

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair on this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintain and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warning are not heeded, bodily injury or death could occur to your or other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "WARNING" as shown following.



The meaning of this safety alert symbol is as follows:

Attention. Be alert. Your safety is involved.

The message that appears under the warning, explaining the hazard, can be either written or pictorially presented.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

LiuGong cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by LiuGong is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or require procedures you choose.

The information, specification, and illustrations in this publication are on the basis of information available at the time when it was written. The specification, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. LiuGong has the most current information available.

CALIFORNIA PROPOSITION 65

 **WARNING: Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects and other reproductive harm. Battery post, terminal and related accessories contain lead and lead compounds, Always wash hands after handling.**

CALIFORNIA PROPOSITION 65

 **WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm. Wash hands after handling.**

The State of California requires the above two warnings.

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Preface

This manual is should be stored in the operator's compartment in the literature holder or seat back literature storage area.

This manual contains safety precautions, operation instructions, lubrication and maintenance.

Some photographs or illustrations in this publications show details or attachments that may be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication.

Whenever a question arises regarding your machine, or this publication, please consult your LiuGong dealer for the latest available information.

Safety

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance and repair on this machine.

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. Read, study and keep it handy.

This section includes a discussion of gauges, switches, machine controls, controls, transportation and towing information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating and stopping the machine.

Operating techniques outlined in this publication are basic skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Maintenance

The maintenance section is a guide to equipment care. The illustrated, step-by-step instructions are grouped by servicing intervals. Items without specific intervals are listed under the "When Required" service interval. Items in the "Maintenance Intervals" are referenced to detailed instructions that follow.

Maintenance Intervals

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

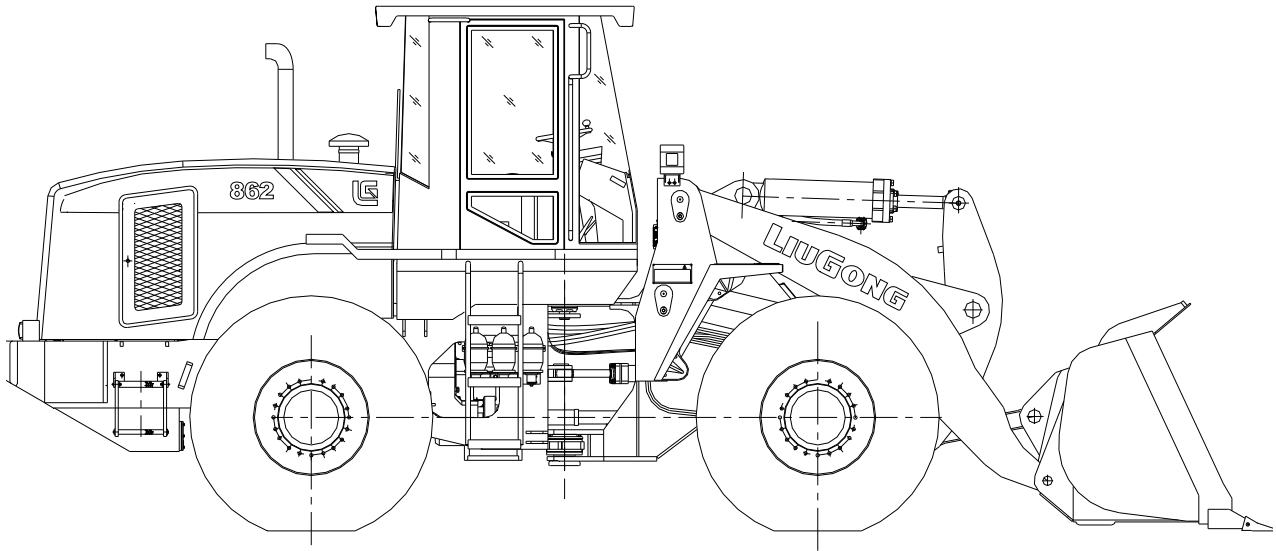
Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the "Maintenance Intervals" may be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly and every 10 service hours or daily.

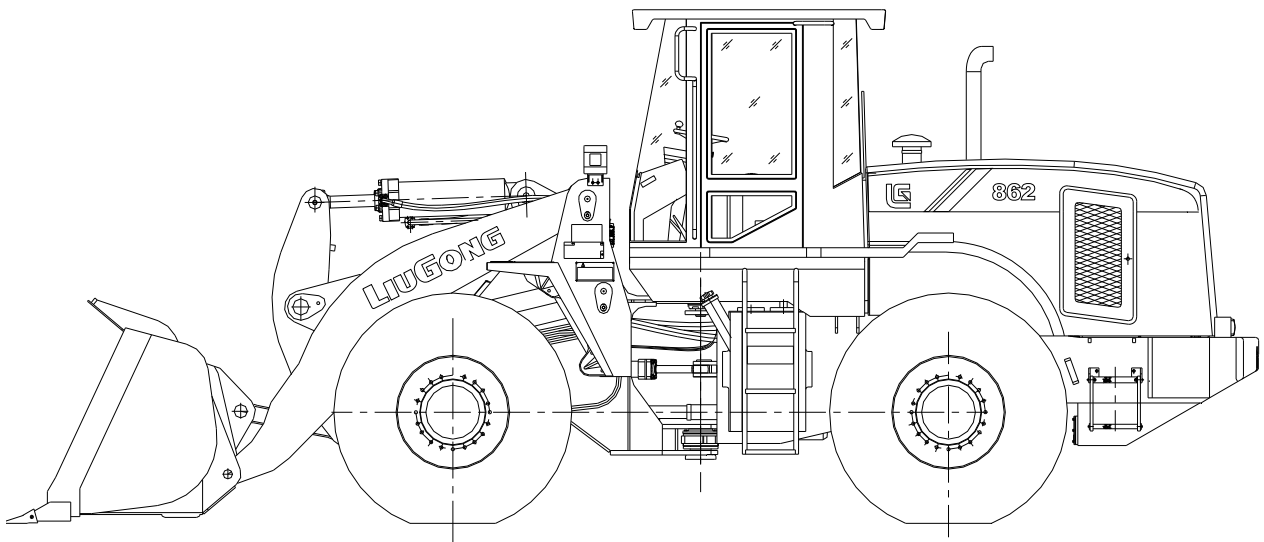


Presentation

Right side view of CLG 862



Left side view of CLG 862



Product Identification

Manufacturer	Guangxi Liugong Machinery Co., Ltd.
Product Identification No. (PIN)	
Engine Serial No.	
Transmission Serial No.	
Cab Serial No.	
Front Axle No.	
Rear Axle No.	



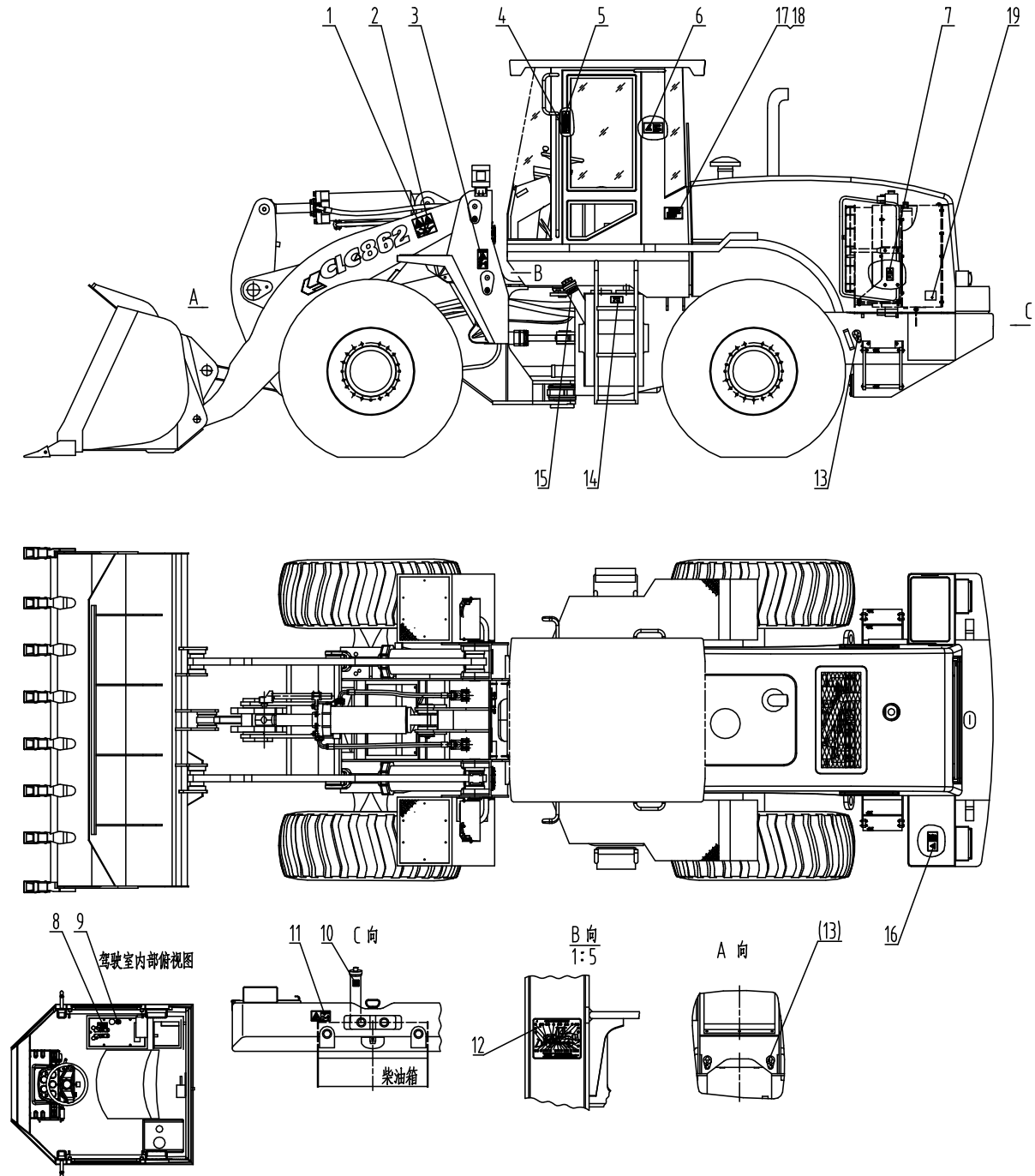
Safety Information

Safety Labels and Label Locations

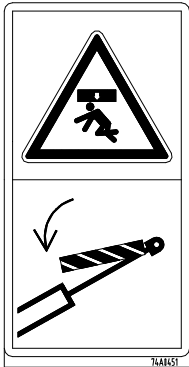
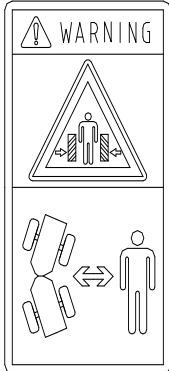
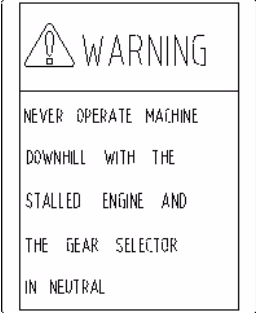
There are several specific safety labels on your machine. Their exact location of the hazards and the description of the hazards are reviewed in this section. Please take time to read, understand and familiarize yourself with each and every one of these safety decals.

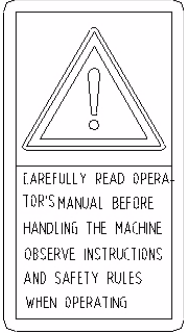
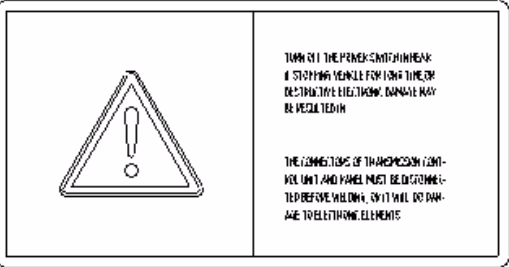
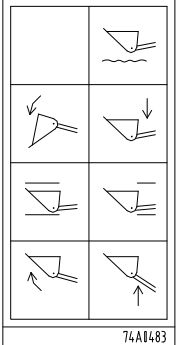
Make sure that you can read all safety signs. Clean or replace these if you cannot read the words or see the pictures. When cleaning the labels use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety signs. Solvents, gasoline or hash chemicals could loosen the adhesive backing of decals causing them to fall off the machine.

You must replace a label if it is damaged, missing or cannot be read. If a label is on a part that is replaced, make sure a new label is installed on the replacement part. Pay attention to the notices of the labels located in the cab before starting.

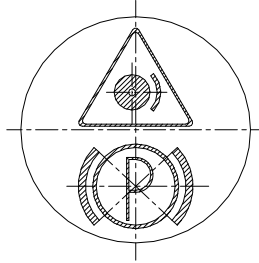


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1. WARNING: Don't walk under the implement (located on both sides of boom)	 74A0414
2. WARNING: Use the safety bracket when lift the bucket for maintenance (Located on both sides of boom)	 74A0451
3. WARNING: No entrance! (Located at the frame articulation joint)	 74A0419
4. CAUTION: Downhill operation caution (Located inside the cab)	 74A0417

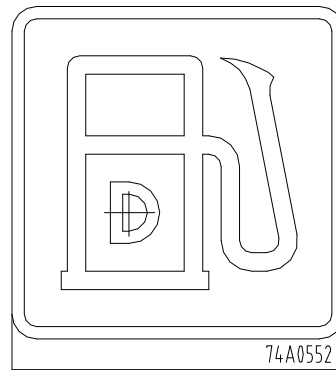
5. WARNING: Cautions before starting.(Located inside the cab)	 74A0415
6. NOTICE: Read the operator' s manual(located inside the cab)	 74A0444
7.WARNING: Keep your hand from the rotating fan.(Located on the radiator bracket)	 74A0416
8. Symbol(Located inside the cab)	 74A0483

9. Hand brake(Located inside the cab)



74A0501

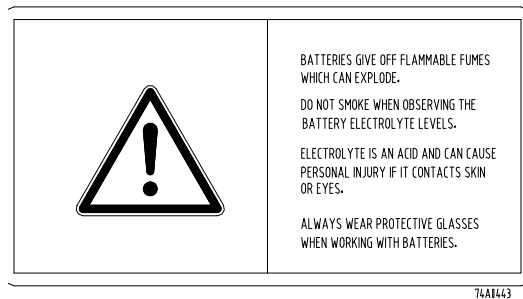
10. Fuel filler (Located on fuel tank)



74A0552

74A0552

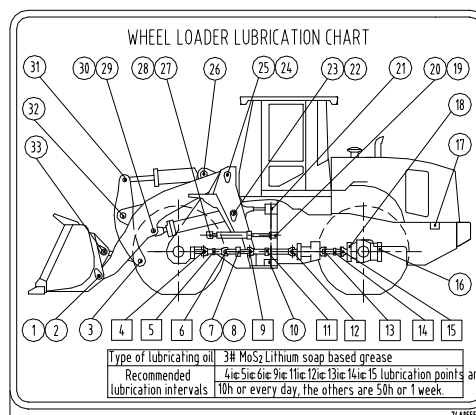
11. Battery warning decal(Located under the battery box cover)



74A0443

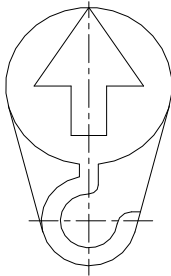
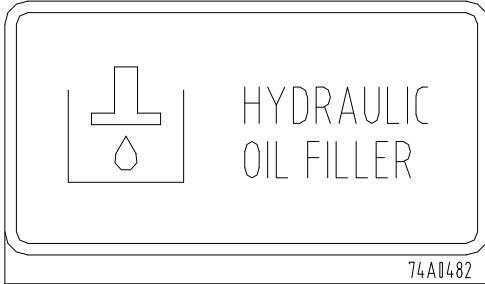
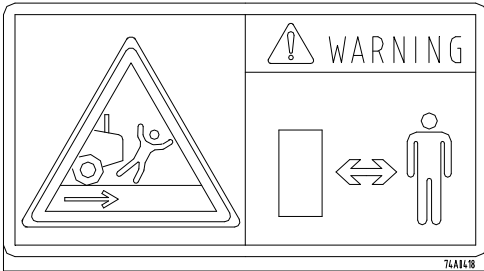
74A0443

12.Lubrication chart(Located on the wing frame of front frame)



74A0555

74A0555

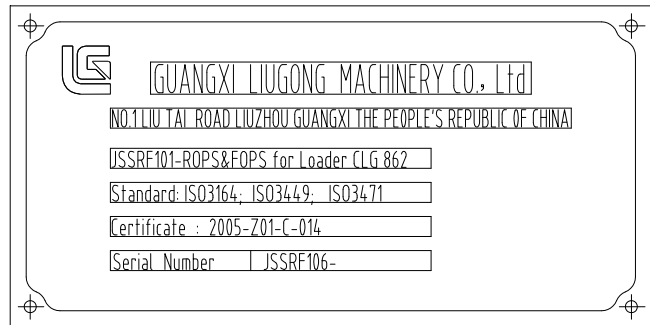
13. Lift decal(Located at both sides of the front and rear frame)	 74A0083
14. Hydraulic oil tank(Located on the hydraulic oil tank near to the left ladder)	 74A0554
15. Hydraulic oil filler(Located on the hydraulic oil tank)	 74A0482
16. WARNING: Keep away from the machine(Located on the counterweight)	 74A0418

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Safety Information

Safety Labels and Label Locations

17. ROPS & FOPS (Located inside the cab)



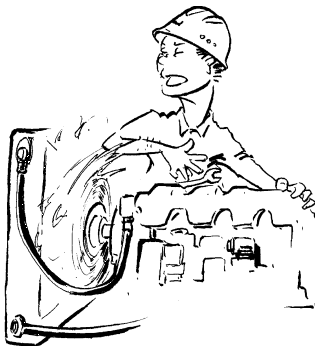
74A1428

General Hazard Information

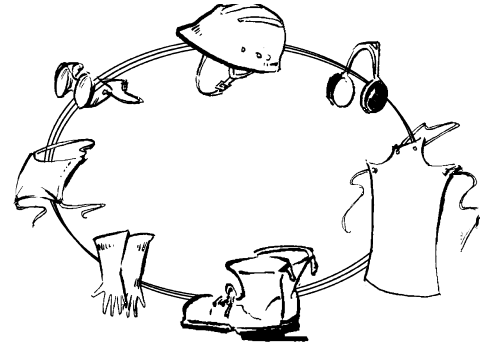
- Only trained and qualified personnel should be allowed to operate or maintain the machine.
- Attach a DO NOT OPERATE or similar warning tag to start switch or control levers before servicing or repairing the machine.



- Do not wear loose fitting clothing, dangling jewelry or long hair that can catch on controls or in other moving parts of the machine and result in serious injury or death.



- Wear safety equipment such as a hard hat, safety glasses, safety shoes and gloves that are appropriate to the job being done. Wear goggles or safety glasses to guard against injury from flying pieces of debris.



- Make sure all protective guards and covers are secured in place on the machine.
- Keep the machine, especially the panel, accesses and ladders, free of foreign material, such as debris, oil, tools and other items which are not part of the machine.
- Secure all loose items such as lunch boxes, tools and others.
- Know the appropriate work-site hand signals and who gives them. Accept signals from one person only.
- Never put maintenance fluids into glass containers.
- Observe the relevant laws and regulations when handling harmful articles such as lubrication, fuel, coolant, solvents, filters, batteries and other matters.
- Use all cleaning solutions with care.
- Report all needed repairs in time.
- Do not allow unauthorized personnel on the machine.

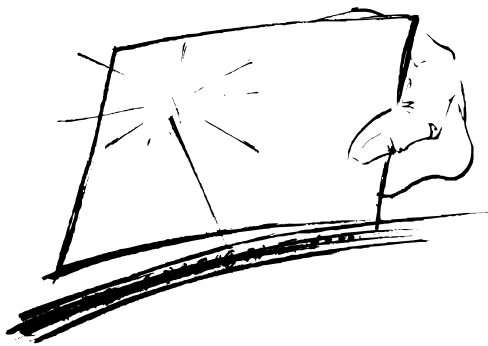
Compressed Air

- Compressed air can cause personal injury. When using compressed air for cleaning, wear a protective face shield, protective clothing and protective shoes. The maximum air pressure should not exceed 25psi(0.2Mpa).

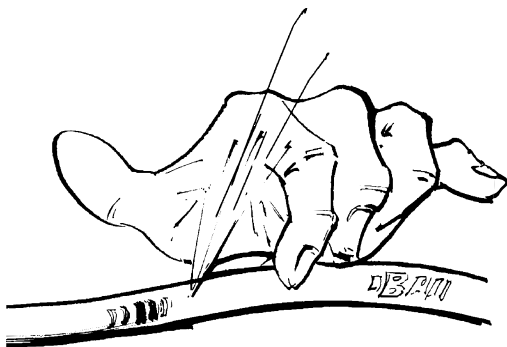
High-pressure Fluid

⚠ WARNING: Avoid injury from high-pressure oil. When repairing hydraulic lines, ensure that system pressure is completely released before beginning the repair. Hydraulic oil under pressure striking the skin could cause serious injury or damage.

- Use caution if you disconnect hydraulic lines or connectors. High pressure oil that is released can cause a hose to whip.
- Wear safety glasses and leather gloves. Never check for a high-pressure leak with your unprotected hand. Use a board or cardboard when checking for leaks.



- Even a pin-hole size leak can cause serious injury. If you are hit by spraying high-pressure oil, see a doctor for treatment at once.



Dispose Fluid Spillage

- Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment.
- Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.
- Obey all local regulations for disposal of liquids.

Cautions about Accumulators

High-pressure nitrogen is contained in the accumulators, making them dangerous articles. Read the following requirements and pay attention to the proper use of accumulators.

- Check accumulators before charging nitrogen. Safe use cannot be guaranteed if there is not a nameplate attached to the accumulators. Never charge accumulators that have an incomplete nameplate or that are of an unidentified type.
- The accumulators are charged with nitrogen. The use of oxygen, compressed air or other flammable air in the accumulator could cause an explosion and possible injury death and damage to the machine.
- When charging accumulators with nitrogen, care should be taken not to damage the diaphragm.
- The accumulator's valve should be installed facing vertically upward. Do not attempt to fix accumulators by welding them.
- Do not drill any hole in the accumulator or close a hole by welding.
- Do not weld a boss on the accumulator.
- Accumulators are high-pressure vessels and should be repaired only by trained specialized personnel.
- Always release pressure in the accumulator before disposing of it.

Asbestos Danger

Breathing asbestos dust can be hazardous to your health. Equipment and replacement parts that ship from Liugong have no asbestos in them. Liugong recommends the use of only genuine factory spare parts. Observe the following rules if you will be handling any spare parts that contain asbestos or if you will be handling any materials containing asbestos fibers:

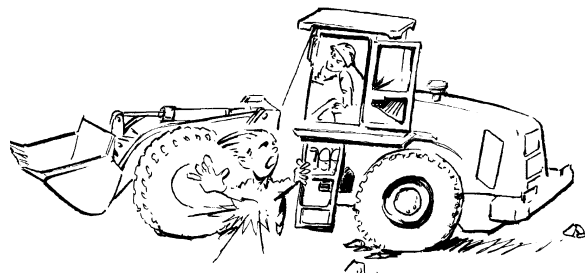
- Never use the compressed gas to clean up asbestos. Use a wet method in order to clean up asbestos materials. Water the area down to clear asbestos dust.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.
- Do not grind materials that contain asbestos.
- Use exhaust opening on permanent machining jobs.
- Obey environmental regulations for the disposal of asbestos.
- Please shower after contact with asbestos.
- Wear an approved respirator if there is no other way to control the dust.



Crushing and Cutting Prevention

- Don't put hand, arm, or any other parts of the body in the removable parts.

- Support equipment and attachments properly when working beneath them. Do not depend on hydraulic cylinders to hold the implement up in the air. The implement can fall if a control lever is accidentally moved, or if a hydraulic line leaked.
- If it is necessary to remove shields in order to perform maintenance, always install the shields after the maintenance is performed.
- Stay clear of all rotating and moving parts.
- Keep hands and objects away from moving fan blades. They will throw or cut any object that contacts the moving blades.
- Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.
- Never attempt adjustments while the machine is moving or the engine is running unless otherwise specified.



- Retainer pins, when struck with force, can fly out and injure nearby persons. Make sure the area is clear of people when driving retainer pins. Wear protective glasses when striking a retainer pin to avoid injury to your eyes.
- Chips or other debris can fly off objects when struck. Make sure no one can be injured by flying debris before striking any object.

Cab Protective Structure Cautions

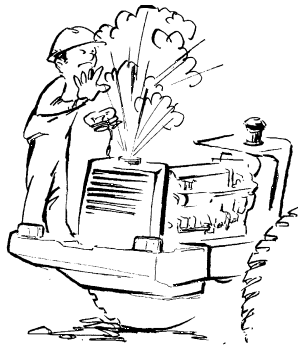
ROPS and FOPS function are available for the cab.

- The strength of the structure will be reduced if it is damaged due to a rollover. ROPS are certified structures and cannot be repaired. Any damage to the ROPS structure will require replacement of the structure to retain the certification.
- Please always fasten your seat belt when you operate the machine.
- It is forbidden to drill holes or weld inside or outside or change anything of the cab. This will damage the integrity of the ROPS structure.
- If the cab is to be modified in any way, contact your local Liugong dealer to avoid damaging the ROPS structure.

Burn Prevention

Coolant

At operating temperature, the engine coolant is hot and under pressure. The radiator and all lines to heaters or the engine contain hot water or steam. Any contact can cause severe burns.



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- Check the coolant level only after the engine has been stopped and the water filling cap is cool enough to remove with your bare hand.
 - Remove the cooling system water filling cap slowly to relieve pressure.
 - Coolant contains alkali that can cause personal injury. Avoid contact with the skin, eyes and mouth.

Oil

- Hot oil and components can cause personal injury. Do not allow hot oil or components to contact the skin.
- At operating temperature, the hydraulic oil tank is hot and can be under pressure.
- Remove the hydraulic oil tank water filling cap only after the engine has been stopped and the water filling cap is cool enough to remove with your bare hand.
- Remove the hydraulic oil tank oil filling cap slowly to relieve pressure.
- Relieve all pressure in air, oil, fuel or cooling systems before any lines, connectors or related items are disconnected or removed.

Batteries

- Batteries give off flammable fumes which can explode.
 - Do not smoke when observing the battery electrolyte levels.
 - Electrolyte is an acid and cause personal injury if it contacts skin or eyes.
 - Always wear protective glasses and gloves when check the batteries.
-



Fire & Explosion Prevention Safety Cautions

- All fuels, most lubrications and some coolant mixtures are flammable.

- Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.
- Do not smoke while refueling or in a refueling area, or where flammable materials are stored.



- Clean and tighten all electrical connections. Check daily for loose or frayed electrical wires. Have all loose or frayed electrical wires tightened, repaired or replaced before operating the machine.
- Keep all fuels and lubrications stored in properly marked containers and away from all unauthorized persons.
- Store all oily rags or other flammable material in a protective container, in a safe place.
- Do not weld or flame cut on pipes that contain flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them.
- Remove all flammable materials such as fuel, lubrication and other debris before they accumulate on the machine.
- Do not operate the machine near an open flame.
- Keep all open flames or sparks away from the battery. Do not smoke in battery charging areas.
- When using jump cables always connect positive(+) cable to positive(+) terminal of battery connected to start motor solenoid and negative(-) cable from external power supply to start motor negative(-) terminal. (if not equipped with start motor negative terminal, connect to engine housing.)

- Do not charge a frozen battery. This may cause an explosion.

Ether(Do not start the machine with ether)

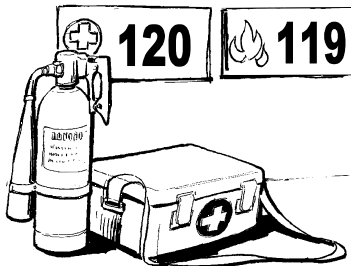
- Any attempt to ether-start the engine will cause severe damage to the engine, personal injury or death.

Cautions Concerning Lines, Tubes and Hoses

- Do not bend or strike high-pressure lines. Do not install bent or damaged tubes or hoses.
- Tighten any loose fuel or oil line, hydraulic system tube or hose. Repair any damaged fuel or oil line, tube or hose. Leaks can cause fires. Contact Liugong or your Dealer for factory authorized replacement parts.
- If you see evidence of any of the following situations, please replacing:
 - (a) Connectors damaged or leaking.
 - (b) Outer covering frayed or cut and reinforcing wire exposed.
 - (c) Outer covering ballooning.
 - (d) Evidence of kinking or crushing of the hose.
 - (e) Reinforcing steel wire of the hose embedded in the outer covers.
 - (f) Terminal displaced.
- Make sure that all clights, guards and heat shields are properly installed. During operation, this will prevent vibration, friction against other parts, and bring excessive heat.
- When removing the connecting lines of the air conditioner compressor, always ensure there is no an open fire nearby as a fire could result in poisonous fumes.

Fire Extinguishers and First-aid Kit

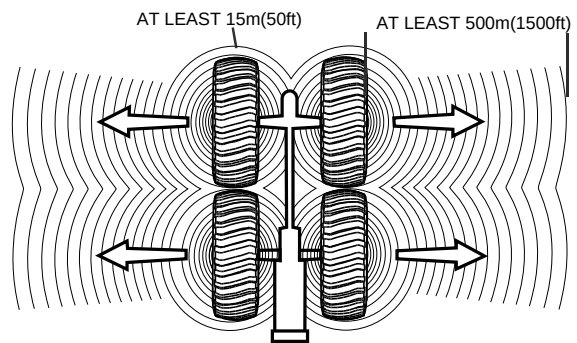
- A fire extinguisher should be available on the machine in case it is needed.
- A first-aid kit should be available at the work site. Periodically check the contents of the kit and supply used medical if necessary.
- Know how to use the fire extinguisher and first-aid kit in case the fire or injury occurs.
- Keep telephone numbers of doctors, first-aid center or fire stations etc. with you so you can contact them in case of an emergency. Post the contact telephone numbers in regulated places. Ensure that all persons know where the telephone numbers are located and know the correct contact method.
- Inspect and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.



To Prevent the Tire Explosion

- Explosions of air inflated have resulted from gas heat-induced combustion inside the tires. Explosions can be caused by heat that is generated by welding, by heating rim components, by external fire, or by excessive use of brakes.

- A tire explosion is much more violent than a blowout. The explosion can propel the tire, the rim components, and the drive train components as far as 500 m (1500 ft) or more from the machine. Both the force of the explosion and the flying debris can cause property damage, personal injury, or death
- Do not approach a warm tire. Maintain a minimum distance, as shown. Stay outside the shadow area.



- Dry nitrogen is recommended for inflation of tires. If the tires were originally inflated with air, nitrogen is still preferred for adjusting the pressure. Nitrogen mixes properly with air. Nitrogen inflated tires reduce the potential of a tire explosion because nitrogen does not aid combustion. Nitrogen helps to prevent oxidation of the rubber, deterioration of rubber, and corrosion of rim components.

Electrical Storm Injury Prevention

- When lightning is striking in the vicinity of the machine, the operator should never attempt to mount and dismount the machine.
- If you are in the cab during an electrical storm, stay in the cab. If you are on the ground during an electrical storm, stay away from the machine.

Attachment Cautions

- Refer to the instruction book and manual and other related information when installing and using spare attachments.
- The use of an unauthorized attachment could cause safety problems, may not be beneficial to the proper operation of the machine and may negatively influence the service life of the machine.
- Liugong will not bear responsibility for injury, accidents and machine damage resulting from the use of unauthorized attachments.

Cautions about Machine Operation

Mounting and Dismounting the Machine

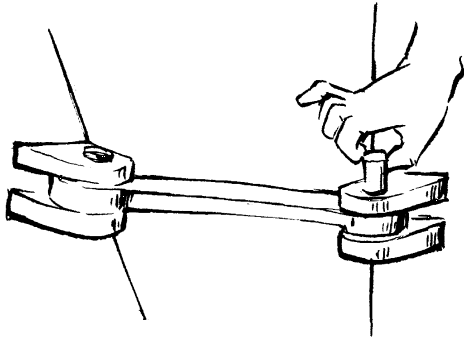
- When mounting and dismounting the machine, check the condition of the handrails and ladders. Clean them of grease, lubricants and dirt at once. Also, repair any damaged parts and tighten loose bolts.
- Mount and dismount the machine only where only at there are handrails and/or ladders.
- Face the machine when getting on or off the machine, grab the handrails with both hands and step onto the ladders. Touch at three points simultaneously (two feet and one hand or two hands and one foot) to ensure stability of the body.



- Never jump off the machine.
- Never get on or off a moving machine.
- Be careful not to touch the control lever when getting on or off the machine.
- Do not try to climb on or off the machine when carrying tools or supplies. Use rope to pull equipments up onto the platform.

Before Starting the Engine

- Make sure nobody around the machine before starting the engine.
- Adjust the driver seat to the right position that is most comfortable and easiest for operation. Check the seat belt and the condition of mounting hardware. Repair or replace any items that are damaged. Replace the seat belt after three years of use or any time the belt shows signs of wear or damage.
- Check to make sure the steering frame lock is in the RELEASED position.



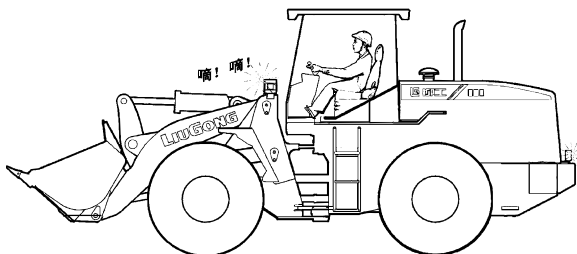
- Check the instruments to ensure they are functioning normally.

Engine Starting

Do not start the engine if there is a DO NOT OPERATE or similar tag attached to the start switch or control levers.



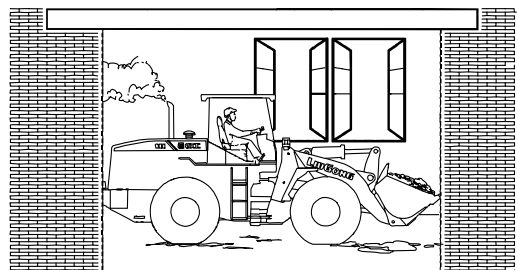
- Ensure the hydraulic control levers are all in the HOLD position and the shift control lever is in the NEUTRAL position before starting the engine.
- Sound the horn to alert personnel when starting the engine.



- Do not start the engine until the driver seat in the driver seat and the seat belt is firmly fastened.



- Only start the engine from the driver seat in the cab. Never start the engine by short-circuiting across the start motor terminals or across the batteries. Starting the engine by short-circuiting could result in damage of the electric system or injury to personnel.
- Never run the engine in a closed or poorly ventilated environment. If working inside, open the doors and windows to ensure enough ventilation to prevent exhaust gas poisoning. Use a power exhaust system when work in an enclosed area.



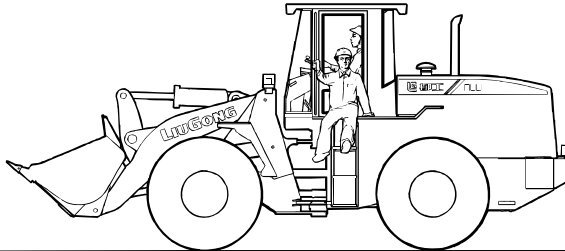
Cautions Before Operating the Machine

- Make sure the machine is free of personnel and obstacles, and fasten the seat belt before operation.
- Keep all the windows, lightshades, rearview mirrors are clean. Secure the doors and windows in either the open or shut position.
- Adjust the rearview mirrors for best vision, especially close to the machine.

- Clear all obstacles from the path of the machine running. Be ware of hazards such as high voltage wires, ditches, etc.
- Make sure the horn, the backup alarm (if equipped) and all other alert devices are working properly.

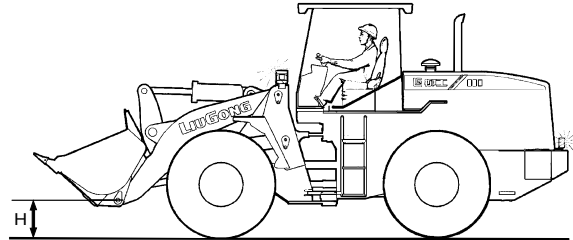
Cautions When Operating Machine

- Know the maximum dimensions of your machine.
- Only operate the machine while seating. The seat belt must be fastened while you operating the machine. Only operate the control levers while the engine is running.
- Make sure that nobody will be endangered before you operate the machine.
- Do not allow another person seating on the machine unless additional seat, seat belt and Rollover Protective Structure (ROPS) are provided.

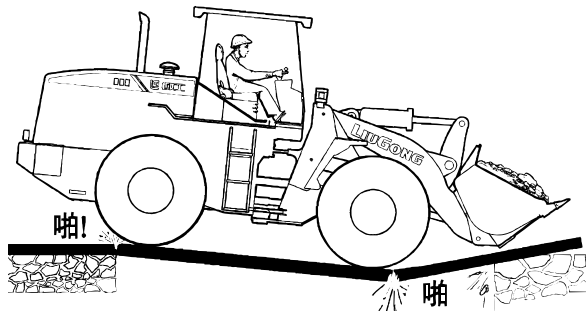
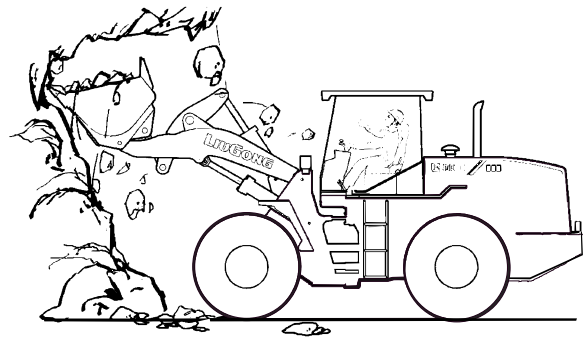


- Before operating the machine, you should operate the machine slowly to an open area, check for proper operation of all control levers and all protective devices.
- Note any needed repairs during machine operation such as an abnormal noise, vibration, smell, wrong reading of gauges, gas or oil leakage, etc., stop what you are doing and report any needed repairs in time.

- When traveling with a load in the bucket, set the load height at $H=500 \sim 600\text{mm}$ (20 ~ 24in) from the ground level to below the boom articulation joint.

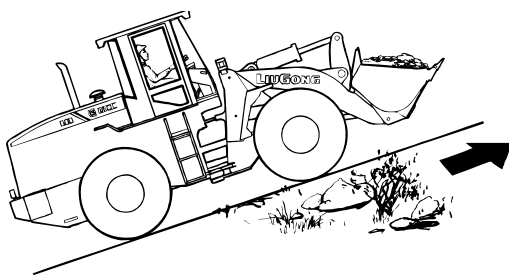
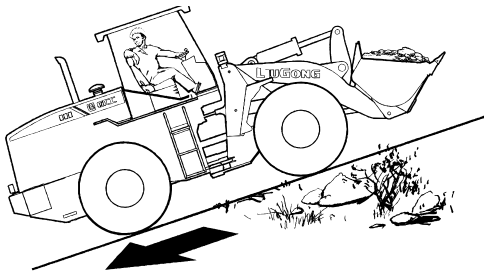


- Do not go close to the edge of a cliff, a dyke, or a hillock to avoid collapse.

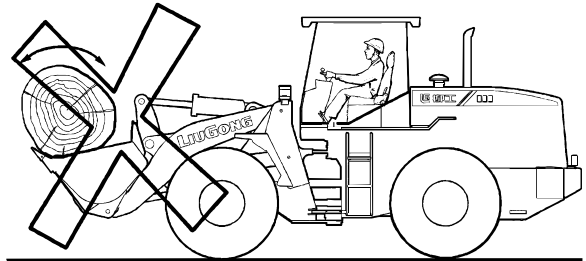




- Avoid any conditions that can lead to the machine tip. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when the machine goes cross ditches, hillocks or other unexpected obstructions.
- Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes.



- If the machine begins to sideslip on a slope, immediately remove the load and turn the machine downhill.
- To prevent the machine from tipping over or damaging the attachment due to overloading, never exceed the machines rated capacity.



- The machine only bear the specified operation, other operation exceeding the applications scope could damage the machine.
- Never use the loader to lift people. Do not use the bucket as a work platform for people and never allow to riding in the bucket.
- When transporting, make sure that the hooks and the towing devices are adequate. Connect trailing equipment to a drawbar or hook only. Never straddle a wire rope cable or similar device, nor allow others to do so.
- No personal should be between the machine and trailing equipment when maneuvering to connect them. Block the tongue or hook of trailing equipment to align it with the drawbar or hook.

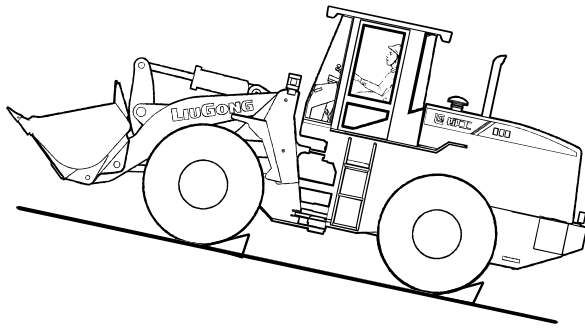
Engine Stopping

- Do not stop the engine immediately after machine has been operated under load. This can cause overheating and accelerated wear of engine components.
- After the machine is parked, allow the engine to run for five minutes before shutoff. This allows hot areas of the engine to cool gradually.

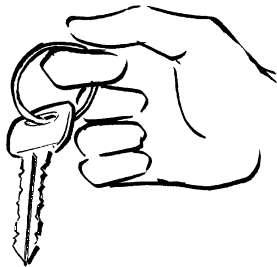
Parking

- Park on flat, level ground where there is no danger, such as a falling rock, and lower the implement to ground. If the hypsography is low, there is no danger where is flood.

- If it is necessary to park the machine on a slope or incline, lower the implement to the ground, engage the parking brake and shut off the engine. Place chocks under the wheels to prevent the machine from moving.



- Engage the service brake. Put the shift control lever to HOLD position and lower the bucket to the ground.
- Engage the parking/secondary brake control lever.
- Turn the battery disconnect switch to the OFF position. If the machine will not be operated for an extended period of time, remove the key to avoid battery discharge that may be caused by a battery short circuit, by the current leaking via certain components, or by damaged.
- When leaving the machine, lay the bucket completely on the ground, lock the controls with the locking devices, turn off the engine and pull the parking brake switch to the brake position. Lock all equipment covers and doors with the key. Remove the key and keep it with you.



Lower the Implement with Engine Shutoff

- Before lowering any implement with the engine shutoff, clear the area around the implement of all personnel.

CAUTION: For the machine controlled by electro-hydraulically control lever, in order to lower the implement, the engine start switch must be on ON position. Turn the engine start switch to OFF position after lowering the implement.

- In order to lower the implement to the ground or trailer, move all control levers to DOWN position. When release them, they will back to HOLD position.

Sound

The sound performance offered for this machine is the standard in European Union Countries and in countries that adopt the EU Directives.

A-Weighted emission sound pressure level, L at the operator's position measured according to "ISO 6396" is 85dB(A) for cab offered by Liugong.

Operator Station

This machine equipped the cab, which meet with industry standard: SAE J154 and ISO 3411.

Any modification to the inside of the operator station should not project into the operator space. The addition of radio, fire extinguisher, and other equipment must be installed so that the define operator space maintained. Any item that is brought into the cab should not project into the defined operator space. A lunch box or other loose items must be secured. Objects must not pose an impact hazard in rough terrain or in the event of a tipping.

Steering Frame Lock

- Connect steering frame lock when the machine is being lifted and shipped. Also connect the steering frame lock when you maintaining near articulation joint.
- Disassemble the steering frame lock before operating the machine.
- More information, please refers to “Steering Frame Lock” on page 53 in operation section.

Key Spare Parts to be Periodically Changed

No.	Key spare parts to be periodically changed	Q' ty	Changing intervals
1	Filter element of hydraulic oil tank	2	Every year or every 2000h(To see which one comes earlier)
2	Fuel hose(fuel tank—fuel pre-filter)	1	Every 2 years or every 4000h(To see which one comes earlier)
3	Fuel hose(fuel pre-filter—fuel lift pump)	1	
4	Fuel hose(fuel return pipe)	1	
5	Steering cylinder seals	2	
6	Hose(pump—pilot valve)	1	
7	Hose(pilot valve—metering pump)	2	
8	Hose(metering pump—steering cylinder)	2	
9	Hose(left steering cylinder—right steering cylinder)	4	
10	Brake cylinder seals	1	
11	Brake hose(brake valve—front axle)	1	
12	Brake hose(brake valve—rear axle)	1	
13	Brake hose(brake valve—accumulatro I)	2	
14	Brake hose(brake valve—accumulatro II)	2	
15	Brake hose(brake valve—accumulatro III)	1	
16	Brake hose(brake valve—parking brake)	1	
17	Accumulator	3	

Application and Specification

Applications

This loader is a kind of engineering machinery mainly used for loading & unloading loose materials. It is mainly used for loading, unloading, bulldozing and traction operation etc. at mine areas, ports and docks, capital construction, road repair and steel & iron enterprises etc. It is a kind of multi-purpose and high efficiency engineering machinery.

This loader is a kind of general-purpose engineering machinery and is not suitable for the flammable, explosive, dusty and air poisonous environments.

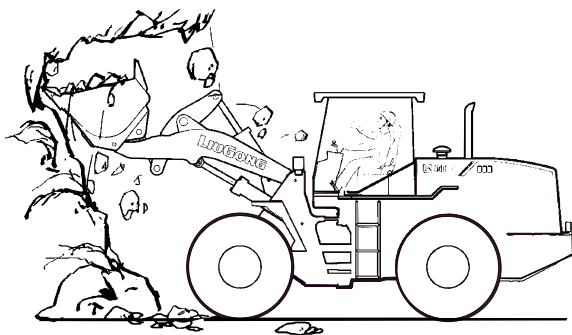
Requirements of Work Environments

- 1) Altitude: $\leq 3048\text{m}$
- 2) Environmental temperature: $-15\text{ }^{\circ}\text{C} \sim 40\text{ }^{\circ}\text{C}$
(The cold starting Aid device is not available)
- 3) Water Depth: $\leq 630\text{mm}$

Forbidden Operation

1. Overload use.
2. Hoist the heavy articles by directly hanging the slings on the bucket teeth.
3. Raise the bucket and excavator above the machine.

! CAUTION: Preventive measures for operation, maintenance and safety rules outlined on this manual are only suitable for the stipulated applications of the machine. Do not use the machine beyond the stipulated application scope, Guangxi Liugong Machinery Co., Ltd will not bear any safety liability, and these safety liabilities will be born by users. Under any cases, do not use the forbidden operation outlined in this manual.



Main Specifications

All rated lift capacities are based on the criteria of the machine being levelled on a hard and flat ground. When the machine is operated in conditions that deviate from these criteria (e. g. on soft or uneven ground, on a slope or when subject to slide loads), these conditions shall be taken into account by the operator.

Machine Specifications

Implement		Unit	
Rated Bucket Capacity		m ³	3.5
Rated Load Weight		kg	6000
Boom Lifting Time (Under Full Load)		s	≤ 6.3 ± 0.2
Total Time		s	≤ 11.5 ± 0.2
Max. Traveling Speeds	Forward 4th Speed	km/h	36
	Forward 3rd Speed	km/h	23
	Forward 2nd Speed	km/h	11
	Forward 1st Speed	km/h	6
	Reverse 1st Speed	km/h	6
	Reverse 2nd Speed	km/h	11
	Reverse 3rd Speed	km/h	23
Max. Traction Force		kN	≥ 165
Max. Breakout Force (Bucket tilting)		kN	≥ 198 ± 5
Max. Gradeability			30°
Min. Turning Radius	Rear Wheel Center	mm	≤ 6290
	Outside Front Corner of Bucket	mm	≤ 6995
Overall Dimensions	Overall Length (Bucket on Ground)	mm	8480 ± 100
	Overall Width (Outside of Wheel)	mm	2800 ± 50
	Bucket Width	mm	3010 ± 30
	Overall Height (Top of Cab)	mm	3467 ± 40
	Wheel Base	mm	3350 ± 30
	Tread Width	mm	2200 ± 10
	Min. Ground Clearance (at Articulation joint)	mm	430 ± 50
	Max. Dump Height	mm	≥ 3150 ± 50
	Dump Reach	mm	≥ 1200 ± 50
Operating Mass(with cab)		kg	19200 ± 100
Driver's Seat	Above steering articulation frame		

Main components Specifications

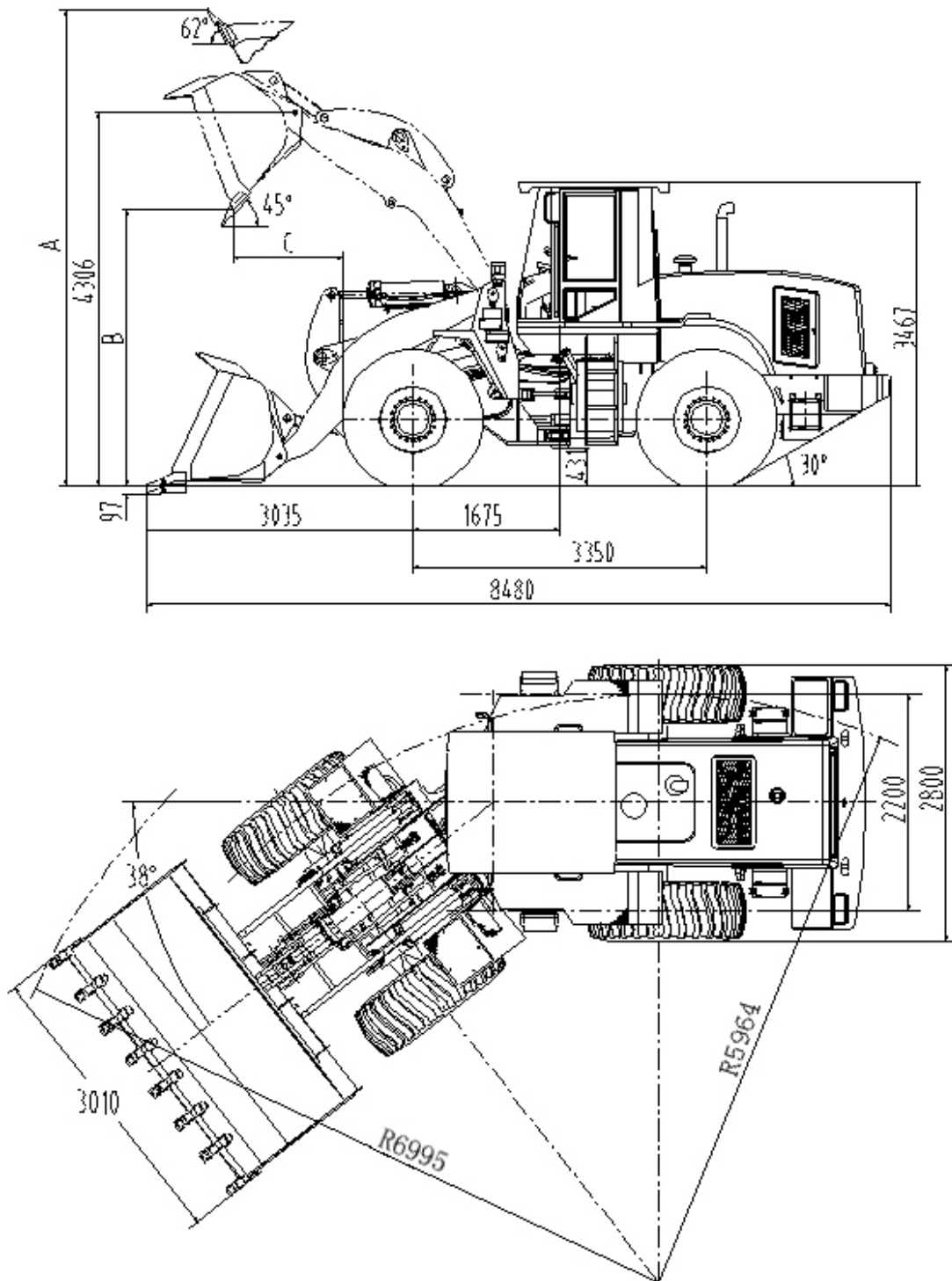
Power system	Engine	Diesel engine	Cummins 6CTA8.3-C240
		Rated speed	2200r/min
		Max. torque	1017N · m/1500r/min
		Rated fuel consumption (bench test)	231g/kw.h
		Fuel	No.0 or No. -35 light diesel fuel
		Diameter of fan (ventilation)	810mm
Power train system	Torque converter	Model	Single turbine
		Torque ratio	2.55
		Cooling type	Oil cooled, forced circulation type
	Transmission	Type	Fixed shaft power shift
		Gear position	Four forward speeds and three reverse speeds
		Operating pressure of shift oil pump (gear pump)	1.6~1.8MPa
	Bevel gear and final drive	Type of bevel gear	Spiral bevel gears single reduction
		Type of final drive	Spur gear planetary reduction
		Reduction ratio	24.485
		Bevel gear ratio	4.625
		Final drive ratio	5.294
	Axles and wheels	Type	Four-wheel drive
		Tyre	23.5-25-20R
		Front tyre pressure	0.425 ± 0.01MPaa
		Rear tyre pressure	0.325 ± 0.01MPa
Hydraulic system	Steering hydraulic system	Type	Articulation frame, hydraulic power steering system
		Steering cylinders-bore × stroke	2- φ 90 × 486mm
		Steering pump	P257-G63487ZGA6/P124-G20ING
		System pressure	17.5MPa
		Flow	127L/2200r/min
		Steering angle	38°±1° each
	Work hydraulic system	Boom cylinders--bore × stroke	2- φ 180 × 740mm
		Steering cylinders--bore × stroke	φ 200 × 556mm
		Control valve	Tandem spool type
		Work pump model	P360-G135367PP6G
		Flow	262.5L2100r/min
		System pressure	20.7MPa
		Pilot pressure	3.5MPa
		Work implement	Single lever, Z bar



Main components Specifications

Brake system	Service brake(foot brake)	Type	Hydraulic, wet type multi-disc brake
		Brake oil pressure	4.8±0.3MPa
		Cut-in pressure of charging valve	12.8MPa
		Cut-off pressure of charging valve	15.9MPa
		Service brake low pressure alert pressure	9MPa
		Nitrogen pre-charge pressure of accumulator(II,III)	5.2MPa
	Parking brake	Type	Automatic and manual activated drum type
		System pressure	15MPa
		Parking brake low pressure alert pressure	6MPa
		Cutoff pressure of parking brake	5.5MPa
		Nitrogen pre-charge pressure of accumulator(I)	9MPa
Air conditioning system	Heating	Work media	Engine coolant
		Heating capacity	5000K Cal/h
	Cooling	Work media	Freon free, R134a
		Cooling capacity	4000K Cal/h
	System voltage		24V
Electrical system	System voltage		24V
	Battery		Two 37B0108
	Bulb voltage		24V
	Engine starting		24V Electric start
Filling capacity	Fuel		320L
	Hydraulic oil		210L
	Crankcase		22L (See dipstick to determine actual volume)
	Transmission system		45L (See dipstick to determine actual volume)
	Front axle(Bevel gear and final drive)		45L (See dipstick to determine actual volume)
	Rear axle(Bevel gear and final drive)		50L (See dipstick to determine actual volume)

Exterior Drawing of CLG862 Wheel Loader



Operation Manual

Before Operation

Mounting and Dismounting

- When mounting and dismounting the machine, check the condition of the ladder and handrails. Remove any grease, lubricant etc. Repair the damaged parts and tighten the loose bolts
- Only mount or dismount the machine with a ladder or handrail.
- Face the machine before getting on or off the machine, grab the handrails with both hands and step onto the ladder. Touch at three points simultaneously (two feet and one hand or two hands and one foot) to ensure stability of the body. Never jump off the machine.



- Never mount or dismount a moving machine. Never take any operation levers as handhold when mounting or dismounting the machine.
- Do not try to climb on or off the machine when carrying tools or other items. Use a rope to pull tools up onto the platform.

Daily inspection

For a maximum service life of the machine, complete a through walk-around inspection before you mount the machine and before you start the engine.

Inspect the area around the machine and under the machine. Look for loose bolts, trash buildup, hydraulic oil, coolant leakage, broken parts, or worn parts.

Inspect the condition of the implement and the hydraulic components.

Check all of the oil levels, all of the coolant levels, and all of the fuel levels.

About more information, please refer to page 83, "Maintenance Intervals Schedule"

Operator Controls and Instrument Panels

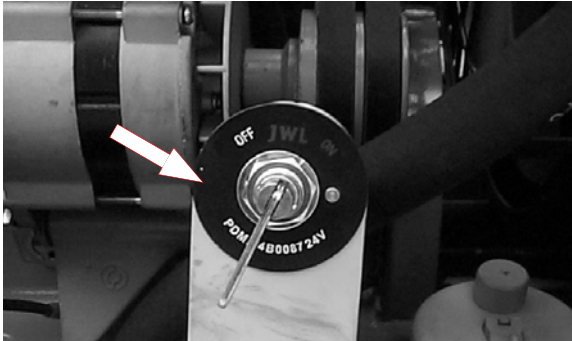
Battery Disconnect Switch

- The battery disconnect switch is located on the right rear side of the rear frame, near the left access door of the engine hood.



A. Disconnect switch--ON

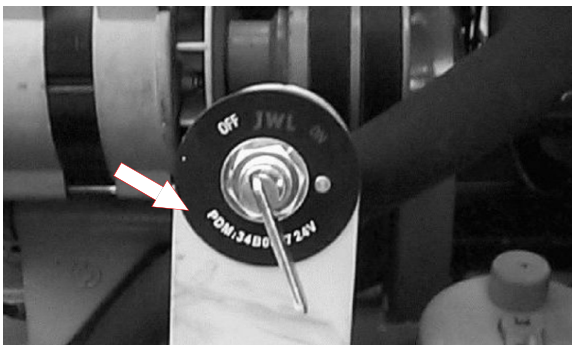
In this position, the battery disconnect switch key will point to the ON position.



Turn the battery disconnect switch key clockwise to ON position before you start the engine.

B. Disconnect switch--OFF

In this position, the battery disconnect switch key will point to the "OFF" position.



To shut down the electrical system, turn the battery disconnect switch key counterclockwise to OFF position.

The battery disconnect switch and the engine start switch perform different functions. To disable the entire electrical system, turn the battery disconnect switch to the OFF position. But the battery remains connected to the electrical system when you just turn off the engine start switch.

Turn the battery disconnected switch to the OFF position and remove the key when you serving the machine or when the machine will not be used for an extended period of a month or more. This will help to prevent discharge of the battery.

! WARNING: Turning the battery disconnect switch off while the engine is running may damage the electrical System!

Engine Start Switch

The start switch (also called ignition switch) is located on the right side console and it has four gears in clockwise direction. See the following picture.



1. **Aux---**The first position when inserting the start switch key and rotate counterclockwise. The key can reset automatically to OFF position after it is released. This position is not applicable on this machine.
2. **OFF---**The start switch key can only be inserted or taken out in this position. The engine is shut down and the power is cut off. All of the other electrical appliances can not be turned on except the hood lift motor switch and sound system.

! NOTICE: Only insert or take out the start switch key at OFF position!

3. **ON---**The first position when insert the start switch key and turn it clockwise. The electrical system of the machine can turn on and work normally.

4. **START**---The second position when inserting the start switch key and turn it clockwise. The engine will be turned on and work. Release the start switch key after starting the engine. This position can not hold on automatically and the key will reset to ON position automatically after released.

In order to protect the start switch, take out the start switch key and cover the key hole with jacket after the start switch is turned off.

⚠ NOTICE: The battery disconnect switch must be at ON position and the shift control lever must be in NEUTRAL before starting the engine.

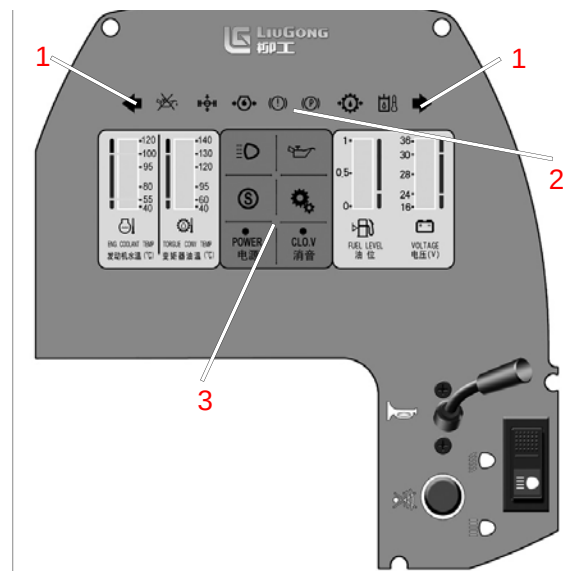
⚠ WARNING

If the engine fails to start, turn the start switch to the I position before restart or the start switch could be damaged!

Do not engage the start switch for more than 15 seconds at one time. Wait at least 30s before restarting. Do not exceed three time consecutive attempts before allowing the start motor and choke solenoid to cool down. Failure to comply could result in a reduction of the service life of the battery as well as damage to the start motor and solenoid.

Instrument Panel

Most of the gauges, alarms and steering indicators are integrated in the instrument panel under the steering wheel. Service hour meter is installed on the control box on the right side of the seat. There are fourteen items showed on the instrument, namely, transmission oil temperature, coolant temperature, transmission oil pressure, fuel level, engine lubricant pressure, power voltage, oil clogged alert, parking brake low pressure alert, service brake low pressure alert, centralized lubrication system alert, hydraulic oil temperature alert, service hour meter and left and right turn indicator.



1. Turn indicator
2. Alert indicators
3. Combined indicators

1. Turn indicators

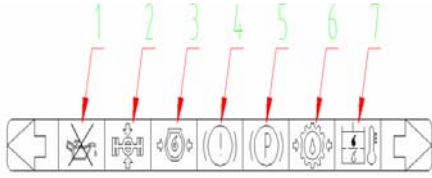


The left indicator flashes when the machine turns left, the front & rear left turn signal light will also flash simultaneously.



The right indicator flashes when the machine turns right, the front & rear right turn signal light will also flash simultaneously.

2. Alert indicators



(1) Centralized lubrication alert indicator (Optional)

When the red indicator flashes, it indicates fault of the centralized lubrication system. (NOTE: the centralized lubrication system is optional. Only when the machine is equipped with centralized lubrication system can this indicator work).



(2) Axle oil low pressure alert indicator (Not available)



(3) Engine oil pressure alert indicator

This is warning category II. The red indicator will illuminate when the engine oil pressure is too low. The buzzer will sound at the same time. Stop the engine to check.



(4) Service brake low pressure alert indicator

This is warning category II. When the service braking oil pressure is too low, this indicator turns on. The buzzer will sound at the same time. Stop the machine to check unless the fault is eliminated.



(5) Parking brake low pressure alert indicator

The illumination of this red alert indicator indicates the hydraulic oil pressure of the parking brake is too low. Stop the machine to check. (Unavailable on this machine)



(6) Transmission oil pressure alert indicator

The red indicator will flash when transmission oil pressure is too low. Stop the engine to check. (Unavailable on this machine)

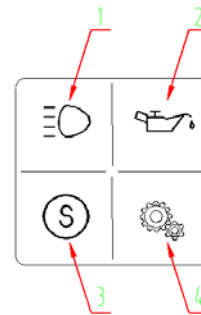
CAUTION: Park the machine on a safe and convenient place for repair when the transmission oil pressure alert indicator is flashing. Check the transmission and transmission oil level. Refill if the oil level is too low. Never go on work or run the machine before eliminating the fault.



(7) Hydraulic oil temperature alert indicator (Unavailable on this machine)

CAUTION: Park the machine on a safe and convenient place for repair when the hydraulic oil pressure alert indicator is flashing. Check the hydraulic oil tank and oil level. Never go on work or run the machine before eliminating the fault.

3. Combined indicators



(1) Front floodlight high beam indicator

The blue indicator indicates the front floodlight is at high beam when it turns on. The blue indicator illuminates.



(2) Centralized lubrication indicator (Optional)

The green indicator indicates that the centralized lubrication system is working when it turns on.
(NOTE: the centralized lubrication system is optional. Only when the machine is equipped with centralized lubrication system can this indicator works.



(3) Start state indicator

The yellow indicator indicates that the start motor is at start state.



CAUTION: The start indicator should be off when the start switch resets from START position to ON position during starting the engine. The engine turns out to have a fault if the indicator continues to illuminate. Turn off the power (turn the start switch to OFF position then turn off the disconnect switch) to check the engine or wirings. Do not work or run the machine continually until the fault is eliminated.



(4) Clutch cut-off indicator

The machine is at clutch cut-off state when the yellow indicator turns on. If the indicator goes off, it indicates that the machine is out of clutch cut-off state.

There are two warning categories in this monitoring system which is divided according to the severe degree.

- Warning category I: Indicators flash.

This warning category includes alert from transmission oil pressure, axle oil pressure, hydraulic oil temperature and centralized lubrication system indicator.

- Warning category II: Indicators flash and buzzer sounds.

This warning category includes engine lubricant pressure alert and service brake low pressure alert.

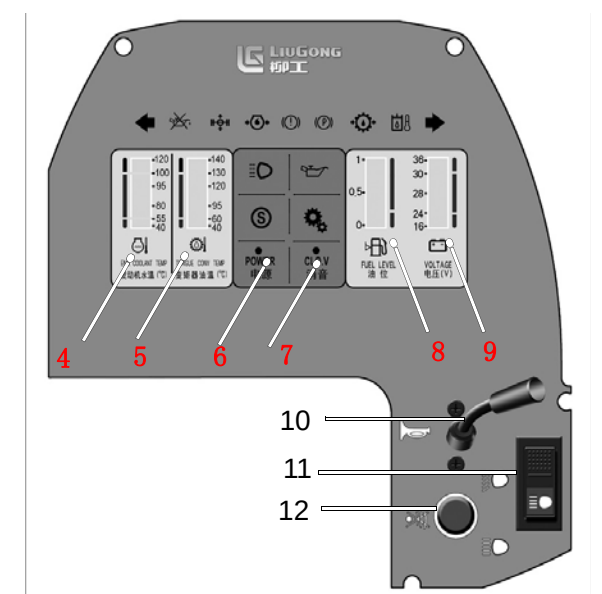
When the start switch is turned on before starting the engine, some indicators such as engine lubricant pressure indicator will alert. After the engine is started successfully for 2 or 3 seconds, all of the indicators will get the normal range, then the indicators and buzzer will stop alerting.



WARNING

Each warning category should be given attention. Stop and check immediately when an alert is found.

When warning category II happens (service brake low pressure alert, engine lubricant pressure is too high or too low), shut down the engine and check for fault. Never go on work or running until the fault is eliminated.





4. Engine coolant temperature gauge

This gauge indicates the coolant temperature of the engine. The normal range is between 65 °C ~100 °C. When the coolant temperature is more than 100 °C, the relevant LCD will flash.

CAUTION: Shut down the engine when the engine coolant temperature indicator flash. Park the machine on a safe and convenient place for repair. Check the engine fan, belts and the radiator coolant level.

WARNING: When checking the engine fan, belt and water tank level, be extremely careful to avoid injury. Keep away from the moving parts to avoid being injured and keep away from hot parts to avoid being burnt.



5. Torque converter oil temperature gauge

This gauge is used to indicate the oil temperature of torque converter. The normal range should be between 55 °C ~127 °C. When the temperature is more than 127 °C, the relevant LCD will flash.

CAUTION: When torque converter oil temperature LCD flashes, please park the machine on a safe and convenient place for repair. Check the transmission and transmission oil level. Never go on work or run the machine before eliminating the problem.

6. Power source indicator

This red indicator will turn on when the instrument is powered.

CAUTION: During engine starting process, the start motor indicator should go off when the key resets from START to ON. If the indicator is still on, then the start motor contact is adhesive or the wiring has trouble. Turn off the power immediately (turn the start switch key to OFF position then turn off the disconnect switch)

7. Alert mute indicator

Press the buzzer alert mute switch, the buzzer will stop beeping, and the alert mute indicator will turn on at the same time; press the mute switch again, the buzzer will beep again and the indicator will go out.



8. Fuel level gauge

This gauge indicates the fuel level of the machine. It has two zones. **1** indicates a full fuel tank, **0** indicates an empty fuel tank. Replenish fuel immediately if the pointer points to 0.2 on the gauge. If the pointer points to 0.2, please make sure there is enough time for the driver to refill fuel.



9. Voltmeter

It indicates the power voltage of the machine. Normal power voltage is about 26 V. When the voltage is below 24 V or over 30 V, the relevant LCD will flash to alarm.

CAUTION: Park the machine on a safe and convenient place to service if the voltage indicator gives an alarm.

10. Turn signal light switch

When pushing the turn signal light switch forward, the left turn indicator will flash, and the front & rear left turn lights will also turn on simultaneously.



When pushing the turn signal light switch backward, the right turn indicator will flash, and the front & rear right turn lights will also turn on simultaneously.



11. Front floodlight switch

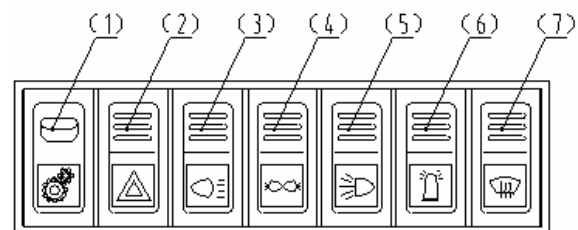
This switch has three positions, high beam, OFF, low beam.



When any one of the indicators turns on, for example, steering system alert, engine oil pressure alert, parking brake low pressure alert indicator or service brake low pressure alert indicator, then the buzzer will beep. Stop the machine to repair until the fault is eliminated.

CAUTION: Do not turn on this key when working or traveling, otherwise serious consequence could be resulted

Switch Panel



12. Buzzer mute key

Press the buzzer mute key, the buzzer will stop beeping, and the alert mute indicator turns on at the same time; press the buzzer mute key again, the buzzer will beep and the alert mute indicator will go out.

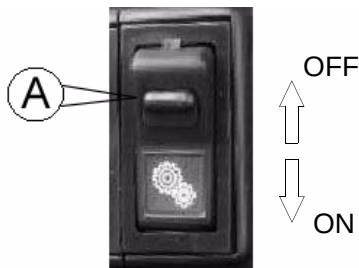


1. Clutch cut-off switch
2. Hazard flasher switch
3. Rear floodlight switch
4. Position switch
5. Work light switch
6. Rotating beacon switch(Optional)
7. Defroster switch(Optional)
8. Service hour meter



1. Clutch cut-off switch

A lock buckle is provided this switch; press the buckle downwards before using the switch! Otherwise the switch will be damaged!



When the clutch cut-off switch is turned on, the shift control valve will cut off the power output of the transmission as the driver depresses down the service brake pedal.

When the clutch cut-off switch is turned off, the power cutoff function will be cancelled, the power output of the transmission will not be cut off even the service brake is depressed down.

CAUTION: The clutch cut-off function can be used in F1, F2 or R1, R2. When the loader is at high speed, to ensure safety operation, even if clutch cut-off switch is turned on, the control box will not cut off power output of the transmission.

! WARNING

When operating the machine on flat ground, the operator should use the clutch cut-off function. Otherwise the performance of the brakes, service life of the brake system and the transmission will be affected!

For safety concern, when the loader is working on slope or steep slope, do not use the clutch cut-off function!



2. Hazard flasher switch

After turn on the hazard flasher switch, both turn signal lights will flash simultaneously, it functions as a warning light when the machine stops in case of danger and emergency.

NOTICE: The left and right turn signal lights switches will not work after the hazard flasher switch is turned on. Therefore, please turn off the hazard flasher switch when starting the machine.



3. Rear floodlight switch

This switch controls on and off of the left and right rear floodlight switch simultaneously.



4. Position light switch

This switch controls the on and off of the position light.

When the position light switch turns on, the four position lights of the machine will turn on.



5. Work light switch

The work light switch controls on or off of the work lights simultaneously.



6. Rotating beacon switch (Optional)

The rotating beacon switch controls on or off of the rotating beacon located on the top of the cab.



7. Defroster switch (Optional)

Defroster switch controls on or off of the rear window defroster.

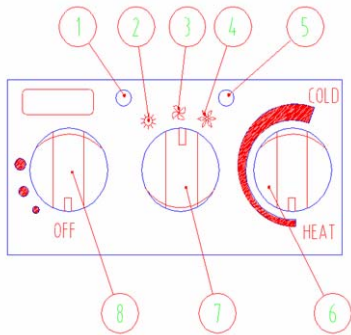


8. Service hour meter

Service hour meter indicates the total work hours of the machine, unit in hour. When start the engine, the service hour meter will start to time. The accumulated work hours of the machine will be shown on the LCD.

Air Conditioner Panel

The air conditioner panel is located on the left side of the steering column.



1. Red indicator
2. Warm air
3. Natural air
4. Cold air
5. Green indicator
6. Temperature control switch
7. Work mode switch
8. Fan speed switch

The air conditioning system is provided with three functions: cooling, heating, dehumidifying & natural air.

Turning the fan speed switch clockwise will increase the fan volume and vice versa. Three positions are available: high, medium, low. Turning the switch to OFF position will turn off the fan.

There are three choices for work mode switch: warm air(left), natural air (middle), cool air (right).

Turn the temperature control switch clockwise to reduce the temperature and counterclockwise to raise.

Cooling

1. After start the engine, turn the fan speed switch to proper position.
2. Turn the work mode switch clockwise to Cool Air position.
3. Turn the temperature control switch to COLD, the green indicator will turn on and cool air will come out.
4. Adjust the the temperature through the temperature control switch.

Heating and dehumidifying

1. After starting the engine, turn the fan speed switch to proper position, and turn the temperature control switch to HEAT position.
2. Turn the work mode switch to Warm Air position, then the red indicator will turn on, the system starts to heat, warm air will come out.
3. Turn the temperature control switch to proper position to adjust the warm air temperature or dehumidify. The green indicator will turn on.

Natural air

Recirculating air and fresh air device are provided for this air conditioner system. Turn on the fan speed switch proper position, then turn the work mode switch to middle position to regulate the air.

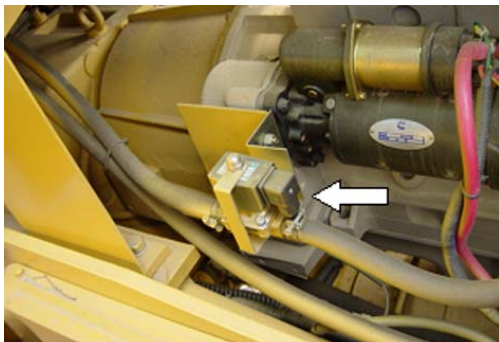
Warm water valve

The heating function of the air conditioning system can be obtained by this: the engine coolant flows through the evaporator of the air conditioning system to release heat. A manual warm water valve is provided on the water inlet pipe of the engine. A solenoid water valve (inside the evaporator) is provided between the water inlet and the evaporator controlled by heating button.

Warm water valve



Water solenoid valve



During normal operation, the manual warm water valve should be at ON position (the warm water valve direction is identical to that of the hoses). The warm air is controlled by the solenoid water valve. If it is necessary to repair the air conditioning system due to fault, firstly turn off the manual warm water valve (the warm water valve direction is vertical to hoses) to prevent coolant loss. Open the warm water valve and solenoid water valve to replace the evaporator coolant together while replacing the engine coolant. Make sure the engine coolant level is correct.

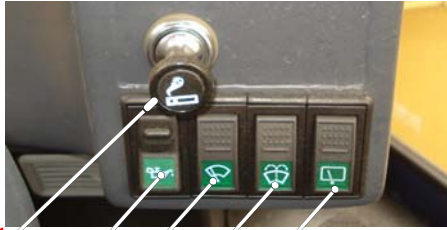
WARNING

When the ambient temperature is below 0 °C , the engine doesn' t work, if the coolant of the engine doesn' t fill with antifreeze, the engine reservoir should be emptied, and open the warm water valve and solenoid valve at the same time, discharge the coolant in the evaporator, otherwise the radiator pipeline will be damaged by freezing due to the low temperature !

Right Instrument Panel

The right instrument panel is located on the right side of the steering column.





1. Lighter
2. Centralized lubrication switch(Optional)
3. Front windshield wiper switch
4. Rear windshield washer switch
5. Rear windshield wiper switch

1. Lighter

Push down the lighter, the lighter will be turned on and begins to heat. The lighter will spring out when it is hot enough. Pull out the lighter for smoking.

The socket of the lighter can be used as a power supply interface of 24 volts DC, the maximum power supply current is 10 Amp.

2. Centralized lubrication switch

This switch is used to open or close the lubrication system.

.A lock buckle is provided this switch; press the buckle downwards before using the switch, Otherwise the switch will be damaged.



3.Front windshield wiper switch

There are three positions of the front windshield wiper: stop, low and high .

The wiper can reset automatically after released.



4.Washer switch

The washer will work and spray water from reservoir to windshield by pressing the switch. The washer will stop spraying after released and it will reset automatically. The washer reservoir is located on the rear right side of the seat, as show below.

Washer reservoir



5.Rear windshield wiper switch

There are three positions of the rear windshield wiper: stop, low and high. The wiper can reset automatically after released.

WARNING

Frequent check should be given to the reservoir to find out whether the water has been used up; otherwise the normal viewing may be impacted.

The washer reservoir should be emptied or filled with antifreeze when the ambient temperature is below 0 °C , or the washer will not work or even be damaged by freezing!

Steering Wheel



Articulate full-hydraulic power steering is provided on this machine, the steering wheel is in the cab and it is connected to the full-hydraulic metering pump. In normal operation, turn the steering wheel clockwise, the machine will turn right; turn the steering wheel counterclockwise, the machine will turn left.

The characteristics of the full-hydraulic power steering are as follows:

1. The steering angle of the steering wheel is not the same with the turning angle of the machine, turn the steering wheel continuously to increase the turning angle of the machine until the desired position is obtained.
2. The machine turning speed is on direct proportion with that of the steering wheel.
3. The steering wheel can not reset automatically when releasing it. But the steering angle will not change. Turn the steering wheel counterclockwise to let the machine run in a level direction after turning is finished.

Horn Switch

There are two horn switches on this machine, one is located in the center of the steering wheel, the other one is located at the end of the combination switch. The functions of these two switches are the same, the horn will hoot when press down any one of the switches. The operators can use the switches according to their operation habits.



Service Brake Pedal



The service brake pedal is located at the front left side of the driver's seat. The brake system has single brake pedal and single circuit system. Depress down the service brake pedal, the front and rear axle will brake and the brake light will turn on.

If the clutch cut-off switch is turned on and the transmission is at first and second position, depressing down the brake pedal, then the transmission will shift to neutral automatically to cut off the power output. If the transmission is at the third and fourth position, the transmission will not shift to neutral even if the brake is depressed down.

If the clutch cut-off switch is turned off, the transmission will not shift to neutral even if the brake is depressed down.

Release the brake pedal to disengage the serviced brake.

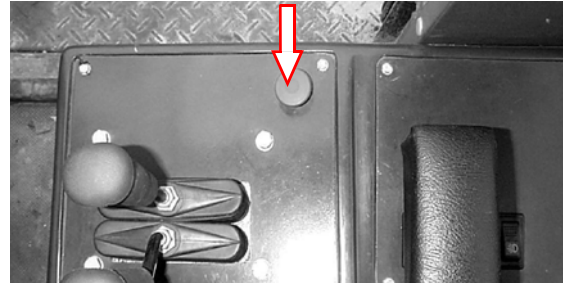
Accelerator Pedal



The accelerator pedal is located at the front right side of the driver's seat. The diesel engine oil supply and the engine speed will increase by depressing down the pedal while the supply declines and the engine speed slows down by releasing it.

Turn the start switch key counterclockwise to OFF position to shut down the engine.

Parking Brake Button



! CAUTION:CAUTION: Unless the service brake pedal can not work, otherwise do not use this parking brake button during driving. Take the parking brake button as the service brake pedal that used in the operation will damage the brake system seriously.

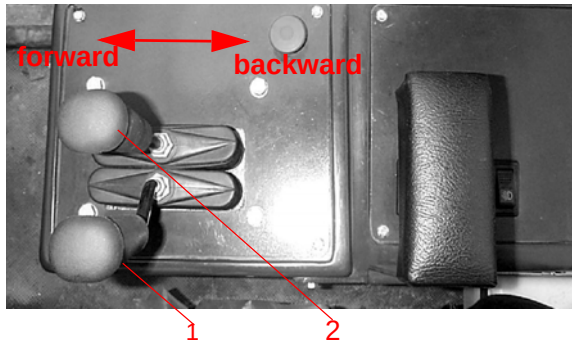
The parking brake button is located on the right side of the driver's seat. Pull it up to engage the parking brake, press it down to disengage the parking brake.

The parking brake is also used as emergency brake. When the machine works under emergency condition, pull up the parking brake button to engage emergency brake. If the machine is at the 1st or 2nd gear, the transmission also automatically shifts to NEUTRAL.

When the service brake system has faults, and the oil pressure of the service brake circuit is below 5.5 Mpa, the parking brake system will work automatically to ensure running safety.

Work Implement Control Lever

Boom and bucket control levers are installed on the right side of the seat. They are respectively used to control the boom and bucket. The lever is naturally at the NEUTRAL position when the engine stops.



1. Boom control lever
2. Bucket control lever

1. Boom Control



Raise

When pull the control lever backward, the boom will raise.

Boom lift kickout: pull the control lever backwards till it reaches to the limit position, then the control lever will stay at this position (it will not reset after released); when the boom reaches to its maximum height, the boom lift kickout switch will actuate and the control lever will return back to the NEUTRAL position, the boom will not raise any more.



Lower

Push the control lever forwards, the boom will lower.



Hold

During operation, the control lever will reset to the NEUTRAL position by releasing it and the boom will stay at the position that is selected.

Float



Push the control lever forwards till it reaches the limit position, then it will stay at that position (the control lever will not reset after released) and the boom is at FLOAT state.

When scraping or loading, push the lever to the FLOAT position, then the bucket will raise or lower along with the ground to avoid damaging the ground.

When lowering the boom, please push the control lever to FLOAT position, and then the boom will lower slowly due to its weight, the driver can operate other implement freely to increase efficiency.

Turn the control lever to NEUTRAL position to cancel FLOAT state.



CAUTION: Do not use FLOAT when lowering the bucket with a load. The quick lowering speed of the bucket will damage the machine.

2. Bucket control



Dump

The bucket will dump forwards when pushing the control lever rightwards.



Hold

During operation, the control lever will reset to the NEUTRAL position by releasing it and the bucket will stay at the position that is selected.



Tilt back

Push the control lever leftwards, and then the bucket will tilt back.

3. Bucket Positioning

If the bucket is at DUMP condition, turn the control lever left to the limit position, the control lever will hold at the limit position. (The lever does not reset to the NEUTRAL position after releasing it), the bucket tilts backward all the time till it tilts to the bucket positioning position. Then the control lever automatically reset to the NEUTRAL position and the bucket holds at bucket positioning position.

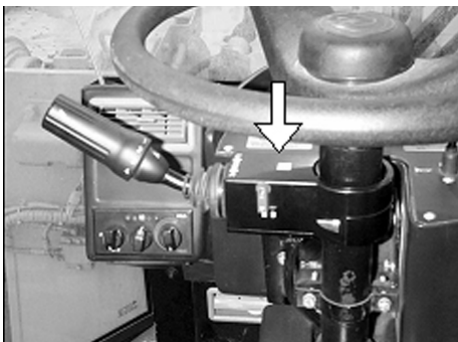
When turning the control lever left to the limit position again, The control lever will be not attracted (it resets to NEUTRAL position after releasing it).

Only when pushing the control lever right and forward and the bucket dumping angle exceeds the bucket positioning position, the switch of the bucket positioner will reset and the auto-positioning function of the bucket will recover. Turn the control lever left to the limit position, then the control lever will hold at the limit left position.

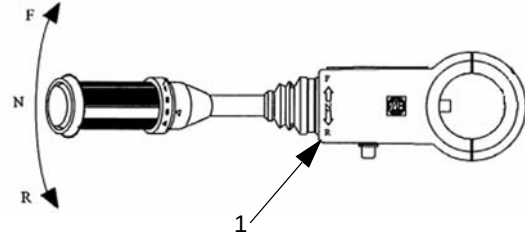
When the bucket is dumping, the control lever does not have HOLD function. Turn the control lever rightwards and the lever will reset to NEUTRAL position after releasing it.

Shift Control Lever

A semi-auto shift control lever is provided for this machine. See the following picture.



Direction Selection



F: Forward
R: Reverse
N: Neutral

1. Shift control lever

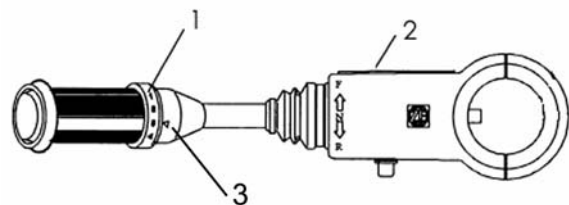
Forward: push the lever forwards, the machine will run forwards (with lever at F position).

Neutral: turn the shift control lever to NEUTRAL position, the machine should not move. Only when the shift control lever is in NEUTRAL position can the engine start. (With lever at N position)

Reverse: push the shift control lever backwards then the machine will run backwards. (With lever at R position)

Speed Selection

Rotate the shift control lever. The number in the arrow direction as illustrated in the picture is the selected position. This machine has four forward positions and three reverse positions. When the shift control lever is in the R4, actually it is in R3.

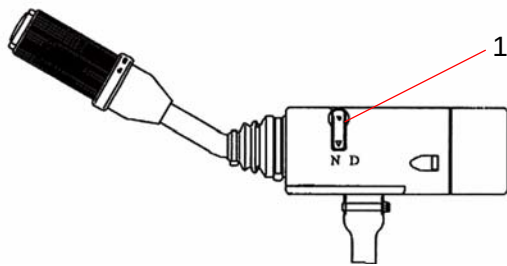


(1) Position
(2) Shift control lever
(3) Position indication arrow

The actual speed value of the machine will display on the speedometer on the central instrument panel.

Special Functions of the Shift Control System

1. Neutral Locking Function



(1) Neutral lock switch

Push the shift control lever to NEUTRAL, and turn the lock switch (1) to position (N), the shift control lever is locked at NEUTRAL position. Turn the lock switch (1) to position (D), the shift control lever is released, and the machine can be operated normally.

Generally, when the machine is at maintenance or in parking condition, in order to prevent the incorrect operation, please turn the lock switch (1) to position (N) to lock the shift control lever at NEUTRAL position.

Use this switch to prevent the incorrect operation.



When the shift control lever is locked at NEUTRAL position, it is forbidden to shift forward or reverse without releasing the neutral locking, otherwise the shift control lever will be damaged!

2. Neutral/Start Interlock Protection Functions

The electrical system of the machine has neutral/start interlock protection function, start the engine only after the shift control lever is at NEUTRAL position so as to prevent unexpected accidents due to sudden actions.

3. Direct Forward/Reverse Change Function

The shift control lever of the machine has no turning interlock function, the driver can directly change directions according to the running speed:

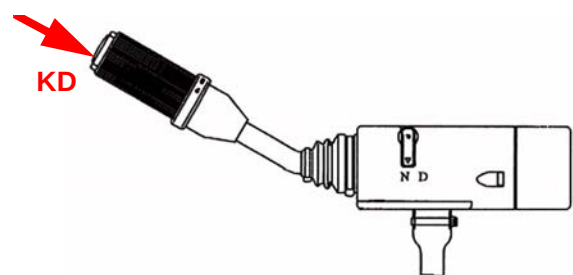
At forward 1st or 2nd gear, directly engage the corresponding reverse (F1 <=> R1 and F2 <=> R2) any time.

At F3 and F4, The driver should operate the shift control lever according to the running speed as the following rules:

When the machine exceeds the preset speed (normally 2nd gear is set as the maximum running speed), the system first automatically reduces to 2nd position at the present running direction and engages the 2nd position after a while, and finally changes speed to the preset position.

4. Forced Down Shift Function (Kick Down Key)

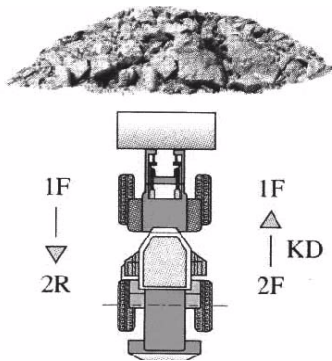
A kick down key (KD key) is provided. It is located at the end of the shift control lever. It is sliding type.



As above picture shown, the arrow direction is the operation direction of the KD key.

When the F2 or R2 is selected, slightly press KD key button, the transmission can automatically shift to F1 or R1.

The KD key function and the direct Forward/Reverse change function have supplied a convenience for gear shifting when loading materials. For example, when the loader runs close to the material stack at F2, push down the KD key, the gear can shift into F1 automatically; after loading, press down the key ↓, the gear will shift to R2 automatically. The loader will leave the material stack at R2 speed, so a high working efficiency can be achieved.



The KD key function will stop automatically when other position is selected, cancel the KD key function through the following ways:

- Pressing KD button again
- Reversing
- Turning the lever, changing the speed
- The lever is at NEUTRAL position

5. Start Speed Limit Function

To ensure the running safety, when the machine starts, the machine is limited to forward 1st & 2nd gear or reverse 1st & 2nd gear by the electronic control box.

It can shift to high speed position when the running speed exceeds the preset value after the machine starts.

To ensure the safety, the position is limited at F1, F2 or R1, R2 by the electronic control box when the machine starts. Only after the speed exceeds the setting value can F3, F4 be shifted. If the speed doesn't reach this value, the machine only can run in F2 (the road condition determines the running speed) even shift the gear to F3, F4. Therefore, the machine can run in high speed gear only after the starting and the running speed exceeds the setting value.

6. System Self-Protection Function

When abnormal information occurs (such as disconnected wiring, ground short-circuit of the electronic control box and odd signal) or power supply exceeds the specified limit or there is an open circuit, the electronic control box changes to NEUTRAL to lock all output signals so that operation mistake can be greatly prevented to ensure the running safety.



CAUTION: When the shift control system has a fault, never remove the transmission system without authorization. Consult with Liugong dealer or Service Company if the fault can not be eliminated.

7. Clutch Cut off Function (Drive Shut off Function)

Depress down the brake pedal after the clutch cut off switch is turned on (see the following picture), then the shift control valve will cut off the transmission power output.



When the clutch cut off switch is turned off, the power cut off function is canceled. That is, the transmission power output wouldn't be cut off when engaging brake.

⚠ CAUTION: The clutch cut off function only can be used in F 1, F 2 or R 1, R 2. To ensure the safe operation, when the loader is at high speed, even if the clutch cut off switch is turned on, the electronic control box will not shut off power output of the transmission.

⚠ WARNING

A lock buckle is provided on the clutch cut off switch. Unlock the buckle before turning off the switch, otherwise the switch could be damaged.

When operating the machine on flat ground, the operator should use the clutch cut off function. Otherwise the performance of the brakes, service life of the brake system and the transmission will be affected!

For safe operation of the machine, when the loader is working on sloping terrain or steep inclines, do not use the clutch cut off function!



Steering Column Adjustment



The steering column of the machine can be adjusted up/down/forwards/backwards within certain scope to meet different drivers' operation habit.

The adjusting handle is located in the middle of the steering column. It is connected with an air spring.

Adjust the steering column as follows:

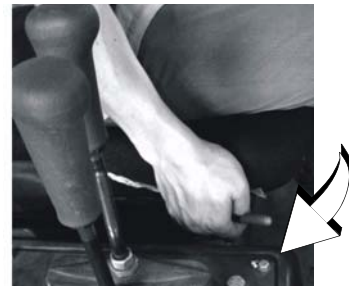
- (1) Raise the handle so that the handle ejects the check valve.
- (2) Hold the handle still, adjust the steering column up and down to proper position.
- (3) Release the handle, then the check valve will close automatically. The steering column adjustment is finished.

Seat Adjustment

The seat provided for this machine can be adjusted in the aspects of rigidity, height, fore-and aft direction, backrest angle and headrest height to meet the needs of different drivers in various working conditions.

1. Fore-and-aft adjustment

There is a handle on the front lower left side of the driver's seat. Pull the handle outside of the seat, the seat can be moved forward or backward. Adjust the seat to proper position then release the handle, the seat will be fixed. The seat can be moved forward or backward for 75mm, it only can be fixed on the locking point.



2. Height adjustment

There are three height positions available in the seat. The seat has been adjusted to the middle position ② before leaving the factory. The operator can adjust it as required. When adjusting the seat, as shown in the following picture, hold the base below the cushion with both hands, then pull it upward smoothly. After the seat is adjusted to proper position, release the handle, the seat will be fixed.



3. Backrest angle adjustment

There is a handle for backrest angle adjusting, as shown below. Turn the handle clockwise firstly, and then move the backrest forward or backward to a desired position, finally, release the handle, the backrest will be fixed on this position. The backrest can be adjusted to forward 12.5° , backward 15° .



4. Seat rigidity adjustment

The handle for seat rigidity adjustment is located under the seat, which can be used to adjust the rigidity of the seat in order to meet the different weight of the drivers. As shown below, turn the handle clockwise or counterclockwise for several turns. There is a weight indicator next to the handle, the reading of the weight indicator will change following the handle adjustment at the same time, which indicates the weight of the driver. The seat rigidity can be adjusted between 50kg ~ 130kg, the preset value is 70 kg before leaving the factory.



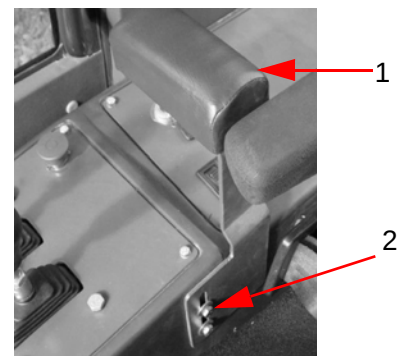
5. Headrest height adjustment (optional)

As shown below, hold the seat headrest with both hands, pulling it upward or downward smoothly can adjust the height of the seat headrest.



Hand Pad

There is a hand pad located beside the seat. The driver can place his right arm on it to reduce fatigue.



- (1) Hand pad
- (2) Fixing bolt

The hand pad can be adjusted to meet the requirements of different drivers. Loosen the two fixing bolts on the hand pad bracket and move the hand pad up and down to appropriate position then tighten it.

Seat Belt (optional)

Seat belt is equipped according to the customer's requirement.

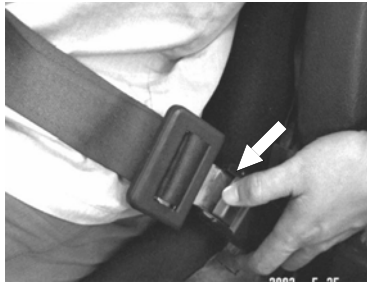
Before using the seat belt, check the seat belt for wear and fastness, replace if necessary.

Adjust the length of the seat belt before use to ensure that the seat belt functions safely and provides comfort. Adjust the length of the seat belt by turning the buckle on the seat belt.

The retractor of the seat belt is located on the right rear side of the seat; insert the buckle into the opening, the retractor will lock the buckle.

A red button is beside the opening of the retractor, press it down, the buckle will spring up from the retractor.

Before using the seat belt, first check the buckle of the seat belt is normally locked and released.



Pilot Control Lever Lock(Optional)

This is equipped on customer' s need.

It is a safety device which is installed at right below of the instrument panel. There are two positions: ON and OFF. Turn the switch to ON position, the work implements will response when operating the pilot control lever; when turn it to OFF position, the work implements will not work even though the pilot control lever is operated.

The pilot cutoff valve is located at the bottom of the pilot control lever.

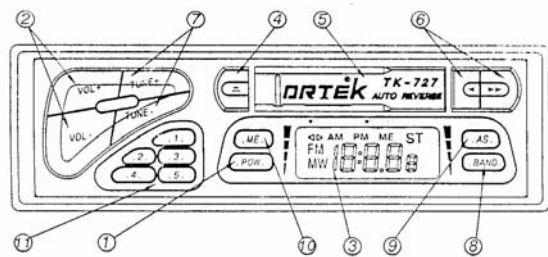
This pilot control lever lock works only when the pilot cutoff valve is at OPEN position.



1. Switch at ON position
2. Switch at OFF position

Sound System(Optional)

The sound system located inside the cab consists of main unit, sound speaker and wire.



1. Source key
2. Volume key
3. LCD
4. Esp key
5. Cassette holder
6. Rapid forward/ reverse keys
7. Manual select key
8. AM/FM select key
9. Auto-memory key
10. Memory key
11. Memory preset key



Connect the battery negative terminal only after the sound system has been installed to avoid a short circuit.

Please make sure you can still hear the traffic (horns, sirens and so on) when adjust the volume.

Source key

Press this key once to open the power supply, and press it again to shut off the power supply.

Volume key

Press the volume button up and down to adjust the volume.

Play play

Put in the tape, the tape service indicator will turn on.

The flashing right indicator indicates that side A is playing.

The flashing left light indicator indicates that side B is playing.

Rapid forward / reverse key

Press any one of the rapid forward key or reverse key, the tape will turn forward or reverse quickly. Before the tape is turning completely, press the opposite key gently to continue playing.

Side A and side B operation

Press ▲ and ▼ ▼ keys at the same time to change side A and side B of the tape, and indicator ▲ / ▼ can indicate which side is playing now. After side A finishes playing, the system can transform to the side B automatically to continue playing. It is unnecessary to withdraw and put in the tape repeatedly.

Esp key

Press this key to stop playing, and the machine will change to the radio state soon after.

Metal tape key

If a chrome tape is used, please press the memory preset key 4, and the display will show "MTL"; press this key again, "MTL" will disappear, and please use ordinary tapes at this time.

Radio and clock operation

1. Manual selection

Press TUNE + key, the frequency will increase. Press TUNE-key, the frequency will decrease.

2. AM/FM key

Press this key to change FM/MW bands, and the display will show FM/MW.

3. Memory key

First, select the desired station manually, and then press this key, and "ME" will flash in the the display. Press 1-5 set keys, the station frequency will be memorized, then "ME" disappears.

4. Auto-memory key

In the receiving state, press this key to scan from low-frequency to high-frequency point automatically, after that, auto-memory function will work. It will stop automatically after it memorizes for 5 groups. Please press BAND key firstly if further memory is needed, select any position of FM/MW and memory, each band can memory 5 broadcasting stations.

5. Setting key (1-5)

1-5 key is used to memorize the required station frequencies, including 1-5AM and FM. A total of 10 stations can be set.

6. Operation methods of time adjustment

After press MEMO key, please press key 1 or key 2 to get the required correct time at the same time. Press key 1 to adjust hour, release it and press key 2 can adjust minute. Time can be adjusted when playing the radio.

WARNING

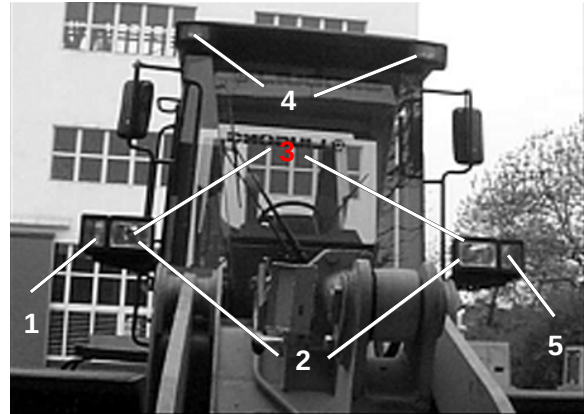
Speakers are easily damaged by water. Do not spurt water on this sound system when wash the machine. Loose cassettes can damage the cassette player. Do not use C-120 tapes.

Do not place cassette tapes near anything magnetic. Be careful if you need to touch the body of the unit as the temperature can exceed 160 degrees Fahrenheit (70 °C) after prolonged periods of operation.

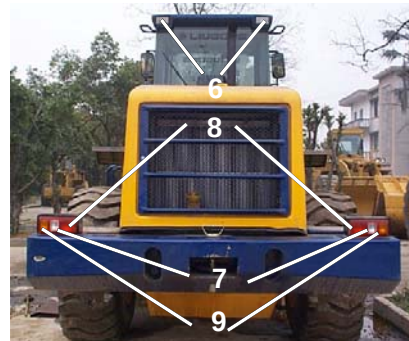
Lights

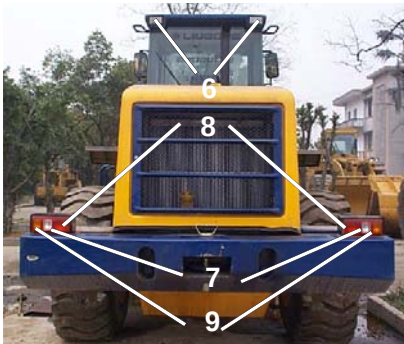
Lights of the machine consist of the front combination lights (left & right each), rear combination lights (left & right each), dome light, work light (left & right each) and rear floodlight (left & right each).

The front combination lights consist of the front floodlight; front position light, front turn signal light. The rear combination lights consist of the rear position light, rear turn signal light, and brake light. The turn signal lights are controlled by the combination switch on the instrument panel.



- (1) Right turn signal light (front)
- (2) Front position light
- (3) Front floodlight
- (4) Work light
- (5) Left turn signal light (front)





- (6) Rear floodlight
- (7) Rear position light
- (8) Rear turn signal light
- (9) Brake light



- (10) Dome light switch
- (11) Rotating beacon (optional)



Door Lock



The key for the right & left door of the cab is the same.

Insert the key and rotate it clockwise for 180 degree then take it out, hold the door lock with your hand, push the lock pin down with your thumb, open the door by pulling the door outside.

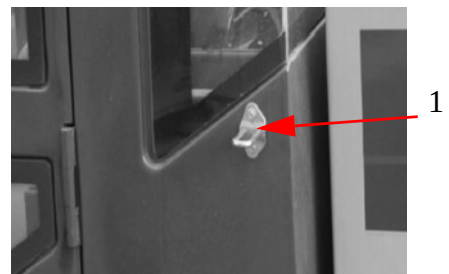
Before locking the door, first close it. Insert the key and rotates counterclockwise to 180 degree , then take it out. After the door is locked, the lock pin can't be pressed down.

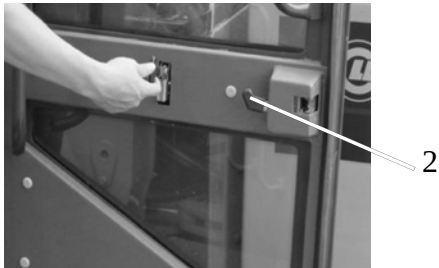
Position Lock

When opening the right and left door to 180 degree, the position lock on the door is locked by touching the buckle outside the cab. Then the door is locked in this position.

The handle of the position lock is located the middle of the door.

Lift the handle to release the position lock to close the door.





- (1) Buckle
- (2) Position lock released

! WARNING: Before the driver operating the machine, always close the right & left first doors to ensure safety.

Rearview Mirrors

Left and right rearview mirrors are separately located at the top of the cab. Before operating the machine, you should adjust the rearview mirrors and make sure the driver has a good rear view when sitting on the seat.



Adjustment of Rearview Mirrors

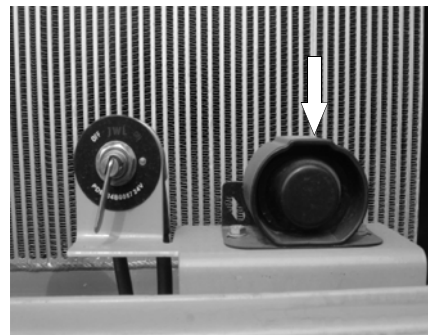
Loosen the connection bolts between the bracket of rearview mirrors and the cab, turn the bracket to adjust the rearview mirrors to proper position.

Loosen the connection bolts between rearview mirrors and the bracket, turn the rearview mirrors to adjust the elevation.

After completing the above-mentioned adjustment, tighten the bolts.

Backup Alarm System

The backup alarm is fitted on the fuel tank, under the torque converter and hydraulic oil cooler. When the machine is reversing with shift control lever turned to REVERSE position, the backup alarm will sound automatically.



! WARNING

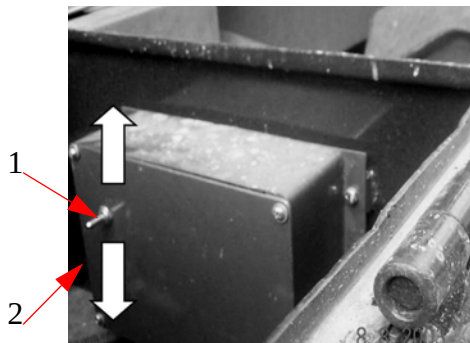
The backup alarm is close to the radiator, when adjusting volume of the back-up alarm, first stop the engine and keep away from hot parts to avoid being burnt.

Engine Hood Lift Device and Switch

The hood lift device located at the rear right side of the machine is composed of lift mechanism and lift control box, the lift control box is located in the battery box on the right side.



When it's necessary to repair the machine with engine hood open, open the battery cover first to get access to the lift control box.



- (1) Lift switch
- (2) Lift control box

The lift switch located on the control box, is instant type.

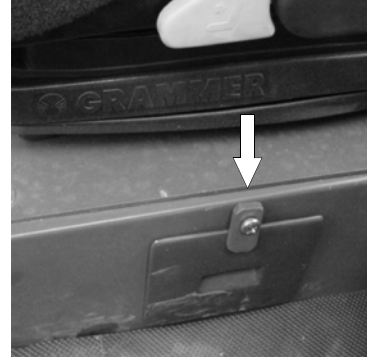
The engine hood will raise if the lift switch is turned upwards.

The engine hood will lower if the lift switch is turned downwards.

The lift switch resets and the engine hood will hold if the lift switch is released.

Small Tool Kit

There is a small tool kit under the driver's seat, which is used to store some common small tools.

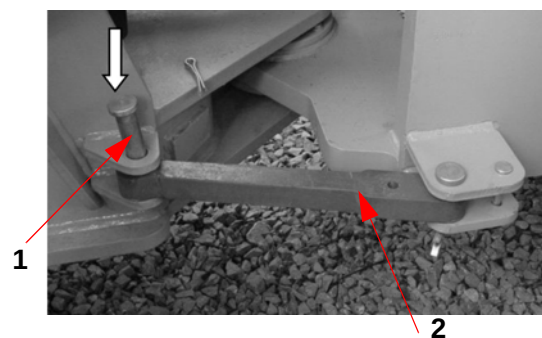


Steering Frame Lock

! WARNING: No clearance for person in this area when machine turns. Injury or death from crushing could result!

! CAUTION: To connect the steering frame lock, the machine must be in the straight ahead direction.

The steering frame lock is located at the left side of the machine.



- (1) Pin
- (2) Steering frame lock

Connect steering frame lock when the machine is being lifted and transported. Also connect the steering frame lock if you are performing service work near the articulation joint.

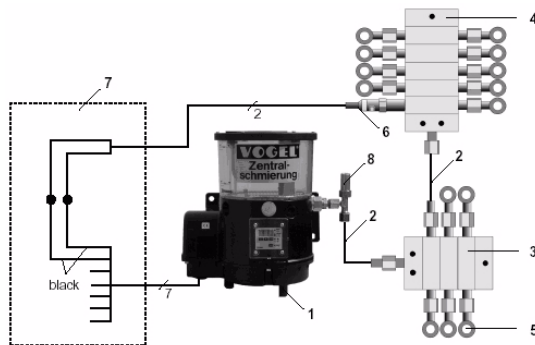
Separate the steering frame lock before operating the machine. Move the steering frame lock to the rear frame and install the pin.

Centralized Lubrication System (Optional)

German BEKA-MAX centralized lubrication system is used for this machine. It consists of pump, controller, wirings, connectors and fixing brackets. This system can lubricate automatically when the bearing is working, which can reduce pollution, friction and abrasion, time of daily maintenance and labor strength

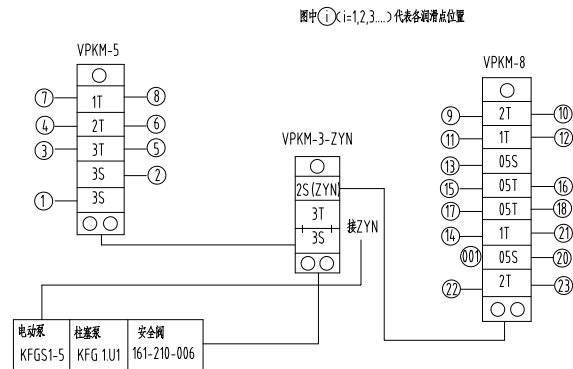
⚠ NOTICE: The lubrication interval has been set before leaving factory. Please do not

Components of centralized lubrication system



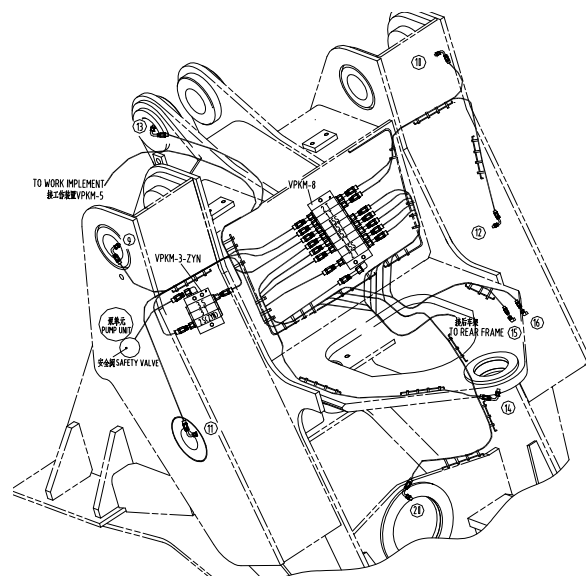
1. Pump device
2. Lubrication lines
3. Main controller
4. Secondary controller
5. Lubrication point
6. Cycle switch
7. Wirings
8. Relief valve

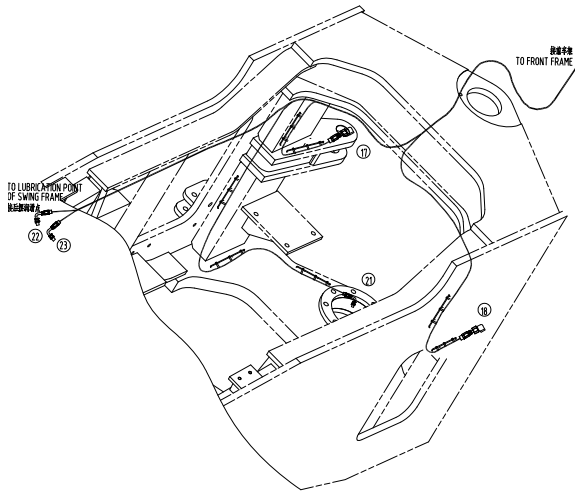
Schematic of Centralized Lubrication System



VPKM in the schematic is the step-forward controller, which is composed of several modules. VPKM-3-ZYN is located on the rear plate of front frame box-LH, VPKM-5 is located under the beam of the boom, and VPKM-8 is located on the rear seal plate of the front frame.

①, ②, ③ indicates the lubrication points, the specific lubrication points are displayed as follows:

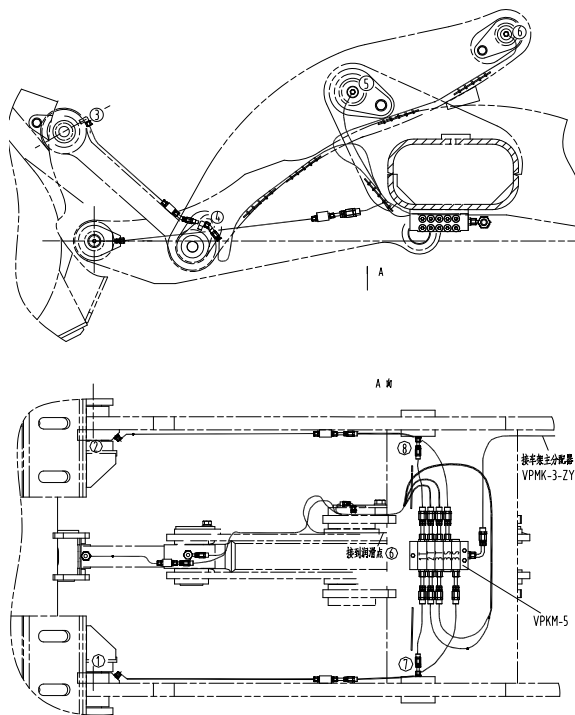




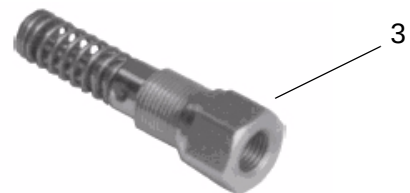
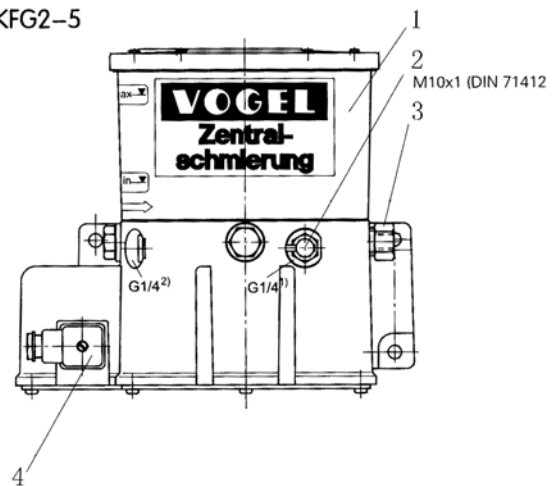
Electric piston pump is located on the left side of the front frame, which is composed of safety valve, piston pump, and electric pump. The piston pump connects to the main controller VPKM-3-ZYN, then to each subsidiary controller respectively through the main controller. The lubrication points of the work attachment are controlled by VPKM-5, and the lubrication points of the front and rear frames are controlled by controller VPKM-8.

Electronic control unit IG471-21 in the electric piston pump can start the lubrication pump at specific interval according to the pre-setting data to provide lubricant to each lubrication point in sequence.

Pump device

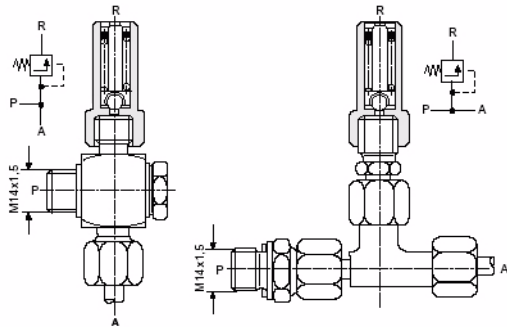


KFG1-5
KFG2-5



1. Grease tank
2. Oil filler connector
3. Pump unit
4. Power source connector(+ to terminal 2, - to terminal 1)

Relief valve (161-210-006) electric pump (KFGS1-5)



A---To pipe Φ 6
P---To pump unit
R---Grease relief port

Relief valve is fixed at the exit opening of pump unit to protect the entire lubrication system from overhigh pressure.

The adjusting pressure of relief valve is 300bar.

If the system pressure is higher than 300 bar caused by the jammed controller or lubrication point, the relief valve will actuate automatically to release grease.

Adjustment and Display of the Electric Controller

Remove the transparent protector on the surface of the electric controller (see the drawing), press " $\triangle$ ", " ∇ " and "SET" on the adjusting panel to adjust the electric controller.



Instructions of the symbol on the adjusting panel:

PAUSE--Working Pause Process

CONTACT.....Run time of the pump

CS..... System inspection with cycle switch

PS..... System inspection with pressure switch
(not within the progressive system)

FAULT Fault symbol

$\triangle$ ∇ Button

.....Opening the display function

.... Displaying name and data of the function

..... Set functional data

SET. Switching over run mode and display mode

..... Setting data

DK..... Short-circuited pause time and directly
entering next lubrication cycle

..... Fault reset

Indication of LED

TPA..... Count mode as the pump stops,
display value unit in hour

cPA Pulse count mode as the pump stops

Operation Manual

Operator Controls and Instrument Panels

bLo Indicates the fault time has exceeded
three working periods of the pump



Adjusting Steps of the Electric Controller

Steps	Contents of the Manual	Notes
1	SET Press SET longer than 3s	Press "SET" key longer than three seconds until 000 is displayed on the screen.
2	SET Press SET shortly (confirm code)	Press "SET" key shortly and when shown "TPA" letter that's enter the pause time set mode of the pump, unit in hour.
3	SET Press SET shortly	Shortly press "SET" key, the set pause time is one hour at the factory.
4	▲ ▼	Press the "TRIANGLE" key to increase or reduce interval value: 0.1-99.9 hours according to the actual situation.
5	SET Press SET shortly, confirm new value	After setting the pause time, press "SET" key to get letter TCO to enter the work time adjusting mode of the pump. Unit in minute.
6	SET Press SET shortly	Example: shortly press "SET" key, four-minute is primal set by factory.
7	▲ ▼	Press the "TRIANGLE" key to increase or reduce interval value: 0.1-99.9 hours according to the actual situation.
8	SET Press SET shortly Confirm new value	Shortly press "SET" key to confirm new value.
9	SET Press SET longer than 2s	Press "SET" key longer than two seconds until the screen turns black and setting is completed.

If the lubrication system has “cycle switch” or “pressure switch” (eg. vehicle chassis lubrication), please add the following steps after finished the above 1-2 steps:

Steps	Contents of the Manual	Notes
3	 Press until: 	Adjust "TRIANGLE" key, the screen appears letter "COP", and enter into the monitor mode condition.
4	 Press SET shortly 	Press "SET" key shortly, the screen appears letter "OFF" (the default check condition of the factory closed).
5	 Press optionally until:  	Adjust "TRIANGLE" key to get letter CS or PS. CS: cycle switch monitor PS: pressure switch monitor
6	 Press SET shortly	Press "SET" key shortly, and confirm the new setting.
7	 Press SET longer than 2s	Press "SET" key longer than two seconds, the setting is completed.

The pause time of CLG842 is 1 hour and the running time is 12 minutes.

⚠ CAUTION: Liugong has set the running time for the machine when manufacturing it. Make sure that the lubrication is satisfactory if any change is needed.

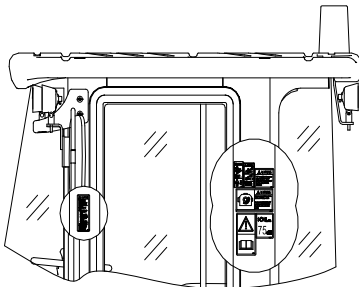
Quick Coupler(Optional)

1. Safety label instructions and locations



Make sure that the quick coupler switch is locked before operating the machine!

This safety label is located on the right side in the cab.



Improper engagement of work attachment could result in injury or death.

Raise the work attachment off the ground and make sure the attachment is at max. bucket tilting position before locking or unlocking the quick coupler.

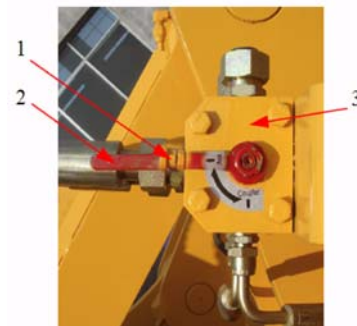
When installing the attachments, make sure the attachment is lowered flatly to ground and at maximum tilting position.

Make sure the work attachment is placed flatly when checking connection condition and operating the quick coupler valve.

1. Make sure the work attachment is connected to quick frame.

2. Make sure the quick coupler valve is at Aux position.

CAUTION: Check whether the oil lines of quicker coupler cylinder have been cut off before operation, that is, turn the quick coupler handle to "Aux" position, and check whether the quick coupler is connected firmly.



- (1) Lock handle
- (2) Quick coupler handle

- (3) Quick coupler valve

WARNING

Keep any unauthorized person clear of the machine when installing or removing the bucket to avoid body injury or death.

2. Install the work attachment

WARNING

Before using the quick coupler, please check the quick coupler carefully for a good connection.

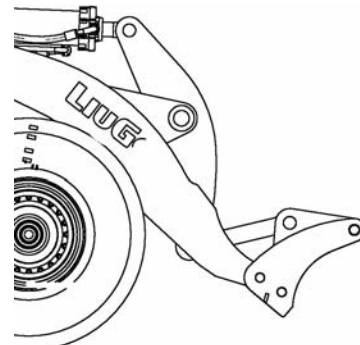
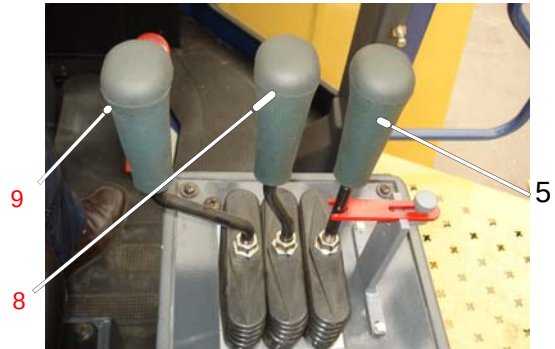
Improper engagement of work attachment could result in injury or death. Do not operate this machine until you have positive indication that the the quick coupler valve is at Aux position and the quick coupler switch is at LOCK position.

Do not raise the work attachment over 100mm to the ground when installing and removing the work attachment.

Do not use the quick coupler when hydraulic line leaks or the fabrications are severely frayed. Repair or replace it immediately.

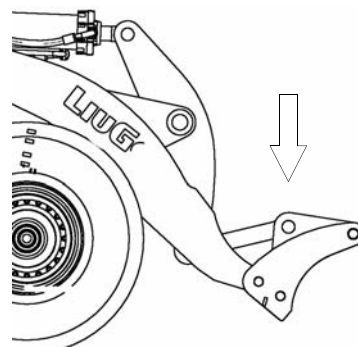
- (1) Park the machine on a flat ground. Lay the work attachment flatly.

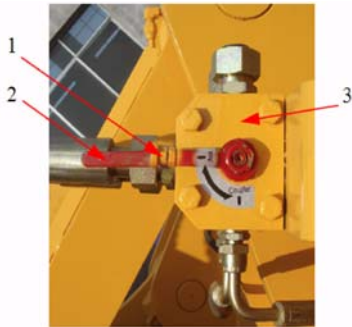
- (2) Push the bucket control lever ⑨ to tilt the quick coupler frame forward..



- (8) Boom control lever
(9) Bucket control lever
(5) Auxiliary control lever

- (3) Shut down the engine. The quick coupler valve ③ is located on the right side of quick coupler frame. Turn handle ② to COUPLER position.





1. Lock handle
2. Quick coupler handle
3. Quick couple valve

⚠ CAUTION: Caution: Try to operate the auxiliary control lever repeatedly for several times, until the pressure in the pilot oil lines has been released. If the pressure in the switch valve has not been released, a turning failure or turning difficulty of the handle ② could be resulted!.

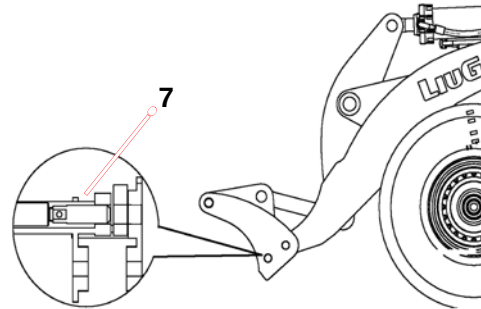
(4) Start the engine.

(5) Loosen nut ⑥ of the auxiliary control lever lock and pull the stop plate ④ outwards to unlock the auxiliary control lever ⑤.

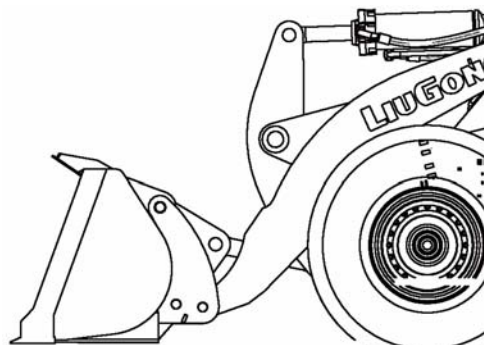
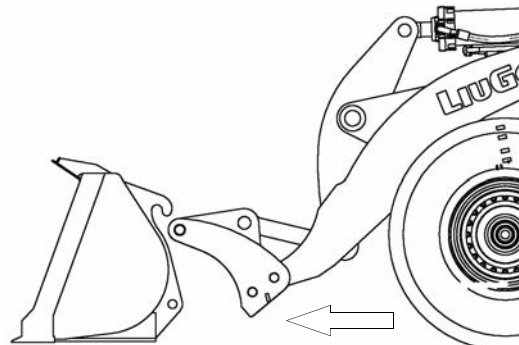


- (4) Stop plate
- (5) Auxiliary control lever
- (6) Nut

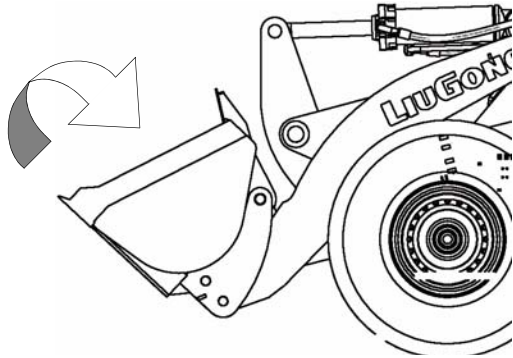
(6) Start the engine. Slightly push the auxiliary control lever ⑤ forwards to let the connecting pin ⑦ of the quick coupler retract inside.



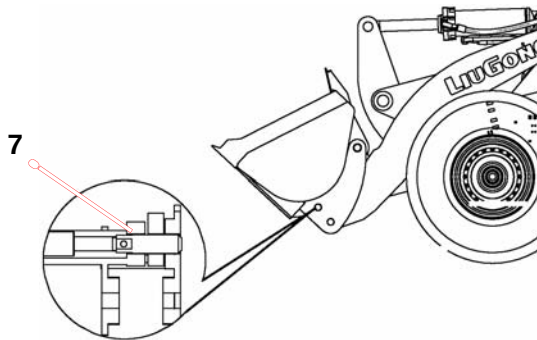
(7) Operate the machine to tilt the quick coupler frame slightly forwards. Slowly drive the machine forward. Raise the boom slightly to let the quick coupler frame engage correctly in the hooks.



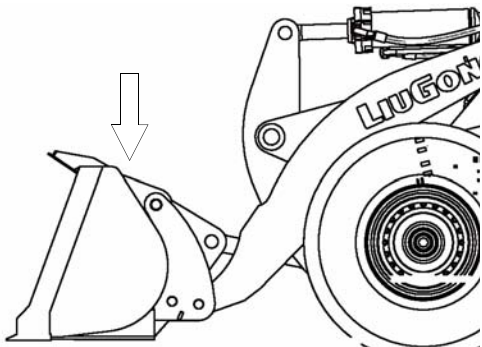
- (8) Push the bucket control lever ⑨ backward to tilt the quick coupler frame backward.



- (9) Pull the Auxiliary control lever ④ backwards (to CLOSE position) to let the connecting pin ⑦ of the quick coupler extends to connect with the work attachment.

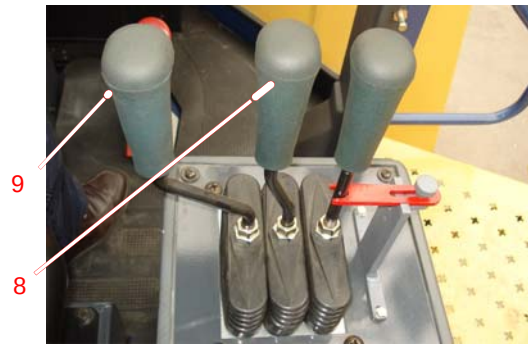


- (10) To ensure the coupler connecting pin ⑦ is fully engaged into the work attachment, tilt the work attachment downwards onto the ground and apply slight force. Then raise the boom (about 1.5 m) and tilt the bucket forwards. Do not separate the bucket from the coupler frame.



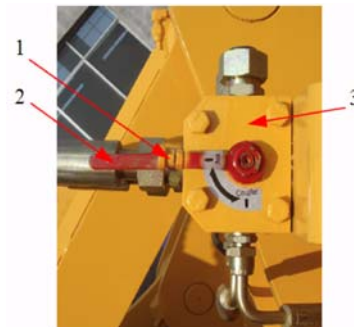
- (11) Lower the work attachments onto ground and shut down the engine.

- (12) Push the boom control lever ⑧ and bucket control lever ⑨ forward until the work attachment does not move or tilt.



- (8) Boom control lever
(9) Bucket control lever

- (13) Pull the lock handle outward and rotate the quick coupler handle to Aux position.



1. Lock handle
2. Quick coupler handle
3. Quick coupler valve

- (14) Push the stop plate ④ inward to lock the auxiliary control lever, then tighten nut ⑥.



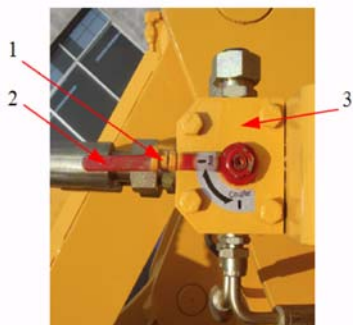


! WARNING

Make sure that the quick coupler can lock and extend normally, failure to comply will result in serious injury or death !

3. Remove the work attachments

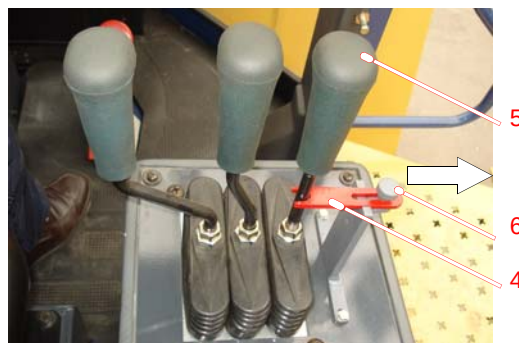
- (1) Park the machine on a flat ground. Lay the work attachment flatly.
- (2) Shut down the engine. Push the boom and bucket control lever forward and backward until the work attachment does not move or tilt.
- (3) Pull the lock handle of the quick coupler valve outward and turn the quick coupler handle to Coupler position.



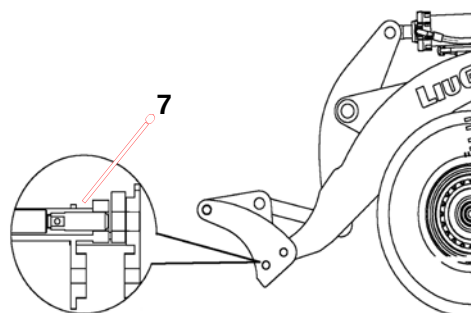
1. Lock handle
2. Quick coupler handle

3. Quick coupler valve

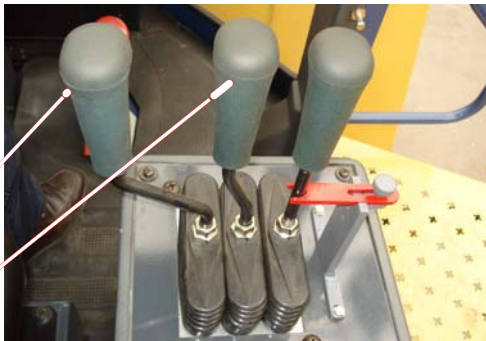
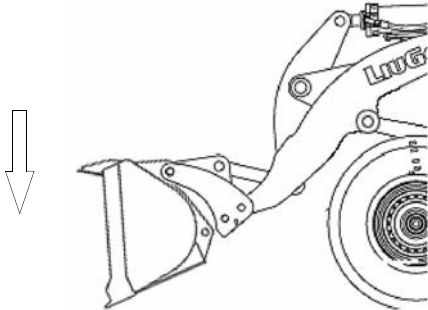
- (4) Loosen nut ⑥ , pull the stop plate ④ outward to unlock the auxiliary control lever.



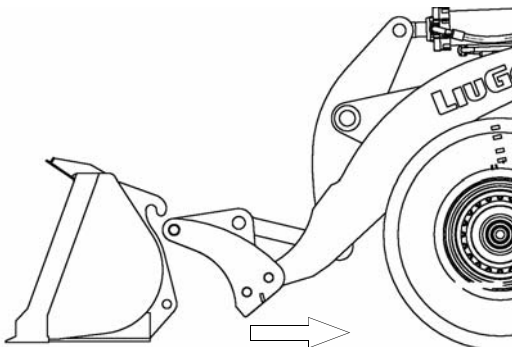
- (5) Start the engine. Slightly push the auxiliary control lever ⑤ forwards to let the connecting pin ⑦ of the quick coupler retract inside.



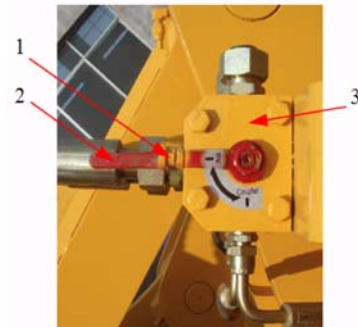
- (6) Operate the boom control lever ⑧ raise the boom slightly. Then operate bucket control lever ⑨ forward to tilt the work attachment forward to let it contact with ground. After that, operate boom control lever ⑧ to lower the boom to let the quick coupler frame disengage from the hook.



- (7) Slowly drive the machine backwards and slightly tilt the quick coupler frame forwards to let the quick coupler frame disengage from the work attachment hook.

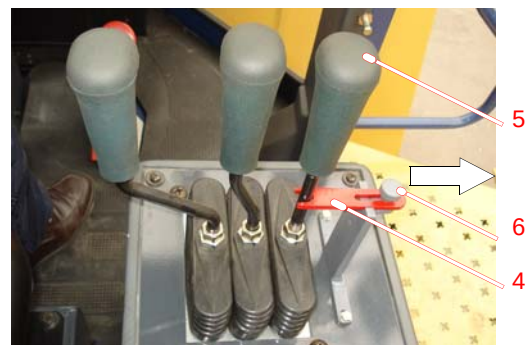


- (8) Pull lock handle ① outward and turn the quick coupler handle to Aux position.



1. Lock handle
2. Quick coupler handle
3. Quick coupler valve

- (9) Push the stop plate ④ inward to lock the auxiliary control lever. Then tighten nut ⑥.



⚠ WARNING

Do not raise the work attachment above the ground for 100 mm when installing and removing the work attachment.

Do not allow any persons stay around when installing or removing the work attachments.

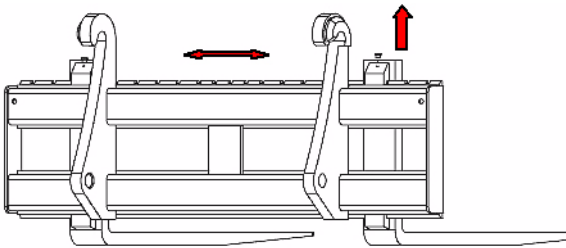
Pallet Fork(Optional)

WARNING

The operator should be trained with professional techniques and have corresponding profession qualifications.

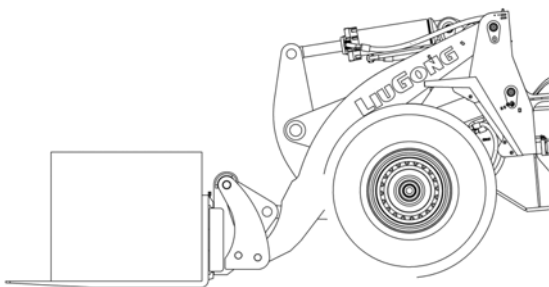
The maximum load capacity of the pallet fork should not exceed 3200Kg.

1. Lift the lock upward to release the fork, move the fork evenly. Adjust the distance of forks to meet the need of material with different width.

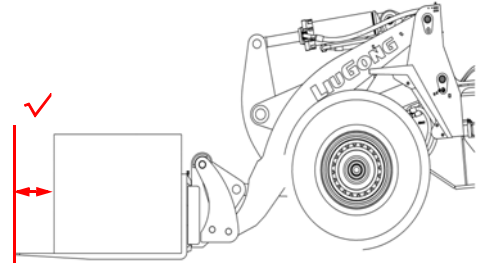


 **CAUTION:** The forks should be evenly spaced in the bracket and the lock should completely insert in the fork channel.

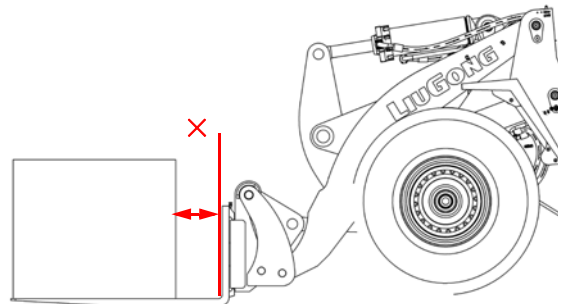
- (2) Level the forks, slowly load the material and the forks should completely insert into the material.



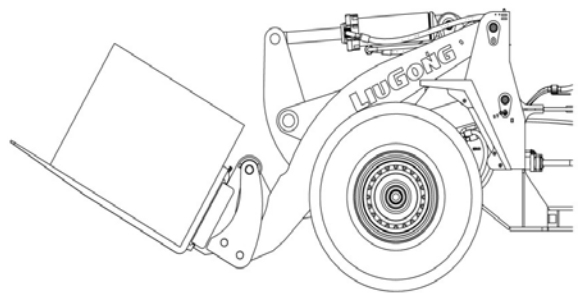
Correct position



Wrong position



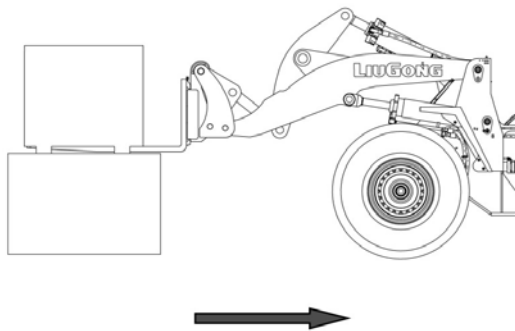
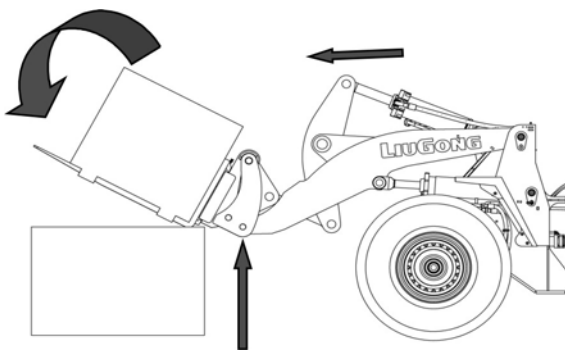
- (3) Slightly tilt the forks backward to get a better stable position for the material.



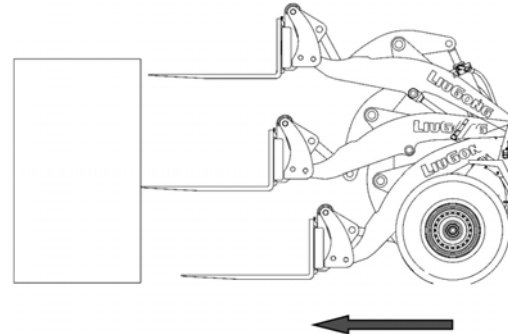
- (4) Travel with the material as low as possible while you still maintain ground clearance. Travel with the material uphill on upgrades and on downgrades. For better visibility, travel in reverse with bulky loads.

⚠ CAUTION: When carrying the load, the height of the work attachment can not exceed 300mm and the travel speed can not exceed 6Km/h.

- (5) Slowly raise the boom. Then slowly drive the machine forward. Lower the boom when the material reaches the desired position and level the forks when the material touches the material surface. Drive the machine reversely when the material is stable enough.



⚠ CAUTION: The level position of the forks top may change during this operation. Therefore, make sure that there is enough distance from the forks top to the material surface.



Crane (Optional)

WARNING

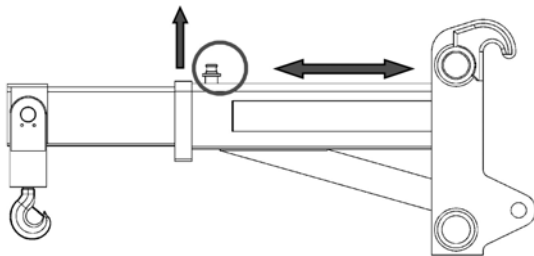
The operator must know the weight of the load ahead.

Any slight shakes on the boom will cause a big shake of the load. Therefore, travel on a smooth ground; do not drive the machine on a slope, muddy road or bumpy surface.

Try to maintain a slow travel speed when carrying the load. The speed must not exceed 6Km/h. Do not start or brake the machine suddenly; avoid any actions that can cause shake.

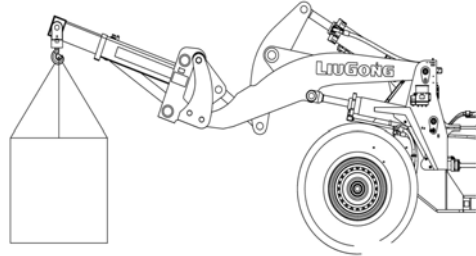
Do not drive the machine in a gale or downfall or any bad weather that may cause shakes.

- (1) The length of the boom can be adjusted to meet the operation needs by taking out the pin upwards.



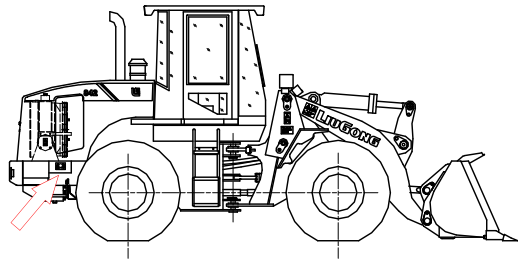
 CAUTION: Try to use a short crane to get a larger carrying capacity and better stability if the work need can be met.

- (2) Choose an appropriate way to carry the load.



 CAUTION: Try to lower the boom height if work need can be met. If ropes and iron chain and so on are needed, try to shorten the flexible length.

Additional Counterweight (Optional)



The additional counterweight is located at the rear of this machine with a weight of 280 kg. The machine can get a bigger tipping load if an additional counterweight is used. Consult with your Liugong dealers for more information if your machine uses the additional counterweight.

If an additional counterweight is attached to the machine, the specifications are changed as follows:

1. The total weight of the machine (when used standard bucket) will reach 19210kg .
2. Straight tipping load: 1.14KN
3. Steering angle (38°) tipping load: 0.96KN.

When long boom or quick coupler is used, if an additional counterweight is added, the total weight of the machine will reach 14280 Kg. Straight tipping load: 1.08KN, steering angle 38° tipping load: 0.94 KN.

Engine Starting

1. Turn on the battery disconnect switch. After the battery disconnect switch is turned on, the key will point to ON position.



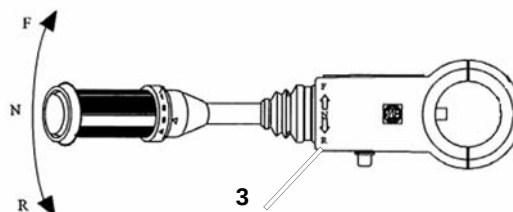
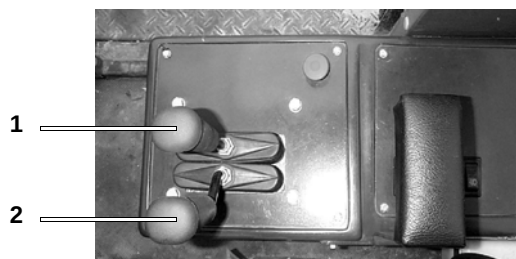
2. Mount and dismount the machine according to the safety regulations.



3. Close the left and right door of the cab. Check the seat belt for normal condition and fasten it.
4. Make sure the pilot cutoff valve lever is at OFF position. If not, turn the lever to the OFF position.



5. Check whether the work implement control lever is at NEUTRAL position. If not, turn it to NEUTRAL position.



1. Boom control lever
2. Bucket control lever

! CAUTION: The electrical system has Neutral/Start Interlock protection function; the engine can start only when the shift control lever is at NEUTRAL position. This can avoid the accident that produced when the machine is started suddenly.

6. Check whether the fan speed switch of the air conditioner system is at Natural Air position and wind mode switch at OFF position, if not, turn them to the desired position.



7. Insert the start switch key and turn clockwise to ON position to turn on the power. Hoot the horn to warn that the machine is going to run.



8. Slightly depress the accelerator pedal after all of the warning indicators turn off. Turn the key clockwise to START position to start the start motor of the engine. In normal case, the engine will start within 10 seconds. Release the start switch at once to let it reset.

⚠ CAUTION: Start motor operation should not exceed 15 seconds. If the engine doesn't start after 15 seconds, release the start switch at once. Wait 30 seconds before trying to start again. If the engine can not be started for three times, wait for at least three minutes before trying again to prevent damage to the start motor.

9. Warm up the engine at idle speed of 600~750 rpm after the engine is started. Check the coolant temperature gauge. Run the engine with full speed only after the coolant temperature reaches 55 °C and the engine oil temperature 45 °C .
10. The warning indicators on the central instrument panel will turn off in sequence. Disengage the parking brake button, the parking brake low oil pressure indicator will turn off.
11. Check the readings of all the gauges to make sure they are in the normal range. Check that all the lights, indicators, horn, windshield wiper and brake lights work normally.
12. During severely cold weather, preheat the hydraulic oil. Pull the control lever backward and hold for about 4-5 minutes, depress the accelerator pedal and let the bucket positioner stop on the boom to make the hydraulic oil flow out, which can increase the hydraulic oil temperature rapidly.
13. Check the service brake, parking brake system for normal condition.
14. If there are no obstacles around the machine, slowly turn the steering wheel and observe for left and right turning.

Operation Techniques

Operation Information

Follow these basic instructions when you are operating the machine.

- To prevent injury, make sure that no one works on the machine or near the machine. Always keep control of the machine.
- Raise the bucket or the implement high enough to go over any obstacle.
- Before disengaging the parking brake, depress the service brake pedal in order to prevent the machine from moving.

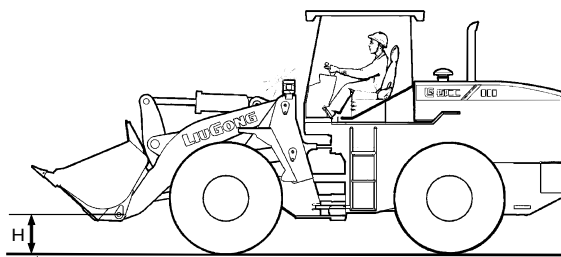
- Drive the machine forward for best visibility and the best stability.
- Reduce the engine speed when turning and go over a hill.

! WARNING: Personal injury or death can result from falling material. Remove any suspensions and watch out sliding material.

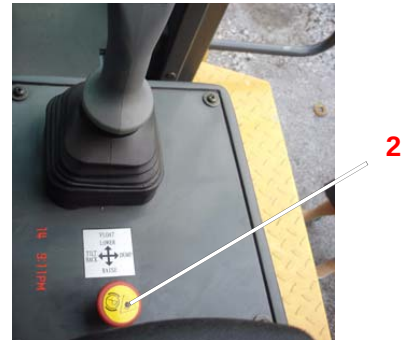
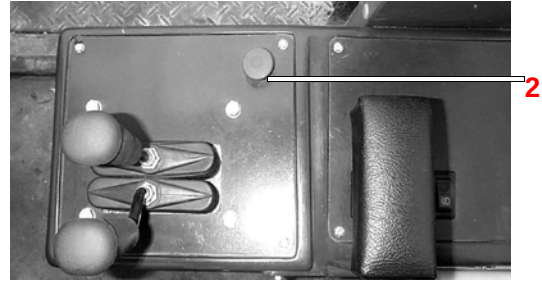
! CAUTION: Never allow the bucket in the float position to avoid bucket damage.

Running Operation of the Loader

1. Operate the control lever to tilt the bucket backward to limit position. Raise the boom to the transportation position. Keep a clearance of approximately $H=500\text{mm}$ between the lower articulation point of the boom and the ground.



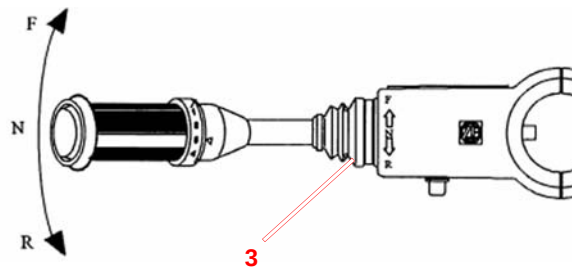
2. Depress down the service brake pedal ① and press down the parking brake button ② to disengage the parking brake. Slowly release the service brake pedal ① and observe the machine for movement.



1. Service brake pedal
2. Parking brake button

! CAUTION: Depress down brake pedal ① and pull up the parking brake button ② if the machine moves. Then check the shift control system for failure. If the machine stops on slope, chock the wheel to prevent movement before checking the machine.

3. Turn the shift control lever to get the forward or reverse gear.



F: Forward
N: Neutral
R: Reverse

! NOTICE: The machine can start only when the F1, F2 or R1, R2 is selected.

4. Drive the machine to an open and flat ground; turn the steering wheel to check whether the machine has spot right and left turn ability.
5. Check the brake performance of the machine. The machine runs at F1 or F2 , release the accelerator pedal, smoothly depress the service brake pedal, the machine should obviously reduce speed and stop.

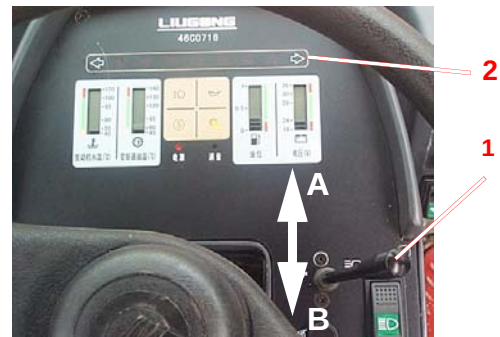
! CAUTION: After depressing the service brake pedal, if you can not feel the machine obviously reduces speed, to ensure the safety, pull up the parking brake button at once to engage emergency brake to force the machine to stop.

6. Check engagement of all the gears.

! CAUTION: Before shifting the gear, to protect the clutch, first release the accelerator pedal, then operate the shift control lever protecting the clutch.

Steering Operation of the Machine

1. Release the accelerator pedal to slow down the engine running speed.
2. Press down the service brake pedal to slow down the running speed.
3. Push the steering switch ① forwards when turning left; pull the combination switch backwards when turning right. (see the following picture) Then the turn signal lights on both the front and rear of the machine and the turn indicators on the instrument panel will turn on to warn the neighboring vehicles and passerby that the machine is going to turn.



1. Steering switch
2. Turn indicator
3. Turning left
4. Turning right
4. An articulated and full hydraulic type steering wheel is used for this machine. Turn the steering wheel to start turning. Turn the steering wheel oppositely for straight running after turning operation is finished.
5. After the turning is finished, turn the steering switch to NATURAL position. The turn signal lights and the turn indicators will turn off.
6. Depress down the accelerator pedal to get a desired running speed of the engine.

! CAUTION: Never turn the machine on the slope. Park the machine on a flat ground then turn it.

Brake Operation of the Machine

When performing brake, first release the accelerator pedal, then smoothly depress down the brake pedal to perform service brake operation.

! WARNING: When the machine runs at high speed, do not rapidly depress down the brake pedal unless an emergency occurs, so as to avoid accidents and damage to the machine.

Downhill Operation

Select a proper speed before go down the hill. Do not change gear during the downhill process. Most of time, the speed for downhill operation is the same. Maintain a proper speed that is slow enough for the conditions. Use the service brake to control the travel speed. Using service brake when the machine runs at a high speed may result an overheating for the brakes and driving axles. These will bring fray or serious damage to the brakes. Run the machine reversely when go down the hill with a load; run forwards when go up the hill.

Machine Operation

Preparation before operation

Before operation, first level the work site with this machine. Remove ballooning, fill-in the pits and shovel away the wet and slide ground surface. Clear the area with large, sharp rocks to avoid damaging the machine's tyres or the machine itself.

If this machine is used to load or unload a truck or hopper, adjust the limit height of the boom lift kickout according to the height of the truck or the hopper to allow the bucket go in and out of the truck or hopper safely.

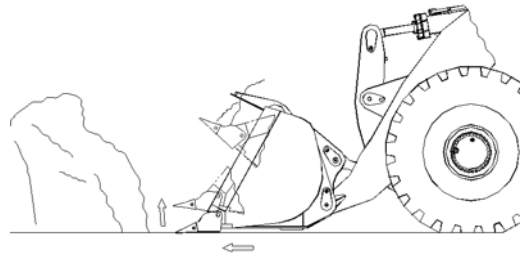
Shoveling

(1) Common Shoveling

Common shoveling is suitable for loading loose materials. Drive the machine at F2 speed to approach materials. Align the bucket center with the materials, The driver holds the steering wheel with left hand and operates the bucket control lever with right hand. Lower the bucket to approximately 500mm above the ground.

At the distance of about 3' (one meter) from the material, lower the boom, let the bucket contact the ground. Press down the KD key on the end of the shift control lever to change the speed of the machine from F2 speed to F1 speed.

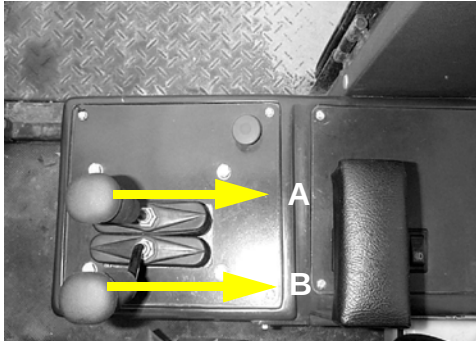
Depress down the accelerator pedal to force the bucket to cut into the material with full power. When the machine can't advance any more, turn the bucket control lever left to tilt the bucket backward. Then turn the lever to NEUTRAL. The machine will continuously cut in the material. Repeat doing this until the bucket is completely filled.



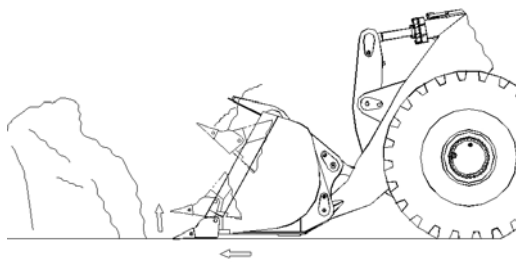
Combination Shoveling

Combination shoveling is mainly used for hard and viscous materials.

The operation of the cutting in material pile is the same as the common shoveling. When the bucket can't advance after cut in the material, operate the bucket control lever backward with right hand and return to the NEUTRAL position to tilt the bucket upward, then the bucket cuts in forward for some distances. Turn the bucket control lever to the right side and return to the NEUTRAL position and to tilt the bucket backward. Then the bucket can continue to cut in the material.



A. Bucket tilt backward
B. Boom raise



Retreating from the material

After the bucket is filled fully, operate the bucket control lever to tilt the bucket backward till the bucket block contacts the boom and then turn the control lever to the NEUTRAL position. Maximum tilting angle can be obtained.

Raise the boom to a certain height to keep the machine away from the material when reversing. Hold the steering wheel with right hand, press the KD key with left hand. Machine speed is changed from forward first speed to reverse second speed.

After the machine retreats from the material, operate the boom control lever to lower the boom to transportation position and the lower articulation point of the boom is about 500mm above the ground.

Transportation of materials

The loader can be used for transporting material under the following conditions:

- When the ground is too soft or the ground is not level, the truck can not be used.
- When transporting distance is less than 500 meters, using trucks for transportation is not economical.

When transporting, make sure that the articulated joint of the boom is at transporting position (about 500mm above the ground). Tilt the bucket back to its limit position (the bucket block contacts the boom) in order to ensure safety and stability when transporting.

! WARNING: Never raise the bucket to the higher position for transporting, or the machine could tip over.

Dumping operation

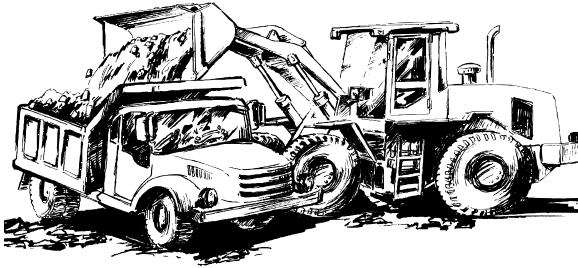
1. Dumping materials into a truck or hopper

Release the accelerator pedal to let the machine approach the truck or hopper at a low speed when the loader is at a distance of 15 meters from the truck or hopper with a full load.

Operate the control lever to let the boom raise to its kickout position, the boom will not raise up any more once it reaches its limitation.

When the bucket is on the top of the truck or hopper, depress down the brake pedal to stop the machine. Then push the control lever rightwards to make the bucket tilt forwards and dump the materials.

If the body length of the truck is over two times than the bucket width, dump the materials from the front part to the rear part.



⚠ CAUTION: When dumping, it is advisable not to bump the bucket positioner with the boom repeatedly so as to avoid damaging the machine.

After dumping, turn the control lever leftwards to the limit position, the bucket will keep tilting back until it reaches the positioning position. Release the lever to let it reset automatically to NEUTRAL position.

Then turn the shift control lever to the REVERSE position so that the machine can leave the truck or hopper reversely.

After the machine leaves the truck or hopper, the driver could drive the machine with lowering the boom for next operation.

2. Dumping at low position

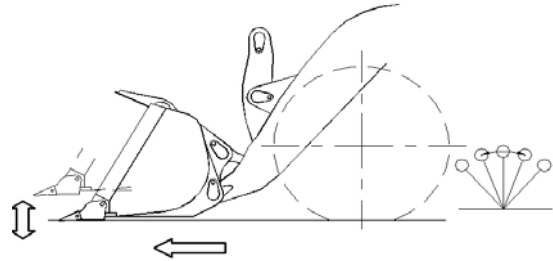
When carrying materials among the work sites, sometimes it may need to dump at a lower position, that is, the machine dumps materials near the ground. After dumping, first turn the bucket to the positioning position, then lift the boom.

Shoving Operation

Place the bucket on the ground, turn the shift control lever to the forward first or second speed and depress down the accelerator pedal to drive the machine forward.

During the shoving operation, slightly lift the boom and continue the shoving operation if the machine meets an obstacle.

To ensure shoving safety, operate the boom control lever slowly and smoothly when lifting or lowering the boom.

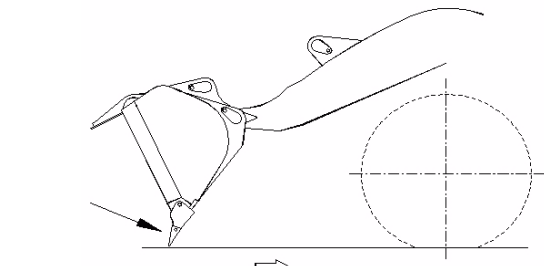


Scraping Operation

Lift the boom, tilt the bucket forward till the blade contacts the ground and maintain an angle of 60° .

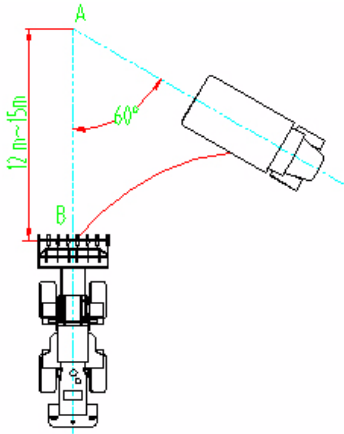
The control lever should be set to the float position for hard road surface, and it should be turned to the NEUTRAL position for soft surfaces.

Turn the shift control lever to reverse first or second gear and depress down the accelerator pedal to operate the machine backward. Scrape the ground evenly by the bucket blade



Operation Method

1. V Type Operation Method



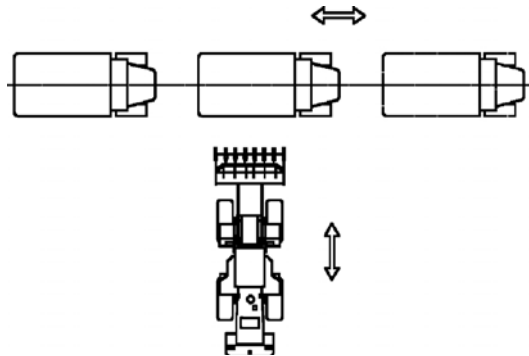
As shown in the above figure, maintain 60° angle between the loader and the truck. Stop the machine at 12~15m away from the truck.

After the machine is loaded fully, drive the machine to 12~15m from the material, then run the machine towards to the truck with bucket lifted while it is turning. After dumping, return the loader to the original position for next loading.

2. Shuttle Operation Method

The shuttle operation is mainly used for the combination operation of the loader with a truck team.

As shown below, after loading, the loader returns to a distance as 2~3 times truck width. Then the truck runs to the front of the loader from one side and stops. The loader moves forwards and lifts the boom. After dumping, the loader returns to the origin position.



If the truck is not completely filled with materials, drive the truck forward for one position. After the loader performs the second loading, it will return to the origin position. Then the truck returns to the front of the loader for dumping.

Repeat the operation until the truck is filled with material. The loader then goes on loading of the next truck.

This operation requires skillful cooperation between the loader and the truck drivers. They communicate with each other by using the horn, lights, or hand signals.

Operation during Cold Weather

CAUTION: If the ambient temperature is too low, the engine can't easily be started, and the radiator will be frozen.

1. Use fuel, hydraulic oil and lubrication with low viscosity and add antifreeze to the coolant. Refer to "Oil Specifications" on page 88 in the maintenance section for particular oil brands.
2. Add anti-freeze in coolant.

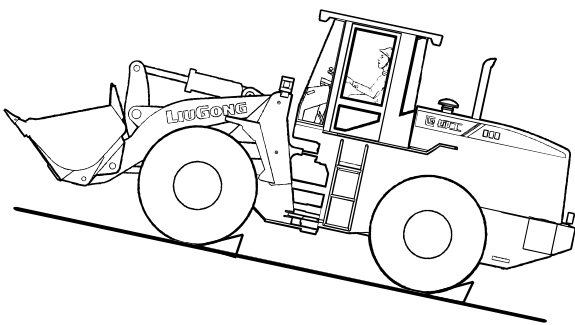
WARNING: Keep antifreeze away from an open fire. Do not smoke when adding antifreeze.

3. In severe cold areas, use anti-cold batteries. As the ambient temperature drops, the electrolyte may be frozen. In order to prevent battery capacity loss, cover the battery or move it to a warm place and fix it the next day, then the engine can be started easily at the next day.
4. Thoroughly clean sludge, water or frozen snow on the machine to avoid them entering into the seam and damaging sealing performance.
5. Park the machine on a dry and hard ground. If impossible, park the machine on the wooden board. The wooden board can prevent the machine from being frozen.
6. After the weather turns warm, change fuel, hydraulic oil and lubricant with half viscosity. Refer to Oil Use Standard stipulated in the Operation and Maintenance Manual for particular oil brand.

Parking

Stopping the Machine

1. Park the machine on a flat ground. If it needs to park the machine on a slope, place a wedge under the wheels to stop it from moving.



2. Use the service brake to stop the machine.
3. Turn the shift control lever to NEUTRAL position.
4. Pull up the parking brake button.

5. Lowering all the implements to the ground and press the bucket downwards slightly.

Turning off the Engine

⚠ CAUTION: Do not turn off the engine when the machine is working with a load. Otherwise, the engine parts will be frayed quickly due to the overheating.

1. Let the engine runs at idle speed for 5 min to let the parts cool down.
2. Turn the start switch of the engine to I position and take out the key.
3. Turn the all the switches to NATURAL or OFF position.

Leaving the Machine

1. Close the left and right door.
2. Use the ladder and the handrail when you get off the machine. Face the machine and use both hands. Make sure that the steps are clear of debris before you dismounting.
3. Inspect the engine compartment for debris. Clean out any debris and paper in order to avoid a fire.
4. Remove all flammable debris in order to reduce a fire hazard. Dispose all debris properly.
5. Turn the battery disconnect switch to the O position.
6. If the machine is not filled with anti-freeze at ex-factory, after the machine parks in winter, open all water drain valves of the engine in time, discharge all coolant in the cooling system and air conditioner system so as to prevent the machine from being cracked by frost. If the machine has been filled with anti-freeze at ex-factory, refer to the instructions of the anti-freeze labels.
7. Fix all covers, lock all equipments and remove the key.

Storage

Before Storage

1. Clean and dry every part of the machine and store it in a dry warehouse. If the machine has to be stored in the open air, park the machine on a concrete ground and cover with canvas.
2. Before storage, refill the oil tank, lubricate every moving pin & shaft and change hydraulic oil.
3. Paint a thin layer of grease on the exposed part of hydraulic oil cylinder piston rod.
4. Remove batteries from the machine and store in a separate place.
5. If the air temperature is below 0 °C , add anti-freeze in cooling water of the engine till it reaches the engine body and evaporator of the air conditioner. Drain out water in the cooling system, also drain out water in the evaporator of the air conditioner.

During Storage

1. Start the machine once every month and run every system, and lubricate every parts of the moving pins and shafts. Meanwhile, charge the battery.
2. Before starting the machine, wipe off grease on the hydraulic oil cylinder piston rod. After operation, paint a layer of grease on it.
3. Paint antirust additive on rusted parts.

⚠ WARNING: To avoid personal injury or death, when working with anti-freeze inside the room, open the windows for ventilation.

Before Reuse

1. Change lubricant of the engine, transmission, axles lubrication and hydraulic oil, brake oil and anti-freeze of the engine.
2. Lubricate all moving pins and shafts.

3. Before starting the machine, wipe off grease on the hydraulic oil cylinder piston rod.

⚠ CAUTION: If the machine is not coated with antirust additive per month during storage, please consult with Liugong dealer.

Transportation Information

Transportation of the Loader

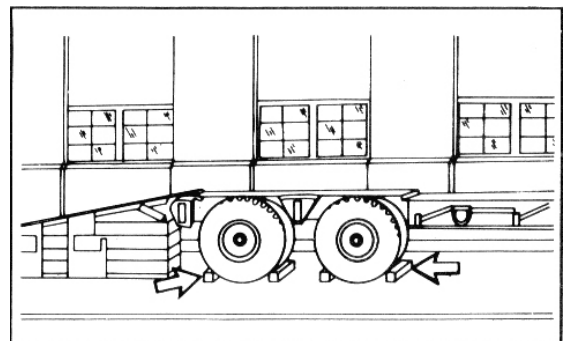
⚠ CAUTION: Obey the correlative laws govern characteristics of the load (weight, width, and length).

Investigate the travel route for overpass clearances, Make sure that there will be adequate clearance for the machine.

Clean ice, snow, or other slippery material from the loading dock and from the truck bed before you load the machine onto transport machine. This will prevent the machine from slipping in transit. This will also prevent a the machinn from moving while the during transportation.

Perform loading according to the following steps:

1. Chock the trailer wheels or the truck wheels before you load the machine.



2. When the machine is loading on the trailer or truck, it is forbidden to turn.
3. After the machine is parked, use the steering frame lock to lock the front frame and the rear frame.



4. Lower the bucket to the floor of the trailer. Turn the shift control lever to the NEUTRAL position.
5. Turn the pilot shutoff valve lever to OFF position.
6. Engage the parking brake button.
7. Stop the engine, turn every switch to NEUTRAL or OFF position and remove the key.
8. Lock the door and remove the key.
9. Turn the battery disconnect switch to OFF position.
10. Chock the wheels of the loader and fasten it with steel wires to avoid movement during transportation.



11. Cover the exhaust outlet to prevent the turbocharger from rotating during transportation. Damage to the turbocharger can result.

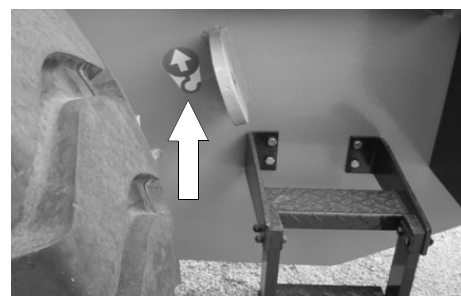
Run the Machine

1. Before you run the machine, consult your tyre dealer for recommended tyre pressure and speed limitations.
2. Stop for 30 minutes after every 40km or after every hour when running the machine for a long distance in order to let the tyre cool down.
3. Inflate the tyre to the correct pressure. Refer to “Tyre Inflation Information” on page 87 .
4. Travel at a moderate speed. Observe all speed limitations when you run the machine.

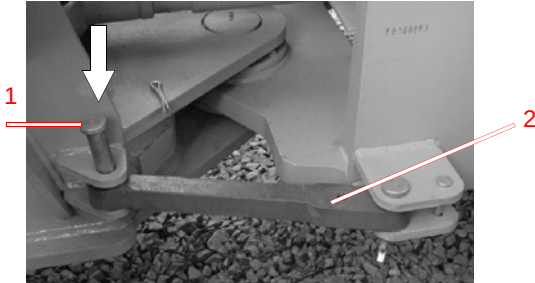
Lift the machine

⚠ WARNING: Improper lift or securing could cause the machine to move and cause injury or damage. Install the steering frame lock before lifting.

1. The lift weight of the machine is $15600 \pm 200\text{kg}$; calculate the maximum lift weight of the crane and loading capacity of the lifting device to ensure the lift safety.
2. The length of the four ropes on the lifting device must be the same to ensure the four lifting eyes share the same pressure.
3. The lifting decal can be seen on the front and rear frame of the machine.



- (4) The lifting device should be fixed on the lift eyes with lift decals on the machine.



⚠ WARNING: Improper lifting could cause the loader to move accidentally and machine damage, personnel injury or death.

Towing Information

Towing the machine

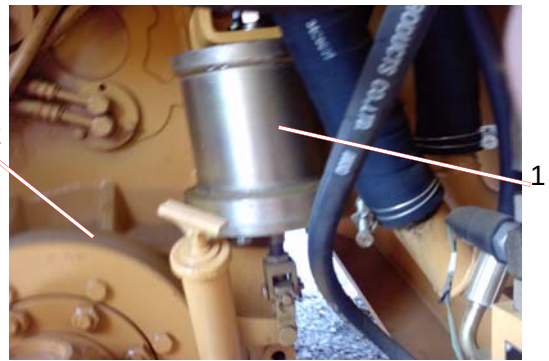
⚠ WARNING

Personal injury or death could result when towing a disabled machine incorrectly. Chock the wheels before disengage the brake to prevent the machine from moving.

Do not tow the machine unless the loader has a severe trouble. The machine can only be towed for a short distance for repair. Never tow the machine for a long distance. The towing distance should not exceed 10Km and towing speed should not exceed 10km/h; otherwise, the gear box will be damaged due to insufficient lubrication. If the machine needs to be transported for a long distance, a truck and trailer should be used.

Do the following steps :

1. Do not run the machine if it is disabled by the engine fault or the brake system fault. Remove the connecting shaft between the parking brake cylinder and the parking brake rod to disengage the parking brake by force.



1. Brake chamber
2. Brake clamp

⚠ CAUTION: Before releasing the parking brake, chock the wheel to prevent movement. Remove the wedge before starting the machine.

2. The towing machine should be equipped with protective guard to protect the towing operator once the towing ropes or towing bar cracks accidentally.
3. Do not allow riders on the machine that is being towed unless the operator can control the steering wheel or the brake.
4. Before you towing the machine, make sure that the towing ropes or the towing bar are strong enough for towing the machine. The towing ropes or towing bar must have a strength that is 1.5 times of the gross weight of the machine that is being towed.
5. Use a rope cable or steel wire with rings as the towing tools. Order a person as observer in the safety position. Stop towing if the ropes begin to crack or loose. Stop towing if the towing machine can move but the towed machine can not move.
6. The minimum angle between the towing ropes and straight direction should not exceed 30° .

7. Quick machine movement could cause the towing ropes or the towing bar overload. This could cause the towing ropes or the towing bar to break. A smooth machine movement helps towing operation easier.
8. Normally, the towing machine should be as large as the disabled machine. The towing machine must have enough brake capacity, enough weight, and enough power for the grade and for the distance that is involved.
9. During towing, all personnel should keep from the both sides of the towing ropes so as to avoid injury caused by break.
10. It may be necessary to connect a large machine or additional machine to the disabled machine in order to provide sufficient control and sufficient brake. This will prevent the disabled machine from rolling away on a downgrade.
11. When towing the disabled machine downhill, to get enough control and brake ability, it is necessary to connect a larger truck or additional machine on the back to avoid a rolling accident.

It is impossible to list all the requirements for all different situations. Refer to liugong dealer for more information of towing the disabled machine.

Towing with a Running Engine

If the engine is running, the machine can be towed for a short distance under certain conditions. The power train and the steering system must be operable. Tow the machine for a short distance only. For example, pull the machine out of mud or to the side of the road.

The operator on the towed machine must turn the machine in the direction of the towing ropes.

Carefully obey all of the instructions that are outlined in this topic.



Maintenance Manual

 **CAUTION:** Please perform the maintenance procedures at the intervals according to this manual. Proper maintenance will extend the service life of the machine and provide safer operation.

Run-in

The run-in of new loader is an important procedure for prolonging of the service life of the machine, eliminating fault and avoiding accidents. The user must read these guidelines for run-in a new loader and how to operate and maintain the machine after purchase.

Run-in-Requirements for New Loaders

- (1) Run-in of a new loader is 100 hours.
- (2) Run the machine for five minutes after starting the machine. Start the machine at low speed. Slowly increase speed.
- (3) Run-in should be done averagely in gears of F1, F2, F3, F4, R1, R2, R3.
- (4) Start the machine at low speed. Slowly increase speed. Always avoid starting, speeding up, turning and braking suddenly except for emergency cases.
- (5) It is better to load with loose material during run-in period. Do not operate rushly and exceed its rating load capacity and travel speed by 70%.
- (6) Check the lubricant periodically. Replace or refill the lubricant according to the stipulated period.
- (7) Please check the transmission, torques, front/rear axles, wheel hub, brake, middle shafts, hydraulic oil, coolant fluid and temperature of the machine periodically for overheating, find out the reasons and remove them.
- (8) Check the tightness of all bolts and nuts.

The following must be done after the first 8 hours of operation during the run-in period.

- (1) Check the tightness of all the bolts and nuts especially bolts of the engine hood, elbow, front and rear axle, wheel, transmission shaft, diesel engine, gear box and front and rear frame joint etc.
- (2) Check the belt tightness of the fan, engine and air conditioner compressor.
- (3) Check the oil level of the transmission, driving axle and diesel engine.
- (4) Check the hydraulic system and braking system for leakages.
- (5) Check the connections of all control levers and flexible shaft.
- (6) Check temperatures and connections of the electric system, power supply of the alternator, lights and the turn signal lights.

 **CAUTION:** Check oil level according to the relevant operation regulations.

Work should be done after the finish of run-in

- (1) Check the tightness of all bolts and nuts, especially exhaust pipe bolts, front axle& rear axle set bolts, and rims nuts and connecting bolts of drive shafts, set bolts of the diesel and the transmission. Also check bolts for the articulation point of the front & rear frame.
- (2) Check the condition of the fan belts, engine belts and air conditioner compressor (optional) belts.
- (3) Check the hydraulic system and brake system for oil leakage.
- (4) Replace the transmission oil and axle lubricant.
- (5) Replace the secondary filter and clean the primary filter of the transmission.
- (6) Clean the return oil filter element of the hydraulic oil tank.

⚠ CAUTION: Replace transmission oil, axle lubricant and secondary filter of the transmission according to operational guidelines.

Maintenance Intervals Schedule

⚠ CAUTION: Read and understand all the safety instructions, warnings and indications before any operations or maintenances.

The maintenance intervals stated in this manual are determined according to the service hour meter or calendar intervals shown (daily, weekly, monthly, etc.). Liugong recommends that maintenance should be performed according to whichever of the above-mentioned intervals occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the "Maintenance Intervals" chart may be necessary.

Perform service on items at multiples of the original requirement. For example, at every 500 service hours or 3 months, also service those items listed under every 250 service hours or monthly, every 50 service hours or weekly and every 10 service hours or daily.

Every-10-Service Hours or Every Day

- Check the battery and the battery disconnect switch.
- Check the oil level of the engine.
- Check coolant level.
- Check hydraulic oil level.
- Check fuel level.
- Drain any water and trash from the fuel pre-filter and filter of the engine.
- Daily inspection.(More information refer to Daily inspection of the Important maintenance procedures)

- Check the engine fan and belt.
- Check work conditions of lights and gauges.
- Check tyre inflation pressure and look for tyre damage.
- Check the work condition of the backup alarm.
- Lubricate every articulation point according to the instructions of the machine lubrication chart on the machine.

Every-50-Service Hours or Every Week

In addition to the all previous service checks:

- Check the transmission oil level.
- Check clearance between the parking brake shoe and brake drum at the first 50 service hours and adjust if necessary. Check once every 250 service hours after that.
- Tighten all connecting bolts on drive shafts.
- Clean the dust and sundries on the strainer of the recirculating and fresh air inlet. Wash them if it is necessary . check the compressor belt for tightness and check the condenser for grease, dirt and sundries .Keep battery terminals clean and coat vaseline to avoid acid fog corroding terminals.
- Check the lubrication condition of the lubricating points and lubricate every lubricating point according to lubrication diagram on the machine.
- Check nitrogen pre-charge pressure of the accumulator (optional) at the first 50 service hours.

Every-100-Service Hours or Two Weeks

In addition to the all previous service checks:

- Replace transmission oil at the first 100 service hours, and change transmission oil once every 1000 service hours after that. If the operating hours are below 1000 hours a year, replace the transmission oil at least once every year. Change the transmission oil secondary filter while changing transmission oil each time, and clean the primary filter on the bottom of the transmission.
- Change gear oil of the axles after the first 100 service hours, change the gear oil of the axles every 1000 service hours. If the operating hours are below 1000 hours a year, change the gear oil of the axles at least once every year.
- Clean the engine cylinder head. Clean the radiator groups.
- Clean the filter strainer of the fuel tank.
- Check nitrogen pre-charge pressure of the accumulator (optional) at the first 100 service hours.

Every-250-Service Hours or Every Month

In addition to the all previous service checks:

- Check the tightening torque of the rims set bolts.
- Check the tightening torque of the transmission and engine fixing bolts.
- Check the implement and the front & rear frames for cracks and loose bolts.
- Check the oil level of the front and rear axles.
- Check the intake air filter alert indicator. If the indicator blinks, please clean or change filter element.
- Check the air intake system of the engine.
- Replace the engine oil and filter.
- Replace the coolant filter of the engine.

- Clear the return oil filter element of the hydraulic system at the first 250 service hours. Replace the return oil filter element of the hydraulic system once every 1000 service hours.
- Check tension and damage condition of engine belt and air conditioner compressor belts.
- Check the refrigerant level in the air conditionerrefrigerant receiver.
- Clean the recirculating air filter and fresh air filter of the cab.
- Check the service brake ability and parking brake ability.
- Check nitrogen pre-charge pressure of the accumulator at the first 250 service hours.

Every-500-Service Hours or Three Months

In addition to the all previous service checks:

- Check the density of antifreeze and coolant additives.
- Replace the fuel pre-filter. Replace the primary filter and the secondary filter of the engine.
- Tighten connecting bolts of the front & rear axles and front & rear frames.
- Check bolts on the articulation joint of the frame for loose condition.
- Check nitrogen pre-charge pressure of the accumulator (optional) at the first 500 service hours . .

Every-1000-Service Hours or Six Months

In addition to the all previous service checks:

- Adjust the engine valve lash.
- Check the engine tensioner bearing and fan shaft housing.
- Change transmission oil, transmission oil filter and clean the filter at the bottom of the transmission.
- Change gear oil of axles.
- Replace the return oil filter element of the hydraulic system.
- Clean fuel tank.
- Tighten all set bolts of the battery and clean battery surface.
- Check nitrogen pre-charge pressure of the accumulator (optional) at the first 1000 service hours.
- Replace the fresh air filter of the cab.

Every-2000-Service Hours or Every Year

In addition to the all previous service checks:

- Check the engine shock absorber (optional).
- Replace coolant and coolant filter and clean the cooling system. If the service hours is below 2000 service hours a year, replace coolant at least once two years.
- Replace hydraulic oil, clean fuel tank and check the oil suction hose.
- Check the service brake system and parking brake systems. Remove and check the friction disc for wear and replace if necessary.
- Check airtight condition of the control valve and work cylinder by measuring natural sediment of the cylinder.
- Check the refrigerant pipe and water hose of the air conditioner for cracks, worn or foamed by oil. check the connectors and clamps for loose conditions.
- Replace the recirculating air filter of the cab.
- Check flexibility of the steering system.
- Check nitrogen pre-charge pressure of the accumulator at the first 2000 service hours . After that, check once every 2000 working hours.



General Torque Specifications

Tighten the bolts used in the machine according to the torque requirements shown in the following table unless other specified:

Standard Torque For Metric Threads

Thread Size	Standard Torque lbf.ft (N • m)	
	8.8 Grade Strength	10.9Grade Strength
M6	7.7±1.1 (10.5±1.5)	
M8	19±2.9 (26±4)	
M10	38±5 (52±7)	53±4 (72±6)
M12	66±9 (90±12)	89±7 (120±10)
M14	107±15 (145±20)	144±11 (195±15)
M16	166±26 (225±35)	225±18 (305±25)
M18	229±33 (310±45)	306±26 (415±35)
M20	302±37 (410±50)	443±37 (600±50)
M22	443±59 (600±80)	590±52 (800±70)
M24	561±74 (760±100)	752±74 (1020±100)
M27	811±111 (1100±150)	1106±74 (1500±100)
M30	1106±148 (1500±200)	1364±11 (1850±150)
M33	1512±221 (2050±300)	2139±295 (2900±400)
M36	1955±258 (2650±350)	2286±184 (3100±250)

Standard Torque for British System Threads

Thread Size	Standard Torque lbf.ft (N • m)
1/4	9 ± 3 (12 ± 4)
5/16	18 ± 5 (25 ± 7)
3/8	33 ± 5 (45 ± 7)
7/16	52 ± 11 (70 ± 15)
1/2	74 ± 11 (100 ± 15)
9/16	110 ± 15 (150 ± 20)
5/8	148 ± 18 (200 ± 25)
3/4	266 ± 37 (360 ± 50)
7/8	420 ± 59 (570 ± 80)
1	645 ± 74 (875 ± 100)

Tyre Inflation Information

Liugong recommends the use of dry nitrogen for tyre inflation and tyre pressure adjustments. It includes all machines with rubber tyres. Nitrogen is an inert gas that will not aid combustion inside the tyre.

The use of nitrogen for tyre inflation can not only reduce the risk of explosion, but also help to prevent oxidation, aging of the rubber, and corrosion of the wheel rim parts.



Training in using the equipment is necessary to avoid over inflation. A tire blowout or a rim failure can cause personal injury. Do not set the tire inflation equipment regulator higher than 140 kPa (20 psi) over the recommended tire pressure.

Check and adjust the tire inflation pressure after cooling completely. Ask all other persons to leave the danger area (around of the rim).

For nitrogen inflation, the same tire pressures that are used for air inflation. Consult your tire dealer for operating pressures.

The tire inflation pressures in the following table are normal temperature inflation pressures.

	Front wheel	Rear wheel
During operating	59 ± 1.5 psi (0.40 ± 0.01Mpa)	51 ± 1.5 psi (0.35 ± 0.01MPa)
Race for a long distance	51 ± 1.5 psi (0.35 ± 0.01Mpa)	51 ± 1.5psi (0.35 ± 0.01MPa)

The tire pressure in a warm shop area 18 ° to 21 ° C will significantly change when you run the machine into freezing temperatures. If you inflate the tire to the correct pressure in a warm shop, the tire will be under inflated in freezing temperatures. Low pressure shortens the life of a tire.

Lubrication Specifications

Oil Change Interval and Refill Capacities

! CAUTION: Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment. Collect the fluid with suitable containers before opening any compartment or disassembling any component. Obey all local regulation for the disposal of liquids.

Item	Interval (service hours)	approximat- ive quantity(L)
Engine oil	250	22
Transmission oil	1000	45
Hydraulic oil	2000	210
Front axle oil	1000	45
Rear axle oil	1000	50
Fuel Tank		320
Cooling system		45

Oil Specifications*Oils used in plains where temperatures are normal*

Type of oil		Name of oil		Position of use
		In Summer	In Winter	
Grease		★ ^a 3# MOS2 lithium based grease (2# MOS2 lithium based grease if the machine is fitted with centralized lubrication system)		For roller bearings, bushings, pins, frame pins, swing frame of rear axle, drive shaft spline, universal joint and water pump shaft etc.
Transmission oil		1300 ★ SAE/15W-40 SHELL 1300		For torque converter and transmission
Hydraulic oil		★ AV68 anti-wear hydraulic oil	HV46 low temperature anti-wear hydraulic oil	For implement hydraulic system & steering hydraulic system and brake system.
Engine oil		★ SAE15W-40 SHELL 1300		For diesel engine
Engine fuel	North	No. 10 & 0 light diesel oil	★ No. 0 light diesel oil	For diesel engine
	South	No. 0 light diesel oil	-No. 20 light diesel oil	
Gear oil		SAE80W-90 (API GL-5/LS) heavy load gear oil		For bevel gear and final drive.

a. Note: " ★ " used by the manufacturer after the machine is newly produced.

Oils used in severely cold areas

Type of oil		Name of oil		Position of use
		In Summer	In Winter	
Grease		2# MOS2 lithium based grease		For roller bearings, bushings, pins, frame pins, swing frame of rear axle, drive shaft spline, universal joint and water pump shaft etc.
Transmission oil		SHELL ATF220		For torque converter and transmission
Hydraulic oil		HV46 low temperature anti-wear hydraulic oil		For implement hydraulic system & steering hydraulic system.
Engine oil		SAE5W-40 SHELL No.1		For diesel engine
Enginefuel		- No. 20 light diesel oil		For diesel engine
Gear oil		SAE80W-90 (APIGL-5/LS) heavy load gear oil		For bevel gear and final drives

**CAUTION:** Do not mix oils of different brands even if they have the same specifications. Clean the system before refilling the different oil.

If the machine is used at low temperature in severe cold areas for a long time, HV-46 low temperature anti-wear hydraulic oil should be used, and ATF220 or DEXRON- III or Donax TC transmission oil should be used.

Replace the lubricant periodically even though the lubricant is very clean because the lubricant might go bad after a long time use.

Choose the oil according to the lowest air temperature in the local area where the machine is used.

Important Maintenance Procedures

Daily Inspection

⚠ CAUTION: Watch carefully for leakage. If you find the leakage, service it. If you suspect leakage or observe leakage, check the fluid level more frequently.

- Check the engine compartment and clean the accumulated sundries on it and on the radiator.
- Check the engine for damaged parts.
- Check the axles, differential, wheel rim brake and transmission for leakages. Repair the leakage point.
- Check the hydraulic oil tank, all of the tubes and hoses, plugs, seals, connectors and oil nozzles for leakages. Repair the leakage and replace the hose if necessary.
- Check all of the implement and linkage for cracks and damages.
- Ensure that all doors, covers and shields are securely attached. Check them for damages.
- Check the ladder, walkway and handrail. Clear away all the trashes and repair or replace any damaged part.
- Check the air inlet and outlet of the evaporator in the air conditioner. Clear away the cotton, paper, plastic and film that can block the air inlet.
- Check the ROPS for visible damage. Consult with Liugong dealer for repair information if there is damage.
- Check all the lighting equipments and replace the cracked bulb and glass if necessary.
- Check the cab and keep the cab tidy.
- Check the instrument panels and indicators for damage. Replace the damaged parts if necessary.

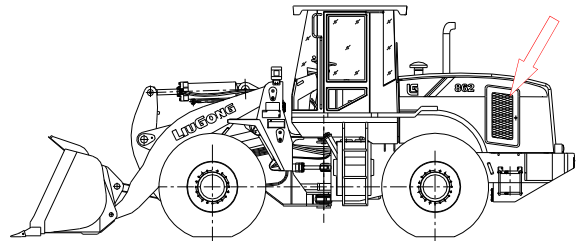
- Check the seat belt, buckle and tighten the bolts. Replace the frayed or damaged parts if necessary.
- Adjust the rearview mirrors and check the window to ensure a good vision for the driver. Clean the windows if necessary.

Coolant Level--Check



Hot coolant can cause serious burn. To open cap, stop engine until the radiator cools down. Then loosen cap slowly to release the pressure.

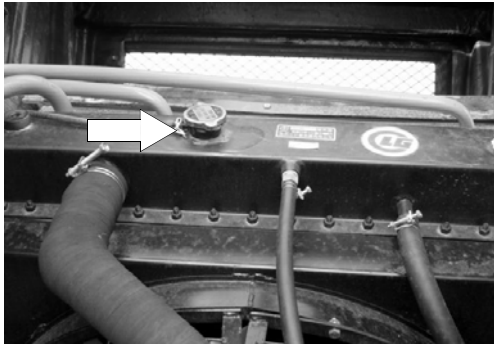
The coolant of the engine consists of coolant , antifreeze and additives. The water radiator is located at the rear of the machine.



Checking Method for Coolant Level

- (1) After the engine coolant temperature comes down to 50 degrees Celsius, slowly screw out the water radiator cap to release pressure to avoid being burned by high temperature vapor or splashing coolant.

Water filler of water radiator



- (2) Check if coolant level is at 1 cm below the water filler, replenish coolant if necessary.
- (3) Check the water filler cap for airtight condition, replace if damaged.
- (4) Screw in the water radiator filler cap.

! CAUTION: Check the cooling system of the engine for leakage everyday. If leakage is found, eliminate the leakage and replenish coolant until it reaches the proper level.

Check the Antifreeze Density

When adding or replenishing engine coolant to a new machine or to an engine with a newly-clean cooling system, first choose the antifreeze density of the coolant according to the lowest local air temperature (10 degrees Celsius lower than the lowest air temperature is preferred). Calculate the required density of antifreeze according to the total capacity of the cooling system of the engine. The total capacity of the cooling system is 45 liters.

Recommended Antifreeze:

Min. suitable environmental temperature (°C)	Part number of anti-freeze
-45	74A1883
-40	74A0093
-15	74A0154

Choose high-quality anti-freeze when replacing the anti-freeze and refill according to the instructions.

3%Additive (SCA) must be contained in the anti-freeze to prevent the engine parts which contact with the coolant from rusting, corrosion and smudged. The additive will be consumed up during running the engine, therefore, check the anti-freeze consistency every 500 work hours or per six months. Refill the anti-freeze by changing the coolant filter periodically.

Refer to the Engine Operation and Maintenance Manual for more information about checking measure of the anti-freeze consistency and refilling instructions.

! CAUTION: Antifreeze is flammable. Never expose antifreeze to an open fire. Never use water as the coolant otherwise it will cause corrosion damage to the system.

Coolant --Replenish

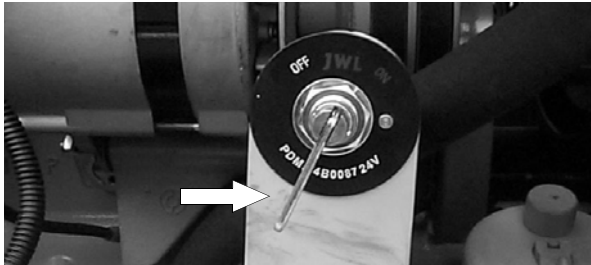


Hot coolant can cause serious burn. To open cap, stop engine until radiator cools down. Then loosen cap slowly to release the pressure.

Replenish coolant as follow:

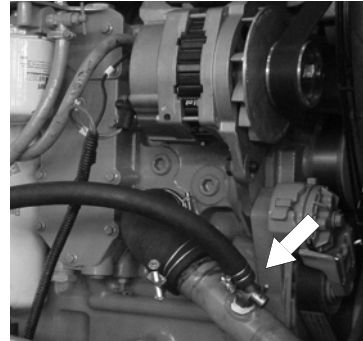
- (1) Mix the water and coolant completely according to desired density level of the coolant.
- (2) Turn on the battery disconnect switch. Insert the key into the start switch and turn clockwise to ON position to turn on the power of the machine.

Disconnect switch



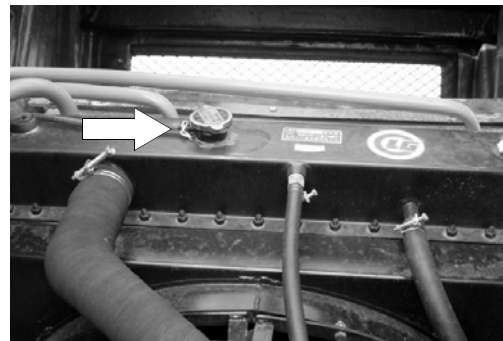
- (3) Turn the work mode switch of the air conditioner to WARM position.
- (4) Turn the manual valve on the water inlet hose of the engine ON position (The valve is at ON as shown)

Manual valve



- (5) Open the water radiator filler cap and slowly replenish coolant till the level reaches 1 cm below the water filler of the radiator and is kept stable within 10 minutes.

Water filler of water radiator



CAUTION: When replenishing coolant, exhaust air from the cooling system lines of the engine.

- (6) Keep the water radiator filler cap open, start the engine and run at idle speed for 5 minutes, and at high speed for 5 minutes, the coolant temperature reaches over 85 °C .
- (7) Check the coolant level again, continue to replenish coolant till the level reaches 1 cm below the water filler cap of the radiator if necessary.

- (8) Check the water radiator filler cap for good condition, replace it if damaged.

WARNING

Do not replenish coolant when the engine temperature is high otherwise this could cause the engine to damage. Replenish coolant only after the coolant temperature is below 50 °C .



Coolant--Replace

WARNING

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment. Prepare to collect the fluid with suitable containers before disassembling any hydraulic oil lines. Obey all local regulation for the disposal of liquids.

Hot coolant can cause serious burn. To open cap, stop engine until radiator cools down. Then loosen cap slowly to release the pressure.



- (2) Turn the work mode switch of the air conditioner system to WARM position.

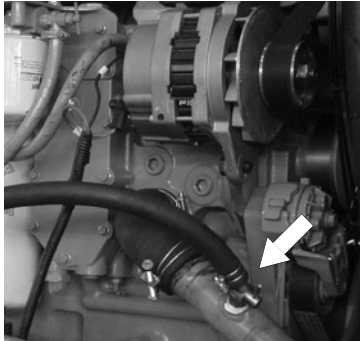
Completely replace the coolant every 2000 service hours or two years (which ever comes first) and clean the cooling system. Clean the cooling system before that interval if the coolant is polluted, the engine is running excessively hot or bubbles appear in the radiator.

Steps for cleaning the cooling system

- (1) Turn on the disconnect switch; insert the key in the start switch and turn it clockwise to the first position to turn on the power of the machine.

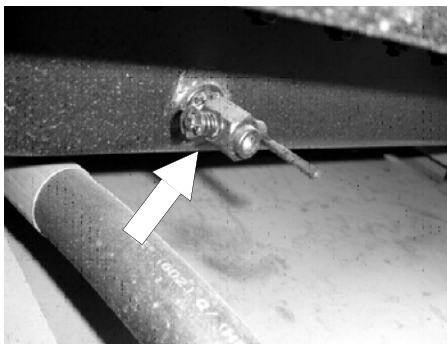


- (3) Turn the manual valve on the water inlet pipe of the engine to ON position. (The valve is at ON as shown)



- (4) Run the engine at idle speed for five minutes, stop the engine. Turn the start switch to the first position to turn on power of the machine. Make sure that the work mode switch of the air conditioner system is at WARM position and the water solenoid is at open state.
- (5) Slowly open the water radiator cap to release pressure after the coolant temperature is below 50 degrees Celsius.
- (6) Open the water drain valve in the bottom of the coolant radiator and drain out the coolant of the engine. Collect the waste coolant with an appropriate container for disposal

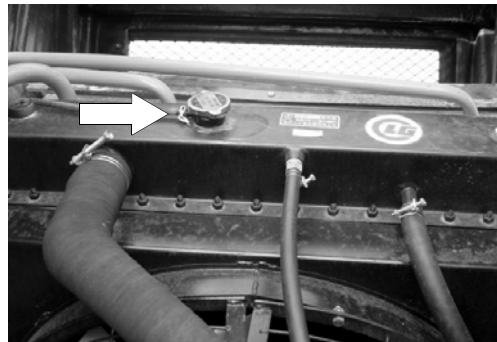
Water drain valve of the water radiator



- (7) After draining out the engine coolant, close the water drainage valve at the bottom of the radiator.
- (8) Check all lines and clamps of the cooling system for damage and replace if necessary. Check radiator for leakage, damage and contamination accumulation. Clean the radiator and repair if necessary.

- (9) Inject cleansers mixed with water and sodium carbonate into the cooling system of the engine. Its proportion is 0.5 kilograms of sodium carbonate against 23 liters of water. The level should reach the normal level of the radiator and should remain at the level for a minimum of 10 minutes.

Water filler cap of water radiator



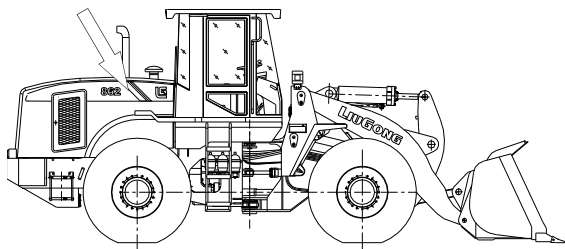
! CAUTION: When replenishing cleanser into the cooling system, exhaust air from cooling system lines of the engine. During cleaning of the cooling system, never cover the water radiator filler cap while running the engine.

- (10) Keep the radiator filler cap open. Start the engine. When the coolant temperature reaches over 80 degrees Celsius, continue to run the engine for another 5 minutes.
- (11) Stop the engine. Drain out cleanser.
- (12) Replenish with clean water until it reaches the normal level and the level remains unchanged for 10 minutes. Keep the radiator filler cap open and start the engine. When the coolant temperature reaches over 80 degrees Celsius, run the engine for another 5 minutes.
- (13) Stop the engine and drain out the cooling system water. If the drained water is still dirty, continue cleaning the system again till the water is clean.
- (14) Replace with a new coolant filter, close all drain valve, then replenish new coolant according to the operation rules previously described in "Coolant --Replenish" on page 91.

⚠ WARNING: The coolant of the engine is poisonous and impotable. Dispose according to the local laws and regulations.

Air Filter Service Indicator--Check

The air filter is located under the engine hood of the machine.



⚠ CAUTION: Shut down the engine when maintain the service indicator to avoid damage to the engine.

1. Shut dow the egnine and open the engine hood. See the following picture for the air filter service indicator.



2. Check the air filter service indicator by eye. Replace the air filter element if the yellow piston of the indicator rises to the red zone.

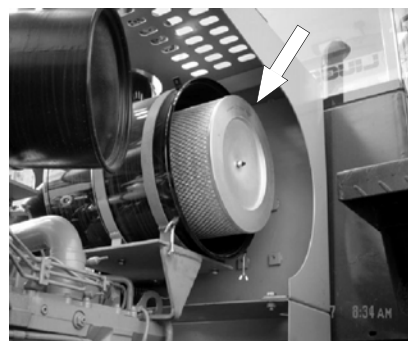
Air Filter--Clean

⚠ CAUTION: Service the air filter if the yellow piston of the service indicator rises to the red zone when the engine is running at high speed.

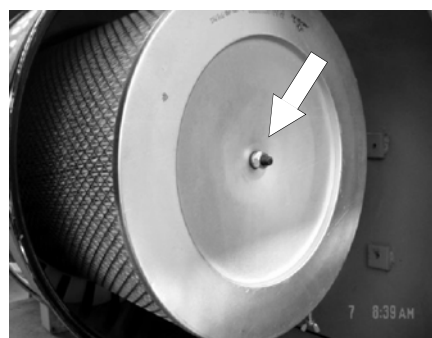
1. Shut down then engine and open the engien hood.



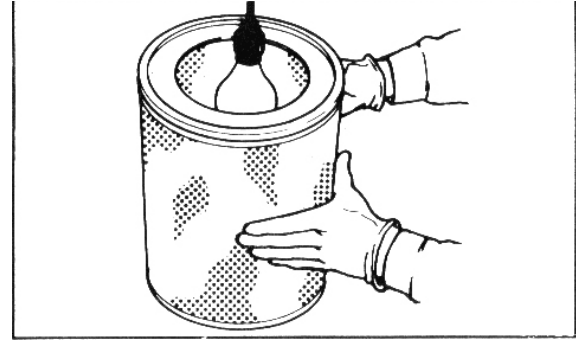
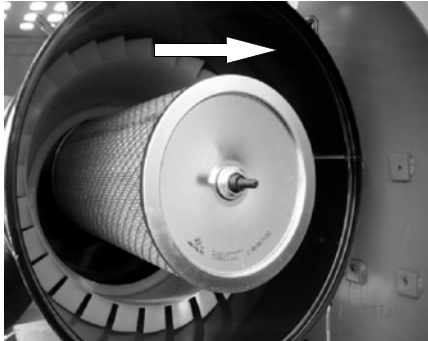
2. Remove inner & outer cover of the air filter.



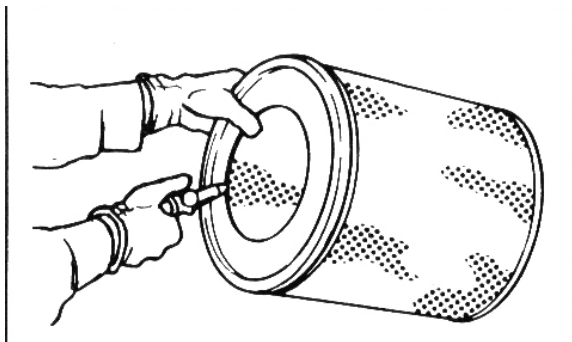
3. Loose the nut on the top of the main filter element then take the element out.



4. Clean the inner wall of the air filter.



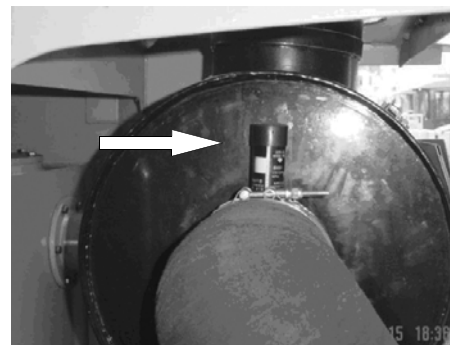
5. Clean the main filter element with compressed air (below 300kPa). First wash it out along the pleats inside the main filter element, then repeat washing the pleats along the inside and outside surface of the main filter element.



⚠ CAUTION: Do not strike when clean the main filter element, or the engine damage could result.

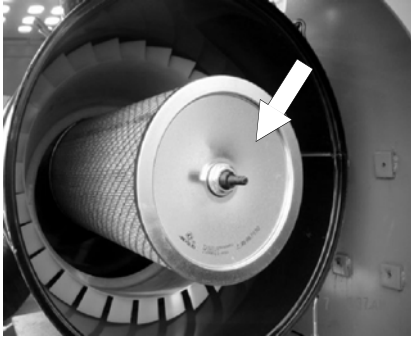
6. After cleaning the main filter element, check with a bulb, if small holes and particles as well as damage of the washer and seal are found, replace with a new main filter element.

7. Fix a clean main filter element into the air filter and ensure an even contact at the end of the main filter element. Tighten the nut on the top of the main filter element, do not use tool to avoid damage to the main filter element.
8. Clean and fix the cap of the air filter, make sure that the inner cap gasket in the air filter contacts evenly with the air filter housing.
9. Press the reset button at the bottom of the service indicator to reset the indicator.



10. After cleaning the main element, start the engine. If the yellow piston of the service indicator still rises to the red zone or exhaust black fog, then replace a new safety element.
11. Replace the main filter element after if has been cleaned up to six times. Replace once every year even if it hasn't been cleaned six times. Change the safety filter element while changing the main filter element.

Air Filter Element-Replace



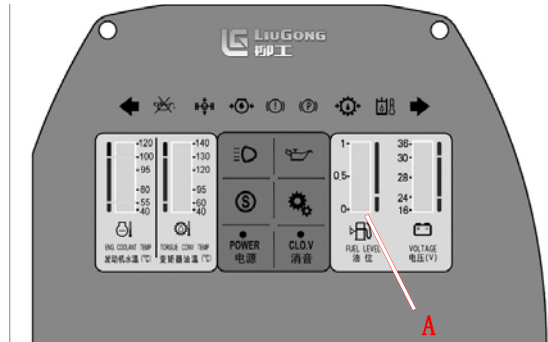
CAUTION: Always replace the safety filter element with a new filter element. Never use again after cleaning.

- (1) Stop the engine and open the engine hood.
- (2) Remove the inner and outer cap of the air filter.
- (3) Remove the main filter element.
- (4) Remove the nuts on the top of the safety filter element, then carefully remove the safety filter element.
- (5) Clean the inside wall of the air filter.
- (6) Fix a new safety filter element, make sure the seal ring on the top of the safety filter element contacts evenly. Tighten the nuts of the top of the safety filter element with hands only, do not use tool.
- (7) Fix a new safety filter element and install the inner & outer caps of the air filter. Tighten the nuts of the top of the main filter element with hands only, do not use tool.
- (8) Press down the reset button under the service indicator to let it reset.

CAUTION: Replace the safety filter element together while replacing the main filter element. After a clean main filter element has been installed, if the air filter alert indicator is still on or black smog is still exhausted, replace the safety filter element.

Fuel System Level-Check

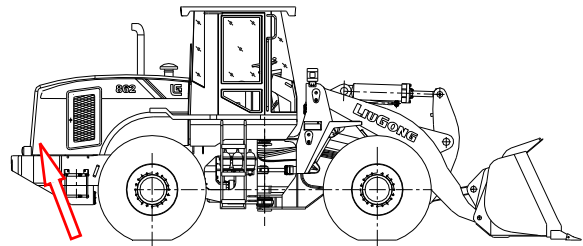
The fuel level gauge is on the cab instrument panel. **1** indicates the fuel level is full enough, **0** indicates an empty fuel tank. Refill fuel timely if the pointer points to **0.2**.



A: Oil level gauge

Fuel System--Replenish

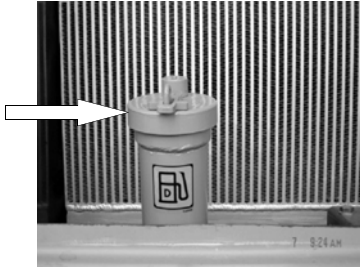
The diesel fuel tank of the machine is located at the rear of the engine. Its capacity is 280 liters.



- (1) Open the rear door of the engine hood to access the fuel filler of the fuel tank.

- (2) Remove the filler cap and replenish the fuel. When opening the fuel filler cap, first pull up the lock plate. Then turn the cap counterclockwise to the next position then remove the cap

Fuel filler cap



- (3) Remove the cap and replenish the fuel.

⚠ CAUTION: Don' t take out the strainer of the fuel filler when replenishing fuel.

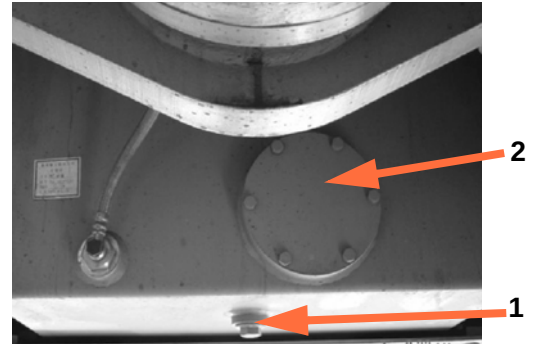
Fuel Tank--Clean

⚠ CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before disassembling any component containing fluids. And dispose of all fluids according to local regulations.

Periodically clean the strainer of the fuel filler and the diesel fuel tank.

Clean the fuel tank according to following ways:

- (1) Removing the flange cap in front of the diesel oil tank. Wash the inner surface of the tank with clean diesel fuel.



- (1) Drain plug
- (2) Flange cover
- (2) Remove the drain plug to drain out the residual fuel.
- (3) Repeat washing until the drained fuel is clean.

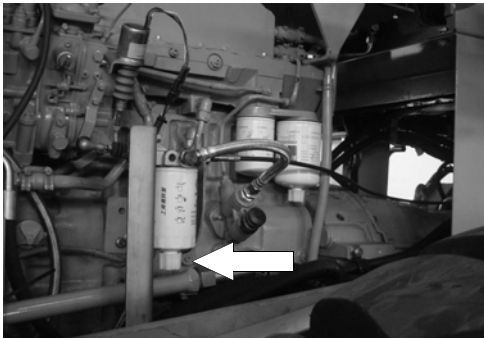
Fuel System Water and Impurity--Remove--Remove

The fuel pump and fuel injection nozzle are precision devices, if the fuel is mixed with water or impurity, the fuel pump and fuel injection nozzle can' t work properly and quickly worn. Measures should be taken to remove water and impurity in fuel.

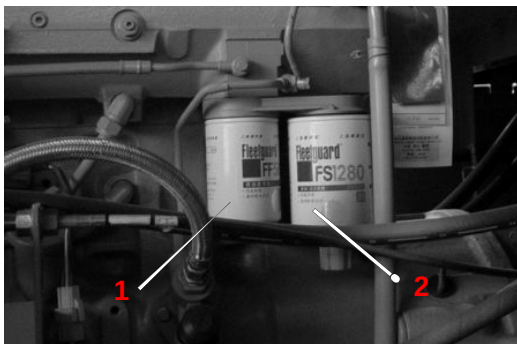
- (1) If the condition is permitted, fuel should be deposited for 24 hours before it is filled to the tank.
- (2) Before filling, screw out the drain plug on the bottom of the tank once every week, drain out water and impurity at the bottom of the tank.
- (3) After completing daily work, replenish fuel and remove the humid air in the fuel tank.
- (4) After replenishing the tank every time, wait for 5 ~ 10 minutes before starting the engine so that water and impurity are sunk into the bottom of the tank.

- (5) After completing daily work, loose the water drain plug of the fuel pre-filter and the fuel filter to drain out water and impurity.

Water drain plug of fuel pre-filter



Fuel pre-filter and secondary filter



1. Secondary filter
2. Pre-filter

! CAUTION: Refill the fuel in time. Any residual fuel at the bottom of the fuel tank contains water and impurity that will affect the normal running of the engine. Drain and clean fuel tank before replenishing.

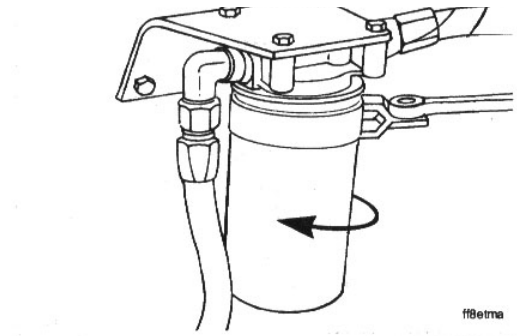
Fuel Filter and Pre-filter--Replace

! CAUTION: Do not fill fuel before the fuel filter is installed. Fuel contamination will quicken the damage of the parts of the fuel system.

- (1) First clean the fuel filter and the support.

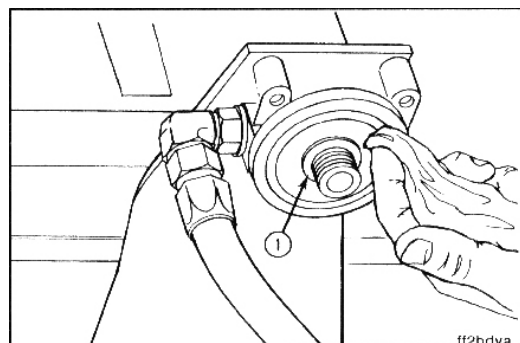
- (2) Remove the fuel filter from the support with a wrench.

Remove the fuel filter



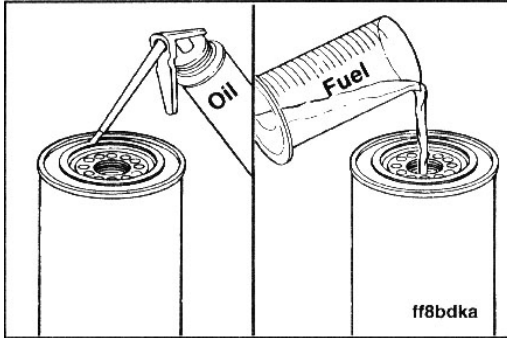
- (3) Remove the gasket ① on the thread connector of the support. Clean the seal surface of the support with a non-fibrous cloth.

Clean the surface of the support



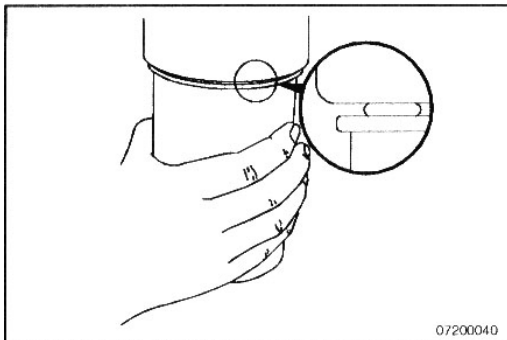
- (4) Fix a new gasket on the thread connector of the support of the fuel filter. Apply a coat of engine oil on the seal surface of the filter. Fill the fuel filter with clean fuel.

Prepare a new fuel filter



- (5) Install the filter to the support with hand. After the gasket of the filter contacts with the support, continue to tighten 1/2 ~ 3/4 turns. Do not over tighten the filter with the wrench to avoid damaging the filter.

install a new fuel filter



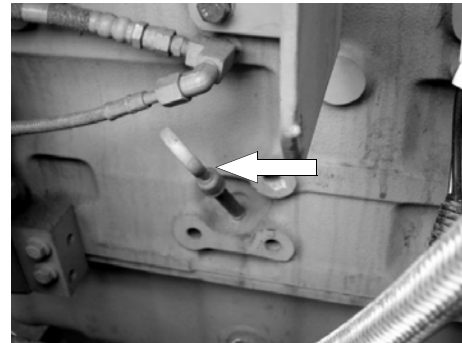
Fuel---Heat

If it is necessary to heat the fuel due to low temperature, ensure that the temperature of fuel doesn't exceed 35 °C . Otherwise power loss could be resulted!

Engine Oil Level-Check

! CAUTION: Too much engine oil or too little can result in damage to the engine.

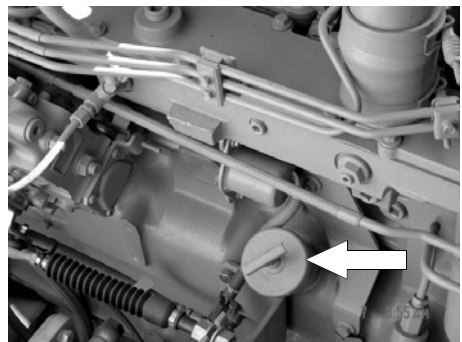
- (1) Drive the loader to a flat area, stop the engine and engage the parking brake .
- (2) After stopping the engine, wait for 10 minutes to let the engine oil in the crankcase return to the engine oil pan.
- (3) Open the engine hood, the dipstick and oil filler of the engine are located on the right side of the engine.(another filler is located on the top of the engine.



- (1) Engine oil dipstick
- (2) Engine oil filler

- (4) Take out the dipstick. Wipe it with a clean cloth and completely reinsert the dipstick into the end of the oilfiller of the engine. Take the dipstick again and check the oil level. The oil level on the dipstick should be between the low (L) and high (H) graduation marks.

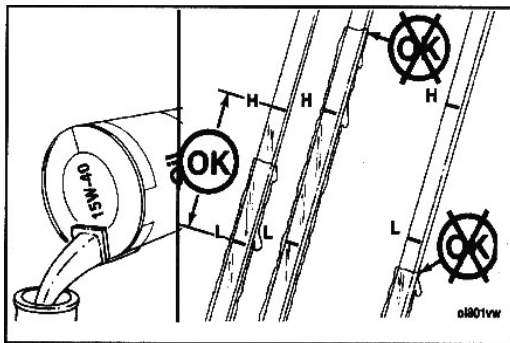
Oil level range



- (5) If the oil level is below L, replenish oil. If the oil level is above the H, screw out the oil drain plug at the bottom of the engine oil pan to release some oil.



Fuel level range



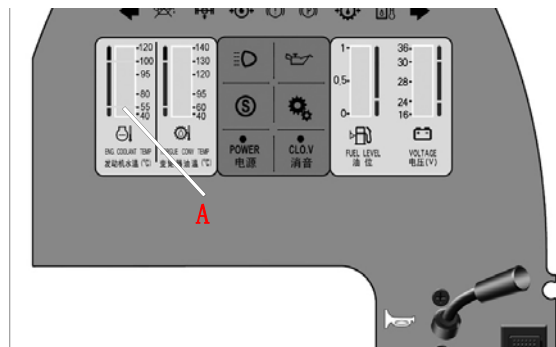
CAUTION: Too much engine oil or too little can result in damage to the engine.

Engine Oil-Replace

CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before disassembling any component containing fluids or dismantling any hydraulic lines. And dispose all fluids according to local regulations.

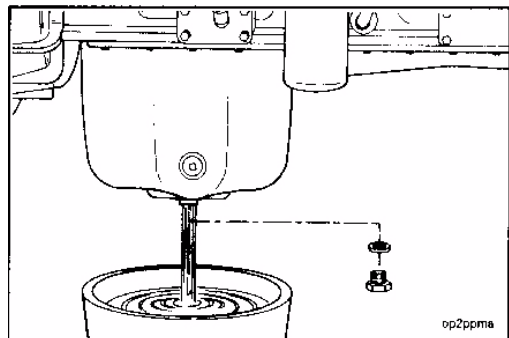
CAUTION: High-temperature lubricant can cause personal injury. Replace the lubricant only when the lubricant is warm and the impurity is floating.

- (1) Park the machine on flat ground, start the engine and until the water temperature reaches 60 °C .

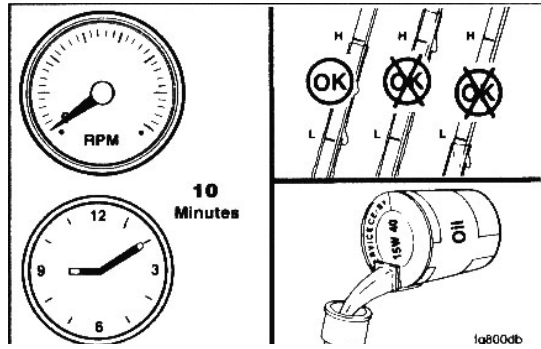


A: Engine coolant temperature gauge

- (2) Stop the engine and engage the parking brake.
(3) The oil drain plug is located on the left side of the rear fraem. Loose the engine oil drain plug to drain the oil into suitable container.



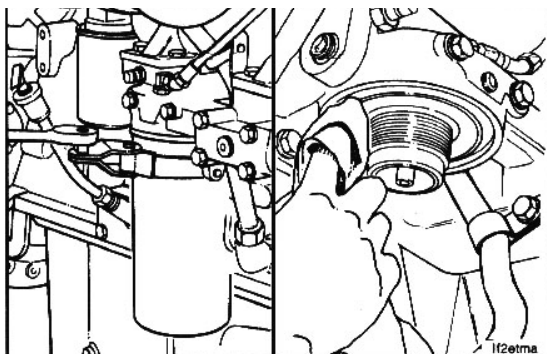
- (4) Tighten the oil drain plug and replenish clean engine oil from the oil filler of the engine till the engine oil is at H on the oil dipstick. Run the engine at idle speed to check the engine oil filter and oil drain plug for leakage.
(5) Stop the engine and wait for about 10 minutes, let the engine oil fully return to the oil pan, check the engine oil level again, if insufficient, replenish engine oil to the H on the dipstick.

Check engine oil level

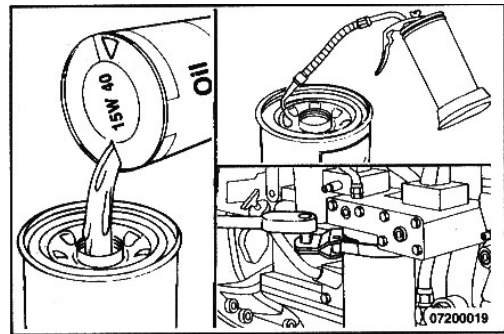
CAUTION: Check the reading of the engine oil pressure gauge after the engine is started for 15 seconds. If no reading is found, shut down the engine immediately to avoid damaging the engine. Check the engine oil for proper level.

Engine Oil Filter--Replace

- (1) Clean the area around the support of the engine oil filter.
- (2) Remove the engine oil filter with a belt spanner.
- (3) Clean the surface of the gasket of the support with a clean cloth. If old O-ring adheres to the support, remove it.

Cleaning the support

- (4) Fix new O-ring, replenish the oil filter with clean engine oil, and apply a coat of clean engine oil on the gasket surface.

Fix new engine oil filter

CAUTION: Fill the filter with clean engine oil before the engine oil filter is installed. If an empty engine oil filter is installed, the engine could be damaged due to a lack of lubricant.

- (5) Secure the engine oil filter on the support and tighten the gasket of the engine oil filter until it contacts with the support. Tighten engine oil filter according to the specified requirements with the spanner.

CAUTION: Excessive tightening the engine oil filter could result in damage to the thread or the seal of engine oil filter element.

Transmission Oil Level-Check

CAUTION: stop the machine on a flat ground when checking the oil level. Turn the shift control lever to **NEUTRAL** position, pull up the parking brake button and install a steering frame lock to stop the machine from moving or turning.

The transmission oil filler is located at the rear frame. The transmission oil dipstick is located inside the oil filling pipe.

Transmissions oil filler

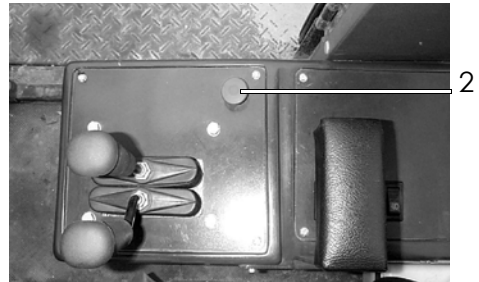


! CAUTION: When checking the transmission oil level, always separately check cold oil level and hot oil level. Too high or too low of oil level of the transmission could result in damage to the transmission, make sure the oil level of the transmission is at proper level.

! CAUTION: Check the transmission oil level only when the engine running and the oil temperature reaches 80 °C ~90 °C .

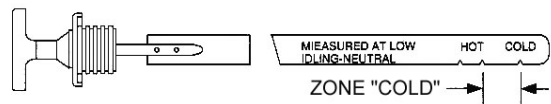
Check transmission oil level:

- (1) Park the machine on a flat ground.
- (2) Turn the shift control lever to NEUTRAL position. Engage parking brake and install the steering frame lock to avoid movement of the machine. Run the machine at idle speed.

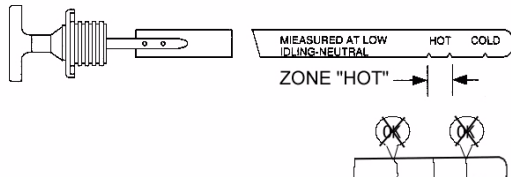


1. Shift contro lever
2. Parking brake button

- (3) Check the transmission cold oil level when the engine runs at idle speed and the transmission oil is below 40 °C . Turn the dipstick counterclockwise and take it out. wipe off the oil with a clean cloth. Insert the dipstick into the end of the oil filling pipe and then take it out again. The oil level of the transmission should reach the COLD zone of the dipstick.



- (4) When the engine transmission oil temperature reaches 80~90 Celsius, take the dipstick out of the oil filling pipe and wipe off the oil with a clean cloth. Insert the dipstick into the end of the oil filling pipe and take it out again. The oil level should be above the HOT graduation of the dipstick. If the oil level is below HOT graduation of the dipstick, replenish transmission oil. If the oil level is above the HOT graduation of the dipstick, loose the drain plug at the bottom of the transmission to release the excessive oil



- (5) After inspection, insert the dipstick into the oil filling pipe of the transmission. Rotating it clockwise to tighten it.

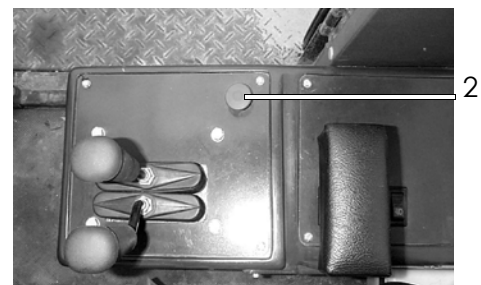
⚠ CAUTION: Pay special attention to the cleanliness of the transmission oil when checking or replacing it. Do not let foreign matters come into the system to avoid damaging the transmission.

The transmission oil could flow from the oil filling tube when taking the dipstick out after the engine is shut down.

The transmission oil temperature can raise quickly by doing the following:

- (1) Park the machine on a flat ground.

- (2) Turn the shift control lever to NEUTRAL position and press the parking brake button to disengage the parking brake.



1. Shift control lever
2. Parking brake button

- (3) Depress the brake pedal to the end.



- (4) Turn the shift control lever to F4 position, then the torque converter is stalled so that the transmission oil can raise quickly.
- (5) Turn the shift control lever to NEUTRAL position after the transmission oil temperature reaches 80 °C . Pull up the parking brake button before checking the transmission oil level.

Transmission Oil --Replace

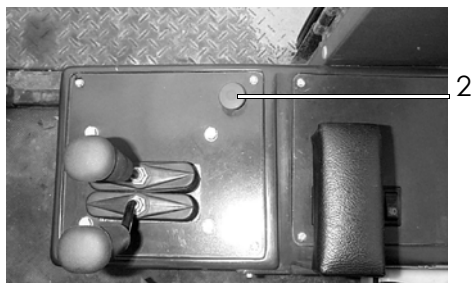
Replace the transmission oil after the first 100 service hours.

After that, change the transmission oil every 1000 service hours at least once a year.

CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting the product. Be prepared to collect the fluid with suitable containers before disassembling any hydraulic lines or component containing fluids. And dispose all fluids according to local regulations.

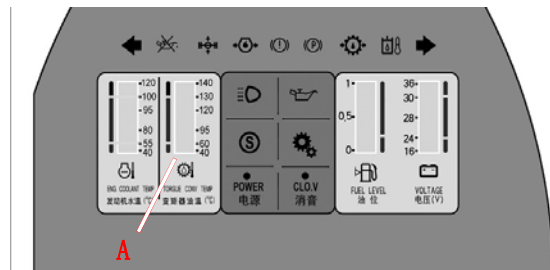
Replace the transmission oil as follows:

- (1) Start the engine and operate the machine for several hours to make the contaminants float.
- (2) Park the machine on flat ground and turn the shift control lever to NEUTRAL. Engage the parking brake and attach the steering frame lock to the front and rear frames to avoid movement of the machine.



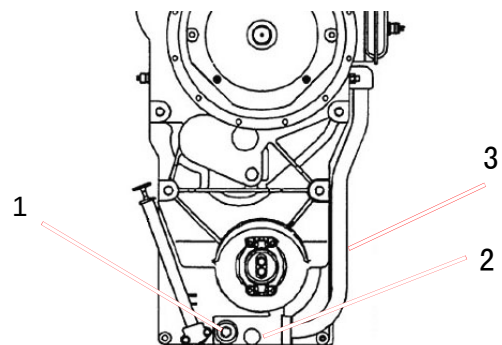
1. Shift control lever
2. Parking brake button

- (3) Start the engine and run at idle speed. Stop the engine when the oil temperature of the engine reaches 80~90 °C .



A. Transmission oil temperature

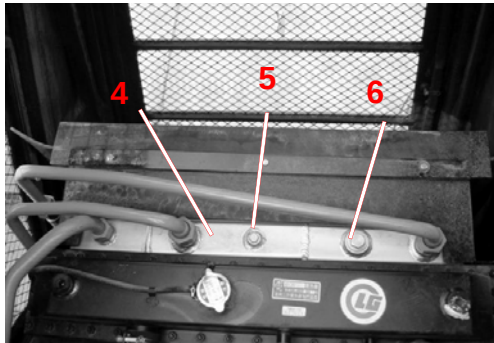
- (4) Loosen the oil drain plug ① at the bottom of the transmission to drain oil. Collect oil with an appropriate container.



1. Oil drain plug
2. Pre-filter of transmission oil
3. Oil suction tube

WARNING: The transmission oil temperature is still high when draining, wear protective clothing and be careful to prevent injury.

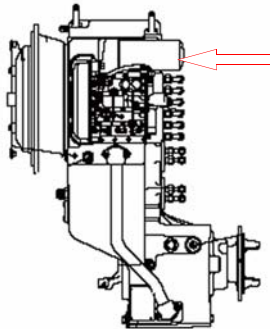
- (5) Loosen the oil drain plug of the torque converter oil radiator(locates near the battery box)and collect with a container. Loose the air release plug of the torque converter oil radiator to quicken oil release speed.



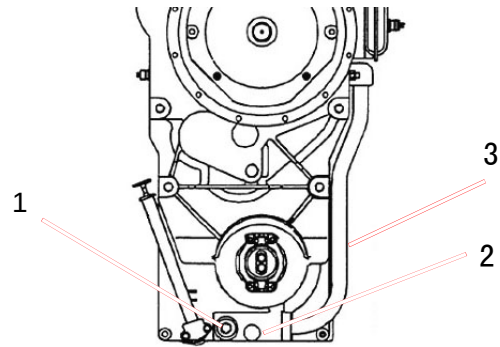
4. Torque converter cooler
5. Vent
6. Oil filler

! NOTICE: Drain the transmission oil and torque converter oil simultaneously whe draining.

- (6) Replace the transmission oil pre-filter.



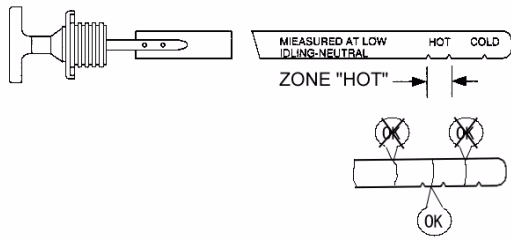
- (7) Remove the oil suction tube③ to take out the pre-filter. Clean the pre-filter with compressed air or fuel. Dry it after clean.



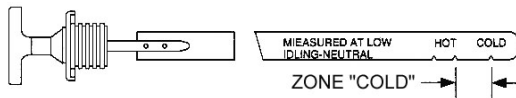
1. Oil drain plug
2. Transmission oil pre-filter
3. Oil suction tube

- (8) Clean any iron filings attached on the drain plug by the magnet. Insert the magnet into the transmission oil pan from the primary filter mounting port. Clean the iron filings on the inner wall of the pr-filter.
- (9) Secure the primary filter, oil suction pipe, drain plug and oil drain plug of the torque converter oil radiator and seals.
- (10) Loosen the drain plug at oil filler ⑥ . Replenish clean transmission oil from the oil filler ⑥ . After the torque converter cooler is fully filled with transmission oil, tighten the air discharge plug and oil drain plug.
- (11) Take out the dipstick of the transmission. Replenish clean transmission oil until the level is above HOT mark.

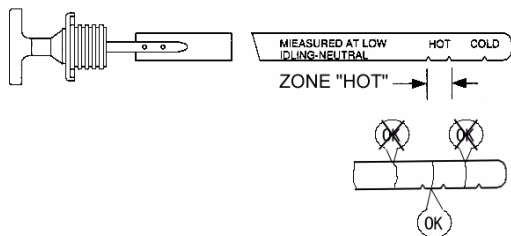




(12) Start the engine and run at idle speed. Check the transmission oil level again and replenish the transmission oil until the oil level is above COLD. The transmission could produce a slightly abnormal noise due to transmission oil insufficiency. The abnormal noise will disappear after the transmission oil reaches the specified level.



(13) When the transmission oil reaches the work temperature 80~90 °C, check the oil level again. The level should be at the HOT graduation of the dipstick. If the oil is insufficient, add oil. If the oil is excessive, drain some excessive oil.

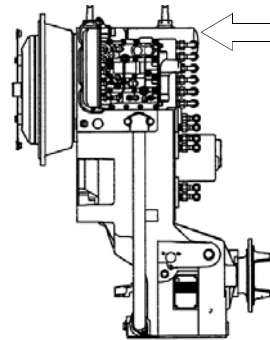


(14) Insert the dipstick and tighten it clockwise.

CAUTION: Before replacing transmission oil, cover the parking brake by cloth to prevent the friction disc from touching with oil to protect the parking brake performance.

Transmission Secondary Filter-Replace

The secondary filter of the transmission is located at the upper right side of the transmission. Replace the transmission oil and secondary filter simultaneously.

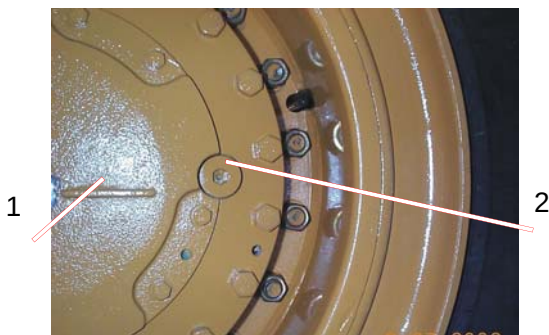


- (1) Clean the surface around the transmission secondary filter.
- (2) Remove the secondary filter from the support with a wrench.
- (3) Clean the seal surface of the support with a clean cloth.
- (4) Apply a coat of transmission oil to the gasket of the new secondary filter.
- (5) Install the secondary filter on the support until the gasket contacts to the seal surface of the support and then manually further tighten it to a 1/3 or 1/2 turn.

Axle Oil Level--Check

CAUTION: Be careful the splashing hot oil when refilling, draining, or loosening the plug.

- (1) Park the machine on a level ground, slowly drive the machine at low speed to keep OIL LEVEL on the axle at level position. As the OIL LEVEL graduation of the front and rear axle could not be at the lowest position at the same time, so separately check the oil level of front and rear axle separately by twice .
- (2) Turn the shift control lever to NEUTRAL, pull up the parking brake button to prevent movement of the machine.
- (3) Start and run the machine with low idle speed.
- (4) Clean the surrounding surface of the oil drain plug then remove the oil drain plug. The axle oil level should reach the lower edge of the oil drain outlet. Replenish clean axle oil if the axle oil level is too low and observe for five minutes after replenishing until the oil level is stable.
- (5) Tighten the oil drain plug.



1. Oil level graduation
2. Oil drain plug

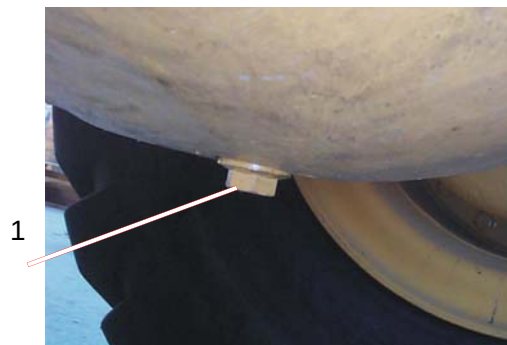
- (6) Check the oil level of another axle with the same operation steps mentioned above.

Axle Oil--Replace

⚠ CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before disassembling any hydraulic line or component containing fluids. And dispose all fluids according to local regulations.

Drain oil after the machine stops running for a period time to let the impurities deposited in the oil float.

- (1) Park the machine on a flat ground, slowly drive the machine at low speed to locate the oil drain plug on the wheel end to the lowest position. As the oil drain plugs on both wheel ends could not be located at the lowest position at the same time, therefore, replace oil of front and rear axle separately by twice.
- (2) Pull up the parking brake button and turn the shift control lever to NEUTRAL position. Install the steering frame lock to prevent the machine from moving.
- (3) Start and run the engine at low idle speed for ten minutes. Then shut down the engine.
- (4) Unscrew the oil drain plug on the wheel end and the axle housing to drain the oil. Collect with a suitable container.



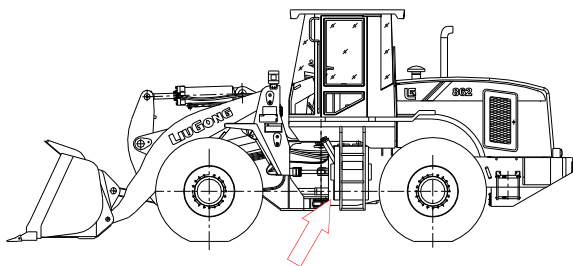
1.Oil drain plug

- (5) Tighten the oil drain plug at the middle of the axle.
- (6) Start the engine and press the parking brake button to disengage the parking brake. Slowly drive the machine at low speed to locate the oil drain plug on the wheel end to the level position. Pull up the parking brake button and turn the shift control lever to NEUTRAL position to run the engine at idle speed.
- (7) Replenish clean axle oil from the oil drain outlet on both wheel ends until the oil level reaches the oil drain outlet edge.
- (8) Tighten the oil drain plug when the oil level is kept stable after ten minutes.
- (9) Remove the steering frame lock before starting to drive the machine.
- (10) Replace the oil of another axle with the same operation steps mentioned above.

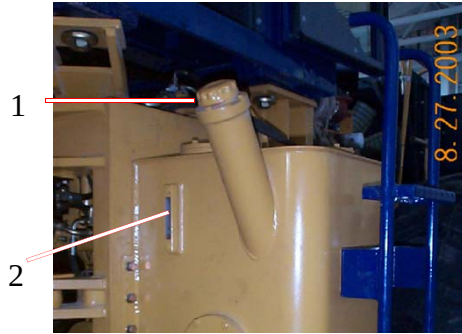
Hydraulic System Oil Level-Check

⚠ CAUTION: When checking the hydraulic oil level, park the machine on level ground and lower the bucket onto the ground. the front and rear frame must be aligned in a straight line.

Hydraulic oil tank location



The hydraulic oil tank is located on the right side of the cab, the sight glass locates on the front of the hydraulic oil tank. is used to indicate the oil volume.



- (1) Oil filler
- (2) Sight glass

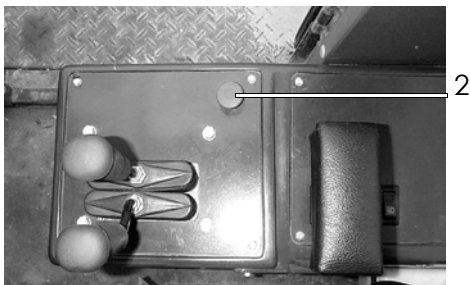
The hydraulic oil level should be kept at 2/3 graduation to the sight glass.

Hydraulic System Oil--Replace

⚠ CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before disassembling any the hydraulic line or component containing fluids. And dispose all fluids according to local regulations.

Pay close attention the cleanliness during replacing the hydraulic oil, do not allow dirt enter the hydraulic system. If the work condition is severe or the hydraulic oil becomes deteriorated due to pollution, such as black color and bubbles on the oil level, change hydraulic oil in time.

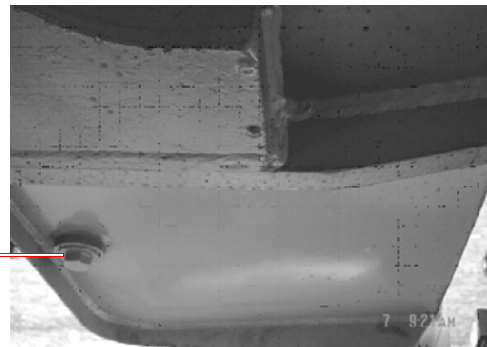
- (1) Park the machine on flat ground, turn the shift control lever to NEUTRAL position, pull up the parking brake button and install the steering frame lock.



1. Shift control lever
2. Parking brake button

- (2) Start and run the engine at idle speed for 10 minutes. Operate the boom and tilt the bucket repeatedly to raise the hydraulic oil temperature.
- (3) Raise the boom to the highest position, tilt the bucket backward to the limit position, and stop the engine.
- (4) Tilt the bucket fully backward to drain the hydraulic oil of the bucket cylinder. After tilting the bucket, lower the boom and drain the hydraulic oil of the boom cylinder.
- (5) Turn the lock device of the pilot control lever to OFF position if equipped.

- (6) Clear the oil drain outlet below the hydraulic oil tank, loosen the oil drain plug to drain out hydraulic oil and collect with a container. Meanwhile, open the oil filler cap to quicken the oil drain speed.

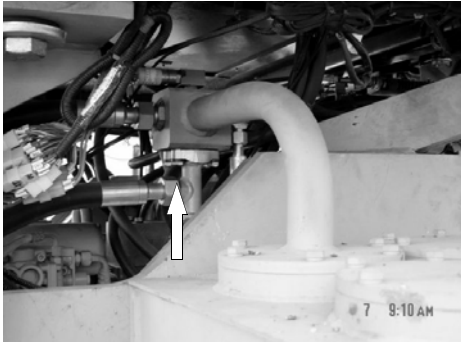


- (1) Oil drain plug
- (2) Oil filler cap

⚠ WARNING: Because the hydraulic oil temperature is still high when draining, wear protective clothing and be careful to prevent injury.

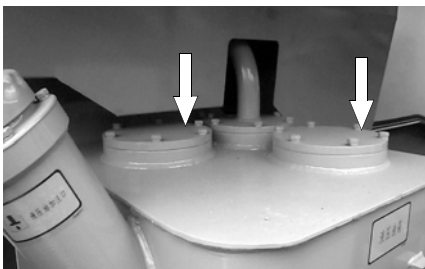
- (7) Remove oil inlet pipe of the hydraulic oil cooler and drain residual hydraulic oil from the cooler.

Oil inlet pipe of hydraulic oil cooler



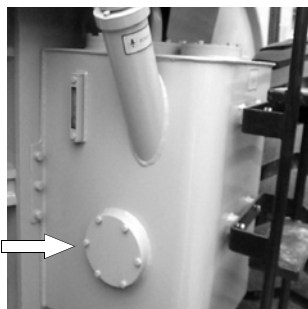
- (8) Remove the end cap of the oil return filter from the hydraulic oil tank, take out the oil return filter element and replace with new one. Open the oil filler cap and take out the oil strainer and clean.

End cap



- (9) Remove the flange cover of hydraulic oil tank below the oil filler cap, wash the bottom and four walls of the hydraulic oil tank with fuel, and finally dry with a clean cloth.

Flange cover



- (10) Fix the oil drain plug of the hydraulic oil tank, oil return filter and its cover, oil inlet strainer, flange cover, and the oil inlet pipe of the hydraulic oil cooler.

- (11) Remove the oil return pipe of the oil cooler and refill hydraulic oil from the inlet. Tighten the pipe after finish.

Oil return pipe of the hydraulic oil cooler



- (12) Replenish clean hydraulic oil from oil filler of the hydraulic oil tank till the oil level reaches the upper graduation of the sight glass. Then tighten the oil filler cap.

- (13) Remove the steering frame lock and start the engine. Turn the pilot shutoff valve lever to OPEN. Operate the control lever to raise and lower the boom for 2~3 times. Tilt the bucket forward and backward and turn from left to right to the maximum angle to fill cylinders with hydraulic oil. Then run the engine at idle speed for five minutes to drain air in the system.

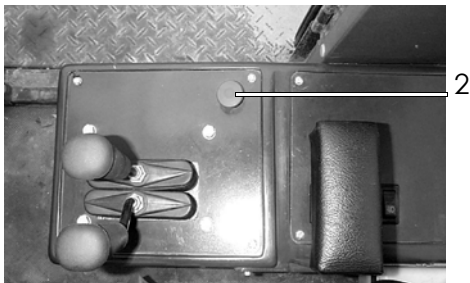
- (14) Shut down the engine. Open the oil tank filler cap and refill clean oil to 2/3 of the sight glass.

Severely Contaminated Hydraulic Oil--Replace

⚠ CAUTION: Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before disassembling any the hydraulic line or component containing fluids. And dispose all fluids according to local regulations.

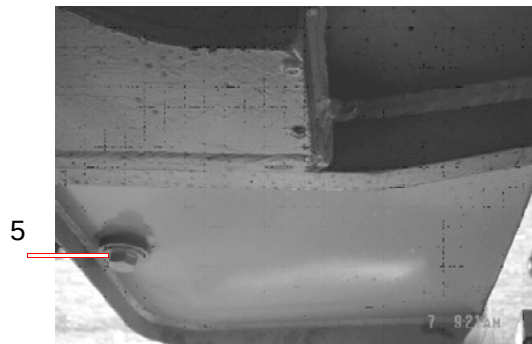
Pay close attention the cleanliness during replacing the hydraulic oil, do not allow dirt enter the hydraulic system. If the work condition is severe or the hydraulic oil becomes deteriorated due to pollution, such as black color and bubbles on the oil level, change hydraulic oil in time.

- (1) Park the machine on flat ground, turn the shift control lever to NEUTRAL position, pull up the parking brake button and install the steering frame lock.



1. Shift control lever
2. Parking brake button

- (2) Start and run the engine at idle speed for 10 minutes. Operate the boom and tilt the bucket repeatedly to raise the hydraulic oil temperature.
- (3) Raise the boom to the highest position, tilt the bucket backward to the limit position, and stop the engine.
- (4) Tilt the bucket fully backward to drain the hydraulic oil of the bucket cylinder. After tilting the bucket, lower the boom and drain the hydraulic oil of the boom cylinder.
- (5) Turn the lock device of the pilot control lever to OFF position if equipped.
- (6) Clear the oil drain outlet below the hydraulic oil tank, loosen the oil drain plug to drain out hydraulic oil and collect with a container. Meanwhile, open the oil filler cap to quicken the oil drain speed.



- (1) Oil drain plug
- (2) Oil filler cap

⚠ WARNING: Because the hydraulic oil temperature is still high when draining, wear protective clothing and be careful to prevent injury.

- (7) Disconnect one end of the oil inlet pipe to drain the residual hydraulic oil from the steering cylinder, oil cooler and other pipes.
- (8) After finish draining, install the oil drain plug and all the disconnected pipes.
- (9) Open the oil filler cap of the hydraulic oil tank and fill with clean oil to proper level.
- (10) Remove the flange cover of hydraulic oil tank below the oil filler cap, wash the bottom and four walls of the hydraulic oil tank with fuel, and finally dry with a clean cloth.
- (11) Replace the contaminated hydraulic oil according to the procedures in “Hydraulic System Oil--Replace” on page 108 . And replace the return element, wash the oil strainer and hydraulic oil tank.

Accumulator Pre-charge Pressure--Check

Three accumulators are used for the brake system. They are located on the right side of the rear frame and under the cab. Accumulator I is used for the parking brake circuit and accumulator II and III are used for the service brake circuit.



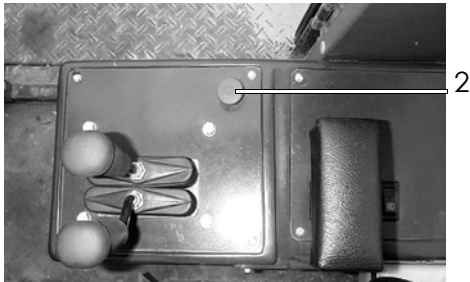
⚠ CAUTION: Check accumulator nitrogen pre-charge pressure according to the intervals specified in Maintenance Interval Schedule section to ensure the proper work of the service brake system and parking brake system. Check the pre-charge pressure by trained personnel with special tools only.

- (1) Park the machine on a flat and open ground, and lower the bucket on the ground. Turn the shift control lever to NEUTRAL, stop the engine. Then turn the start switch clockwise to the ON position to turn on power .

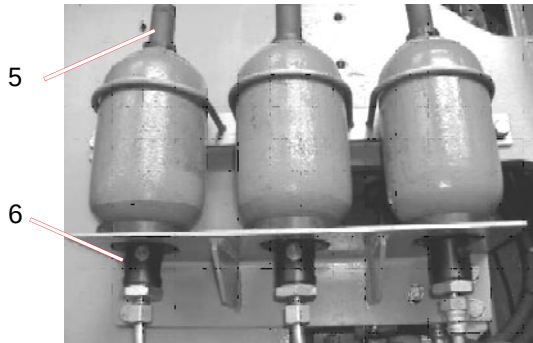


- (2) Continuously depress down the brake for about 20 times, then press down and pull up the parking brake button for about 20 times, release high pressure oil in the accumulators.





- (3) Loosen the air discharge plug of the accumulator slowly to drain the residual pressure oil inside the accumulator.



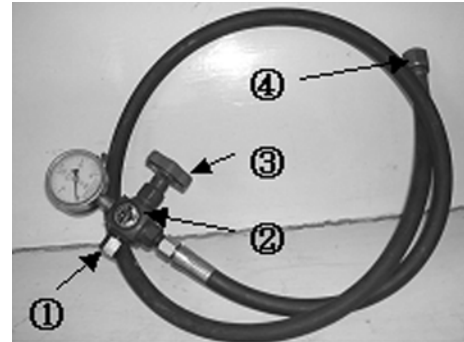
- (5) Protection cap of the charge valve
(6) Air discharge plug

⚠ WARNING: Do not let the residual pressure oil in the accumulator spray any one as this can cause injury or death.

- (4) Remove the protection cap of the charge valve from the accumulator.

- (5) Cover the end of the charge tool that connected to the nitrogen bottle with plug, and connect another end to the air charge valve of the accumulator.

PC charge tool CQJ-25



- A. To air charge valve
B. Air outlet
C. Switch
D. To nitrogen bottle

- (6) Turn on the switch on the air charge tool, the thimble in the charge tool ejects the air charge valve, then the pointer of the pressure gauge should show the pressure reading. After the pointer is stable, its reading is nitrogen pre-pressure value of the accumulator. Replenish nitrogen pre-pressure if the pressure is too low. Its value should be:

	Nitrogen pre-charge pressure
Accumulator I	$9.2 \pm 0.05\text{Mpa}$
Accumulator II & III	$5.5 \pm 0.05\text{Mpa}$

- (7) Turn off the switch on the charge tool, then remove the charge tool, fix the protection cap of the air charge valve of the accumulator.

Accumulators--Charge

⚠ CAUTION: If nitrogen pre-pressure of the accumulators is insufficient, refill in time, otherwise the normal use of the brake system could be affected.

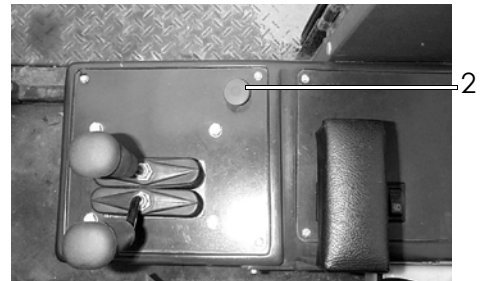
Charge the accumulator by trained personnel with special tools only.

Operation steps are as follows:

- (1) Park the machine on a flat ground and lay the bucket flatly on the ground. Turn the shift control lever to NEUTRAL position and shut down the engine. Then turn the start switch clockwise to ON position to turn on the power



- (2) Depress down the brake pedal repeatedly for 20 times, then pull up and push down the parking brake button for about 20 times to discharge the high pressure oil inside the accumulator.



- (3) Loosen the air discharge plug of the accumulator to drain the residual pressure oil inside the accumulator.



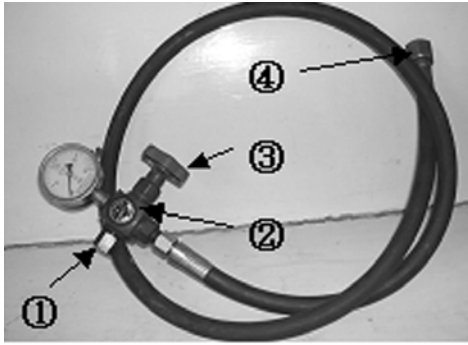
- (5) Protection cap of the air charge valve
- (6) Air discharge plug

⚠ WARNING: Do not let the residual pressure oil in the accumulator spray any one as this can cause injury or death.

- (4) Remove the protection cap of the charge valve from the accumulator.

- (5) Connect the gauge end ① of the charge tool to the air charge valve and another end ④ to nitrogen bottle.

charge tool CQJ-25



1. To the air charge valve
 2. Air discharge outlet
 3. Switch
 4. To nitrogen bottle
- (6) Open the nitrogen bottle valve. Slowly open the switch on the charge tool to charge the accumulator after the pointer of the pressure gauge is stable.
- (7) The inflated pressure may be obtained in a short period. Turn off the nitrogen bottle valve to check whether the pressure on the gauge have met the standard. Recharge if the pressure is not sufficient or release air through the air discharge outlet ② on the charge tool to lower the pressure to appropriate value if the pressure is too high.
- (8) If the desired pressure is available, turn off the nitrogen bottle valve then take off the valve on the charge tool. Remove the charge tool.
- (9) Apply a coat of oil to the top of the charge valve to check if any leakages occur. There should be a leak if air bubble is found. Slightly hit the charge valve by a hammer and mini-screwdriver, let it be downwards and then return to contact completely with the seal surface.
- (10) Fix the protection cap of the charge valve on the accumulator.

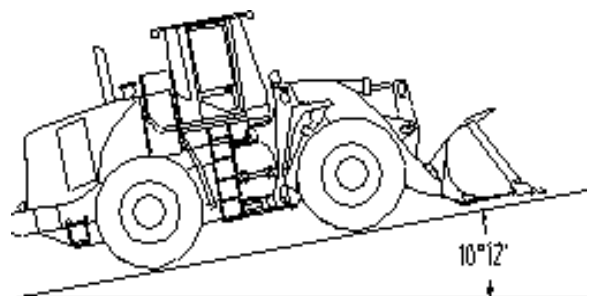
! WARNING: Charge the accumulator with nitrogen only. Do not charge it with oxygen, compressed air or other flammable gas to avoid explosion.

Brake System Parking Brake Performance--Inspect

! CAUTION: Check the parking brake performance frequently to ensure the machine can safely stop and ensure its emergency braking capability.

- (1) Adjust the air pressure of the machine tyres to the specified value, Lay the bucket flatly with a distance about 300mm above the ground. Make sure the service brake is performing normally.
- (2) Start the engine and drive the machine to a slope with a gradient of 18% (the angle is about $10^{\circ} 12'$). The slope surface should be smooth, dry and rough.
- (3) Pull up the parking brake button and slowly release the service brake pedal. Check to see if the machine has moved from its original location.

! WARNING: Personal injury can result if the machine moves while checking.



Brake System Service Brake Performance--Inspect

⚠ CAUTION: Before checking the service brake ability, make sure the machine's parking brake system works normally in case of any emergency happens.

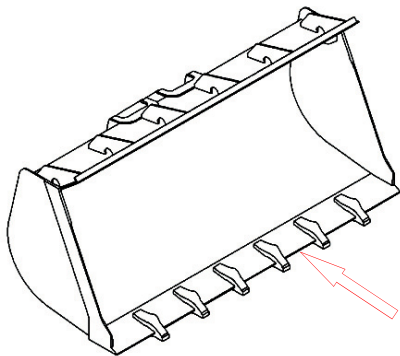
Drive the machine at 32km/hr on a straight, flat and dry road surface. Depress the service brake pedal to fully brake the machine. After the machine stops, turn the shift control lever to NEUTRAL, pull up the parking brake button then release the service brake pedal. The brake distance should not exceed 15m.

⚠ WARNING: Personal injury can result if the machine moves while checking.

Bucket Cutting Edges--Inspect and Replace

⚠ WARNING: Personal injury or death can result from bucket falling. Chock the bucket before replacing bucket cutting edges.

Cutting edge



Check the cutting edges and the end bits for wear and for damage. Use the following procedure to service the cutting edges and the end bits:

- (1) Raise the bucket and chock the bucket. The wedge height should not exceed that the bucket tooth needs.
- (2) Lower the bucket onto the wedge.
- (3) Stop the engine and pull up the parking brake button.
- (4) Remove the pins by the retainer side of the tooth, then remove the tip and retainer.



- (5) Clean the teeth, tips and retainers. Fix the retainer to the side channel of the teeth.



- (6) Fix new tips onto the teeth.



-
- (7) Strike the pins into the retainers, teeth and tips.
-



-
- (8) Start the engine.
(9) Raise the bucket and take out the wedge.
Then lower the bucket onto ground.
-

Battery--Check



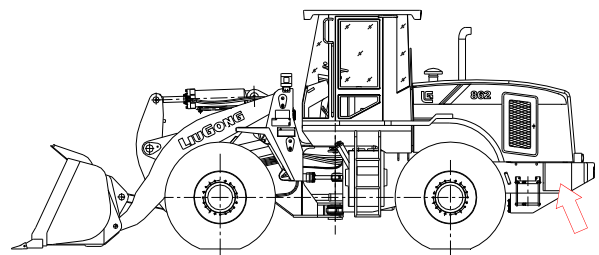
Never let burning cigarette or open fire close to the batteries.

Wear safety glasses and rubber gloves when touching batteries during work. Also wear protective clothes as the vitriol in the battery can result in blind or burn.

See the doctor at once if you touch the vitriol carelessly.

Stop the engine before working with batteries.

The battery is located in the battery box on the left side of the rear frame. Maintenance-free battery is provided for this machine. Obey the following procedures when handling with the battery.



Reasons for Battery Electrolyte Loss

- (1) Abnormal usages, such as the electrical appliances are turned on for a long time under unstarted condition.
- (2) The batteries is exhausted due to long time running, current leakage, or additional electrical appliances is used.
- (3) Frequent starting of the machine.

- (4) Failures of machine charging system, such as malfunction of alternator or its electronic units, low charging voltage, loose engine belt, etc., which result in abnormal charging of the batteries, battery electrolyte loss, black hydrometer, and even starting failure.
- (5) The batteries has been stored over six months before used.

⚠ NOTICE: The batteries under the above-mentioned condition can work again by recharging.

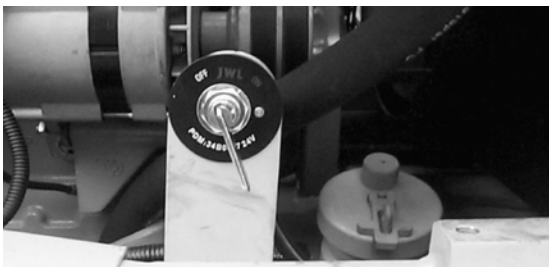
Battery--Install

⚠ WARNING: the battery plate will loosedue to the machine vibration after operating the machine for a period of time. Check the tightness of the nut located in the middle of the plate. Tight it if it is loose.

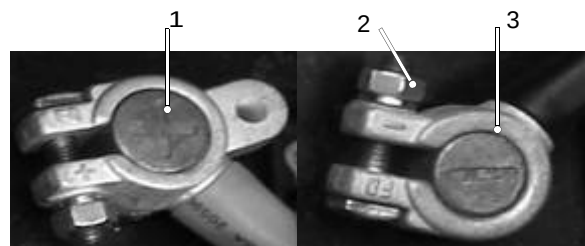
⚠ WARNING:The battery terminals and the cable connector may not be in a good connection due to the machine vibration after operating the machine for a period of time. Check the battery terminal and cable c connector connection for tightness frequently.

If the hydrometer of the battery is green, then this battery can be installed to the rear left side of the machine.

- (1) Turn disconnect switch to OFF position. Turn the start switch (also called ignition switch) to OFF position then remove the key.



- (2) Clean the battery terminals and surface with a clean cloth. Do not use petrol or other organic impregnant or cleanser.
- (3) When connecting, link the battery positive terminal to the alternator positive terminal while the battery negative terminal to the alternator negative terminal.



- (1)Positive terminal
- (2)Nut
- (3)Negative terminal

- (4) Tighten the nut.

- (5) Turn on the battery disconnect switch. Insert the key and start the engine.

! WARNING

A wrong installation of the negative and positive terminal will result a serious damage to the battery. Distinguish the positive (+) and negative terminal (-) correctly.

Battery--Charge

A long-time use of the electricity appliances without starting the engine or a long-time stop, a long-time stop, electricity leakage, or the alternator can not be charged; all these reasons could lead to abnormal battery charge and result in an electricity insufficiency or even can not start the machine. Recharge the battery if this happens

! WARNING

Keep ventilated when charging. Charge the battery under normal temperature.

Do not smoke when charge the battery, keep any kindling away.

The battery could have an explosion danger if it is deposed improperly when charging.

! CAUTION: The battery can not be charged on the following situations

- If the battery housing cracks or there is an acid leakage. Discard it.
 - If the terminal cracks. Discard it.
 - Do not charge the battery if it is over-charged or over-discharged. Discard itj
- (1) Turn the disconnect switch to OFF position and turn the start switch to OFF position and take out the key.



- (2) Remove the battery from the machine. When removing, first disconnecting the negative terminal of the battery.

! CAUTION: When connect the battery, first connect its positive terminal; when disconnect the battery, first disconnect its negative terminal.

- (3) Clean the battery terminals and surface with a clean cloth, remove the oxidation surface.
- (4) Connect the positive clamp of the charger to the positive terminal of the battery, the negative clamp to the negative terminal under room temperature. Never charge the battery in series connections (24V).
- (5) It is recommended to use a charger with a constant voltage of 16V (the maximum voltage cannot exceed 16.2 V) and limit current of 25A. The battery charge is finished if the hydrometer turns green.
- (6) Charge the battery according to the following specification if the above-mentioned requirement can not meet:
- (a) Choose 1/8 ~ 1/10 rated capacity current to charge(12 ~ 15A for 37B0108 battery, and 10 ~ 12A for 37B0077 battery)

(b) Table of charge time and battery voltage for reference.

- (7) As for the battery with a voltage under 11.0V, it may not be able to be charged at the beginning. Due to the serious insufficiency of electricity, the proportion of vitriol is close to water, therefore, the battery resistance is higher. Reduce the charging current or change another charger with bigger power to charge, or charge in series with another battery. The vitriol proportion increases during recharge and the circuit can get right gradually.

Battery Voltage	Charge Time
12.55-12.45v	2h
12.45-12.35v	3h
12.35-12.20v	4h
12.20-12.05v	5h
12.05-11.95v	6h
11.95-11.80v	7h
11.80-11.65v	8h
11.65-11.50v	9h
11.50-11.30v	10h
11.30-11.00v	12h
Below 11.00v	14h

! WARNING: Fix the two terminals tightly. Do not charge the battery of 24V voltage in serial connection.

! WARNING: Stop charging immediately to check the reason if the battery discharge hole spurts acid during the charging process.

- (8) Stop charging if the battery temperature exceeds 45 °C during the charging process. Halve the circuit before recharging after the battery temperature drops to the ambient temperature.
- (9) Check the battery voltage every hour during the charging process. The battery is full of electricity if the end voltage of the battery reaches 16.0 V and the voltage difference is lower than 0.05 V within one hour. Stop charging.

! CAUTION: If the hydrometer is black, check for loose cable and clean connecting terminal. Check whether the voltage has come to 16V. If the hydrometer is clear, it is likely that air bubble exist in it. If the hydrometer is still clear after slight shaking (indicates that the electrolyte loss), replace with a new battery.

- (10).It is recommended applying Vaseline on the battery terminals to avoid electric corrosion after charge is completed.

Battery Maintenance during the Machine Storage

- (1) Disconnect the negative terminal of the battery if the machine is stored exceeds 15 days.
- (2) Check the electricity state of the battery every 3 months.
- (3) If the voltage exceeds 12.4V, the battery is in normal condition.
- (4) If the voltage is under 12.4V, the battery lacks for electricity.
- (5) Recharge if the battery lacks for electricity. Recharge according to special procedures.
- (6) As for the machine which has not disconnected the battery terminals, check the battery voltage state every month. If the voltage is under 12.4V, recharge it according to special procedures.

- (7) As for the machine which is stored over 1 year, replace with a new battery and dispose the old one if the above- mentioned requirements can not be followed.

Battery--Recycle

When discarding the battery, its inner material such as lead, acid and plastic shell can pollute the environment due to its outer frayed structure or other reasons. Therefore, do not throw the old battery randomly, dealing with it by collecting for the battery dispose station or put it into the recycle can set by the manufacturer (if there is any)in the local place.

Bucket Positioner--Adjust

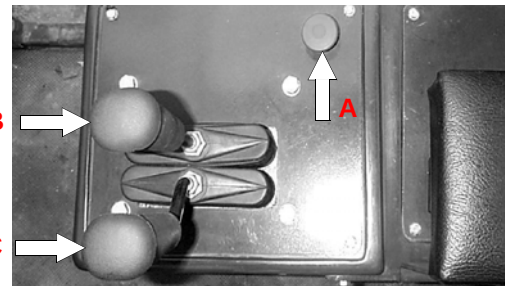
Bucket positioner is provided to this machine.

Adjust the bucket positioner as follows:

1. Park the machine on a flat ground and turn the shift control lever to NEUTRAL position.



2. Operate the bucket control lever to lay the bucket onto ground, then pull up the parking brake button.



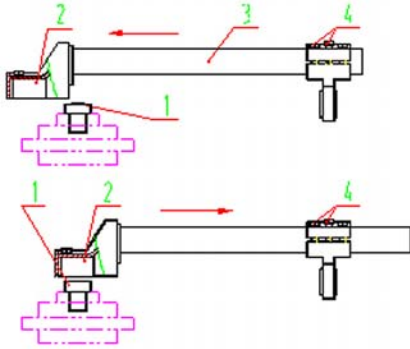
- A. Parking brake button
B. Boom control lever
C. Bucket control lever

3. Shut down the engine and install the steering frame lock.



- D. Start switch
E. Steering frame lock

4. Loosen nut (4) , move bucket positioner assembly (3) forwards to keep a certain distance between positioner switch (2) and magnet (1).



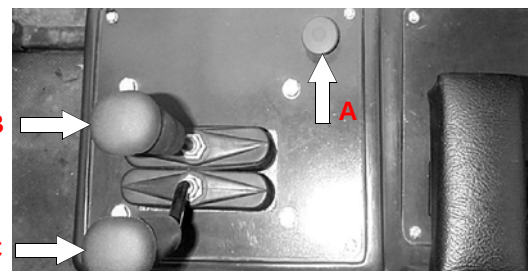
5. Turn the start switch clockwise to the first position to turn on the power. Turn the bucket control lever to the most backward position, then the positioner will be attracted by the electromagnetic force.
6. Move the positioner assembly backwards to positioner switch (2) to align with magnet (1), then the electromagtic force will disappear and the bucket control lever will reset to NEUTRAL position. Tighten nut (4). Keep the positioner switch (2) and magnet (1) at a distance of 4~6 mm.
7. After finish, remove the steering frame lock and start the engine. Check whether the above adjustment is suitable or not.

Boom Lift Kickout--Adjust



Pay close attention to safety when adjusting the boom lift kickout. Keep any unauthorized person away from the machine. Do not allow any person stand underthe boom.

1. Park the machine on a flat ground and turn the shift control lever to NEUTRAL position. Pull up the parking brake button.



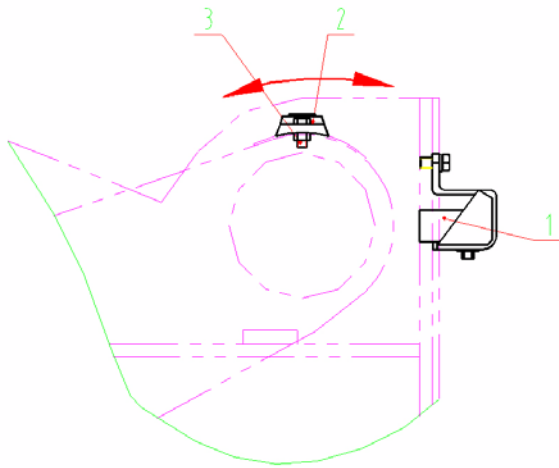
- A. Parking brake button
- B. Boom control lever
- C. Bucket control lever

2. Operate the boom control lever to the desired position. Shut down the engine adn install the steering frame lock.



- F. Start switch
- E. Steering frame lock

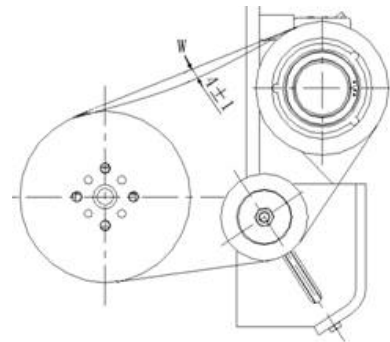
3. Turn the start switch clockwise to ON position to turn on power. Push the boom control lever to the most backward position, then the lift kickout will be attracted by electromagnetic force.
4. Loosen nut (3) and adjust the kickout to make the kickout switch (2) align with magnet (1), then the electromagnetic force will disappear and the boom control lever will reset to NEUTRAL position automatically. Tighten nut (3).



5. Keep a distance of 4~6mm between the kickout switch (2) and magnet (1). Adjust the kickout switch clockwise to reduce the lift height and counterclockwise to increase.
6. After finish, remove the steering frame lock and start the engine. Check whether the above adjustment is suitable or not.

Air Conditioner Compressor Belt Tension--Check(Optional)

The compressor belt tension: apply ($w=1.3\text{Kg}$) force in the center span of the pulleys (compressor pulley and engine pulley). The deflation of the belt center distance should be $4 \pm 1\text{mm}$. See the following picture:



Replace with a new belt if the belt is not tense. That is, the deflation of the belt center distance is more than $4 \pm 1\text{mm}$ when applying ($w=1.3\text{Kg}$) force in the center span of the pulleys (compressor pulley and engine pulley).

Replace the belt if the belt fluffs or cracks.

Cab Air Strainer-Clean and Replace(Optional)

The cab air filters consist of recirculating air strainer and fresh air strainer. The clogging of the filters is entirely dependent on the working environment of the machine.

WARNING

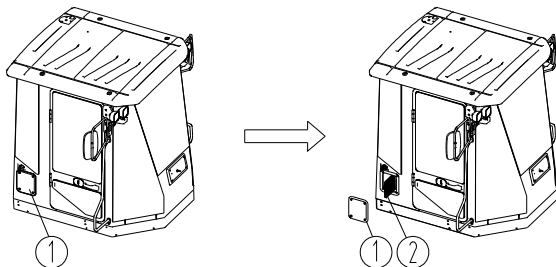
The cab filters are only intended to separate particles (dust and sundries) from the air. Do not use it for poisonous gas!

If the recirculating strainer is blocked, the air flow rate will be reduced, and the effect of cooling and heating will be weakened. The fresh air will reduce if the fresh airstrainer is blocked.

It may be dangerous when stricken by the compressed air or high-pressured water, or use the compressed air or the high-pressured water to clean dust or dirty materials. Do wear protective glasses, shield or other protective devices.

1. Clean and replace the recirculating air strainer

- (1) Remove the four mounting bolts on the cover plate to take off the cover plate ①. Then remove the recirculating air strainer ② (vertical installed)



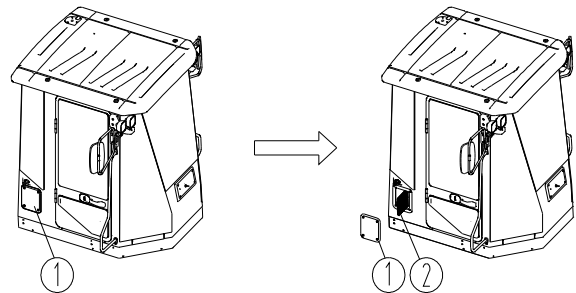
- (2) Clean the filter with compressed air or soft brush. If the filter is too dirty or too oily, wash it with neutral detergent. Dry the filter completely before reuse.

 **CAUTION:** If air filter element is damaged, install a new filter.

- (3) Install the recirculating strainer after clean it. Install the door cover plate ①.
- (4) Replace the recirculating strainer every 2000 hours. The new strainer must meet the standard of ISO10263-2.

2. Clean /replace the fresh air strainer

- (1) Remove the mounting bolts on the strainer housing, then remove the strainer housing ① and the fresh air strainer ② (horizontal installed).



- (2) Clean the filter with compressed air or soft brush. If the filter is too dirty or too oily, wash it with neutral detergent. Dry the filter completely before reuse.

 **CAUTION:** If the fresh air strainer is damaged, replace with a new one.

- (3) Put the clean fresh air filter ② into the groove of strainer housing ①, then install them to the original position, finally secure the bolts.
4. Replace the fresh air strainer every 1000 hours. The new strainer must meet the standard of ISO10263-2.

Engine Valve Lash--Check

⚠ WARNING: Adjustment of the engine valve lash must be performed by the trained person with special tool.

More information about the adjusting procedure of the engine valve lash refer to the Operation and Maintenance Manual of the Engine

Engine Air Intake System--Check

This step mainly check the air intake system for cracked hose, loose clamps or holes. Tighten or replace the parts to ensure the air intake system has no leakage.

Engine Belt--Check

Check the belt of the engine with eyeballing for cracked surface.

If the belt cracks in its lengthways or flake material fall off, replace it with a new belt. More information of replacing procedure, please refer to the Operation and Maintenance Manual of the Engine.

Engine Tensioner Bearing and Fan Hub--Check

Check the tensioner to ensure it can turn freely.

Check the fan hub, it must rotate without any wobble or excessive end play.

Fuse--Check and Replace

The fuses are located in the cab. The fuses protect the electrical system from being damaged due to circuit overload. If the fuse is broken, replace with a new one. Check the circuit if the new fuse is broken again. Repair the circuit, if necessary.

Refer to the following table for the color of fuses.

Model	Color
BK/ATC-5A	Orange
BK/ATC-7.5A	Brown
BK/ATCC-10A	Red
BK/ATC-15A	Blue
BK/ATC-20A	Yellow
BK/ATC-30A	Green

⚠ CAUTION: Replace fuses with the same type and size only. Otherwise, circuit damage can result. If it is necessary to replace fuses frequently, an electrical problem may cause. Contact your Liugong dealer.

Backup Alarm--Test

Turn the engine start switch to ON position to turn on the power.

Pull the parking brake button up to test the parking brake.

Turn the engine start switch to START position to start the diesel engine.

Put the shift control lever into REVERSE position, the backup alarm should sound immediately.

The backup alarm will continue to sound until the shift control lever is turned to NEUTRAL or into FORWARD position.

Seat Belt--Inspect

The driver should check the seat belt for its fray and fastness before use it. Replace it if necessary.

Adjust the seat belt's length to ensure its work and comfort ability before use it. Adjust it through moving its buckle position on the belt.

Replace the seat belt every 3 years, even though its outlook is in a good condition. . A valid date is provided on every seat.belt.; Find out the valid and safe use date of the seat belt according to it..

For further information of the seat belt replacement, please refer to Liugong dealer.

Window Washer Reservoir--Fill

The washer reservoir is located on the rear right side of the seat. Replenish the washer through the water filler inlet of the washer reservoir..



WARNING

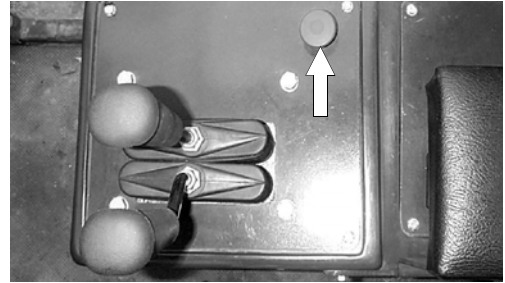
Frequent check the washer reservoir to find whether the water has been used up, otherwise the normal viewing may be affected. The washer reservoir should be emptied or filled with antifreeze when the ambient temperature is below 0 °C , otherwise the washer will not work or even be damaged by frozen.

Welding Operation

To avoid damage of the electrical parts and bearings, always observe proper welding operation steps. When welding on the loader with the electrical parts or engine, always observe the following operation steps:

1. Park the machine on level and open ground.

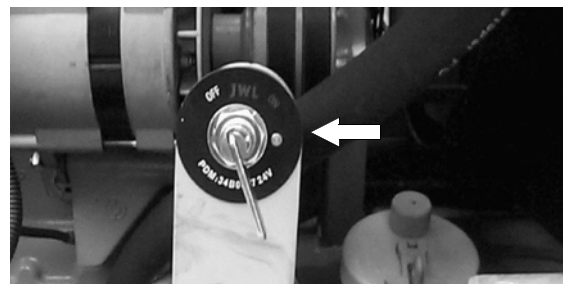
2. Pull up the parking brake button.



3. Stop the engine.



4. Turn off battery disconnect switch to cut off the connection between the battery and frame.



5. If your machine is equipped with other electronic units such as a loudspeaker etc, we recommend you disconnecting all connectors that connect the electronic units to the machine harness!

6. Remove the paint from the welding area.
7. Clamp the ground cable of the welder with welding parts tightly. Try to make the ground position close to the welding position as much as possible. Check and confirm the welding circuit from the welder to the welding parts does not pass through any one of the following component:
 - Bearings
 - Hydraulic cylinders
 - Controllers or interior circuit of other electronic units
- Never weld on or cut containers or tanks which contain or may have contained flammable liquids.

Doing so is to avoid damage of any of the following parts:

- Bearings
 - Hydraulic units
 - Electronic units
 - Other parts on the machine.
8. Keep flammable articles away from the welding site. Protect every cable and rubber hose and remove any flammable material. Do not let welding sparks ignite flammable material to avoid damage.

Cautions when welding:

- Never use the earth point of any appliances as the earth point for the welder.
- When welding near the earth point of an electrical appliance, always disconnect the ground cable before welding and make sure the welding circuit does not pass through the appliance so as to prevent damage to the electrical appliance.
- Do not work with an voltage over 200V continuously.
- The distance between the welding area and welder ground cable should be kept within 1m.
- Never weld on or cut pipes or lines containing fuels, engine oil or hydraulic oil.

