Waste Disposal

- To prevent pollution, pay attention to the manner of disposing of waste materials.
 - ◆ Always put oil drained from your machine in containers. Never drain oil directly onto the ground or dump into the sewage system, rivers, the sea, or lakes.
 - ◆ When disposing of harmful objects such as oil, fuel, coolant, solvent, filters, and batteries. Obey appropriate laws and regulations.



2 TRANSPORT AND STORAGE



Warning

Before reading this chapter, please thoroughly read and make sure contents described in the chapter "SAFETY RULES" of this manual are understood completely.

2.1 TRANSPORT

2.1.1 General Transport Instructions

- Before using a trailer to transport machine, contact local traffic department to confirm relevant regulations, make sure that machine's overall length, width, height and weight are within allowed spec.
- If there are any dimensions out of spec, obtain special permission from relevant government agencies or dismantle the machine into smaller unit to transport.
- Select proper transportation tools according to machine's weight, length, width and height.
- Survey the traffic condition for transportation in advance, e.g. road condition and width, height of bridges and tunnels as well as the limits of weight and traffic regulation etc.

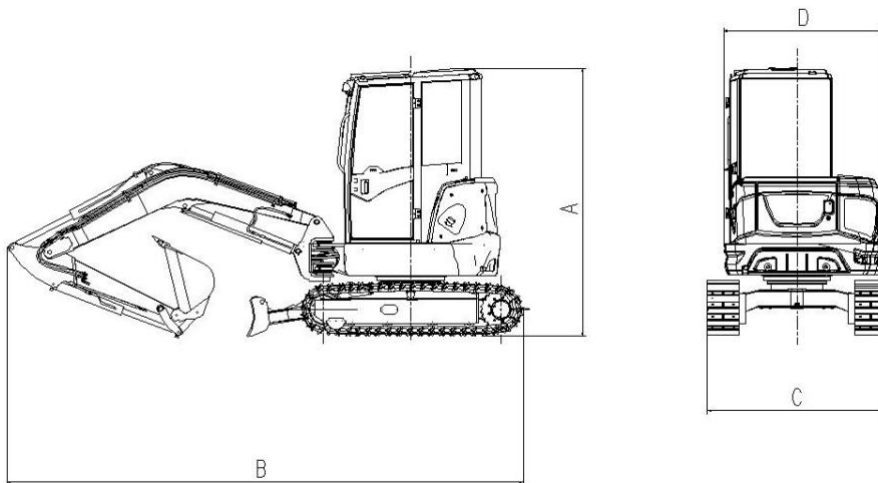


Note:

- ◆ **Transportation weight and dimension of the machine may change with different configuration of the front device and attachments.**

2.1.2 Transport Specification

The details of machine dimension are showed in following picture.



A. total height: 2555mm

C. chassis width: 1700 mm

B. total length: 4890 mm

D. upper-structure width (cab) : 1505 mm

2.1.3 Driving Onto or Off a Platform Trailer



Warning

When loading or unloading, do not go at idle speed mode to prevent sudden change in speed.

- ◆ Set travel speed at low position. Do not attempt

any travel speed switching operation to avoid that sharp change of speed and over-speed cause danger. Always keep the machine travel at low speed.

- ◆ Be sure engine runs at low speed, adjust throttling knob to keep the engine run at low speed.
- ◆ When loading or unloading, do not attempt any steering operation. At which moment, steering operation is extremely dangerous. The machine is subject to rolling over. If the machine needs to change direction, go back to level ground or trailer platform, then revise travel direction and cross the slope.
- ◆ Do not attempt any other operations (e.g. steering and moving work equipment etc) on slope. Allow only travel operation.
- ◆ Because it ' s a raised shape at the place where ramp intersects the flats. Pay attention to pass it: the slope should not exceed 15° .
- ◆ Prevent the machine from tipping over and other damages due to upper-structure slewing. Lower the boom, fold arm and bucket and slew the upper-structure slowly to get the optimum stability.
- ◆ Clean up the track, slope of the trailer and loading surface to prevent hazards resulting from obstacle and oil

2.1.4 Loading

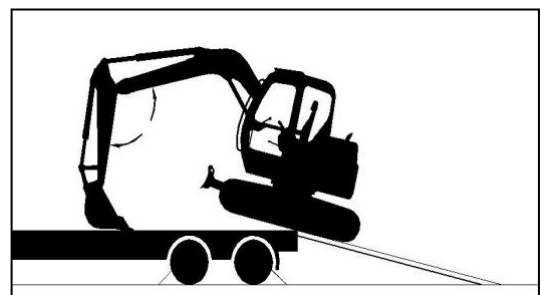
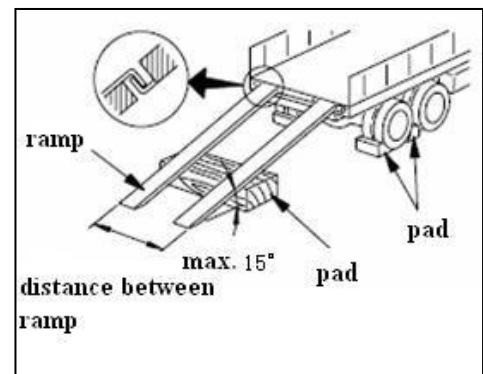


Note

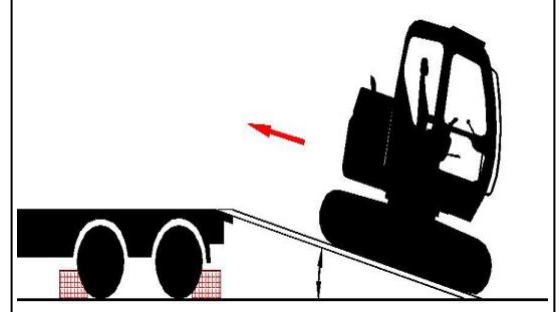
- ◆ Load the machine only on firm, level ground and keep a safe distance with the road shoulder.
- ◆ Chock the machine to prevent the machine movement during loading process.
- ◆ The ramp for loading must have enough strength and width with an maximum slope of 15° , be sure both side of the ramp is at equal level so that machine could travel safely.

Loading operation

- Switch off idle speed, set engine speed to low speed by means of fuel control knob.
- Set travel speed selector to low speed position.



- Machine direction : When loading, if machine is equipped with working device, keep the working device at the front of the machine and travel forward. If no working device, travel in reverse to load the machine.
- Align the direction of the machine with the ramp: be sure the center line of the machine track matches that of the ramp and travel slowly.
- Lower the working equipment as much as possible without causing any interference on the machine. When traveling on slope, operate only the travel lever; never operate the other lever or pedal.
- When the machine travels over the rear wheels of trailer, travel the machine slowly so that the smooth change of machine position (from grading to level) is possible. pay attention not to make working equipment hit trailer.
- When the machine travels to the middle of the trailer, slew the upper-structure 180°making the working equipment face backside of the machine.

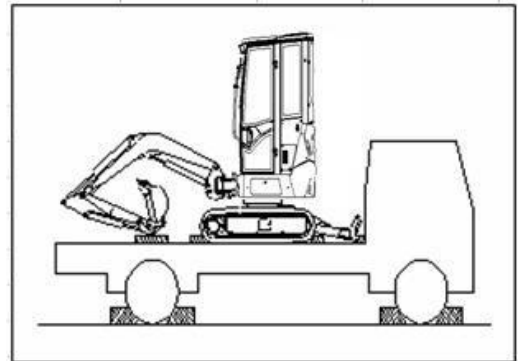


2.1.5 Tying Down the Machine



Note

- ◆ **Secure the chains or slings to the machine frame. Do not place the chains and slings across or press on the hydraulic piping or hoses.**
- When placing the machine on the specified position of the trailer, fold working equipment to transportation configuration, lower the boom, place a wooden block under bucket cylinder to prevent damages to it during transportation.
- Pull the pilot safety lever to LOCK position, stop the engine, remove engine starting key, and lock the cab door securely.
- Chock the front and rear position of the track to prevent machine movement during transportation.
- Fix the four corners of the machine and front accessories to the trailer with chains or wire ropes.
- Raise the ramp located on the rear part of the trailer then fix it.



2.1.6 Unloading



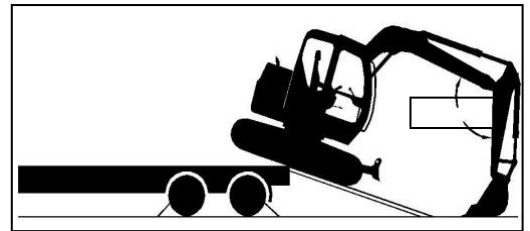
Note

Load the machine only on firm, level ground and keep a safe distance with the road shoulder.

- ◆ Chock the machine to prevent the machine movement during loading process.
- ◆ The ramp for loading must have enough strength and width with an maximum slope of 15° , be sure both side of the ramp is at equal level so that machine could travel safely.
- ◆ In case of cold weather, fully warm up the machine.

Unloading procedure

- Switch off idle speed function, set travel speed to low speed position, adjust engine throttle knob to set engine speed at low speed.
- Raise boom to proper height.
- Align the center line of machine track with that of ramp and travel slowly.
- When machine is over the rear wheels of the trailer, operate on the machine slowly so that the machine could transfer to the ramp smoothly.
- When on the ramp, adjust working equipment angle so that the angle of boom and arm is within $90-110^{\circ}$. Lower the bucket to the ground until the machine leave ramp.

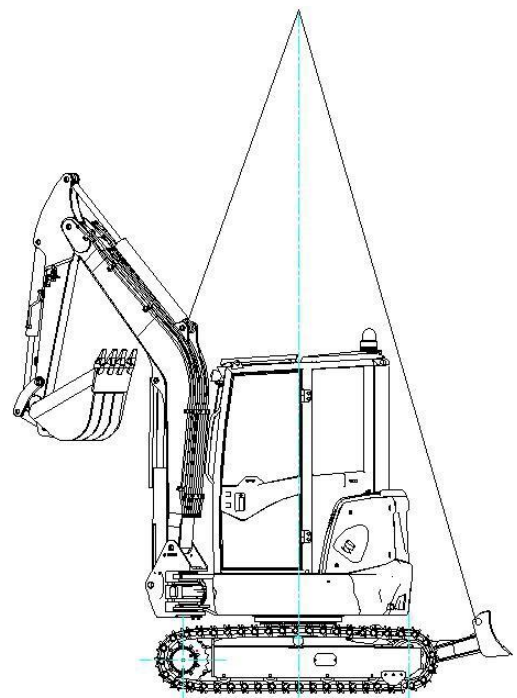


2.1.7 Lifting Machine



Note

- ◆ Never raise the machine with any worker on it.
- ◆ Make sure the wire rope has sufficient strength for the weight of the machine. The service condition must be in accordance with relevant forced standard.
- ◆ Swing the working equipment to the sprocket end, set the undercarriage and upper structure parallel. Do not swing to the other direction.
- ◆ Do not lift the machine in any posture other than the posture given in the right fig.



- ◆ **When lifting, keep the machine horizontal. Never walk under the machine.**
- ◆ **This lifting procedure applies to machine with standard specifications.**
- ◆ **To get the lifting methods information for the machines equipped with other attachments or optional devices, please contact CFG or our distributor.**

Machine lifting procedure

- (1) Swing the work attachment to one side of the drive sprocket, extend arm cylinder and bucket cylinder completely, operate boom cylinder and lower the work attachment to ground;
- (2) Shut down the engine, take out the key and lock cab's door and windows;
- (3) Use steel ropes and support rods with enough length and twine the machine with protective material to avoid damage;
- (4) Reeve the steel rope through four pedals on front, rear, left and right, and then fasten firmly;
- (5) Adjust steel rope to make the lifting angle is not over than 40°;
- (6) Lift the machine slowly, and always keep the machine in level position. If not level, the steel rope should be adjusted again.

2.2 STORAGE



Note

- ◆ **To protect the hydraulic cylinder piston rod while in storage, keep the work equipment in the fig shown at right. (This prevents rust from developing on the piston rod).**

2.2.1 Before Storage

- Clean and wash all surface and exposed parts.
- Apply grease to all lubricating parts until fresh grease spills out.
- Change engine oil.

- Apply grease to exposed parts on piston rod.
- Top up fuel tank with diesel oil.
- Disconnect battery negative terminal and secure battery cover. You can also remove the battery from the machine, store it separately.
- If the expected ambient temperature may below 0°C (32°F), mix coolant with anti-freezing liquid.
- Select proper storage position: The machine must be kept at well-ventilated indoor place, if the machine has to be stored outdoors, select level, firm ground and cover the machine with a sheet.

2.2.2 During Storage



Note

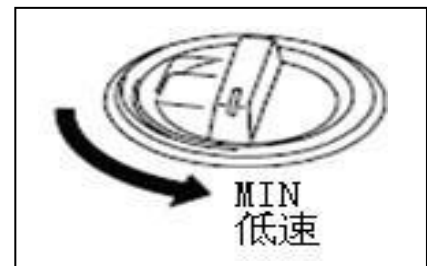
- ◆ **When it's necessary to perform the rust-preventive operation while the machine is at indoor, open the doors and windows to ventilate and prevent gas poisoning.**
- During storage, operate the machine to travel, swing and dig for 2 to 3 cycles at least once a month so as to lubricate machine, and charge the machine battery.
- Before operating, check cooling water level and lubrication status.
- Air condition must run once a month.

2.2.3 After Storage

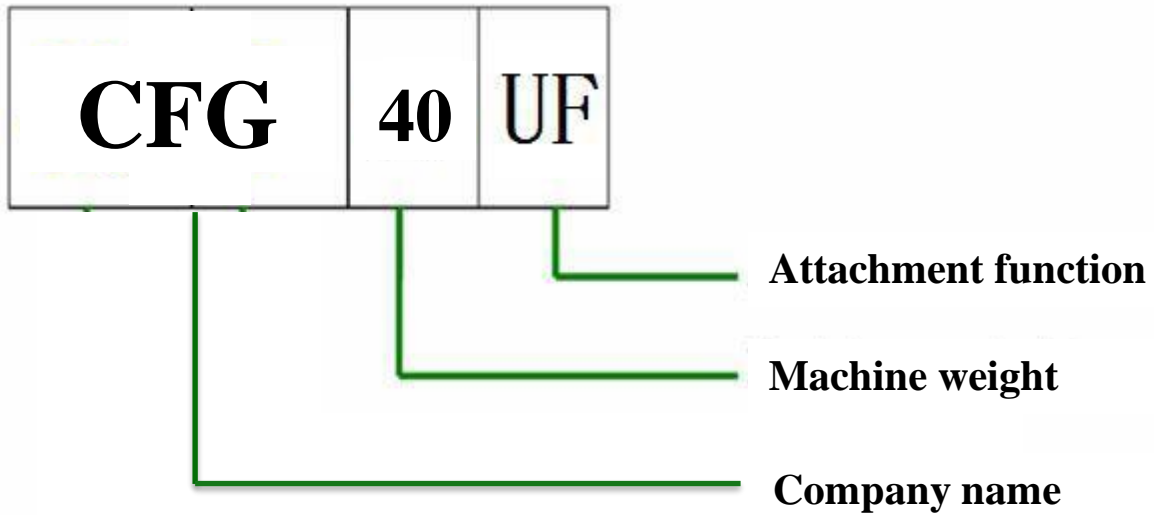


Note

- ◆ **Start engine only in well-ventilated condition.**
- Remove lubricating grease on piston rod surface.
- Apply grease to all lubricating parts.
- Check engine oil level, keep it in specified level, if not, and refill engine oil. If some water is found to mix in the oil, replace it.
- Check fuel level and bleed the air.
- Check its level to ensure that it is with the standard range.
- Start and run the engine at half speed for several minutes before operation with full load.
- Cycle all hydraulic function for several times.



3. ABOUT MACHINE



Attachment function:

UF — Upgraded code

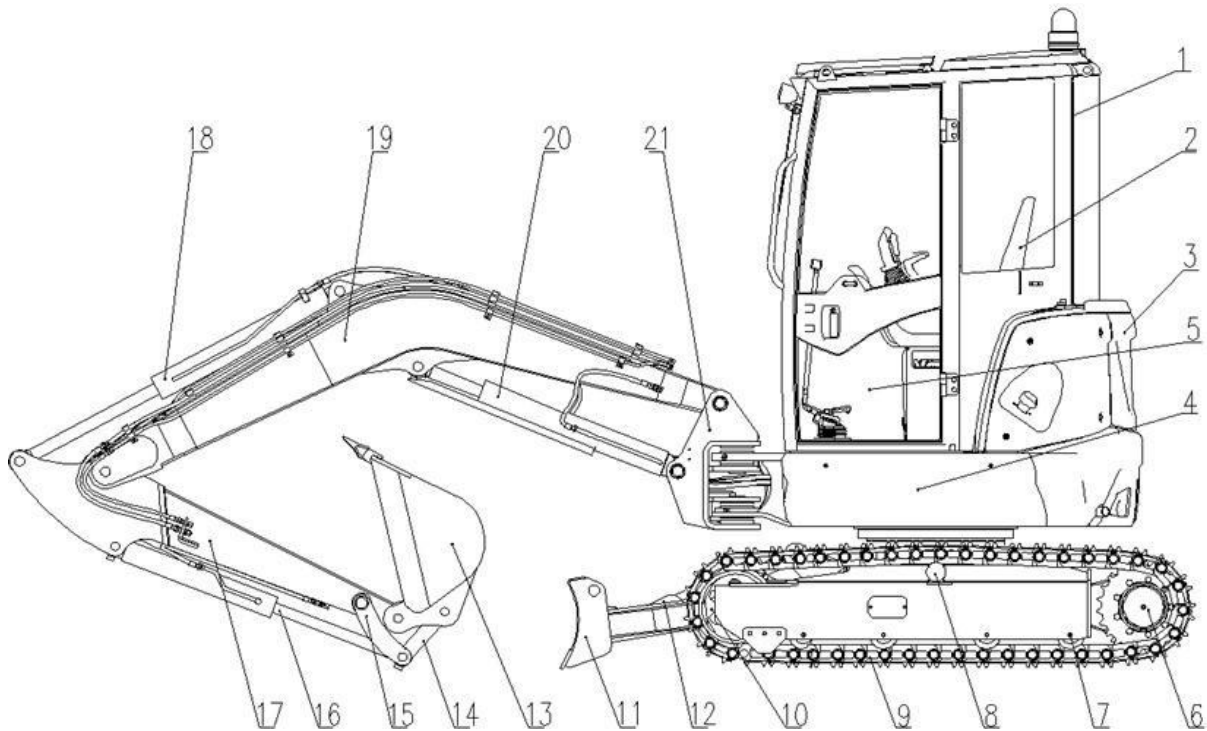
Model	Development code No.	Swing	Crawler allocation	Cab allocation	Weight (Kg)
CFG40UF	785	equipped	Steel track	Cab	3850
		equipped	Rubber track	Cab	3750



Note: The above weight figures are measured with the following five requirements:

1. Diesel oil tank is full (diesel oil instrument displays full);
2. Hydraulic oil is enough;
3. Water tank antifreeze fluid is enough;
4. Sealing plate is assembled;
5. Driver's weight is not included

3.1 POSITION OF MACHINE COMPONENTS



- | | |
|-------------------|------------------------|
| 1. Cab | 11. Dozer blade |
| 2. Seat | 12. Dozer cylinder |
| 3. Rear hood | 13. Bucket |
| 4. Fuel tank | 14. Link rod |
| 5. Hydraulic tank | 15. Rocker arm |
| 6. Travel motor | 16. Bucket cylinder |
| 7. Track roller | 17. Arm |
| 8. Carrier roller | 18. Arm cylinder |
| 9. Track | 19. Boom |
| 10. Idler | 20. Boom cylinder |
| | 21. Boom swing knuckle |

3.2 CAB (CLOSED)

- 1 Seat
- 2 LH Joystick
- 3 Pilot safety lever
- 4 Auxiliary control pedal
- 5 Left-travel control lever
- 6 Right-travel control lever
- 7 Boom swing/attachment control pedal
- 8 Monitor
- 9 RH Joystick
- 10 Dozer blade/ Hydraulic quick-change control lever
- 11 Rocker control switch
- 12 Monitor control rod
- 13 Engine throttle dial
- 14 Engine ignition switch
- 15 Air conditioner control panel

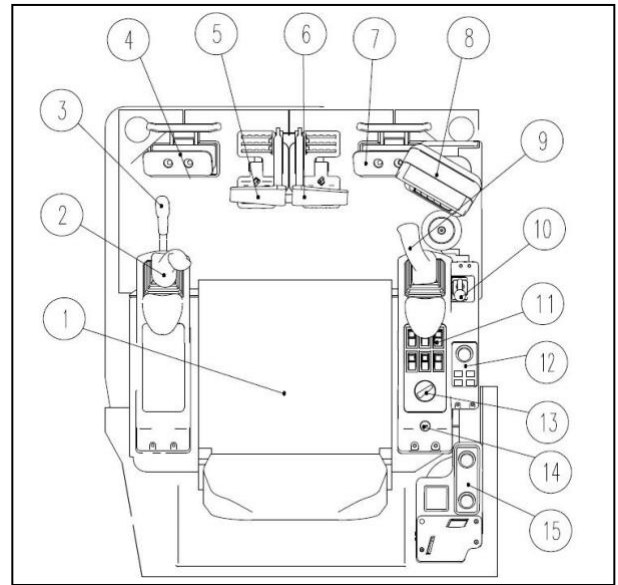


FIG. 3.2.1

Operational illustration in the cab (mode one):

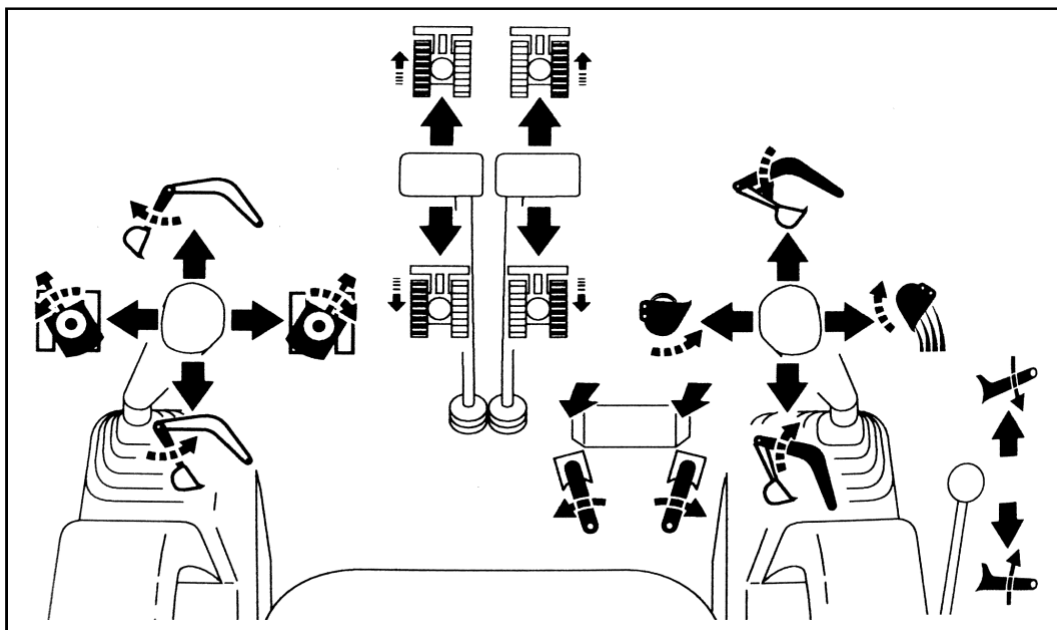


FIG. 3.2.2

Cab control illustration (mode two):

(only for North America market)

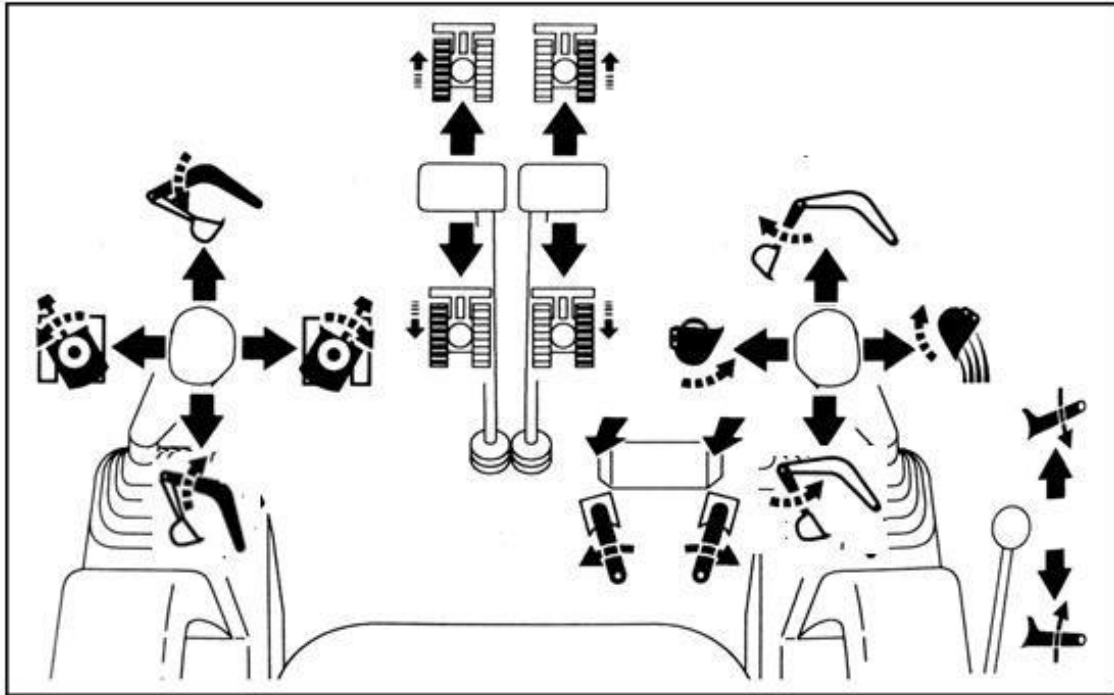


FIG. 3.2.3

Switching method of operation mode:

Open the hinged door of left housing cover, as FIG. 3.2.4, left and right operation switch valve ① locate on the bottom left of the platform respectively. Pull out the snap ring and pin, turn the switch anticlockwise 90° to the II position shown in the FIG. 3.2.5, and release the snap ring. Operating mode is changed from mode one to mode two. Left and right pilot control function is changed as below:

- Motions are controlled by right pilot handle as below:
 - a. Push forward to extend arm
 - b. Pull rearward to retract arm
 - c. Push leftward to load with backhoe bucket or clamshell bucket load
 - d. Push leftward to dump with backhoe bucket or clamshell bucket dump
- Motions are controlled by left pilot handle as below:
 - e. Pull rearward to lift boom
 - f. Push forward to lower boom
 - g. Push leftward to turn upper-structure anticlockwise
 - h. Push leftward to turn upper-structure clockwise

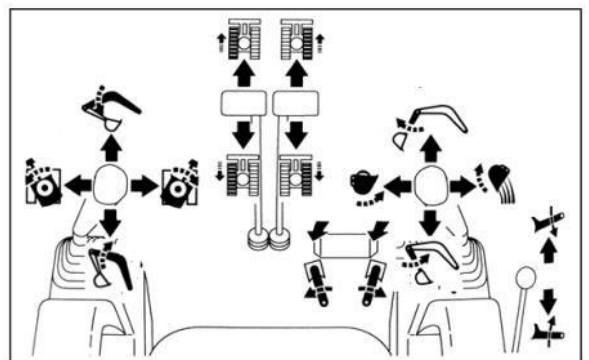




FIG. 3.2.4

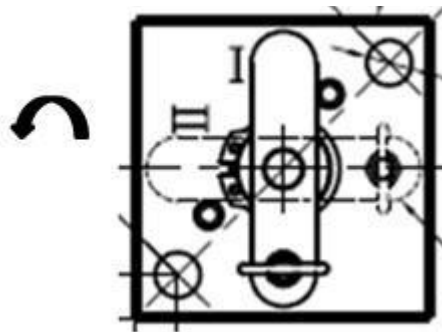


FIG. 3.2.5

On the opposite, mode two is changed to mode one.

Mode one is the international general operation mode, mode two is the general operation mode in the USA.

Mode one is mainly introduced in this manual.

3.3 START-UP SWITCH

CAUTION

Don't turn the starting key from "OFF" to "ON" or from "ON" to "OFF" in a short time. Failure to comply may damage the engine.

P — POSITION(no any action)

O — OFF(stop the engine) I —

ON(connect electric power) II

— HEAT(warm-up)

III — START(start engine)start the engine, The switch will turn back to "ON" position after releasing the key. Before start-up for another time, Shut down the power supply first.

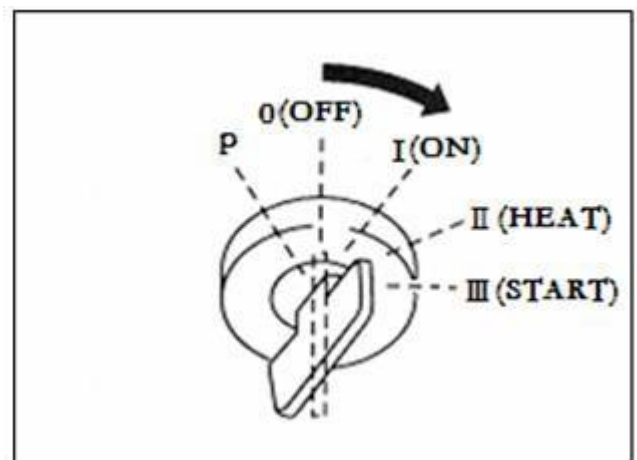


FIG. 3.3.1

3.4 MONITOR

3.4.1 Details about Monitor



FIG. 3.4.1

- | | |
|------------------------------------|-----------------------------------|
| ① Engine gear indication | ② Failure warning |
| ③ Air filter clogged warning | ④ Low engine oil pressure warning |
| ⑤ Preheating icon | ⑥ Charging warning |
| ⑦ Fuel level indication | ⑧ Main menu button |
| ⑨ Auto-idling Button | ⑩ Failure information button |
| ⑪ Idling speed button | ⑫ Engine speed |
| ⑬ Engine working hour meter | ⑭ Engine stage working meter |
| ⑮ High coolant temperature warning | ⑯ Coolant temperature gauge |

1 Engine gear indication

This indicates engine working gear.

2 Failure warning

When the malfunction occurs, the icon on the display turns red with buzzer sounding.

3 Air filter clogged warning

When air filter element is clogged, this indication light comes on, and a prompt displays on the screen, showing that “Air filter is clogged”. At this moment, machine should be shut down immediately to clean or change air filter element.

4 Low engine oil pressure warning

This indicates engine oil pressure. When system is powered on, the engine is not started, and this symbol lights up. If engine oil pressure signal line is broken or the sensor is damaged, the buzzer will sound and a prompt display on the screen, showing that engine oil pressure is abnormal; When starting engine, engine oil pressure is normal, the indication light will be off. If engine oil pressure is low, this indication lights up, buzzer will sound and a prompt displays on the screen, showing that engine oil pressure is low, at this moment, machine should be shut down to check causes of malfunction.

5 Preheating icon

When starting the engine in cold days, turn the key to warm-up position, the indication light of preheating lights up, and a prompt displays on the screen, showing that “preheating...”, after 15 seconds, “preheating has been finished” displays on the screen.

6 Charging warning

Here refers to engine charging signal. When the system is powered on, engine is not started, this indicator light comes up, if the charging signal wire is broken or the sensor is damaged, buzzer will sound and a prompt will display on the screen, showing “charging is abnormal”; When engine is started and charging is normal, the indication light is off. If charging is abnormal, this indication light will come on, buzzer will sound and a prompt will display on the screen, showing that “Charging is abnormal”.

7 Fuel level indication

This indicates residual fuel capacity.

8 Main menu button

Press down this button to change system interface to the interface of hour meter, and rotation speed, press it again to enter into the interface of time and date.

9 Low fuel level warning

Here shows fuel capacity. When fuel level is lower than 10%, this indicator light comes on and buzzer sound, and then a prompt displays on the screen, showing that fuel level is low.

10 Failure information button

Press down this button to enter failure information interface, and failure code and failure name are listed.

11 Idling speed button

When the system is at auto idling speed, this indication light turns on.

12 Engine speed

This is the real-time rotation speed of the engine.

13 Engine working hour meter

Here is the working time of machine in an hour.

14 Engine stage working hour meter

Here shows the working hour of machine in a certain time.

15 High coolant temperature warning

Green zone is pointed for normal water temperature Red zone is pointed, that means water temperature is too high.

16 Coolant temperature gauge

Here shows the temperature of engine coolant.

1. Machine Settings

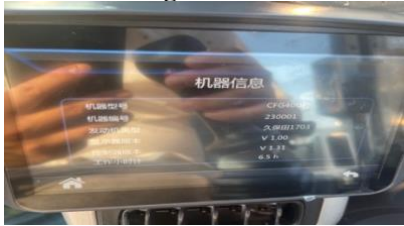


FIG. 3.4.2

2. Function Extension –Advanced Settings

It includes running information parameter selection, port information selection, main page warning parameter selection and warning parameter threshold valve settings. Users can set above settings according to self-demand.

3. Work hour meter, meter hour and work calendar

Here counts total work hours of engine, main meter hours. And work calendar can be checked by month.

FIG. 3.4.3



4. Maintenance and Failure Information

Here includes maintenance information, real-time failure information, historical failure information and engine failure information.

Code	Failure Description	Failure Class
F001	Throttle dial failed	1

FIG. 3.4.4

5. Language Settings

There're 13 languages for selection.

FIG. 3.4.5



3.5 ROCKER CONTROL SWITCH

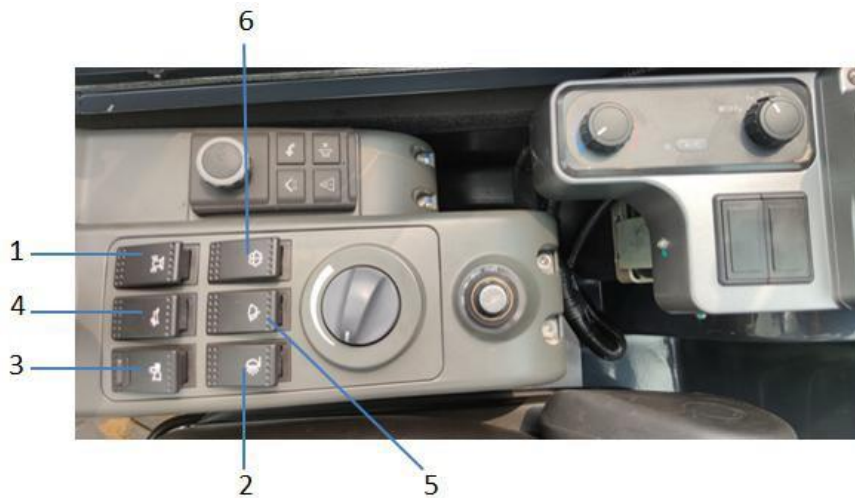


FIG. 3.5.1

1 —Warning light work switch:

After the switch is pressed down, red light comes on and the warning light work and starts to flicker.

2 —Work light switch:

It's a switch to control work light.

Note: Turn the wok light on when it's dim or dark.

3—Quick-change lock switch:

This switch is to control dozer blade and hydraulic quick-change lock.

4 —Travel speed switch:

This switch is to control fast-speed travel and low-speed travel.

5—Wiper switch:

This switch is to control wiper in the cab. After it is pressed down, the wiper starts to work and the icon is in green light; Press it again, the green light is off and the wiper stop working.

There're two grades of this switch, this first is Gear One (low speed), the second is Gear Two (High Speed).

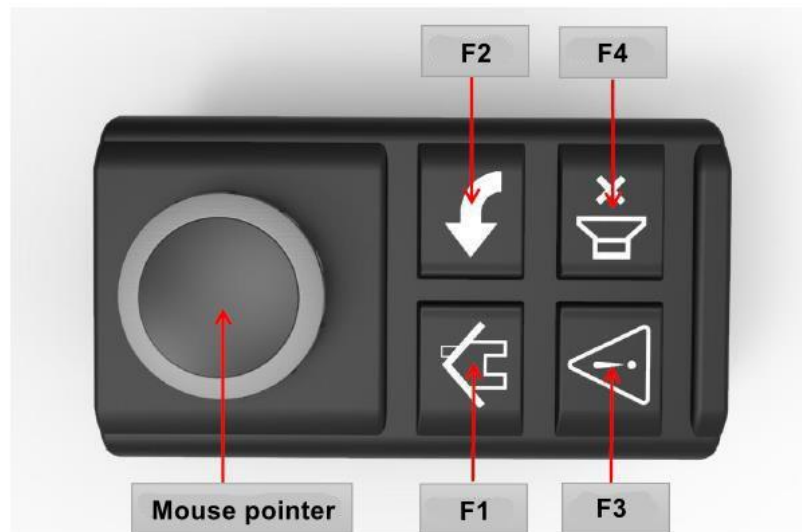
⚠️ 【Note】 : In cold days, the wiper may be frozen on the window, thus, don't operate it before thawing, failure to comply may damage the wiper.

6 —Washer switch:

This switch is to control the water-spray pot. After it's pressed down, the sprayer on the window starts to spray water with the icon the monitor is in green light. Press this switch again, the green light is off and the sprayer stop working.

This switch includes two grades.

3.6 MONITOR CONTROL PANEL



Button	Function
F1	One key back to home page
F2	Back to previous page
F3	Check failure code
F4	Alarm silence

FIG. 3.6.1

3.7 AIR CONDITIONER

3.7.1 Work Theory

1. Refrigeration Theory:

Air conditioner is to reduce the temperature in the cab by the evaporation of liquid absorbing the heat and discharging the gasified material out of the cab.

Following installed main components form the refrigeration circulation, including compressor, condenser and A/C inner evaporator. The cab is cooled by this circulation.

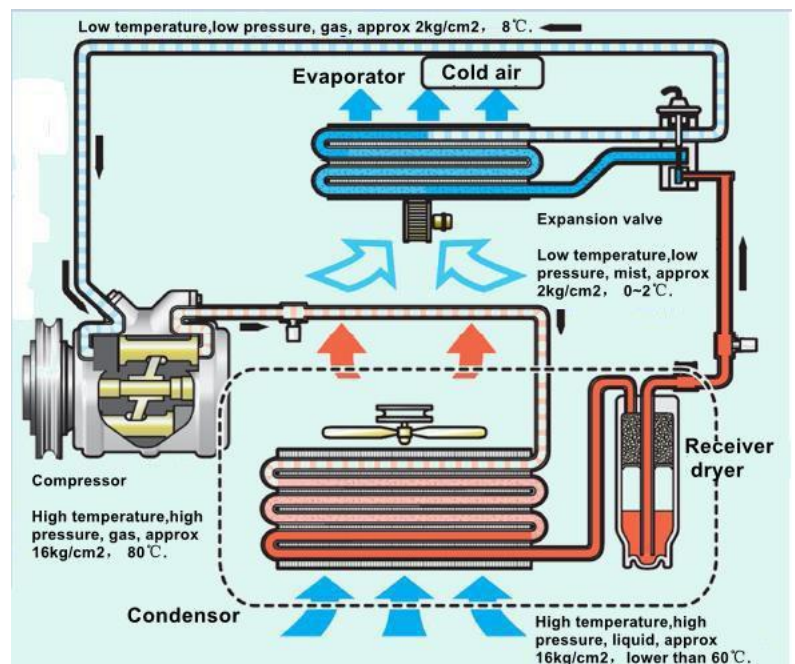


FIG. 3.7.1

2. Heat Theory:

The coolant which is heated by the engine, then it will be pumped to the heater core, and make the cold air in the cab become warm

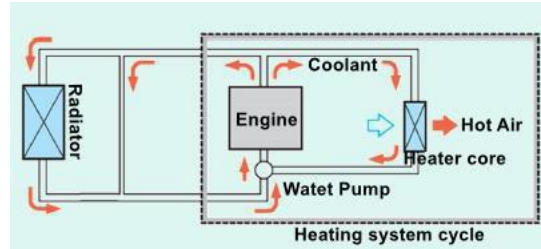


FIG. 3.7.2

3.7.2 Installation

After installation, check the air conditioner for firm and no looseness, the wiring harness and water pipe connection for correct reliability.

3.7.3 Operation

Enough ventilation space should be provided.

Don't put flammable and explosive objects on the air outlet.

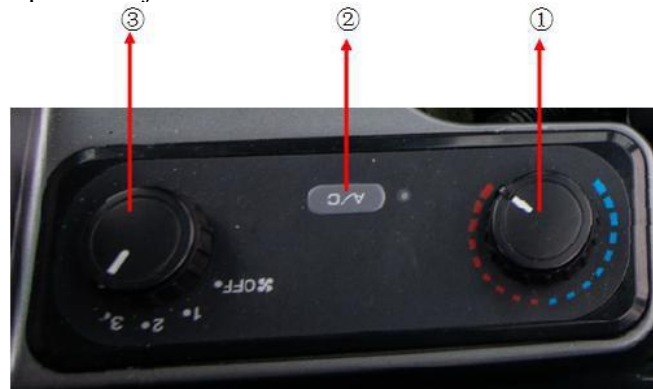


FIG. 3.7.3

①— Temperature adjustment knob, the blue scale is for the adjustment of cold wind, the red scale is for the adjustment of hot wind.

②— A/C button, it's the air conditioner compressor button. Press it down to turn on the compressor with the light on and enable the cold wind function.

③— Wind speed switch, this is to adjust the cold (hot) wind speed, including gear 1/2/3.



【Note】 :

- **Connection pipe:** It's forbidden to operate the O-ring with woolen gloves to prevent the coolant leakage caused by the attachment of dust and foreign object.
- **When assembling the drain pipe,** pay attention to check for flat hoses, hoses of strong shapes, which is hard to discharge water; any hoses droop with inclined angle; so as to

prevent water accumulation in the air conditioner and lead to fly-out water from air outlet and water leakage.

- **Coolant refilling:** Make sure the type of coolant is HFR-134R; It's forbidden to inject liquid coolant from the low pressure side, otherwise, the piston will be stuck when the compressor is running; If refilling should be done again, the injected coolant should be discharged before refilling.
- **Running-in of compressor:** In the mode of idle-speed, run for more than 10 minutes when the air conditioner is powered on, in this way, oil can be distributed in the A/C system evenly to prevent the compressor stuck at the beginning.



【Note】 : You'd better to use this function when the excavator is running to avoid the low power of the battery.

3.8 RADIO


3.8.1 Panel Functions



FIG. 3.8.1

- (1) **Power ON/OFF:** 


Short press to power on or off.

- (2) **Sound mode:** 

Short press to select among BAS, TRE and VOL.

- (3) **Auto-save** 

Short press to search radio station and save those with strong signals automatically.

- (4) **Upward selections** 

short press it to search radio station frequency automatically in the order of descending frequency. On the play mode, press it to switch to previous one. Long press it to search radio station frequency manually. Descend one frequency step by each short pressing.

(5) Downward selection 


short press it to search radio station frequency automatically in the order of increasing frequency. On the play mode, press it to switch to next one. Long press it to search radio station frequency manually. Increase one frequency step by each short pressing.

(6) Band selection: 

Radio mode, pressing this button repeatedly can recycle select band: FM1—FM2—FM3—AM1—AM2.

(7) Mute: 

Short press, ON/OFF mute



(8) Volume adjustment: 

Tone or volume +/-.


(9) Play/Pause: 

Radio mode: short press to broadcast radio station which is stored on number 1; long press to store the currently playing station into number 1.

Play mode: short press to pause / play.

(10) Fast Backward /Forward:  

Short press to play fast backward or forward, and short press again to exit.

(11) Radio prestorage 3/Repeat playing 

Radio: short press, broadcasting radio station number 3 storage, long press to save the currently playing station to the 3 station. When playing a MP3, short press, repeat broadcasting the current folder.

(12) Radio prestorage 

Radio: short press, broadcasting radio station number 5 storage, long press to save the currently playing station to the 5 station. When playing a MP3, short press, play the next folder.

(13) Radio prestorage 

Radio: short press, broadcasting radio station No. 6 storage, long press to save the currently playing station to the 6 station. When playing a MP3, short press, play the next folder.

(14) Function selection mode 

Cyclic switching among RADIO, USB and SD three models, not inserted SD card, SD card mode automatically hide.

(15)-Build-in USB/SD card interface

(16) Mute self-lock switch, after this switch is pressed down, the radio is silence; release it to recover.

3.8.2 Radio Bluetooth Function

Operation steps:

(1) Turn on the radio.



FIG. 3.8.2

(2) Press the button “MODE” to switch the radio to “BT” mode.



FIG. 3.8.3

(3) Enable the Bluetooth function of cellphone to search device (device name: BT MP3), press “connect” on the cellphone, the radio will display after successful connection.



FIG. 3.8.4

(4) If there's no successful connection with some cellphones, it's necessary to change the setting of bluetooth on the cellphone. As figure 2.4.5

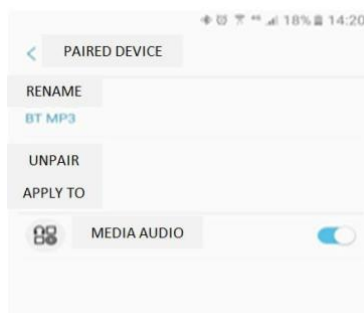


FIG. 3.8.5

3.9 SEAT ADJUSTMENT

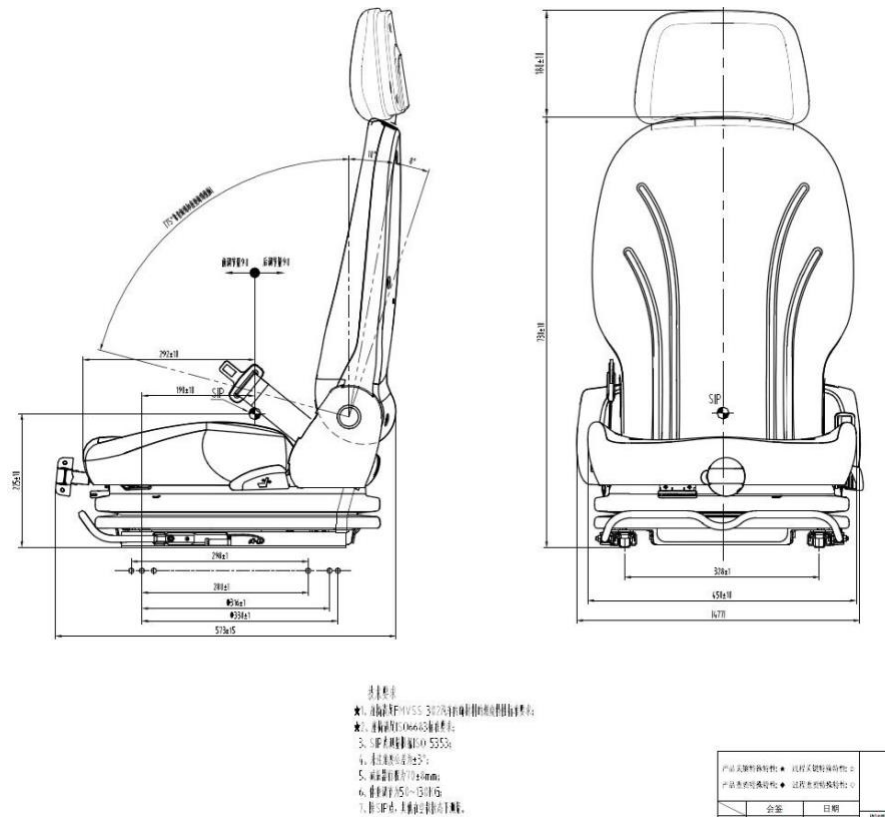


FIG.3.9.1

The seat SC29-32 is a luxury seat designed for engineer machinery. Its backrest and sponge surface are designed according to ergonomics, making you feel more comfortable. A shock absorber device is installed, which can help reduce or offset harmful shock and eliminate the fatigue during travelling, so as to ensure the safe operation of the operator.

Technical Features

- (1) The Forward and afterward travel of the seat is 180mm (For:90mm, Aft:90mm)
- (2) The stepless adjustable angle scope of the backrest: $75^{\circ} - 28^{\circ}$.
- (3) Shock absorber stroke is 70mm;

Operation Instruction

- (1) Forward & Afterward adjustment

Put up the adjustment knob by your hand, then pull or push knob forward or backward to the proper position you want, and then release the knob, the slider will lock automatically.

- (2) Backrest adjustment

Put up recliner knob, then rotate the backrest to the proper position you want, release the knob to lock the backrest.

Caution

- (1) Only adjust the seat when the driver is in safety status.
- (2) For slider and recliner adjustment, please make sure the knob in the proper position; only

when the adjustment mechanism parts are separate can you do the adjustment.

- (3) After all the adjustment, please make sure every knob stays in proper position and every part is locked.

The seat of the machine meets the requirements of EN ISO 7096:2000.

3.10 PILOT SAFETY LEVER



【Warning】

- The pilot safety lever should be locked when shutdown or leaving the cab seat, failure to comply may result in serious accidents.
 - The engine should be shut down and the safety lever should be locked before leaving the operator's seat.
 - Don't touch other operating levers when pulling or putting down the safety lever.
 - The work lever of the front equipment can't be locked by the pilot safety lever, including left operating handle and right operating handle. Thus, touch these two levers by accidently, no bad results; But the pilot safety lever can't control the dozer (chassis) control lever, left & right travel control lever, boom swing control pedal and auxiliary control pedal.
- Pull up the safety lever to the lock position, the front work equipment can't work,



【Note】 : Lower bucket (front work equipment) to ground, place all control lever to “neutral” position and stop the machine.

- Before work, push down the safety lever to “UNLOCK” position.



【Note】 : When the engine doesn't work, place the safety lever on the “UNLOCK” position, the starting switch is turned on, push the handle to operate. Accumulator can provide pressure for the control spool to move.



【Note】 : If the safety lever on the “UNLOCK” position, all the control lever are on the “Neutral” position, the front work equipment still can work, in this case, there's some stoppage for the system. Push the safety valve to “Lock” position, turn off the engine switch and contact with the local CFG agent.

3.11 ENGINE THROTTLE DIAL

Engine throttle dial is used to regulate the speed of the diesel engine. Turn this dial to the rightmost end reaching the high idle-speed position, the leftmost end is the low-speed position. Adjust the speed between two ends to control the diesel engine rev.



FIG. 3.11.1

3.12 PILOT CONTROL HANDLE

Operation marks:

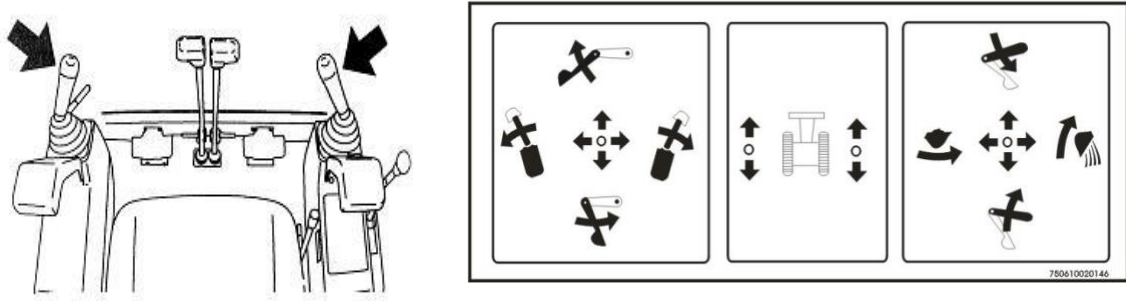


FIG. 3.12.1

Before operation, figure out each control lever for each part carefully. The instructions on this manual are made in accordance with the international standard.

Use these levers to control boom, arm, bucket, swing, boom deflection and dozer blade.

Right operating handle, following motions are controlled.

- a — lift boom
- b — lower boom
- c — backhole bucket load, or clamshell bucket load
- d — backhole bucket dump, or clamshell bucket dump

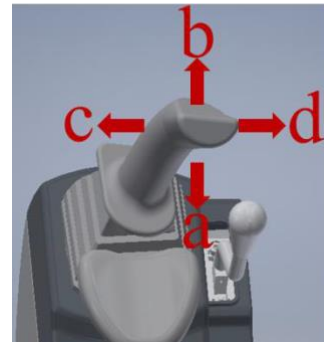


FIG. 3.12.2

Left operating handle, following motions are controlled. e—

- rotate upper-structure anticlockwise
- f — rotate upper-structure clockwise
- g — extend arm
- h — retract arm

Composite movements can be done by operating two handles together. Besides, horn buttons are equipped on handles.

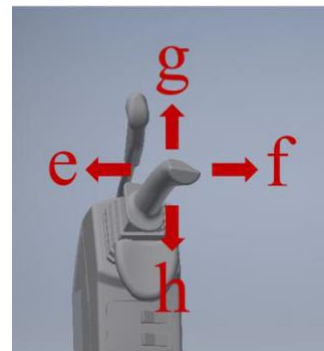


FIG. 3.12.3

Dozer control pedal

This control lever can control the dozer by the composition operation with the transfer switch of dozer blade and undercarriage extension & retraction on the left control box.

- (A) — lift the dozer
- (B) — lower the dozer

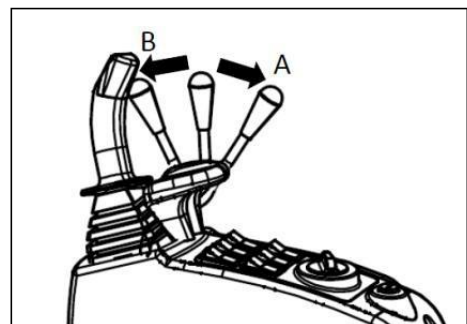


FIG. 3.12.4

Travel control lever

Make sure that the dozer is at the foreside of the operator's seat before operating the traveling control lever. Reverse the control lever when the dozer is at the back of operator's seat.

The travel control lever can operate the machine go forward or backward or change the direction of traveling.

Refer to the page of "operation of travel handle".

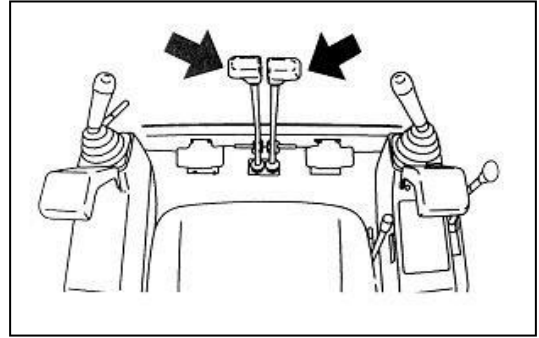


FIG. 3.12.5

Boom swing control pedal

This pedal is used to control the boom swing.

- (A) Boom swing rightward
- (B) Boom swing leftward

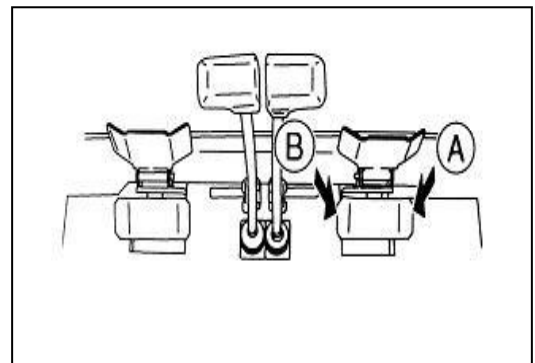


FIG. 3.12.6

F. Auxiliary control pedal

This pedal is used to control the hydraulic oil of auxiliary hydraulic circuit

- (A) Hydraulic oil flows to the right auxiliary pipe
- (B) Hydraulic oil flows to the left auxiliary pipe.

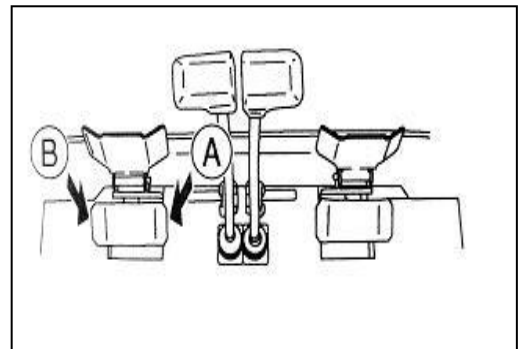


FIG. 3.12.7

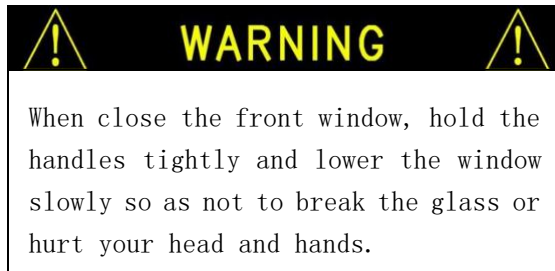
! WARNING !

Set the pedal to lock position when it is not being used, if the pedal has not been locked and be stepped on accidentally, serious accidents may cause!

These devices are used to lock the boom swing and auxiliary pedal. You can lock the pedal by putting the lock pedal on the pedals.

3.13 OPENING AND CLOSING OF FRONT WINDOW

Front window of the cab can be opened easily for maintenance and emergency leave. Open the fixed buckle of front window, push the glass window upwards and backwards to the scheduled position, then the front window is fastened. Before closing the front window, firstly, loosen the lock pin, grasp the two handles with your hands, lower the front window slowly to the bottom, then lock the lock pin tightly.



3.14 AIR DUCT HOOD AND COVERING PARTS

Air duct hood:

The engine should be equipped with air ducting hood to prevent foreign materials from being reeled into fan which disturbs the normal work of fan. On the other hand, the assembly of air ducting hood can prevent accidents caused by carelessly putting hand into the fan. It is equipped with mounting plate on both left and right and is connected with the water tank.



Covering Parts

The upper-cover can protect the hydraulic components, electric circuit in the interior of the excavator and ensures the beautiful appearance. It is fixed on the platform and also protects engine.

3.15 ACCESSORY

No.	Serial no.(drawing no.)	Component	Qty.
1	703101006001	Grease cup M6 JB/T 7940.1	2
2	703101008002	Grease cup M8X1 JB/T 7940.1	8
3	703101010001	Grease cup M10X1(steel made) JB/T 7940.1 imported	10
4	703102010002	Grease cup M10X1 45° JB/T 7940.2	5
5	703102010001	Grease cup 90° M10X1 JB/T 7940.2	2
6	720211000008	Inserted fuse BX2011C-5A	1
7	720211000009	Inserted fuse BX2011C-10A	5
8	720211000010	Inserted fuse BX2011C-20A	1
9	720211000011	Inserted fuse BX2011C-15A	1
10	720211000018	Inserted fuse BX2011C-30A	2
11	750401000009	Grease gun JC-LG14K	1
12	750401000039	Grease gun LG14KE	1
13	790010000001	Work clothes	2
14	720245010004	Ignition key14-0492-0301	2
15	750629000009	Fire extinguisher	1

3.16 DECALS

Center of gravity label:

Traction hook label:



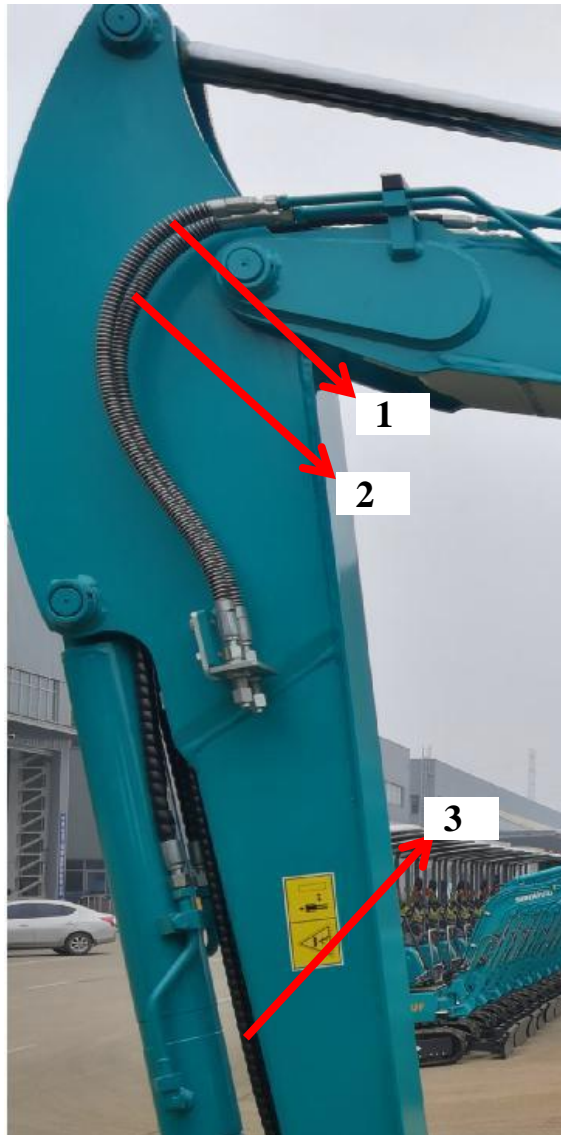
Pedal dropping label:



3.17 ATTACHMENT AND THE PIPELINE

As shown in FIG. 3.17.1,

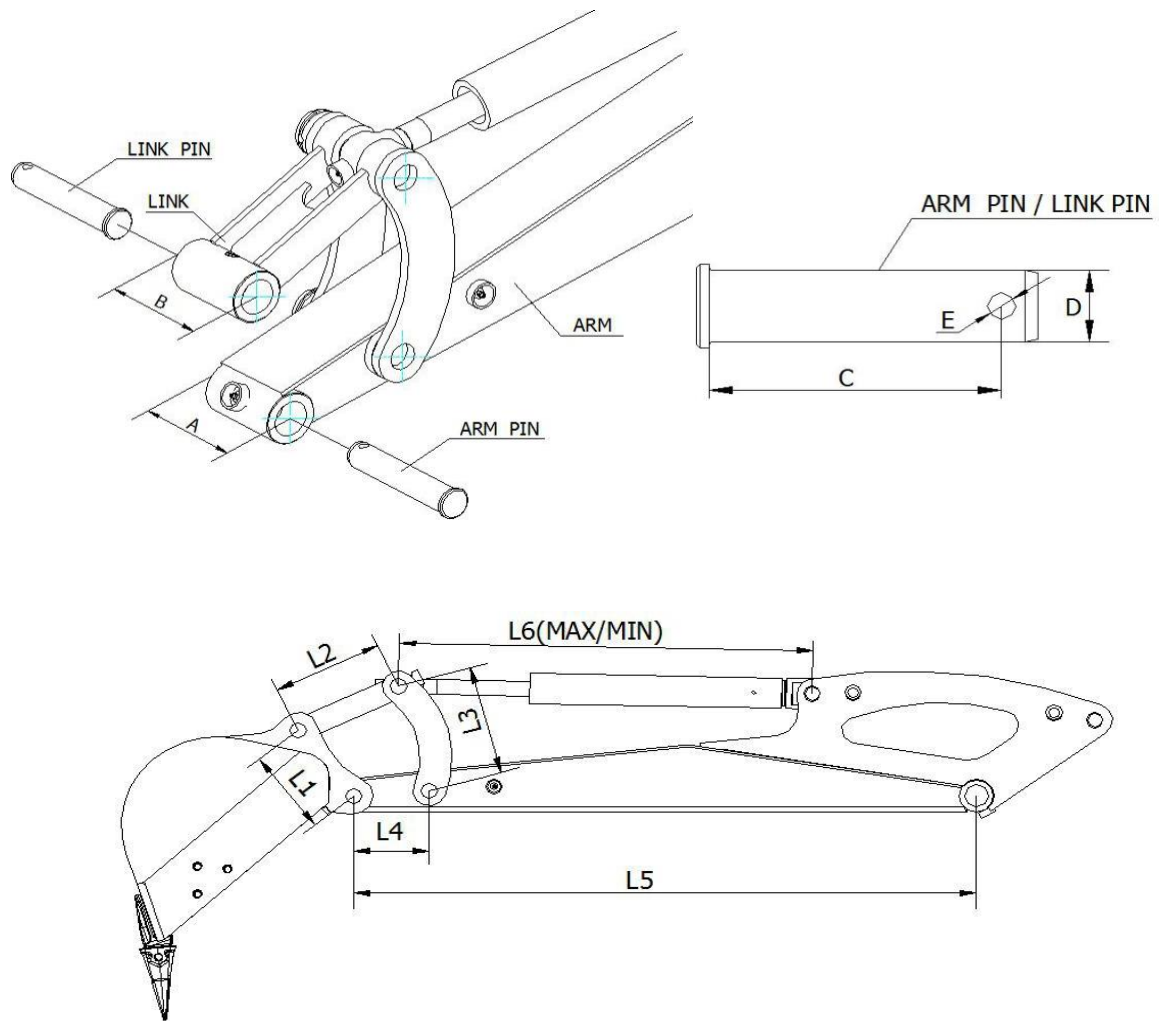
- 1 — Breaking pipeline
- 2 — Attachment pipeline
- 3 — Hydraulic quick hitch pipeline



Pipeline Parameter of CFG40UF Breaking, Attachment and Hydraulic

Breaking Pipeline			Attachment			Hydraulic quick hitch		
Pressure (MPa)	Flow (L/min)	Oil supply (Interflow)	Pressure (MPa)	Flow (L/min)	Oil supply	Pressure (MPa)	Flow (L/min)	Oil supply
15	50	P1	20	29	P1	24.5	20	P1
Size of pipe joint	Seal type		Size of pipe joint	Seal type		Size of valve block joint	Seal type of joint	
M18X1.5	Seal O ring		M16X1.5	Seal O ring		G1/4	ED pad plane sealing	

Parameters of key structural parts are shown as below figure for attachment assembly.



A	143.5mm
B	143.5 mm
C	208 mm
D	Φ 35 mm
E	Φ 10.5 mm
L1	195 mm
L2	256 mm
L3	280mm
L4	163 mm
L5	1350 mm
L6(MIN)	800 mm
L6(MAX)	1270 mm

3.17.1 Hydraulic Quick Hitch

Quick hitch device can change working tools easily by the operating button and operating joystick in the cab.

CFG40UF crawler type hydraulic excavator is equipped with SWQC02 hydraulic quick hitch, of which the working pressure is 4 ~ 21MPa, the greatest pressure is 30MPa, working flow is 10 ~ 20L/min and cylinder stroke is 40mm.

Joint specification of pressure oil source valve block is G1/4 , it's plane sealed with ED pad.



1. Valve block joint of pressure oil source ① connect with the right hydraulic quick hitch pipeline (The left and right hydraulic quick hitch pipeline is distinguished by the driving direction when operator sits in the cab.)
2. Valve block joint of pressure oil source ② connect with the left hydraulic quick hitch pipeline .

Pipeline connection method varies with different brands. More details, please contact with the designated agent of CFG or the manufacturer of hydraulic quick hitch.

● Operation Procedure of Hydraulic Quick Hitch

1. Pull down left control box to unlock pilot safety rod ①.



2. Press down the blade/hydraulic selector switch ② on the panel of rocker switch, changing to “hydraulic quick hitch” function.



②

3. Dozer control lever ③ control the hydraulic quick hitch cylinder to change bucket and other attachment.



③



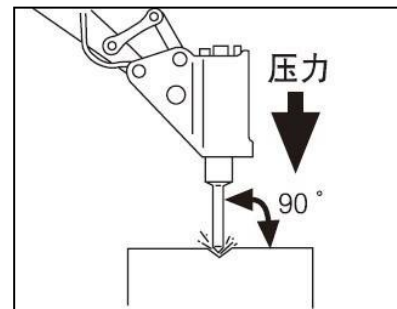
【NOTE】 : The “hydraulic quick hitch” function should be disabled when it’s not needed to avoid serious accidents caused by accidental operation.

3.17.2 Hydraulic Breaker

Hydraulic hammer breaker is to run the piston in fast speed repeatedly with the circulation of working oil, making full use of the produced vibration impact to break rocks.

SC300 silent hammer breaker is equipped on this machine. Details are as below:

Weight is 180kg, diameter of drill pipe is 53mm, pressure is 90 ~ 120Kg/cm² , quantity of flowing is 25~50L/min, impact frequency is 600~ 1100bpm, overflow valve pressure is 150~160 Kg/cm², and nitrogen chamber pressure is 16.5Kg/cm².



Main use of hydraulic hammer breaker

Applied range of hammer breaker	
Mining	Mountain cutting, quarrying, recrushing, grizzly crushing
Metallurgy	Steel ladle, slag cleaning, furnace breaking, equipment foundation demolishing
Highway	Expressway repair, concrete breaking, foundation excavation
Railway	Mountain cutting, tunneling, road demolishing, pavement punning
Construction	demolition of old building, breaking of reinforced concrete
Ship repair	Clam removal of ship, rust removal
Others	Ice breaking, frozen earth breaking, vibration of sand mould

● Operation of Hydraulic Hammer Breaker

Breaking is controlled by the left foot pedal, of which the pedal cover should be opened when operation.



Step on the control pedal with left foot and the hammer breaker begins to work.



In order to prevent accidental operation, please cover the protective plate up when there is no need to operate break hammer.

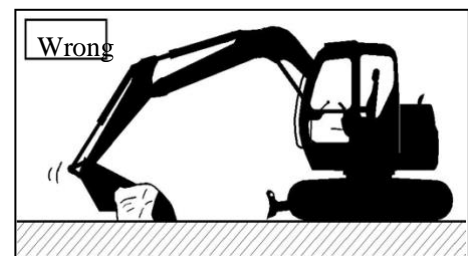


- **Assembly and Operation Keypoints of Hydraulic Hammer Breaker**



- ① Auxiliary 1 (Double Effect)
- ② Drain (Return Line Breaker)

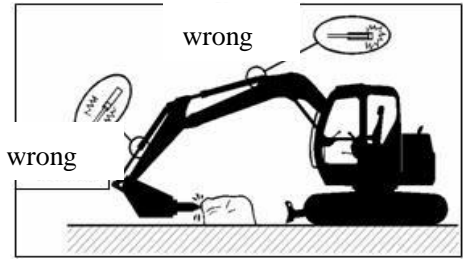
- (1) Cap the pipe end of arm and dismantle the hammer breaker when not use.
- (2) Install plugs for hose ends to prevent dirt.
- (3) Store some spare caps and plugs for necessary use.
- (4) Avoid dirt entering when changing the installation of bucket to hammer breaker.
- (5) After connection, check seal for oil leakage and bolts of tube clamp for slack.



Before installing the hammer breaker to the arm, the operation manual of the excavator and the hammer breaker should be read carefully. In addition, confirm or check as required.

(1) Confirm and check as requirements before operation every day.

(2) Operate the excavator slowly. Because the hammer breaker is heavier than the bucket, that is the reason of the descending stability of the excavator. Thus, it should be supported by mouldboard and the operation should be done in the front.

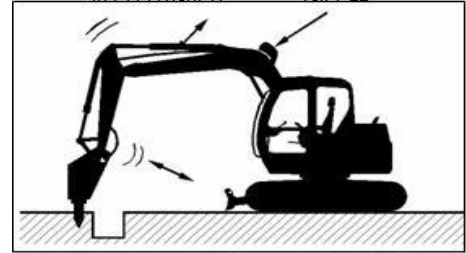


(3) Avoid using the hammer breaker for striking. Never use boom or arm to break objects. If not, the excavator may be damaged.

(4) Don't move objects with the hammer breaker, if failure to do so the excavator may be damaged.

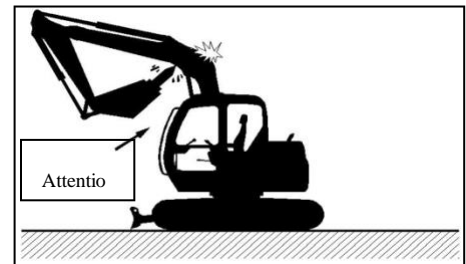
(5) Don't operate the hammer breaker when the hydraulic piston rod is fully retracted or extended to avoid the damage of hydraulic cylinder or the excavator.

Abnormal hose vibration



(6) If there's abnormal jump of hydraulic hoses of the hammer breaker, stop the operation immediately. That's caused by the damaged accumulator, of which the pressure change of the hammer breaker. More seriously, the hammer breaker and the excavator may be damaged too.

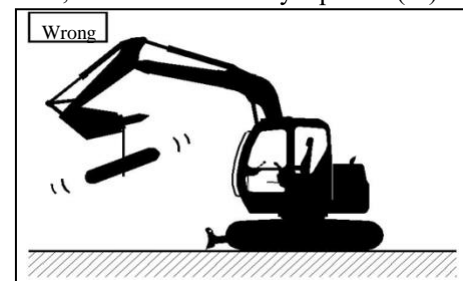
(7) When retracting hammer breaker, pay attention to not collide the hammer rod with the boom.



(8) Don't operate the hammer breaker in the water.

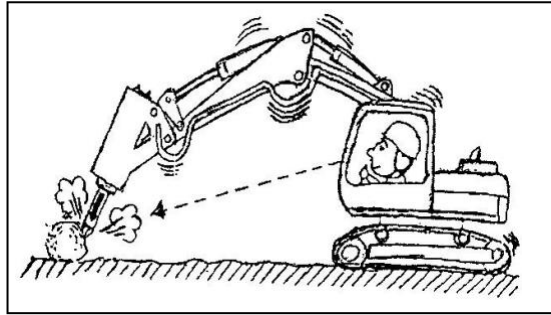
(9) Don't lift any objects with the hammer breaker. If failure to do so, the excavator may tip and (or) the hammer breaker may be damaged.

(10) Don't operate the hammer breaker after rotating the upper-structure to one side, because under this posture, the excavator is very unstable.



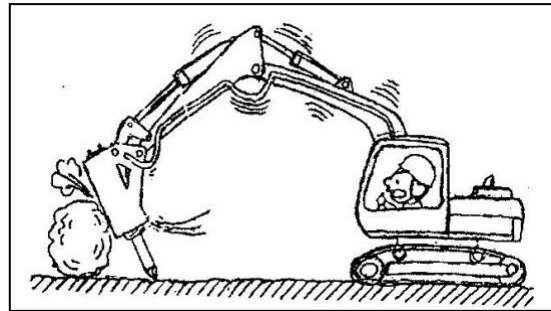
Safe Operation of Hydraulic Hammer Breaker

a) Please stop operation when oil tube vibrates too much. When high and low pressure oil tube of hammer breaker vibrate excessively, that should be disassembled and repaired, please contact with designated CFG after-sale service station.



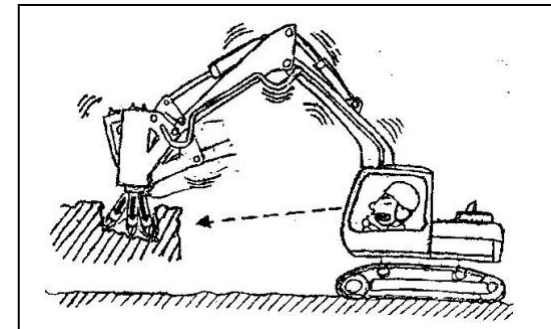
b) Forbid empty hitting

Stop the striking on the moment once the rock is broken, because continuous empty-hitting may not only damage the drill rod and flat pins, and the load bearing mechanism. When rod position is incorrect or when the drill rod is used as a lever, empty hitting will happen. (the sound is different if it's empty hitting.)



c) Forbid to move rock

Forbid using side wall of hammer breaker to move rock, because this is the main factor to damage the bolts of the hammer breaker, drill rod, meanwhile, the boom and mechanical boom will be damaged.

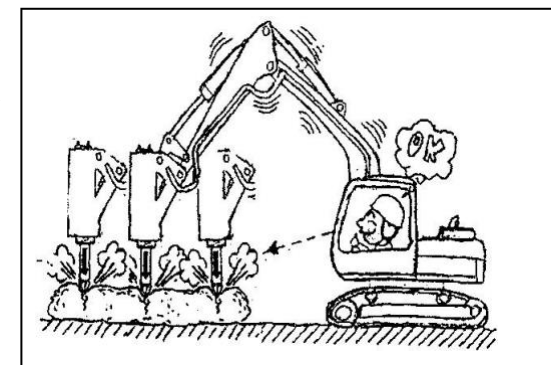


d) Do not use the drill rod as a crowbar

Bolts and drill rod also will be damaged when using the drill rod as a crowbar.

e) Do not continue to hit over 1 minute

When the hammer breaker continues to hit over 1 minute at the same place, if the rock still not be crushed, replace hit point to hit again. The drill rod will be abraded fast if the striking is kept at one point continuously.

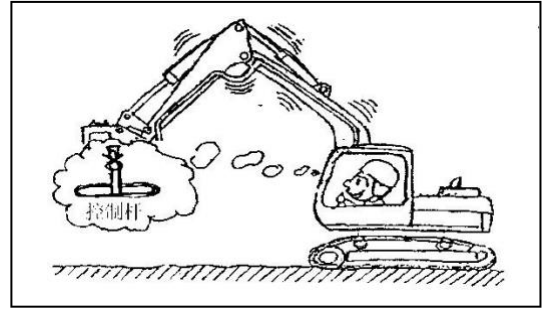


f) Crush a big hard rock starting from the edge

Hitting from the crack or the edge, it's a relatively easy job, even if to crush a big hard rock.

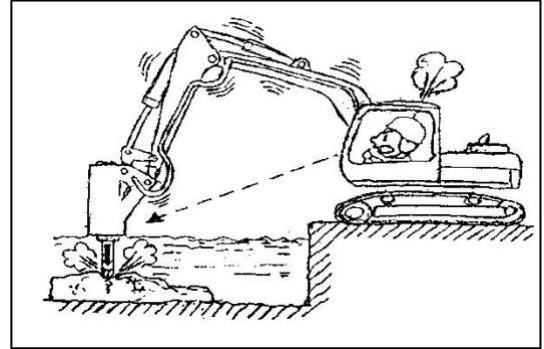
g) Operate hammer breaker with proper engine speed

Operate the hammer breaker with a proper engine speed, high engine speed not only cannot improve hitting power of the hammer breaker, but also make oil temperature high, so as to damage piston and valves.

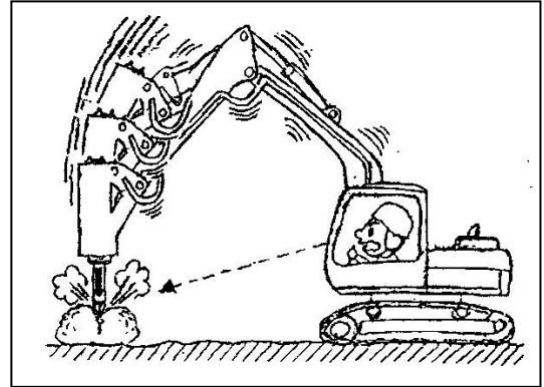


h) Do not operate the hammer breaker in water or mud

When parts except drill rod sinking in water or mud, please stop operating the hammer breaker, because mud may be gathered on the piston or the similar parts, resulting in the premature damage of the hammer breaker.

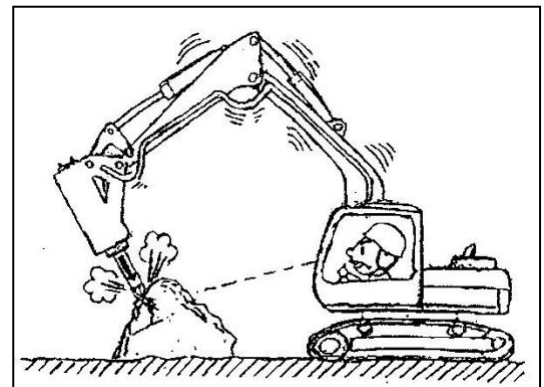


I) Do not hit the rock with the falling part of hammer breaker
Hit the rock with falling part of hammer breaker that will cause counter-acting force to hammer breaker and the load bearing mechanism, thus, damage the hammer parts and the machine.



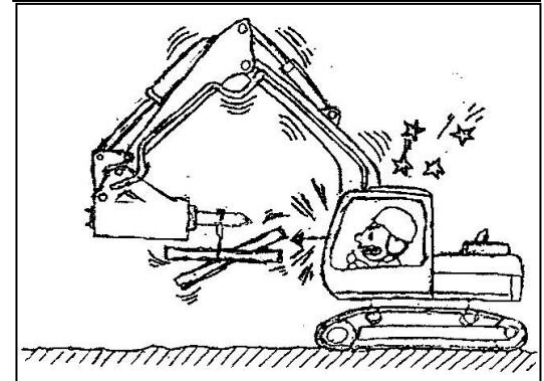
J) Do not hit the limit position of load-bearing cylinder

When hitting on the limit position of load-bearing cylinder (machine boom completely stretched or retracted), arm and every part of loaded machine will be damaged.



K) Do not use hammer breaker to lift objects

Lifting objects on the hammer breaker or drill rod, it will damage the hammer breaker and it's very dangerous.

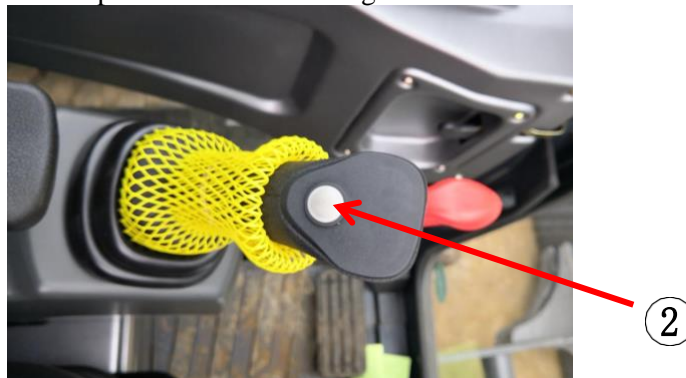


3.17.3 Operation Procedure of Attachment Control

1. Pull down left control box to release pilot safety lever ①.



2. Press down the select button of boom swing/ attachment control on the top of left operating joystick, and hold it, changing the right control pedal from boom swing mode to attachment control mode.



3. Control motions of attachment pipeline with right control pedal ③.



【Note】 : Release the select button of boom swing/attachment control on the top of left

operating joystick when attachment control function is not needed to avoid serious accidents caused by accidental operation.

Details about assembly method of attachment, please contact with the agent designated by CFG or attachment manufacturer.



1. Attachment pipeline on the left
2. Attachment pipeline on the right

3.17.4 Safety Note

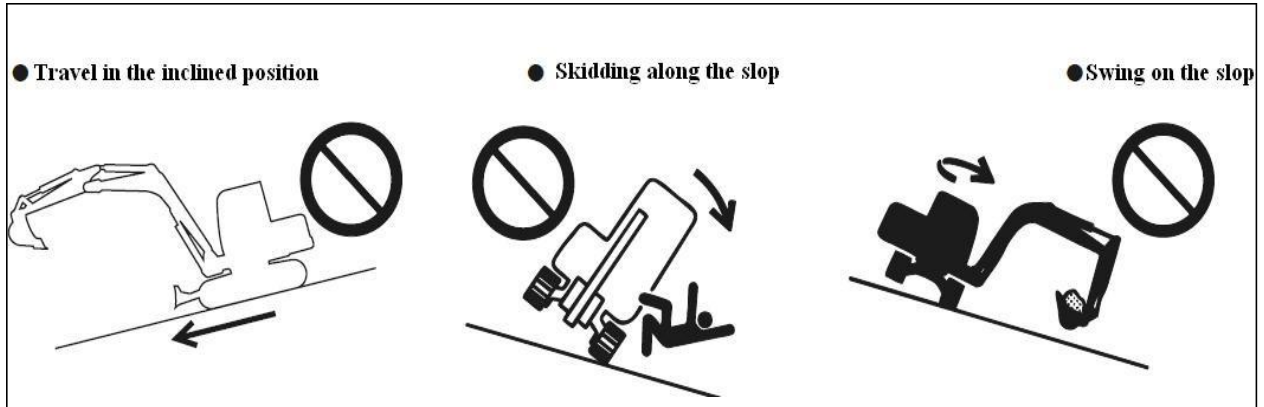
Warning

- Please consult CFG dealer before installing optional parts;
- Don't use other option attachment which is not agreed by CFG or CFG dealer, or it will shorten the service life of the machine and cause other safety problems.
- CFG will not be responsible for any hurt, accidents or machine damage which is caused by using unauthorized option attachment;
- Machine vibration and noise varies with the use of different attachment.
- Select flat hard ground to operate and make sure there's good light and ventilation.
- Clear up the working area, clear away obstacles and dangerous objects, and the leaked lubricating oil and grease on the ground.
- Appoint one person to conduct operation and obey his instruction when the machine is lifted.
- Park the machine on a stable position to avoid tipping when assembling or disassembling the working device.
- Unauthorized person is not allowed in the working area, as for there's the risk of falling of loaded objects.
- A crane should be used when lifting or moving a heavy object exceeding 25kg.
- Replace optional work device or other special work device, please do the running-in first and then check oil level, if necessary, please fill oil. Consult local CFG dealer about details for assembly and disassembly.

- NOTE FOR ASSEMBLING ATTACHMENT

**Warning :**

- **Extended or heavy work attachment will decrease the stability of machine, so if travelling or slewing on the slope, the machine may tip. The following operation is dangerous, it's forbidden to do so.**



1. When travelling downhill, lower the center of gravity of work device to avoid tipping forward.
2. Forbid travelling along the slope to avoid roll-over.
3. It's forbidden to swing on the slope.
4. After a heavy work device is installed, the swing exceeding stroke of the machine will increase (the distance is that the position when stopping the swing operation to the position the machine stops swing). Wrong estimation of the swing exceeding stroke may make the machine colliding with surrounding objects, so enough distance should be kept during operation. Besides, nature falling will also increase (the work device will decrease gradually as for its gravity)
5. After installing a longer work attachment, the work range will become larger. Operator should pay attention to estimate the distance correctly to avoid collision. Thus, a certain distance should be maintained with the objects within the area.

3.18 ELECTRIC PROPORTIONAL JOYSTICK

Select single or dual electric proportional joystick according to your demand.

3.18.1 Single Electric Proportional Joystick

As shown in below figure, electric proportional switch ① is equipped on right operating joystick, Scroll it to the left to control motions of breaking pipeline.



3.18.2 Dual Electric Proportional Joystick

As shown in below figure, machine with dual proportional joysticks equipped with a roller switch respectively on both joysticks Push this electric proportional switch leftward and rightward, and hold that to control motions of attachment.



4. MACHINE OPERATION

4.1 MACHINE WORKING ENVIRONMENT

- (1) Machine adjustment is not needed below the altitude of 2300m.
- (2) If it's necessary to work in the environment with temperature above -30°C, the machine should be preheated completely prior to working.
- (3) If the cab is not a closed one, the machine is only applicable to work in the environment with temperature of 15°C-35°C, besides, the machine should be preheated fully prior to working.
- (4) The machine can be used in all day even on rainy or snowy days, and related safety operation procedure should be observed.

CAUTION

- The manual only applies to normal working conditions, when the machine works in other potentially dangerous conditions, such as conditions with inflammable, explosive materials, dust and poisonous chemical materials, you should obey corresponding safe operation instructions and regulations.
- If the cab is not a closed one, splashing materials may cause injury from the front, the side or rear, please be caution.
- When the machine is used with other purposes not in this manual, you have to get the consent of CFG or its agents and obey relative regulations in the place where the machine is used.

4.2 RUNNING-IN OPERATION

Watch engine running carefully

 **Important:**

Take care of machine in initial 50 hours, till you fully familiar with the sound and conditions of the machine.

Operate the machine with the engine power limited in the range of 80% of the full load.

Avoid idle the engine excessively.

Check the indicator lights and indicator frequently during operation.

Every 8 Hours of Operation or Everyday

- Carry out the 8-hour operation or everyday maintenance. (refer to maintenance guide...eight hours)
- Avoid idle the engine excessively.
- In the first 100-hour or when work in mud, lubricate the pivot of working instrument every other 8 hours' operation.

After First 50 Hours of Operation

- Carry out 50-hour operation maintenance. (refer to maintenance guide...fifty hours)
- Check the torque of detectable fastener. (refer to the torque specifications of fastener in the maintenance part)

After First 100 Hours of Operation

Carry out 50-hour and 100-hour maintenance. (refer to maintenance guide....50 hours and 100 hours)

4.3 OPERATING ENGINE

4.3.1 Daily Inspection

1) Electrical system

Check whether there are abraded or cracked wire and slack connector or not, and check whether the light can be turned on or off normally.

2) Boom, arm, bucket, dozer blade, sheet metal, track shoe

Check whether there are curving, damaged and lost parts or not.

3) Fastener

Check whether there are slack or lost parts or not.

4) Fuel system

Drain water and sediment from the fuel tank.

5) Hydraulic system

Check leakage, hose twist, abrasion between pipes and hose or other parts.

6) Lubrication

Check the appointed lubrication points listed in the periodic maintenance table.

7) Protection device

Check backplate and mud fender.

8) Safety

Keep all people away from machine and remove barrier.

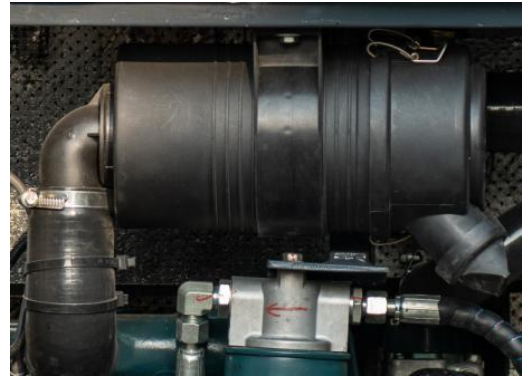


4.3.2 Checking Diesel Engine

Place the machine on a horizontal ground, check the engine oil level (stop engine, the engine oil will return to the tank 15 minutes later)

The oil dipstick should be in the range of “MIN” and “MAX” mark.

The methods of using and maintaining engine, please refer to “Instruction Manual of Diesel Engine”.



4.3.3 Electrical Device

Check all switches, indicator lights, safety warning devices, battery electrolyte acidity and fuses.

4.3.4 Air Filter

When indicator light comes on, it means that you should maintain or replace filter element.

4.3.5 Oil Level in Hydraulic Oil Tank



Hydraulic oil filling mark:

Please pay attention to the followings when filling oil to hydraulic oil tank:

- Place machine on a horizontal ground and retract all hydraulic cylinders, the oil level is not allowed to exceed MAX mark.
- Similarly, when all hydraulic cylinders extend, the oil level should be above the MIN mark.
- Choose the recommended oil according to the Lubricant List.
- All filled hydraulic oil must pass through returning oil filter. The daily maintenance should be taken in accordance with the criterion.

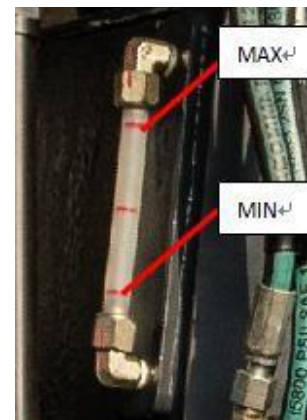


FIG. 4.3.4

Engine starting and stopping label:



FIG. 4.3.5

4.3.6 Before Starting Engine

- 1) Keep pilot valve control lever locked and pilot handle & travel pole neutral. Operator sits on seat.
- 2) Turn the key switch to ON position, all indicator lights come on except engine hour meter and LCD module, buzzer tweets, self-inspection is finished after 2 seconds and the monitor system is on normal working condition.

4.3.7 Starting Engine

- 1) Keep pilot control lever locked.
- 2) Turn the key switch to ON position.
- 3) Honk the horn to warn surrounding people.
- 4) Start engine by turning key switch clockwise to START position. Release key, the switch will return to ON position.



【 Important 】

In order to avoid damage of starter, never operate motor starter for 15 seconds or more every time. If the engine can't be started, turn the key switch to OFF position. Wait for more than 2 minutes, and then try again. After starting for 3 times, the engine still can't run, the oil supply system should be checked. After wrong start-up, don't turn the key switch till the engine stops, if not to do so, the starter may be damaged.

4.3.8 Starting Engine in Cold Weather

- 1) Turn the key switch to ON position.
- 2) Screw key switch to start position and keep a few seconds to lubricate the hydraulic pump before engine starts.
- 3) Screw key switch anticlockwise to HEAT position, the indicator light will on, after 30 seconds which means the preheating is finished.
- 4) When the preheating indicator light is on, start the engine as procedures in 4.3.7.

4.3.9 Adjusting Diesel Engine Rev

When accelerator handle is lifted to upmost and engine runs at full load; lower handle to bottommost, engine runs at minimum load; adjust accelerator between upmost and bottommost to control engine rev, and also you can screw handle to adjust accelerator imperceptibly.

4.3.10 Stopping Engine

- 1) Lower the bucket to ground.
- 2) Place the accelerator handle to minimum load position for about 5 minutes.
- 3) Screw key switch to "OFF" position to stop engine, and take out key.
- 4) Pull pilot control lever to LOCK position.



【Important】 Don't stop engine directly when it is full loaded, it should stop engine after 5 minutes minimum loaded operation to unload the heat load and avoid possible damage to engine. If engine stop with load, it should remove load and start engine at once. Before loading, please run 1 minute with half of the speed.

4.3.11 Using Auxiliary Battery

CAUTION

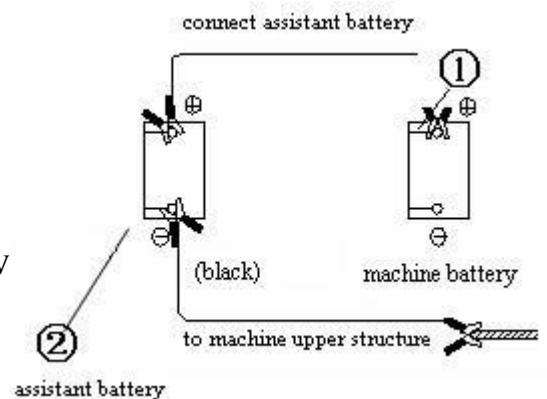
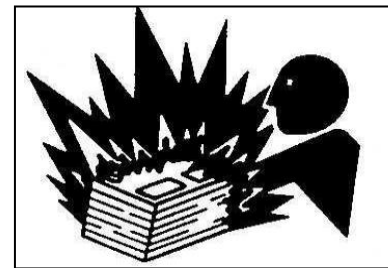
- When battery is used or charged, it will produce explosive gas. Avoid flame or spark close to battery. Charge battery in a well-ventilated area. Place the machine on dry & hard ground, not on steel plates, otherwise it may produce spark accidentally. Never connect anode and cathode directly, otherwise it will cause short circuit.
- When starting engine, the operator must sit on the operation seat to control machine.



【Important】 Earth the 12V cathode (-), and only use 12V auxiliary battery.

When the battery exhaust, start the engine with auxiliary battery as following instructions.

- 1) Connect auxiliary battery
 - Stop engine which is equipped with auxiliary battery.
 - Connect one end of red wire ① with battery anode (+), and connect the other end with auxiliary battery anode (+).
 - Connect one end of black wire ② with cathode of auxiliary battery, and connect the other end with excavator framework as ground connection. When connecting with



excavator framework, keep as far as possible away from the battery connection wire end.

- Start engine.

2) Separate auxiliary battery

- First, break black cathode (-) wire ② away from framework.
- Disjoin the other end of black cathode (-) wire ② from auxiliary battery.
- Disjoin red anode (+) wire ① from auxiliary battery.
- Disjoin red anode (+) wire ① from machine battery.

4.4 TRAVEL CONTROL

4.4.1 Travel with Foot Pedal

- 1) **Straight travel:** Step on two pedals forward at the same time (pedal 1 and 2 in FIG. 4.4.1)
- 2) **Straight reversing:** Step on two pedals backward at the same time. (pedal 3 and 4 in FIG. 4.4.1)

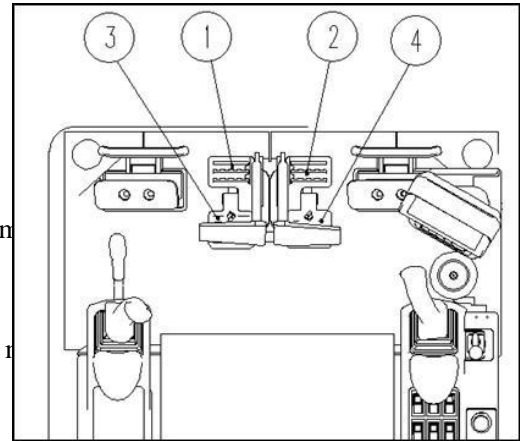


FIG. 4.4.1

3) Turning in one point

- Turn left (FIG.4.4.2): Step on right pedal 2 forward and left pedal 3 backwards. (FIG. 4.4.1)
- Turn right (FIG. 4.4.3): Step on right pedal 4 backwards and left pedal 1 forward. (FIG. 4.4.1)

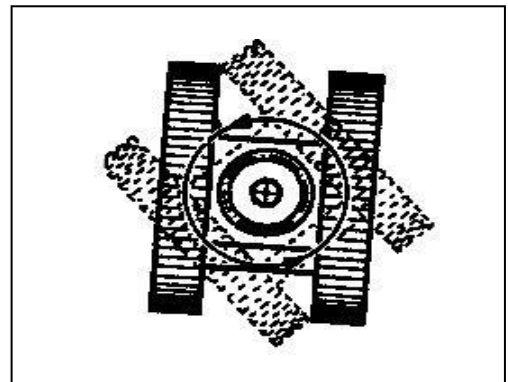


FIG. 4.4.2

4) Make a turn with one-side crawler (FIG.3-11)

- Left Turning: Step on right pedal 2 forward. (as 3 in FIG. 4.4.1)
- Right Turning: Step on left pedal 1 forward. (as 1 in FIG. 4.4.1)

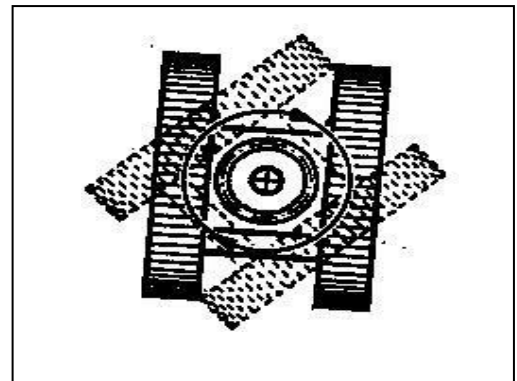
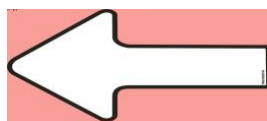


FIG. 4.4.3



Warning:

In order to protect travel mechanism, turning should be avoided while backing.



Travel direction label: (this decal is located on outer side of both left and right track beam.)

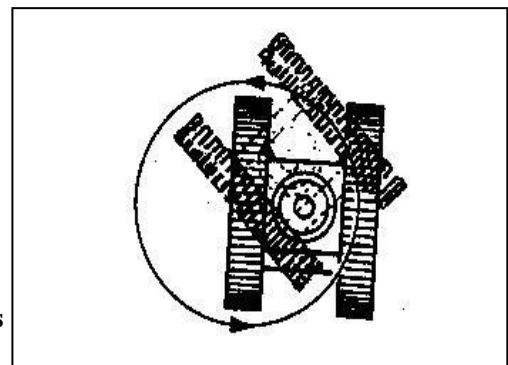


FIG. 4.4.4

4.4.2 Travel with Joysticks

If traveling should be adjusted slightly, operate that by handle control. This method is safe and reliable and suiting for loading and unloading the machine to a trailer.

- 1) **Straight travel:** Push two handles forward at the same time.
- 2) **Straight reversing:** Pull two handles backward at the same time.
- 3) **Turning in one point**
 - Left Turning: Push right handle forward and pull left handle backward.
 - Right Turning: Pull right handle backward and push left handle forward.

4) Turning with one side crawler

Left Turning: push right handle forward.

Right Turning: push left handle forward.



Warning:

In order to protect travel mechanism, turning should be avoided while backing.

4.4.3 Travel Speed

When the machine is traveling, press high/low speed switch ⑥ on control panel(FIG 2-5), the shift of travel motor high and low speed is achieved, then the machine can travel at high or low speed.

4.4.4 Travel Brake

Release travel pedal or travel handle, it will return to neutral position automatically, the machine stops traveling.

4.4.5 Key Points of Travelling

- 1) Avoid crossing over obstacles whenever possible. Because the machine may get injured from the possible strike. If you must do so, keep the bucket attachment close to the ground and stride over the obstacle slowly with the centre of the track.
- 2) On uneven ground, travel at low speed and avoid accelerating, stopping or changing directions abruptly.
- 3) When working in water, check the depth of the water, make sure that the water's depth is not higher than the half of the track roller. Never dip the rear end of the machine into water.
 - If the lubricant parts need to work in water for a long time, add enough lubricant oil until the old oil is replaced.

- Never immerse the slew bearing in water or sand, if you have to do so, contact the dealer or technician to confirm if this is allowed.
- 4) Pay special attention to the balance when traveling on a slope (the maximum grade ability is 20°, maximum lateral tipping angle is 10°). And you should note that when actual working area conditions are poor, the machine's stability might be lower.
- When traveling on slopes or grades, lower the bucket to a height of 20 to 30cm. In emergencies, lower the bucket to the ground and stop the machine.
 - When traveling on slopes or grades, move slowly in first gear (low speed).
 - Do not travel down slopes in reverse.
 - Do not change the directions or cross slopes sideways. First return to a flat surface, then redirect the machine.

- 5) If the excavator can't travel for getting into miriness, you can extend arm and place bucket to ground to lift one side of crawler, then turn the lifted crawler to clean out the bedload. In order to reduce the force enduring of boom and arm, the angle between boom and arm should be in the range of 90°--110° (FIG. 4.4.5).

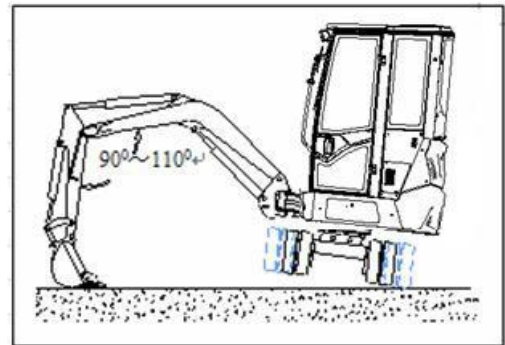


FIG. 4.4.5

- 6) When the machine gets into wallow or passes raceway, you can use arm and boom to help the machine pass (FIG. 4.4.6).

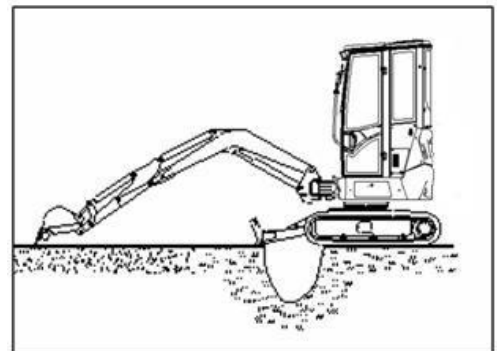


FIG. 4.4.6

- 7) The machine must travel in the pose shown in fig 3-14 when traveling up on a slope of 15° or more.

- 8) The machine should travel at low speed and in a pose shown in FIG. 4.4.8 when it is traveling down on a slope of 15° or more.

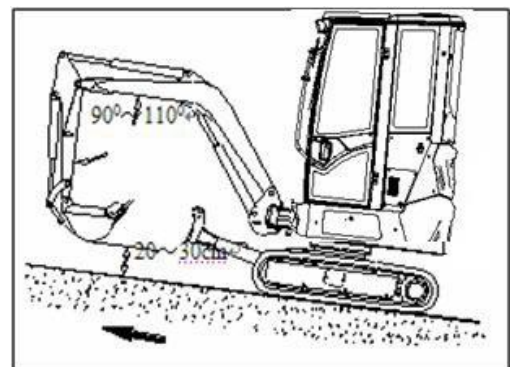


FIG. 4.4.7

**【Note】 :**

- ◇ When travelling down a slope, if the control lever returns to the neutral position, the brake will be applied automatically.
- ◇ When travelling up a slope, the arm can dig into ground to avoid slipping.
- ◇ If the machine shut down suddenly while travelling down a slope, the control lever return to neutral position, apply the parking brake, lower the dozer blade onto ground, and then start the machine.

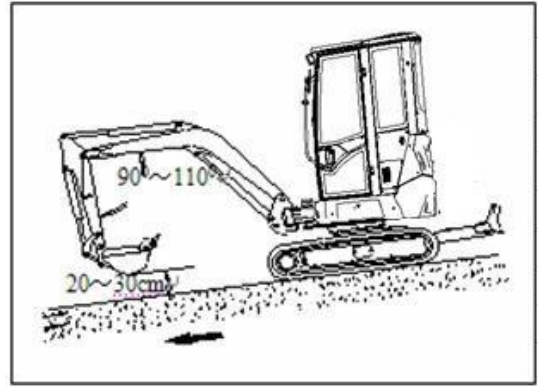


FIG. 4.4.8

4.5 EXCAVATION

4.5.1 Working Status

When digging lengthways with backhoe, make the drive wheel backward and idler forward. (as FIG. 4.5.1)

In order to guarantee safety in quarry working, make the drive wheel backward and idler forward.

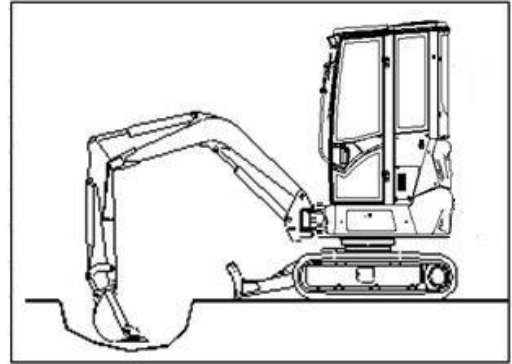


FIG. 4.5.1

Two Pilot Handles Control

- 1 — Left pilot handle
- 2 — Right pilot handle

Control with right pilot handle

Right figure is the front view of right pilot handle (when operator sits on the seat). The four movements of handle can make the excavator move as follows.

- a — Raise boom
- b — Lower boom
- c — Backhoe bucket load, or clamshell bucket load
- d — Backhoe bucket dump, or clamshell bucket dump



FIG. 4.5.2

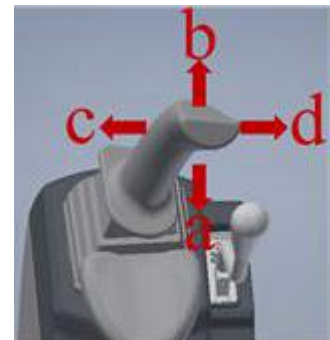


FIG. 4.5.3

Control with left pilot handle

Right figure is the obverse view of left pilot handle (when operator sits on the seat). The four movements of handle can make the excavator move as follows.

- e — Rotate upper-structure slew anticlockwise.
- f — Rotate upper-structure slew clockwise.
- g — Extend arm
- h — Retract arm

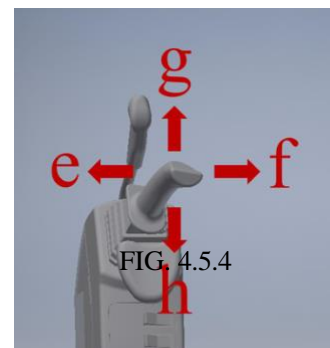
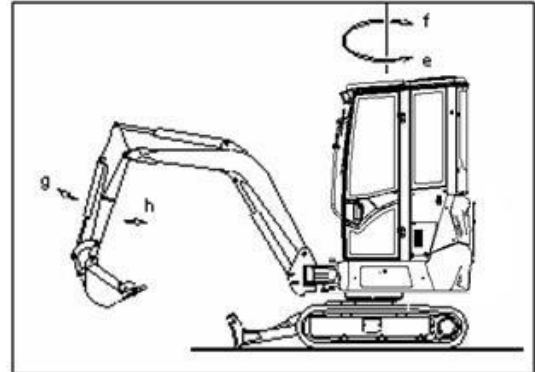


FIG. 4.5.4

4.5.2 Composite Movements of Excavator

- 1) When the machine slews, you can operate the composite movement of boom and bucket.
- 2) It can operate as follows: bucket digs while extending or retracting arm; arm digs while lowering boom, etc.
- 3) Besides the co-operation between right and left handle, pull either of the handles to any diagonal orientation (45 ° direction), can achieve the adjacent two composite movements.



4.5.3 Upper-Structure Slewing Brake

Release slewing control handle, return it to neutral position, it will bring sufficient brake power to brake the platform. While reversing the handle operation can bring more brake torque.

! **CAUTION** !

- Do not allow operation on rocks (neither hard rocks nor soft ones).
- Do not allow breaking or flat operation by slewing the machine. (e.g. break wall or flat the ground).
- Do not allow digging the bucket teeth into ground while slewing.
- Do not allow pulling the machine forward by digging bucket teeth into ground.
- Do not allow excavation by walloping or using the weight of the machine.
- Break the hard groundsill rocks into small pieces by hydraulic hammer before excavation, etc. This can prevent damage to machine and will save cost comparatively.
- During excavation, especially deep digging work, pay attention to avoid bucket teeth and boom cylinder colliding with dozer blade.
- Try your best to place the dozer blade at the rear end.
- The dozer is used for simple bulldozing work, so never dig the dozer blade too deep, or the dozer blade or even the infrastructure may be damaged.

4.5.4 Excavation Keypoints

- 1) Operator must wear safety helmet and work clothes, make sure the safety of working area before starting machine.
- 2) During digging work, the dozer blade should be placed on ground.
- 3) Other people are not permitted to stand on the machine or within the range of 6m away from working radius. When begin to work or transport with full load, operator should honk the horn to warn.
- 4) Bucket should dig along the cutting track and avoid digging hard earth constrainedly, otherwise it will cause the hydraulic oil overheated.
- 5) During work, do your best to avoid pulling the handle to the end, otherwise it will make hydraulic oil

overheated and damage components.

- 6) Slewing is not allowed if bucket has not left the working face.
- 7) It allows using arm and bucket to impel or level off rideau, but never operate side of bucket to work by slewing force.
- 8) When working at swampy ground (especially on rainy day), the excavator must be kept at a proper distance away from working face to prevent collapse.
- 9) After stopping machine, shut off all switches of control panel, shut off electric power and lock cab.
- 10) During digging work, avoid overload work to reduce energy consumption and hydraulic oil temperature.
- 11) During digging work, pay attention to the cylinder stroke end, avoid using baffle of boom, arm, and bucket to prolong the lifetime of framework.
- 12) If the productivity can satisfy the working demand, in order to prolong engine lifetime and keep low noise running, try your best not to run at maximum accelerator, the best revs of engine should be 1600-1800 r/min.
- 13) Before every shift, according to the rules, inject grease to all reaming connections through grease nozzles until the grease overflows. Otherwise it will cause axle and sleeves damage.

4.5.5 Excavator Parking

- 1) Place excavator on a horizontal ground.
- 2) Lower the bucket to ground.
- 3) Place accelerator handle on minimum load position for 5 minutes.
- 4) Turn ignition key to “OFF” position, and take out key.
- 5) Pull pilot control lever to lock position.



【IMPORTANT】

In order to protect the electrical parts in the cab, the top window and cab door should be closed after parking the excavator.

Inspection after stopping the engine

- Check the oil tank and water tank, work device, upper-structure and undercarriage, repair all the abnormal parts;
- Fill up the oil tank, this can refer to chapter “check the oil level”, and
- Clean all the paper scrapes and mud from engine.
- Remove dirt from undercarriage.
- Lock all the doors and boxes.

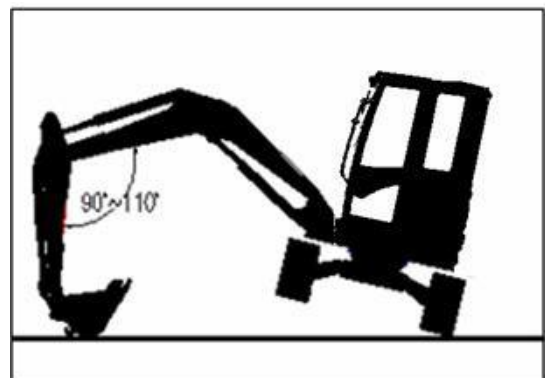


FIG. 4.5.6



【Important】 In cold weather, the excavator should be parked on hard ground to avoid crawler and ground freeze together. If freeze does happen, please lift crawler by boom, move excavator carefully to avoid damaging drive wheels.

- 8) If you have to park the machine on the slope, use other method to prevent machine from sliding.

4.5.6 Operation on Swampy Ground

- 1) Try your best to avoid traveling on swampy ground.
- 2) Clean crawler frame if the machine works on very soft ground or is stuck.
- 3) Slew upper-structure 90° and lower bucket to lift one side of crawler off ground, keep the angle between boom and arm within a range of 90°--110°, and place the bucket arc on the ground.
- 4) Turn the lifted crawler to eliminate mud.

4.5.7 Lifting One Side of Crawler by Boom and Arm



Note:

- (a) Keep the angle between boom and arm in the range of 90°--110°, and place the arc part of bucket on the ground.
- (b) Slew upper structure 90 ° and lower bucket to lift one side of crawler off ground. Don't dig into the ground with bucket teeth when the machine is in backhoe condition.
- (c) Place chock under the framework to support machine.

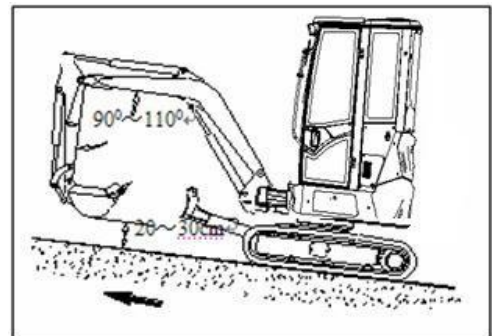


FIG. 4.5.7

4.5.8 Avoid Tilting

Avoid transverse traveling on a slope. When the machine travels on a slope, the traveling direction should be accordant with the gradient. When upgrade and downgrade, keep the bucket pointing to the traveling direction and lifted 20-30cm to the ground. Lower bucket at once if the machine is skidding or instable.



4.5.9 Operation in Water or Mud

You should note following information when operating in water or mud:

- 1) The working area should be hard enough to prevent excavator from sinking.
- 2) The water flow should be slow.
- 3) Undercarriage immersed height should not exceed chain carrier plate (roller).
- 4) Avoid immersing slewing support, inner gear ring, and slewing connector.
- 5) The rear end of machine is not allowed to be immersed into water.

When operating in these conditions, please check the excavator position often.



FIG. 4.5.8

4.5.10 Backhoe Operation

- 1) Place the bucket teeth on ground while the angle between bucket bottom and ground is 45°.
- 2) Apply arm to be the main digging force, pull bucket to the machine direction.
- 3) When mud adheres to the bucket, remove arm and (or) bucket quickly to throw dirt.
- 4) When digging a straight trench, place crawler parallel to the trench. After digging to required depth, remove machine to continue digging.



【Important】

- ◆ When lowering boom, you should avoid stopping it suddenly. Otherwise the impact load may damage excavator.
- ◆ When operating the arm, avoid lowering hydraulic cylinder to the bottom to prevent the damage of hydraulic cylinder.
- ◆ Avoid bucket colliding with the crawler.
- ◆ When digging a deep trench, avoid collide the boom or arm cylinder hose with ground.

4.5.11 Leveling Operation



【Important】 :

Don't use bucket for leveling operation too excessively. Failure to comply may result in machine damage caused by overloaded operation.

Don't push or pull earth with bucket when the machine travels.

- 1) Push dozer blade backward to fill and level road.
- 2) Apply boom, arm, and bucket generally. As the figure shows, place bucket and arm on a line basically. Operate arm in while lifting boom slowly. Once arm passes the vertical position, lower boom slowly and keep the movement of bucket plane. Operating boom, arm, and bucket at the same time enables the leveling operation more accurate.

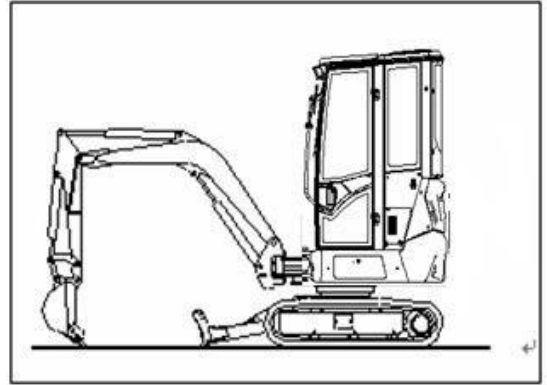


FIG. 4.5.9

4.5.12 Preventing Ground Collapse

- 1) Place traveling motor to the rear end of machine to work while the machine and the digging surface are in certain angle or perpendicular.
- 2) Don't place machine at the edge of trench or digging area.
- 3) Don't dig earth under the machine.

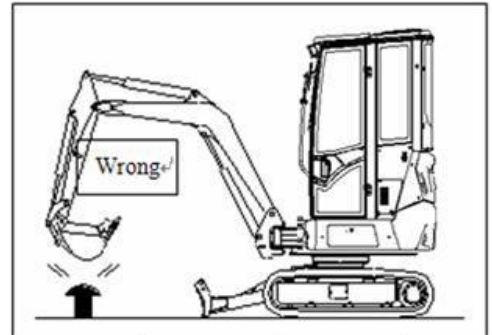


FIG. 4.5.10

4.5.13 Operation Tips

- 1) In digging work, don't let bucket collide with crawler.
- 2) Try your best to place the excavator on horizontal ground.
- 3) Don't operate bucket as a hammer or piling machine. Don't slew machine to remove blocks or to break up wall.



【Important】

In order to prevent damaging hydraulic cylinder, don't allow bucket cylinder to collide with ground or bucket tamping when the bucket cylinder is fully extended (bucket fully retracted).

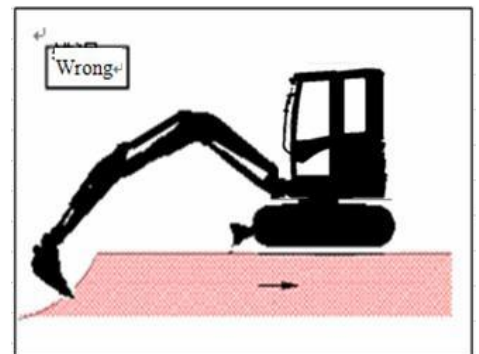


FIG. 4.5.11

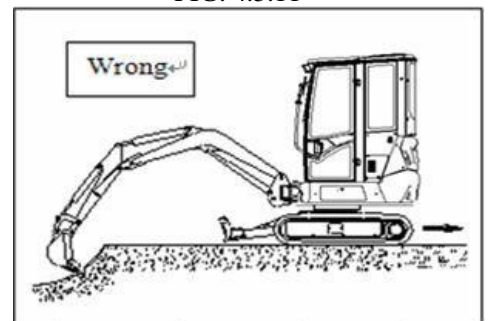


FIG. 4.5.12

- 4) Adjust the digging length and depth every time to ensure every digging is fully loaded.

Adjust the digging length and depth every time to ensure every digging is fully loaded. In order to increase throughput, full load should be the first important goal, and then the working rate.



【 Important 】 : In order to prevent damaging hydraulic cylinder, don't allow bucket cylinder to collide with ground or bucket tamping when the bucket cylinder is fully extended (bucket fully retracted)

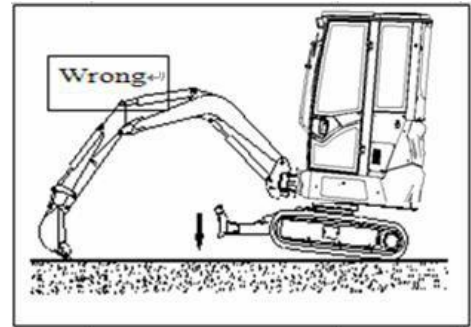


FIG. 4.5.13

The rapid circulation output of every full load of digging will be bigger than part full load.

- 5) Once trench is excavated, it can dig up rocks by raising bucket from earth.
- 6) Don't make side bucket be loaded. For example, don't level materials by swinging bucket or side impact objects with bucket.

4.5.14 Preventing Misuse of Machine

- 1) Don't treat traveling movement as additional digging force. Failure to comply may damage the machine.
- 2) Don't raise the front and rear of machine and treat the weight of machine as additional digging force. Failure to comply may damage the machine.

4.5.15 Position of Dozer Blade

Dozer Blade Operation mark:



Pay attention to the dozer blade position

- 1) When extending dozer blade, it may collide with boom cylinder or bucket, please pay attention to it.
- 2) When carrying out deep digging work, place dozer blade at rear to guarantee safety.

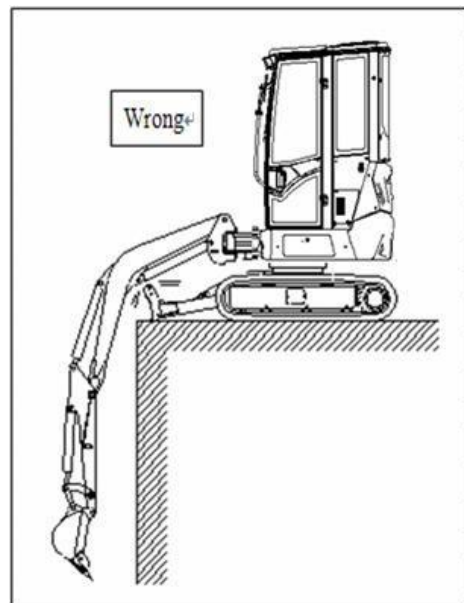


FIG. 4.5.14

4.5.16 Prevention Measurement for Dozer Blade

- 1) Don't use dozer blade to dig, otherwise it will damage dozer blade or crawler system.
- 2) Dozer blade can't support large or unstable barycenter objects, otherwise it will damage dozer blade or crawler system.
- 3) When the machine is traveling, dozer blade can't hook any object, otherwise it will damage dozer blade or crawler system.
- 4) When propping up machine with the dozer blade, the ground should be level to ensure dozer blade touch ground stably.

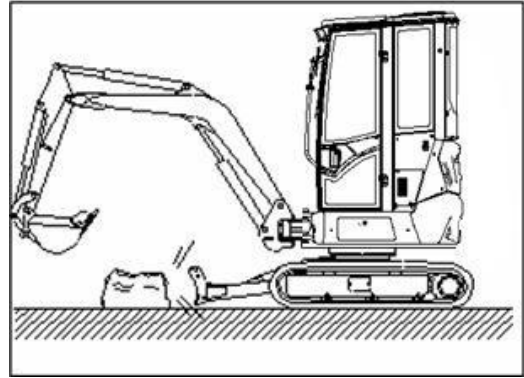


FIG. 4.5.15

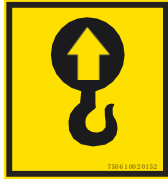
4.5.17 Be Careful when Retracting Front Working Device

Don't allow the bucket to collide with dozer blade when retracting the front working device.

4.5.18 Don't Allow Dozer Blade to Touch Roadblock

Don't allow dozer blade to touch roadblock, otherwise dozer blade, cylinder or other components will be damaged.

4.6 HOISTING WORK



Lifting hook mark:

- 1) Sling/chain should tightly bind the load, the workman should glove when bind sling/chain.
- 2) Connect sling/chain with bucket lifting ring, curled bucket and retracted arm.
- 3) Before start, uniform the hand signals with signalman.
- 4) Acquaint with the positions of all workmen in the range of work area.
- 5) Mark hand rigging on the load to ensure the people pulling hand rigging is away from load.
- 6) Try to lift the load before normal operation.
 - Park the machine beside the load.
 - Load the machine.
 - Lift load to the height of 50mm off the ground.
 - While keeping the load close to ground, move the load from the machine.
 - If there is any evidence of stability reduction, lower load to the ground.
- 7) Just lift the load to required height.

! **WARNING** !

Follow all local safety laws and regulations when the machine lifts objects.

- Don't use damaged chains, wire ropes, or cord in lifting work.
- Don't move the load suddenly, don't move load on the top of human beings, and never permit anybody to be adjacent to the load.
- Ensure everybody is away from the lifted objects until the chocks support the load or the load has been stably placed on the ground.
- Fix upper-carriage and place the travel motor at the rear.
- Don't connect sling/chain to the bucket teeth.

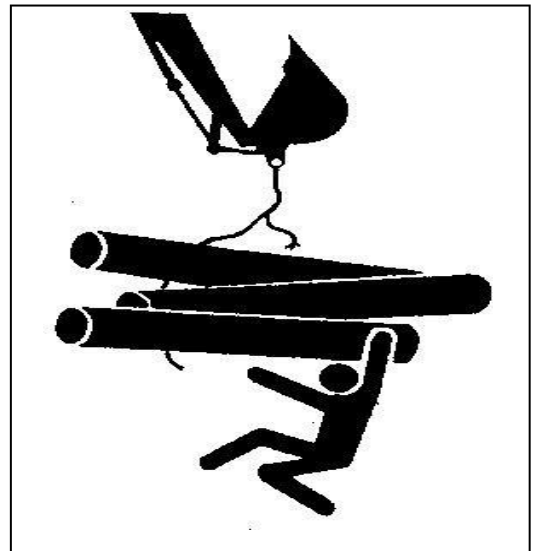


FIG. 4.5.16

4.7 HYDRAULIC BREAKING OPERATION

Hydraulic breaking operation tips...if equipped

Choose hydraulic breaker with correct dimension and weight. Consult with your dealer.

Multiple unit valve section assignment

The hydraulic pressure of section AUX (the hydraulic pressure of the breaker section) is supplied by the section four of main valve with pressure 15MPa.

Note for hydraulic breaker tube fitting

- 1) When the hydraulic breaker is out of use, cover the pipe end of arm and fit a plug at the end of hydraulic breaker hose to avoid dirt entering into system.
- 2) Ensure the stock of cover and plug in tool compartment for maintenance purpose.
- 3) Avoid dirt entering into system when changing bucket into breaker.
- 4) After connection, check the oil leakage and bolts slack condition.

Before fitting hydraulic breaker on the arm, read machine and hydraulic breaker manuals carefully, and carry out the required confirmation or inspection.

Carry out required inspection before daily operation.

- 1) Operate machine slowly, the stability of machine will be decreased because the hydraulic breaker is heavier than the bucket. Therefore, use dozer blade to support and work in front of dozer blade.
- 2) Avoid hammering work with hydraulic breaker. Never use boom or arm to break objects, otherwise it will damage machine. (as FIG. 4.7.1)
- 3) Don't move objects with hydraulic breaker, otherwise it will damage machine.
- 4) Don't operate hydraulic breaker when hydraulic cylinder piston retracts or extends fully, avoid damaging hydraulic cylinder or machine. (as FIG. 4.7.2)
- 5) If hydraulic breaker hose jumps abnormally, stop operation immediately. The pressure change of breaker accumulator or damaged accumulator will cause unusual hose jump, and damage hydraulic breaker or machine.
- 6) When retracting front attachment, don't allow the chisel of breaker to touch boom.

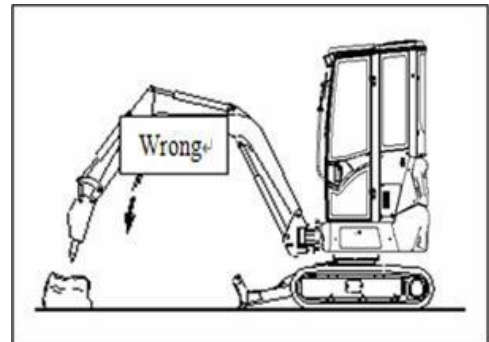


FIG. 4.7.1

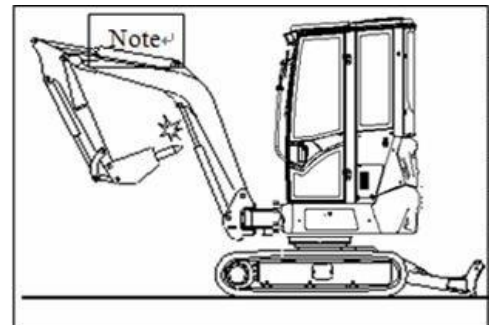


FIG. 4.7.2

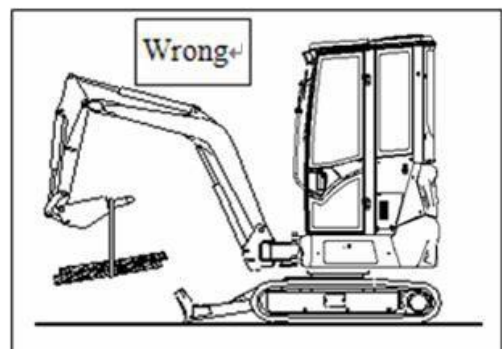


FIG. 4.7.3



- 7) Don't operate hydraulic breaker in water.
- 8) Don't lift objects with hydraulic breaker, otherwise it will cause machine tipping and (or) breaker damage. (as FIG. 4.7.3)
- 9) Don't swing upper-structure to the side of machine to operate hydraulic breaker, or the machine will be instable and thus shorten the lifetime of undercarriage.

Replacement of hydraulic oil and filter element

Hydraulic breaker operation will pollute hydraulic system and accelerate aging. You should replace hydraulic oil filter element and hydraulic oil more frequently to avoid damaging hydraulic pump and other hydraulic parts. The recommended replacement interval is shown as follows.

Replacement interval (hours)

	Excavator with hydraulic hammer breaker	Excavator with normal bucket
Hydraulic oil	500★	1000
Filter core	500★	1000


CAUTION


- The figures with mark ★ apply for excavators whose hydraulic breaker operation time is 100%. For the hydraulic breaker operation time ratio is less than 100%, the replacement interval should be as following diagram showing.
- When the machine operates hydraulic breaker continuously more than 100 hours, replace hydraulic oil filter element.

4.8 BOOM SWING

The boom swing pedal locates at the position of operator's right foot, it is used to swing boom, but the upper-structure (cab, engine, etc.) won't slew when operating this pedal.

- A. Step on foot pedal rightward ---- Boom swing rightward
- B. Step on foot pedal leftward----- Boom swing leftward

WARNING

Set the pedal to the lock position when it is not used. If not, if any controls should be touched accidentally when the pedal has not been locked, it may cause serious accidents. To lock the pedal,

Put the lock pedal on the pedal to lock them.

The figure to the right shows the maximum swing distance of boom swing from upper-structure central line.

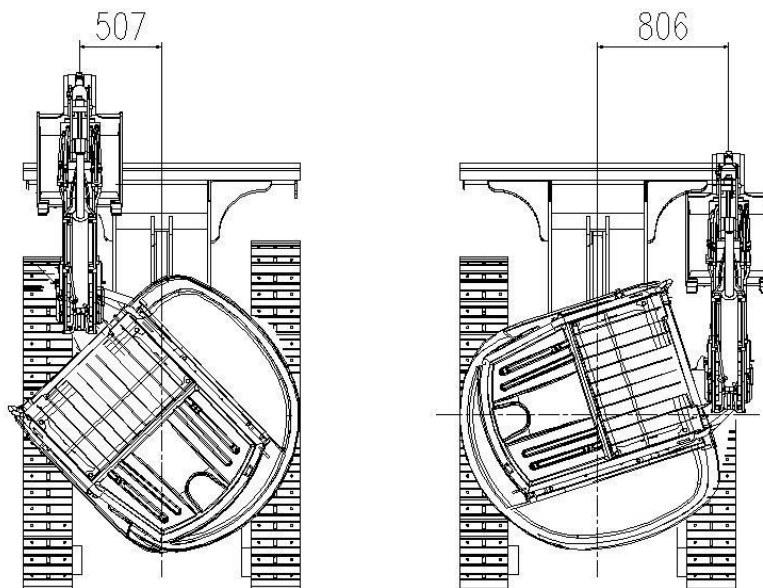


FIG. 4.8.1

5 MAINTENANCE

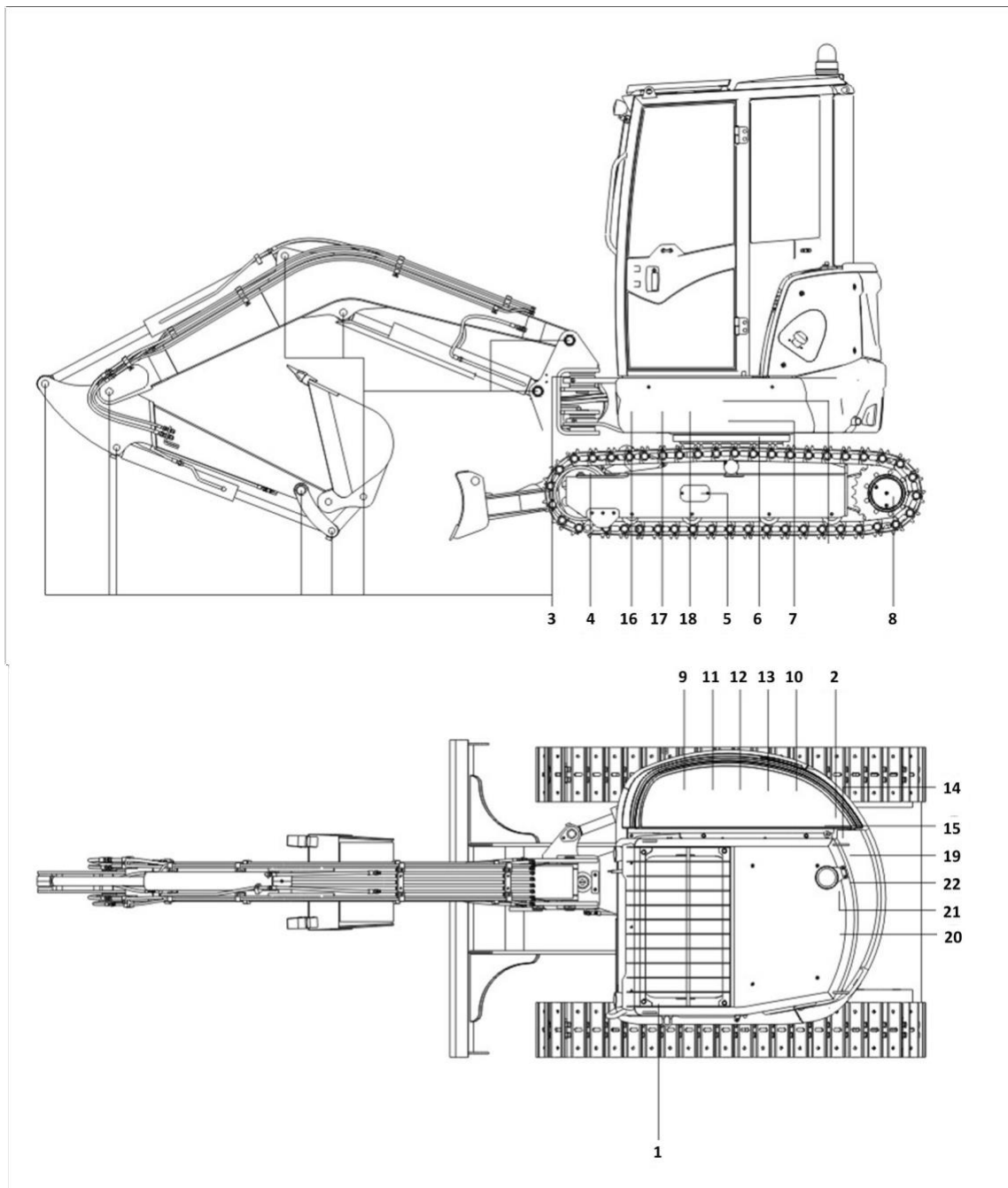
◆ Maintenance & Lubrication Chart:

No.	Items	Maintenance Interval							Places
		8	50	100	250	500	1000	2000	
1	Cluster and indicator lights	△							1
2	Battery (electrolyte)			□					1
3	Work equipment pin	□							18
4	Idler, track roller, and carrier roller							□	12
5	Crawler tension cylinder		□						2
6	Swing bearing		□						3
7	Travel motor gear oil					□	○		2
8	Hydraulic oil level	□					○		1
9	Hydraulic oil return filter						○		1
10	Hydraulic oil suction filter						○		1
11	Pilot filter					○			1
12	Air plug element				○				1
13	Radiator				△				1
14	Coolant	□					○		1
15	Fuel oil level	□							1
16	Fuel tank strainer			△					1
17	Fuel filter element					○			1
18	Engine oil , oil level		○ (Initial)		○ (2 nd time)	○			1
19	Engine oil filter		○ (Initial)		○ (2 nd time)	○			1
20	Oil-water separator	△							1
21	Air filter			△		○			1

Maintenance & Lubrication Chart:

Remark:

▲	Inspection, clean
■	Inspection & filling-up
●	Replacement



5.1 CORRECT MAINTENANCE AND INSPECTION PROCEDURE

Please read this manual carefully and learn how to maintain excavator correctly. Follow the correct maintenance and inspection procedures in this manual.

Check excavator before daily operation.

- 1) Check monitor.
- 2) Check all liquid level.
- 3) Check leakage, distortion, abrasion, and damage of hoses and pipes.
- 4) Check noise and temperature around excavator.
- 5) Check slack or loss of parts.

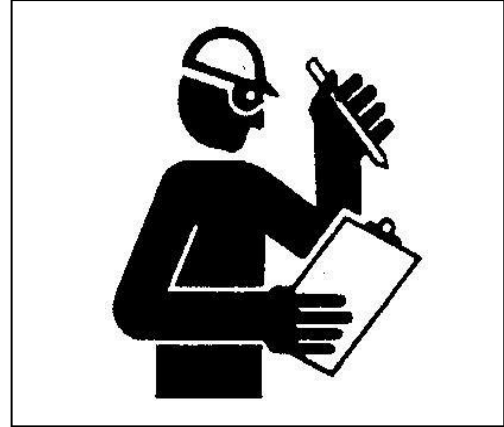


FIG.

Repair the excavator before operation if the machine has problems, or consult your dealer.

! **CAUTION** !

- Use recommended fuel, hydraulic oil and lubricant.
- Only use genuine CFG parts.
- If user doesn't use recommended fuel, hydraulic oil, lubricant and genuine CFG parts, the warranty will automatically be invalid.
- Never adjust engine rev limiter or hydraulic system safety valve.
- Avoid electric parts touching water and vapor.
- Never disassemble engine pump controller, sensor, etc.

5.1.1 Periodic Maintenance

Carry out all recommended maintenance in this manual. (in the next page)

5.1.2 Checking Hour Meter Frequently



Determine when to take regular maintenance according to the hour meter.



FIG 5.1.2

The intervals in the periodic maintenance list are based on the normal condition. If operate excavator in bad conditions, the intervals should be shorten.

5.1.3 Using Fuel and Lubricant Correctly

 CAUTION 	
Always use recommended fuel and lubricant, otherwise it will damage the machine and lose the warranty of CFG.	

5.1.4 Preparation for Maintenance

- 1) Place the machine on a hard horizontal ground.
- 2) Lower the bucket to the ground.
- 3) Operate engine at low rev for 5 minutes.
- 4) Stop engine, and take out the key from switch. (If it is necessary to maintain the machine as the engine runs, operator can't leave cab)
- 5) Pull the pilot control lever to "LOCK" position.
- 6) Before maintenance, please hang the label "DO NOT OPERATE" on left control handle.

5.1.5 Engine Maintenance

Please carry out periodic maintenance in accordance with KUBOTA DIESEL ENGINE MANUAL.

5.1.6 Periodic Replacement of Hydraulic Hose

- 1) Make sure to carry out periodic inspection of machine to guarantee safe operation. If listed parts are damaged, it may cause serious fire. Because it is difficult to judge the aging situation of these parts by vision, you should replace them at listed intervals. However, if any part is found bad in the inspection, it should be replaced before operation without consideration of intervals. Also check the hose couplers, if they are distorted, cracked or aged, replace them if necessary.
- 2) Make sure to check all hoses periodically, and replace them if necessary.
- 3) Consult your dealer about how to replace hose correctly.

Recommended periodic hose placement list

Periodic replaced parts		Replacement Interval
Engine	Fuel hose (from fuel tank to precipitator, from precipitator to oil feeding pump)	1.5 years
Main frame	Pump suction hose (from oil tank to main pump)	2 years
	Pump output hose (from pump outlet to multipurpose valve)	2 years
	Multi-way valve hose (from multipurpose valve to working device, slewing coupler, slewing motor)	2 years
	Low pressure hose (pilot hose, oil-returning hose)	2 years
Working Device	Boom cylinder hose	2 years
	Arm cylinder hose	2 years
	Bucket cylinder hose	2 years



Note: Make sure to replace seals (such as O-RING) when replacing hoses.

5.2 MAINTENANCE GUIDE

5.2.1 Adding Lubricant Grease

Parts name		Qty.	Interval (hours)						
			8	50	100	250	500	1000	2000
Each junction pin shaft of working device	Junction pin shaft of boom and platform	1	▲						
	Pin shaft on two ends of boom cylinder	2	▲						
	Each pin shaft of bucket and arm	8	▲						
	Pin shaft on two ends of dozer cylinder	2	▲						
	Junction pin shaft of dozer blade and chassis	2	▲						
Swing bearing track		1		▲					
Inner swing gear ring		1		▲					
Control lever		4	During maintenance						

Label of lubricating grease:



5.2.2 Engine Oil

Parts name		Qty.	Interval (hours)						
			8	50	100	250	500	1000	2000
1. Engine oil	Check oil level	—	△						
2. Engine oil	Replace	4.5L		○*		○*	○		
3. Engine oil filter	Replace	—		○*		○*	○		



Note: ★ means that the engine oil and engine oil filter must be replaced after the first 50 hours' operation of machine.

Please maintain as per the requirement in diesel engine manual book.

CAUTION

- The performance of engine oil is very different, commonly the engine oil adopts API or CCMC standard.
- KUBOTA engine company recommends to use engine oil .of SAE15W-40.

Engine oil specification:

Be sure engine oil being used must meet following criterion or classification.

API classification CF (or higher)

ACEA classification E3, E4, E5.

JASO classification DH-1

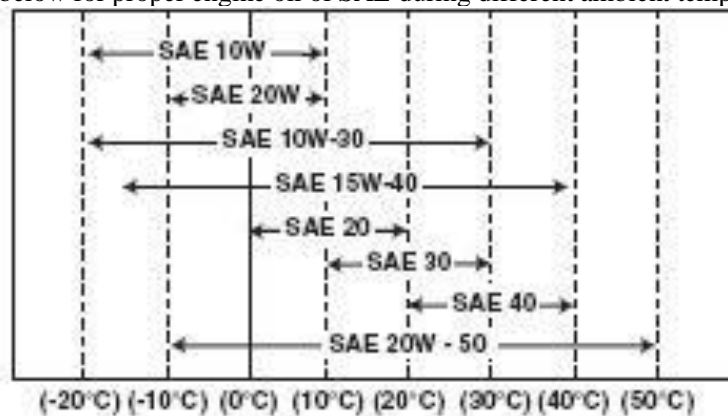
The other technical requirement for engine.

Replace engine oil, when value TBN drops to 1.0(mgKOH/g). Test method of TBN (mgKOH/g) ; JIS K-201-5. 2-2

(HCI), ASTM D4739 (HCI).

Engine oil viscosity :

Refer to viscosity fig below for proper engine oil of SAE during different ambient temperature.



Check engine oil level

CAUTION

In order to get correct value, check oil level before starting engine every day and make sure to park the excavator on level ground.

CAUTION

The reading will be imprecise if check oil level immediately after stopping machine. Make sure to cool down the engine oil at least 15 minutes before inspection.

- 1) Park the excavator on a level ground.
- 2) Take out dipstick, wipe the oil with clean cloth, and insert dipstick into engine again.
- 3) Take out dipstick again, the oil level must lie between MAX and MIN marks.
- 4) Fill engine oil through filler filter if necessary. Make sure to use recommended oil. (refer to “recommended engine oil list”)

Replace engine oil

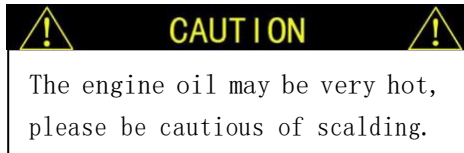
The engine oil and oil filter must be replaced after the first 50 hours' operation.

After first replacement, please carry out replacement as per <KUBOTA operation and maintenance manual >.

Replace engine oil filter...It should be changed at the first 50 hours' operation, the next two time after that change it every 250 hours, and then change once every 500 hours afterwards.

Steps for replacing engine oil and filter

- 1) Warm up engine oil before startup, but don't overheat.
- 2) Park the excavator on a level ground.
- 3) Lower the bucket to ground.
- 4) Run engine idle for 5 minutes.
- 5) Shut off engine, and take out key switch.
- 6) Pull the pilot control lever to lock position.
- 7) Take off the outlet plug, pour the oil into a 10L container through a clean cloth.



- 8) After oil is vented, check whether there is metallic chipping on cloth; If there is, technical inspection should be done to the engine, if there isn't, go to the next step.
- 9) Fit and screw down outlet plug.
- 10) Clean surrounding area of engine oil filter seat. Turn the filter cartridge anti-clockwise to remove old seals.
- 11) Clean sealed washer surface of filter seat.
- 12) Wipe clean oil on the seals of new filter.
- 13) Fit new filter, turn filter clockwise until the washer touch interface. Ensure not to damage washer when fitting filter.
- 14) Screw down engine oil filter. Remember not to make it too tight to prevent screw thread distortion or filter element seals damaging.
- 15) Open oil filter cover, and fill recommended oil in engine 15 minutes later, check whether the oil level lies within the marking range or not.
- 16) Fit filler cap.
- 17) Start engine. Run at low revs for 5 minutes.
- 18) Check whether the engine oil pressure indicator light goes out at once, if not, stop engine and check for the reason.
- 19) Stop engine, take out key from key switch.
- 20) Check whether there is any leakage at outlet plug.
- 21) Check oil level on dipstick

5.2.3 Gear Oil

Part name		Qty.	Interval (hours)						
			8	50	100	250	500	1000	2000
Swing reduction gearbox	Check oil level	—	lubricated by the hydraulic oil in the work pipeline						
Travel reduction gearbox	Check oil level	—					□		
	Replace	2X0.6-0.8L						○	

Travel reduction gear

Check oil level...every 500 hours operation

- 1) Park the excavator on a level ground.
- 2) Lower bucket to the ground.
- 3) Run engine idle for 5 minutes.
- 4) Shut off engine, and take out key switch.
- 5) Pull the pilot control lever to lock position.
- 6) Open oil level check plug, check oil level.
- 7) If necessary, fill the filler through oil ② filler hole to the level as the right figure shows.(refer to TABLE 5.2.1)

In the figure: ② is the reduction gearbox oil filler hole, ③ is the oil drainage port.



FIG. 5.2.1

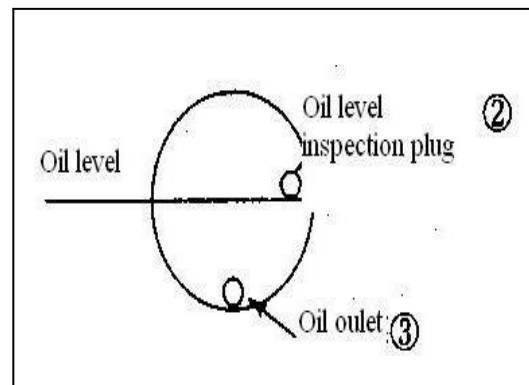
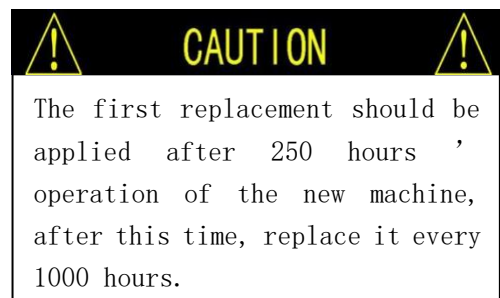
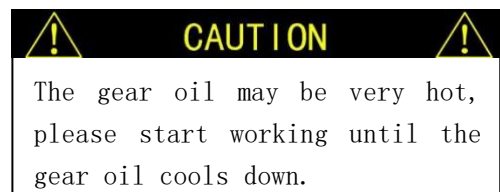


FIG. 5.2.2

Replace gear oil...every 1000 hours operation

- 1) Park the excavator on a level ground.
- 2) Lower bucket to the ground.
- 3) Run engine at low revs for 5 minutes.
- 4) Shut off engine, and take out key switch.
- 5) Pull the pilot control lever to lock position.
- 6) Take out oil drainage port plug ③, and empty gear oil.
- 7) Re-fit on oil drainage port plug.
- 8) Take out filler cap. Fill in gear oil until the oil level is equal to the oil filler hole.



5.2.4 Fuel System

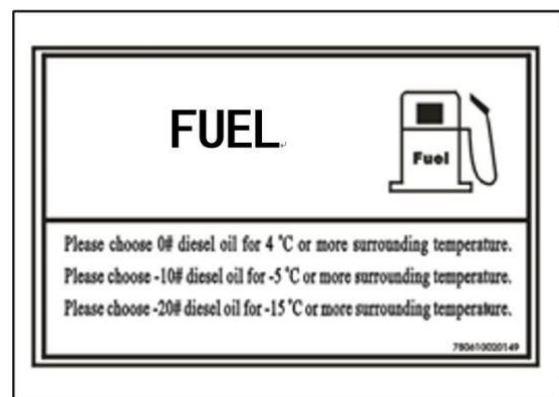
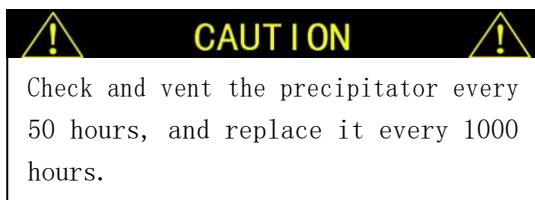
Parts name	Qty.	Interval (hours)						
		8	50	100	200	500	1000	2000
1. Vent fuel tank sediments	1	△						
2. Check and vent sediments in precipitator	1			△				
3. Vent water and sediment in water segregator	1	△						
4. Replace fuel filter	1					○		
5. Check fuel hose	Leakage, crack, etc.	—	△					
	Crack, distortion, etc.	—				△		



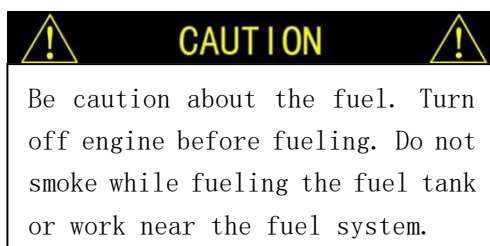
【Note】: “★” means that to check the fueling strainer every 100 hours and drain once, and change every 1000 hours.

Recommended fuel:

Please use high quality diesel fuel (GB2520 in normal condition; 10 for the winter) only, do not use kerosene.



Fueling



- 1) Refer to “stop engine” chapter, park the excavator properly and turn off the engine correctly.
- 2) Check fuel indicator on monitor, do fueling work if necessary.
- 3) Prevent any dirt, dust, water or other impurity from getting into fuel tank or fuel system.
- 4) Make sure that there is no fuel sparked onto the ground in the fueling work every day after the work in order to prevent coagulation of fuel.
- 5) Put on cap after fueling.

Vent the sediment in fuel tank..... every day

- 1) Rotate the upper-structure flat roof 90°, and park the excavator on level ground.
- 2) Lower the bucket to ground.
- 3) Run engine at low revs for 5 minutes.
- 4) Shut off engine, and take out key switch. (best before start-up)
- 5) Pull the pilot control lever to lock position
- 6) Open the vent valve on the bottom of fuel tank for several seconds, vent water and sediment. Then close the vent valve.

Check and vent sediments in precipitator...every 8 hours

CAUTION

Fuel precipitator is generally called fuel primary filter. The fuel, which comes from fuel tank, should be filled into fuel pump after being percolated through it, this can protect fuel pump.

Vent water and sediment of the separator...every day

Vent water and sediment of the segregator...every day. Shut off engine in a correct manner. Open the vent valve on the bottom of the separator. Screw the valve anticlockwise for four circles, until the valve goes down for 25mm. Vent the water in the catch basin of the filter until pure fuel flows out.

CAUTION

Exhaust the air in fuel system after venting the water.

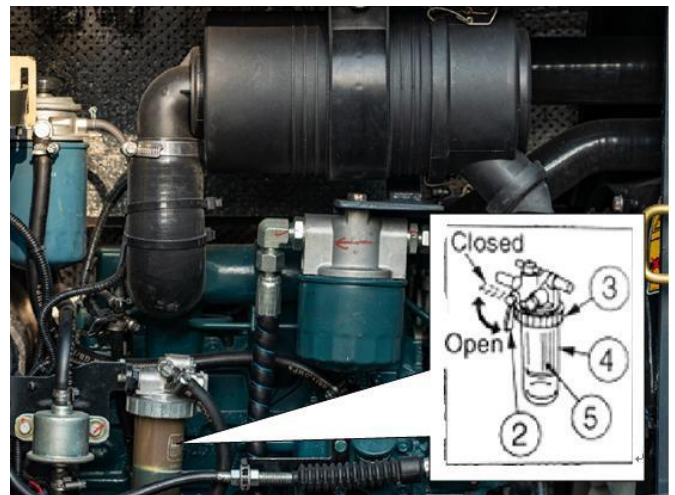


FIG.5.2.4

Replace the fuel filter...every 500 hours

- 1) Use proper container when venting the fuel to protect environment and secure safety. Do not pour the fuel on ground, into slot or river, pool and lake. Properly dispose of the scrap fuel.
- 2) Clean the surrounding area of filter. Disassemble the filter, clean the surface of the sealed washer.
- 3) Replace O ring.
- 4) Fill clean fuel into the new fuel filter and lubricate the O ring with clean oil.
- 5) Screw down the filter by your hands, but make sure not overdo it.
- 6) Exhaust the air from fuel system after replacement of the filter.

CAUTION

Over screwing will distort the screw thread and damage the sealed ring of filter core or filter shell.

CAUTION

More operation details are in KUBOTA OPERATION MANUAL.

Check the fuel hose...every day

CAUTION

Leakage of fuel will result in fire, and human accidents.

In order to prevent such danger:

- 1) Park the excavator on firm level ground. Lower the bucket to ground, stop the engine in a correct manner, and take off the key from key switch.
- 2) Check the twist wear and leakage of fuel hose. Replace or fasten the hose if any abnormality is found.(refer to the table below)

Inspection of hoses

interval (hour)	Check point	abnormality	Solution
Every day	Hose end Hoses with knitted cover	leakage wear crack	Fasten or replace replace replace
Every 200 hours	Hose end Hoses with knitted cover hose hose hose end and connector	crack crack brushfire protrusion bending distortion & eroding	replace replace replace replace (adopt proper bending radius) replace

CAUTION

Please use the genuine components of CFG only.

Exhaust air from fuel system

CAUTION

Air in the fuel system will cause start-up difficulties and abnormal operation of engine. After venting water and sediment from precipitator, make sure to exhaust air from fuel system after replacing the fuel filter or venting over the fuel tank.

Exhaust air from fuel system by pushing down the handle on fuel filter seat.

CAUTION

More operation details are in KUBOTA OPERATION MANUAL.

5.2.5 Hydraulic System

Parts name	Qty.	Interval (hours)							
		8	50	100	250	500	1000	1500	2000
1. Check hydraulic oil level	—	△							
2. Vent sediments of hydraulic oil tank	—						△		
3. Replace hydraulic oil	40L						○		
4. Clean oil suction filter	—	When replacing hydraulic oil							
5. Replace oil suction filter	—								
6. Clean oil return filter	—				△				
7. Replace oil return filter element	—						○		
8. Replace pilot oil filter	—					△			
9. Check hose and pipeline	Leakage	—	△						
	Crack and bend	—	△						

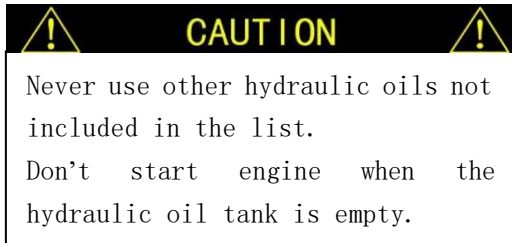
Inspection and maintenance of hydraulic device

CAUTION

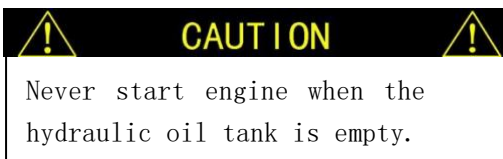
The hydraulic parts will be very hot during operation. Please remember to cool down excavator before inspection or maintenance.

- 1) Make sure to park the machine on a firm level ground when maintaining hydraulic system.
- 2) Lower bucket to ground, and stop engine.
- 3) Begin hydraulic system maintenance after parts, hydraulic oil, and lubricant have cooled down completely. The hot parts or oil are likely to fly out or spark out and cause serious damage. When removing screw plug or bolts, keep your body and face away from them. Because even if in the cooled condition, they may be pressurized.
- 4) Before maintaining hydraulic system, exhaust air of hydraulic oil tank to release pressure. Make sure to operate control lever several times to release inner pressure.
- 5) Avoid checking and maintaining the travel and slewing circuit at slope. Because even if the air in the hydraulic tank is released, it still be pressurized by the gravity.
- 6) When connecting hydraulic hoses and pipes, pay special attention to keep seals surface clean and avoid damaging them. Please remember followings:
 - Wash the interior of hoses, pipes, and oil tank with cleanser; and wipe up them before connection.
 - Use intact or non-defective O rings. Don't damage them in the assembly.

- Never distort high pressure hoses, because the lifetime of distorted hose will be shortened greatly.
- 7) Fill same brand & spec. hydraulic oil, never use different brands of oil at the same time. When delivered from the factory, the excavator has been filled up with hydraulic oil with “★”mark. Thus, the special hydraulic oil with CFG logo is recommended to use for better service. Failure to comply, our company will not provide warranty.



Check hydraulic oil level...every day

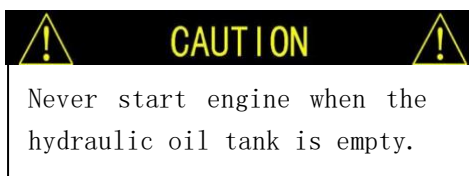


- 1) Park machine on a level ground.
- 2) Arm cylinder extracts and bucket cylinder extends completely to fix excavator.
- 3) Lower bucket to ground.
- 4) Run engine idle for 5 minutes.
- 5) Stop engine, and take out key switch.
- 6) Pull pilot control lever to lock position.
- 7) Open right side door, check oil level meter. The oil level should be between marks. Otherwise you should fill oil.

Fill oil:

- 1) Screw anticlockwise and open screw cover on the top.
- 2) Fill oil through filter netting, and check oil lever meter again.
- 3) Screw down cover.

Vent hydraulic oil tank sediment...every 1000 hours



- 1) For easy access, rotate upper-structure 90°, and park the machine on level ground.
- 2) Lower bucket to the ground.
- 3) Run engine idle for 5 minutes.
- 4) Stop engine, and take out key switch. (before start-up)

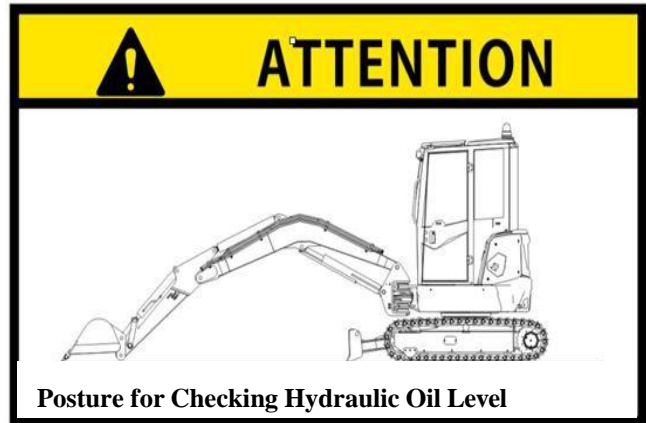


FIG. 5.2.5

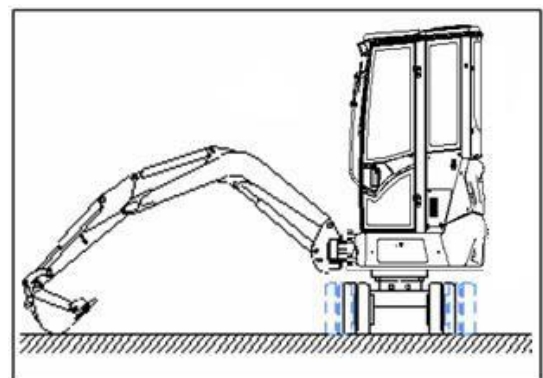


FIG. 5.2.6

- 5) Pull pilot control lever to lock position.

CAUTION

Don't loosen vent plug before oil cools down, the hydraulic oil may be hot enough to cause scald.

- 6) Keep your body and face far away from oil outlet plug.
- 7) Loosen vent plug at the bottom of hydraulic oil tank after oil cools down, vent water and sediments.
- 8) Screw down vent plug after water and sediments have been vented.

Replace hydraulic oil...every 1000

Clean oil suction filter element, oil return filter element

...when replacing hydraulic oil

WARNING

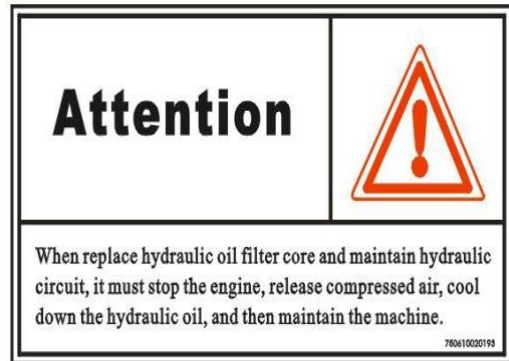
The hydraulic oil may be hot, cool it down before operation.

- 1) For easy access, rotate upper-structure 90°, and park the machine on level ground.
- 2) Arm cylinder extracts and bucket cylinder extends completely to fix excavator.
- 3) Lower the bucket to ground.
- 4) Run engine at low revs for 5 minutes.
- 5) Stop engine, and take out key.
- 6) Pull pilot control lever to lock position.

CAUTION

Before screwing the screw plug, or separating the oil pipe, stand at the side of the part, screw it slowly to release pressure, and keep your face and body away from the screw plug.

- 1) Release oil vent plug ③ at the bottom of hydraulic oil tank by spanner to vent the oil. And fill the scrap oil into some kind of container.
- 2) Release the rubber hose connecting oil return hole flange ② and oil sucking hole flange ④.
- 3) Remove the oil return hole flange ② and oil sucking hole flange ④.



CAUTION

The replacement interval of hydraulic oil is different with its specification. (Refer to the table 5.2.3 of recommended hydraulic oil).

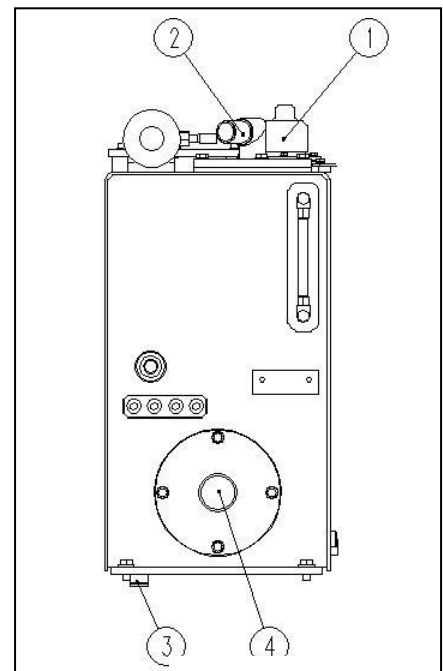




FIG. 5.2.8

- 4) Remove the oil suction filter element and oil return filter element.
- 5) Clean the interior of oil suction filter element and oil tank, if change filter, fit new filter on the flange.
- 6) Connect the clean filter element (or new filter element) with their connect flange, fasten the fuel tank, then connect the rubber hose.
- 7) Clean, fit on, and screw down oil outlet plug ③.
- 8) Fill the new clean hydraulic oil from point ① to the oil tank. Keep the oil level reach the position between the marks of oil level meter.
- 9) Screw down screw plug ① of filter.



Exhaust air

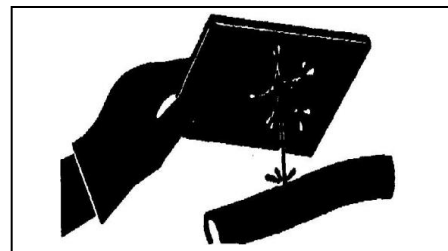
 CAUTION 
<p>After the replacement of hydraulic oil, exhaust the air from hydraulic circuit and hydraulic device. If this work has not been properly done, it may cause damage to the hydraulic devices.</p>

- 1) Release exhaust plug of hydraulic pump.
- 2) Once hydraulic oil overflows from the exhaust plug plug, screw the plug down immediately.
- 3) Start engine and run it idle for 10 mins.
- 4) Idle the engine, make all hydraulic cylinders do incomplete stroke extending & retracting operation for four or five times.
- 5) Run engine at high speed, make all the hydraulic cylinders do incomplete stroke extending & retracting operation for four or five times.
- 6) Idle the engine again, extend or retract all hydraulic cylinders fully for four or five times.

Check the hoses and pipes...every day

...every 200 hours

 CAUTION 
<p>The jets of high pressure liquids can penetrate skin and cause serious damage.</p>



Inspect leakage with a cardboard, pay attention to protect your hands and body not touching high pressure liquids. If accident occurs, see the doctor at once. Any liquids penetrated in skin must be cleaned within a few hours. Otherwise it will cause necrosis.

! CAUTION !

The leakage of hydraulic oil and lubricant can cause fire and damage of human body, in order to prevent this danger:

- Park the excavator on a firm level ground.
- Lower the bucket to ground.
- Idle the engine for 5 minutes.
- Stop the engine in a correct manner and take out the key from key switch.
- Put pilot control lever to LOCK position.
- Check the twist, the wear between other parts, leakage of fuel hoses. Replace or fasten them immediately if there is any abnormality. (Refer to the table below)
- Fasten loosened clamp, hose, pipeline and flange bolt of oil cooler, repair or change the damaged or lost one. Don't bend or collide the high pressure pipe. Never install bended or damaged hoses and pipeline.

Hose inspection

Interval hour	Check point	Abnormality	Solution
Every day	Hose surface Hose end Connector	leakage leakage leakage	replace replace fasten or replace hose or O ring
Every 200 hours	hose surface hose end hose surface hose surface hose hose hose end and connector	crack crack out coming of enhanced material parts protrusion bending distortion and eroding	replace replace replace replace replace replace(adopt proper bending radius) replace

! CAUTION !

Please use the original components of CFG only.

5.2.6 Air Filter

Parts name		Qty	interval (hour)						
			8	50	100	250	500	1000	2000
1. Air filter element	Clean	1			△		○		
	Replace	1	After 5 times clean or 1 year operation						
2. Air filter and connecting pipes between engines	Check seal		△						
	Replace		Replace immediately when crack or leakage is detected						

Clean air filter element...

every 100 hours or clogging indicator light comes on.

Replace outer and inner filter element...

every 5 times clean or 1 year operation.

! CAUTION !

- Only clean air filter at scheduled time to prevent dust entering engine.
- Also check airproof and fixation termly of elastic joint between engine and air filter. Because the engine, muffler, radiator, hydraulic oil pipe, glide components and many other parts of the machine may still hot, touching may cause scald.
- Shut off engine and cool the machine down before inspection and maintenance.
- Wear proper protective equipment when operating compressed air, such as blinkers and light filter mask, metal scraps or other objects may cause damage to human body.



FIG.5.2.10

- 1) Park excavator on level ground.
- 2) Lower bucket to ground
- 3) Idle the engine for 5 minutes.
- 4) Stop engine, and take out key switch.
- 5) Pull pilot control lever to lock position.
- 6) Open engine cover.
- 7) Release the lock catch ⑤ and take out the dust collection cup ⑥.
- 8) Clean the interior of the dust collection cup ⑥

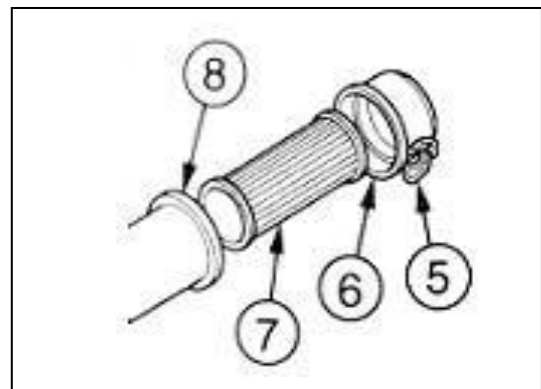


FIG.5.2.11

- 9) Take out the filter element ⑦.
- 10) Cover the back ⑧ of the casing of the air filter with cloth or adhesive tape to avoid the entering of dust.
- 11) Clean the interior of the casing ⑧.
- 12) Use dry compressed air whose pressure is lower than 686kPa to clean air filter element ⑦, first, blow along the flute of interior of the filter element, then blow from outside, finally blow from the interior.

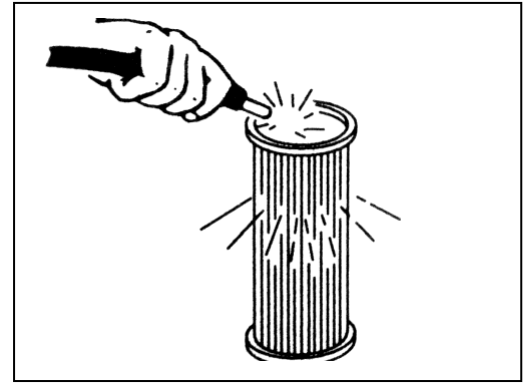


FIG.5.2.12

CAUTION

Decrease pressure of compressed air, keep other people away from operation site, beware of flying debris and wear personal safety implements.

- 13) Light a lamp in the filter element, check the filter element ⑦, replace it immediately whether any hole or spot is detected.
- 14) Remove the cloth or adhesive tape of step 10.
- 15) Install filter element ⑦.
- 16) Install dust collection cup ⑥, keep the “TOP” mark up, then lock the lock catch ⑤.

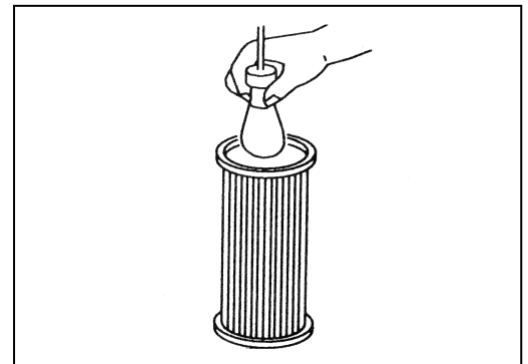


FIG.5.2.13

Connection pipeline between air filter and engine

Check seal...every day

Replace...When pipeline has crack and air leakage

CAUTION

If bad seal or crack occurs on connection pipeline, dirty air will enter and damage engine.

5.2.7 Cooling System

Parts name	Qty	Interval (hours)						
		8	50	100	250	500	1000	2000
1. Check cooling water level	1	△						
2. Check and adjust fan belt tension	1		※1	△				
3. Replace cooling water	-						△	
4. Clean radiator and hydraulic oil cooler core	interior	1			△※3			
	exterior	1	When replacing cooling water					

! CAUTION !

- Only maintain in the first inspection.
- When the machine is delivered, 30% of antifreezing fluids has been filled in the cooling system.
- Operate the machine at dusty areas, maintenance interval should be shortened.

Antifreeze:

If the air temperature is below 0°C (32°F), add antifreeze and soft water to the cooling system. In general, the ratio of antifreeze should be between 30% and 50%.

If the ratio is less than 30%, the cooling system will be rusted; if the ratio is more than 60%, the engine will be overheated. Use 50% water and 50% glycol antifreeze, the engine can operate at the -37°C perennially.

! CAUTION !

- Antifreeze is poisonous, if ingested, will cause serious injury or death. In case of drinking it by accident, you should lead vomiting and go to hospital at once.
- Ensure storing the antifreeze with container, which has been sealed with cover or has obvious mark, the antifreeze should be stored at the place that children can't get.
- If the antifreeze splashes into eyes by accident, wash eyes 10 to 15 minutes with water, and then go to hospital at once.
- Obey all the regulations when storing or throwing away antifreeze.

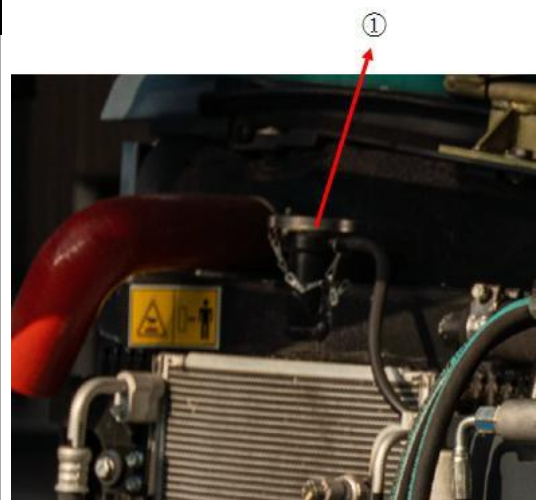


FIG.5.2.14

Check cooling water level...every day

CAUTION

Before the system cools down, don't loosen water filler cover ① of radiator. Screw off the cover slowly, release all the pressure before removing the cover.

When engine is running, the cooling water level should reach the lower surface of flume neck. If the water level is lower than the lower surface, add cooling water to water tank.

Check and adjust fan belt tension

Every 100 hours (the first check should be after 50- hour operation)

CAUTION

Slack fan belt may cause insufficient power of battery, engine overheat, and quick & abnormal belt abrasion. On the other hand, over tighten the belt will damage bearing and belt.

CAUTION

Don't check, test, and replace belt when engine is running.
Mount new belt, run engine at low revs for 3-5 minutes, adjust tension again to ensure the new belt is perched correctly.

Press the belt with thumb at the middle point between strap wheels and crank, if the press is 58.8N (6kg), the maximum flexibility should be 10mm.

Visually check the damage, crack, and abrasion of belt. If there is any ill evidence, change the belt.

Clean radiator and oil cooler element

Exterior.....every 250 hours

Interior.....every 1000 hours

- Open radiator repairing door and hood cover.
- Use compressed air (less than 0.2MP) or water to clean or wash the radiator of oil cooler.

CAUTION

- Use low pressure compress air (less than 0.2MP) to do clean work, be aware of flying claps, wear individual protect equipment, including eye protection items.
- When working in the dusty environment, check the sundries and blocking of radiator, oil cooler and condenser core.

Replacement of coolant every 1000 hours



Warning】 :

- Before this operation, please shut down the engine and cool down the machine.
- Touching the parts may cause scald after stopping the engine just for a while, because the machine body, muffler, radiator and other parts are in a high temperature.

- The engine coolant is in the condition of high pressure and high temperature. Be careful to screw off the radiator cover and drain plug to avoid injection of high pressure coolant with high temperature.
- If maintenance is necessary when engine is running, two personnel cooperation is required. One person maintains the machine and the other one sits in the operator' s position.
- Keep body and clothes away from running parts when maintenance.
- Standing in the rear of the excavator is very dangerous as for a sudden move. Thus, never stand in that position.
- Don' t remove the radiator cover or water drain plug before engine coolant cools down.

- 1) Open the engine right cover.
- 2) Loosen the radiator box cover, release the press in radiator.
- 3) Loosen the water venting plug ① to vent the coolant into some kind of container.
- 4) Screw down the water venting screw plug ① and add some cleanser and water, fill the radiator water tank with water. This job may take some time. Please use the cleanser under the instruction on this manual.
- 5) Start the engine, ide it for about 30 minutes. Pay attention to the cleanser level and add water if the level goes down after start-up for 5 minutes.



① FIG. 5.2.15

- 6) Shut off engine and vent all the cleanser.
- 7) Screw down the water venting plug ①, add water, start engine and run idle for 10 minutes, then shut off the engine and vent all the water.
- 8) Repeat the hereinbefore cleaning work until the water is clean.
- 9) Screw down the water venting plug ①and add new coolant till the appointed height after clean job.
- 10) Start engine and run it idly, exhaust air, shut off engine after the coolant level is stable and stay at the appointed height.
- 11) Check the coolant height, then screw down the water tank cover.

5.2.8 Others

Parts name	Qty	Interval (hours)						
		8	50	100	250	500	1000	2000
1. Check bucket teeth for abrasion and looseness	—	▲						
2. Replace bucket	1	When necessary						
3. Control lever lubricant		When necessary						
4. Check track sag	2		▲					
5. Replacement of rubber track	2	When necessary						
6. Clean track mechanism	—	When necessary						
7. Bolt & nut tightening torque		When necessary						

Check bucket teeth...every day

- 1) Check the abrasion and looseness of bucket teeth. 2
-) Replace the seriously abraded teeth.
- 3) The replacement procedures :

! CAUTION !

To prevent injury caused by flying off metal scrap, wear goggles or safety glasses.

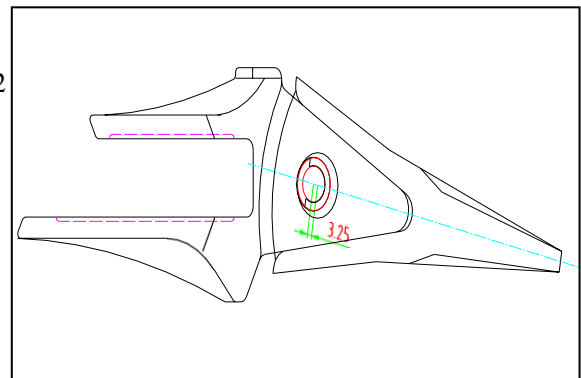


FIG. 5.2.17

- Take out lock pin ① with a hammer and punch. When disassembling the lock pin, be careful, do not damage elastic steel ring ②.
- Dismantle teeth, check the damage of lock pin ① and elastic steel ring ②, replace them if necessary.
- Clean the protruding seat surface.

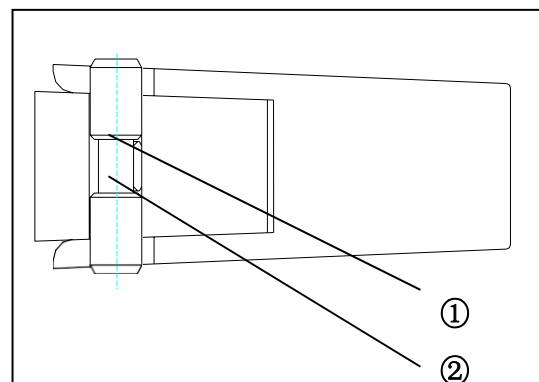


FIG. 5.2.16

! CAUTION !

Various buckets may use various teeth assembly.

- Fit the lock pin into the hole completely as instructions.
- Check the bucket teeth at regular interval to ensure the abrasion, don't exceed the scheduled limitation.

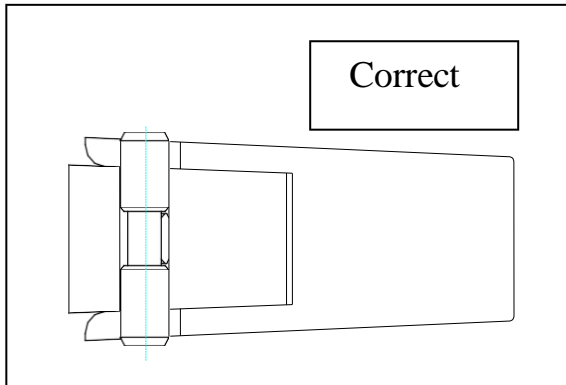


FIG.5.2.18

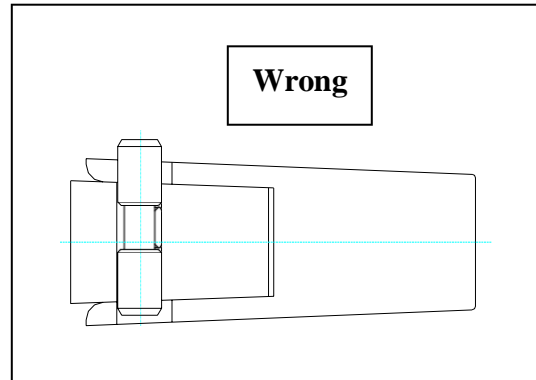
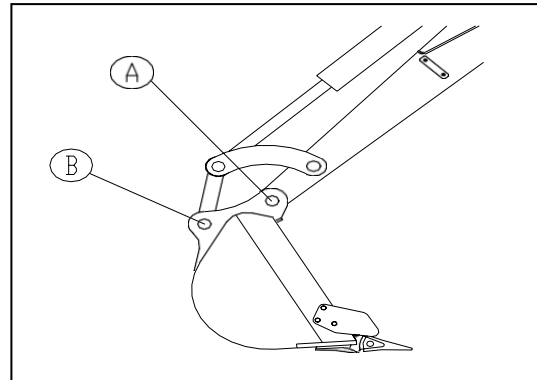


FIG. 5.2.19

Replace bucket

! **CAUTION** !

To prevent injury caused by flying off metal scrap when beating the connection rod in or out, wear goggles, safety glasses or other safety instrument.



- 1) Park machine on the level ground, lower the bucket to the ground and place its plane surface on the ground. Ensure the bucket won't roll after pins are removed.
- 2) Remove the orientation pin at the clip spring exterior and take out orientation pin.
- 3) Remove bucket pin A and B, separate arm and bucket.
- 4) Clean orientation pin, pin and holes, daub sufficient lubricant to them.
- 5) Calibrate the arm and new bucket, ensure the bucket will not to roll.
- 6) Fit pin A and B, and fit corresponding orientation pins and new clip springs.
- 7) Adjust bucket connection clearance of pin A and B. Guarantee the unilateral clearances between bucket and connection rod, and between clearance bucket and arm are from 0.25mm to 0.7mm, the clearance between pin and bucket should be as little as possible. Use adjusting gasket to adjust the middle clearance.(use the same amount of gasket at both sides)
- 8) Grease pin A and B.

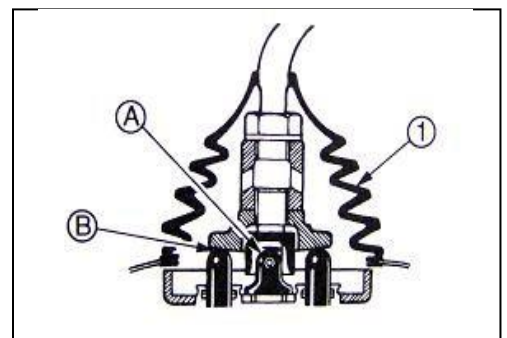


FIG5.2.21

Lubrication of control lever

WARNING

To prevent injury caused by flying off metal scrap when beating the connection rod in or out, wear goggles, safety glasses or other safety instrument.

Add some lubricant to the control lever and pedal if they cannot move smoothly.

A. Control lever

- 1) Disassemble the low part of the rubber dustproof cover of the operation lever, turn over it upward.
- 2) Clean the aging lubricant and add new lubricant.
- 3) Reinstall the rubber dustproof of control lever.

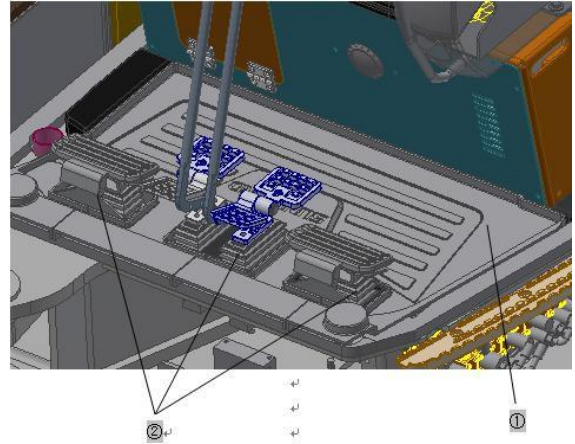


FIG. 5.2.22

B. Travel control lever

- 1) Remove rubber mat ①.
- 2) Loosen the bolt, disassemble cover ①.
- 3) Disassemble rubber dustproof ②.
- 4) Use doper to add lubricant to lubricant nozzle ③.
- 5) Clean the overflowed lubricant.
- 6) Fit the cover and rubber mat in the reversed order of disassembly operation.

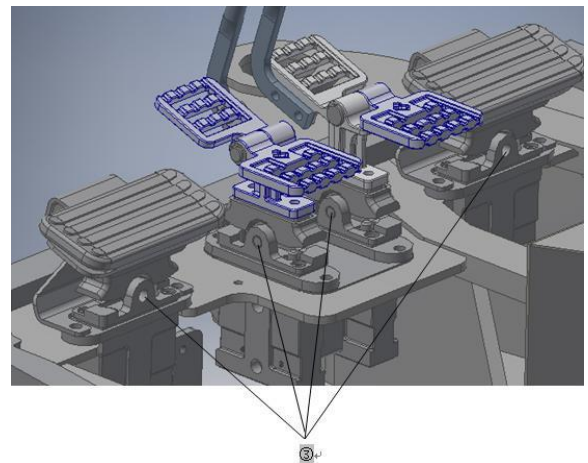


FIG. 5.2.23

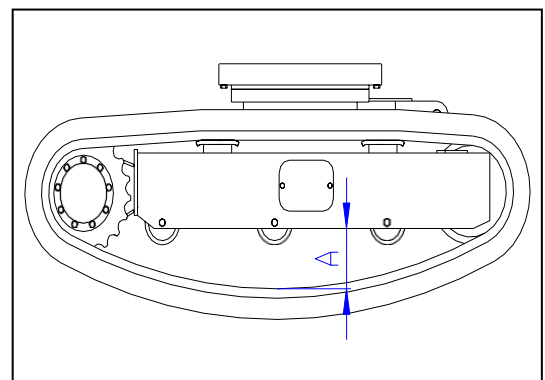


FIG. 5.2.24

Check track sag

...every 50 hours (or when necessary)

! WARNING !

- Please use wood block, jack or other firm and stable supporter to lift the machine. Never work while there is not enough support of the machine, especially when the hydraulic cylinder is working.
- There is pressure grease in the track tightening mechanism, the grease pressure relief valve may fly out and cause damage if you do not operate as the follow procedures.
- Slowly screw off the grease pressure relief valve.
- Never let your body, face, legs or arms be exposed in front of the grease pressure relief valve.
- Two men are needed when checking the track tension, one operates the excavator to lift the track of one side, the other one measures the dimension, you must pay more attention to prevent the sudden movement of the machine. Warn up the engine before the checking work and park the machine on a level ground, and use stoppers if necessary.

A. Inspection

- 1). Slowly operate the control valve, use the operation device and dozer blade to lift the machine.
- 2). Check the center under surface of the track frame and the clearance of the up surface (A), the clearance should be within following range: A 65~70mm.

! CAUTION !

If there is too much dirt, dust or other things on the undercarriage assembly, you may get an incorrect measure result, so you must clean the undercarriage before the measuring work.

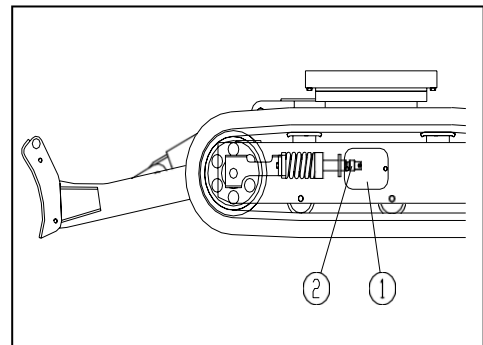


FIG 5.2.25

B. Adjustment
Increase tension power

- 1) Take off cover ①.
- 2) Use grease gun to inject grease into grease pressure relief valve ② through grease nozzle.
- 3) Check the track tension.

Decrease tension power

- 1) Take off cover ①.
- 2) Slowly screw off grease pressure relief valve ② to release grease. If there are any difficulties when adding the grease, move the machine forward or backward.

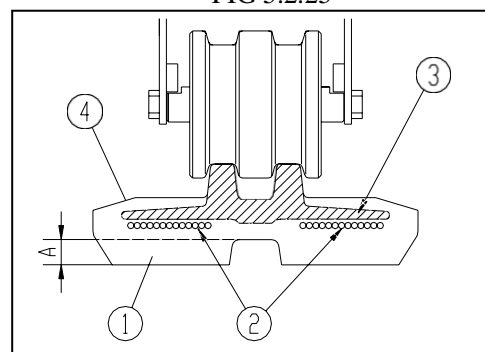


FIG. 5.2.26

- 3) Screw down grease pressure valve ②.
- 4) Check the track tension.

Replace rubber track

Check the rubber track and repair or replace them immediately when following conditions appear. And contact the CFG dealer for repair or replacement.

- 1) If the track has been pulled longer and cannot recover, it should be replaced immediately.
- 2) If the dummy club ① is lower than 5mm, replace track.
- 3) If more than 2 of the steel wire core ② have exposure, replace track.
- 4) If half of the steel wire core ② has broken, replace the track.
- 5) Replace the track if only one of the iron core has desquamated.
- 6) Replace track when rubber track has a more than 60mm long gap.

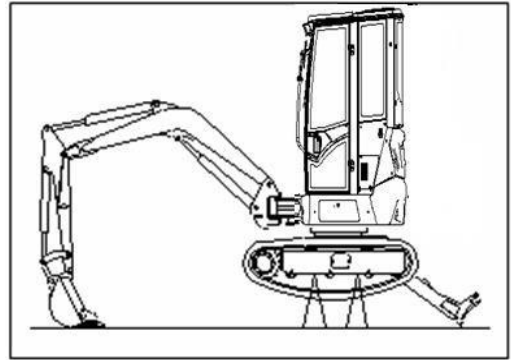


FIG. 5.2.27

A. Disassembly

- 1) Completely loosen the tightened track.
- 2) Slowly operate the control lever, use the operation device and dozer blade to lift the machine, and use other firm and stable objects to support the machine.
- 3) Insert a steel pipe into the gap between rubber track and the track frame, slowly reverse the sprocket wheel until the steel pipe is near the guild wheel and rubber track leaves the guild wheel to a certain height.
- 4) Slide the rubber track to the side of machine to disassemble it. Both of the two tracks can be disassembled following this schedule.
- 5) Disassemble the other track with the same procedures.

B. Installation

- 1) Slowly operate the control lever to lift the machine with control device and the dozer blade, then use some wood blocks, a jack or other firm subjects to support the machine.
- 2) Install the rubber track on the sprocket wheel.
- 3) Insert a steel pipe into the gap between the rubber track and the track frame, slowly reverse the sprocket wheel until the steel pipe is near the idler and rubber track has left the idler for a certain height.
- 4) Slide the rubber track to the inboard of the machine, get the track, sprocket wheel and guild idler in mesh and take out the steel pipe.
- 5) Check the rubber track and ensure that it is in mesh with sprocket wheel and idler.
- 6) Tighten the rubber track with tightening mechanism until it reaches the standard tension.
- 7) Install the other track with the same method.

Clean the track

! **CAUTION** !

- Stop machine and clean it immediately when it is very dirty.
- Any dry and firm dirt or freezing dirt will cause damage to the track mechanism and shorten its service life.

- 1) Lift the track on one side of the machine and firmly support it before cleaning the machine.
- 2) Clean all the sand grains and dirt in the idler slide way.

Bolt & nut tighten torque

(ISO10.9 intensity standard certificated)

- 1) If no special request, considering the screw down moment of the bolt and nut refers to the following table.
- 2) Don't use the moment in the following table when assembling plastic caps, or the cap may be broken. Contact the CFG dealer or after service department for help when doing this.
- 3) Use standard pieces of bolts and nuts in the same specification for replacement.
- 4) Alternately screw down the bolts and nuts (up/down/left and right), or screw it 2-3 times to ensure enough tension.

Screw thread	Spanner specification (mm)	Screw thread specification	Torque (N.m)
Thick screw thread	10	M6×1.0	9.8±0.5
	12,13	M8×1.25	22.6±1.1
	14,17	M10×1.5	47.1±2.4
	17,19	M12×1.75	83.4±4.1
	19,22	M14×2.0	134.4±6.7
	22,24	M16×2.0	207.9±10.4
	27,30	M20×2.5	410.9±20.5
Thin screw thread	12,13	M8×1.0	24.5±1.2
	14,17	M10×1.25	50±2.5
	17,19	M12×1.5	87.3±4.3
	19,22	M14×1.5	135.3±6.8
	22,24	M16×1.5	220.6±11
	27,30	M20×1.5	452.1±22.6

5.2.9 Maintenance in Special Situation



Operation condition	Maintenance
In mud, water or rain	<ol style="list-style-type: none"> 1. Inspect the loose and lost of connector, bolts and nuts, obvious damage and leakage. 2. Clean mud、stone、sand grain on the machine, check the damage、crack and loose of jointing after work. 3. Carry out everyday lubrication and maintenance. 4. Clean concerned parts with water after working in acid rain or corrosive chemical materials.
On the sea	<ol style="list-style-type: none"> 1. Inspect all the screw plugs and make sure that all of them have been screwed down. 2. Clean the machine carefully to remove all the salt on machine and maintain the wiring frequently to prevent possible cauterization.
On dusty or hot condition	<ol style="list-style-type: none"> 1. More frequently clean the air filter element. 2. Wash the radiator and oil cooler cooling fin to remove dust and dirt. 3. More frequently clean the fuel sucking filter and its core. 4. Termly carry out clean maintenance, especially the surface of the engine and generator.
On the stony ground	<ol style="list-style-type: none"> 1. Carefully operate the machine. Check if the undercarriage and track assembly are over damaged or worn. 2. Check for the loosen、damaged and lost connector、bolts and nuts. 3. More frequently check the over damaged and worn bucket and breaker. 4. Install a top frame and front frame if necessary to prevent damage caused by fallen subjects.
In cold weather	<ol style="list-style-type: none"> 1. Use high quality, low glutinosity oil, which fit the environment temperature. 2. Make sure to use the antifreeze, which fit the temperature. 3. Charge the battery a little bit before the usual time. If the battery is not completely charged, the electrolyte may be frozen. 4. Clean all the dirt on machine to prevent possible damage caused by frozen dirt.

5.2.10 Protection for Long-Term Storage

If the excavator needs to be stored for over 1 month, the following protection should be adopted to maintain its function during the store period.

Protection for long term store

Maintenance	Details
Clean machine	Completely clean the machine, fix any malfunction.
Add lubricant oil and grease	Check the lubricant to find if it is dirty or insufficient. Add lubricant to the parts, which need this. And apply a layer of oil.
Battery	Take off the battery and charge it then restore it.
Coolant	Add antirust. Add antifreeze if it is possible to be frozen; or vent out all the coolant, and hang a label: "No water in radiator" in the cab.
Dustproof and moistureproof measure	Store the machine in a dry garage and cover it.
Tools	Inspect and repair it after stored.
Lubricant operation—run at low speed without load for a few minutes	If the oil layer is damaged, the part is likely to rust, and cause some abnormal wear. Start the machine once per month at least to prevent this situation and check the liquid level of coolant and lubricant.


CAUTION


- "Lubricant operation" means to warm up the machine and repeat the operation of a series of traveling, rotation and digging for 2-3 times.
- The lubricant oil and grease will become aging. Therefore, carry out inspection before operating the machine every time.

5.2.11 Air Conditioner Maintenance

- (1) Use compressed air to wash heating core surface termly (half a year ~ one year) according to work environment.
- (2) Inspect air conditioner for hot water pipe and wiring harness termly to prevent abrasion, scald, over bend and connector loose.





5.2.12 Attached Table

Table 5.2.1 CFG Recommended Oil

Oil	Oil type and specification
Engine oil	Engine oil SAE CI-4 15W-40
Gear oil	Power train oil GL-5 80W-90 (CFG genuine)
Hydraulic oil	Hydraulic oil L-HM46 anti-wear (CFG genuine)
Coolant	Non-Amine Engine Coolant (FD-2B HEC-II-40) (CFG genuine)
Lubricating grease	2# EP lithium base grease

6. TROUBLESHOOTING

If malfunction occurs, stop machine immediately, analyze the reason and adjust or repair the machine as following methods, objects and order.

 CAUTION 
Only authorized people can disassemble and repair the hydraulic parts, please consult with manufacturer if mentioned works is necessary.
 CAUTION 
The malfunction reason and repair manner of the engine, please refer to the KUBOTA OPERATION MANUAL.

Malfunctions and Solutions

Malfunction	Possible Causes	Solutions
Noisy hydraulic pump and vibratory pipeline	<ol style="list-style-type: none"> 1. Hydraulic malfunction. 2. Air bubble in hydraulic system. 3. Aging hydraulic oil, degenerative oil mixed with moisture, wrong brand and specification produce bubble. 4. Low hydraulic oil temperature and high viscosity of hydraulic oil. 	<ol style="list-style-type: none"> 1. Consult with your dealer. 2. Check whether air leakage at oil pump inlet pipeline. 3. Replace oil. 4. Run engine in low revs and then warm up the engine.
Control levers don't work or work slowly.	<ol style="list-style-type: none"> 1. The machine is out of use for a long time, air separates from oil and floats in pilot control pipeline and hydraulic cylinder, etc. 2. No pressure or exceeding pressure in pilot system. 3. Low hydraulic oil temperature and high viscosity of hydraulic oil 4. Hydraulic pump malfunction. 5. Main safety relief valve malfunction 	<ol style="list-style-type: none"> 1. Operate control levers for several times. 2. Check hydraulic control system, low-pressure relief valve, and gear pump. 3. Warm up machine. 4. Consult with your dealer. 5. Consult with your dealer.
A cylinder doesn't work or work slowly.	<ol style="list-style-type: none"> 1. Corresponding pilot valve malfunction 2. Corresponding reversing valve malfunction 3. Corresponding overload valve malfunction 4. Hydraulic cylinder rod damaged 5. Hydraulic cylinder interior seals damaged 	<ol style="list-style-type: none"> 1. Repair 2. Consult with your dealer 3. Consult with your dealer 4. Consult with your dealer 5. Replace oil seals

Slewing platform don't slew, slew slowly, or slew not smoothly.	<ol style="list-style-type: none"> 1. Corresponding pilot valve malfunction 2. Hydraulic motor malfunction 3. Slewing retarder malfunction 4. Slewing bearing malfunction 5. Need to add lubricant grease into the slewing bearing. 	<ol style="list-style-type: none"> 1. Repair 2. Consult with your dealer 3. Consult with your dealer 4. Repair 5. Add lubricant grease
Track of one side doesn't work or move very slowly (serious deflection of traveling)	<ol style="list-style-type: none"> 1. Control pilot valve malfunction 2. Corresponding reversing valve and stop valve malfunction 3. Center connector seal damage 4. Hydraulic motor malfunction 5. Travel redactor fault 6. The displacement of duplex hydraulic pump is not equal 	<ol style="list-style-type: none"> 1. Repair 2. Consult with the dealer 3. Consult with the dealer 4. Consult with the dealer 5. Consult with the dealer 6. Consult with the dealer
The hydraulic oil temperature rises too fast or becomes too high	<ol style="list-style-type: none"> 1. There is dirt on the surface of oil cooler. 2. Wear of hydraulic parts and reduction of the cubage efficiency. 3. Overflow valve and over load valve opens too frequently 	<ol style="list-style-type: none"> 1. Clean 2. Contact the dealer 3. Over digging, over loading, change the digging method.
Some unexpected actions occur without operating the handle	<ol style="list-style-type: none"> 1. Pilot valve lever block. 2. Pilot valve spool block. 	<ol style="list-style-type: none"> 1. Contact the dealer 2. Contact the dealer
Mandril leak at the top of pilot valve	Seal ring of the pilot valve mandril piston trepan boring aging or damage	Inspect and replace
"Nodding" condition of the work device	Usually caused by the block of multi-way valve lever's check valve	Inspect and replace

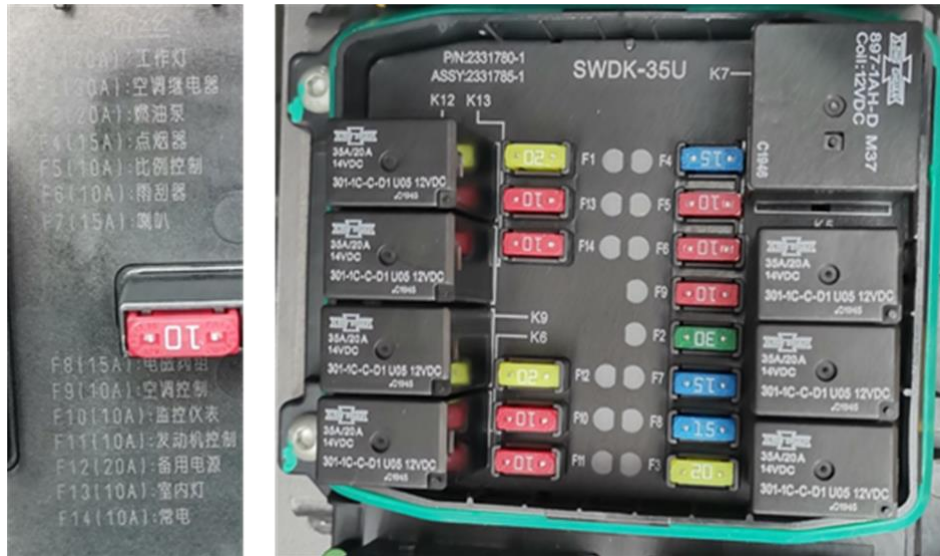
Air Conditioner Malfunctions and Solutions

Malfunction	Description	Check	Solution
Air conditioner unit stops working.	Air blower stops running.	<ol style="list-style-type: none"> A. Circuit break. B. Bad grounding. 	<ol style="list-style-type: none"> Check and repair Check and repair
Heating effect is not good.	Air blower works normally.	<ol style="list-style-type: none"> A. Hot water tube circuit block. B. Heavy dust on heater core surface. 	<ol style="list-style-type: none"> Check tube circuit. Clean core surface.

Malfunction and Solution of Electrical System

Electrical system		
Malfunction	Possible Causes	Solutions
Starting motor continues to run after engine is started.	Start relay fails to disconnect or gets pulled in. Defective starting key	Replace starting relay or contact with your distributor Contact with your designated distributor
While engine is running, charging indicator illuminates.	Engine belt loosened or damaged. Belt pulley wear out Engine damaged Defective charging circuit Low voltage of battery	Adjust engine belt or replace Replace belt pulley Contact with your designated distributor Check and repair Charge or replace battery
Display screen does not work	Fuse blown out Defective wire circuit Display screen damaged	Replace fuse Check circuit and repair Contact with your designated distributor
All indicators do not work	Fuse blown out Defective wiring circuit Defective circuit board	Replace fuse Check circuit and repair, or Contact with your designated distributor Contact with your designated distributor
Individual indicator does not work	Bulb damaged Fuse blown out Defective wiring circuit	Change bulb Change fuse Check circuit and repair, or Contact with your designated distributor
Abnormal fuel indication	Defective oil level sensor Defective wiring circuit Defective indicator	Check and repair, or replace Check circuit and repair, or Contact with your designated distributor
Displayed temperature of coolant do not reflect real temperature	Defective temperature sensor Defective wiring circuit Defective indicator	Contact with your designated distributor Check circuit and repair, or Contact with your designated distributor Contact with your designated distributor

Fuse Location and Function



F1	20A	Working light
F2	30A	Air conditioner relay
F3	20A	Fuel pump
F4	15A	Cigar lighter
F5	10A	Proportional control
F6	10A	Wiper
F7	15A	Horn
F8	15A	Solenoid valve set
F9	10A	Air conditioner control
F10	10A	Monitoring meter
F11	10A	Engine control
F12	20A	Emergency power supply
F13	10A	Indoor light
F14	10A	Normal electricity



(Sequence: the corresponding label on electrical control box)

7. TECHNICAL PARAMETERS

7.1 PARAMETERS

Engine KUBOTA diesel engine
 Model KUBOTA D1703
 Displacement 1.647L
 Number of cylinder 3
 Power 18.2kW/2200rpm
 Fuel assumption 250g/kw.h
 Coupling BoWex 48-208 FLE-PA 709965
 Radiator 4842 094.0000 V1

Hydraulic device

Hydraulic pump piston pump
 Model HP5V45/AV10RB2S2MG-L1/1-TE931
 Flow 1 * 88 L / min
 Work pressure 24.5 MPa
 Multi-way valve HVSE-09-10-P270-BE008
 Hydraulic pilot valve carry out the hydraulic proportion control of the boom, arm, bucket
 and flat swing through 2 “+” control
 joysticks
 Model Right pilot handle R908354046 (4TH5I121-11/SL18PRBH235M01)
 Left pilot handle 908354045 (4TH5I121-11/SL18435M01)
 Pilot system pressure 3.5Mpa
 Hydraulic cylinder (standard backhoe) double action combined sealed hydraulic tank
 Boom cylinder φ85 X φ45 mm
 Arm cylinder φ80 X φ50 mm
 Bucket cylinder φ70 X φ45 mm
 Dozer cylinder φ95 X φ50 mm
 Swing cylinder φ95 X φ50 mm
 Swing hydraulic motor piston variable motor
 Model B0250-27047
 Travel hydraulic motor piston variable motor
 Model MAG-26VP-400F-8 (B0240-26024)
 Hydraulic oil tank capacity 41 L

Hydraulic cooling device

Oil cooling device model 4842...089.0000V1
 Fan drive Engine drive

Hydraulic oil filter

Oil return filter element model KSP-0200010L

Swing mechanism

Maximum output screw moment.....	9123 N.m
Platform swing speed.....	9.5rpm
Slewing bearing.....	QNA 567 *20 Z6-00
traveling brake.....	hydraulic brake “+”spring pressure multiple brake (normally closed)

Electric device

Battery.....	1X12V,60Ah
Starter.....	12V, 2KW
Generator.....	12V, 60A

Fuel device

Fuel tank capacity.....	40L
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Travel mechanism

Speed ratio.....	41.9
Maximum output torque moment	
High speed.....	2387 N.m
Low speed.....	4299 N.m

Travel speed

High speed.....	4 km/h
Low speed.....	2.3 km/h
Gradeability.....	30°

Travel brake.....	hydraulic brake“+” spring pressure multiple brake (normally closed)
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Track tension.....	hydraulic
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Optional items:

Standard bucket:	520mm, 0.11 m ³
Optional bucket:	(300mm, 0.06 m ³), (600mm, 0.125 m ³), (1200mm, 0.25 m ³)
Standard arm:	1350 mm
Optional arm:	1550 mm

Customers can choose simple cab and quick coupler as an option according to different requirements.

7.2 TECHNICAL INSTRUCTIONS

CFG40UF is an all hydraulic track excavator with beautiful appearance, 360° rotatable flat roof, 850mm long small rear end, all of these ensure the work in limited place.

The engine is KUBOTA 3-cylinder water-cooling diesel engine which has a normal rated power of 18.2kW/2200rpm. Use flexible supporting breadthwise,install the engine at the rear end of machine.

Air filter is a fixed equipment of FPG057512; safety device (optional) on engine inlet pipe ensures more safety and stability of the engine.

Large capacity water tank with air exhaust device for the engine cooling system can effectively protect engine

and ensure normal work in high temperature and prevent overheating.

The main pump and engine directly connected with coupling, maximum work pressure is 24.5 Mpa.

Use flexible shaft coupling installed in the diesel motor flywheel to drive the main pump, perfectly avoid the influence on main pump, which is caused by the vibration of diesel motor.

Hydraulic system and pilot system

Hydraulic pump, main valve, drive motor and swing motor which are products of international brand with perfect quality and stable work condition can ensure the stable work of the whole system.

- Full power qualified system can make full use of the engine power.
- Abortively matched drive control element can ensure the good control of the whole machine.
- The system can appropriately distribute and make use of flow to improve and promote the machine performance.
- High pressure double speed travel motor provides high traction and travel speed.
- Adopt a 41L oil tank to supply the oil pump.
- Oil pump supply oil to the entire working device through multi-way valve, and the oil comes back to oil tank through oil cooler and magnetism papery filter.
- The pilot control mechanism in cab can ensure the multi-way valve action.
- The gear pump connected with main pump can supply hydraulic oil to pilot oil passage.
- The high precision high-pressure filter in pilot oil passage can avoid interferer from outside.

Hydraulic oil cooling

We adopt aluminium oil air exchanging cooler. Hydraulic oil can be perfectly cooled.

Fuel device

Diesel tank can be supplied from a 40L fuel tank, the compact and appropriate design makes it very easy to add fuel and clean.

Rotary drive

Hydraulic swing motor drives the swing supporting of inner joggle through a planetary reducer. The normally engaged brake in drive system can ensure the safety of the machine.

Boom swing

The design of ultra-large angle boom swing mechanism makes the machine be applied at side ditch, side channel, foot of wall and cliff. It better meets the current demand of both home and foreign markets and broadens the use range of machine.

Chassis

The excavator chassis is a high tortuosity rigid steel structure part.

The large dimension pilot wheel and drive wheel provide best travel ability on severe road condition and self-clean ability.

Undercarriage with the function of left and right track frame flexing has greatly improved the stability of machine in operation.

The wheels and track are high-quality products with good stability. The single element of track device, such as oriented wheel, carrier roller, track wheel, have a long lubricant cycle and don't need to be maintained frequently.

Hydraulic track tension device can conveniently tension and loosen track.

The helix spring provides huge tension power for oriented wheel and ensures the track orientation, avoid track digression.

High alloy steel track has good adhesion, stability and long service life.

Travel drive

Travel drive adopts axial piston double speed oil motor for power supply, providing high travel speed and more traction.

Novel travel mechanism is a build-in structure with compact structure and high universality.

The variable system make the travel speed change from 0~2.3km/h to 0~4km/h.

Travel brake

Adopt Japan KYB or NACHI insert-type piston motor and well-assorted brake drive which is hydraulic brake “+” multiple spring pressure brake (normally closed), that provide stable brake ability while working, especially when working on the slope.

Compensation valve connected with travel motor can avoid overdrive when machine traveling on slope.

Cab

The cab has two types, the common one & the brief one.

The simple cab is only installed with a canopy, which can be installed or disassembled easily. In hot days, you can have a bright mood when being blew by cool wind in the cab.

The general cab is installed on the platform with elastically. Its structure fit the international standard. Besides, closed cab and canopy cab both meet the test requirements of TOPS and FOPS, obtaining the CE certificate.

Wide front door can extend to the front and ensure convenient passage.

Glass around the cab and turnover front window provides best view for operator.

Cab seat is designed according to the ergonomics and can provide more comfort. The surface, backrest and rigidity are adjustable and can suit different kinds of requirement from different operator.

Seat with safety belt and pillow is optional.

Control lever is appropriately integrated with left & right control box underneath the operator’s seat, the light handle of the lever can prevent fatigue caused by long time work.

Double action pedal switch control the travel drive. Also it can be controlled manually.

Instrument panel is in the right front of the cab, through which monitor the machine work, diesel engine, electronic device, hydraulic system and all kinds of alarms. `All the indicator’s sketch maps comply with SAE standard.

There is radio installed in cab.

Also, there is air conditioner in cab (optional). The heater we adopt is world famous Denso product with perfect performance, also having good ability in anti-knock and anti-pollution.

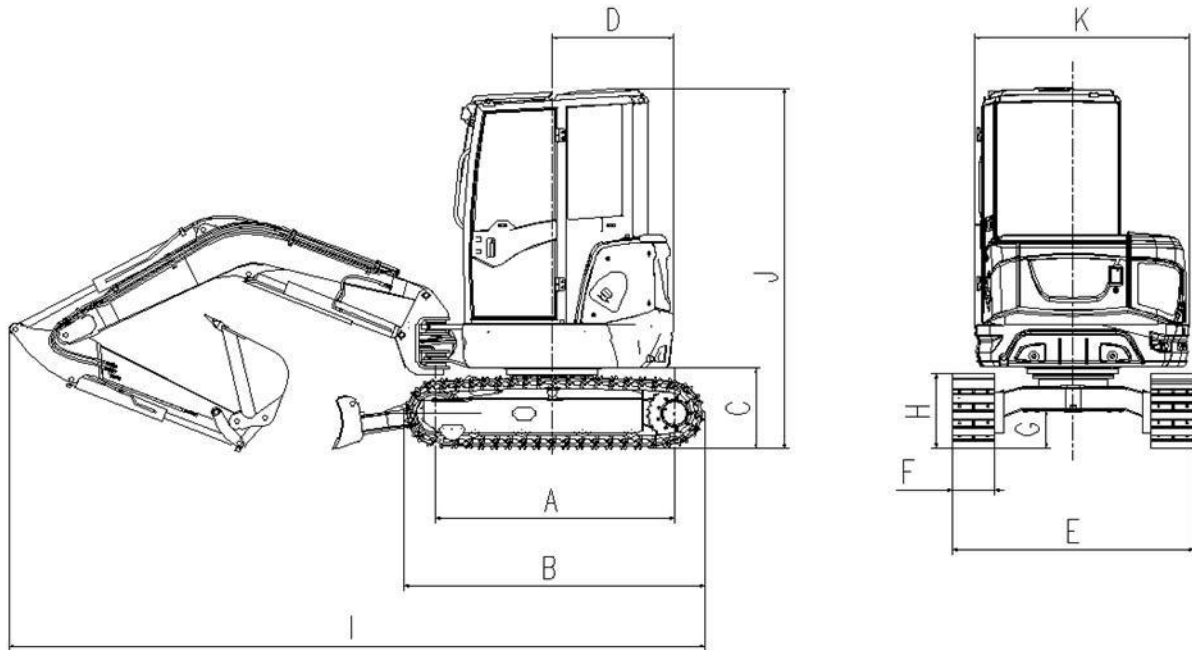
Machine canopy and sound insulation

The whole canopy is composed of firm middle machine canopy and back cover. It can protect the engine and pumps, the high quality sound insulation materials reduce noise to comply with European standard.

Bucket teeth

We adopt knockdown tooth, which has a tooth cover and tooth holder made by wearable alloy steel. The cover and holder are connected with lateral pin, which allows easy replacement. Though there is no special bucket tooth on the side of the bucket, there are side blades with clearance angle to help digging.

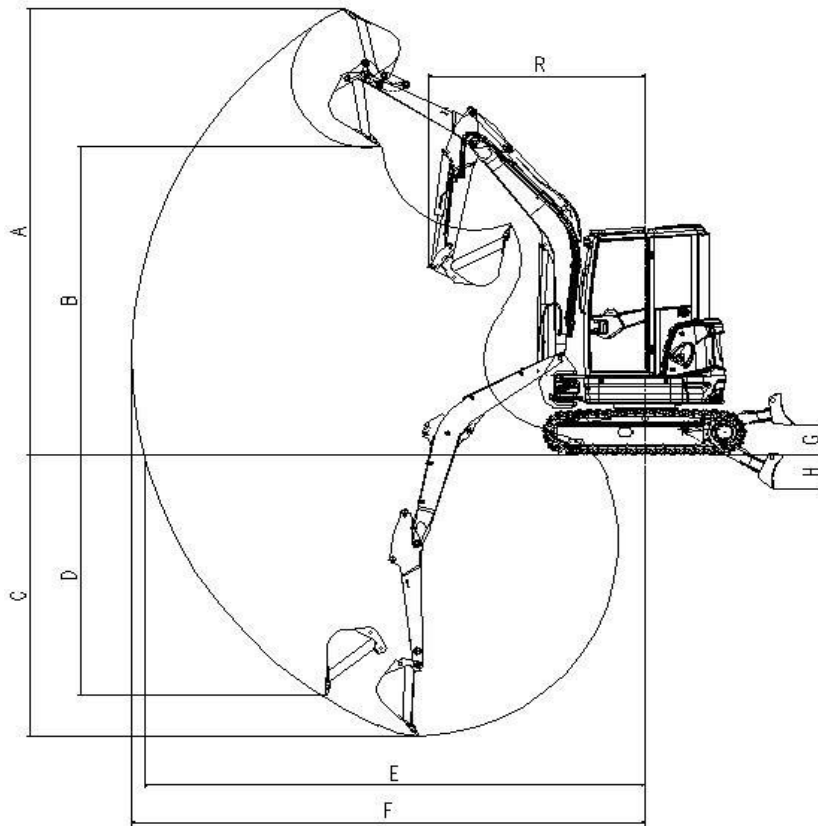
7.3 DIMENSION & WORK PARAMETERS



7.3.1 Dimension

Parameter			Model	CFG40UF
Outline dimension(length × width × height)			mm	4890*1700*2555
Dimension parameter	A	Tumbler distance	mm	1670
	B	Length of track	mm	2163
	C	Platform ground clearance	mm	570
	D	Tail swing radius	mm	850
	E	Chassis width	mm	1700
	F	Track width	mm	300
	G	Chassis ground clearance	mm	270
	H	Track height	mm	520
	I	Overall length	mm	4890
	J	Overall height of cab	mm	2555
	K	Upper structure width	mm	1505
Dozer dimension (length × width)			mm	1700×366

7.3.2 Work Parameters



Parameter			Model	CFG40UF
Working range	A	Max. digging height	mm	4925
	B	Max. dumping height	mm	3400
	C	Max. digging depth	mm	3120
	D	Max. vertical digging depth	mm	2665
	E	Max. digging reach	mm	5390
	F	Max. reach at ground level	mm	5260
	G	Max. lifting height of dozer	mm	337
	H	Max. digging depth of dozer	mm	376
	R	Min. swing radius	mm	2263

7.3.3 Noise & Vibration Description

(1) According to ISO3744 & ISO6395: the machine fulfills the requirements of the Directive 2000/14/EC & 2005/88/EC, results are as followings:

Noise at operator's position: $L_{pA}=80\text{dB}$;

Machine noise: $L_{WA}=94\text{ dB}$

Seat shock absorption:

Excavator status	Engine speed/mode	Accelerated speed m/s^2	
		Operator seat	Cab floor
Engine runs without load	1200rpm	0.80	0.70
	1500rpm	0.44	0.55
	1800rpm	0.22	0.57
	2000rpm	0.34	0.68
	2200rpm	0.40	0.72
	2400rpm	0.31	0.75

7.3.4 Lifting Capacity

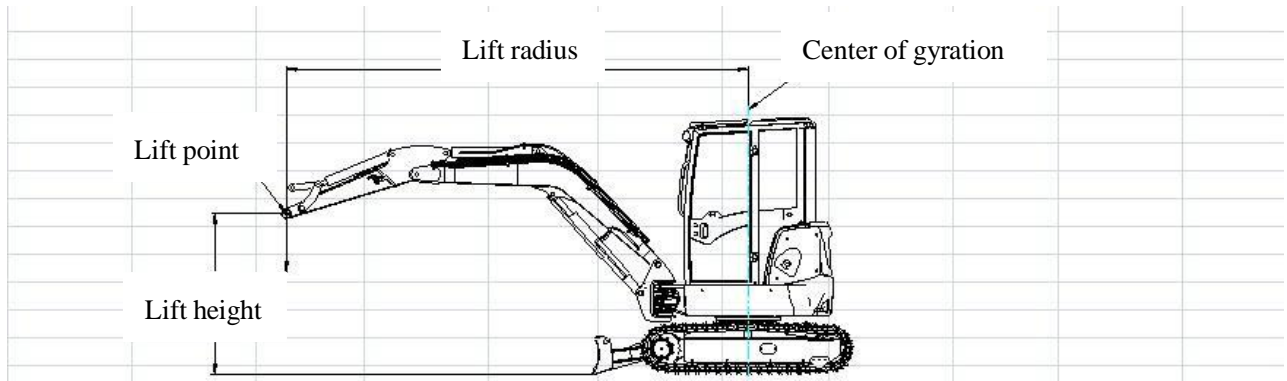
Height of lift point	Lift point radius (max.)		Lift point radius (4.0m)		Lift point radius (3.5m)		Lift point radius (3.0m)		Lift point radius (2.5m)	
	Right ahead (kg)	Side (kg)	Right ahead (kg)	Side (kg)	Right ahead (kg)	Side (kg)	Right ahead (kg)	Side (kg)	Right ahead (kg)	Side (kg)
4.0m	-	-	-	-	-	-	-	-	-	-
3.0m	687.3*	382.5	-	-	-	-	-	-	-	-
2.0m	774.3*	292.5	817.8	382.5	878.7*	472.5	1017.9*	645.0	1226.7*	847.5
1.0m	809.1*	262.5	957*	337.5	1078.8*	427.5	1357.2*	555.0	1853.1*	757.5
0m	-	-	-	-	-	-	-	-	-	-

Note:

1) The load marked with "*" is restricted by the hydraulic capacity based on the standard of ISO10567, in which mentioning related load should not be over than 87% of the hydraulic capacity.

2) The load without "*" is restricted by the tipping load based on the standard of ISO10567B, in which mentioning related load should not be over than 75% of anti-tipping capacity.

3) Attachments of excavator, such as bucket and lift hook, are not included in this table.



5) For the sake of safety regulations, before using the machine for lifting, an overload indicator kit must be installed.

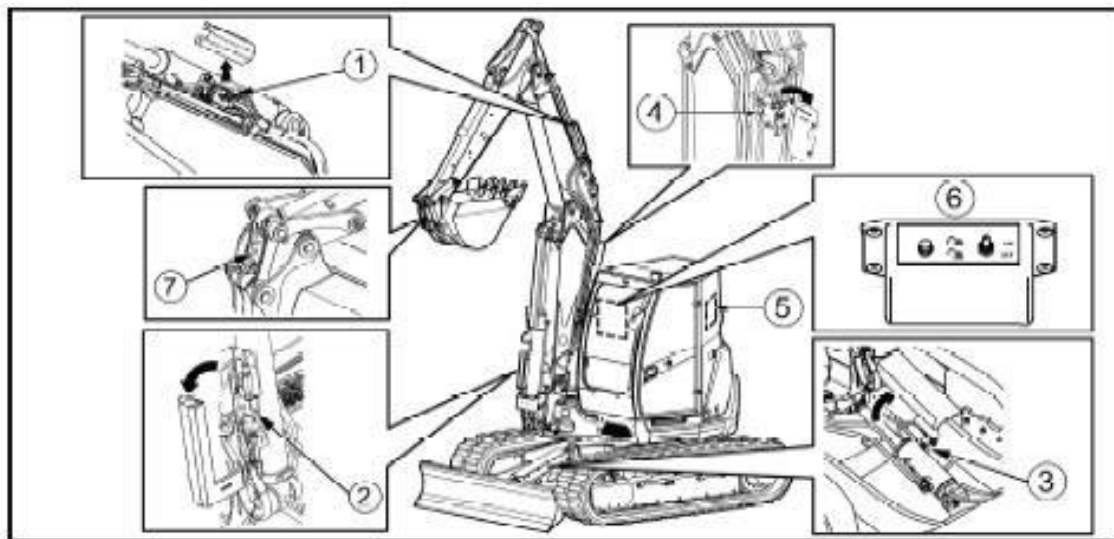
LIFTING KIT

IMPORTANT

The composition of this kit varies depending on the machine configuration.

WARNING

Do not perform lifting operations without the following lifting equipment being installed on the machine.



- 1 – ARM safety valve
- 2 – BOOM safety valve
- 3 – BLADE safety valve
- 4 – 2 Pieces Boom (If equipped)
- 5 - Lifting stability Label
- 6 – Overload indicator boxe
- 7 - Lifting Ring on bucket link

Safety valves

The safety valves must be installed with the ring. These valves are installed on the machine's BOOM, ARM, 2 PC (if equipped) and blade to prevent equipment from falling to the ground in the event of a break in the hoses.

Lifting Ring

An appropriate ring is required to suspend a charge with the machine. For more details, contact your dealer.

The welding ring on the bucket link must be installed with safety valves.

Important

This kit can be provided without ring welded on the bucket link if the machine is equipped with an accessory equipped with a lifting device, hook.

Overload box

When the operator wishes to do lifting operations it is imperative that the switch of the overload box is in the ON position and this is to alert the operator of the risky positions according to the load handles and the position of equipment.

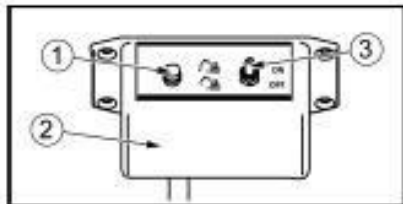
An audible signal warns the operator that the load he is handling is too heavy and that he may turn over the machine.

When the buzzer sounds, the operator must quickly place the load on the ground as it may turn over the machine.

IMPORTANT

Activating the load indicator case does not exempt the operator from assuming that the load he is going to handle does not exceed the value indicated on the stability table.

It is forbidden to handle loads without activating the overload box.



- 1 - Green light: is turned on when the load indicator is active.
- 2 - Overload box located in the cabin
- 3 - Switch

1. Maximum Use Charge (C.M.U.)

Lifting Tables

A stability table summarizing the machine's lifting capabilities is provided with the safety valves KIT.

DANGER

The stability table must be installed inside of the cabin in a way a be visible by the operator from the driving position during the use of the machine.

Check it out before you do any load lifting operation.



Description	Reference
Overload indicator Kit	KIM049500201

Before any intervention on the machine.

- Place equipment and blade on the ground.
- Shut down the engine.
- Operate the levers
- Open the hydraulic tank cap to depressurize the hydraulic system

Check to be carried out after mounting the kit.

- Check that all parts of the kit are properly tightened and maintained.
- Start the machine. At reduced speed, make the maximum movements.
- Check hose deflections, tension and bends. Reorient if necessary.
- Check that no part of the kit comes into contact with the machine environment.
- Check no leakages

At start of operation.

- Drain the pilot line (if the original control hose has been disconnected).
- Adjust the pressure-switch for correct overload information.
- Glue the stability table to the right inner glass

Description of the mounting

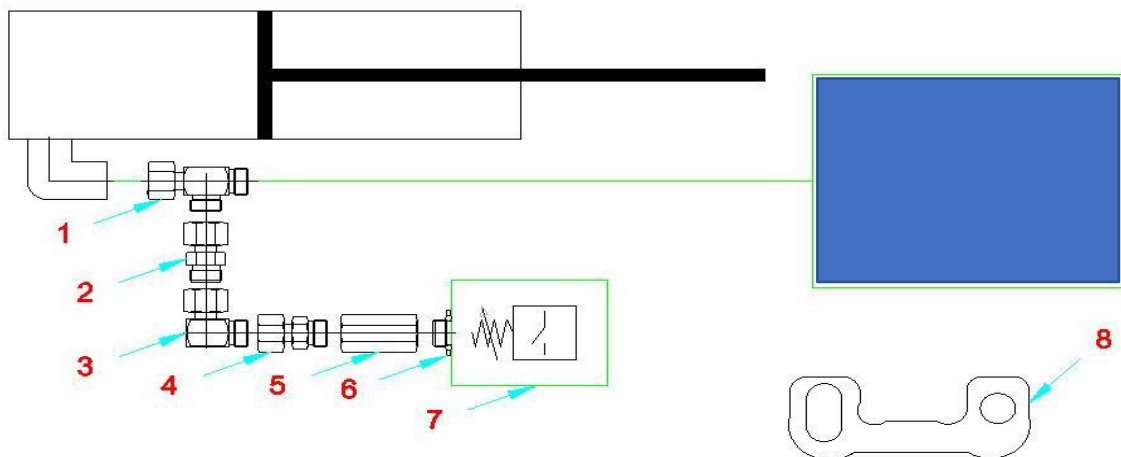
The assembly of this kit consists in equipping the machine with an overload indicator which must be activated during lifting operations.

Overload indicator KIT mountingMontage

Pressure switch installation on BOOM Cylinder:

Insert the tee between the actuator and the valve, then orient the assembly so that the pressure switch is as close as possible to the actuator, if it is not likely to deteriorate at

Install the Insert Bracket to secure the Rigid Tube.



Repère	Quantité	Désignation
1	1	Té tournant
2	1	Adaptateur tournant 18l
3	1	Coude tournant
4	1	Adaptateur tournant 10l
5	1	Union femelle femelle
6	1	Bague d'étanchéité
7	1	Presostat
8	1	Ferrure

Electrical Installation:

Secure the box in the cab using the self- tapping screws.



Make sure that the electrical cable is well protected with the sheath and secure and the connector.



Electrical Coupling:



Electrical supply:



Spliced cigar lighter power supplies stored under the ventilation control console.

Overload pressure-switch setting:

Connect the male plug to the Time Indicator box cable, following terminal numbers 1,2 and 3.
Connect the male and female plugs together.

Partially remove the pressure switch cap.

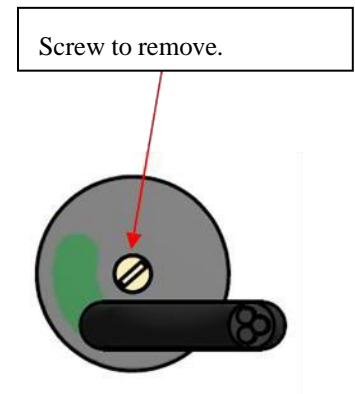
Completely remove the central screw on top of the pressure switch, with a flat screwdriver (diameter 4 mm).

Use a 2 male hex wrench to adjust the release pressure.

Lift the load as indicated in the load table (see machine operating manual), with the hex wrench tighten the adjustment screw to the maximum, Gradually loosen until switching pressure is reached to power the audible and visual alarm on the overload indicator box (red light). Check the setting, adjust if necessary.

Reassemble the center screw and cap assembly to ensure tightness of the pressure switch.

The pressure switch corresponds to the IP65 standard, insensitive to water spray and dust. No warranty will be accepted if water oxidation is present inside the connector.



If there is no stability table glued to the glass, use the one provided with the kit and put it on the right side of the glass.



Factory preset pressure-switch for standard equipment, adjustment possible.

8. MANUFACTURER INFORMATION

Company: CFG INDUSTRIAL LTD.

Trade mark: 

Add: 6200 S Oak Park Ave, Chicago, Illinois 96938, United States

Sales hotline: 773-927-8098; Service hotline: 773-927-8098

Maintenance point: Our office in various provinces and cities of China and USA