LW321F 轮式装载机

LW321F WHEEL LOADER

操作与保养手册

OPERATOR'S MANUAL

Foreword

This manual is an important part of the machine, which shows you the useful information regarding: machine components and its operation, safety, service, maintenance, troubleshooting and technical specifications. This manual can help you operate machines smoothly, safely and efficiently.

Note:

◆ Please read carefully and understand completely this manual content before using, maintaining and repairing themachine, especially those information about safety precautions. Please operate this machine according to this manual strictly.

◆ The operator of the machine must keep this manual within his reach, and the service people of this machine also must be familiar with and understand this manual content.

◆ If this manual gets lost or become dirty, please get a new one from XUGONG SCIENCE & TECHNOLOGY CO., LTD. or its authorized agent. If you re-sell the machine to others, please hand over this manual to the new mahcine user.

◆ This manual is altered always for the sake of continuous improvements on design and different requirements from customers, so what is stated in the manual may be different from the one in your hand, and such difference may effect the service and maintenance to the machine . Therefore, if you want to know the latest information about the machine and have any questions to this manual, please contact XUGONG SCIENCE & TECHNOLOGY CO., LTD. or its authorized agent.

Warning Signs for Safety Precautions

	This safety warning sign show you the very important information about the safety! When you see the sign in this manual, please read the item beside the sign and obey with the item strictly, and inform it to other people. Ignorance to safety warning can cause serious injuries and casualties.

Warning sign for safety	Explanation
 DANGER	If you pay no attention to any danger risk, casualty or serious injury will occur.
 WARNING	If you pay no attention to any danger risk, casualty or serious injury may occur.
 CAUTION	If you pay no attention to any danger risk, injury to people or damage to equipment may occur.

Declaration from The Manufacturer

◆ Only the trained and authorized people can operate and service this equipment.

◆ Operator and relative people must wear necessary safety protection staffs and take necessary safety measurement.

◆ Don't take any operation that is forbidden in this manual under any condition.

◆ Manufacturer can't predict all the working environment in which latent danger exists and operation that may cause danger. If you do the operation that is not mentioned in this manual, please ensure that this operation will not damage to the operator, other people and this equipment. If you can't ensure safety of such operation, please stop working and consult with XUGONG SCIENCE & TECHNOLOGY CO., LTD. or its authorized agent.

◆ The manufacturer will not be responsible for the casualty, injury and damage caused by using this equipment beyond this equipment purpose and regulations of operator's manual.

◆ The unauthorized restructuring to the machine can cause danger, and manufacturer will not be responsible for the damages caused by unauthorized restructuring.

◆ When you operate, drive or service this machine , please obey with local laws and regulations.

◆ The manufacturer will not be responsible for the injury and damage caused by force majeure.

◆ Manufacturer reserve the right to make changes to this manual at any time without giving prior notice.

Contents

1. Operation

2. Lubrication , Maintenance And Repair

3. Transportation , Storage And Protection

4. Technical Specifications

Operation

1.1 The Use Of The New Loader

1.1.1 Notices

This machine has already been checked and adjusted completely before selling. However, if it works under the atrocious environment at the beginning the service life of the machine may be shortened obviously. So it is necessary to carry out a run-in to the machine at the first 50 operating hours and pay attention to maintaining service.

Please obey with the following regulations during the run-in period:

- After starting the loader, idle the machine for 5 minutes to get it warmed up.
- It is forbidden to accelerate the engine suddenly during pre-warming up process.
- Avoid of emergent driving, sudden turnaround and unnecessary emergent braking.
- Check and repair the machine according to regulations.

1.1.2 Study The Safety Items

- Study the loader manual and concerned documents, understand them completely.
- Be familiar with all operating levers, indicating meters and alarming devices.
- Identify warning signs and safety signs, which can remind you the dangerous conditions.
- Obey with and take good care of all the safety signs that are pasted on the machine, replace the defaced one and replenish the lost one.

1.1.3 Learn The Checking Method

- Many safety and protecting devices are installed on the machine, such as seat belt, lamp, protecting fence, ladder and extinguisher and so on, ensure them under the controllable condition.
- Check if tyres are wore out or damaged or not. Check if all tyre air pressures are normal or not. Don't operate the loader if some tyre air pressure are insufficient.
- If the lock bar of steering pin is installed, please keep it in ready condition. The locked machine can't be turned.

1.1.4 Be Familiar With Your Machine

- Be familiar with functions of every controlling device, meter and pedal. Clear grease out from operating levers, pedals and handles to avoid of sliding.
- Clear sundries out from the cab, and keep the cab ground clear.

1.1.5 Running-In Of The Machine

- Although the loader has been checked and adjusted, but if it is used in a bad operating environment at the beginning, the service life of it should be shortened. Please apply running-in operation for 50 hours at initial stage.
- After starting, idle the machine for 5 minutes.
- It is forbidden to accelerate the engine suddenly during warming up process.
- Avoid of sudden startup, sudden accelerating and steering and sudden braking, except in emergency case.
- During running in period, every gear should be engaged equally in time.
- During run-in period, it is better to load the bucket with loose materials and avoid of rude operation. The loading capacity should not exceed 70% of its rated capacity and the driving speed should not exceed 70% of the rated maximum speed.

- Pay attention to the lubricating state of the machine, and replace or inject the lubricant according to prescribed schedule.
- Pay attention to the temperature of transmission, torque converter, front and rear axle, wheel hub and brake drum. If overheating occurs, please find out the reason and resolve the problem.
- Check the tightness of every bolt and nut.
- After 10 hours of running in period, the following operations should be carried out:

  △ Check the tightness of every bolt and nut overall, especially, the cylinder head bolt of diesel engine, fixing bolts on engine, gearbox and front & rear axle, hub nuts, and the connecting bolts of the transmission shaft etc. All the above mentioned bolts should be checked.

  △ Clean the rough engine oil filter, fine engine oil filter and fuel filter.

  △ Check the tightness of fan belt, generator belts and belts on air-conditioner compressor.

  △ Check the status of the battery electrolyte and tighten the joints of the battery.

  △ Check the oil level in the transmission system.

  △ Check the airproof status of the hydraulic system and braking system.

  △ Check if every control lever and accelerator lever are well connected and tightened.

  △ Check the temperature and connection of every component in the electric system, and check the generator performance, illumination lamps and steering lamps.

1.2 Application Purpose Of The Machine

This loader is of a construction machinery with a single bucket, front dumping, articulated frame and wheel type. It can be widely used in construction worksites, port wharfs, stations and storage areas for loading or short-distance transporting loose materials such as mud, sand, coal and dust. Also it can be applied in towing, ground leveling, stacking and piling. All of these application make it become a high-efficient and multi-function construction machinery.

The machine is featured in the following characteristics :

- Applied with articulated frame, with the articulating center being placed in the middle of the two wheelbases, and small steering radius, so the loader is very maneuverable and suitable for narrow places.
- Applied with hydraulic mechanical transmission, so the power of the engine can be fully used, and the torque can be increased, so as to obtain a bigger drawing force. Meanwhile, the loader adopt variable infinitively speed, which can effectively protect the transmission system and the engine.
- With the full hydraulic steering and power shift and hydraulic operating system, it is flexible, steady and reliable to operate the machine.
- Having the low-pressure & wide-base tyres and the swing rear axle, the loader has a good off-road performance, so it can travel and work freely on rough terrains.

Requirements for the working environment :

- Elevation : ≤3000mm
- Ambient temperature : -15℃~40℃
- Water-wading depth : ≤500mm

Forbidden operation :

- Overloading.
- Hanging a cable on bucket teethes to lift heavy object.
- Excavating at the over-head position of the loader.

1.3 Component Names And Decals

1.3.1 Component Name

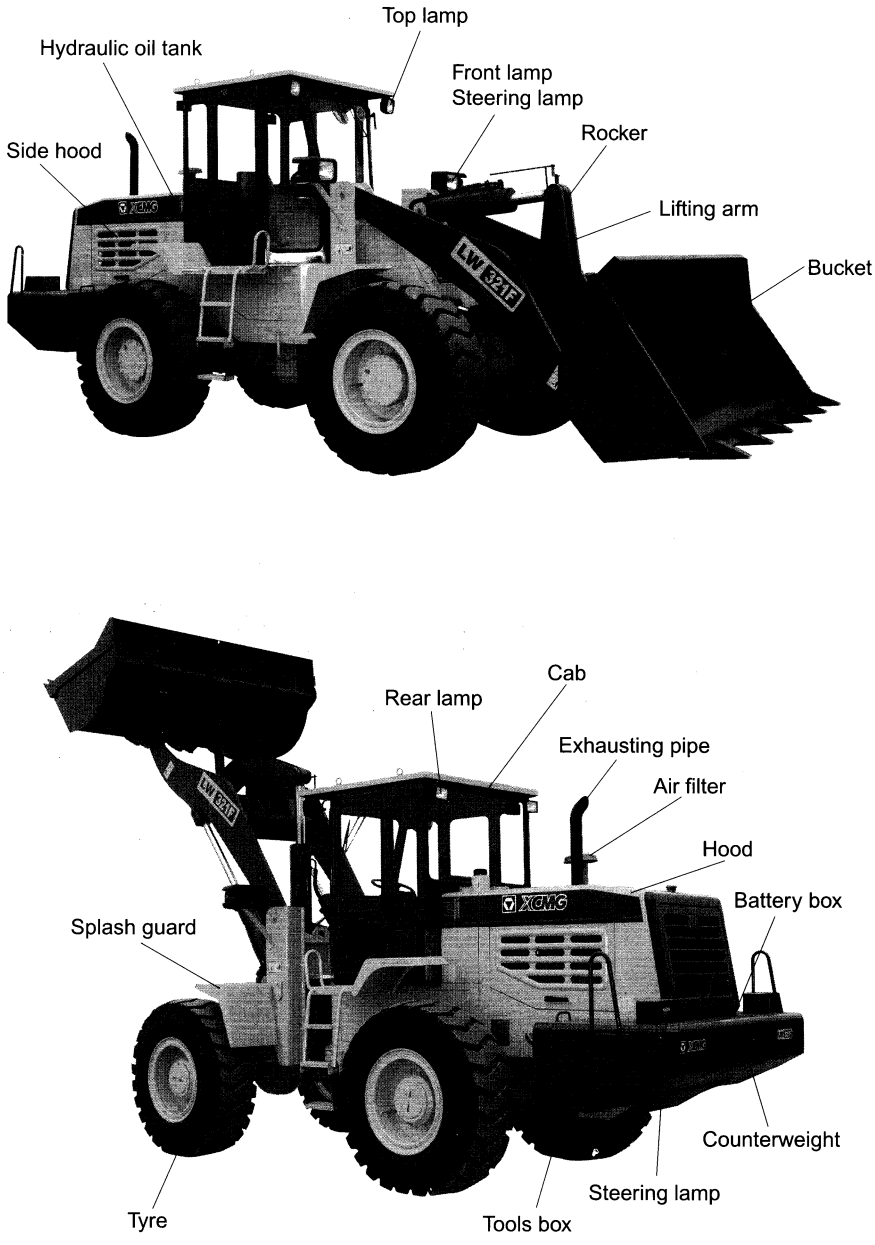


Figure1–1 Overall figure and component name

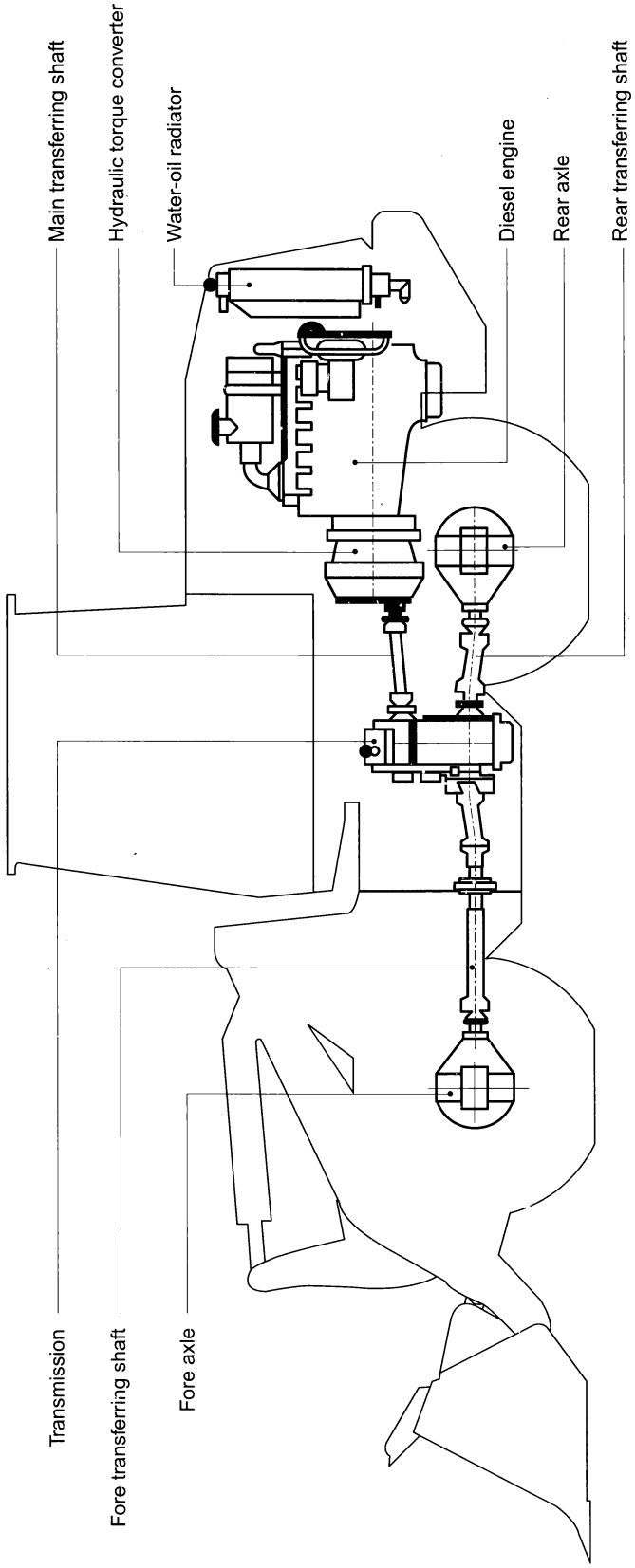


Figure1–2 Power transmission diagram

1.3.2 Decals And Number

☆Decal of the loader (Figure 1-3)

The decal is pinned on the front frame which shows the loader type, product number, producing date and manufacturer name.

☆The signs of XCMG are located below the cab and on left side of cab.

☆Frame number is impressed on the left side of rear frame and outlined with black line.

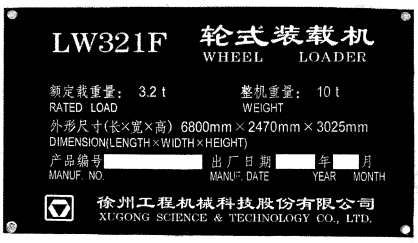


Figure1–3 Decal of the loader

☆Decal of engine (Figure 1-4)

It is pinned on the engine

Figure1–4 Decal of engine

☆Every main component also has its decal which shows the product type, number and manufacturer and so on.

CAUTION	Please obey with those signs warnings which are painted on the loader.

☆ If these signs and decals get tore off or unreadable, please get a new one available on the machine.

1.4 Safety Signs And Theirs Position

There are some safety signs pasted on the loader. Please read all the safety signs and obey with them. The positions of safety signs are shown in the Figure 1-5.

Take good care of these safety signs, replace the damaged one and replenish the lost one in time. If one component of the loader with safety sign on it has to be replaced, please paste a new safety sign on the new component.

Use clothing and suds to rinse the dirty signs. It is not allowed to use and gasoline to rinse the dirty signs.

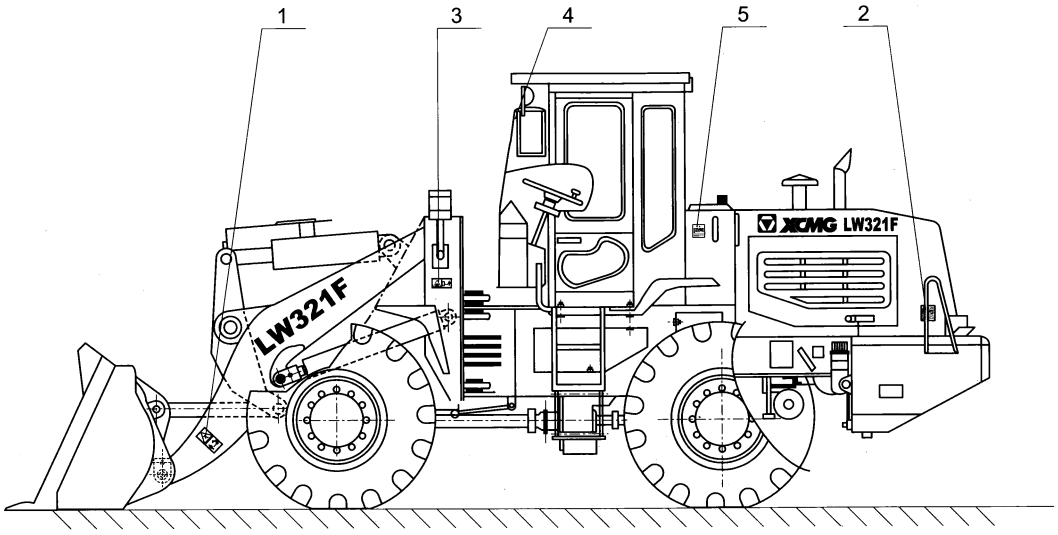


Figure1–5 Pasting positions of safety signs

1.4.1 Don't Stand Under The Raised Working Equipment. (Figure 1-6)

The signs are pasted on the two sides of lifting arms.

Figure1–6

1.4.2 Notices To Injecting The Anti-freezer. (Figure 1-7)

It is pasted on two sides of the engine hood.

Figure1–7

1.4.3 Don't Enter This Working Area. (Figure 1-8)

The sign is pasted on the articulation joint of the front and rear frame.

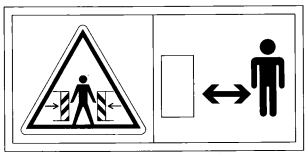


Figure1–8

1.4.4 Hand Braking. (Figure 1-9)

It is pasted on the cab window.

Figure1–9

1.4.5 Notice To Injecting The Hydraulic Oil. (Figure 1-10)

The sign is pasted on the left side of hydraulic oil tank.

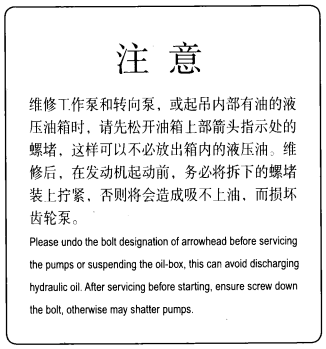


Figure1–10

1.5 Instruments And Controls

1.5.1 Composition Of Control System

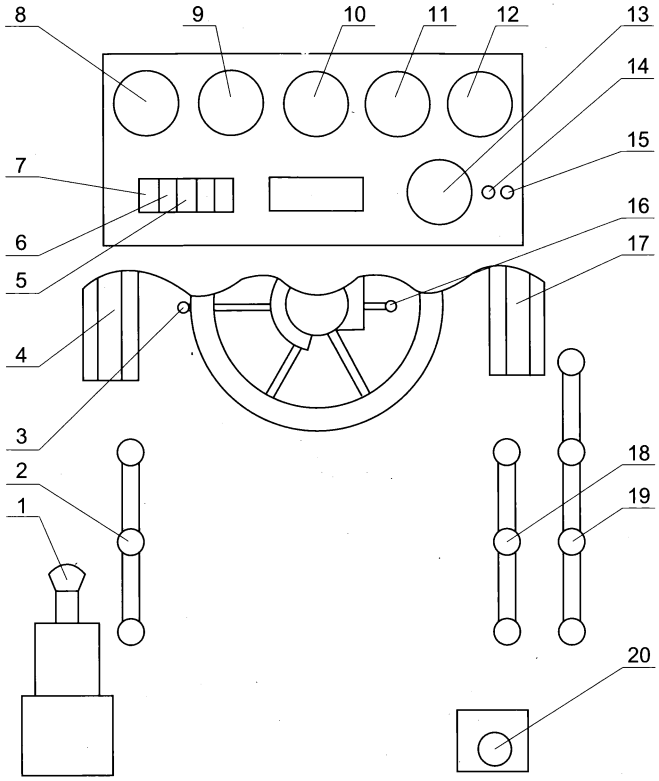


Figure1–11 Composition of instruments and controls

1. Hand Brake
2. High-Low Speed Lever
3. Gear-Shiftting Lever
4. Braking Pedal
5. Switch Of Heating Wind
6. Switch Of Instrument Lamp
7. Switch Of Front Lamp
8. Engine Oil Pressure Gauge
9. Water Temperature Gauge
10. Voltage Meter
11. Oil Temperature Gauge Of Torque Converter
12. Air Pressure Gauge
13. Timer
14. Starting Switch
15. Start Butt on
16. Steering Lamp Switch
17. Accelerator Pedal
18. Bucket Operating Lever
19. Lifting Arm Operating Lever
20. Shut-Off Lever

1.5.2 Function Explanations

N0.	Name	Function	Note
1	Hand brake	Pull out the handle to brake the loader, and down the handle to release the braking.	
2	High-low speed lever	Push it forward to get low speed, and pull it back to get high speed while the middle position means neutral gear.	
3	Gear-shifting lever	Push it forward to get gear I and II; push it furthermore to get gear I and II; pull it back to get reverse gear I and II; and the middle position is neutral gear.	
4	Braking pedal	Trample down the pedal to brake the loader.	
5	Switch of heating wind	It is used to control the heater.	
6	Switch of instrument lamp	It is used to control the lamp for illuminating the instrument panel.	

N0.	Name	Function	Note
7	Switch of front lamp	It is used to turn on or off the front lamp.	
8	Engine oil pressure gauge	It can display the oil pressure of engine.	
9	Water temperature gauge	It can display the temperature of engine cooling water.	
10	Voltage meter	It can display the voltage of battery.	
11	Oil temperature gauge of torque converter	It can display the oil temperature of torque converter.	
12	Air pressure gauge	It can display the air pressure of braking system.	
13	Timer	It can display the total working time of the loader.	
14	Start switch	Insert the key and turn it right to turn on the electrical system of the machine.	
15	Start button	Press down the button to start the engine.	
16	Switch of steering lamp	It is used to control the steering lamp.	
17	Accelerator pedal	It can control the oil input to engine.	
18	Operating lever of bucket	Push the knob forward to have the bucket dump, and pull it back to retract the bucket. When the knob being put in middle position, the bucket remains motionless.	
19	Operating lever of lifting arm	Pull back the lever to raise the lifting arms and push it forward to lower it down and push it furthermore to get floating position. When it being put in middle position, the lifting arm remains motionless.	
20	Shut-off lever	Pull up the lever to stop the engine.	

1.5.3 Gear-Shifting Operation (Figure 1-12 & 1-13)

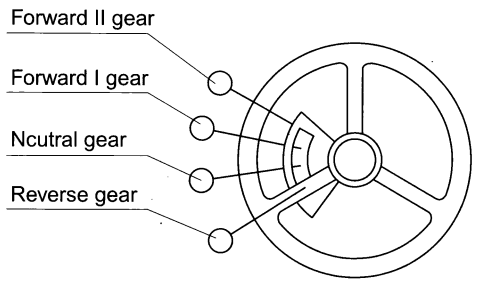


Figure1–12 Gear position

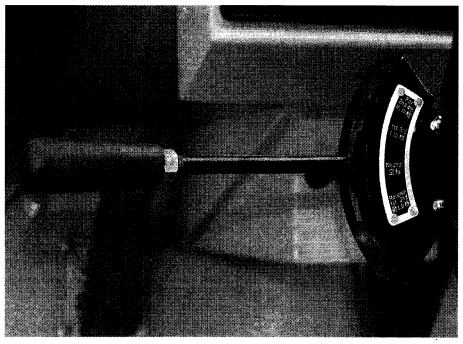


Figure1–13 Actual photo of gear–shifting handle

1.5.4 Operation Of Working Apparatus (Figure 1-14 & 1-15)

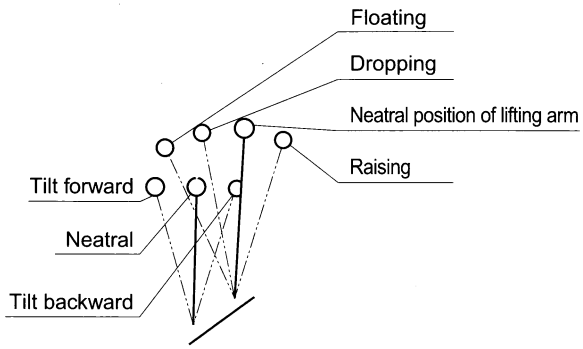


Figure1–14 Positions of control levers

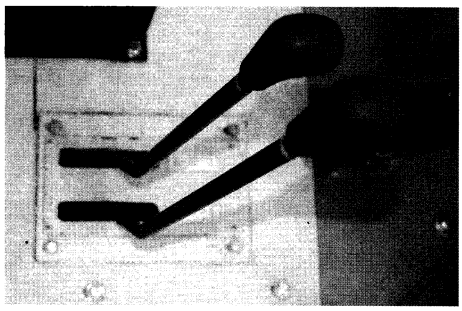


Figure1–15 Actual photo of control levers

1.5.5 Parking Brake (Emergent Braking) (Figure 1-16 & 1-17)

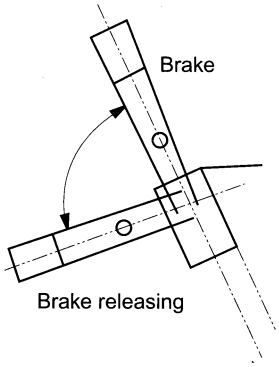


Figure1–16 Positions of control lever

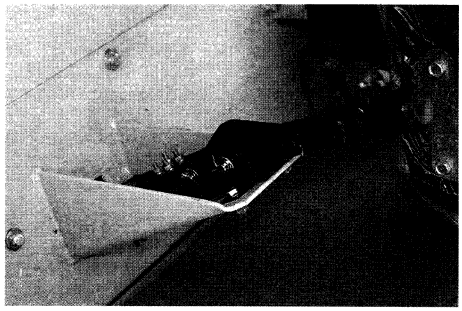


Figure1–17 Actual photo of control lever

1.5.6 Control Lever For High-Low Speed (Figure 1-18 & 1-19)

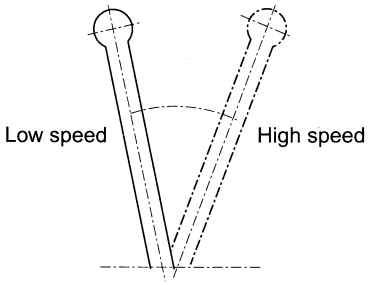


Figure1–18 Positions of control lever

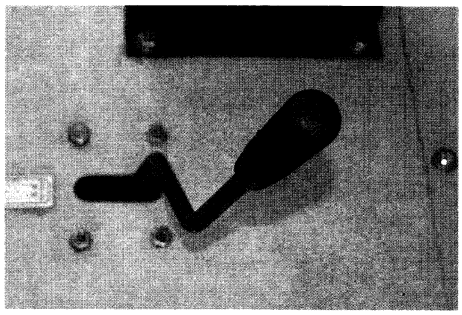


Figure1–19 Actual photo of control lever

1.5.7 Seat Adjustment (Figure 1-20)

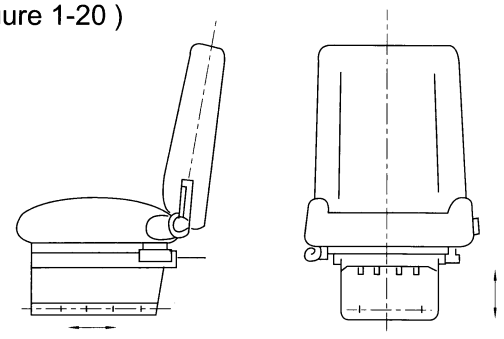


Figure1–20 Seat (double–way, with cushion)

1.6 Operation Regulations

1.6.1 Safety Rules

A. Safety rules

● Don't operate the loader if you feel uncomfortable or take medicines or drink alcohol. Operating the loader with bad health may injure others or yourself. (Figure 1-21)

● When you work together with other people, please make them understand the gesture language.

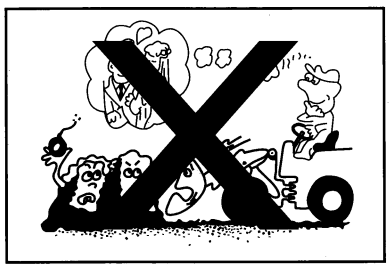


Figure1-21

B. Safety guard

● When operating or maintaining the loader, please take safety guards.

● When operating or maintaining the loader, please wear safety hat which is made up of hard material, safety glasses, safety shoes, glistening coat, veil, earplugs and gloves. When scattering metal scrapes or cleaning the debris from air filter by hammer or compressed air, please wear safety glasses, hard hat and thick gloves. (Figure 1-22)

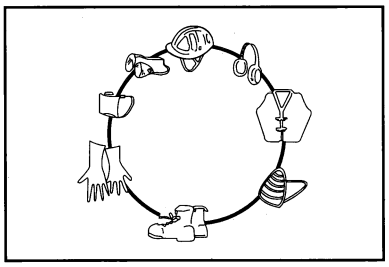


Figure1-22

● Don't wear loose clothing as loose clothing can be easily enwinded in control levers or moving parts to cause casualty.

● Don't wear greasy clothing which can incur burning. (Figure 1-23)

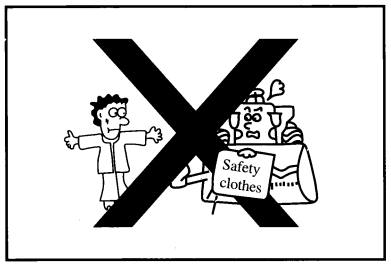


Figure1-23

● Compressed air can injure people. Please wear veil, protective clothing and safety shoes when using the compressed air to clean something. The maximum pressure of compressed air should not exceed 0.3 Mpa.

● Check if the safety guards are normal or not before putting them into use.

Any unauthorized restructuring to this loader can result danger or casualty. Before restructuring the loader, please consult with Xugong Science & Technology Co., Ltd.(XCMG) or authorized agent. Manufacturer should not be responsible for the damages caused by unauthorized restructuring.

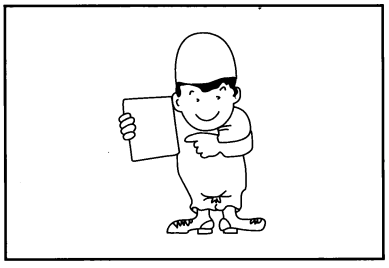


Figure1-24

1.6.2 Safety Operation

A. Be familiar with the loader.

● Only the authorized technician can operate and maintain the loader.

● When operating or maintaining the machine, please obey with all safety regulations and notices.

● Read the Operator's Manual of the loader, study the structure, maintenance and operation of the loader, and be familiar with all buttons, handles and meters.

● Please understand all regulations about operation, get known all the signals which are used in working process. If there are some grease on the operating area, please wipe it out immediately because it can result slippery. (Figure 1-24, 1-25)

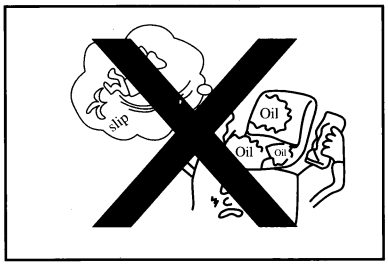


Figure1-25

● Before and after machine operation, please check every system. Check if all safety protecting methods are in safe condition or not. Check if all tyres are wore out or not, and theirs air pressures are normal or not. Breakdowns and accidents should occur if you neglect oil leakages, water leakages, deformations, looseness and abnormal noise. So please check the loader frequently. (Figure 1-26)

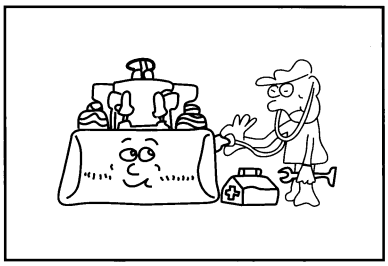


Figure1-26

B. When you leave the seat, please lock these devices :

● Before operator leaving the seat, please lock the control levers and pull out the handle of parking brake. Careless touching on unlocked operating levers can cause accidents.

● When you leave the loader, please lay the working apparatus on ground and lock the control levers, then stop the engine. Lock all devices by keys. Take keys along with you always.

C. Get on and off the loader

● Inspect the ladder and handrail before and after getting on and off the loader. Wipe away oil, lubricant and sludge that are on the ladder or handrail.

● Don't jump on or off from the loader. Never getting on or off the loader when the loader is moving. (Figure 1-27)

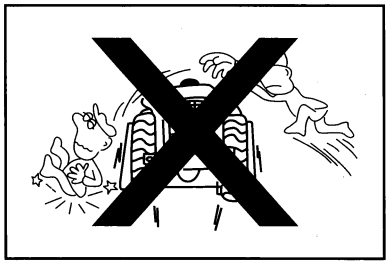


Figure1-27

● When getting on or off the loader, please face to the loader, grip the handrail and step on the ladder and ensure your body is stable.

● Don't grip any control levers when you getting on or off the loader.

● Don't get on and off the loader from the rear ladder or tyres.

● Don't climb up and down the loader carrying with tools or other materials, please use ropes to hoist the tools or other materials.

D. Fire-prevention

Fuel and lubricant used by loader are combustible materials, so it is dangerous when fire approaching the loader.

● Keep fuel and lubricant far away from fire.

● Stop the engine when injecting fuel. Smoking and fire are forbidden during oil injecting process.

● Screw up all caps of oil tanks.

● Use marked vessels to hold combustible liquid, and put them on a fixed place. Unconcerned people is disallowed to use it.

● Move combustible material away from the loader surface, ensure that no greasy cloth or combustible material exists on the loader surface. (Figure 1-28)

● Don't weld or incise the pipes containing combustible liquid. Before welding or incising pipes, please use non-combustible liquid to clean the pipes.

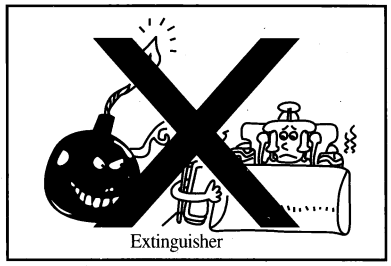


Figure1-28

● When the loader is working, keep the exhauster of muffler far away from combustible materials, such as withered grass or waste paper and so on.

● Choose the parking place carefully and keep hot parts of the loader far away from combustible materials. (Figure 1-29)

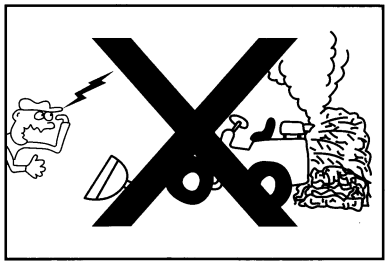


Figure1–29

● Prevent pipes and hoses from leaking. Replace the damaged pipes and hoses. Use the pipes and hoses which have been repaired or cleaned.

● Battery can produce out explosive gas, so don't let smoking and fire approach the battery. Maintain the batteries according to Operator's Manual strictly. (Figure 1-30)

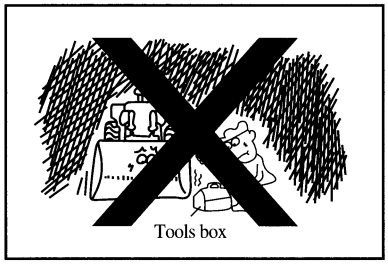


Figure1–30

● When checking the dark area, don't use fire to lighten the area. (Figure 1-31)

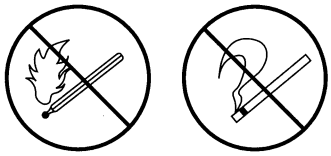


Figure1–31

E. Road driving

● Front-located working apparatus may obstruct the visual field of operator. When the bucket is filled with load, weight is concentrated on two front wheels of the loader, so take stability into consideration when driving on a road.

● Fog, flappy soot and sand can obstruct the visual field of operator.

● Investigate the working place in advance, watch the road condition, keep vigilance against to obstacles, sludge, snow and cave. (Figure 1-32)

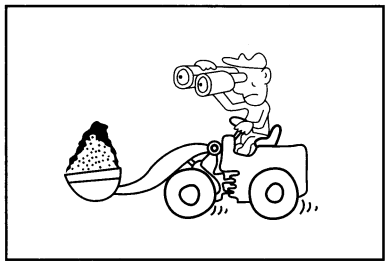


Figure1–32

● Before driving on speedway and public road, please refer to Operator's Manual in advance and obey with local traffic rules. Don't incur traffic jam and be quickly when getting through a crossing.

● Understand all operating regulations and signals, operator must know the meaning of every signal and sign at the first glance. (Figure 1-33)

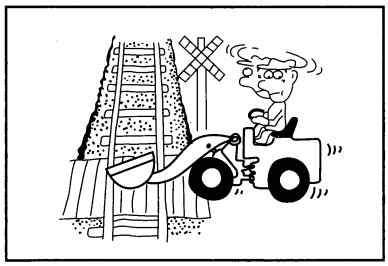


Figure1–33

F. Fire extinguisher and first-aid kit

Take steps according to following items if injure or fire accident has occurred.

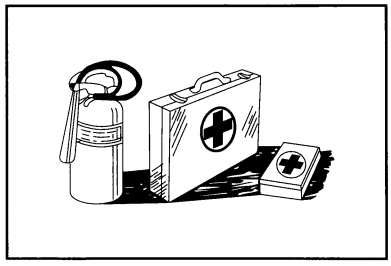


Figure1–34

- You must prepare a fire extinguisher and know how to use it.
- First-aid kit must be prepared on the working place. Refresh the first-aid kit with new medicines.
- You must know how to save yourself when fire accident occurring or you have been injured.
- Some useful telephone numbers must be pasted on a obvious place, such as telephone number of doctors or hospitals, ensure all people know these telephone numbers and know the communicating method. (Figure 1-34)

G. Guard against crushing or incising injuring

- Any part of your body should never get into working area of moving parts of the loader. Along with the movement of working equipment, the space of linkage devices will increase or decrease, approaching to this area can result injuring. If it is necessary to enter into the space that between moving parts, please stop the engine and lock the working equipment. (Figure 1-35)

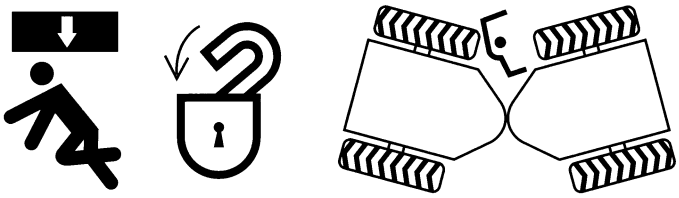


Figure1–35

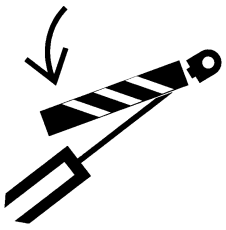


Figure1–36

- Support the loader reliably and firmly when you have to work under the machine. Don't rely on the cylinder to support the loader. Accessory may fall down if controlling device moves or pipes leak oil. (Figure 1-36)
- Don't adjust anything when the loader or the engine is running.
- Evade away from all rotating parts and working parts.
- Ensure that no sundries exist in laminas of fan. Rotating laminas of fan can eject out or break the sundries which exist in the fan.
- It is dangerous to check the engine when the engine is running, avoid of doing that.

H. About the aether (if your loader has been installed with aether start device)

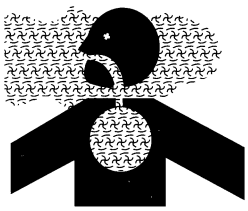


Figure1–37

- Aether is a poisonous and combustible material.
- Inhaling into or contacting with the aether can injure you. (Figure 1-37)
- Good ventilating must be provided to the place where aether is used.
- Don't smoke when replacing the aether.
- Guard against fire when using aether.

- Don't put the aether cylinder on a living area or in the cab.
- Put the aether cylinder on a shadowy place.
- Put the abandoned cylinder on a safe place, don't bake something on it and bore some holes on it.
- Keep the aether cylinder far away from unconcerned people.

I. Notices about accessories

- When installing and using a accessory, please read the manual which is about to the accessory.
- Don't use the accessories that are unauthorized by Xugong Science & Technology Co., Ltd or its agent. The unauthorized accessories can cause dangers and tamper with the normal operation.
- Xugong Science & Technology Co., Ltd should not be responsible for the damages and accidents caused by using the unauthorized accessories.

1.6.3 Safe Starting

A. Operator's dress

Operator must wear protecting dresses according to actual condition. Protecting dresses include safety hat, safety clothing, safety shoes, safety glasses, gloves and respirator. (Figure 1-38)

Figure1-38

B. Investigate the surrounding environment of working place before starting operation.

- Investigate the surrounding environment of working place before starting operation. Keep guard against abnormal conditions that can result dangerous accidents. (Figure 1-39)
- Be familiar with the terrain and ground condition of the working place, choose the safest working method.
- Make the ground of working place more firm and level before starting operation. If the working place is sandy, please sprinkle some water on the ground before working.

- When working on a public road, please assign a man as traffic director, or set fence around the working place and set up some notices which show "No entrance ".
- Ensure good and effective ventilation before you working indoors, avoid of toxicosis resulted from waste gas.
- Some water pipes, gas pipes and electrical cables may be buried under the ground, please take notices of the burring positions and avoid of damaging these pipes.

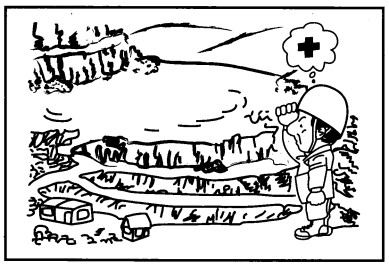


Figure1-39

- Before working in a shallow water or passing through a sandy bank, please inspect the water floor and water depth and velocity of stream. Prevent the driving axle contacting with water. Cleanout and check lubricating holes after working.

C. Check the loader before starting it

Check the loader before every daily work, perform daily maintenance insistently. Treat abnormal condition seriously, repair breakdown immediately and report to managing personnel. (Figure 1-40)

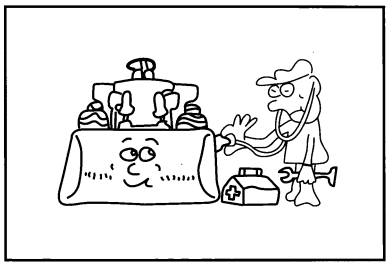


Figure1–40

- Take notice to oil leakage, water leakage, looseness of bolts, abnormal sound and lost of parts.
- Ensure that the lock bar has been disengaged.
- Check the oil level of cooling liquid and fuel and oil in engine sump, check that air filters are blocked or not.
- Ensure that all illuminating devices and lamps are normal, repair the abnormal one.
- Ensure that all meters and gauges are normal, put operating levers at theirs right positions.
- Clean the cab windows and clean all lamps to get a good visual field.
- For get a good visual field, turn rear-view mirrors to a proper angle. Replace the damaged glass of rear-view mirror.
- Don't leave tools or parts around the operator's seat. Vibrations can make these tools or parts fall down to damage operating levers or switches.
- Adjust the angle of seat until operator feel comfortable, and ensure safety belt and its fixing are reliable. Replace the safety belt which has been used for 3 years.
- Ensure the fire extinguisher is normal.
- Clear grease and sludge away from handrail, ladder and shoes to avoid of sliding.

D. Start the loader

- Before getting on the loader, ensure that no one stay in or surround the loader. Ask unconcerned people keeping distance away from the loader, then start the loader.
- Don't start the engine if control lever is pasted on a tab which shows "No operation".
- At first, sit down on the seat and adjust it until you feel comfortable. Take on the safety belt.
- Be familiar with all alarm devices and meters and operating devices.
- Ensure that the parking brake has been released and all operating levers have been put at theirs neutral position.
- Sound the bugle to remind surrounding people getting away.(Figure 1-41)
- Start the engine according to Operator's Manual.
- The engine should be started only when the operator remain in cab.

Starting the engine by making the start motor shortcut is forbidden, this operation not only can damage the electrical system, but also is a dangerous job.

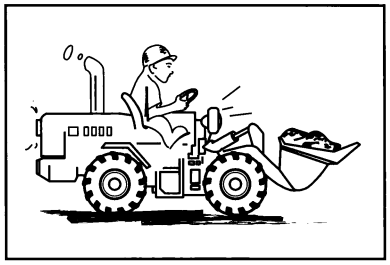


Figure1–41

- Refer to Operator's Manual in advance before using aether cooling starting device. Keep guard to fire because the aether is combustible material.
- Aether is forbidden to be used when plug-shape pre-warmer has been installed on the engine.

E. Checking after the loader has been started

Inspect the loader according to following items after the loader has been started and before working.

- If abnormal sound or vibrations occur while the engine is running, it means that the loader has troubles, please resolve the troubles and report to managing personnel. (Figure 1-42)

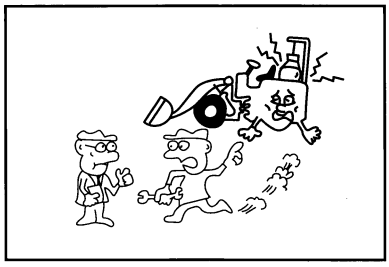


Figure1–42

- Check the speed controlling of engine under the condition of neutral gear.
- Pay attentions on all meters and apparatus and alarm lamps, ensure that they can work normally and remain in regulated range.
- Try operating on all operating levers and ensure that they are flexible.
- Try the gear-shifting lever to feel that the gear position is right or not.
- Inspect the braking pedal and accelerograph pedal, and inspect that the steering is sensitive or not under the condition of low speed.
- Ensure the reverse alarm is normal.
- Ensure that the hand braking has been disengaged.

1.6.4 Safe Driving

A. Ensure safety for yourself and others

- Keep a right operating habit to ensure safety.
- Sound the bugle before starting the loader, start the loader after everything is confirmed normal.
- Ensure that no one or no obstacle is near the loader. (Figure 1-43)

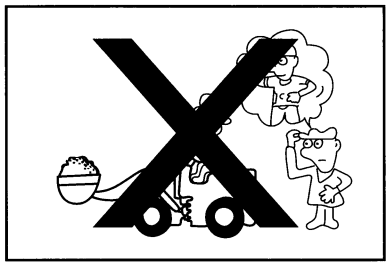


Figure1–43

- Don't stretch your arms or legs out of the cab, it can incur injure. Don't put your arms or feet on operating devices. (Figure 1-44)

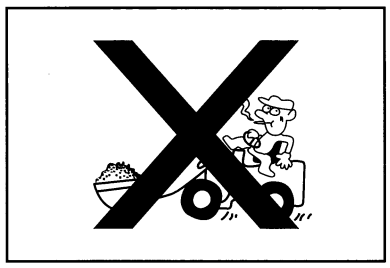


Figure1–44

- Devote your mind to operation because momentary neglect can result tragedy. Attend to surrounding people and sound the bugle to alarm them. (Figure 1-45)

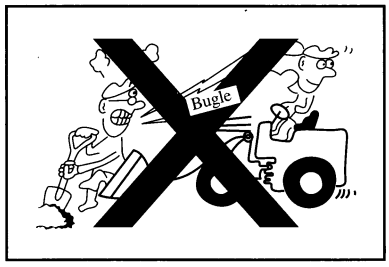


Figure1–45

- Don't drive the loader with the doors and windows are open, but fixed door or window is not restricted by this regulation. (Figure 1-46)

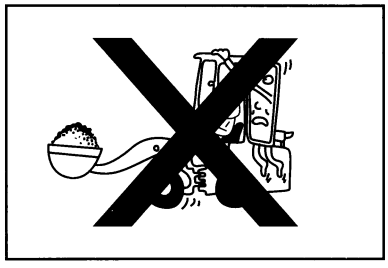


Figure1–46

- The loader is not a man carrier, so hitchhiking is disallowed.
- Using the bucket to carry people or as working platform is very dangerous. (Figure 1-47)

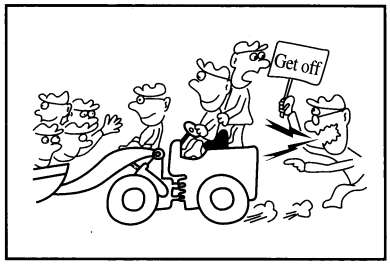


Figure1–47

- Please obey with traffic rules when driving the loader on a public road, don't incur traffic jam, and get through the crossing quickly. (Figure 1-48)
- Drive the loader with courtesy when driving on a public road, keep distance away from other vehicles.

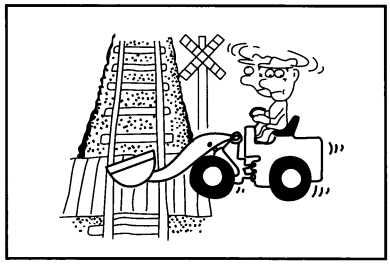


Figure1–48

⚠ DANGER	Emergent braking may cause injuring ! It is very dangerous to shift between forward and reverse gear when the loader driving with high speed.

B. Transporting with full load

- It is dangerous to drive the loader with the bucket being highly raised and full of load. When transporting some load, please choose a suitable speed and keep the bucket away from the ground 500~600mm, so the center of gravity of the loader can be lowered and the stability can be ensured. (Figure 1-49)

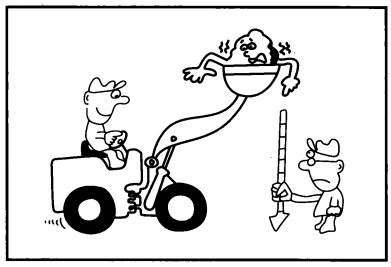


Figure1–49

- The load would not exceed the limit of the rated load. Avoid of overloading. Xugong Science & Technology Co., Ltd. should not be responsible for the injuring or damaging to people and machine caused by overload. (Figure 1-50)

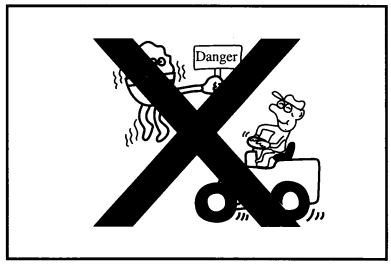


Figure1–50

- Avoid of hurry driving, emergent braking, hurry turning and bypassing when transporting load.
- It is dangerous to operate the working equipment impetuously. Impetuous action of working apparatus can throw out the load or overturn the loader. (Figure 1-51)

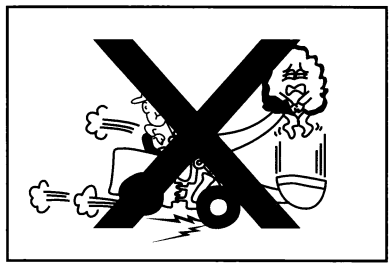


Figure1–51

C. Over-speed is forbidden

● Be familiar with the performance of the loader and choose the right speed according to actual condition. Determine the most suitable route and working method and get cooperating people known that.(Figure 1-52)

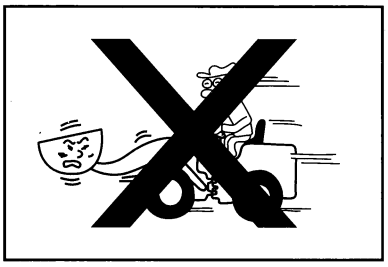


Figure1–52

● Drive the loader slowly to make the loader in a controllable condition.

● Speedy driving, hurry turning or emergent braking is forbidden when the loader drives on a bumpy road or a slope.

● It is hard to control the steering wheel when the loader drives on a uneven terrain or a messy road, so take great care to prevent overturning. (Figure 1-53)

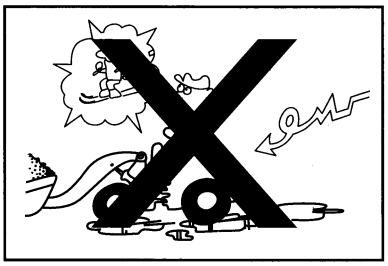


Figure1–53

● Run the engine smoothly, and don't turn the loader when it is running with high speed. (Figure 1-54)

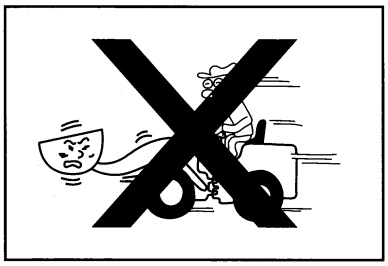


Figure1–54

D. Keep good visibility

● When the visibility is limited, the speed should be reduced. Sound the bugle to remind surrounding people and avoid of savage operation. (Figure 1-55)

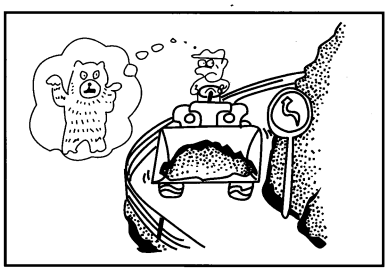


Figure1–55

● Bad weather, such as: flying sand, thick fog and heavy rain, can weaken or invalidate the visibility, so reduce the speed and sound the bugle.

● When loading a large size goods, be careful of lifting, moving and shifting gears. Be sure that no one enter into the working area, and a guider is necessary. (Figure 1-56)

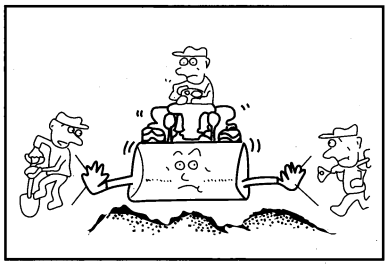


Figure1–56

● Misconception to the distances and terrain may occur in the night, so keep a proper speed that suitable to the surrounding illuminating.

● Turn on the front lamps and top lamps when working at night.(Figure 1-57)

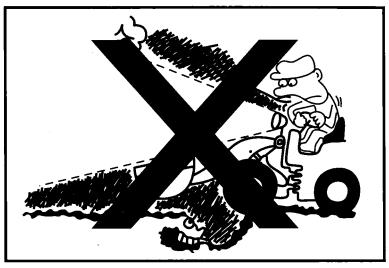


Figure1–57

E. Obstacles

● When passing a place with many obstacles such as the roof and the porch of the buildings, do not get the machine collided with these obstacles.

● Lower the speed when driving or steering in a limited areas. Be sure that there is no obstacle around it.

● When the road condition is bad, operate the machine carefully, and avoid of losing the stability. (Figure 1-58)

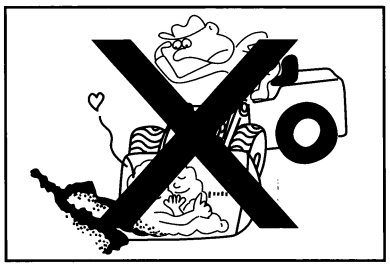


Figure1–58

F. When traveling under severe condition

● Do not work alone in the dangerous places. Investigate the road conditions, intensity of bridge and the topography of the worksite in advance. (Figure 1-59)

● Take notices to sinking of wheels and braking performance when driving in a marsh and loose ground.

● Don't make the bottom of driving axle contact with water when working in shallow water and swamp area.

● Avoiding of traveling too close to the overhangs and deep ditches. There is a hazard that the weight and the vibration of the machine will make the soil to collapse, and the machine may fall or overturn.

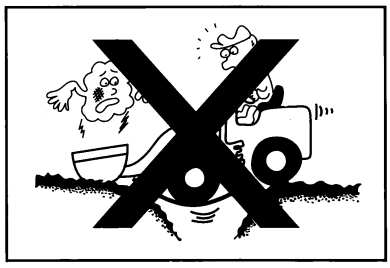


Figure1–59

● When working in a dangerous place which has the hazard of falling rocks or overturning, start the protection devices (FOPS & ROPS).

● When working continuously in rainy weather, working condition may be changed by rain, so take great care. When working on the place where earthquake or blast has happened, please take more care.

● When working on a snowy ground, reduce the loading volume and take notices to skidding. (Figure 1-60)

G. Driving on slope

● Travelling sideways or turning on a slope is very dangerous, don't try this operating. (Figure 1-61)

● Don't swerve on a slope. Swerving only can be performed on a flat ground. Lower the speed and reduce the turning angle when working on hilltop, bank and slope.

● Getting up or down a slopes is preferred rather than passing through an alleyway or pavement.

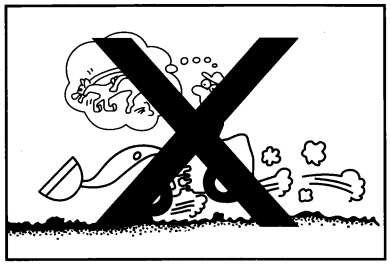


Figure1–60

● Choose a proper speed gear before getting down a slope, and don't shift speed on the process of getting down a slope.

● The gravity centre of the loader will be concentrated on fore wheels or rear wheels when driving on a slope, so please take more care and avoid of emergent braking.

● When driving on a slope, a bank or a hillside, make the bucket near the ground and keep a distance of 20-30cm away from ground. If emergent case occur, please drop the bucket to ground which can help the loader to stop and prevent it from overturning.

● When driving on a slope with full load

△ Use the gear I

△ Don't swerve

△ Keep the loader forwards when driving uphill and backwards when driving downhill. (Figure 1-62)

● If it is necessary to brake the loader while the loader is downhill, trample down the braking pedal without cutting off the power. Do not put the gear-shifting lever on the neural position. When the speed is faster than the rated speed, trample the braking pedal to reduce the speed.

● If the engine stops working when the loader driving on a slope, please trample down the braking pedal completely and drop the bucket to ground, then apply parking brake to fix the loader.

● If the gradient of the slope is less than 15°, repeat the above procedure and put operating levers at theirs neutral position, then start the engine again. (Figure 1-63)

H. Take notices when swerving the loader.

To prevent accidents, even if the loader has been equipped with reverse alarm and rear-view mirrors, obeying with following rules is necessary before moving the machine and the working equipment.

● Sound the bugle to remind surrounding people.

● Ensure that no one is surrounding the loader. Especially check the area that behind the loader for the sake of this area is invisible to the operator's position. (Figure 1-64)

● Some one should be designated to guide the transportation when operating on a dangerous place or a place with poor visibility.

● No one can enter into the driving area or turnaround area without allowance.

● Don' t change the driving direction when the loader driving at high speed.

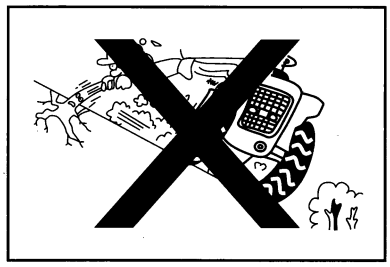


Figure1-61

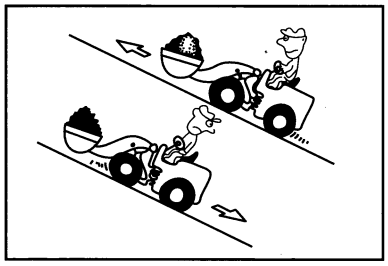


Figure1-62

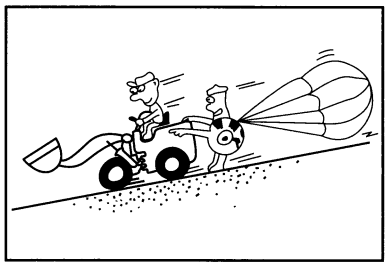


Figure1-63

Figure1-64

1.6.5 Safety

A. Keep a good operating habit.

● When operating the loader, operator must sit on the seat and take the safety belt. The loader should always be in controllable condition. (Figure 1-65)

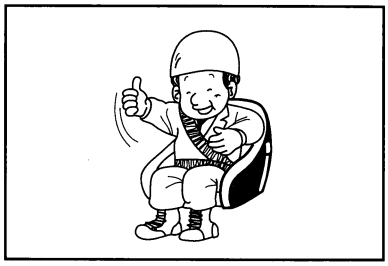


Figure1–65

● The operation to handles must be correct. (Figure 1-66)

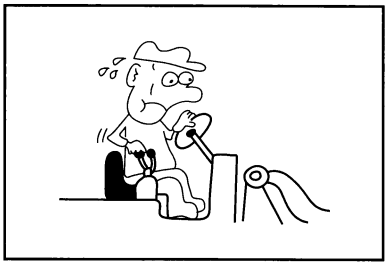


Figure1–66

● Repair the breakdown at once if the breakdown occur, and listen the abnormal sound to distinguish the reasons of breakdown. Don't repair the part that is in working. (Figure 1-67)

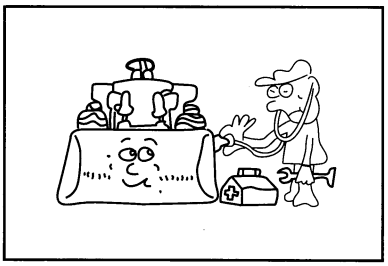


Figure1–67

● Do not overload. Performance that is beyond the capability of the loader is extremely dangerous. It is very dangerous to disobey the instructions when operating. Please investigate the load weight in advance to avoid of overload. Xugong Science & Technology Co., Ltd. should not be responsible for the damages and injures caused by overload. (Figure 1-68)

Figure1–68

● Dashing with high speed is equal to suicide. Dashing not only can damage the loader but also can injure the operator. Never try doing it. (Figure 1-69)

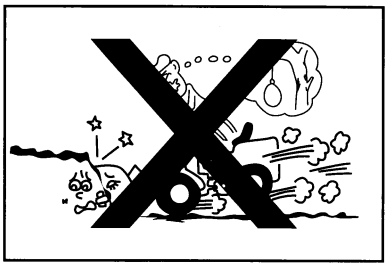


Figure1–69

● The loader should be aligned vertically to the heap to be loaded. If handling the heap from an oblique direction, the loader may be unbalanced. (Figure 1-70)

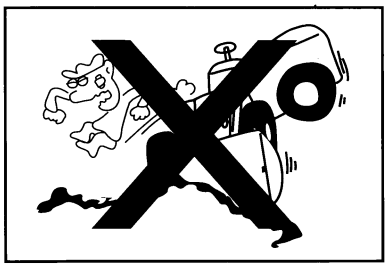


Figure1-70

● Investigate the surrounding condition in advance before starting operation.

● Check the ground condition before passing through a tunnel or over a bridge.

● When working in heavy windy weather, operate the loader favourably with the wind.

● Be careful when the load must be lifted to the highest position. Lifting the load to high position is dangerous because it make the loader unbalanced, so move the loader slowly and take notices when tilting the bucket forward. (Figure 1-71)

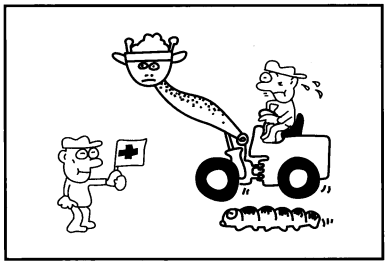


Figure1-71

● When a truck cooperating with the loader, avoid of the bucket colliding with the truck. No one can stand under the bucket and don't hang the bucket over the cab of the truck. (Figure 1-72)

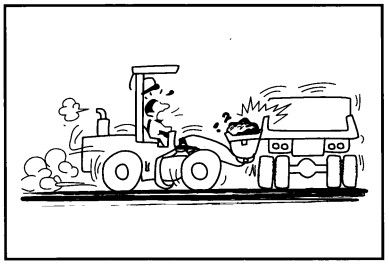


Figure1-72

● Before traversing the loader, please observe the behind area carefully. (Figure 1-73)

● Stop working when the visibility is weakened by smoking, heavy fog and flay dust. Please prepare illuminating devices if the working place is dark.

● When working at night, please notice the following items.

a. Ensure that sufficient illuminating devices have been prepared.

b. Ensure that all working lamps of the loader can work normally.

c. You will easily have a wrong impression to the distance and height of objects at night.

d. When working at night, please stop the loader to inspect its condition frequently and check the surrounding condition.

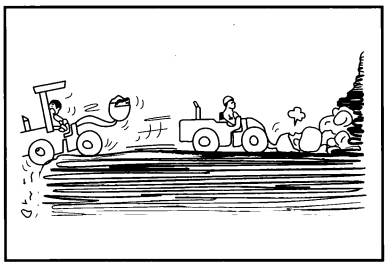


Figure1-73

● Before passing over a bridge or other constructions, please ensure that it has enough solidity to support the loader. (Figure 1-74)

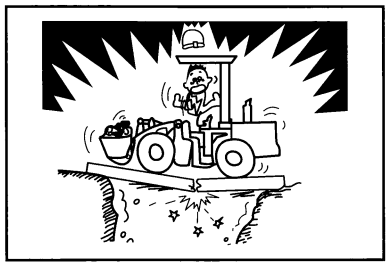


Figure1-74

• The loader is a special purpose machine. Don't use the head or any part of the working equipment to scratch, move or push something. (Figure 1-75)

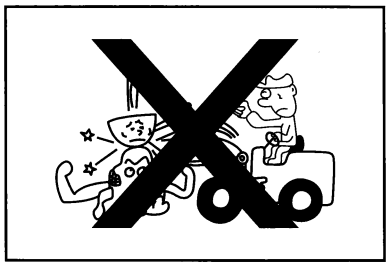


Figure1–75

B. Take notices to surrounding environment

• Unconcerned people should not be permitted entering into working area. As the working mechanisms of the loader move up and down, and the loader itself also move around, so it is forbidden to enter into the working area of the working equipment. If the machine can't work, please fix the working equipment firmly at first. (Figure 1-76)

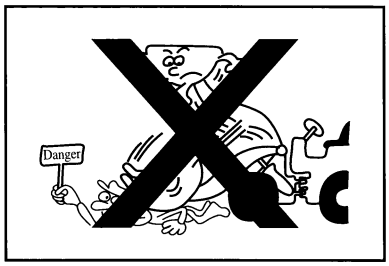


Figure1–76

• When working near a cliff or a place which is easy to collapse, please operate the loader with the safest method and assign a guider to help you. (Figure 1-77)

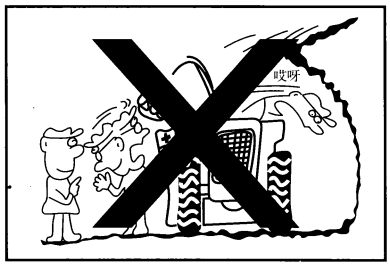


Figure1–77

• When dumping soil or stone from a higher place, the safety of the dumping place should be considered.

• When the material is near the cliff or the loader is near the top of a slope, the speed of the loader will increase abruptly as the load being dumped, so remember to decelerate the loader.

• When embanking or shoving and dumping near a cliff, you should make one heap and then use the second heap to push the first one. (Figure 1-78)

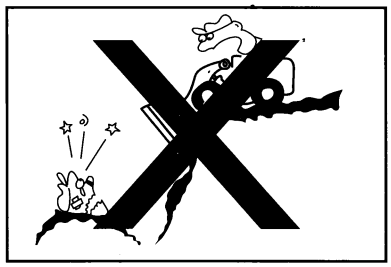


Figure1–78

C. Ensure the ventilation before operating indoor.

• If some operation have to be done in a enclosed room or in a place which has poor ventilating, the windows must be opened for ventilation. If the opening of windows still can't provide enough ventilating, fans are necessary. (Figure 1-79)

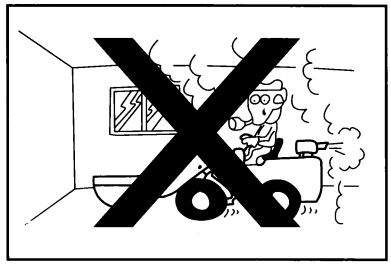


Figure1–79

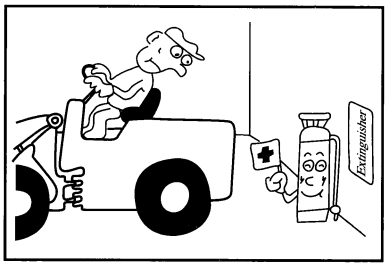


Figure1-80

● Prepare several fire extinguishers before working inside a enclosed room, and bear in mind its location and using method. (Figure 1-80)

D. Keep far away from dangerous place

● If the air released from the muffler is ejected to combustible material or the exhauster is near to them, fire will be easily lighted. So when you are near the combustible or dangerous material such as oil, cotton, paper, withered grass or chemical substance, special attentions must be paid. (Figure 1-81)

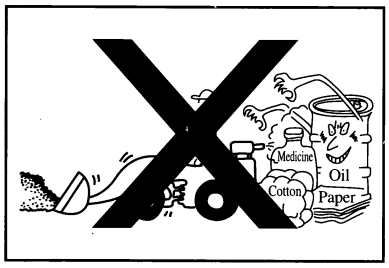


Figure1-81

E. Keep far away from high voltage lines

● Don' make the machine contacted with high voltage lines. Even if nearing the high voltage line also can cause electrical shock. Keep a safe distance from high voltage line according to following table.

	Voltage	The minimal safety distance	
Low voltage	100-200V	2m	7ft
	6,600V	2m	7ft
High voltage	22,000V	3m	10ft
	66,000V	4m	14ft
	154,000V	5m	17ft
	187,000V	6m	20ft
	272,000V	7m	23ft
	500,000V	11m	36ft

● Do the following jobs well to prevent accidents

△ If the risk of contacting with electrical cables is obvious, please consult with local electrical department before working.

△ Take on rubber shoes and rubber gloves. Put a rubber pad on the operator's seat. Prevent any part of your body from contacting with the metal chassis.

△ Assign a guider to remind you when the loader getting near the electrical cables.

△ Operator should not leave the cab if the working equipment has contacted with electrical cables.

△ No one can be permitted to get near the loader when working near the high voltage line.

△ Know the voltage of high voltage line from electrical department before working.

1.6.6 Safe Parking

- Choose a place as flat as possible to park the loader, drop the working equipment down onto the ground.
- Don't park the loader on a slope. If parking the loader on a slope is unavoidable, the gradient of the slope should not exceed 1/5, at the same time, use wedges to fix wheels, then drop the working apparatus down onto the ground.
- If the loader is in trouble or has to be parked on a place in which the traffic is heavy, please set fence, signal flags or warning poles around the loader. Take some methods to make other vehicles see the loader clearly. The loader and fence and signal flags should not jam the traffic.
- Dump all load out before stopping the loader, drop the working equipment to ground and lock all operating levers, pull up the parking brake and put it at braking position. Lock all devices and take out keys. When getting down the loader, please face to the machine while getting down and keep your body stable. Jumping down from the loader is forbidden.
- Don't get on the loader while it is running.

1.6.7 Precautions For Cold Weather

- After working, please clear ice, snow, water or sludge away from wires, sockets, switches and sensors or theirs surfaces. If you do not clear these, it will be froze and make your machine fail to work in next operation.
- Warm-up your loader completely before working. If the loader has not been warmed-up completely, it will react slowly and may result accident.
- Operate every operating lever to make hydraulic oil circulate in hydraulic system and get warmed, therefore the loader can work ably.
- If the electrolyte of battery has iced, don't charge electricity to battery. Don't use another electrical source to start the engine, as this performance is dangerous because it can make battery to fire.
- When charging electricity or using other electrical source to start the engine, make sure that the electrolyte has thawed out and check out if there is any leakage on it before starting.

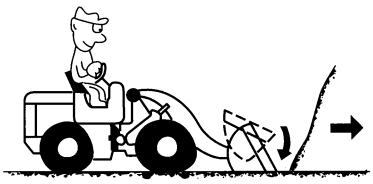
1.7 Working Method

1.7.1 Excavating Performance

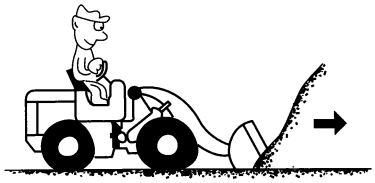
Excavating performance is to insert the bucket into material heap and load or shove.

Excavating performance includes shoving and digging.

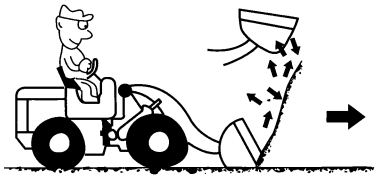
⚠ CAUTION	When performing excavation, make the two sides of bucket bear load evenly, only one side of the bucket bearing load is forbidden.



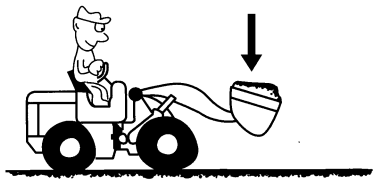
Keep the bucket parallel with ground.



Apply low-speed gear to drive the loader and get close with the heap of load, insert the bucket into heap of load.



Raise the lifting arms and operate the bucket control lever to make it tilt back for 2-3 times to fully load material to be loaded.



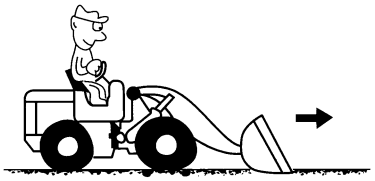
Keep the bucket tilting backwards to its maximum limit, and raise it 400-500mm above the ground.

A. Shoving operation

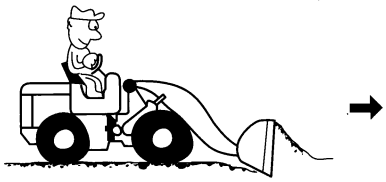
Keep the bucket parallel with the ground while driving the loader, insert the bucket into heap fully, raise the lifting arms and reverse the loader. Operate the bucket 2-3 times to make it tilt backward.

Besides, when it is hard to insert into a material heap, shake the bucket by moving the tilt lever back and forth to fill up the bucket.

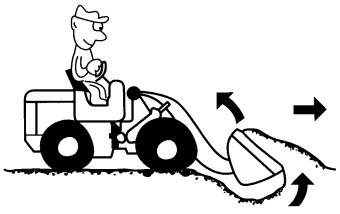
CAUTION	If the wheel skids, please reduce the force that is applied on the accelerator pedal and the load, avoid of forcible operation.



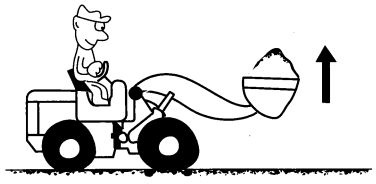
Keep the bucket tilt forwards a little.



Drive the loader to fill the material into bucket (cutting depth can be adjusted by controlling the handles of lifting arm and bucket).



Raise the lifting arm and keep the bucket tilting backwards.



Keep the bucket tilting backward to its maximum limit, and keep it away from the ground 40cm.

B. Digging operation

The proper inclining angle of the bucket is 0°~10°.

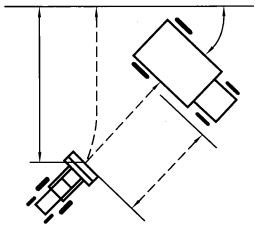
Drive the loader with a low speed, raise the lifting arm after the bucket inserting into 10~30cm, at the same time tilt the bucket backward. The less the bucket digs, the easier the loader does.

1.7.2 Load Performance

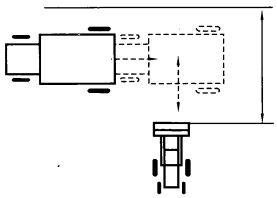
When loading sand, rocks or ores into truck or container, please choose a high efficient working method.

Determine the working method according to actual condition, the working method includes the cooperation of loader and truck or only the loader.

CAUTION	Clear the gravels and stones away from the ground by bucket, which can prevent wheels from damaging and the road surface frequently.



V-type cycling operation



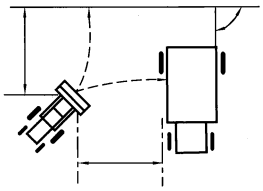
I-type cycling operation

CAUTION	Pay attention on the road surface when transporting, choose a speed that will not make loaded material splash out and lower the bucket when driving.

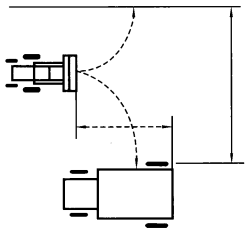
A. Dig and load on a flat ground

Keep the bucket tilt forwards a little, operate the lifting arms and bucket to adjust the digging depth while driving the loader. Special attention should be paid when the terrain varies.

Following operation must be performed according to "shoving operation".



L-type cycling operation

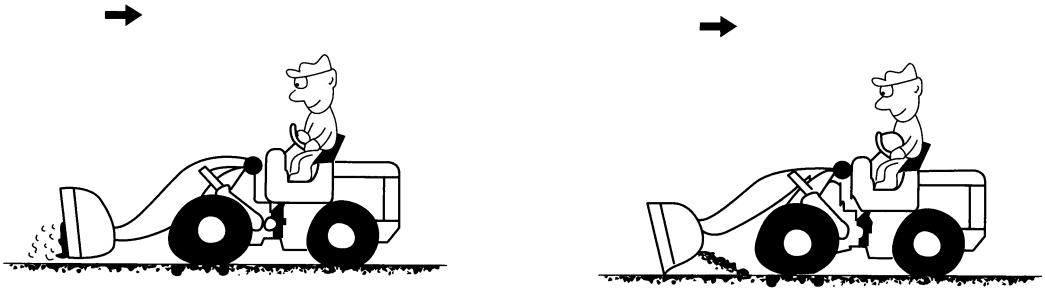


T-type cycling operation

B. Working in combination with transporting vehicle

The method has, as shown in above figures, four types. Choose a working method of shortest cycling time.

The above-mentioned method is to use the machine for continuous shovelling, transporting and dumping. This method is suitable to the transporting distance of 30~100m in normal condition.



1.7.3 Ground Preparation

By the angle formed by bucket cutting edge and the ground, the loader can perform soil scattering, ground levelling and foundation laying.

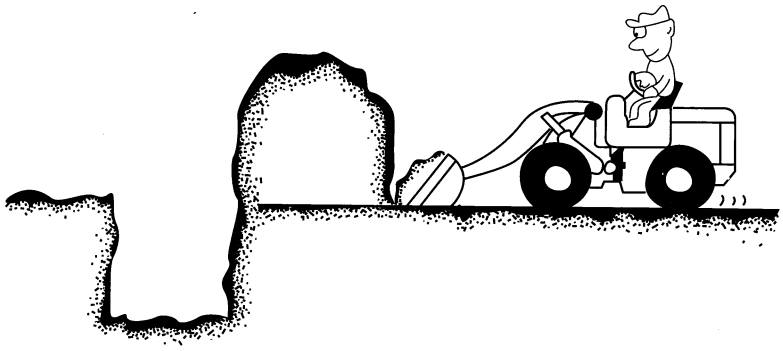
CAUTION	When performing the ground preparing, the machine must be driven backward.If it is a must to prepare the ground while the loader is forward moving, please keep the forward tilting angle within 0°~10°.

Soil scattering

Load sand or soil into bucket, then tilt the bucket forward to 10°~15° and scatter the sand or soil evenly while the loader is moving backwards.

1.7.4 Soil Pushing

The bucket can be used as a scraping plate to level up the ground. At this time, fill the bucket with sand or soil and keep it parallel with ground, then perform levelling up.



Coarse levelling

Tilt the bucket forward completely, keep the bucket teeth contacting with ground and reverse the loader at a low speed to make the ground levelling.

Fine levelling

Fill the bucket with sand or soil and keep it contacting with ground horizontally. Put the handle of the lifting arms at "float" position, then reverse the loader slowly.

When working on a hard ground, put the handle of the lifting arms at "float" position, make the bucket stick to ground and scrape the ground clearly.

CAUTION	During the machine operation as above-mentioned, the water temperature of engine should not be over 90℃, oil temperature of torque converter should not be over 110℃, oil pressure of braking should not be lower than 0.44Mpa. Otherwise, stop working immediately and figure out the problem reason.

1.7.5 Snow Sweeping

Please pay special attentions on following items.

Although the snow sweeping is similar to common loading performance, but the snowy road is a special condition which can result skidding or the steering wheel out of control.

Avoid of hurry driving, emergent braking, rapid turning , and operate the loader with care.

Notices of snow sweeping

- Ensure the safety when fog weakening your visual field.
- Take notices to those objects buried under the snow.
- Know the positions of ditches and curb.
- Anti-skid chains must be installed on 4 wheels.

1.7.6 Towing Performance

Raise up the towing pin which is located at the counterweight and thread towing cable through it, then put the towing pin down.

CAUTION	The towing cable should be threaded firmly.

The braking device of the vehicle which is to be towed can function normally, otherwise don't attempt to tow it.

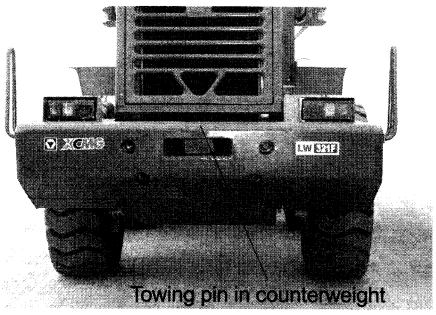


Figure1–82 The photo of towing pin located in counterweight

Notices to towing performance

- When towing a break-down loader in short distance, please obey with the following instructions. The speed should not exceed 2km/h, move the break-down loader to a safe place to repair it. This method can only be used in emergent case. Please use a truck to move the break-down loader for the long-distance transportation.
- Necessary security protection should be made for the towing vehicle, and try to prevent any injury happening on operators caused due to the failure of towing cable and towing link.
- It is forbidden to operate the vehicle unless the operator can control the steering and braking of the vehicle to be towed.
- Before towing a loader, please check the condition of towing cable and towing link, ensuring that they have enough intensity. The strength of the towing cable must be 5 times to the weight of the loader. Towing cable can also be used to draw the loader that is trapped in sludge or on a slope.
- Chains can not be used as towing cable because it may break and cause casualty. Assign a observer on a safe

place who can stop the towing performance if the towing cable breaks or gets loose.

- Terminate the towing performance when the towed vehicle can move by itself.
- The minimum towing angle must be ensured, which should not be over 30o.
- Hurry towing can break the towing cable, so it is suggested to apply slow and smooth towing.
- Under the normal condition, the size of the towing vehicle should be same with that of the loader to be towed, and the towing vehicle should also be of proper braking performance, sufficient power and weight to meet the demands in terms of towing slope and towing distance.
- When towing a break-down loader downhill a slope, a larger vehicle should be needed and follow after the loader, so as to prevent the break-down loader from rolling.
- Towing force should vary according to different terrain condition. If the terrain condition is level and smooth, the needed towing force is small. If the terrain condition is bad, the towing force is large.
- If the machine engine is still running, the break-down loader only can be moved for a short distance just under special case, while the machine's power system and steering system also can be operated. Bear in mind that the machine can only be towed for a short distance, e.g., tow the machine out of mud trap or tow it onto a road edge.
- Before towing, keep the direction of the loader in line with the towing direction.

A improper towing method or bad steel cable can result casualty or damage, so obey with following items.

△ The towing vehicle and towed machine must be installed with ROPS & FOPS.

△ Choose the high quality steel cable, and please wear gloves when dealing with steel cable.

△ Before cooperating with other workers, discuss with them and determine the signals that will be used.

△ If the engine and braking systems of the break-down loader gets troubles, please consult with their manufacturer for repairing them.

△ It is dangerous to tow a loader on a slope.

△ The steel cable to be used for towing should be strong enough to tow the break-down machine. No one should stay between the towing machine and the towed machine.

△ Keep the hook of the towed machine be in alignment with the towing machine.

△ Don't stand astride on towing cables by two feet.

1.8 Oil And Water Supplying

1.8.1 Notices

- All oil must be pure and be sedimented for 72 hours. The cleanness of the hydraulic system should reach to 18/15 (gb/t14039-93) or NAS10 (American Standard), otherwise it may make bucket fall and cause excessive abrasion to the pump.
- Oil injector and related parts must be clean and prevent water or dirt getting into oil.
- Keep the loader in a level condition when checking the oil quantity.
- Under different ambient temperature, use oil with different viscosity and trademark, please observe with the relative instructions.
- Different kinds of oil can not be mixed or substituted together, otherwise it may cause rubber elements aging and early abrasion.
- Check any oil leakage in the system after oil injecting.

CAUTION	Avoid of scalds when checking or replacing the oil and cooling liquid.

1.8.2 Injecting Method

A. Inject oil to hydraulic oil tank

● Oil checking:

Check the oil level in hydraulic oil tank Bear it in mind that oil level must be above the middle scale of the oil-dipstick. When necessary, please replenish it with the new oil.

CAUTION	when checking oil level, the bucket should be placed on the ground horizontally and the engine should be stopped.

● Replacing with new oil according to following procedure:

△ Raise the lifting arms to the utmost high position and then stop the engine. Lifting arms will drop down and bucket will overturn by theirs own weight, so cylinder oil should be discharged out completely.

△ Open the oil-drainage plug to discharge dirty oil when the oil is still warm.

△ Remove away the flange cover and clean the injecting hole and filters. Replace the damaged oil filter.

△ Inject new oil through oil-filling plug till it reaches to the middle scale of the oil-dipstick. It is forbidden to inject new oil directly without the oil filter.

△ After injecting the new oil, run the engine with low speed and operate the working apparatus several times to bleed out air from the system, at this time, oil level may drop a little, so please check the oil level again, replenish new oil if it is necessary.

● Draining debris

Drain out the water and debris that are deposited in the oil tank from drainage plug.

B. Fill fuel to fuel tank

● Check of the fuel level

There is a level indicator on the fuel tank, keep the fuel level always above the 2/3 of the lower scale.

● Draining debris

Drain out water and debris that are deposited in the oil tank from draining plug. At the same time, clean the fuel-filling plug and oil filter. For the damaged filter, please replace with a new one.

C. Fill braking oil

There are two oil cups on the booster pump.

● Checking the braking oil level

Check the braking oil level. The height between oil surface and oil-filling plug should be 15~25mm. Replenish with new oil when necessary.

● Replacing with new oil

Replace all the braking oil according to lubricating schedule, at the same time, clean the oil cup and replace the filter.

● If air getting into braking hydraulic system, the braking performance should be effected negatively. So it is needed to bleed out air after replacing braking oil. Oil drainage should be in the follow steps:

△ Clean the hydraulic pipes, braking oil cups, oil-filling plug and exhaust nozzle.

△ Fill braking liquid to its oil cup.

△ Start the engine, then stop it after braking pressure reaches 0.68~0.7Mpa.

△ Sleeve the exhaust nozzle with a transparent hose, with one end of the transparent hose into the oil cup.

△ Release all exhaust nozzles for bleed out air, and trample down the braking pedal several times till there is no bubbles ejecting out from exhaust nozzle. Screw up the exhaust nozzle and disengage the braking pedal. When bleeding out air, please replenish in time braking liquid to the oil cup, so as to avoid air getting into pipe system.

△ After the air has been bleeded out completely, fill in oil to desired level.

⚠ CAUTION	Oil of different brands should not be mixed together. Mineral oil should not be used as braking liquid.

D. Oil filling to the transmission system

Fill oil into transmission system through oil pipe. Check its oil level according to Gearbox Manual.

E. Filling oil to both front & rear axle

● Checking oil

Screw off the oil filling plug and check the oil level. If the oil surface is near the plug, it is enough, replenish new oil when oil level is insufficient.

● Replacing with new oil

● Drain out the used oil from the draining plugs on hub reduction and main reduction areas. It is better to drain out oil while the machine still being warm.

● Screw off the oil-filling plugs on main reducer and hub reducer to fill up with new oil till there is oil flowing out from both the oil filling plug of the main reducer and the watching-hole of the hub reducer. (The arrow direction on the hub should face downward, and the watching-hole is located at the arrow end).

● Finally, screw up the oil filling plug.

F. Fill oil to engine

● Checking the oil level

△ Pull out the oil-dipstick and clean its end, insert it into oil again, then pull it out to check.

△ The oil level is right if the oil surface lies between upper and lower scale of the dipstick. If the oil level is bellow the lower scale, then replenish it with new oil till it arrives at the upper scale.

△ Checking oil level can only be implemented before working or after the engine stops running for 15 minutes.

△ Check the cleanness of the oil again. If it is found that the oil is over polluted, replace it completely with the new oil.

● Replacing with new oil

△ Drain out the used oil from oil-draining plug of the oil pan, then fill up new oil via the oil filling hole till the oil level reaches to the upper scale.

△ Run the engine with low speed, then stop it to check the oil level. Replenish with more new oil if the oil

level is insufficient.

△ The oil level should not be over the upper scale.

△ The replacement for the engine oil should only be done while the engine still being hot.

G. Fill cooling water

● Water filling up

△ If the temperature of engine water is too high, firstly check the water quantity in the radiator. Replenish water if water level is insufficient. At the same time, check if the radiator gets blocked or not and if the hoses get worn out or not. Be sure to put the radiator cover tightly to prevent cooling water evaporating.

△ Replacement for the cooling water should only be done while the radiator is cold. Firstly open the radiator cover, then open the draining valve to drain off the cooling water.

△ Start the engine after finishing the cooling water replacement for making the water level drop a little. Then stop the engine and replenish cooling water again if necessary.

△ Fill the radiator full with cooling water, then run the engine with high speed to make the cooling water circulate inside the radiator. Fill more cooling water while the engine is running. At the same time, drain out the cooling water from draining valve until the clean cooling water flow out from the draining valve.

⚠ CAUTION	Don't open the radiator cover when the engine is running or the engine stopped just a moment ago. The ejecting of hot water is very dangerous.

● If it is necessary to open the cover, please cover it with a cloth.

● Cautions:

△ Rain water, tap water or precipitated river water can be used as cooling water. Well water can also be used as cooling water.

△ When the ambient temperature is lower than 0℃, please add anti-freezing agent into cooling water to prevent water getting frozen.

△ If the loader is stored for a long time and without anti-freezer, please drain out all cooling water completely.

△ Cooling water that is with anti-freezer does not need to be drained out. But the high quality anti-freezer should be used.

△ In a extreme hot weather with temperature up to more than 30℃, engine is easy to get overheated, so parking place must be a shady place.

△ To prolong the service life of the engine, make the engine run with low speed for 5 minutes at the end of daily work. Stop the engine after the water temperature becoming cooled.

△ The freezing point of anti-freezing agent should be 10℃ lower than the lowest temperature of the ambient temperature.

△ The anti-freezing agent should be replaced every year.

1.8.3 Oil Type And Brand (Table 1-3)

NO.	Description	Oil Specification		Application (on machines)	Viscosity
1	Diesel oil	CD 15W/40		Standard	100℃ 12.5 ~ 16.3
					100℃ 9.3 ~ 12.5
		CF-4 15W/40		Loaders with Cummins engine	100℃ 12.5 ~ 16.3
		CF-4 5W/50		Highland-type loaders	100℃ 16.3 ~ 21.9
2	Diesel	Summer	0#	Standard	
		Winter	10#, 35#		
		50#		Highland-type loaders	
3	Gear oil	85W/90 GL-5		Standard	
		75W/90 GL-5		Highland-type loaders	
4	Hydraulic oil	Summer	L-HL46	Standard	100℃<6.1; 40℃ 41.4 ~ 50.6
		Winter	L-HL32		100℃<5; 40℃ 28.8 ~ 35.2
		30#		Highland-type loaders	50℃ 32.26
5	Transmission oil	6# hydraulic transmission oil		Standard	100℃ 5.0 ~ 7.0
		8# hydraulic transmission oil		Highland-type loaders	100℃ 7.0 ~ 9.0
6	Braking oil	719 synthetical braking liquid			-40℃ <1500 50℃ ≥4.2 100℃≥1.5
7	Anti-freezing agent				
		Greatwall FD-Ⅲ		Highland-type loaders	
8	Lubricating grease				

Lubrication , Maintenance and Repair

2.1 General Principle Of Maintenance

2.1.1 Warning Label

- When the operator is maintaining or refueling the machine, starting engine or operating the joystick by other persons may cause severe injury or death to the operator.
- Post a warning label on the joystick in the cab to show that service and maintenance are being done to the machine. If necessary, post the warning labels around the machine.

2.1.2 Common Knowledge

- The operator and the service people should be trained and get relative professional certification. The persons who have nothing with the inspection and maintenances are not allowed to enter in the working areas. You can appoint the special person to guard the areas.
- You should repair the loader according to the this manual. If you do not know how to repair the loader, you should ask help from manufacturer.
- Repairing procedures should be programmed in advance. When the loader is to be repaired or its parts to be dismantled, assign a service foreman who is in charge of the service work on site, and do the service work in the order as programmed..
- The operator should wear a safety hat, protection suit with the wristbands and trouser-legs tightened. Sometimes according to the maintenance work scope, safety glasses, gloves and mask should also be worn. (Figure 2-1)
- Please use the proper tools and do not use the broken and inferior tools.
- To avoid the accident, you should always lower down all the working apparatus. Stop the engine, engage the hand brake and place the chock under the wheels when you repairing the loader. (Figure 2-2)
- Pay attention the decals. The most important points are decaled on the loader and they must be followed strictly. If the decals are peeled off or polluted, new ones must be attached or clean them.
- Before repairing the loader, you should post a warning tab-"Operation is forbidden" or other similar sign in the cab to alarm others not to touch any handle in cab. If you do not do this, it is very dangerous for the service man and himself. (Figure 2-3)
- Appoint a director for assembly or disassembly the accessories.
- Fuel and oil is dangerous. Fuel, oil, grease and linoleum are not allowed to be exposed to any fire and flame. (Figure 2-4)
- No smoking when adding oil and doing inspection work.
- Put the accessories taken down from the loader in a safe place, and make sure these accessories will not disappear. Make rails beside the working areas and hang a sign to forbid irrespective people get close.

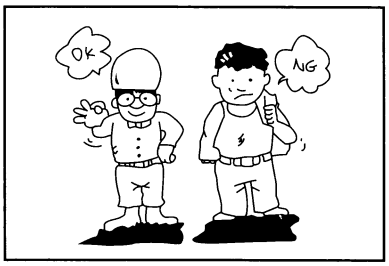


Figure 2–1

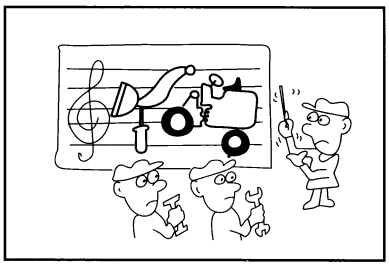


Figure 2–2

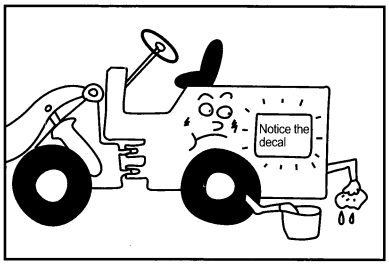


Figure 2–3

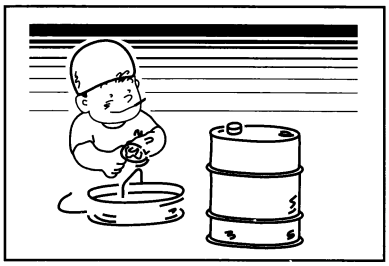


Figure 2–4

- Forbid any irrespective people to enter into the working areas.
- Keep the working area clean and orderly. Do not get oil and grease scattering to all over the working areas. Avoid firing and slipping. (Figure 2-5)

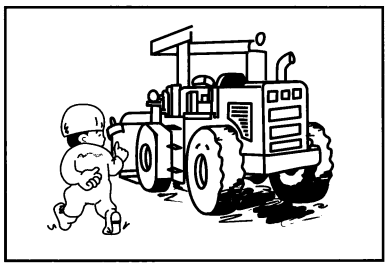


Figure 2–5

- When checking or maintaining the machine, the frames should be locked by a locking bar. (Figure 2-6)

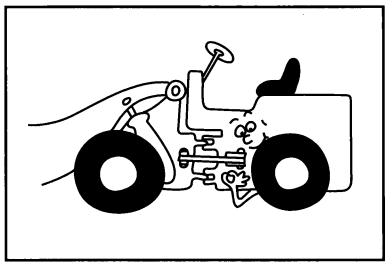


Figure 2–6

- When you jack up one side of the machine, don't allow other person to get into the other side of the machine.
- Before jacking up the loader, block the other side wheels by wedges. After jacking up the loader, please put cushion under it. (Figure 2-7)

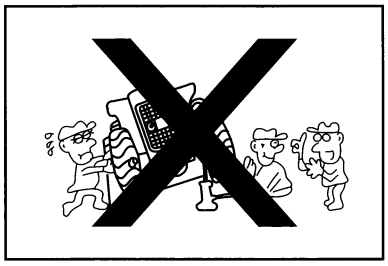


Figure 2–7

- Don't reconstruct the machine on the site.

Never reconstruct the loader on site which may affect the functions , safety and strength of the loader or its bucket. (Figure 2-8)

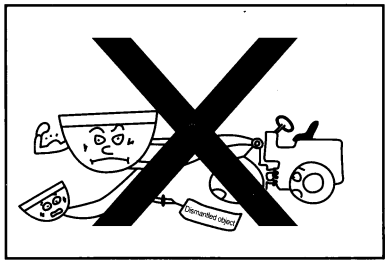


Figure 2–8

- Prepare the extinguisher before working inside a building, and get familiar with where it is located and how to use it. (Figure 2-9)

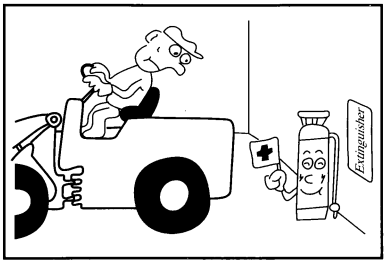
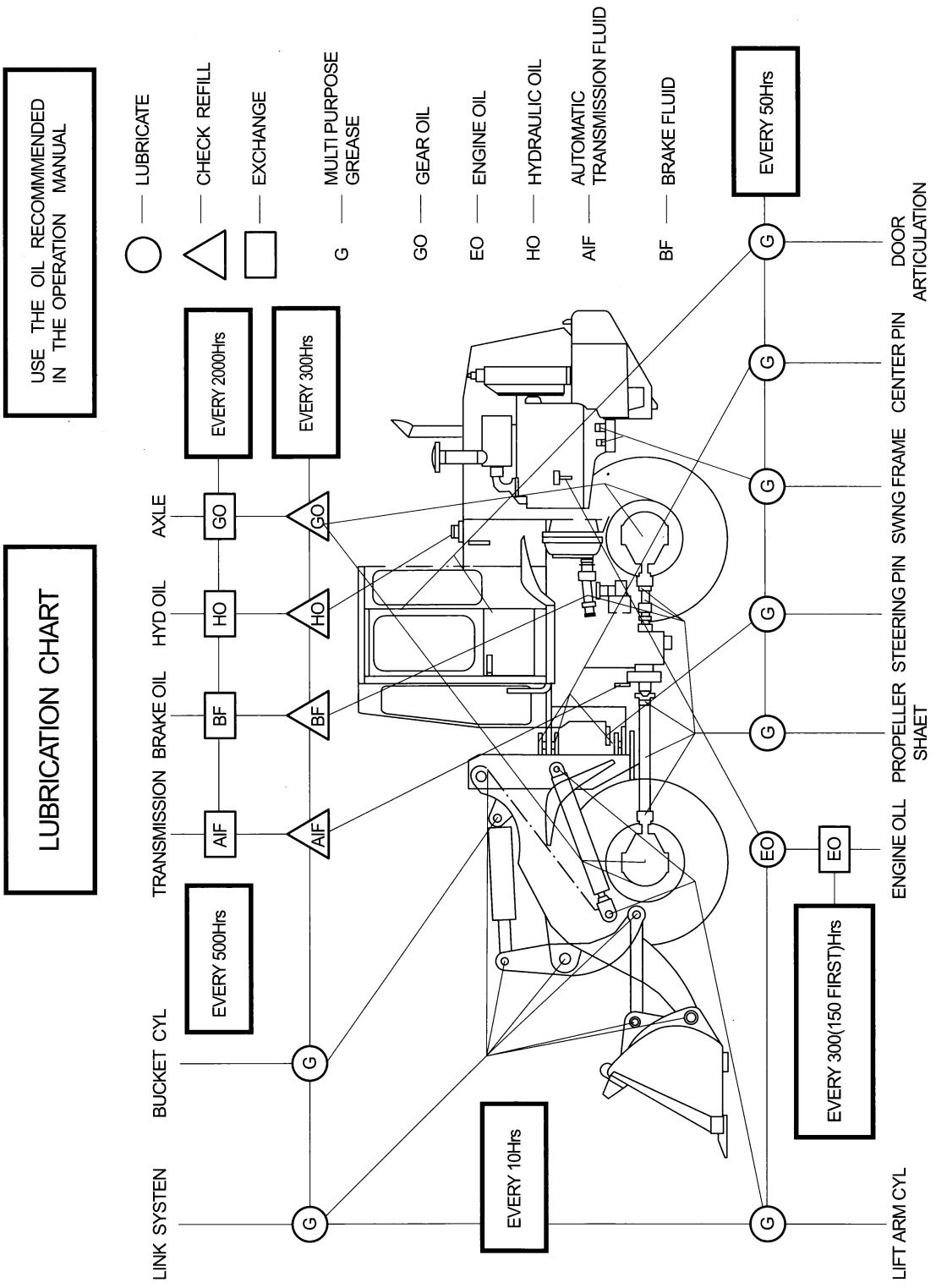


Figure 2–9

2.2 Lubricating The Machine

2.2.1 Parts To Be Lubricated And Lubricating Schedule.



2.2.2 Recommended Lubricant And Oil (See The Table 1-3)

2.2.3 Instructions To Be Followed When Refilling Fuel And Lubricating Oil

A. Fuel, lubricating oil, hydraulic oil, anti-freezing addition and braking oil could be flammable with fire or flame, so following points must be obeyed:

- Stop the engine when refilling fuel or lubricating oil.
- Smoking is definitely prohibited.
- Clean away the leaked fuel, lubricating oil, hydraulic oil, anti-freezing agent and braking oil.
- All the tank covers for fuel, lubricating oil, hydraulic oil, anti-freezing agent and braking oil must be securely fastened.
- Refill the fuel, lubricating oil, hydraulic oil, anti-freezing addition and braking oil in the place with good ventilation.

B. Precautions

- Oil is required to be cleaned. The diesel oil must be deposited for some time.
- Oil injector and oil-filling area must be clean. Prevent contaminated water entering into oil.
- When checking oil quantity, the machine must be kept in a level state.
- Under different ambient temperature, please use oil with different viscosity and trademark. Please strictly adhere to the relative instruction in this manual.
- Different type of oil can't be mixed and substituted together. Otherwise it may cause rubber components aging and early wearing-out.
- After filling oil or changing oil, please check if there are any oil leakage.

C. Inject oil to the hydraulic tank

- Checking oil level:

Check the oil dipstick in oil tank. The oil surface should be kept above the middle scale of dipstick. When oil level is not enough, please replenish with oil.

⚠ CAUTION	When checking oil level, the bucket should be positioned on the ground in level state, and the engine stops running.

- Replacing with new oil according to following steps:

△ Raise the lifting arm to its highest position. Then stop the engine. Lower the lifting arm and tilt bucket downwards with their own weight, so as to let oil inside hydraulic cylinder flow out completely.

△ When the oil being still warm, loosen the drainage plug under the hydraulic oil tank to discharge used oil.

△ Remove away the flange cover, and clean the oil filling plug and oil filter. Also replace the oil filter when it gets broken.

△ Replenish with new oil till oil surface till it reaches the middle scale of oil dipstick. It is not allowed to fill in new oil directly via oil filling plug without the help of oil filter.

△ After filling in new oil, start the engine and let it run at low speed, and operate every control handles several times, so as to bleed out air from the working system. Afterwards, maybe the oil level will get lower slightly, so it is necessary to check the oil level again (above the middle scale of dipstick). If necessary, refill in with more new oil.

- Discharging contaminated remains

The contaminated remains and water inside the oil tank could be discharged from the drainage plug.

D. Inject fuel to fuel tank

- Checking fuel level

Inject new fuel to the fuel tank when the fuel level drops down to the lower scale.

● Discharging contaminated remains

Drain off water and contaminated remains inside the tank from the drainage flange at the bottom of the tank. And then clean the fuel filling plug and fuel filter. Replace the filter if it gets worn.

F. Refill the braking oil

There are two braking oil cups (which are located on the boosting pumps on the right side of machine frame.)

● Checking oil level

Check the braking oil level. The height between the oil surface and oil filling plug should be 15-25mm. When there is not enough oil , replenish it with new oil.

● Replacing with new oil

Completely replace the braking oil according to the interval schedule for lubricating. When replacing braking oil, clean the oil cups and replace the oil filter.

If air penetrating into braking hydraulic system, it will affect negatively the machine braking performance. So it is needed to bleed out air from the system according to following steps:

△ Clean the hydraulic pipelines, braking oil cups, drainage plug and air-discharging plug.

△ Fill up the oil cup with braking oil liquid.

△ Start up the engine, and shut it off after the air pressure reading being up to 0.68-0.7MPa.

△ Fit a hyaline hose on the air-draining plug, leaving the other end of the hose in the oil cup.

△ Loosen all the air-draining plugs, and repeatedly step on the braking pedal several times, and then step it down fully till the oil liquid without any bulb flowing out. After that, tighten the air-draining plug, and release the braking pedal. During the air bleeding, replenish braking oil to oil cup in time, so as to prevent air entering into circuit system again.

△ After finishing air bleeding, fill in braking oil to the level as required.

If it is necessary to use different type braking liquid, please discharge the old braking liquid completely and

⚠ CAUTION	Don't mix different type of oil together. And it is either not allowed to use mineral oil as braking oil.

use the new braking liquid clean the braking system.

G. Inject new oil to the torque converter and transmission system

The torque converter and transmission system both use the same transmission oil, which must be checked and replaced periodically .

● Oil level checking

Open the oil-drainage plug of the gearbox.

If there is any oil flowing out from the oil-drainage plug immediately after the oil-drainage plug is unscrewed, it means that there is too much transmission oil in gearbox. Then what you need to do is to keep the oil-drainage plug open till there is even no oil flowing out, which shows the oil level inside gearbox is ok. However, if there is no oil flowing after the oil-drainage plug is unscrewed, it means oil level inside the gearbox is not enough. Then you need to replenish with new transmission oil till there is oil flowing out from the oil-drainage plug.

Oil level checking for the gearbox should only be done after the engine having been started.

Type	One stage-planetary deceleration
Speed ratio	3.882

Tyres

Tyre specification	17.5-25
Inflating pressure	Fore tyre: 0.32-0.35 MPa
	Rear tyre: 0.28-0.30 MPa

Braking system

Foot brake	Oil disc braking on 4 wheels
Braking air pressure	784-833 KPa
Hand brake	Soft shaft operation, belt type

Steering system

System pressure	10 MPa
Max turning angle	± 35°

Hydraulic system of the working device

System pressure	15 MPa

Oil liquid volume

Fuel (diesel)	150 L
Lubricating oil of engine	20 L
T/M & T/C oil	32 L
Hydraulic reservoir	170 L
Axle	25 L

refill the water again.

When inner cleaning needs to be performed for the radiator, firstly fill the radiator fully with water and run the engine at a high speed to make the water circulate. Drain the water again through the drainage-cap. Keep the engine running at idle speed, while injecting the radiator with fresh water till clean water flows out from the drainage-cap.

When the engine just stops or keep running, never open the radiator cover. High temperature water will burst out to burn you.

☆If it is necessary to open the radiator, cover it with a cloth and then screw it off slowly to open.

● Notes

△ Rain water, city water and precipitated river water can be used as cooling water .Well water can be used only after being softened.

△ When the ambient temperature is below 0℃, anti-freezing agent should be injected into the cooling water to protect the cooling system .

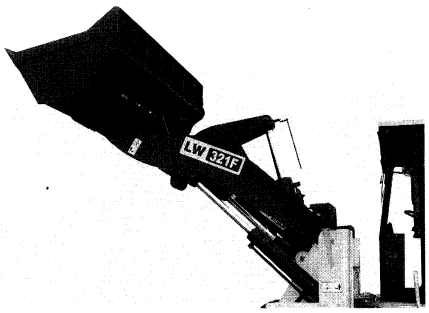
△ If no anti-freezing agent is added , all the cooling water should be drained out through the draining valve to protect them from cracking.

△ It is no need to drain out cooling water after anti-freezing agent has been used. High quality anti-freezing agent should be used .

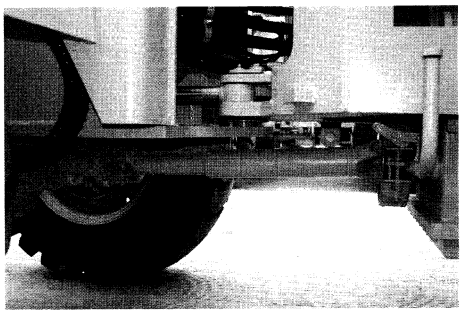
△ In summer, when the ambient temperature exceeds 30℃, the engine is easy to get overheated. So it is better to park your machine in a shadowed place.

△ In order to prolong the service life of the engine, at the end of daily work firstly keep the engine run at a low speed for about 5 minutes till the water gets cool, and then stop the engine.

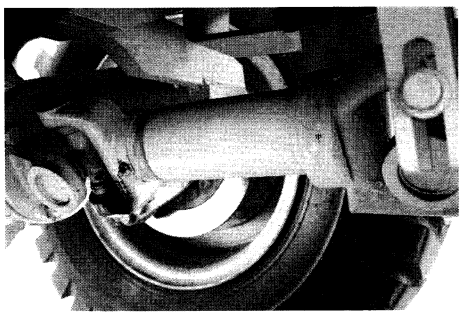
2.2.4 Lubrication Points And Oil Filling Points



Lubricating point of working mechanism



Lubrication points of front transmission shaft



Lubrication points of rear transmission shaft

4.1 Technical Specifications

	Common type of LW321F	High dump type of LW321F
Overall dimensions		
Overall 1ength (bucket on the ground)	6800 mm	7150 mm
Bucket width	2470 mm	2470 mm
Overall height	3025 mm	3025 mm
Wheel base	2600 mm	2600 mm
Tread	1850 mm	1850 mm
Min. ground clearance	400 mm	400 mm
Specification		
Rated capacity	3200 kg	2600 kg
Bucket volume	1.8 m^3	1.5 m^3
Operating weight	10 t	10 t
Traveling speeds		
Ⅰ	10 km/h	10 km/h
Ⅱ	16 km/h	16 km/h
Ⅲ	21 km/h	21 km/h
Ⅳ	35 km/h	35 km/h
Reverse Ⅰ	14 km/h	14 km/h
Reverse Ⅱ	25 km/h	25 km/h
Max. tractive force	90 KN	90 KN
Max. climbing gradient	28°	28°
Max. dumping angle	44°	44°
Max. dumping height	2900 mm	3250 mm
Dumping reach	960 mm	1050 mm
Overturn angle of bucket		
The lowest position	45°	48°
The highest position	52°	45°
Bucket automatic leveling function	yes	Yes
Max. Breakout force	105 KN	110 KN
Total cycling time	9.8 S	9.8 S
Min. Turning radius		
Outside of the bucket	5400 mm	5400 mm

2.3 Maintaining To The Machine

2.3.1 Common Operation And Instructions

A. Cleaning

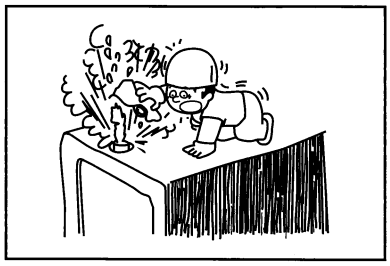


Figure 2–10

- Clean the machine before doing any service and maintenance, so as to prevent dirt getting into the machine.
- If the machine is dirty when doing service and maintenance, it is not easy to find problems and may cause dirt spatter into eyes or may have the danger of sliding or hurting due to greasy dirt on the machine.
- While cleaning the machine, use the cleaning-addition which is not flammable. (Figure 2-10)
- When cleaning the inside part of machine, should lock the control handles by locking-device to prevent the working mechanism moving. And get the braking system be engaged.
- When cleaning the machine, wear anti-slip shoes to avoid slipping on wet ground. When using the high pressure water to wash the machine, please wear the protection clothes.

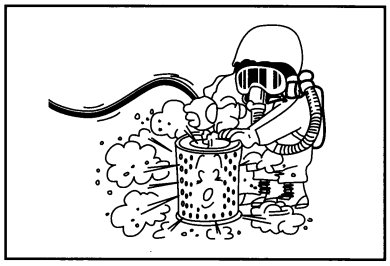


Figure 2–11

- Don't splash out water directly on the electric component (e.g: sensor, and sockets and plugs). If water gets into the electric system, it can cause breakdown.
- When cleaning the filter elements with compressed air, wear the protection clothes and safe glasses. (Figure 2-11)

B. Illumination

- When checking the fuel, lubricant, electrolyte of the storage battery or cleanser of window glass, it is required to use the illuminator which is of exploding-proof. Otherwise, there is a danger of explosion.
- If the operator works at a dark place without lighting, there is a danger of injury. So lighting should be equipped.
- Even if in the dark, it is not allowed to use lighter or fire to light. There is a danger of fire. Explosion may occur when gas emitted from the storage battery meets with the fire.
- When taking the machine as a lighting power source, please follow the instructions in this manual.

Figure 2–12

C. Work in an enclosed room

- The exhausted gas of engine is poisonous and if you have to work in a closed room, you must use the ventilation devices. If you have not installed the ventilation devices, you should open door and windows. (Figure 2-12)

D. Working under the machine

- Stop the loader on a smooth ground, and put down all the working mechanism on the ground before working under the loader.
- Block the wheels with chocks.
- It is very dangerous to work under the loader which is only supported by working mechanism.
- Never work under the loader which is with poor supporter. (Figure 2-13)

Figure 2–13

Technical Specifications

- The end of battery should be disconnected in order to prevent the battery from exploding .
- Disconnect the clip connection of the computer control panel of the transmission (which is placed in the control box right side of the driver's seat in the cab) to prevent burning the panel when welding; After finishing repairing, insert back the clip connector of control panel properly according to the requirement, otherwise you can't start or run the machine.
- Clear paints from welding place in order to prevent the production of the pernicious gas.
- Burnable vapor and spark may be produced when welding on or near the hydraulic equipment or pipelines, which may cause fire, so welding in above mentioned places should be forbidden.
- If sparks caused by welding drop on rubber hose, electric wire or pressure pipeline directly, these tubes may burst suddenly, the insulating cover of the electric wire will be damaged, so please use fender to guard these pipes.

- When welding near tyre, special attention should be paid because it may explode. (Figure 2-15)

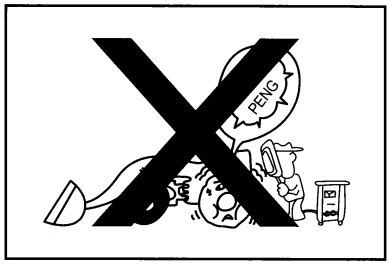


Figure 2–15

- When welding, protective clothes should be wore.
- The ventilation of the welding place should be well prepared. (Figure 2-16)
- Clear up all inflammable material, and fire extinguisher should be supplied at the site.

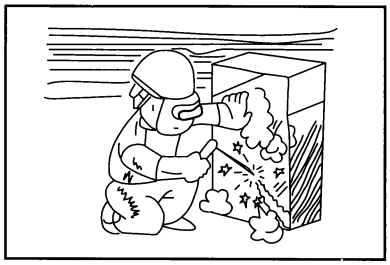


Figure 2–16

2.3.2 Checking And Maintaining To Every System

A. Inspection and service for the cooling system

- When just finishing work, the hydraulic oil temperature, the oil and water temperature in engine and radiator are very high and still have pressure. At this moment, any attempt to open oil tank, radiator, drain oil or water, or change the filter may be severely burnt. Wait till the temperature fall down and observe the required program when doing the above operation.
- To prevent splashing hot oil, turn off the engine, cool the hot water and open slowly to release the pressure. When checking the temperature, put your hand close to the front of water radiator, check the air temperature. But pay attention not to touch the radiator.
- For preventing hot oils from splashing out , stop the engine and let oil get cooled. And slowly open the cover of hot oil tank cover to release its pressure. When checking if the oil temperature has been cold or not, get your hand near the front of radiator for hydraulic oil and torque converter oil. And check air temperature. Don't touch the radiator.
- Don't touch the engine body or muffler, exhaust tail tube and relay when the machine is still hot, and avoid being scalded.
- Don't remove the engine oil temperature sensor, water temperature sensor, torque converter sensor and air-conditioner tubes so as not to get scaled. (Figure 2-17)

3.2.3 After A Long Time Storage

Figure 3–8

- Move away all the protecting coverings.
- Clean away the anti-rust grease on the exposed parts. (Figure 3-8)
- Drain out the oil that is inside the engine, gear box and driving axle, and then wash them and refill with new oil.
- Drain out the debris and water from hydraulic oil tank and fuel tank.
- Dismantle the pneumatic cylinder of the engine, and lubricate the valve and rocker shaft. And check the performance of each valve.
- Fill the radiator with cooling water to the standard level.
- Charge the battery again and connect it to the wires.
- Adjust the inflation pressure of the tyres in accordance with the road condition.
- Follow the checking procedures before operating.
- Warm up the engine.

3.2.4 Storage Of Other Parts

Obey with following instructions when storing the tyres.

- Being as a general principle, the tyres must be stored in warehouse. Anybody without prior approval should not enter into the warehouse. If tyres have to be stored outdoors, please settle a protecting fence surrounding the storing area. Notes which show "No Entrance" should be settled.
- Tyres should be stored in dry and clean area, otherwise moisture will speed up the oxidation of the tyres and oil or polluted dirt will make tyres corroded more quickly. When storing tyres, you should consider, as much as possible, sheltering and heat-insulation, and avoid air ventilation. The tyres under storing should be covered with canvas, plastic or other covering staffs. Incorrect storage for tyres will seriously affect their quality and service life.

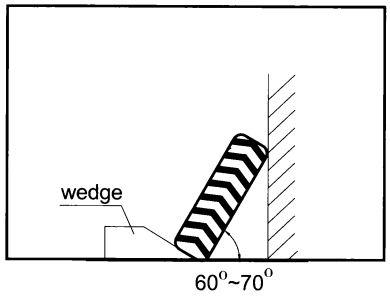


Figure 3–9

- Put tyres on the flat ground vertically, and fix them by means of wedges, so as to prevent them falling down even if it touched by somebody disapproved. If a tyre is placed on the ground by its side, then it may be pressed flat, which, being as a result, will worsen its quality. The tyres under storage should be turned once every month. (turn 90°).
- If wheel tyre is to fall down, get away from it, since the tyres of construction machinery are very heavy, and any attempt to hold it by hand will incur serious injury. (Figure 3-9)

Only the qualified technician can service the electrical system.

When you adjust the out-sourcing electrical power, please connect the grounding-line at last to prevent generating sparkle around the battery, which, otherwise, could result exploding. Bear it in mind that the grounding -line is connected from the end of the regulator to that of the starter.

E. Engine hood

Don't service the non-mental engine hood willingly. The dust produced by polishing the hood can cause exploding, and the dust is injurious to your health.

F. Rejected staffs

Please obey with following instructions to prevent the pollution.

- Don't pour the rejected oil liquid into rivers and sewer network.
- The drained oil must be placed in a container rather than pouring it directly onto the ground.
- Please respect the local relative laws and regulations when disposing the the harmful and poisonous materials, for instance: lubricant, fuel, cooling liquid, battery and so on.

G. Fire Prevention

- When refilling fuel, it is a must to stop the engine. And during refilling fuel, it is prohibited to smoke or expose to fire or flame.
- The storage for fuel, grease and other combustible staffs should be kept far away fire.
- Clean away all the combustible staffs, such as: fuel, lubricating oil and other foreign articles built-up on the machine. And make sure there is no any oily cloth or other combustible material existing.
- There will be some explosive gas producing near the battery, so neve get it near to fire or flame. Strictly follow the relative instructions to maintain and use the battery.
- When parking the machine, care should be taken to select the suitable parking location and its surrounding environment. And special attention should be paid to ensure that there is no withered grass, used paper and other combustible material near the muffler of the machine. (Figure 2-18)

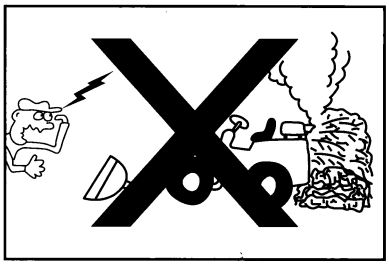


Figure 2–18

- Check if there is any leakage of fuel, engine oil and hydraulic oil. If it is in case, replace the broken hoses. And only after cleaning and fixing the problems, you can make another attempt to drive the machine again.
- Check if the electrical wires get broken or failed. If finding any damage, replace it with a new one.
- When cleaning the components, use the non-combustible cleaning solvent. Don't use the petroleum oil or other combustible liquid for cleaning.
- Don't make any welding or fire-cutting on the pipelines or tanks which contain combustible liquid. Before you make any welding or cutting, clean the pipeline first with non-combustible cleaning solvent, then make welding and cutting. (Figure 2-19)

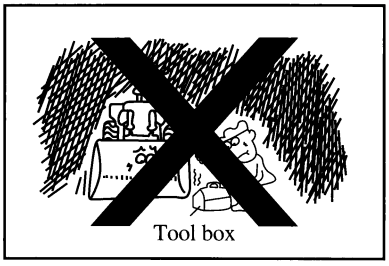


Figure 2–19

- The ether is a kind of combustible material, so avoid it exposing to fire or flame. When using it, strictly follow relative instructions.
- Prior to making any service and repairing, check if the fire-extinguisher is proper or not. Know the storage location of the fire-extinguisher and first-aid kit.
- When it is needed to check the dark area on the machine, don't use flame or fire to lighten this area.

NOTE: The operating weight should vary according to different working devices.

△ Please select those ropes and lifting devices which have enough solidity. Keep the loader horizontal in the hoisting process.

△ The girder of hoisting device must has enough width to avoid colliding with the loader.

△ Take the length, width, height and weight into consideration.

△ Every loader has lifting lugs, there are two lugs on the rear part of the loader and two on the front part of the loader. Ropes can be threaded through them. (Figure 3-5, 3-6)

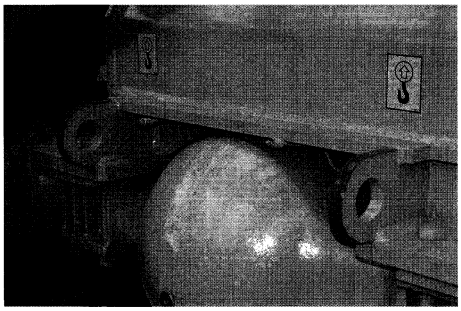


Figure 3–5 lifting hook of fore frame

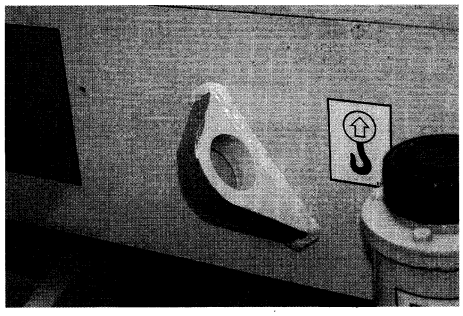


Figure 3–6 Lifting hook of rear frame

3.1.3 Transporting The Loader On A Public Road

- When transporting this loader, please obey with those laws which regulate the weight, height, width and length.
- Determine the transporting route with regarding to the weight, height, width and length of the machine.
- Before passing through a bridge or a building, please ensure in advance that its strength can support the weight of the machine. Obey with traffic rules when driving on a public road.
- If the loader has to be dismantled for the purpose of being transported, please consult with manufacturer or its agent.

3.2 Storage And Protection

3.2.1 Daily Parking

Park the loader on a place, with its bucket resting on the ground horizontally. Try your best to park the loader on a dry place, and avoid of moisture. If the machine has to be kept outside, a shelter cloth must be used to cover it.

- Turn the ignition switch to "OFF" position, take out the key and keep it in a safe place.
- After the ignition key being pulled out. Operate slowly the control levers of the working devices for 2 to 3 times, so as to release the remained pressure inside the cylinders and hoses, and then leave them at their neutral positions.
- Place the gear-shifting lever at neutral position, and the parking brake must be engaged.
- Lock the front and rear chassis with the lock bar.
- Lock all the parts that have locking key. Pull out the keys and keep them safely.
- In winter or cold weather (when the ambient temperature below 0℃), anti-freezing addition must be applied into the cooling water. Cooling water must be drained out completely for those machines without anti-freezing addition in the cooling system, so that the engine can be protected from being cracked by ice.

● Connect the positive (+) clamping-terminal of the recharger with positive pole (+), and negative terminal (-) with negative pole (-). And fasten their connection.

● If the recharging ratio is less than 1/10, then you have to make rapid-recharging and set it within the battery's rated capacity. If the recharging current is too much, then it may cause electrolyte leakage or evaporation, which will possibly cause fire or explosion.

Starting the machine by means of voltage-increasing cable

If there are some trouble in the connection of voltage-increasing cable, fire accident may be produced out. So obey with following steps for the operation:

● Two people will be available for this operation. (one of them will keep sitting on the operator seat).

● When starting a machine, prevent it from colliding with another vehicle.

● When connecting the voltage-increasing cable, shut off the Starting-up switches of both the machines.

● When installing the voltage-increasing cable, you must remember that the positive (+) cable should be connected first. When dismounting the voltage-increasing cable, grounding or negative (-) cable should be removed first.

● The final grounding cable should be connected to the engine of the breakdown machine, but this will cause sparks, so when making connection, please get away from the battery as far as possible.

● When dismounting the voltage-increasing cable, care should be taken to prevent the clampers of cables touching with each other or touching with the machine.

K. Disposal of rejectecd battery

Don't dispose the rejected battery willingly everywhere if it could not be used due to aging or deterioriation. Also, don't pour its acid liquid willingly everywhere, as the acid liquid may bring serious damage to people's health and animals or bad pollution to the surrounding environment.

Maintenance for Tyres

● If the tyres explode, the explosion itself will throw the wheel hub, tyres, driving axle and other components 500m or more far away from the machine And explosion and its partials will cause server damage and healthy injury, so the tyres pressure must be maintained at normal pressure range. Never inflate the tyres beyond its rated pressure range. (Figure 2-22)

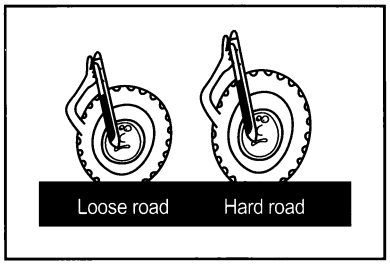


Figure 2–22

● During traveling, the heat produced due to high-speed machine traveling will cause the tyres pressure arising to some extent, which is the normal case, please don't attempt to reduce the tyres pressure. What you should do is to reduce the machine traveling speed or just stop the machine to have the tyres cooling down. However, if the machine keeps moving at very high speed continuously, which will cause the tyres being overheated, then tyres explosion will be led, so attention should be given.

● When adjusting tyre pressure, keep away from the tyre as far as possible. And you should always stand at the back of the tyre.

● It it prohibited to inflate the tyres with combustible gas. It is recommended to use dry Nitrogen . If the tyres have already been filled with air, you can also use Nitrogen for pressure adjustment purpose, and Nitrogen can be well mixed with air. Inflating tyres with Nitrogen can possibly reduce the risk of tyres explosion, since Nitrogen doesn't help combust but can prevent the rubber oxidation and deterioration and avoid rust for wheel hubs.

● In order to avoid tyres being over inflated, it is necessary to have proper tools to be used for inflating tyres

3.1 Safe Transportation

3.1.1 Load Or Unload The Machine

- Before loading the machine onto a carrier, clear the ice or snow from the carrier to avoid of slippery.
- If the loader should be transported to a cold area, ensure that its cooling system has good anti-freezing ability.
- Wedge the towing vehicle or locomotive before lifting the loader.
- There is always a potential risk of danger during loading and unloading the machine, so special care should be given. During loading and unloading the machine, run the engine at low speed.
- Moving the machine should be done on the hard ground, and the machine should be kept at a safe distance from road side.
- When loading or unloading the machine to or from a carrier vehicle, you must be sure that the wheels of vehicles are securely positioned, not moving. And put a wedge under the slope plate. (Figure 3-1)

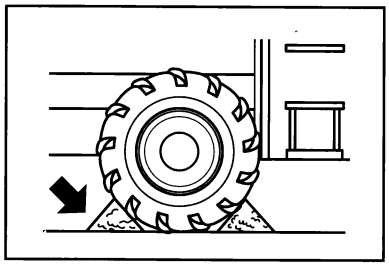


Figure 3–1

- Use those slope plates which have enough strength, length and width, so that it can be sure the slope plates are strong and safe enough to load or unload the machine. The angle between the slope plates and ground should not be larger than 15°. And the gap between slope plates should be in accordance with the wheel base of the machine to be loaded or unloaded. (Figure 3-2)
- Make sure the slope plates are securely fastened and have same height.
- Make sure the slope plates are free of grease, oil, ice and other loosing material. And also remove away the dirt from the machine wheels.
- Never make steering on the slope plates. But if the steering has to be done, at first get the machine off from the slope plates. After steering, you can drive the machine onto the slope plates again.

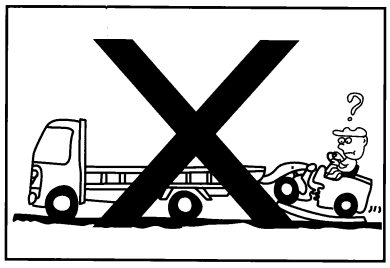


Figure 3–2

- Perform following jobs after loading the machine
  - △ After loading the machine onto a carrier, lock the articulation of front and rear frame.
  - △ Drop the bucket down on the deck of carrier and put the gear-shift lever at neutral position.
  - △ Engage the parking brake.
  - △ Stop the engine and pull out the key.
  - △ Move all hydraulic controlling lever to release pressure.
  - △ Lock the door of cab and take all safety measures.
  - △ Wedge all wheels of the loader.
  - △ Prepare enough ropes to prevent the loader from skidding during transporting.
  - △ Cover the exhausting nozzle.

3.1.2 Hoist Or Put Down The Machine

- When the loader has to be moved into a ship or other place, please use the lifting lugs which is located on front and rear frame.

- Fastening, sealing and overheating of transmission, torque converter, hydraulic pump, steering devices, axles and brake clippers.
- Fastening of all the pins and bolts on wheel rims and transmitting shafts.
- Empty the radiator when the environmental temperature is below 0℃(except with antifreeze).
- Check if the brake liquid is enough or not .
- Clean the oil-water separator and drain the water in the air tank.
- Lubricate each grease point as required in the time schedule.

Reasonable inspections and maintenance are necessary to your loader. Be careful not to cause any accident or hurt yourself. If something abnormal is found during your inspection, mark it first and fix it after all the checking items.

When inspection is carried out with the bucket highly raised, make sure that it cannot fall down.

Fire is strictly forbidden when checking or maintaining. No smoking is permitted and fire extinguisher must be at hand.

2.4.2 Periodical Checking And Repairing

Time schedule for periodical maintenance

Inspection and service schedule for engine (Table 2-1)

Inspection and service schedule for electrical system (Table 2-2)

Inspection and service schedule for steering system (Table 2-3)

Inspection and service schedule for transferring device (Table 2-4)

Inspection and service schedule for working device (Table 2-5)

Inspection and service schedule for braking system (Table 2-6)

Inspection and service schedule for miscellaneous items (Table 2-7)

Transportation , Storage and Protection

Inspection and service schedule for electrical system (Table 2-2)

Check item \ Check time		10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Battery	Electrolyte		●				
	Proportion			●			
Charging effect			●				
Condition of the circuit lines							
Action of the meters, condition of lamp, sound of the bugle		●					
Wear and pollution of the motor and generator					●		

Inspection and service schedule for steering system (Table 2-3)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Action of the steering cylinder	●		★Lubrication grease			
Rubber hose of the steering device						Every 4 years
Loosening and clearance of the steering wheel	●					
Center pin of the frame			★Lubrication grease			

2.6.4 Braking System

Breakdown phenomena	Reasons of breakdown	Remedies
Foot-braking pressure is insufficient.	1. There is oil leakage from braking plates. 2. There is air in braking hydraulic circuit. 3. Low braking air pressure. 4. Pressure booster gets worn. 5. Oil leaks onto braking plates from hub. 6. Braking plates wear out totally.	1. Replace the seal ring. 2. Bleed air out. 3. Chek air-compressor, oil-water separator, safety valve and sealing performance. 4.Check the pressure booster casing. 5. Check or replace the hub sealing ring. 6. Replace the braking plates.
The braking system could not be disengaged.	1. Braking valve is wrongly positioned. And the piston rod is blocked and the spring fails to work or just is broken. 2. Pressure-booster works defectively. 3. Pump piston could not restore to its original position.	1. Check or replace the braking valve. 2. Check or replace pressure booster. 3. Check or replace the sealing ring.
Braking oil pressure gauge shows the pressure reading increases slowly	1. Poor sealing for pneumatic system. 2. Air compressor can't work well. 3. Oil-drainage plug of the oil-water separator is not firmly tightened.	1. Check and repair the pneumatic system. 2. Check the air compressor. 3. Re-tighten the plug.

2.6.5 Hydraulic System

Breakdown phenomena	Reasons of breakdown	Remedies
Insufficient power for raising the main boom, or insufficient power for tilting bucket.	1. Oil sealing ring for cylinders wears out or gets broken. 2. The distribution valve wears too much, and the valve clearance is out of its acceptable limit. 3. There is oil leakage from hydraulic oil circuit. 4. Severe inner oil leakage in the oil pump. 5. Wrong adjustment for the safety valve, which causes the problem of low system pressure. 6. The oil suction pipe and oil filter get blocked.	1. Replace the oil sealing ring. 2. Dismount the valve, and check and repair it, so as to have its clearance be up to desired value. Or just replace the distribution valve with a new one. 3. Figure out where oil leaks, and eliminate the oil leakage problem. 4. Replace the oil pump. 5. Reset the system pressure to desired value. 6. Clean the oil filter and change oil.
When the engine rotates at high speed, the bucket or main boom raises quite slow.	1. Please see details in No. (1) of this section. 2. The safety valve gets blocked deadly.	1. Please see details in No. (1) of this section. 2. Dismount and check the safety valve.
Hydraulic oil gets mixed with transmission oil.	Hydraulic oil and transmission oil come together due to over-wearing and aging of the sealing ring for oil pump.	Replace the oil sealing ring, clean the oil filter, and check to see if the oil-suction pipe-lines get deformed or cracked.

Inspection and service schedule for braking system (Table 2-6)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
The damage and looseness of the braking device	●					
Braking oil and its leakage	●					
Braking performance	●					
The performance and clearance of the braking pedal	●					
The weariness of the braking friction plate		●				
The looseness of the arrester bolt			●			
The hand braking performance and orientating condition	●					
The wear status of arrester friction plate			●			
The wear of park braking drum				●		

Inspection and service schedule for miscellaneous items (Table 2-7)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Clean the loader	●					
The fastening of main bolts	●Only the first time		●			
Oil leakage	●					
Damage of tubes	●					
Abnormal sound from pump and valve	●					
Previous abnormal condition	●					

Breakdown	Phenomena	Reasons of breakdown	Remedies
It is hard to steering	The steering wheel can not return back to its neutral position. And there is increasing pressure loss while steering wheel being at its neutral position.	Spring is broken.	Replace the damaged spring.
	There is so much vibration on the steering-wheel that you even could not turn the steering-wheel.	Pin is broken or deformed or there is cracking or deformation problem at the link shaft.	Replace the pin or link shaft.
	Wrong oil-circuit for the steering system. And the steering wheel turns by itself or swings.	Wrong installation of the rotator and the link shaft.	Assemble it again.
	Machine driving direction is not in alignment or the steering cylinder doesn't move or maybe slowly moves when you turning the steering wheel	The dual-way overload valve fails to work (the steel ball gets blocked or its spring can't work properly).	Clean the double-direction overload valve.
Steering wheel can't restore to its original position	Pressure at the neutral position increases. The steering mechanism can't release its load when steering wheel stops turning.	1. Steering column is not in eccentric with valve core. 2. The steering column and the valve core are deadly engaged. 3. Resistance to steering column is too much. 4.Spring plate is broken.	Resolve the breakdown correspondingly to its reason.
Manual steering is impossible	When performing power steering, operator can't feel the steering limit while the steering cylinder is already at its maximum limit. definitely. When you turn the steering wheel, the cylinder has no reaction.	The radial or axial clearance between the stator and rotor is too great.	Replace the couple of stator and rotor.

● Check the wear status of the disc braking device.

If the wear of braking cushion exceeds its maximum limit, the ineffective braking is very dangerous . Please take more frequent checking as the braking cushion gets worn to its limit.

E. Maintenance every 1000 hours (at the same time, maintenance every 50,100,250,500hours should also be made).

● Replace the gear oil in front and rear axle.

● Replace the hydraulic oil, clean the hydraulic oil filter and clean the breath hole of the transmission system & torque converter.

● Clean and check the braking booster, replace the braking oil, and check the performance of the braking system.

● Clean the diesel oil filter.

● Lubrication : Inject grease to the articulation pin , front and rear transmission shaft , main transmission shaft and park braking clamp, etc. .

● Adjust the impeller gap of the turbo charger and fasten the mounting bolts on the turbo charger.

F. Maintenance every 2000 hours

● Check and repair the engine according to the Engine Manual.

● Check and repair the transmission system and torque converter

● Dismantle and check the axle, axle differential and rim reducer .

● Dismantle and check the steering device and steering valve and adjust the steering angles.

● Check the sealing status and system pressure of the multi-way valve cylinder and working cylinder by visibly checking how much the working cylinder has dropped down. If the cylinder has dropped down one time beyond the designed value, then you need to dismount the cylinder and valves to figure out cause.

● Check if the cracks occur on working apparatus and welded parts. And check if the nuts and bolts are securely fastened.

● Check the welding position on rim and correct any deformation.

2.4.4 Checking And Maintaining To Machine Component

A. Electrical system

● Battery

△ Clean the battery and check the amount and gravity of the electrolyte.

· Clean--clean the battery to prevent the salinization of vitriol.

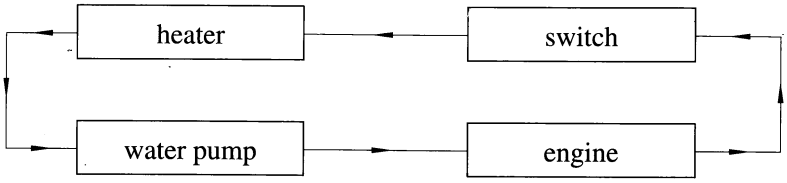
· Electrolyte amount--It is normal when the surface of the electrolyte level is 10 to 15 mm higher than the electrodes. Specific gravity of the electrolyte should be gauged before replenishing.

· Gravity gauging--Measure the electrolyte gravity of the with hydrometer. If the measured values for all battery are different , accordingly battery recharging should be performed to get the values even. Correct specific gravity is 1.260@20℃. If the temperature is other than 20℃, electrolyte gravity should be calculated in accordance with relative calculation chart. The dead limit of the gravity value is 11/60, so never make it lowered than this value. If the electrolyte gravity drops down sharply, electrodes, generator and fan belts should be checked in terms of their fastening status.

· Battery management--In cold winter , the temperature for the electrolyte being frozen is about -35℃ when it is fully recharged. The battery troughs will be damaged by being frozen, so measures should be taken to protect them. Regarding the protecting method , you will have no worry when the batteries are charged 75%

2.5.6 Heating System

A. Working principle:



Engine provides the heating source and the circulating water in engine is connected to the radiator. There is a fan blowing heating wind into cab, which will improve the operator's operating environment.

B. Notes: Before using the heating system, run the engine for a while till the water temperature reaches to 70 ℃, then start the heater. When the ambient temperature drops down to 0℃, discharge water out from the pipes and radiator to avoid water being frozen. If the water has been injected with anti-freezer, there is no need to discharge water.

2.6 Trouble Shootings

2.6.1 Engine System

Phenomena of breakdown	Reasons of breakdown	Remedies
Engine is running but machine can't drive.	1. Gear has not been engaged. 2. The oil amount in transmission system is not enough. 3. Transmitting oil pump is damaged and the pressure gauge has no indication. 4. Trouble occurs in torque converter.	1. Engage the gear. 2. Replenish oil to regulated amount. 3. Replace or repair the oil pump. 4. Check if the torque converter has leakage or is damaged.
Oil pressure for gear-shifting is too low	1. Valve pressure is adjusted improperly. 2. Clutch has serious oil leakage. 3. Gear-shifting valve restores to its original position. 4. Leakage from oil circuit. 5. Oil pump fails to work. 6. Oil filter is blocked.	1. Adjust it to regulated value. 2. Replce the oil seal and its bracket. 3. Check the valve return spring and if there is any debris in the cavity. 4. Fasten the tubes. 5. Replace the oil pump. 6. Clean the oil filter.
Gear-shifting could not be engaged.	1. Oil pressure for gear-shifting is low. 2. Transmission pipeline is clogged. 3. Clutch has serious oil leakage.	1. See the above text. 2. Dismantle and dredge it. 3. See above text.
The driving force is insufficient.	1. Oil in the transmission system is insufficient. 2. Oil pressure for gear-shifting is too low. 3. Braking system is adjusted improperly, the brake clamp couldn't be disengaged. 4. The temperature in torque converter is too high. 5. The driving and driven clutch plates do not engage correctly. 6. The rotating speed of the engine is slow.	1. Replenish the oil. 2. See above text. 3. Check and adjust it. 4. When the oil temperature is over 100 ℃, please stop the machine and check it. 5. Dismantle , clean and replace the plate. 6. Check and adjust the rotating speed.

C. Transmission system

● After 2000 working hours, the gearbox, torque converter , main drive and hub reducers of the driving axles should be dismantled for inspection and washing. Pay attention to abnormal noises from the transmission system during operation.

● Transmission pipe-line filter

When replacing the filter element, first release the dirt and debris out, and then take off the cover to change the filter element with a new one. Afterwards, replace the cover.

● Transmission shaft

Check if the mounting screws and the spline are securely fastened. And also check if there is any vibration at the driving shaft.

When dismantling and reassembling the shafts , pay attention to the relative positions of the universal joint yokes at the two ends , and the arrows should be kept in alignment.

● Wheels

Check the tyres inflation pressure and also check the tyres surface to see their wear status and to see if there is any metal partials embedded in tyres. And the mounting nuts on wheel rims should also be checked. Such checking should be done while the machine is cold. Normally the tyre inflation pressure should be a little bit lower when machine operating in sandy area than that when machine operating in hard-ground areas.

⚠ CAUTION	Check if the locking ring is disengaged or not. Special attentions must be paid when inflating tyres.

● After 2000 hours , check the welding seams on wheel rims and also check the parts which are loaded. If there is any deformation case, please correct it.

D. Working mechanism

● After 2000 hours , the natural subsidence of the working mechanism should be checked. Raise the main booms up to their utmost limit while the machine bucket is empty. Then stop the engine, be sure descending length of the lift-cylinders should not be beyond 65mm within 15 minutes.

● If the descending volume is too much (over 65mm), check the sealing performance for distribution value and lift cylinders and measure the system working pressure.

E. Braking system

● Disc brake

Check the wear status for the brake friction plate and carry out air-bleeding for the system periodically.

● Checking to the brake friction plates

Screw off the screw pin and remove the plate cover. The friction plate can then be taken out . There are 3 ditches on the plate, which shows how much the plates are worn. If the ditches become disappeared, the plate has to be replaced.

● Air-bleeding

Air trapped into the system will affect the machine braking performance. After finishing parts replacement or system cleaning, bear in mind to bleed air out from the braking system.

- When battery works normally, it can be charged or discharged by itself, so there is no need to dismantle it down.
- If the battery does not work for a long time, you should take it down and charge it monthly.
- The information about start motor, generator and relay are listed in Engine Manual.
- If you find that the electrical system can't be charged fully, please check the battery and connecting wires, and check the generator if it is necessary.

B. Lamps

This loader is equipped with illuminating lamps, signal lamps, rear signal lamp, front working lamps, rear working lamps, overhead lamps, gauge lamps and indicating lamps.

NO.	Description	Amount	Model	
1	Front lamps and front working lamps	4	24V	55/50W
2	Rear working lamps	2	24V	35W
3	Front and rear steering lamps	4	24V	21W
4	Rear lamps and braking lamps	2	24V	10/21W
5	Signal lamps for reverse	2	24V	21W
6	Overhead lamps	1	24V	5W
7	Gauge lamps	5	24V	2W
8	Front lamps	2	24V	10W

Note: indicating lamps

Indication of left steering

Indication of low pressure alarm

Indication of right steering

Indication of machine starting

Indication of alarm to engine oil pressure

Note: If this alarm lamp still is "ON" when the engine working normally, please stop the engine to check the cause, so as to prevent the start motor from being burnt down.

C. Instrument panel

This loader adopts many kinds of gauges which include engine water temperature gauges, engine oil pressure gauge, braking air pressure gauge, voltage meter, torque converter oil temperature gauge and timer. All meters and controlling switch are installed on the panel.

The range of engine water temperature gauge is 50~115℃, with indication range of 50-60~100-115℃. The acceptable gauge reading is between 60~90℃.

The range of engine oil pressure gauge is 0~1.0Mpa with normal value of 0.1~0.6Mpa.

The voltage meter shows the working status of the generator, which shows voltage at 28V.

The timer records the total working time of the engine.

D. Principle diagram of electrical system

coefficient is produced when turbine stops. With the increasing of the output speed , conversion coefficient drops. Through the torque converter, the speed can be variable infinitively, the driving torque can be adapt to the required load torque automatically.

When the turbine speed reaches to the 80% of the impeller speed, conversion coefficient near 1 . then turbine torque is equal to the impeller torque, at this time, torque converter is equal to a coupler.

B. Transmission system

The structure of the transmission gearbox is of counter shaft type. The multi-disc frictional clutch, which is controlled by hydraulic system, can engage or disengage under the loading condition. All transmission gears are supported by roller bearing.

All of the gears, bearings and clutches must be lubricated by the cooled oil.

Transmission gearbox has three multi-disc wet-type clutch. In the process of gear-shifting, corresponding clutch friction disc is pressed tightly by the oil pressure in axial direction. The clutch friction disc is released by a spiral spring force which pushes the piston back.

C. Precaution on operating gearbox

When parking the loader, the oil that is in torque converter, oil cooler and oil-circuit will flow back to oil-pan, so if you want to inspect the oil level, please keep the engine idling and torque converter under normal temperature. The oil level will stay between the upper and lower scale of the oil-dipstick.

Attention: If engine has stopped, oil level will rise . Rising height will change with the mounting position of the gearbox. Only part oil in the gear box and torque converter can be discharged through the oil-drainage plug.

CAUTION	When replacing the oil, please clean or replace the oil filter.

When cleaning the main oil circuit filter, prevent the debris getting into oil circuit.

In addition, fix a cover on the hand brake to prevent the oil getting into it, otherwise it will affect the braking performance. When fixing the filter, take care not to strike or bump its outer surface.

When inspecting the oil level, you must observe the relatives safety regulations. Put the parking brake at braking position and use a wedge to block the machine wheels.

Start the engine only when the shift handle stays at neutral position. Out the consideration of safety, don't release the hand brake before starting the loader.

CAUTION	Please release the parking brake before driving the loader.

CAUTION	Don't put the transmission system at neutral position when the loader is sliding.

2.5.3 Braking System

Braking system is used for speed controlling or parking on the flatland or slope.

This loader has two braking systems .

A. Service braking system (foot brake)

This braking system is used to control speed in normal traveling, with advantages of being smooth and safe. The system adopts dry-type air-over-oil braking system, which is featured in reliability, safety, easy maintenance and simplified structure. The system can automatically offset wear for braking plates, with nice radiation performance and long service life and none noise.

B. Emergency and parking brake system (hand brake)

This system should be used after the loader stops on a slope or a flat ground.

2.5.4 Hydraulic System

The hydraulic system of LW321F loader includes working hydraulic system and steering hydraulic system.

A. Working hydraulic system

Working hydraulic system of the loader is used to control the movement of lift arms and bucket. It mainly is composed of working pump, hydraulic control valve, double-function safety valve, lift cylinder, tilt, oil tank and pipes and so on.

If the direction-changing valves of lifting arms and tilt cylinder all are in neutral position, high pressure oil in oil pump returns back to oil tank, then the front and rear chambers of lifting arm cylinders and tilt cylinders will all close, so the lifting arms and bucket will be kept at original position. Direction-changing valve of lifting arm cylinder can be used to control the lifting arms and direction-changing valve of tilt cylinder can be used to control the bucket. Double-effect safety valves are installed in the front and rear chamber of the tilt cylinder, it can resolve the disharmony of working mechanism.

B. Check and adjust the braking system

For on-spot checking, the hydraulic system of working mechanism can be checked by means of raising or lowering lifting arms, tilting the bucket, releasing pressure from distribution valve and safety valve and descending the lifting arms.

● Check the highest pressure of the system

Screw off the plug on the oil tube of the hydraulic control valve and fix a 25Mpa pressure gauge, then lift the arm to horizontal position, have the engine and hydraulic oil be their working temperature and keep the engine running at rated speed. Operate the bucket control lever to tilt it backward till the pressure reaches to its maximum which will be 15Mpa. If it is not the case, please adjust the safety valve of the hydraulic control valve.

● Check and adjust the pressure of the double-effect safety valve

△ Checking and adjustment for big chamber safety valve of tilt cylinder.

Screw off the plug on tube of the tilt cylinder big chamber, and fix a 25Mpa pressure gauge, then raise the lift arm to the highest position. Have engine and hydraulic oil be their normal working temperature and keep the engine running at idle speed. Tilt the bucket to its most front position, then lower the lift arm. At this time, the pressure reading will be 17.5Mpa. If it is not the case, please adjust it.

△ Checking and adjustment for small chamber safety valve of tilt cylinder.

Screw off the plug on the tube of the tilt cylinder's front chamber, and fix a 16Mpa pressure gauge, then raise the lift arm to its horizontal position. Have engine and hydraulic oil be at their working normal temperature

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When cleaning the main oil circuit filter, prevent the debris getting into oil circuit.

In addition, fix a cover on the hand brake to prevent the oil getting into it, otherwise it will affect the braking performance. When fixing the filter, take care not to strike or bump its outer surface.

When inspecting the oil level, you must observe the relatives safety regulations. Put the parking brake at braking position and use a wedge to block the machine wheels.

Start the engine only when the shift handle stays at neutral position. Out the consideration of safety, don't release the hand brake before starting the loader.

CAUTION	Please release the parking brake before driving the loader.

CAUTION	Don't put the transmission system at neutral position when the loader is sliding.

- When battery works normally, it can be charged or discharged by itself, so there is no need to dismantle it down.
- If the battery does not work for a long time, you should take it down and charge it monthly.
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7	Gauge lamps	5	24V	2W
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Note: indicating lamps

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Indication of machine starting

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This loader adopts many kinds of gauges which include engine water temperature gauges, engine oil pressure gauge, braking air pressure gauge, voltage meter, torque converter oil temperature gauge and timer. All meters and controlling switch are installed on the panel.

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The range of engine oil pressure gauge is 0~1.0Mpa with normal value of 0.1~0.6Mpa.

The voltage meter shows the working status of the generator, which shows voltage at 28V.

The timer records the total working time of the engine.

D. Principle diagram of electrical system

C. Transmission system

● After 2000 working hours, the gearbox, torque converter , main drive and hub reducers of the driving axles should be dismantled for inspection and washing. Pay attention to abnormal noises from the transmission system during operation.

● Transmission pipe-line filter

When replacing the filter element, first release the dirt and debris out, and then take off the cover to change the filter element with a new one. Afterwards, replace the cover.

● Transmission shaft

Check if the mounting screws and the spline are securely fastened. And also check if there is any vibration at the driving shaft.

When dismantling and reassembling the shafts , pay attention to the relative positions of the universal joint yokes at the two ends , and the arrows should be kept in alignment.

● Wheels

Check the tyres inflation pressure and also check the tyres surface to see their wear status and to see if there is any metal partials embedded in tyres. And the mounting nuts on wheel rims should also be checked. Such checking should be done while the machine is cold. Normally the tyre inflation pressure should be a little bit lower when machine operating in sandy area than that when machine operating in hard-ground areas.

⚠ CAUTION	Check if the locking ring is disengaged or not. Special attentions must be paid when inflating tyres.

● After 2000 hours , check the welding seams on wheel rims and also check the parts which are loaded. If there is any deformation case, please correct it.

D. Working mechanism

● After 2000 hours , the natural subsidence of the working mechanism should be checked. Raise the main booms up to their utmost limit while the machine bucket is empty. Then stop the engine, be sure descending length of the lift-cylinders should not be beyond 65mm within 15 minutes.

● If the descending volume is too much (over 65mm), check the sealing performance for distribution value and lift cylinders and measure the system working pressure.

E. Braking system

● Disc brake

Check the wear status for the brake friction plate and carry out air-bleeding for the system periodically.

● Checking to the brake friction plates

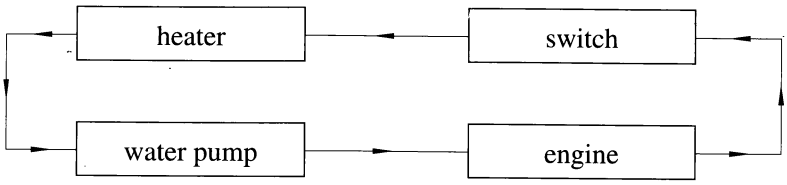
Screw off the screw pin and remove the plate cover. The friction plate can then be taken out . There are 3 ditches on the plate, which shows how much the plates are worn. If the ditches become disappeared, the plate has to be replaced.

● Air-bleeding

Air trapped into the system will affect the machine braking performance. After finishing parts replacement or system cleaning, bear in mind to bleed air out from the braking system.

2.5.6 Heating System

A. Working principle:



Engine provides the heating source and the circulating water in engine is connected to the radiator. There is a fan blowing heating wind into cab, which will improve the operator's operating environment.

B. Notes: Before using the heating system, run the engine for a while till the water temperature reaches to 70 ℃, then start the heater. When the ambient temperature drops down to 0℃, discharge water out from the pipes and radiator to avoid water being frozen. If the water has been injected with anti-freezer, there is no need to discharge water.

2.6 Trouble Shootings

2.6.1 Engine System

Phenomena of breakdown	Reasons of breakdown	Remedies
Engine is running but machine can't drive.	1. Gear has not been engaged. 2. The oil amount in transmission system is not enough. 3. Transmitting oil pump is damaged and the pressure gauge has no indication. 4. Trouble occurs in torque converter.	1. Engage the gear. 2. Replenish oil to regulated amount. 3. Replace or repair the oil pump. 4. Check if the torque converter has leakage or is damaged.
Oil pressure for gear-shifting is too low	1. Valve pressure is adjusted improperly. 2. Clutch has serious oil leakage. 3. Gear-shifting valve restores to its original position. 4. Leakage from oil circuit. 5. Oil pump fails to work. 6. Oil filter is blocked.	1. Adjust it to regulated value. 2. Replce the oil seal and its bracket. 3. Check the valve return spring and if there is any debris in the cavity. 4. Fasten the tubes. 5. Replace the oil pump. 6. Clean the oil filter.
Gear-shifting could not be engaged.	1. Oil pressure for gear-shifting is low. 2. Transmission pipeline is clogged. 3. Clutch has serious oil leakage.	1. See the above text. 2. Dismantle and dredge it. 3. See above text.
The driving force is insufficient.	1. Oil in the transmission system is insufficient. 2. Oil pressure for gear-shifting is too low. 3. Braking system is adjusted improperly, the brake clamp couldn't be disengaged. 4. The temperature in torque converter is too high. 5. The driving and driven clutch plates do not engage correctly. 6. The rotating speed of the engine is slow.	1. Replenish the oil. 2. See above text. 3. Check and adjust it. 4. When the oil temperature is over 100 ℃, please stop the machine and check it. 5. Dismantle , clean and replace the plate. 6. Check and adjust the rotating speed.

● Check the wear status of the disc braking device.

If the wear of braking cushion exceeds its maximum limit, the ineffective braking is very dangerous . Please take more frequent checking as the braking cushion gets worn to its limit.

E. Maintenance every 1000 hours (at the same time, maintenance every 50,100,250,500hours should also be made).

● Replace the gear oil in front and rear axle.

● Replace the hydraulic oil, clean the hydraulic oil filter and clean the breath hole of the transmission system & torque converter.

● Clean and check the braking booster, replace the braking oil, and check the performance of the braking system.

● Clean the diesel oil filter.

● Lubrication : Inject grease to the articulation pin , front and rear transmission shaft , main transmission shaft and park braking clamp, etc. .

● Adjust the impeller gap of the turbo charger and fasten the mounting bolts on the turbo charger.

F. Maintenance every 2000 hours

● Check and repair the engine according to the Engine Manual.

● Check and repair the transmission system and torque converter

● Dismantle and check the axle, axle differential and rim reducer .

● Dismantle and check the steering device and steering valve and adjust the steering angles.

● Check the sealing status and system pressure of the multi-way valve cylinder and working cylinder by visibly checking how much the working cylinder has dropped down. If the cylinder has dropped down one time beyond the designed value, then you need to dismount the cylinder and valves to figure out cause.

● Check if the cracks occur on working apparatus and welded parts. And check if the nuts and bolts are securely fastened.

● Check the welding position on rim and correct any deformation.

2.4.4 Checking And Maintaining To Machine Component

A. Electrical system

● Battery

△ Clean the battery and check the amount and gravity of the electrolyte.

· Clean--clean the battery to prevent the salinization of vitriol.

· Electrolyte amount--It is normal when the surface of the electrolyte level is 10 to 15 mm higher than the electrodes. Specific gravity of the electrolyte should be gauged before replenishing.

· Gravity gauging--Measure the electrolyte gravity of the with hydrometer. If the measured values for all battery are different , accordingly battery recharging should be performed to get the values even. Correct specific gravity is 1.260@20℃. If the temperature is other than 20℃, electrolyte gravity should be calculated in accordance with relative calculation chart. The dead limit of the gravity value is 11/60, so never make it lowered than this value. If the electrolyte gravity drops down sharply, electrodes, generator and fan belts should be checked in terms of their fastening status.

· Battery management--In cold winter , the temperature for the electrolyte being frozen is about -35℃ when it is fully recharged. The battery troughs will be damaged by being frozen, so measures should be taken to protect them. Regarding the protecting method , you will have no worry when the batteries are charged 75%

Breakdown	Phenomena	Reasons of breakdown	Remedies
It is hard to steering	The steering wheel can not return back to its neutral position. And there is increasing pressure loss while steering wheel being at its neutral position.	Spring is broken.	Replace the damaged spring.
	There is so much vibration on the steering-wheel that you even could not turn the steering-wheel.	Pin is broken or deformed or there is cracking or deformation problem at the link shaft.	Replace the pin or link shaft.
	Wrong oil-circuit for the steering system. And the steering wheel turns by itself or swings.	Wrong installation of the rotator and the link shaft.	Assemble it again.
	Machine driving direction is not in alignment or the steering cylinder doesn't move or maybe slowly moves when you turning the steering wheel	The dual-way overload valve fails to work (the steel ball gets blocked or its spring can't work properly).	Clean the double-direction overload valve.
Steering wheel can't restore to its original position	Pressure at the neutral position increases. The steering mechanism can't release its load when steering wheel stops turning.	1. Steering column is not in eccentric with valve core. 2. The steering column and the valve core are deadly engaged. 3. Resistance to steering column is too much. 4.Spring plate is broken.	Resolve the breakdown correspondingly to its reason.
Manual steering is impossible	When performing power steering, operator can't feel the steering limit while the steering cylinder is already at its maximum limit. definitely. When you turn the steering wheel, the cylinder has no reaction.	The radial or axial clearance between the stator and rotor is too great.	Replace the couple of stator and rotor.

Inspection and service schedule for braking system (Table 2-6)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
The damage and looseness of the braking device	●					
Braking oil and its leakage	●					
Braking performance	●					
The performance and clearance of the braking pedal	●					
The weariness of the braking friction plate		●				
The looseness of the arrester bolt			●			
The hand braking performance and orientating condition	●					
The wear status of arrester friction plate			●			
The wear of park braking drum				●		

Inspection and service schedule for miscellaneous items (Table 2-7)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Clean the loader	●					
The fastening of main bolts	●Only the first time		●			
Oil leakage	●					
Damage of tubes	●					
Abnormal sound from pump and valve	●					
Previous abnormal condition	●					

2.6.4 Braking System

Breakdown phenomena	Reasons of breakdown	Remedies
Foot-braking pressure is insufficient.	1. There is oil leakage from braking plates. 2. There is air in braking hydraulic circuit. 3. Low braking air pressure. 4. Pressure booster gets worn. 5. Oil leaks onto braking plates from hub. 6. Braking plates wear out totally.	1. Replace the seal ring. 2. Bleed air out. 3. Chek air-compressor, oil-water separator, safety valve and sealing performance. 4.Check the pressure booster casing. 5. Check or replace the hub sealing ring. 6. Replace the braking plates.
The braking system could not be disengaged.	1. Braking valve is wrongly positioned. And the piston rod is blocked and the spring fails to work or just is broken. 2. Pressure-booster works defectively. 3. Pump piston could not restore to its original position.	1. Check or replace the braking valve. 2. Check or replace pressure booster. 3. Check or replace the sealing ring.
Braking oil pressure gauge shows the pressure reading increases slowly	1. Poor sealing for pneumatic system. 2. Air compressor can't work well. 3. Oil-drainage plug of the oil-water separator is not firmly tightened.	1. Check and repair the pneumatic system. 2. Check the air compressor. 3. Re-tighten the plug.

2.6.5 Hydraulic System

Breakdown phenomena	Reasons of breakdown	Remedies
Insufficient power for raising the main boom, or insufficient power for tilting bucket.	1. Oil sealing ring for cylinders wears out or gets broken. 2. The distribution valve wears too much, and the valve clearance is out of its acceptable limit. 3. There is oil leakage from hydraulic oil circuit. 4. Severe inner oil leakage in the oil pump. 5. Wrong adjustment for the safety valve, which causes the problem of low system pressure. 6. The oil suction pipe and oil filter get blocked.	1. Replace the oil sealing ring. 2. Dismount the valve, and check and repair it, so as to have its clearance be up to desired value. Or just replace the distribution valve with a new one. 3. Figure out where oil leaks, and eliminate the oil leakage problem. 4. Replace the oil pump. 5. Reset the system pressure to desired value. 6. Clean the oil filter and change oil.
When the engine rotates at high speed, the bucket or main boom raises quite slow.	1. Please see details in No. (1) of this section. 2. The safety valve gets blocked deadly.	1. Please see details in No. (1) of this section. 2. Dismount and check the safety valve.
Hydraulic oil gets mixed with transmission oil.	Hydraulic oil and transmission oil come together due to over-wearing and aging of the sealing ring for oil pump.	Replace the oil sealing ring, clean the oil filter, and check to see if the oil-suction pipe-lines get deformed or cracked.

Inspection and service schedule for electrical system (Table 2-2)

Check item \ Check time		10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Battery	Electrolyte		●				
	Proportion			●			
Charging effect			●				
Condition of the circuit lines							
Action of the meters, condition of lamp, sound of the bugle		●					
Wear and pollution of the motor and generator					●		

Inspection and service schedule for steering system (Table 2-3)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
Action of the steering cylinder	●		★Lubrication grease			
Rubber hose of the steering device						Every 4 years
Loosening and clearance of the steering wheel	●					
Center pin of the frame			★Lubrication grease			

Transportation , Storage and Protection

- Fastening, sealing and overheating of transmission, torque converter, hydraulic pump, steering devices, axles and brake clippers.
- Fastening of all the pins and bolts on wheel rims and transmitting shafts.
- Empty the radiator when the environmental temperature is below 0℃(except with antifreeze).
- Check if the brake liquid is enough or not .
- Clean the oil-water separator and drain the water in the air tank.
- Lubricate each grease point as required in the time schedule.

Reasonable inspections and maintenance are necessary to your loader. Be careful not to cause any accident or hurt yourself. If something abnormal is found during your inspection, mark it first and fix it after all the checking items.

When inspection is carried out with the bucket highly raised, make sure that it cannot fall down.

Fire is strictly forbidden when checking or maintaining. No smoking is permitted and fire extinguisher must be at hand.

2.4.2 Periodical Checking And Repairing

Time schedule for periodical maintenance

Inspection and service schedule for engine (Table 2-1)

Inspection and service schedule for electrical system (Table 2-2)

Inspection and service schedule for steering system (Table 2-3)

Inspection and service schedule for transferring device (Table 2-4)

Inspection and service schedule for working device (Table 2-5)

Inspection and service schedule for braking system (Table 2-6)

Inspection and service schedule for miscellaneous items (Table 2-7)

3.1 Safe Transportation

3.1.1 Load Or Unload The Machine

- Before loading the machine onto a carrier, clear the ice or snow from the carrier to avoid of slippery.
- If the loader should be transported to a cold area, ensure that its cooling system has good anti-freezing ability.
- Wedge the towing vehicle or locomotive before lifting the loader.
- There is always a potential risk of danger during loading and unloading the machine, so special care should be given. During loading and unloading the machine, run the engine at low speed.
- Moving the machine should be done on the hard ground, and the machine should be kept at a safe distance from road side.
- When loading or unloading the machine to or from a carrier vehicle, you must be sure that the wheels of vehicles are securely positioned, not moving. And put a wedge under the slope plate. (Figure 3-1)

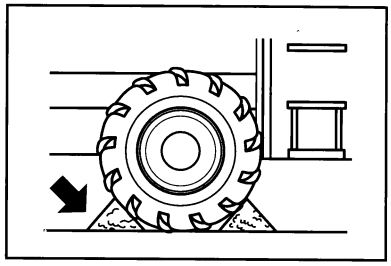


Figure 3–1

- Use those slope plates which have enough strength, length and width, so that it can be sure the slope plates are strong and safe enough to load or unload the machine. The angle between the slope plates and ground should not be larger than 15°. And the gap between slope plates should be in accordance with the wheel base of the machine to be loaded or unloaded. (Figure 3-2)

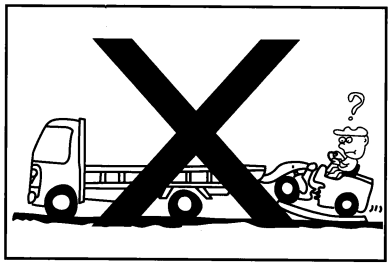


Figure 3–2

- Make sure the slope plates are securely fastened and have same height.
- Make sure the slope plates are free of grease, oil, ice and other loosing material. And also remove away the dirt from the machine wheels.
- Never make steering on the slope plates. But if the steering has to be done, at first get the machine off from the slope plates. After steering, you can drive the machine onto the slope plates again.
- Perform following jobs after loading the machine
  - △ After loading the machine onto a carrier, lock the articulation of front and rear frame.
  - △ Drop the bucket down on the deck of carrier and put the gear-shift lever at neutral position.
  - △ Engage the parking brake.
  - △ Stop the engine and pull out the key.
  - △ Move all hydraulic controlling lever to release pressure.
  - △ Lock the door of cab and take all safety measures.
  - △ Wedge all wheels of the loader.
  - △ Prepare enough ropes to prevent the loader from skidding during transporting.
  - △ Cover the exhausting nozzle.

3.1.2 Hoist Or Put Down The Machine

- When the loader has to be moved into a ship or other place, please use the lifting lugs which is located on front and rear frame.

- Connect the positive (+) clamping-terminal of the recharger with positive pole (+), and negative terminal (-) with negative pole (-). And fasten their connection.
- If the recharging ratio is less than 1/10, then you have to make rapid-recharging and set it within the battery's rated capacity. If the recharging current is too much, then it may cause electrolyte leakage or evaporation, which will possibly cause fire or explosion.

Starting the machine by means of voltage-increasing cable

If there are some trouble in the connection of voltage-increasing cable, fire accident may be produced out. So obey with following steps for the operation:

- Two people will be available for this operation. (one of them will keep sitting on the operator seat).
- When starting a machine, prevent it from colliding with another vehicle.
- When connecting the voltage-increasing cable, shut off the Starting-up switches of both the machines.
- When installing the voltage-increasing cable, you must remember that the positive (+) cable should be connected first. When dismounting the voltage-increasing cable, grounding or negative (-) cable should be removed first.
- The final grounding cable should be connected to the engine of the breakdown machine, but this will cause sparks, so when making connection, please get away from the battery as far as possible.
- When dismounting the voltage-increasing cable, care should be taken to prevent the clampers of cables touching with each other or touching with the machine.

K. Disposal of rejectecd battery

Don't dispose the rejected battery willingly everywhere if it could not be used due to aging or deterioriation. Also, don't pour its acid liquid willingly everywhere, as the acid liquid may bring serious damage to people's health and animals or bad pollution to the surrounding environment.

Maintenance for Tyres

- If the tyres explode, the explosion itself will throw the wheel hub, tyres, driving axle and other components 500m or more far away from the machine And explosion and its partials will cause server damage and healthy injury, so the tyres pressure must be maintained at normal pressure range. Never inflate the tyres beyond its rated pressure range. (Figure 2-22)

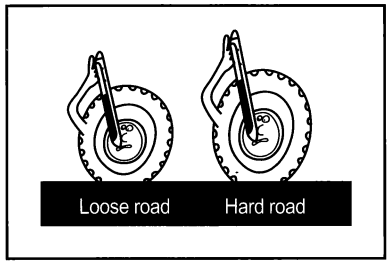


Figure 2-22

- During traveling, the heat produced due to high-speed machine traveling will cause the tyres pressure arising to some extent, which is the normal case, please don't attempt to reduce the tyres pressure. What you should do is to reduce the machine traveling speed or just stop the machine to have the tyres cooling down. However, if the machine keeps moving at very high speed continuously, which will cause the tyres being overheated, then tyres explosion will be led, so attention should be given.
- When adjusting tyre pressure, keep away from the tyre as far as possible. And you should always stand at the back of the tyre.
- It it prohibited to inflate the tyres with combustible gas. It is recommended to use dry Nitrogen . If the tyres have already been filled with air, you can also use Nitrogen for pressure adjustment purpose, and Nitrogen can be well mixed with air. Inflating tyres with Nitrogen can possibly reduce the risk of tyres explosion, since Nitrogen doesn't help combust but can prevent the rubber oxidation and deterioration and avoid rust for wheel hubs.
- In order to avoid tyres being over inflated, it is necessary to have proper tools to be used for inflating tyres

NOTE: The operating weight should vary according to different working devices.

△ Please select those ropes and lifting devices which have enough solidity. Keep the loader horizontal in the hoisting process.

△ The girder of hoisting device must has enough width to avoid colliding with the loader.

△ Take the length, width, height and weight into consideration.

△ Every loader has lifting lugs, there are two lugs on the rear part of the loader and two on the front part of the loader. Ropes can be threaded through them. (Figure 3-5, 3-6)

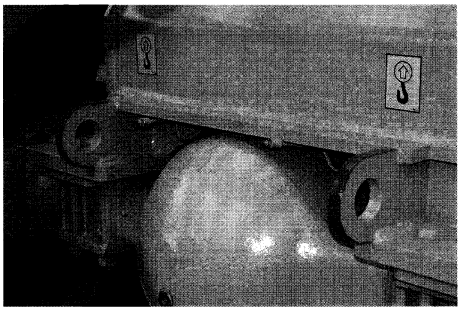


Figure 3–5 lifting hook of fore frame

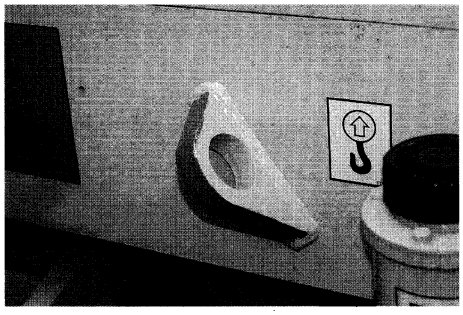


Figure 3–6 Lifting hook of rear frame

3.1.3 Transporting The Loader On A Public Road

- When transporting this loader, please obey with those laws which regulate the weight, height, width and length.
- Determine the transporting route with regarding to the weight, height, width and length of the machine.
- Before passing through a bridge or a building, please ensure in advance that its strength can support the weight of the machine. Obey with traffic rules when driving on a public road.
- If the loader has to be dismantled for the purpose of being transported, please consult with manufacturer or its agent.

3.2 Storage And Protection

3.2.1 Daily Parking

Park the loader on a place, with its bucket resting on the ground horizontally. Try your best to park the loader on a dry place, and avoid of moisture. If the machine has to be kept outside, a shelter cloth must be used to cover it.

- Turn the ignition switch to "OFF" position, take out the key and keep it in a safe place.
- After the ignition key being pulled out. Operate slowly the control levers of the working devices for 2 to 3 times, so as to release the remained pressure inside the cylinders and hoses, and then leave them at their neutral positions.
- Place the gear-shifting lever at neutral position, and the parking brake must be engaged.
- Lock the front and rear chassis with the lock bar.
- Lock all the parts that have locking key. Pull out the keys and keep them safely.
- In winter or cold weather (when the ambient temperature below 0℃), anti-freezing addition must be applied into the cooling water. Cooling water must be drained out completely for those machines without anti-freezing addition in the cooling system, so that the engine can be protected from being cracked by ice.

Only the qualified technician can service the electrical system.

When you adjust the out-sourcing electrical power, please connect the grounding-line at last to prevent generating sparkle around the battery, which, otherwise, could result exploding. Bear it in mind that the grounding -line is connected from the end of the regulator to that of the starter.

E. Engine hood

Don't service the non-mental engine hood willingly. The dust produced by polishing the hood can cause exploding, and the dust is injurious to your health.

F. Rejected staffs

Please obey with following instructions to prevent the pollution.

- Don't pour the rejected oil liquid into rivers and sewer network.
- The drained oil must be placed in a container rather than pouring it directly onto the ground.
- Please respect the local relative laws and regulations when disposing the the harmful and poisonous materials, for instance: lubricant, fuel, cooling liquid, battery and so on.

G. Fire Prevention

- When refilling fuel, it is a must to stop the engine. And during refilling fuel, it is prohibited to smoke or expose to fire or flame.
- The storage for fuel, grease and other combustible staffs should be kept far away fire.
- Clean away all the combustible staffs, such as: fuel, lubricating oil and other foreign articles built-up on the machine. And make sure there is no any oily cloth or other combustible material existing.
- There will be some explosive gas producing near the battery, so neve get it near to fire or flame. Strictly follow the relative instructions to maintain and use the battery.
- When parking the machine, care should be taken to select the suitable parking location and its surrounding environment. And special attention should be paid to ensure that there is no withered grass, used paper and other combustible material near the muffler of the machine. (Figure 2-18)

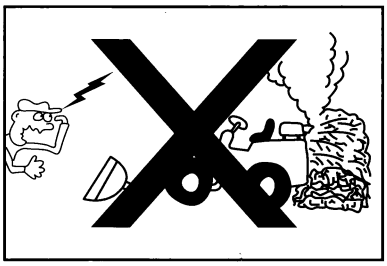


Figure 2–18

- Check if there is any leakage of fuel, engine oil and hydraulic oil. If it is in case, replace the broken hoses. And only after cleaning and fixing the problems, you can make another attempt to drive the machine again.
- Check if the electrical wires get broken or failed. If finding any damage, replace it with a new one.
- When cleaning the components, use the non-combustible cleaning solvent. Don't use the petroleum oil or other combustible liquid for cleaning.
- Don't make any welding or fire-cutting on the pipelines or tanks which contain combustible liquid. Before you make any welding or cutting, clean the pipeline first with non-combustible cleaning solvent, then make welding and cutting. (Figure 2-19)

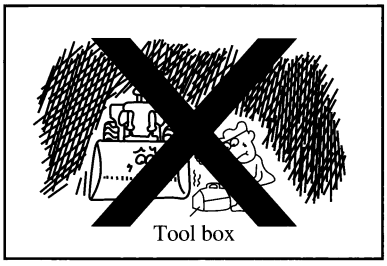


Figure 2–19

- The ether is a kind of combustible material, so avoid it exposing to fire or flame. When using it, strictly follow relative instructions.
- Prior to making any service and repairing, check if the fire-extinguisher is proper or not. Know the storage location of the fire-extinguisher and first-aid kit.
- When it is needed to check the dark area on the machine, don't use flame or fire to lighten this area.

3.2.3 After A Long Time Storage

Figure 3–8

- Move away all the protecting coverings.
- Clean away the anti-rust grease on the exposed parts. (Figure 3-8)
- Drain out the oil that is inside the engine, gear box and driving axle, and then wash them and refill with new oil.
- Drain out the debris and water from hydraulic oil tank and fuel tank.
- Dismantle the pneumatic cylinder of the engine, and lubricate the valve and rocker shaft. And check the performance of each valve.
- Fill the radiator with cooling water to the standard level.
- Charge the battery again and connect it to the wires.
- Adjust the inflation pressure of the tyres in accordance with the road condition.
- Follow the checking procedures before operating.
- Warm up the engine.

3.2.4 Storage Of Other Parts

Obey with following instructions when storing the tyres.

- Being as a general principle, the tyres must be stored in warehouse. Anybody without prior approval should not enter into the warehouse. If tyres have to be stored outdoors, please settle a protecting fence surrounding the storing area. Notes which show "No Entrance" should be settled.
- Tyres should be stored in dry and clean area, otherwise moisture will speed up the oxidation of the tyres and oil or polluted dirt will make tyres corroded more quickly. When storing tyres, you should consider, as much as possible, sheltering and heat-insulation, and avoid air ventilation. The tyres under storing should be covered with canvas, plastic or other covering staffs. Incorrect storage for tyres will seriously affect their quality and service life.

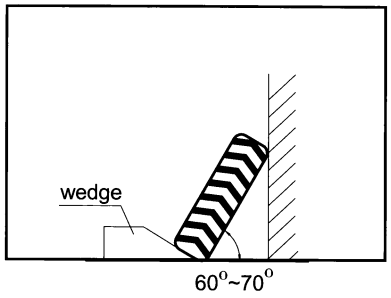


Figure 3–9

- Put tyres on the flat ground vertically, and fix them by means of wedges, so as to prevent them falling down even if it touched by somebody disapproved. If a tyre is placed on the ground by its side, then it may be pressed flat, which, being as a result, will worsen its quality. The tyres under storage should be turned once every month. (turn 90°).
- If wheel tyre is to fall down, get away from it, since the tyres of construction machinery are very heavy, and any attempt to hold it by hand will incur serious injury. (Figure 3-9)

- The end of battery should be disconnected in order to prevent the battery from exploding .
- Disconnect the clip connection of the computer control panel of the transmission (which is placed in the control box right side of the driver's seat in the cab) to prevent burning the panel when welding; After finishing repairing, insert back the clip connector of control panel properly according to the requirement, otherwise you can't start or run the machine.
- Clear paints from welding place in order to prevent the production of the pernicious gas.
- Burnable vapor and spark may be produced when welding on or near the hydraulic equipment or pipelines, which may cause fire, so welding in above mentioned places should be forbidden.
- If sparks caused by welding drop on rubber hose, electric wire or pressure pipeline directly, these tubes may burst suddenly, the insulating cover of the electric wire will be damaged, so please use fender to guard these pipes.

- When welding near tyre, special attention should be paid because it may explode. (Figure 2-15)

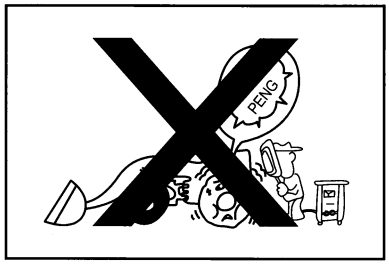


Figure 2–15

- When welding, protective clothes should be wore.
- The ventilation of the welding place should be well prepared. (Figure 2-16)
- Clear up all inflammable material, and fire extinguisher should be supplied at the site.

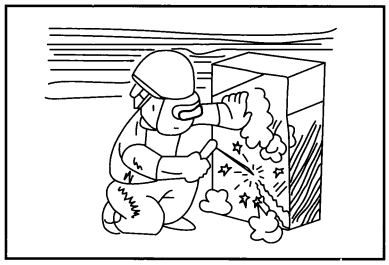


Figure 2–16

2.3.2 Checking And Maintaining To Every System

A. Inspection and service for the cooling system

- When just finishing work, the hydraulic oil temperature, the oil and water temperature in engine and radiator are very high and still have pressure. At this moment, any attempt to open oil tank, radiator, drain oil or water, or change the filter may be severely burnt. Wait till the temperature fall down and observe the required program when doing the above operation.
- To prevent splashing hot oil, turn off the engine, cool the hot water and open slowly to release the pressure. When checking the temperature, put your hand close to the front of water radiator, check the air temperature. But pay attention not to touch the radiator.
- For preventing hot oils from splashing out , stop the engine and let oil get cooled. And slowly open the cover of hot oil tank cover to release its pressure. When checking if the oil temperature has been cold or not, get your hand near the front of radiator for hydraulic oil and torque converter oil. And check air temperature. Don't touch the radiator.
- Don't touch the engine body or muffler, exhaust tail tube and relay when the machine is still hot, and avoid being scalded.
- Don't remove the engine oil temperature sensor, water temperature sensor, torque converter sensor and air-conditioner tubes so as not to get scaled. (Figure 2-17)

Technical Specifications

2.3 Maintaining To The Machine

2.3.1 Common Operation And Instructions

A. Cleaning

- Clean the machine before doing any service and maintenance, so as to prevent dirt getting into the machine.
- If the machine is dirty when doing service and maintenance, it is not easy to find problems and may cause dirt spatter into eyes or may have the danger of sliding or hurting due to greasy dirt on the machine.
- While cleaning the machine, use the cleaning-addition which is not flammable. (Figure 2-10)

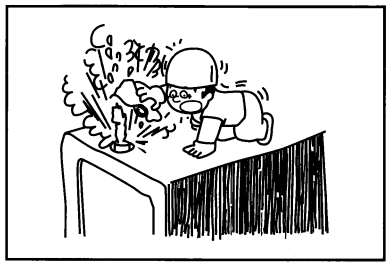


Figure 2–10

- When cleaning the inside part of machine, should lock the control handles by locking-device to prevent the working mechanism moving. And get the braking system be engaged.
- When cleaning the machine, wear anti-slip shoes to avoid slipping on wet ground. When using the high pressure water to wash the machine, please wear the protection clothes.

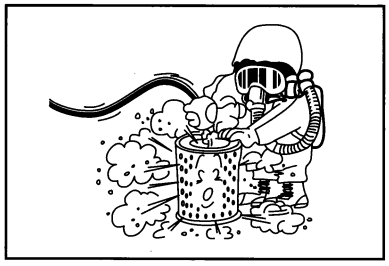


Figure 2–11

- Don't splash out water directly on the electric component (e.g: sensor, and sockets and plugs). If water gets into the electric system, it can cause breakdown.
- When cleaning the filter elements with compressed air, wear the protection clothes and safe glasses. (Figure 2-11)

B. Illumination

- When checking the fuel, lubricant, electrolyte of the storage battery or cleanser of window glass, it is required to use the illuminator which is of exploding-proof. Otherwise, there is a danger of explosion.
- If the operator works at a dark place without lighting, there is a danger of injury. So lighting should be equipped.
- Even if in the dark, it is not allowed to use lighter or fire to light. There is a danger of fire. Explosion may occur when gas emitted from the storage battery meets with the fire.
- When taking the machine as a lighting power source, please follow the instructions in this manual.

Figure 2–12

C. Work in an enclosed room

- The exhausted gas of engine is poisonous and if you have to work in a closed room, you must use the ventilation devices. If you have not installed the ventilation devices, you should open door and windows. (Figure 2-12)

D. Working under the machine

- Stop the loader on a smooth ground, and put down all the working mechanism on the ground before working under the loader.
- Block the wheels with chocks.
- It is very dangerous to work under the loader which is only supported by working mechanism.
- Never work under the loader which is with poor supporter. (Figure 2-13)

Figure 2–13

4.1 Technical Specifications

	Common type of LW321F	High dump type of LW321F
Overall dimensions		
Overall 1ength (bucket on the ground)	6800 mm	7150 mm
Bucket width	2470 mm	2470 mm
Overall height	3025 mm	3025 mm
Wheel base	2600 mm	2600 mm
Tread	1850 mm	1850 mm
Min. ground clearance	400 mm	400 mm
Specification		
Rated capacity	3200 kg	2600 kg
Bucket volume	1.8 m^3	1.5 m^3
Operating weight	10 t	10 t
Traveling speeds		
Ⅰ	10 km/h	10 km/h
Ⅱ	16 km/h	16 km/h
Ⅲ	21 km/h	21 km/h
Ⅳ	35 km/h	35 km/h
Reverse Ⅰ	14 km/h	14 km/h
Reverse Ⅱ	25 km/h	25 km/h
Max. tractive force	90 KN	90 KN
Max. climbing gradient	28°	28°
Max. dumping angle	44°	44°
Max. dumping height	2900 mm	3250 mm
Dumping reach	960 mm	1050 mm
Overturn angle of bucket		
The lowest position	45°	48°
The highest position	52°	45°
Bucket automatic leveling function	yes	Yes
Max. Breakout force	105 KN	110 KN
Total cycling time	9.8 S	9.8 S
Min. Turning radius		
Outside of the bucket	5400 mm	5400 mm

refill the water again.

When inner cleaning needs to be performed for the radiator, firstly fill the radiator fully with water and run the engine at a high speed to make the water circulate. Drain the water again through the drainage-cap. Keep the engine running at idle speed, while injecting the radiator with fresh water till clean water flows out from the drainage-cap.

When the engine just stops or keep running, never open the radiator cover. High temperature water will burst out to burn you.

☆If it is necessary to open the radiator, cover it with a cloth and then screw it off slowly to open.

● Notes

△ Rain water, city water and precipitated river water can be used as cooling water .Well water can be used only after being softened.

△ When the ambient temperature is below 0℃, anti-freezing agent should be injected into the cooling water to protect the cooling system .

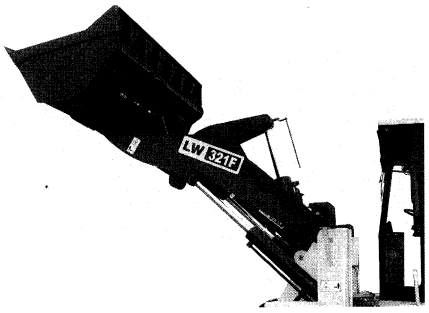
△ If no anti-freezing agent is added , all the cooling water should be drained out through the draining valve to protect them from cracking.

△ It is no need to drain out cooling water after anti-freezing agent has been used. High quality anti-freezing agent should be used .

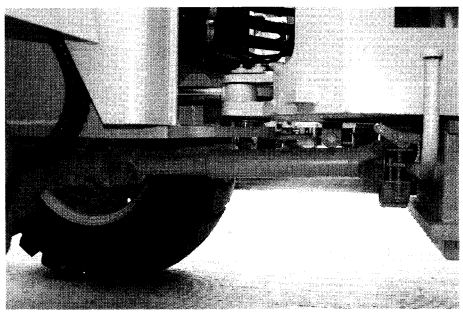
△ In summer, when the ambient temperature exceeds 30℃, the engine is easy to get overheated. So it is better to park your machine in a shadowed place.

△ In order to prolong the service life of the engine, at the end of daily work firstly keep the engine run at a low speed for about 5 minutes till the water gets cool, and then stop the engine.

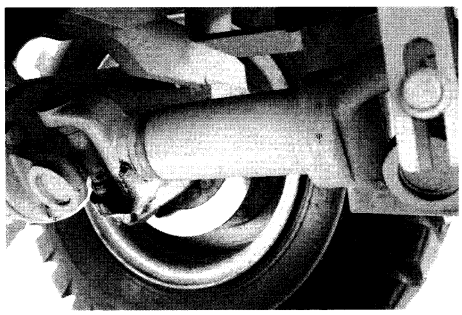
2.2.4 Lubrication Points And Oil Filling Points



Lubricating point of working mechanism



Lubrication points of front transmission shaft



Lubrication points of rear transmission shaft

Type	One stage-planetary deceleration
Speed ratio	3.882

Tyres

Tyre specification	17.5-25
Inflating pressure	Fore tyre: 0.32-0.35 MPa
	Rear tyre: 0.28-0.30 MPa

Braking system

Foot brake	Oil disc braking on 4 wheels
Braking air pressure	784-833 KPa
Hand brake	Soft shaft operation, belt type

Steering system

System pressure	10 MPa
Max turning angle	± 35°

Hydraulic system of the working device

System pressure	15 MPa

Oil liquid volume

Fuel (diesel)	150 L
Lubricating oil of engine	20 L
T/M & T/C oil	32 L
Hydraulic reservoir	170 L
Axle	25 L

Inject new fuel to the fuel tank when the fuel level drops down to the lower scale.

● Discharging contaminated remains

Drain off water and contaminated remains inside the tank from the drainage flange at the bottom of the tank. And then clean the fuel filling plug and fuel filter. Replace the filter if it gets worn.

F. Refill the braking oil

There are two braking oil cups (which are located on the boosting pumps on the right side of machine frame.)

● Checking oil level

Check the braking oil level. The height between the oil surface and oil filling plug should be 15-25mm. When there is not enough oil , replenish it with new oil.

● Replacing with new oil

Completely replace the braking oil according to the interval schedule for lubricating. When replacing braking oil, clean the oil cups and replace the oil filter.

If air penetrating into braking hydraulic system, it will affect negatively the machine braking performance. So it is needed to bleed out air from the system according to following steps:

△ Clean the hydraulic pipelines, braking oil cups, drainage plug and air-discharging plug.

△ Fill up the oil cup with braking oil liquid.

△ Start up the engine, and shut it off after the air pressure reading being up to 0.68-0.7MPa.

△ Fit a hyaline hose on the air-draining plug, leaving the other end of the hose in the oil cup.

△ Loosen all the air-draining plugs, and repeatedly step on the braking pedal several times, and then step it down fully till the oil liquid without any bulb flowing out. After that, tighten the air-draining plug, and release the braking pedal. During the air bleeding, replenish braking oil to oil cup in time, so as to prevent air entering into circuit system again.

△ After finishing air bleeding, fill in braking oil to the level as required.

If it is necessary to use different type braking liquid, please discharge the old braking liquid completely and

⚠ CAUTION	Don't mix different type of oil together. And it is either not allowed to use mineral oil as braking oil.

use the new braking liquid clean the braking system.

G. Inject new oil to the torque converter and transmission system

The torque converter and transmission system both use the same transmission oil, which must be checked and replaced periodically .

● Oil level checking

Open the oil-drainage plug of the gearbox.

If there is any oil flowing out from the oil-drainage plug immediately after the oil-drainage plug is unscrewed, it means that there is too much transmission oil in gearbox. Then what you need to do is to keep the oil-drainage plug open till there is even no oil flowing out, which shows the oil level inside gearbox is ok. However, if there is no oil flowing after the oil-drainage plug is unscrewed, it means oil level inside the gearbox is not enough. Then you need to replenish with new transmission oil till there is oil flowing out from the oil-drainage plug.

Oil level checking for the gearbox should only be done after the engine having been started.

LW321F 轮式装载机

LW321F WHEEL LOADER

零件手册

PARTS MANUAL

● Oil replacing

In addition to the regular oil-change as scheduled, the transmission oil should also be totally changed if finding the oil quality getting deteriorated or mixed with other oil.

When changing the transmission oil, drain out the used transmission oil via the oil-pan. After that, fill in new oil via the oil-filling plug. Then start the engine and let it run at low speed for bleeding air out the transmission system. After finishing air-bleeding, you will find the oil level gets lower a little bit, so you need to replenish with more oil.

H. Fill oil to front and rear driving axle

● Oil level checking

Screw off the oil-filling plug and check the oil level, if the oil level is near the plug, it is ok, otherwise, replenish with new oil.

● Oil replacing

Drain out the used oil from the oil-drainage plugs on both the main reducer and hub reducer respectively.

Screw off oil-filling plugs on the left and right hubs and main reducers. Inject with new oil till there is oil flowing out from the oil filling plug and oil-level observation hole (at this time, the arrow on the hub reducer should face downwards).

I. Fill engine oil

● Oil Level checking

Take out the engine oil dipstick and clean it, then reinsert it again into engine oil pan, and pull it out to check the oil level.

If the oil level stays between the upper and lower marks of the dipstick, it is to say that the level is correct. Replenish new oil if the level is lower than the lower mark till it reaches to the upper mark.

Level checking should be done before machine operation or 15 minutes after the its engine stops.

After level checking, the oil pollution and mixed debris should also be checked. If oil is over polluted , it must be replaced totally with new oil.

● Oil replacing

Drain the used oil through the oil-drainage plug on the oil sump, and then inject new oil through the oil-filling plug till the oil level reaches to the upper mark of oil dipstick.

Start the engine and let it run at a low speed for a while, then stop the engine to check the level again, If oil level is not sufficient, please replenish with new oil.

The oil level should not exceed the upper mark.

Engine oil should only be replaced while the engine is still warm.

J. Fill the cooling water

● Cooling water replenishing

If the water temperature becomes too high, firstly check the water level that is inside the radiator.

At the same time, you must also check if the holes of the radiator element get clogged or hoses get burst. The cover of radiator should be fastened to avoid vaporization.

● Water replacing

The cooling water must be replaced only when the radiator is cold. Open the water tank cover, and then open the drainage-cap at the bottom of the radiator, the water can then be drained out.

After replacing cooling water , start the engine to make the water level drop a little . Then stop the engine to

前　言

本零件手册仅供选购我公司LW321F型轮式装载机零部件时参考。

本零件手册主要介绍了LW321F型轮式装载机零部件及各部分的结构和装配关系，供广大用户、销售、及技术人员了解选购、维修和保养时使用。

在本手册零件中，凡是不可拆卸的部件（焊接件、铆接件）一般只标出部件代号，不再另列其组成零件的代号。

订购零部件时，为避免订购和我公司发货失误，请务必注明以下各项详细资料：

1. 轮式装载机的出厂日期和编号。

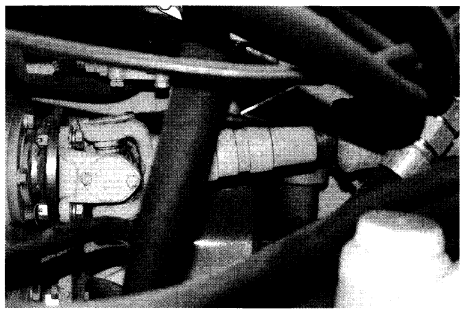
2. 所订购的零部件的代号和名称。

3. 所需数量。

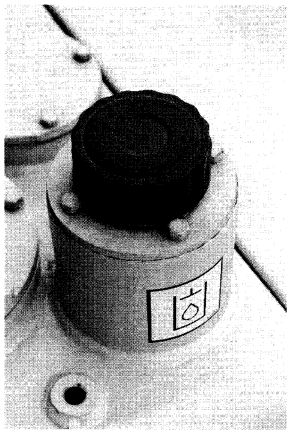
4. 如果你需要邮购，需详细注明邮往地点、单位和邮政编码。

LW321F型轮式装载机将根据技术发展和用户的要求不断改进，因此本零件手册也将定期补充修订；如有更改，恕不另行通知。

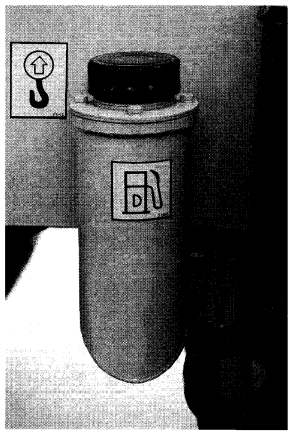
Braking oil–filling point



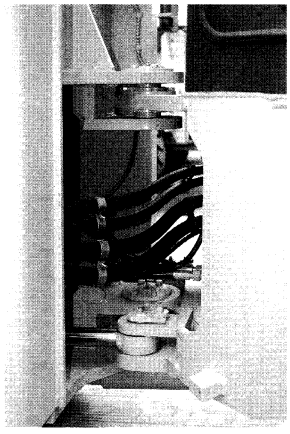
Lubrication point of main transmission shaft



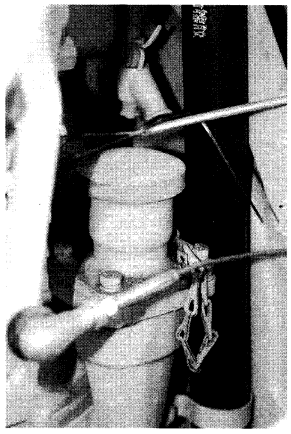
Hydraulic oil–filling position



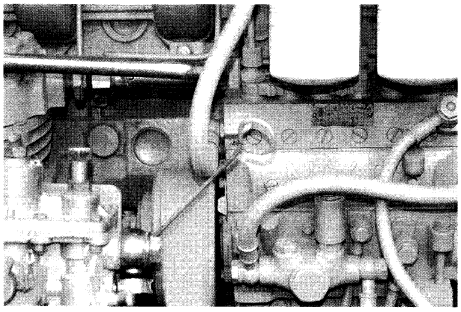
Fuel–filling position



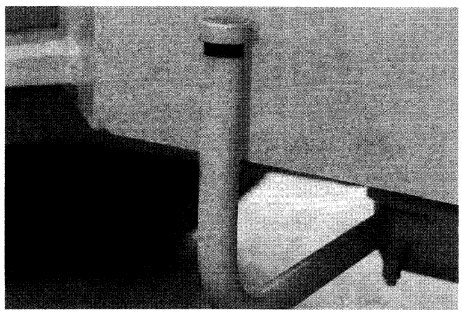
Lubrication point of central articulating pin



Engine oil–filling position



Engine oil dipstick



Transmission oil–filling position

3. 工作装置
WORKING DEVICE

4. 操纵与驾驶室
CONTROLS AND CAB

5. 制动系统
BRAKE SYSTEM

6. 液压系统
HYDRAULIC SYSTEM

7. 电气系统
ELECTRICAL SYSTEM

E. Working on the top of the machine

● When carrying our maintenance on the top of machine, ensure the foothold is clean and there are no barrier obey with the following instructions for preventing falling down.

△ There are no sprinkled lubricating grease and lubricant on the machine.

△ Don't leave tools everywhere.

△ Pay attention on the paces while walking on the machine.

● Don't jump off from the machine directly. When getting on or off the machine, please face toward the machine, and use the ladder and handrail

● Use the protecting device under the special circumstance.

● The top of the engine hood is smooth and slippery, so no people will be allowed to stand on it.

● Standing on the top of tyre is dangerous, so never stand on the tyres.

● When cleaning the front glasses of the cab, you should stand on the splash fender of front frame.

F. Servicing the machine while the engine is running

In order to avoid injury and accident, don't carry out maintenance work for the running engine. If maintenance has to be carried out while the engine is running, follow the following instructions:

● Appoint a man sitting on driver's seat and get ready to stop the engine at any time.

● Don't touch exhausting pipe or high temperature parts, such as end tube, muffler, etc. so as to avoid scalding.

● When working close to a rotating part, there is the risk to be rolled inside by rotating parts, so special care should be given.

● Don't touch any control handle. If it is necessary to operate a control handle, firstly make a alarming to other people and ask them to leave.

● Never touch the rotating leafs of the fan or the fan belt as it is very dangerous. (Figure 2-14)

● Don't adjust the part that you do not understand.

G. Don't leave anything falling into the machine

● When opening the cover or oil-filling hole for repairing, care should be taken not to drop anything into the machine. If anything has fell into the machine, it may cause breakdown, you must take it out.

● Unnecessary tools and parts should not exist in your pockets when maintainingthe machine.

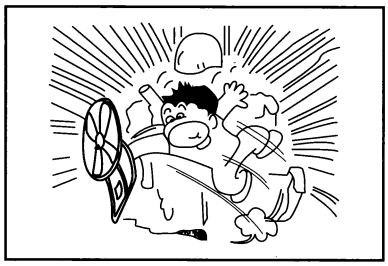


Figure 2–14

H. Heavy objects

● While using the hammer, wear the protective glasses, security helmet and protective clothes. And a stick of copper cushion is needed between the hammer and the parts to be struck.

● If using a hammer to hit a hard part such as pin or bearing, there will be the risk that crashes may enter into eyes, so special care should be given.

● Use tools and heavy objects carefully and avoid them falling down.

I. Repair by welding

Welding must be taken by skillful workers at places with proper equipment. Gas, fire or electric shock can be produced when welding. So it is disallowed for unqualified persons to carry out the operation. The following instructions must be obeyed while welding:

动力传动系统

ENGINE AND TRANSMISSION SYSTEM

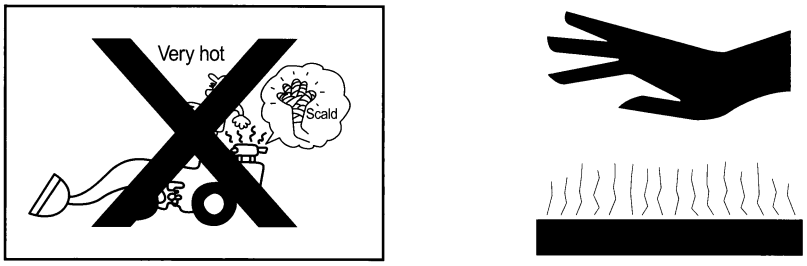


Figure 2–17

● Cooling system contain alkaline material, so pay attention to not to have the cooling system touch your skin and eyes.

● When replacing coolant liquid, engine oil, transmission oil and oil filters, etc, use the proper container to hold these oil liquid. The disposing to waste liquid should be conformed with the local rules and regulations.

● When you need to remove the air-conditioner tubes, remember not to expose the tubes to fire and flame. Otherwise it will cause injury due to poisonous gas.

B. Inspection and service for hydraulic system

● Before making any inspection and service for hydraulic system, securely lock the hydraulic cylinders and other hydraulic devices. Have the hydraulic oil get cool, then release all the pressure from the hydraulic system.

● Don't bend or hit the high-pressure pipelines. And never mount the tubes and hoses that are bent abnormally or already broken on the machine.

● If some tubes or hoses which are used for fuel circuit, lubricating oil circuit and hydraulic system circuit become loose or broken, get them fixed. Leakage may also cause fire, please repair it or make replacement.

● Please check carefully all the tubes and hoses, and tighten all the connection fittings with torque as required. When making inspection for any oil leakage, use a clean piece of plate or paper board to make such inspection rather than by means of hand, since the liquid pressure from leaking point will cause severe health injury, even if the leaking point is very small, like a needle eye, the leakage pressure can strike through your skin. If oil liquid splashes onto your skin, seek help from the competent surgeon to treat the case within several hours. And replacement should be made if following cases are found:

△ Connecting fittings be broken or leakages appear.

△ The external coating of hoses are worn out or cracked and their reinforcing wires are exposed.

△ Hoses get bulged at some particular locations.

△ Hoses get obviously twisted or deformed due to pressing.

△ The hose reinforcing wires get extending out.

△ End is connected wrongly.

● Make sure that all pipelines clamping, protection and insulating plates are correctly mounted, so as to prevent shocking and conflicting with other parts.

● When replacing coolant liquid, engine oil, transmission oil and oil filters, etc, use the proper container to hold these oil liquid. The disposing to waste liquid should be conforming with the local rules and regulations concerning environmental protection.

C. Air reservior

Discharge the water from air reservoir every day, especially in winter. Ensure that the water draining valve is closed before starting the machine.

D. Electrical system

1.1 LW330F(II).1 柴油机系统 Engine System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	YC6108G	柴油机	Engine	1
2	Z3(YC).1.7	前支架 (右)	Front Support	1
3	Z3(YC).1.8	前支架 (左)	Front Support	1
4	GB93-87	垫圈 12	Washer	20
5	GB5783-86	螺栓 M12 × 30	Bolt	16
6	GB5782-86	螺栓 M16 × 80	Bolt	4
7	Z3(YC).1-3	垫板	Plate	2
8	Z3(LT).1-2	垫块	Rubber Block	2
9	GB93-87	垫圈 16	Washer	8
10	GB6170-86	螺母 M16	Nut	8
11	330E.1.1	燃油箱	Fuel Tank Ass.	1
12	Z3(LT).1-6A	过油螺栓 M14 × 1.5	Bolt	2
13	GB5783-86	螺栓 M16 × 70	Bolt	4
14	Z3(YC).1.1	右后支架	Supporting Bracket	1
15	Z3(LT).1.2	左后支架	Supporting Bracket	1
16	Z3(LT).1-3	垫块	Rubber Block	2
17	LW330F.1-1	软管	Hose	1
18	ZL40A.12.4-1	放水阀	Draining Valve	1
19	LW330F.1.1	弯管接头	Joint of Bent Pipe	1
20	JB/T8870-1999	喉箍 d70	Clamp Hoop	6
21	LW330F.1-2	软管	Hose	1
22	GB6170-86	螺母 M12	Nut	4
23	GB97.1-85	垫圈 12	Washer	4
24	Z3.1-4	垫片	Washer	2
25	GB5782-86	螺栓 M12 × 70	Bolt	4
26	XGSX01-07	水油散热器组合	Radiator	1
27	LW330F.1-3	软管	Hose	1
28	吉普车用喝风线	熄火操纵	Fuel Cutoff Control	1
29	XZ1129001	油门操纵阀	Accelerator Control Valve	1
30	GB5781-86	螺栓 M6 × 25	Bolt	5

H. Maintenance for battery

The battery electrolyte contains sulphuric acid and can produces hydrogen, so incorrect handling for the battery will cause serious injury and fire risk, therefore, the following points must be obeyed:

- Never get the lighted cigarette or flame close to the battery. (Figure 2-20)
- When you have to touch the battery during working, you ought to wear safety glasses and rubber gloves.
- If the electrolyte is splashed onto your clothes or skin, rinse it off with plenty of fresh water immediately.
- If the battery electrolyte is splashed into eyes, it will cause blindness. In this case, rinse the eyes with plenty of fresh water and go to hospital right away.

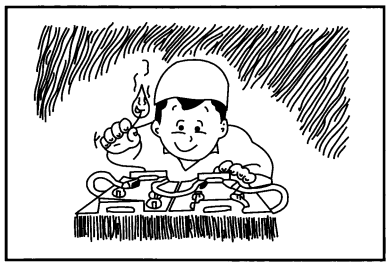


Figure 2–20

- If you drink the electrolyte carelessly, then you must drink a lot of water, milk, fresh egg or vegetable oil, and get help from doctors or go to hospital immediately.
- Before operating about the battery, remember to stop the engine.
- Avoid the touching of metal staffs (e.g: tools), which could cause short circuit to positive pole (+) and negative pole (-) of the battery.
- When installing the battery, fix the positive pole (+) first; when dismounting the battery, disconnect the negative pole (-) first.
- When disassembling or installing the battery, firstly check which pole is positive pole and which is negative pole, then tighten it with screws. If the electrolyte level reaches near " lower", then refill stilled water till it reaches " upper" level.
- When cleaning the top surface of the battery, use a piece of cloth to wipe it. Never use petroleum oil and other organic solvent and cleaning solvent.
- Tighten the top cover of the battery.
- If the electrolyte has been frozen, don't recharge the battery and start the engine with other power source either, otherwise it is very dangerous and will cause battery gets fire. When charging the battery or starting the engine with other power source, melt the battery electrolyte first before attempting to start the engine, and you also need to check if there is any leakage.
- Remove the battery from the machine before recharging the battery.
- When repairing the electric system or doing welding on the machine, it is needed to remove the negative pole (-) of the battery to prevent the current flowing. (Figure 2-21)

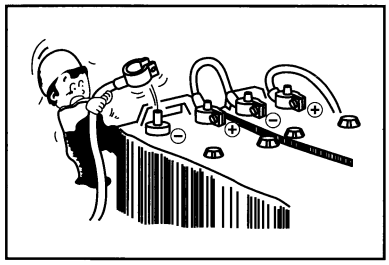


Figure 2–21

J. Recharging

When recharging the battery, if handle the battery incorrectly, then there is the risk of battery explosion. So the procedure for recharging the battery should be in line with required process and instruction, and also obey the following points.

- Recharging for the battery should be done in a place with good ventilation. Take out its top cover, by doing so hydrogen scattering and explosion can be prevented.
- Set the recharging voltage according to the voltage requirement for the battery to be recharged. If the recharging voltage is wrongly set, then it will cause the recharger getting too hot or fire and also possibly explosion.

1.1 LW330F(II).1 柴油机系统 Engine System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	GB93-87	垫圈 6	Washer	6
32	GB97.1-85	垫圈 6	Washer	8
33	GB6170-86	螺母 M6	Nut	3
34	Z5G.1.1.7A-1	软轴支架	Supporting Bracket	1
35	LW330F.1.4	操纵软轴	Operating Cable	1
36	GB5783-86	螺栓 M6 × 12	Bolt	1
37	Z3G.1.7-2	弯板	Bent Plate	1
38	GB5783-86	螺栓 M8 × 20	Bolt	2
39	GB93-87	垫圈 8	Washer	2
40	LW330F.1.5	支架	Supporting Bracket	1
41	GB5783-86	螺栓 M8 × 25	Bolt	8
42	GB97.1-85	垫圈 8	Washer	8
43	GB93-87	垫圈 8	Washer	10
44	GB6170-86	螺母 M8	Nut	8
45	LW330F(II).1-1	压板	Pressing Plank	2
46	LW330F(II).1-2	胶皮	Rubber Plate	2

with Nitrogen and relative training on how to use these kind of tools.

- Check tyres and wheel hub. Don't operate the loader when the tyre pressure is very low. And also check if there are any cracks or deformation on the tyres.
- Check the mounting screws and bolts on the wheels to see if they are securely fastened as required by the manufacturer.
- During checking the wheels, don't make any access to the steering wheels, both in the front and in the back. Such checking should be done from the wheel sides. When you need to remove one of the wheel, other wheels should be blocked with wedges. (Figure 2-23)

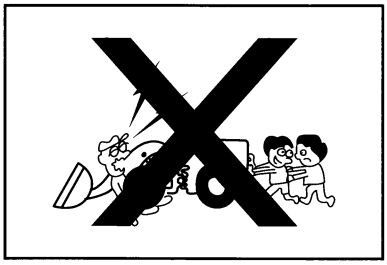


Figure 2–23

- When performing welding near a wheels, special care should be given because the tyre wheel may cause explosion. (Figure 2-24)
- Repairing the tyres and wheel hubs is a dangerous job. Only the trained and competent personnel can make inspection and maintenance to tyres and wheel hubs with the help of proper tools and correct procedures.
- When replacing a tyre, make sure the tyre to be used is correct. All tyres should be same in terms of specification data and texture.

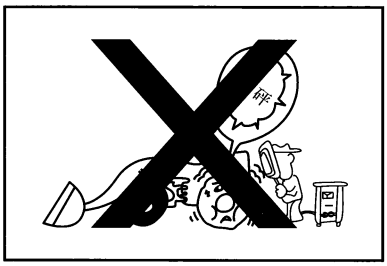


Figure 2–24

2.4 Lubrication And Maintenance

The maintenance is very important to the loader . It is a wrong idea that the maintenance is unnecessary as long as the loader can work normally. The right maintenance not only can prolong the service life of the loader , but also can find the trouble early , so the repairing time and cost should be saved.

2.4.1 Checking And Maintaining Before And After Working

A. Checking before working

- Water level of the radiator.
- Oil levels inside the sump of the engine.
- Oil levels inside the fuel tank, hydraulic reservoir and transmission.
- Seal of each oil hose, water hose, water hose, air hose and their connectors.
- Connections of the batteries.
- Reliability of service brake and park brake.
- Flexibility of each control lever and shift them into their neutrals.
- Inflation of each type.
- Fastening of the rim bolts, axle bolts and other screws.

B Checking and maintaining after the working

- Check the fuel level.
- Oil level and cleanness of the oil sump. If the oil is found over-leveled and diluted, cause should be found out and cleared.
- Leakage from each hose and their connectors.

1.2 330E.1.1 柴油箱总成 Fuel Tank Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	330E.1.1.1	箱体	Tank Body	1
2	YWZ-127	液位计	Level Gauge	1
3	GB1235-76	O型密封圈 45 × 3.5	O-Ring	1
4	ZL40.1.3-7	螺塞	Screw Plug	1
5	GB5783-86	螺栓 M8 × 16	Bolt	4
6	XGXL2-10 × 0.63	加油滤清器	Oil Filter	1
7	Z3.1A.1.1A	加油口	Oil Injecting Hole	1
8	GB5783-86	螺栓 M8 × 20	Bolt	4
9	GB93-87	垫圈 8	Washer	4
10	Z3.1A.1-1	密封垫	Seal Washer	1
11	Z3(LT).1-6A	过油螺栓 M14 × 1.5	Bolt	2
12	JB982-77	垫圈 14	Washer	4
13	XGXL5-10 × 100	滤油器总成	Oil Filter	1
14	JB982-77	垫圈 45	Washer	1
15	GB97.1-85	垫圈 16	Washer	4
16	GB93-87	垫圈 16	Washer	4
17	GB5783-86	螺栓 M16 × 35	Bolt	4

Time schedule for periodical maintenance

This schedule is designed according to normal working time and conditions. If the working condition is too bad, adjust it as soon as possible. The time intervals listed in the following forms is decided with the time accumulator of the loader.

Mark explanation : ●Check ★Replenish ◇Replace △Clean

Inspection and service schedule for engine (Table 2-1)

Check time / Check item	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
The oil and pollution of the engine	●	◇ Only after the first 25 hours		◇ 200 hours for the engine with turbo charge		
Water level of the radiator	●				◇, △	
Fuel tank	●					
Filter core of the air filter	●	Change it every year when it is necessary				
Discharging of debris and clean of the filter core				△Every 150 hours		
Oil coarse filter				●Every 150 hours	△Every 600 hours	
Tension of the fan belt	●				△Every 600 hours	
Fastening of the cylinder cover						●Every 1200 hours
Clearance of the air gap				●Every300 hour		
Oil ejecting time						●Every 1200 hours
Ejecting condition of the ejector						●Every 1200 hours
Compressing pressure of the cylinder						●Every 1200 hours
Provide lubrication oil to oil pump and speed adjustor						◇Every 1200 hours
The clearance and rotation of the turbo rotator						●Every 1200 hours
Fastening of bolts					△Every 600 hours	
Exhausting condition	●					
Bearings of the pump and fan		★Lubrication grease				
Action of the accelerator pedal	●					

1.3 LW330F.2 驱动桥总成 Driving Axle Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	PRC111D006A	前驱动桥	Front Driving Axle	1
2	GB2900-1991	轮胎 17.5-25	Tyre	4
3	Z3G.2.1	钢圈	Ring	4
4	PRC111D006B	后驱动桥	Rear Driving Axle	1
5	GB5785-86	螺栓 M24 × 2 × 220	Bolt	8
6	GB93-87	垫圈 24	Washer	16
7	GB6176-86	螺母 M24	Nut	16
8	GB5785-86	螺栓 M24 × 2 × 240	Bolt	8

Inspection and service schedule for transferring device (Table 2-4)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
The oil level of hydraulic torque converter and transmission	●			◇Only the first time		
Looseness of the transferring shaft bolt	●			●Lubricating grease		
Air hole of the axle housing					△	
Replace the oil of the differential				◇Only the first time		◇Every 2000 hours
Replace the oil of the main reducer				◇Only the first time		◇Every 2000 hours
Rough filter net of transmission					★	
Filter core of pipe-lines					◇	
The condition and pressure of tyres	●					
The engagement of the shift lever	●					

Inspection and service schedule for working device (Table 2-5)

Check item \ Check time	10 hours	50 hours	100 hours	250 hours	500 hours	1000 hours
The clearance and action of the operation lever	●				●Lubrication grease	
The damage of the boom and bucket	●					
The wear on the bucket teeth and cutting edge	●					
The dirt and damage on the hydraulic cylinder	●					
The oil level in oil tanks		●Displace the debris				◇Every 2000 hours
Oil filter for oil tanks						◇
Lubricating grease supply			★			

1.4 PRC111D006 桥总成 Axle Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	83240200	轮边减速器总成	Planetary Reduction Ass.	2
2	72006035	制动器总成	Brake Assembly	2
3	80350100	桥壳总成	Axle Housing Ass.	1
4	82350200	主减速器总成	Carrier Assembly	1
5	75500151	螺栓 M10 × 30	Bolt	7
6	52020003	垫圈 10	Washer	11
7	75500225	螺柱 M10 × 50	Bolt	3
8	51014003	螺母 M10	Nut	3
9	52000002	垫圈 10	Washer	3
10	75500681	固定锥套	Cone	3
11	75500159	螺栓 M10 × 40	Bolt	4
12	56100001	通气塞	Plug	1
13	51010007	螺母 M20 × 1.5	Nut	24
14	52020008	垫圈 20	Washer	24
15	79600119	轮辋螺母	Nut	24
16	80240003	轮辋螺栓	Bolt	24
17	75500197	螺塞 M24 × 1.5	Plug	2
18	53200005	组合密封垫	Compound Seal	2
19	80214001	半轴	Side Shaft	2

2.4.3 Periodical Maintenance

The proper lubricating and maintain can ensure the normal operation and prolong the machine service life, so the time and cost of repair can be reduced.

The periodical maintenance is divided into six time modes: 50hrs, 100hrs, 250hrs, 500hrs, 1000hrs, 2000hrs.

A. Maintenance every 50 hours

- Fasten the connecting bolts of front and rear transmitting shaft .
- Check the oil level in braking booster.
- Check the oil level of transmission.
- Check the accelerator control hand brake and gear-shifting performance.
- Inject grease to fan shaft , chassis articulating pins, transmission shaft, rear axle supports and steering pins.
- For draining sediments and mixed water from fuel , loosen the drainage plug that is at the bottom of fuel tank.

B. Maintenance every 100 hours

- Check if the mounting bolts for wheel rims and braking disc are securely fastened.
- Check the oil level in front and rear axles.
- Clean the air filter element.
- Measure the inflation pressure of tyres.

The inflating pressure of tyres should be measured before starting the machine.

Tyre pressure: Front tyres: 0.32~0.35Mpa Rear tyres: 0.28~0.30Mpa.

- Check the engine oil level if necessary. Fill more engine oil via the oil-filling plug.

C. Maintenance every 250 hours

The following maintenance should be performed only after the first 250 working hours.

- Fuel filter: replace the filter core.
- Transmission oil filter: replace the filter core.
- Engine air gap: check and adjust.
- Clean the filters of oil filter and fuel filter and transmission filter.
- Fill the battery liquid and clean its surface , apply some Vaseline on its connector..
- Check if the working mechanism, frame, weld and fixing bolts get loose or cracked. And fasten the nuts on wheel rims.
- Check the wear status of the parking brake drum.
- Adjust the tension of fan belt. Press the central point between engine pulley and fan pulley with about 6kg force. The normal tension flexibility of the belt is about 10mm. After adjusting, mounting bolts should be tightly fastened.
- Lubrication : Inject grease to the bucket pin, bucket, boom pin, tilt cylinder pin, raising cylinder pin, lift arm pin, steering cylinder pin.

D. Maintenance every 500 hours

- Replace the oil of transmission system and clean the filter for oil-pan.
- Fasten the bolts that connect the axles and frame.
- Check and adjust the hand brake clearance.
- Replace the diesel oil.
- Lubrication : Inject grease to the main transmission shaft, front and rear transmission shaft.

1.5 82350200 主减速器总成 Carrier Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q'ty
1	82214203/8221510	主传动齿轮副	Pinion	1/1
2	151040002	螺母 M12 × 1.25	Nut	12
3	75500010	螺栓 M12 × 1.25	Bolt	12
4	54000001	轴承	Bearing	1
5	75200054	锁紧片	Lock Plate	2
6	50004003	螺栓 M10 × 20	Bolt	2
7	54100038	轴承	Bearing	2
8	75200100	调整螺母	Adjust Nut	2
9	82214207	差速器总成	Differential Ass.	1
10	79800023	主减速器壳体组件	Carrier Case	1
11	54100012	轴承 27310E	Bearing	1
12	82214205	隔套	Spacer	1
13	54100011	轴承 27309E	Bearing	1
14	75200067	垫片	Washer	1组
15	82214206	轴承座	Bearing Cage	1
16	75203628	盖总成	Cage Ass.	1
17	82350201	连接法兰组件	Flange Ass.	1
18	75500013	锁紧螺母	Lock Nut	1
19	52020005	垫圈	Washer	5
20	75500005	螺栓 M14 × 1.5 × 45	Bolt	5
21	52020004	垫圈 12	Washer	1
22	75500006	螺栓 14 × 1.5 × 45	Bolt	1

of their full capacity. And it is also effective when the gravity is raised up to 1.280, but never be beyond that value. In hot summer : as the water inside the electrolyte may get vaporized easily, they must be checked once a week and distilled water should be replenished. In very hot place , it also works if the gravity decreases to 1.220 ± 0.01 after recharging finished.

△ Electrolyte : The electrolyte can only be replenished with distilled water or refined water . If the batteries are still used when the level of the electrolyte is at its minimum level, the electrodes may be corroded and the service life of the batteries are shortened.

△ When replenishing electrolyte in cold weather, perform that before starting the engine, and never replenish after operating, so as to avoid freezing.

△ The batteries should be kept clean. As the tops or terminals of batteries are easily polluted, and that will be the main reason of electricity escaping, so they must be cleaned frequently.

△ When assembling electrode terminals , grind them first and then clamp fast.

△ Before you inspecting the electrical system, be sure to disconnect the negative terminal (-) of the batteries first.

△ As explosive gas may release out surrounding the batteries, flame is forbidden to be held near them.

⚠ CAUTION	If electrolyte gets on your skin (hand , face or eye), wash it immediately by fresh water (city water). Drink plenty of water if it happens to get into your mouth . Specialized doctor should be seen after your have first aid .

● Wires and fuses

△ Always pay attention to the connections and protecting peel of wires and the clamping of the fuses.

△ If one line works abnormally, the fuse of this line should first be checked.

△ If the fuse is to be replaced , causes should be found out , and then check the lamp bulbs and disconnection.

△ Fuses are located at upright corner of the cab and under the left side of the instrument panel .

△ The capacity (ampere) on the bulb and clamp must also be checked.

● Lamps and instruments

△ Check the function of each lamp switch.

△ Dirt on lamps must be cleaned away

△ Press the horn button to check the sound.

△ if the pointer of meters stay in green area, it is normal.

B. Steering device

● Fully hydraulic steering unit has been adopted in this type of loader . When the loader works correctly , driving direction can be changed by a slight turning of the steering wheel . When you feel hard to steer , do not turn the steering wheel rudely, stop the loader for checking. Operation can be resumed after the trouble has been eliminated.

● Don't turn the steering wheel before starting the machine.

● Don't forcefully turn the steering wheel in case it gets hard to turn it.

● After 2000 working hours, the steering valve should be dismantled for inspection and steering angle be corrected. When internal or external leakage happens to the steering cylinders, inspection is necessary and seals should be replaced.

1.6 83240200 轮边减速器总成 Planetary Reduction Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	77000021	隔套	Sleeve	1
2	77000044	调整支柱	Adjust Put	1
3	83240206	限位块	Block	各1共4
4	53200002	组合密封垫	Compound Seal	1
5	75500842	螺塞 M12 × 1.25 × 9	Plug	1
6	52020004	垫圈 12	Washer	1
7	50012030	螺塞 M12 × 1.5 × 30	Plug	1
8	52020006	垫圈 16	Washer	11
9	50012035	螺栓 M16 × 1.5 × 30	Bolt	11
10	51270006	销 B12 × 24	Pin	2
11	53200005	组合密封垫	Compound Seal	1
12	75500197	油塞 M24 × 1.5	Plug	1
13	83240201	行星轮架	Planetary Gear Carrier	1
14	83240203	太阳轮	Sun Gear	1
15	83240211	行星轮垫	Washer	6
16	83240204	行星轮	Planet Gear	3
17	83240205	行星轮轴	Planet Gear Shaft	3
18	54400006	滚针	Rolling Needle	126
19	50160003	螺钉 M8 × 15	Screw	3
20	52060005	锁紧垫片	Lock Washer	1
21	71270231	螺母 M75 × 2	Nut	2
22	77000021	隔套	Spacing Sleeve	1
23	83240208	齿圈	Ring Gear	1
24	83240210	卡环	Lock Ring	1
25	83240209	齿圈支承	Ring Supporter	1
26	54100006	轴承 2007124E	Bearing	1
27	83240202	轮毂	Hub	1
28	54100005	轴承 2007122E	Bearing	1
29	53100013	油封 B140 × 170 × 15	Seal	1
30	53100005	油封 FB140 × 170 × 15	Seal	1
31	83021509	油封座	Oil Seal Cage	1

When making air bleeding, take a piece of transparent hose and insert its one end into the air nozzle while the other end is put into an oil container. Release the nozzle and trample down the braking pedal several times continuously till there is any oil liquid coming out without bubbles. Afterwards fasten the nozzle and then release the braking pedal.

- Brake pedal

The performance for braking pedal can only be checked while the machine is traveling. And also figure out if the braking performance is only acting on one side.

Check the pedal clearance after the pedal has been trampled down, movement to its front end must be of the clearance of 13 to 23mm.

- Booster pump

After working for 2000 hours , the booster pump should be dismantled and thoroughly serviced.

- Parking brake

Engage the hand brake and check if the loader is under braking condition. If the braking performance is not good or abnormal phenomena appears, please find out the reason and eliminate it. The frictional lining and braking drum must be checked .

F. Miscellaneous

- After 2000 hours operation, the whole loader must be visually checked. Pay attention to damages, deformations, cracking, welding peelings and other shortcomings which can hinder normal operation, especially the working apparatus and wheels.
- After 2000 hours, check the fastening of each screw and nut on the loader . Fasten it if necessary.

Special attentions should be paid to the rim nuts and screws on the suspending parts. Check the sealing of each hose connection , engine, radiator and transmission system for oil or water leakage.

- If leakage is hard to be found , stop the engine and clean the part that is to be checked , then restart the engine.

2.5 Structural Principle and Maintenance Precautions

2.5.1 Engine

This loader adopts YC6108G engine, the details of the engine are listed in the Engine Manual accompanying with the engine.

2.5.2 Transmission System

A. Torque converter

The torque converter includes three units: impeller, turbine and stator.

These three units make up of a working system for transmission with oil liquid flowing in accordance with the above order through the circuit. The oil-input gear pump of transmission supplies oil to torque converter uninterruptedly, which makes the torque converter work, therefore increasing the output torque of engine. At the same time, the oil that is displaced from torque converter takes away the heat produced by torque converter. Oil liquid flows from the impeller to the turbine, changing direction in this process. The turbine and the output shaft should attain torque which is determined by the load. The function of the stator is to alter the direction of the oil flowing from the turbine and flowing into the impeller again, so the stator meets a resistive torque. The ratio of turbine torque and the impeller torque is named as conversion coefficient. In general, if conversion coefficient increases, the speed ratio between the turbine and the impeller decreases. The maximum conversion

1.7 72006035 制动器总成 Disk Brake Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	75700436	夹钳体	Clamp Body	1
2	75700443	封油分泵盖	Pump Cover	1
3	75700458	进油分泵盖	Pump Cover	1
4	79900278	圆柱销	Column Pin	4
5	50009015	螺柱 M10 × 35	Screw	8
6	75700459	孔塞	Hole Plug	1
7	52020003	垫圈 10	Washer	8
8	75700462	螺栓 M10 × 35	Bolt	4
9	51014003	螺钉 M10	Screw	4
10	54800005	钢球	Steel Ball	2
11	75700442	放气嘴	Deflate Nozzle	2
12	55400001	放气嘴保护罩	Nozzle Protection	2
13	75700438	防尘圈	Dustproof Ring	4
14	75700435	摩擦垫块底板	Plate of Friction Pad	2
15	75700463	摩擦片	Friction Slice	2
16	75700440	活塞	Piston	4
17	53000010	O型密封圈 75 × 3.1	O-Ring	2
18	75700439	矩形密封圈	Rectangular Seal Ring	4
19	75700437	销轴	Pin Shaft	4

After the loader has stopped, engage the hand brake. If you need to leave the loader unattended, please use a wedge to block the wheels.

If the loader will be maintained unused for a long time, the control handle must be placed at neutral position.

If the loader stop driving but its engine still running with the gearbox, engine may stop automatically. However at this time the loader possibly crawls as long as the road is level, since the engine in the racing state can produce a little traction torque through torque converter. So the parking brake should be used.

We suggest that gear-shifting can be done grade by grade.

Under the function of the brake system, the speed of the engine will accelerate sharply. It is dangerous to skip a certain gear because the engine speed changes sharply. Only when the low gear has reached to its maximum speed, gear-shifting can be done. If necessary, trample down the brake and make gear-shifting at low speed.

If the reverse operation occurs when the loader is driving in high speed, please reduce the engine speed first. The highest reverse driving speed should not be over 10km/h, if possible, please only apply gear I and gear II under such circumstance.

When the loader being towed, release the parking brake and be sure the towing speed should not be over 10km/h, and the towing distance should not be over 10 kilometer. Otherwise, it will damage the transmission system. Trailer or other types of carrier vehicle should be used when the loader needs to be transported for long distance.

The normal oil temperature of torque converter is 80-110℃, but it is permitted that the oil temperature reaches to 115℃ within a short time.

Oil temperature of the torque converter should not reach to its maximum limit of 115℃ under normal operation. If the torque converter oil temperature exceeds 120℃, it is a must to stop the loader first. Then check the machine to see if there is oil leakage while the engine running at 1200-1500r/min and the transmission system being at neutral gear.

Under such situation, oil temperature in torque converter will drop to its working temperature range within 2-3 minutes, otherwise the system must has defect, you must get rid of it before you attempt to restart it again.

When troubles occur in transmission system, please stop the engine and turn to a technician.

D. Driving axle

The front axle is fixed on and the rear axle is oscillated with chassis. For the purpose of increasing traction power, the machine adopts 4-wheel drive system.

The driving axle is composed of axle casing, main reducer (including its differential), axle shaft and hub reducer.

The axle casing is fixed on the frame, which bears the load from the machine frame and transfers it to wheels, it also is the casing for main reducer, axle shaft and hub reducer.

The main driver is one stage spiral bevel gear reducer, and it mainly is used to increase the torque of the transmission system, lower the transmission and change the driving direction.

Differential is a planetary gear couple which is consisted of two bevel axle shaft gears, spider, four bevel pinion gears and left and right differential cage . It differentiates the speed for the left and right wheel and transfers the torque of the main transmission and movement to the hub reducer.

Hub reducer is a planetary gear transmission mechanism. With its inner gear ring fixed on hub bearing, planetary gear and hub rotating together. Function of the hub reducer is to increase the torque of driving system and reduce the speed of transmission.

Tyres and rims are the main driving device. With the low-pressure wide-base cross-country tyres (17.5-25), the loader has a good off-road performance.

1.8 LW330F.3 变速箱变矩器系统 Transmission and Torqur Converter System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	JB3616.1-1984	喉箍 31-36	Hoop	10
2	Z3.3-1	软管 Ø 19	Hose	1
3	Z3.3.6	滤清器	Oil Filler	1
4	Z3.3-2	软管 Ø 19	Hose	1
5	GB93-87	垫圈 12	Washer	18
6	GB5783-86	螺栓 M12 × 30	Bolt	8
7	YJ315X	液力变矩器	Torque Converter	1
8	LW330F.3.1	直角接头	Joint	1
9	LW330F.3.7A	胶管	Hose	1
10	Z3.3-15	纸垫	Paper Pad	1
11	Z3.3-11	联接盘	Joint Flange	1
12	GB5782-86	螺栓 M10 × 35	Bolt	8
13	GB93-87	垫圈 10	Washer	14
14	GB5782-86	螺栓 M10 × 40	Bolt	2
15	LW330F.3.6	吸油法兰盘	Oil Inlet Flange	1
16	Z3.3-4	软管 Ø 32	Hose	1
17	LW330F.3.4	球铰接头体	Ball Articulating Joint	1
18	Z3.3-10	铰接螺栓	Articulating Bolt	3
19	JB982-77	垫圈 22	Washer	9
20	Z3.3.11	接头体	Joint	2
21	CB32	变速泵	Shift Pump	1
22	LW330F.3.5	胶管	Hose	1
23	Z3.3-6	软管 Ø 32	Hose	1
24	LW330F.3.2	直角接头	Right Angle Joint	1
25	LW330F.3.3A	出油法兰盘	Oil Outlet Flange	1
26	Z3.3-7A	接头体	Joint	1
27	Z3.3.8	直角接头体	Right Angle Joint	1
28	Z3.3-8	软管 Ø 19	Hose	1
29	Z3.3-19	软管接头体	Joint	3
30	Z3.3-5	软管 Ø 19	Hose	1

and keep engine running at idle speed. Tilt the bucket to its most front position, then raise the lift arm. At this time, the pressure reading of the pressure gauge should be 8Mpa . If it is not the case, please adjust it.

C. Steering hydraulic system

The function of the steering system is to control the direction of the loader's traveling , which can make the loader travel in direct line and change the direction flexible on steering.

LW321F wheel loader adopts the fully hydraulic steering , which is composed of steering pump, distribution valve , the cycloidal hydraulic steering gear , steering cylinder , filter , hydraulic tank and so on .

The oil that comes from the steering pump gets into the steering gear. In case the steering wheel is not rotating , hydraulic oil should return to hydraulic tank through inner spool.

In case the steering wheel is rotating, the oil that comes from the pump enters measuring motor (including the rotator and stator) in steering gear via modulating valve , which has the rotator moving with the steering wheel and inject the certain amount of hydraulic oil to left chamber or right chamber, by which to realize machine steering.

Steering valves are installed on the steering valve body, which connects with the pump and steering gear and ensures steering gear and the whole steering system can work normally under the rated pressure. At the same time , it can also protect the steering cylinders, steering pump and the connecting pipes.

D. Maintenance to hydraulic system

- Hydraulic oil in the system must be kept clean. In case the ration of filter is larger than 75, the accuracy of oil-suction filter should be over 400um, the accuracy of oil-return filter should be over 50um.
- Hydraulic oil must be checked at regular interval. If the oil cleaning degree is under 10 stage (ISO4406-19/16) according to NAS1638 chart, the oil must be filtrated or renewed. After 1200 hours of the loader operation, the oil must be changed and new oil should be filled according to the following procedures:

△ Lift the arms to their utmost height, and then stop the engine. Tilt the bucket and lower the lifting arms by their own weight to discharge the oil that is inside the cylinder thoroughly.

△ When the oil is still warm, screw off the plug at the bottom of the tank to discharge out the debris.

△ Screw off the plug of the oil tank and cylinder hose to discharge out the dirty oil. Afterwards clean the tank and filter by kerosene (or diesel).

△ After replenishing new oil, let the engine run at a low speed and operate the working apparatus to bleed air from the system.

- When dismantling the hydraulic element, keep working place tidy and clean to prevent dust, dirt, debris dropping into the hydraulic elements.
- To install the hydraulic elements after finishing maintenance, please check the former rubber , oil-seal and O-ring. Replace the bad elements that damage the seal.
- When dismantling the hydraulic elements, don't strike or hammer the elements.

2.5.5 Electrical System

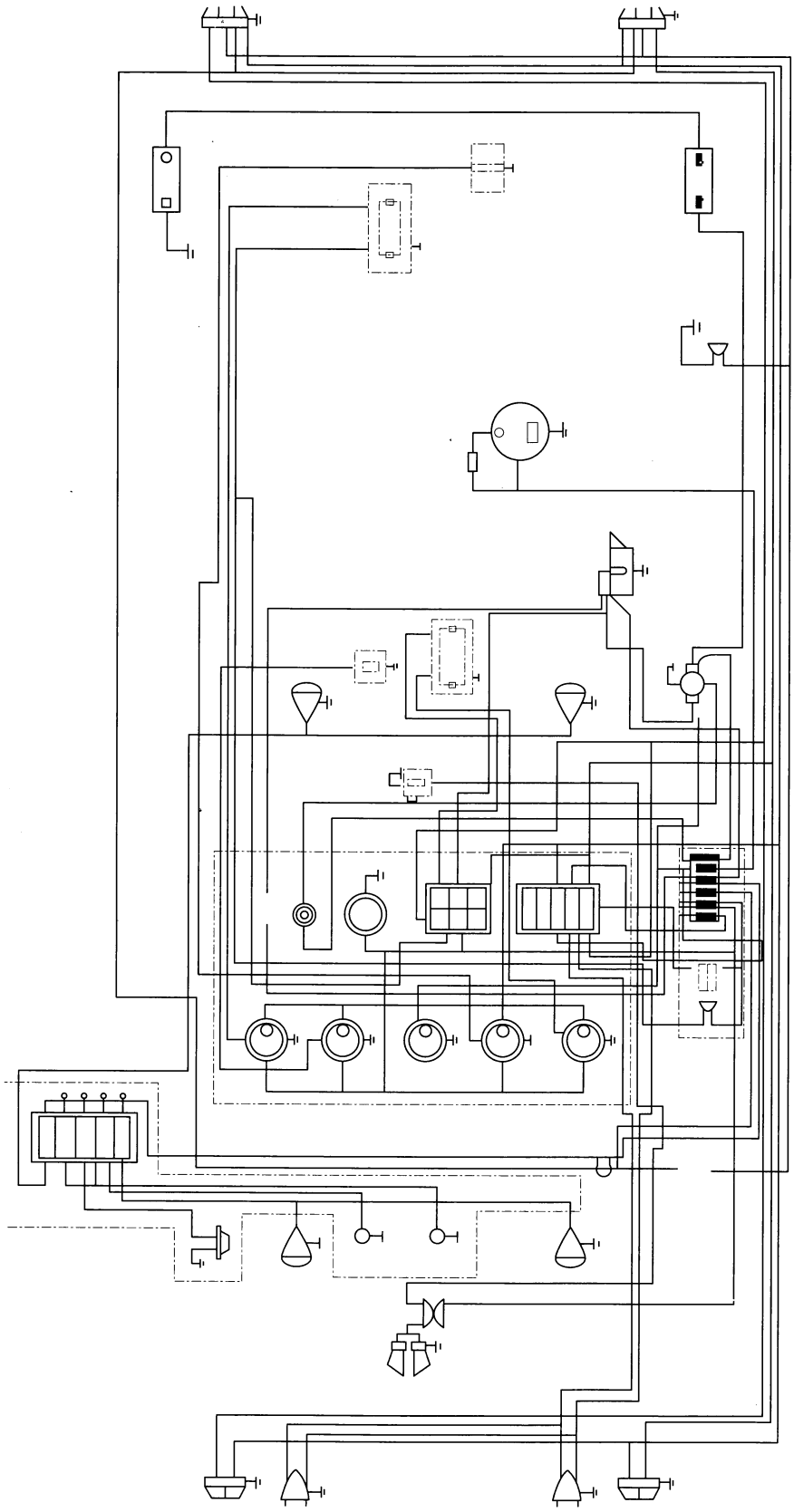
The electrical system is composed of batteries, start motor, generator for charging, relay and lamps. Its negative pole is connected to ground the voltage is 24V.

A. Battery

- Two 6-QA-180 batteries with voltage of 12V are connected in series, so the total voltage is 24V.

1.8 LW330F.3 变速箱变矩器系统 Transmission and Torqur Converter System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	Z5G.1.3-5	螺堵	Screw Plug	1
32	BS428	变速箱	Transmission	1
33	Z3.3.16-1	接头	Joint	2
34	JB3616.1-1984	喉箍	Hoop	4
35	Z3.3.16-2	软管	Hose	1



Principle diagram of electrical system of LW321F wheel loader

1.9 YJ315X 变矩器总成 Torque Converter Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	30D-11-31	铜套	Copper Bush	1
2	30D-11-30	驱动盘	Driving Wheel	1
3	GB93-87	弹簧垫片 10	Washer	25
4	GB5783-86	螺栓 M10 × 40/M1 × 55	Bolt	12/12
5	30D-11-32	联接轮	Connective Wheel	1
6	GB289-64	滚针轴承 4074106	Needle Bearing	1
7	GB893-76	孔用挡圈 55	Snap Ring	1
8	GB894-76	轴用挡圈 38	Snap Ring	2
9	30D-11-37	涡轮	Turbine	1
10	30D-11-28	涡轮座	Turbine Guide Sleeve	1
11	30D-11-29	定位销	Position Pin	6
12	GB894-76	轴用挡圈 60	Snap Ring	1
13	30D-11-27	导轮	Pilot Gear	1
14	GB1235-76	密封圈 339 × 3.5	O-Ring	1
15	30D-11-25	泵轮	Impeller	1
16	30D-11-24	隔环	Spacing Ring	1
17	GB893-76	孔用挡圈	Snap Ring	1
18	GB1235-76	密封圈 130 × 3.1	O-Ring	1
19	GB5783-86	螺栓 M8 × 24	Bolt	24
20	30D-11-22	销轴	Pin	4
21	30D-11-21	泵轮座	Impeller Guide Sleeve	1
22	GB5783-86	螺栓 M10 × 30	Bolt	12
23	30D-11-26	气轮壳中节	Converter Housing	1
24	GB68-76	沉头螺钉 M8 × 20	Screw	12
25	30D-11-23	隔离盘	Spacing Disc	1
26	BJ1303104070	油封 100 × 120 × 13	Oil Seal	1
27	GB93-87	弹簧垫圈 12	Spring Washer	19
28	GB5782-86	螺栓 M10 × 22	Bolt	8
29	30D-11-33	销 A6 × 20	Pin	1
30	GB5782-86	螺栓 M8 × 18	Bolt	6

Phenomena of breakdown	Reasons of breakdown	Remedies
The gearbox and torque converter get overheated.	1. Oil is insufficient. 2. Clutch slips. 3. Working time is too long.	1. Replenish oil. 2. Check and repair the clutch and adjust its pressure. 3. Stop working to cool the machine.
Gear shifting is disordered	1. Arrangement of gear is wrong.	1. Readjust and repair it.

2.6.2 Steering System

Breakdown	Phenomena	Reasons of breakdown	Remedies
It is hard to steering	It is easy when turning steering-wheel slowly and hard when turning it quickly.	1. Oil supplying to oil pump is insufficient. 2. Too muck pressure loss on the pipe that connects the pilot valve and steering-wheel. 3. Valve core of pilot valve is clogged. 4. There is some air in the pipe that is between pilot valve and steering-wheel.	1. Repair or replace the oil pump. 2. Redesign the pipe-line, and select the spring with high vigidity. 3. Eliminate the clogging phenomena or replace the pilot valve. 4. Turn the steering wheel to its limit and then turn it even further, so the safety valve is open to bleed air.
	The steering wheel is easy to turn in case the machine is without load while it is hard to turn in case the machine is with load	1. The pressure setting of safety valve in pilot valve is too low. 2. The valve core is clogged or the inner leakage is severe.	1. Readjust the pressure of safety valve. 2. Eliminate the clogging problem or replace the safety valve.
	It is hard to turn the steering wheel and steering cylinder has no action.	1. The check-valve (being of steel ball) fails to work.	1. Replenish with new steel ball if the steel ball gets lost. If there is any foreign gets into the valve, clean it.
	There is some foam in the oil.	1. There is some air in the steering system.	1. Bleed air from system and check the oil suction line.
	It is heavy to make steering.	1. Oil amount is insufficient and the oil viscosity is too high.	1. Replenish with new oil or replace with the low viscosity oil.

1.9 YJ315X 变矩器总成 Torque Converter Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	30D-11-36	垫圈	Washer	2
32	30D-11-35	油塞	Oil Plug	2
33	30D-11-34	橡胶齿	Rubber Tooth	20
34	30D-11-12	输出联接法兰	Output Connection Flange	1
35	30D-11-16	垫圈	Washer	1
36	30D-11-13	密封垫	Seal Gasket	1
37	30D-11-17	垫圈	Washer	1
38	30D-11-14	槽形螺母	Slot Shape Nut	1
39	30D-11-20	驱动油泵主动齿轮	Drive Gear	1
40	30D-11-38	垫圈	Washer	1
41	GB894-76	轴用挡圈 100	Snap Ring	2
42	30D-11-19	密封环 80	Seal Ring	6
43	GB5783-86	螺栓 M12 × 30	Bolt	1
44	30D-11-05	导轮座	Stator Guide Seat	1
45	30D-11-10	套	Sleeve	1
46	30D-11-09	主动轴	Drive Shaft	1
47	30D-11-08	密封环 60	Seal Ring	1
48	GB276-64	滚动轴承 310	Roller Bearing	1
49	GB893-76	孔用挡圈 110	Snap Ring	1
50	30D-11-06	主动齿轮	Drive Gear	1
51	GB894-76	轴用挡圈 48	Snap Ring	1
52	30D-11-1	箱体	Box Body	1
53	GB894-76	轴用挡圈 30	Snap Ring	1
54	GB276-64	滚动轴承 307	Roller Bearing	1
55	30D-11-18	被动齿轮	Driven Gear	1
56	GB893-76	孔用挡圈 90	Snap Ring	1
57	30D-11-15	输出轴	Output Shaft	1
58	GB276-64	滚动轴承 308	Roller Bearing	1
59	30D-11-07	密封垫	Seal Washer	1
60	NJ130-2402050	油封 55 × 82 × 22	Oil Seal	1

2.6.3 Electrical System

Breakdown phenomena	Reasons of breakdown	Remedies
It is hard to start the engine or the engine can't be started at all	1. The battery is damaged or not be charged fully. 2. Switch is damaged. 3. Starting motor is damaged. 4. Poor wires connection. 5. Fuel oil way or the air way has breakdown.	1. Replace the battery or charge it fully. 2. Repair or replace the switch. 3. Repair or replace the starting motor. 4. Check and repair the starting wires. 5. Check the fuel oil way or air way.
Starting motor is always burnt down frequently.	1. The starting key can't restore to its original position. 2. The electrical contactor for starting motor could not be well disengaged due to somehow adhension. 3. Starting circuit has shortcut.	1. Repair or replace the starting key. 2. Repair or clean the contactor. 3. Check and repair the starting circuit.
Meter indication is abnormal.	1. Wire gets loose or shed off. 2. Sensor is damaged. 3. Meter is damaged.	1. Check or repair the wire. 2. Replace the sensor. 3. Replace the damaged meter with the same type one.
Buzzer gives sound ceaselessly.	1. WIre gets loose or shed off. 2. Braking air pressure is too low. 3. Buzzer is damaged. 4. Pressure sensor is damaged.	1. Check the circuit and make the connection reliable. 2. Check the air-way. 3. Repair or replace the buzzer. 4. Replace the pressure sensor.
Lamp can not be "ON".	1. The fuse is broken. 2. Bulb filament is burnt down. 3. Connecting wire gets loose or shed off.	1. Replace the fuse. 2. Replace the bulb. 3. Repair the connecting wire.
Generator can't be re-charged.	1. Some wires get broken or loose. 2. Fuse is broken. 3. Diode is brunt down. 4. Electrical brush is blocked or the slip ring is poorly connected. 5. Circuit of stator and rotor is broken or shortcut.	1. Connect wire properly. 2. Replace the fuse. 3. Replace the diode. 4. Repair the electrical brush and the slip ring. 5. Replace the generator.

1.9 YJ315X 变矩器总成 Torque Converter Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
61	30D-11-11	油封法兰	Oil Seal Flange	1
62	GB5782-86	螺栓 M8 × 22	Bolt	2
63	GB93-87	弹簧垫圈 8	Spring Washer	2
64	GB91-76	开口销 5 × 45	Cotter Pin	1
65	GB894-76	轴用挡圈 30	Snap Ring	8
66	30D-11-39	驱动油泵被动齿轮	Driven Gear	3
67	GB276-64	滚动轴承 206	Roller Bearing	3
68	30D-11-40	套	Bushing	3
69	GB277-64	滚动轴承 5020	Roller Bearing	3
70	30D-11-04	止动环	Retaining Ring	3
71	30D-11-03	垫圈	Washing	3
72	GB893-76	孔用挡圈 68	Snap Ring	3
73	30D-11-02	驱动油泵轴	Pump Shaft	3
74	GB894-76	轴用挡圈 30	Snap Ring	8
75	GB276-64	滚动轴承 212	Roller Bearing	1
76	GB5783-86	螺栓 M12 × 32	Bolt	12
77	GB93-87	弹簧垫圈 10	Lock Washer	12
78	30D-11-50	观察盖	Watching Cover	1
79	GB93-87	弹簧垫圈 6	Spring Washer	4
80	GB5782-86	螺钉 M6 × 15	Screw	4

2.7 Replacement Of The Key Parts

- Customers must service the loader periodically to ensure the safety. Those parts which are listed in the following list are important to your safety and should be replaced according to schedule.
- Those parts will get aged and wore out along with working time increasing, it is hard to judge the condition of those parts, so replace those key parts periodically without regarding if they are normal or not.
- Repair or replace the damaged part right away without regarding to the schedule.
- When replacing a hose, please replace the O-ring and seal cushion at the same time.
- For replacing those key parts correctly, it is better to consult with XCMG or its agent.

Key Parts Replacement List

NO.	Key parts to be replaced periodically	Quantity	Replacing schedule
1	Filter of oil-suction circuit of hydraulic oil tank	2	1 year or every 2000 hours.
2	Filter of oil-return circuit of hydraulic tank	1	
3	Filter of oil-suction circuit of fuel tank	1	
4	Oil-filling filter for hydraulic tank	1	2 years or 4000 hours
5	Fuel-filling filter for fuel tank	1	
6	Fuel hose (fuel tank--fore-hand filter of diesel)	1	
7	Fuel hose (fore-hand filter of diesel--oil pump)	1	
8	Fuel hose (fuel pump--diesel filter)	1	
9	Fuel hose (diesel filter--high pressure pump)	1	
10	Fuel-return hose	1	
11	Hose (torque converter--radiator)	1	
12	Hose (radiator--torque converter)	1	
13	Steering cylinder seals	2	
14	Hose (valve block--air cylinder)	1	
15	Hose (air cylinder--foot brake)	2	
16	Hose (foot brake--booster pump)	3	
17	Hose (foot brake--check valve)	1	
18	Hose (check valve--braking cylinder)	1	

1.10 YJ315X 减压阀总成 Reducing Value Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	30D-11-44	弹簧	Spring	1
2	30D-11-43	弹簧	Spring	1
3	GB1235-76	密封圈 19 × 2.4	Seal Ring	2
4	30D-11-42	压盖	Pressing Cover	2
5	30D-11-47	螺塞	Screw Plug	1
6	30D-11-45	减压阀体	Reducing Valve Body	1
7	30D-11-46	减压阀杆	Reducing Valve Stem	1
8	30D-11-41	销 6.5 × 32	Pin	2
9	GB5783-86	螺栓 M10 × 30	Bolt	4
10	GB93-87	弹簧垫圈 10	Washer	4
11	GB1235-76	密封圈 30 × 3.1	Seal Ring	1
12	GB1235-76	密封圈 26 × 2.4	Seal Ring	1
13	30D-11-48	溢流阀	Relief Valve	1
14	30D-11-49	弹簧	Spring	1

1.11 Z3.4 传动轴总成 Driving Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.4.1(徐桥)	接管	Connector	1
2	GB5782-86	螺栓 M16 × 80	Bolt	4
3	GB6182-86	锁紧螺母 M16	Lock Nut	4
4	GB93-87	垫圈 16	Lock Washer	4
5	GB97.1-85	垫圈 16	Washer	4
6	Z3.4-1	螺栓 M12 × 40	Bolt	8
7	GB93-87	垫圈 12	Lock Washer	8
8	GB6181-86	螺母 M12	Nut	8
9	GB91-86	销 3.2 × 22	Pin	8
10	Z3.4.2	主传动轴	Main Driving Shaft	1
11	LW330F.8.1	后车架	Rear Chassis	1
12	Z3.4.2	螺栓 M14 × 45	Bolt	16
13	GB93-87	垫圈 14	Lock Washer	20
14	GB6181-86	螺母 M14	Nut	20
15	GB91-86	销 3.2 × 26	Pin	20
16	Z3.4.3	前传动轴	Front Transferring Shaft	1
17	Z3.4-3	螺栓 M14 × 56	Bolt	4
18	Z3.4.4A	后传动轴	Rear Axle Driving Shaft	1
19	Z3.4-4	垫片	Shims	2

● The improper hoisting to the loader can result injury and damage to people and the machine, therefore before hoisting the loader, please lock the frame to prevent the machine from turning. (figure 3-3)

● Retract the locking bar when the hoisting performance finished. (Figure 3-3)

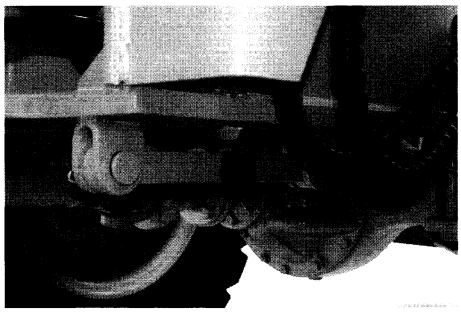


Figure 3–3 Locking pole of steering

△ Sketch map for hoisting the loader. (Figure 3-4)

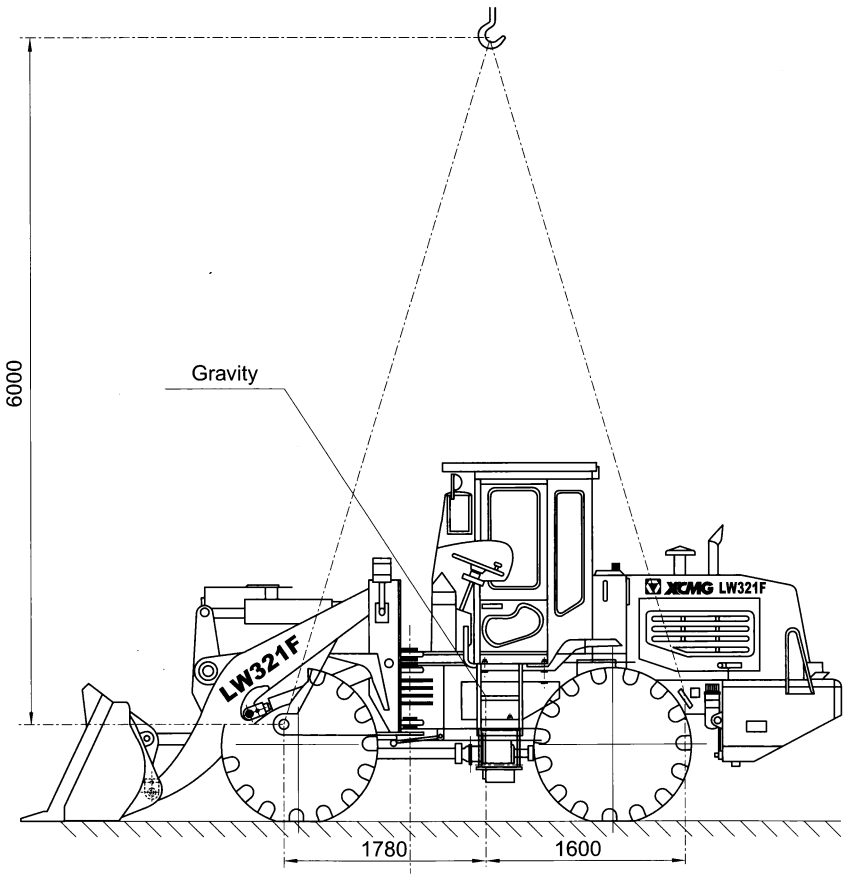


Figure 3–4 Hoisting the loader

When hoisting the loader, the rope only can pass through the lifting lugs.

CAUTION	Prevent hydraulic pipes from being damaged.When lifting the loader, make sure that there is nobody standing under the lifted machine.

1.12 Z3.4.2 主传动轴 Main Driving Shaft

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	130-2201040B	传动轴套管叉总成	Yoke Assembly	1
2	130-2201087	传动轴套管叉油封	Oil Seal	1
3	130-2201089	传动轴套管叉油封垫圈	Oil Seal Washer	1
4	130-2201090	传动轴花键轴护套总成	Retainer Cap	1
5	130-2201024	传动轴万向节凸缘叉衬垫	Washer	2
6	130-2201088	传动轴套管叉油封	Oil Seal	1
7	130-2201020	后桥传动轴带万向节总成	Universal Joints Ass.	1

3.2.2 Long Time Storage

The storing period for the machine includes short-term storing and long-term storing. For short-term, the storing period should not exceed two months. Over more than two months must be taken as a long-term storing. The parking place for storing should be sheltered, ventilated and dry and without any corrosive substances or gas.

Before storing

If a wheel loader needs to be stored for a long time, take the following measures.

- Clean the machine thoroughly, have it be dry and store it in dry storage house. If the machine has to be stored under open air, then it should be stored on the concrete ground where it is easy to drain off water, and cover it with canvas.
- Before storing it, fill up the fuel tank, add grease and change hydraulic oil.
- Coat the piston which extends out from hydraulic cylinders with grease.
- Dismount the negative pole of battery and close the battery box cover, or remove the battery from the machine and store it separately. (Figure 3-7)

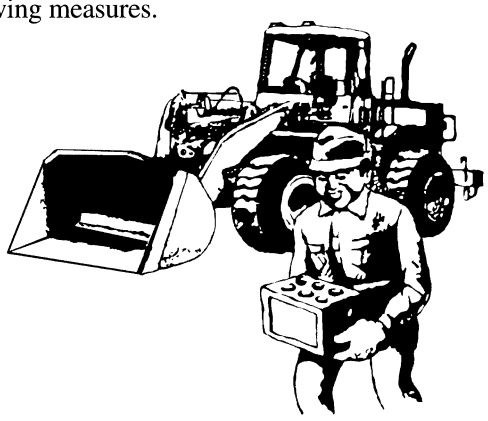


Figure 3–7

- If the air temperature falls down below 0℃, add anti-freezing addition into cooling water of the radiator.
- Put on the security lock and then lock the bucket, control lever for working arms and articulation locking-bar. Afterwards, engage the parking brake.

When the loader needs to be stored within one month, except those mentioned measures in the Daily Parking, the following procedures must be noted:

- Start and drive the machine every week, and operate its working device to let it be ready for work at any time.

When the loader needs to be stored over one month, except those mentioned in Daily Parking, the following procedures must also be noted.

- Check all the oil levels and lubricating points to see if the oil being in the level as required.
- Considering the raining season, try your best to park the machine on a hard ground of a higher place.
- The battery must be removed. Although the machine is indoor stored, if it is too hot or damp, the battery must be dismounted to get it stored in a better place, and charge it once a week.
- Parts which moisture can easily get in (such as: ventilating device and air filter) should be covered with a clothes.
- The inflating pressure of the tyres must be standard. Check the wear and damage status of the tyres.
- In order to release the heavy load on the tyres, it is better to jack up the machine to let it be in floating state. If the loader can't not be jacked up, the inflation of the tyres must be checked every two weeks to ensure the tyre pressure.
- Restore the machine into ready-work condition each week. Start the engine and let it warm up, and then move the machine back and forth a little bit.
- If you think it is necessary to activate the working device, before you do it, the grease on the cylinder rods must be cleaned away. And after such attempt, apply grease to cylinder rods again.

1.13 Z3.4.3 前传动轴 Front Driving Shaft

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	2201C-023	突缘叉 (BQ140)	Yoke	2
2	2201D-050	套管叉 (BQ140)	Sleeve Yoke	1
3	2201D-061	(BQ140)		1
4	2201D-062	(BQ140)		1
5	2201C-011	(BQ140)		1
6	2201D-016	大卡环 (BQ140)	Snap Ring	1
7	2201D-017	(BQ140)		1
8	804705K2			8
9	2201C-026	孔用卡簧 (BQ140)	Snap Ring	8
10	2201C-30	万向节总成 (BQ140)	Universal Joint Ass.	2
11		油杯 (BQ140)	Grease Cup	1
12	2201D-018	(BQ140)		1
13	2201D-021	(BQ140)		1
14	2201D-022	(BQ140)		1
15	2201D-066	(BQ140)		1

1.14 Z3.4.4A 后传动轴 Rear Driving Shaft

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	2201C-023	突缘叉	Flange Yoke	2
2	ZL30-210	滑动叉总成	Sleeve Yoke	1
3	2201D-016	大卡环	Snap Ring	2
4	404202B	防尘套	Dust Boot	1
5	ZL30-220	焊接轴叉	Slip Yoke Ass.	1
6	2201C-030	万向节总成	Universal Joint Ass.	2
7	ZZ01C-026	孔用卡簧	Snap Ring	8

1.15 BS428 变速箱箱体部件 Transmission Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL20-03001	箱体	Body	1
2	403091	铭牌	Decal	1
3	GB/T827-1986	标牌铆钉	Rivet	4
4	ZL20-030057	支架	Supporting Bracket	2
5	GB5783-86	六角螺栓	Bolt	8
6	GB93-87	弹簧垫圈 16	Lock Washer	8
7	GB6170-86	六角螺母 M16	Nut	8
8	GB5783-86	六角螺栓 M10 × 25	Bolt	18
9	GB93-87	垫圈 10	Washer	57
10	ZL20-030003	端盖	Cover	1
11	ZL20-030002	纸垫	Paper Pad	2
12	ZL20-030005	调整环	Adjusting Ring	1
13	ZL20-030006	调整螺丝	Adjusting Screw	2
14	GB5783-86	六角头螺栓 M6 × 6	Bolt	2
15	ZL20-030004	止动片	Stop Plate	2
16	ZL20-030008	输入轴端盖	End Cover of Input Shaft	1
17	JB2600-80	油封 45 × 62 × 12	Oil Seal	1
18	ZL20-030058	中间轴端盖	Cover	1
19	ZL20-030025	纸垫	Paper Pad	1
20	ZL20-030059	挡油盖调整环	Adjusting Ring	1
21	GB6170-86	螺母 M8	Nut	6
22	GB93-87	垫圈 8	Washer	14
23	ZL20-030062W1	接头法兰	Flange	1
24	ZL20-030062-4	垫片	Gasket	1
25	WL-100X100-J	滤芯	Filter Core	1
26	GB5783-86	螺栓 M8 × 25	Bolt	6
27	ZL20-030062-3W1	法兰接头	Flange Joint	1
28	GB5783-86Q26-01	六角螺栓 M8 × 30	Bolt	4
29	ZL20-030020	形圈 50 × 4	O-Ring	1
30	Q20-01	密垫片 61	Gasket	1

Turning angle of the frames	35 ± 1°	35 ± 1°
Oscillating angle of the rear axle	± 12°	± 12°

The following tecchncial date is applied to standard LW321F and high-dumping LW321F.

Engine

Model	YC6108G
Rated power	92 kw
Rated speed	2300 r/min
Max. torque	420N.m/1400-1600r/min

Transmission system

Torque converter	
Model	YJ315X
Type	1 stage, 3-elements
Cyclic diameter	315 mm
Conversion coefficient	K=3.2
Cooling method	Oil cooling-pressure circulating type
Oil inlet pressure	560 KPa
Transmission	
Model	BS428
Type	Fixed shaft type, power shift Mechanical fork shift Gear meshed type
Gear number	4 forward and 2 reverse
Ⅰ	3.82 3.05
Ⅱ	2.08 0.87
Ⅲ	1.09
Ⅳ	0.59
Transmission working oil pressure 1.1-1.5MPa	1078-1471 KPa
Transmission oil pump model	CB32
Displacement of transmission oil pump	32 ml/r
Front and rear axle	
Speed ratio	5.286
Hub reducer	

1.15 BS428 变速箱箱体部件 Transmission Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	ZL20-034001	油底壳	Oil Pan	1
32	ZL20-030007	吸油管	Tube	1
33	ZL20-030043	永久磁铁	Permanent Magnet	1
34	ZL20-034004	垫圈	Washer	1
35	Q20-01	螺塞 M20 × 1.5	Plug	1
36	GB1235-76	O型圈 40 × 3.1	O-Ring	1
37	ZL20-037000 × 2	油管头	Coupling	1
38	GB5783-86	六角螺栓 M8 × 25	Bolt	4
39	ZL20-037200	油管盖	Oil Pipe Cap	1
40	ZL20-030063	大端盖纸垫	Paper Gasket	1
41	ZL20-030033	O型形橡胶圈	O-Ring	1
42	ZL20-031000	大端盖	End Cover	1
43	ZL20-030032	轴套	Sleeve	3
44	ZL20-030031	垫片	Gasket	3
45	ZL20-035002	外封轴盖	Cover	3
46	ZL20-035001	进油端盖	Cover	3
47	GB119-86	定位销 A10 × 40	Position Pin	1
48	GB70-85	圆柱内六角螺钉 M10 × 30	Screw	13
49	ZL20-030022	输出轴调整垫片	Adjusting Gasket	1组
50	ZL20-030026	前输出轴封油盖	End Cover	1
51	HG4-335-66	油封 65 × 90 × 12	Oil Seal	2
52	GB5783-86	六角头螺栓 M10 × 30	Bolt	35
53	ZL20-030101	通风器盖	Cap of Ventilator	1
54	GB39-88	方螺母 M6	Square Nut	1
55	ZL20-030103	通风片	Ventilating Plate	1
56	ZL20-030105	铜套	Copper Sleeve	1
57	ZL20-030106	迷宫片	Gasket	5
58	ZL20-030107	铜隔套	Brass Spacing Sleeve	4
59	ZL20-030102	长螺丝	Stud	1
60	ZL20-030109	壳体	Housing	1

4.2 Overall Dimensions

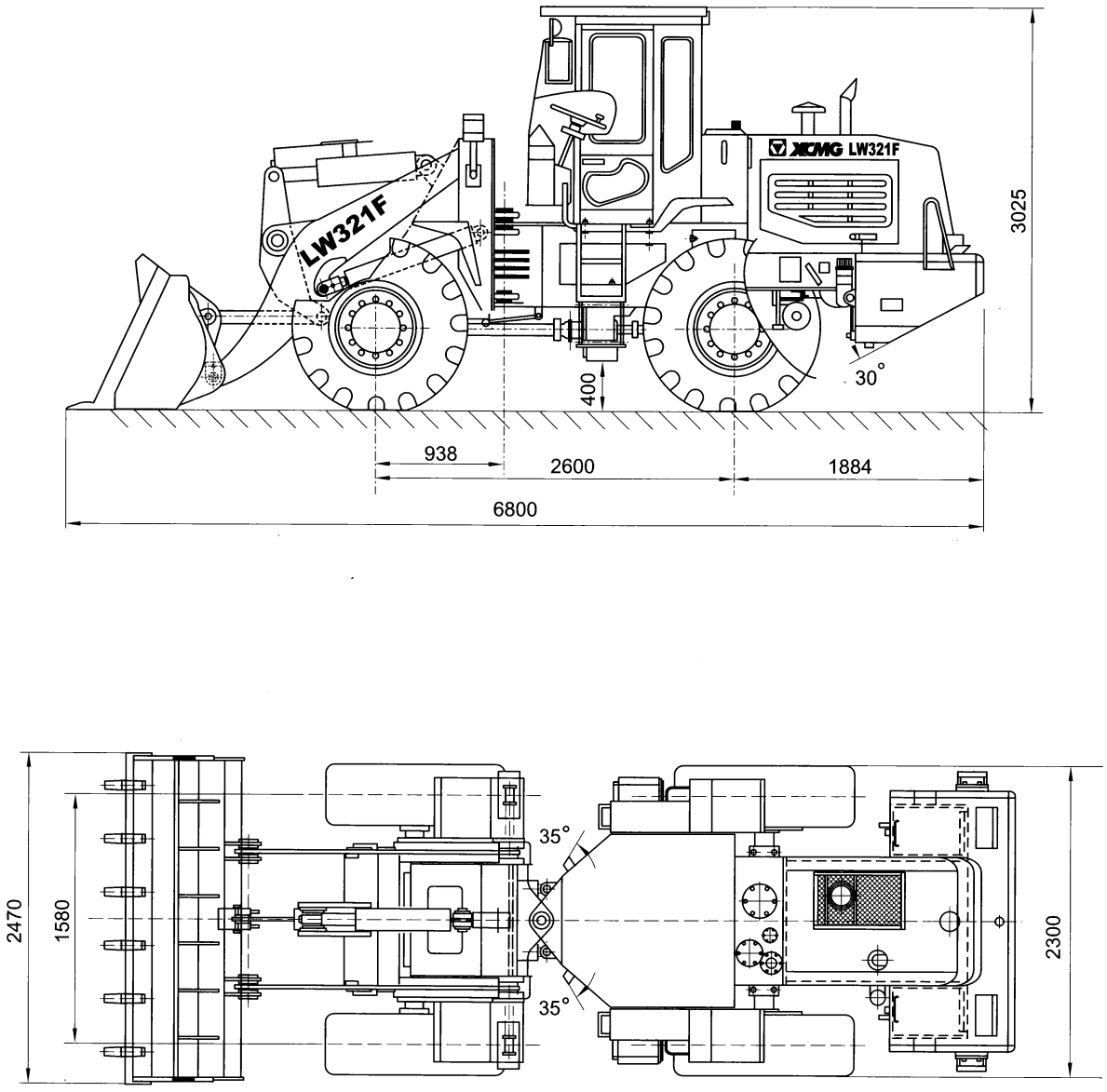


Figure 4–1 Overall figure of LW321F wheel loader

1.15 BS428 变速箱箱体部件 Transmission Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
61	ZL20-030108	纸壳	Paper Pad	1
62	ZL20-030039	箱盖	Box Cover	1
63	ZL20-030060	挡油盖	Oil Fending Cover	1
64	GB867-86	半圆头铆钉 4×18	Rivet	4
65	ZL20-030040	纸垫 0.5	Paper Pad	1
66	GB5783-86	方角头螺栓 M10×35	Bolt	4
67	Q21-34	闷塞7	Plug	6
68	ZL20-031005	闷塞	Plug	6

1.16 BS428 变速箱输入轴总成 Input Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB810-76	小圆螺母 M20 × 1.5	Nut	1
2	GB858-88	圆螺母止动垫圈 20	Stop Washer	1
3	GB97.1-85	垫圈 20	Washer	1
4	ZL20-030061 × 1	凸缘总成	Flange Ass.	1
5	GB297-84	圆锥滚子轴承 7507	Cone Roller Bearing	2
6	ZL20-032008	输入轴	Input Shaft	1
7	ZL20-032009	闷塞 9	Plug	1
8	GB893.2-86	孔用挡圈 75	Snap Ring	2
9	GB276-89	向心球轴承 109	Ball Bearing	2
10	ZL20-032007 × 1	齿轮 (Z=33)	Gear	1
11	ZL20-032101	挡圈	Snap Ring	1
12	ZL20-032102	外端盖	Cover	1
13	ZL20-032104	外摩擦片	Clutch Disc (Outer)	6
14	ZL20-030103	内磨擦片	Clutch Disc (Inner)	5
15	GB894.2-86	轴用弹性挡圈 60	Snap Ring	1
16	ZL20-032110	弹簧座	Spring Seat	1
17	ZL20-032108	弹簧	Spring	1
18	ZL20-032016	活塞	Piston	1
19	ZL20-032107	封油圈	Seal Ring	1
20	GB1235-76	O型密封圈 6.0 × 3.1	O-Ring	1
21	ZL20-032105	离合器壳体总成	Clutch Housing	1
22	GB308-89	钢球 5	Steel Ball	1
23	ZL20-032109	阀座	Valve Seat	1
24	ZL20-032010 × 1	齿轮 (Z=46)	Gear	1
25	ZL20-032007	止动垫	Stop Plate	4
26	GB5783-87	六角螺栓 M10 × 25	Bolt	8
27	GB119-86	圆柱销 A8 × 22	Pin	2
28	ZL20-032004	轴套	Bushing	1
29	ZL20-032003	内封油套	Piston	1
30	CA10-350914-A	烽塞环 Ø 52	Piston Ring	2

FOREWORD

This manual can provide you reference when you purchasing the XCMG LW321F Wheel Loader.

This manual mainly introduces the parts, component structures and assemblies of every system of the loader, which can help users, sellers and technicians purchase and service the loader.

In this manual, those parts (including welded parts or riveted parts) which can't be dismantled furthermore have been numbered, so no separate number is given to their composite parts.

When you need to purchase some parts from us, please inform us of the following information clearly to ensure we can deliver you the right staffs you just need.

ex-work date and serial number of the Wheel Loader.

Part No. and Part Description of the parts that you need.

quantity of the parts that you wish to buy.

Please advise us of your mailing address, company name and post code if you wish us to send parts to you by mail.

The LW321F Wheel Loader will be updated technically, so we reserve the right to make changes to this manual at any time without giving prior notice.

1.16 BS428 变速箱输入轴总成 Input Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	ZL20-032002	轴端挡板	Plate	1
32	ZL20-032001	止动垫	Stop Plate	1
33	GB5783-86	六角螺栓 M8 × 16	Bolt	2

目　录

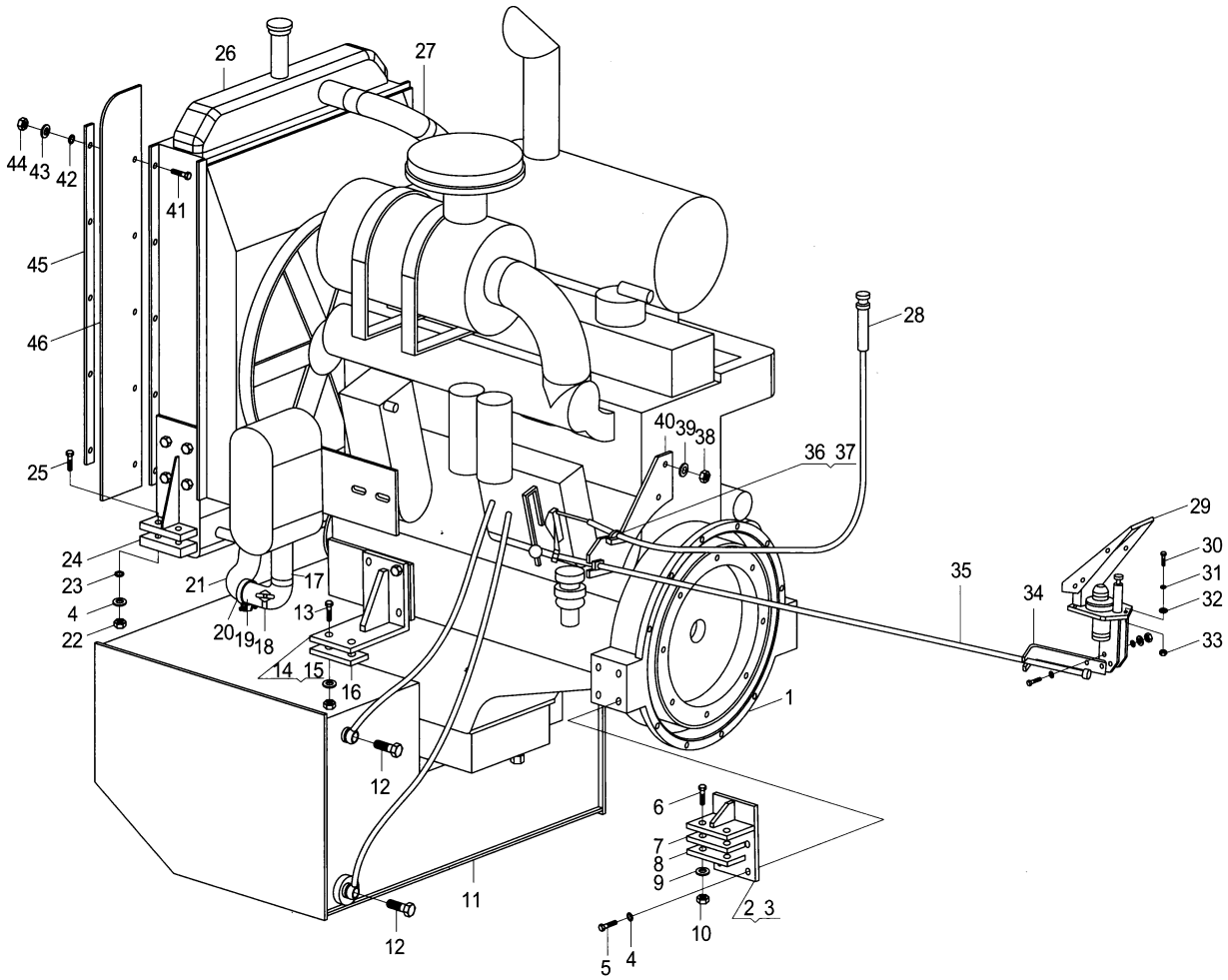
1. 动力传动系统
ENGINE AND TRANSMISSION SYSTEM

2. 车架与附件
CHASSIS AND ACCESSORIES

1.17 BS428 变速箱倒档轴总成 Reverse Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB5783-86	六角螺栓 M8 × 16	Bolt	2
2	ZL20-032001	止动垫	Stop Plate	1
3	ZL20-032002	轴端挡板	Plate	1
4	CA10-3509164A	活塞环 Ø52	Piston Ring	2
5	ZL20-032003	内衬油套	Piston	1
6	GB297-86	圆锥滚子轴承	Roller Bearing	2
7	ZL20-0360001	轴套	Shaft Sleeve	1
8	ZL20-032009	闷塞 9	Plug	1
9	ZL20-036003	倒档轴	Reverse Shaft	1
10	GB893-86	孔用弹性挡圈 75	Snap Ring	2
11	GB276-89	向心球轴承 109	Ball Bearing	2
12	ZL20-036002 × 1	齿轮 m=4.5，Z=49	Gear	1
13	ZL20-032101	挡圈	Snap Ring	1
14	ZL20-032102	外端盖	Gear Ring	1
15	ZL20-032104	外磨擦片	Clutch Disc (Outer)	6
16	ZL20-032103	内磨擦片	Clutch Disc (Inner)	5
17	GB894.2-86	轴用弹性挡圈 60	Snap Ring	1
18	ZL20-032110	弹簧座	Spring Seat	1
19	ZL20-032108	弹簧	Spring	1
20	ZL20-032106	活塞	Piston	1
21	ZL20-032107	封油圈	Seal Ring	1
22	GB1235-76	O型密封圈 6.0 × 3.1	O-Ring	1
23	ZL20-032105	离合器壳体总成	Clutch Housing	1
24	GB308-89	钢球5	Ball	1
25	ZL20-032109	阀座	Seat	1
26	ZL20-036004 × 1	齿轮 m=4.5，Z=44	Gear	1
27	ZL20-032006	止动垫	Stop Plate	4
28	GB5783-86	六角螺栓 M10 × 25	Bolt	8
29	GB119-86	圆柱销 A8 × 22	Pin	2

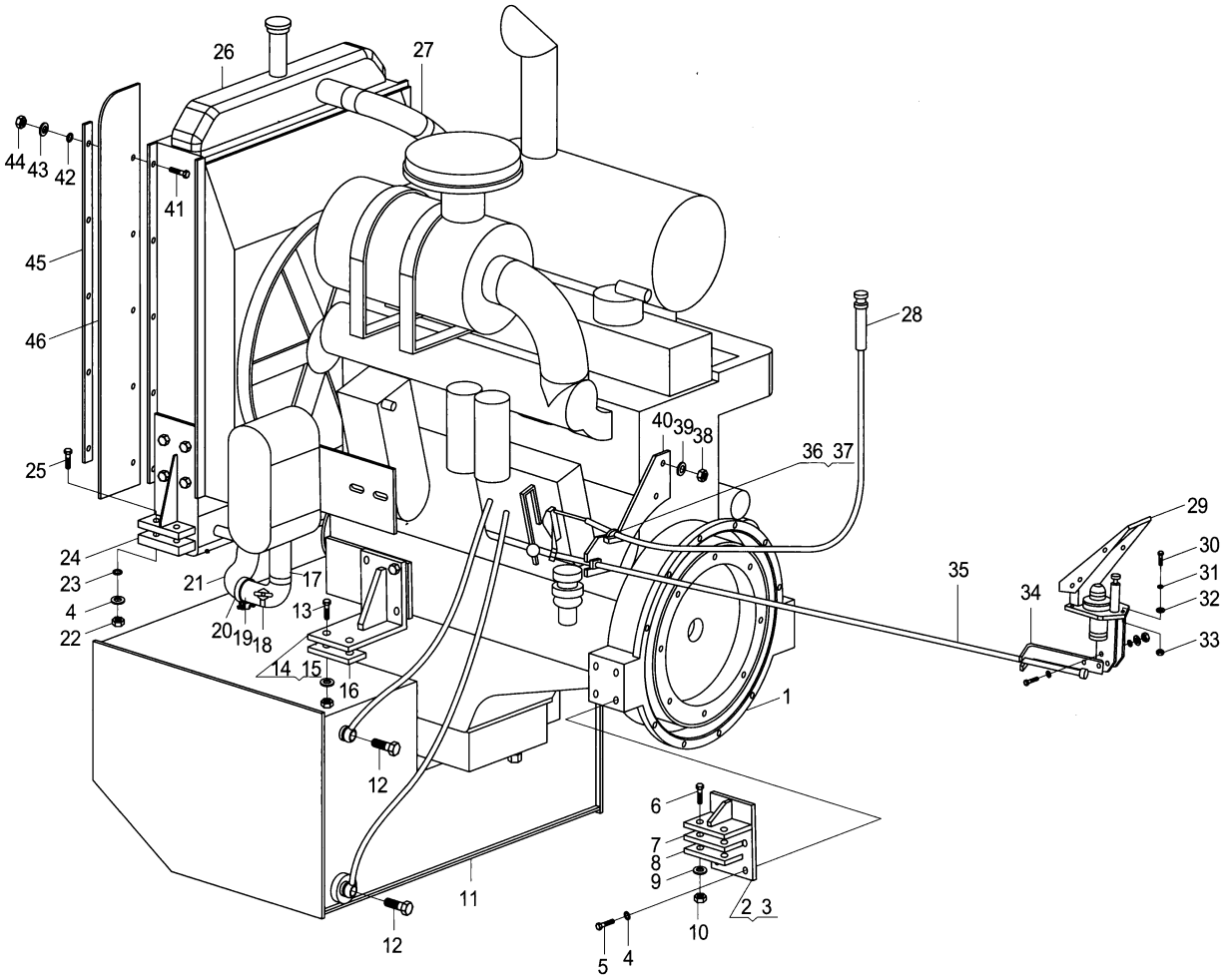
1.1 LW330F(II).1 柴油机系统 Engine System



1.18 BS428 变速箱中间轴总成 Medium Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB5783-86	六角螺栓 M8 × 16	Bolt	2
2	ZL20-032001	止动垫	Stop Plate	1
3	ZL20-032002	轴端挡板	Plate	1
4	CA10-3509164A	活塞环 Ø52	Piston Ring	2
5	ZL20-032003	内衬油套	Inner Lining Sleeve	1
6	GB297-86	圆锥滚子轴承 7507	Roller Bearing	2
7	ZL20-033001 × 1	齿轮 m=5，Z=24	Gear	1
8	ZL20-032009	闷塞 9	Plug	1
9	ZL20-033002	中间轴	Middle Shaft	1
10	GB893-86	孔用弹性挡圈 75	Snap Ring	2
11	ZL276-89	向心球轴承 109	Ball Bearing	2
12	ZL20-032004 × 1	齿轮 m=4.5，Z=41	Gear	1
13	ZL20-032101	挡圈	Snap Ring	1
14	ZL20-032102	外端盖	Gear Ring	1
15	ZL20-032104	外磨擦片	Clutch Disc (Outer)	6
16	ZL20-032103	内磨擦片	Clutch Disc (Inner)	5
17	GB894.2-86	轴用弹性挡圈 60	Snap Ring	1
18	ZL20-032110	弹簧座	Spring Seat	1
19	ZL20-032108	弹簧	Spring	1
20	ZL20-032106	活塞	Piston	1
21	ZL20-032107	封油圈	Seal Ring	1
22	GB1235-76	O型密封圈 6.0 × 3.1	O-Ring	1
23	ZL20-032105	离合器壳体总成	Clutch Housing	1
24	GB308-89	钢球 5	Ball	1
25	ZL20-032109	阀座	Valve Seat	1
26	ZL20-033005 × 1	齿轮 m=4.5，Z=54	Gear	1
27	ZL20-032006	止动垫	Stop Plate	4
28	GB5783-86	六角螺栓 M10 × 25	Bolt	8
29	GB119-86	圆柱销 A8 × 22	Pin	2

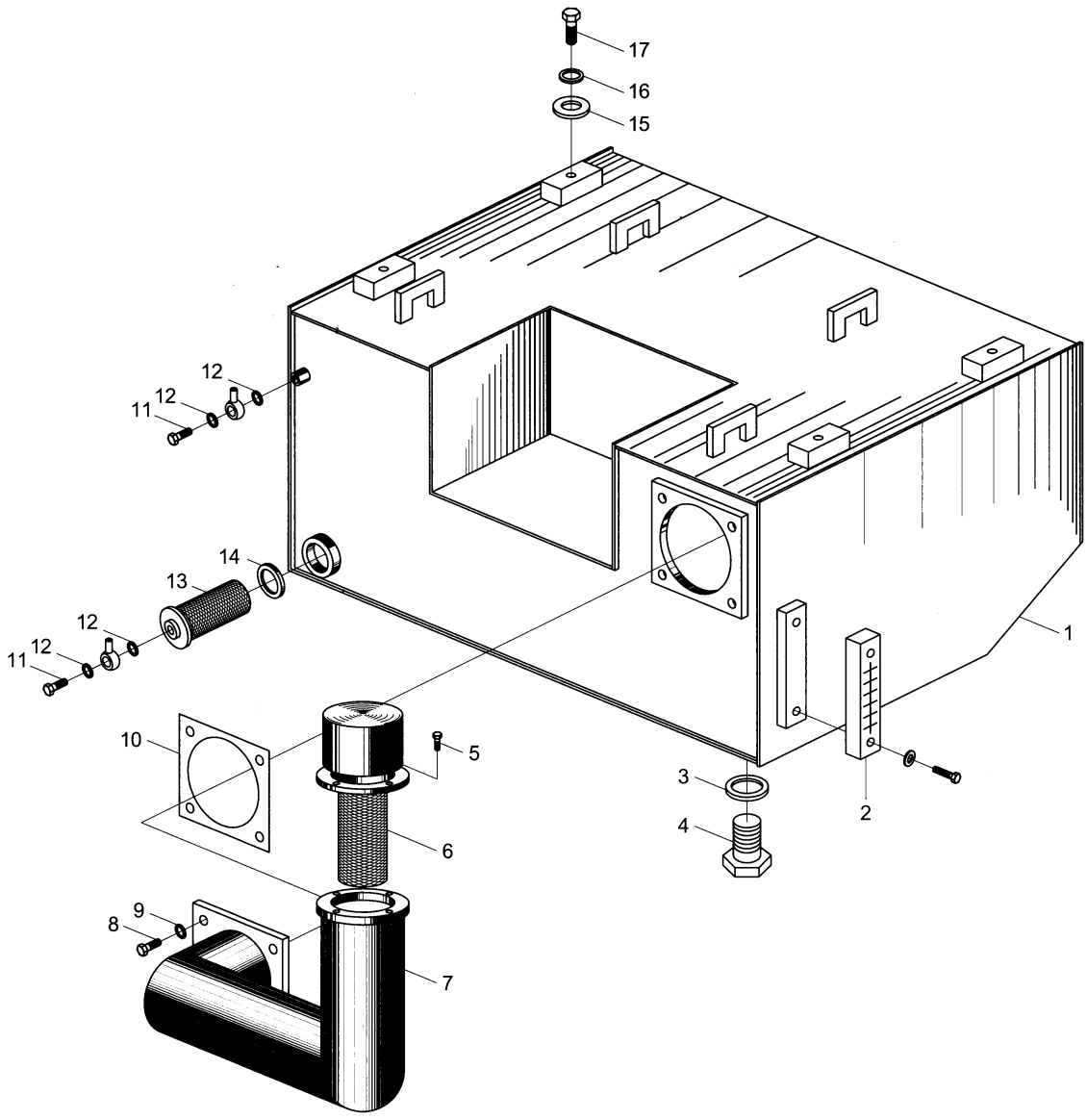
1.1 LW330F(II).1 柴油机系统 Engine System



1.19 BS428 变速箱输出轴总成 Output Shaft Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB5783-86	六角螺栓 M10 × 25	Bolt	4
2	ZL20-030077	止动垫	Stop Plate	2
3	ZL20-030078	压板	Plate	2
4	Q26-01	O型密封圈 52 × 5.7	O-Ring	2
5	ZL20-030013	输出轴法兰	Flange	2
6	ZL20-030030	防尘罩	Dust Proof Cover	2
7	HG4-335-66	油封 65 × 90 × 12	Oil Seal	4
8	ZL20-030071	输出轴后端盖	End Cover	1
9	GB5783-86	六角螺栓 M10 × 30	Bolt	8
10	GB93-87	垫圈 10	Washer	8
11	GB276-89	球轴承 310	Ball Bearing	2
12	ZL20-030010A	止推环	Stop Ring	2
13	SF-1 5530	滑动轴承	Slide Bearing	4
14		隔套	Spacing Sleeve	
15	ZL20-030009	齿轮 (Z=36)	Gear	1
16	ZL20-030019	高低档滑动齿套	Gear Bushing	1
17	GB308-89	钢球 4	Steel Ball	2
18	ZL20-030072A	输出轴	Output Shaft	1
19	ZL20-030021 × 1	齿轮 (输出轴低速档) (Z=56)	Gear	1
20		隔套	Spacing Sleeve	
21	ZL20-030029	手制动鼓	Parking Brake Drum	1
22	GB6175-86	六角螺母 M14	Nut	4
23	GB93-87	弹簧垫圈 14	Spring Washer	4
24	GB5783-86	六角头螺栓 M14 × 40	Bolt	4

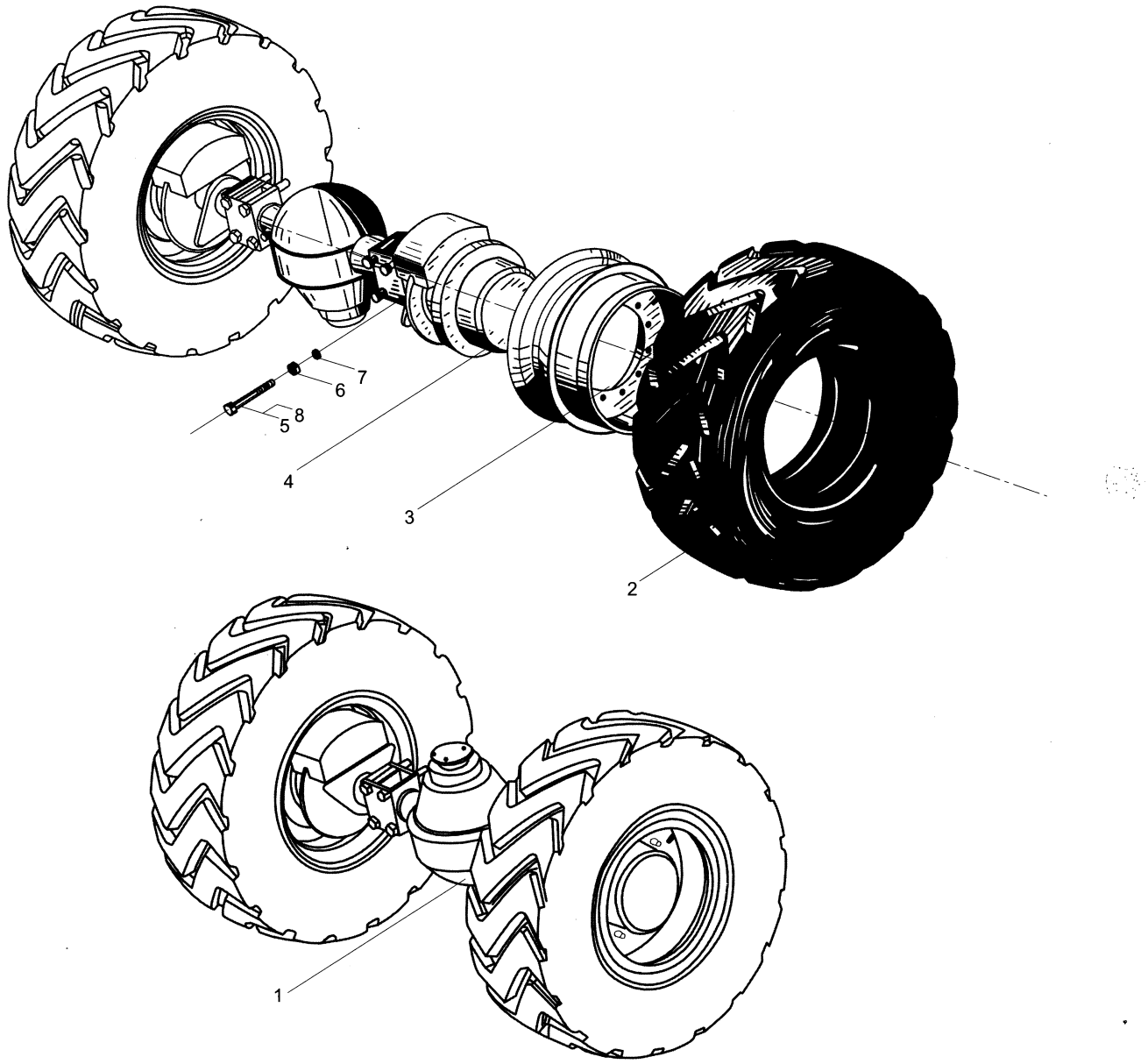
1.2 330E.1.1 柴油箱总成 Fuel Tank Ass.



1.20 BS428 变速箱手制动总成 Parking Brake Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL20-038005	手制动连接板	Connective Plate	2
2	ZL20-038003	凸轮板	Cam Plate	2
3	GB97.1-85	垫圈 16	Washer	2
4	GB91-86	开口销 3 × 25	Cotter Pin	2
5	GB882-86	销轴 A 16 × 48	Pin Shaft	2
6	ZL20-038004	吊紧螺丝	Screw	1
7	ZL20-038002	吊紧螺丝细弹簧	Thin Spring	2
8	ZL20-038001	吊紧螺丝粗弹簧	Spring	2
9	GB97.1-85	垫圈 12	Washer	1
10	GB6171-86	螺母 M12 × 1.25	Nut	2
11	GB6170-86	螺母 M8	Nut	2
12	GB5783-86	螺栓 M8 × 75	Bolt	1
13	ZL20-038102	制动带上脚	Brake Band (Upper)	1
14	GB867-86	半圆头号铆钉 6 × 12	Rivet	18
15	ZL20-038101	制动带下脚	Brake Band (Lower)	1
16	GB875-86	扁平头半空心铆钉 5 × 12	Rivet	4
17	ZL20-038104	手制动磨擦片	Friction Plate	2
18	GB875-86	扁平头半空心铆钉 5 × 17	Hollow Rivet	22
19	ZL20-038103	钢带	Steel Band	1
20	ZL20-038105	制动带支架	Bracket of Braking Band	1
21	GB32.1-86	螺栓 M10 × 55	Bolt	1
22	ZL20-038007	铁丝 0.5	Wire	1
23	ZL20-038006	调整弹簧	Adjusting Spring	1
24	ZL20-030041	手制动器右支架	Bracket (Right)	1
25	GB5783-86	六角螺栓 M8 × 25	Bolt	4
26	GB93-87	弹簧垫圈 8	Lock Washer	4
27	ZL20-030042	制动器左支架	Bracket (Left)	1
28	GB5783-86	六角螺栓 M12 × 30	Bolt	4
29	GB93-87	弹簧垫圈 12	Lock Washer	4

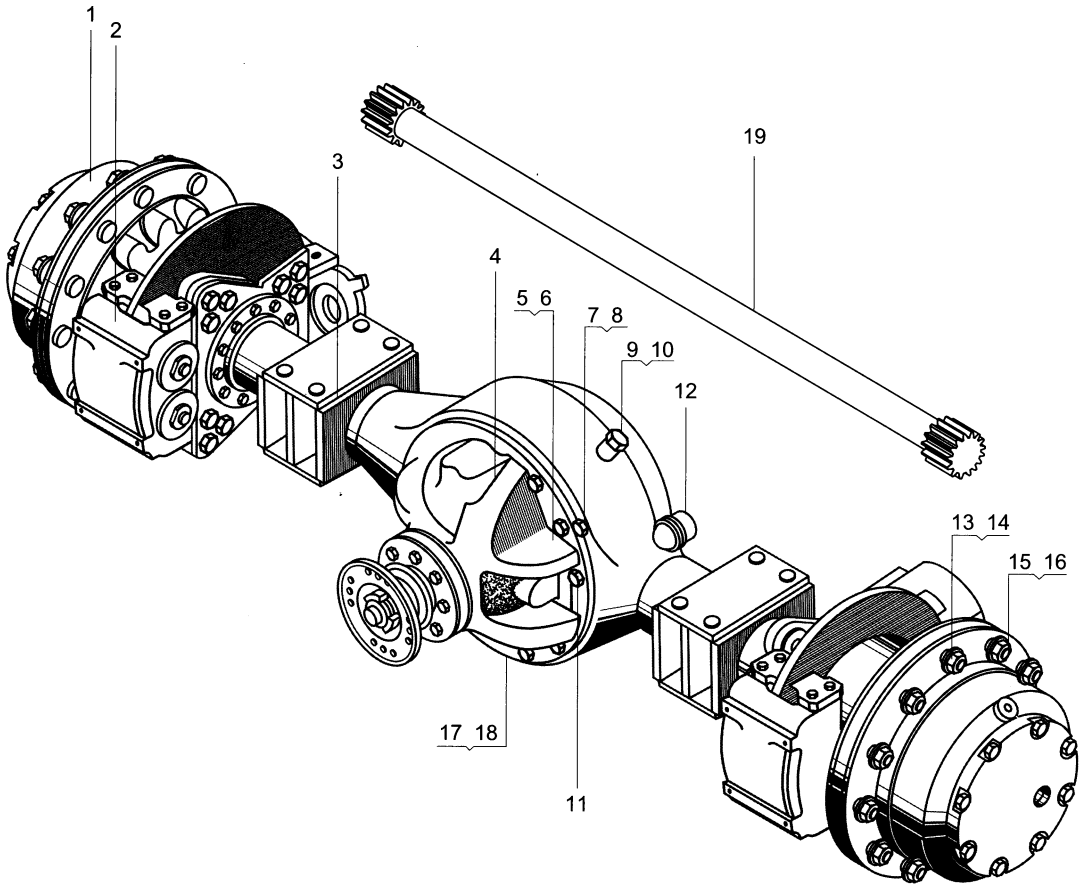
1.3 LW330F.2 驱动桥总成 Driving Axle Ass.



1.21 BS428 变速箱操纵阀总成 Transmission Control Valve Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL20-039011	螺钉	Screw	1
2	ZL20-039013	垫圈	Washer	1
3	ZL20-039012	弹簧	Spring	1
4	GB308-89	钢球 10	Ball	1
5	ZL20-039023	防尘套	Dust Cap	1
6	ZL20-026010	测压接头	Joint of Pressure Metering	1
7	ZL20-026009	测压接头垫圈	Washer	2
8	Q20-01	螺塞 M10 × 1-6h	Plug	1
9	GB893.2-86	孔用挡圈 30	Snap Ring	2
10	JB2600-80	油封 14 × 30 × 10	Oil Seal	4
11	ZL20-039010	调整垫圈	Washer	2
12	ZL20-039009	操纵滑阀	Operating Slide Valve	1
13	ZL20-039022	防尘套 (ø10)	Dust Proof Sleeve	1
14	ZL20-039015	螺塞	Screw Plug	1
15	Q26-01	O型圈 22 × 2.5	O-Ring	1
16	ZL20-039016	皮碗	Rubber Bowel	1
17	ZL20-039017	制动滑阀	Braking Slide Valve	1
18	ZL20-039018	弹簧	Spring	1
19	Q26-01	O型圈 16 × 2	O-Ring	1
20	ZL20-039019	弹簧座	Spring Seat	1
21	ZL20-039021	螺塞	Plug	1
22	ZL20-039007	阀体	Body	1
23	ZL20-029020	纸垫 0.5	Paper Cushion	1
24	ZL20-039008	底板	Plate	1
25	GB70-85	圆柱头内六角螺钉 M6 × 16	Screw	15
26	ZL20-030034	纸垫	Paper Cushion	1
27	GB5782-86	六角螺栓 M10 × 45	Bolt	8
28	GB93-87	垫圈 10	Washer	8

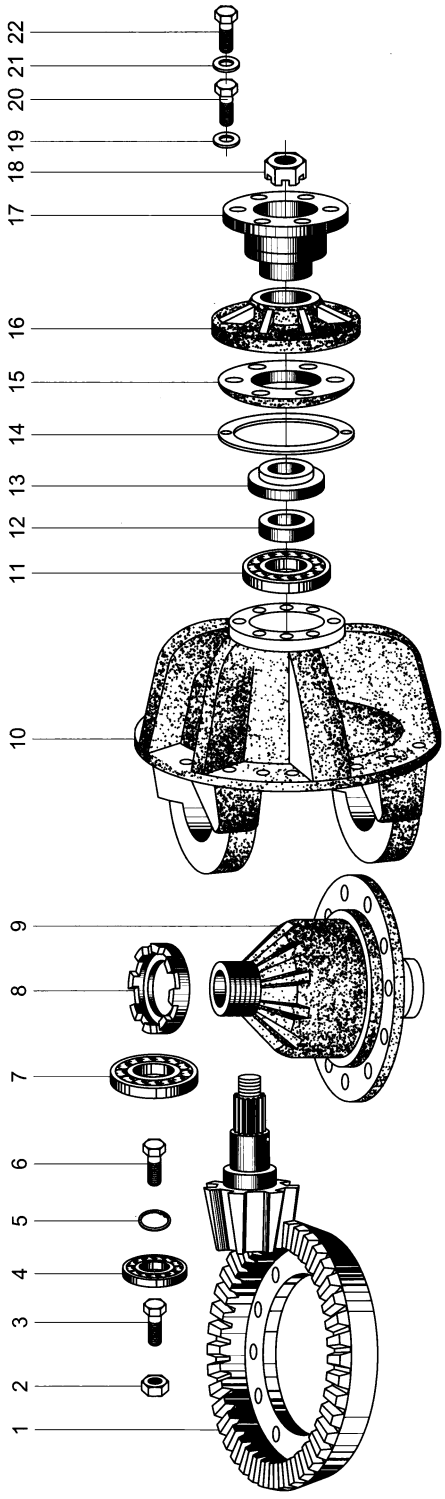
1.4 PRC111D006 桥总成 Axle Ass.



1.22 BS428 变速箱高低档拨叉机构 Yoke Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1		铁丝 Ø1	Iron Wire	1
2	ZL20-030049	紧定螺钉	Set Screw	1
3	ZL20-030048	高低换档拨叉	Yoke	1
4	ZL20-030045	纸垫	Paper Cushion	1
5	ZL20-030047	拨叉支架	Yoke Support	1
6	GB93-87	垫圈 10	Washer	4
7	GB5783-86	六角螺栓 M10 × 30	Bolt	4
8	JB2600-80	油封 18 × 35 × 10	Oil Seal	1
9	ZL20-030046	拨叉轴	Yoke Shaft	1
10	Q21-01	螺塞 M12 × 1.25	Screw Plug	1
11	ZL20-030044	垫圈	Washer	1
12	GB308-89	钢球 10	Steel Ball	1
13	ZL20-030055	弹簧 Ø1.6	Spring	1

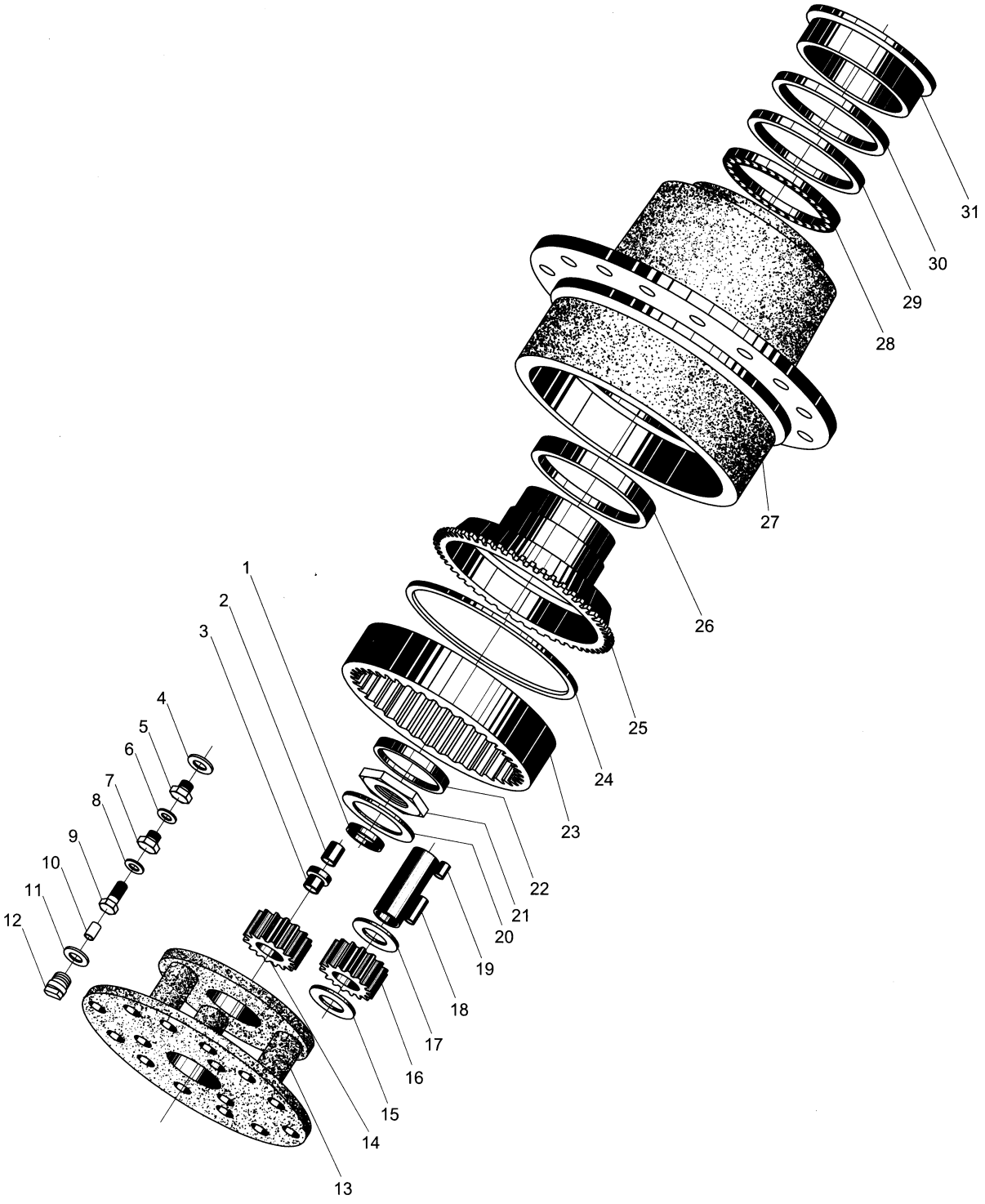
1.5 82350200 主减速器总成 Carrier Ass.



1.23 Z3.7 高低速操纵 Shift Control

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL40.7.1-16	手柄	Knob	1
2	GB6170-86	螺母 M12	Nut	1
3	Z3.7.6A	操纵杆	Control Lever	1
4	GB6170-86	螺母 M10	Nut	8
5	GB93-87	垫圈 10	Lock Washer	8
6	ZL40.10.7-4A	固定座	Fixing Seat	2
7	GB5782-86	螺栓 M10 × 25	Bolt	4
8	ZL40.10.7-3A	隔套	Spacer	2
9	ZL40.10.7-1A	衬套	Lining Bushing	1
10	Z3.7-5	轴	Shaft	1
11	JB/T7940.2-1995	油杯45° M10 × 1	Grease Cup	1
12	GB86-88	螺钉 M6 × 1	Screw	2
13	Z3.7.5-2	叉接头 M12	Joint	2
14	GB882-86	销轴 B12 × 40	Pin Shaft	2
15	GB91-86	销 3.2 × 30	Cotter Pin	2
16	GB6170-86	螺母 M12	Nut	4
17	Z3.7.5-1	联接杆	Link Rod	1
18	GB5782-86	螺栓 M16 × 100	Bolt	4
19	Z3.7-3	支承板	Supporting Plate	2
20	Z3.7-2	板	Plate	2
21	GB93-87	垫圈 16	Lock Washer	4
22	GB6170-86	螺母 M16	Nut	4
23	GB5783-86	螺栓 M8 × 20	Bolt	1
24	Z3.7-8	垫圈	Washer	1
25	Z3.7-7	支架	Bracket	2
26	GB91-86	销 2.5 × 24	Pin	1
27	GB97.1-85	垫圈 10	Washer	2
28	Z3.7.4	下部机构	Lower Mechanism	1
29	GB5782-86	螺栓 M10 × 45	Bolt	4
30	GB882-86	销轴 B10 × 60	Pin Shaft	1

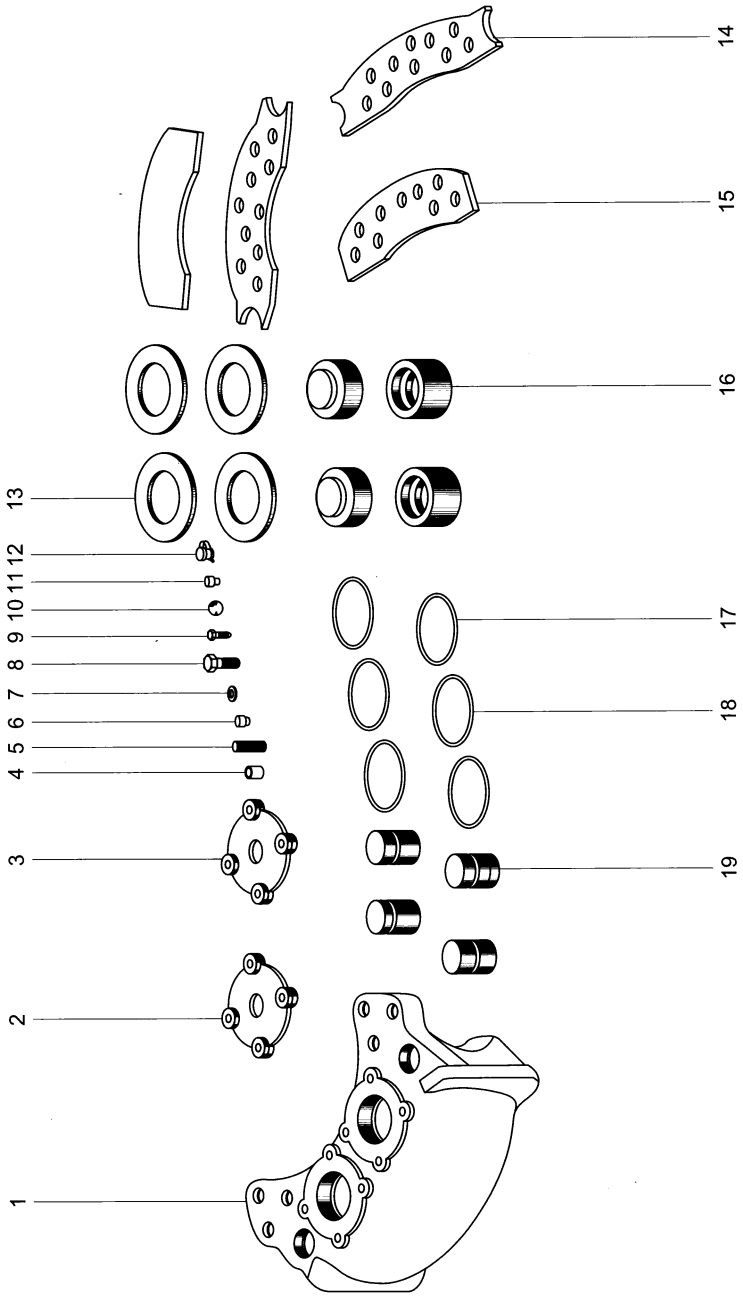
1.6 83240200 轮边减速器总成 Planetary Reduction Ass.



1.23 Z3.7 高低速操纵 Shift Control

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	Z3.7-4	轴	Shaft	1
32	GB93-87	垫圈 16	Lock Washer	4
33	GB6170-86	螺母 M16	Nut	4

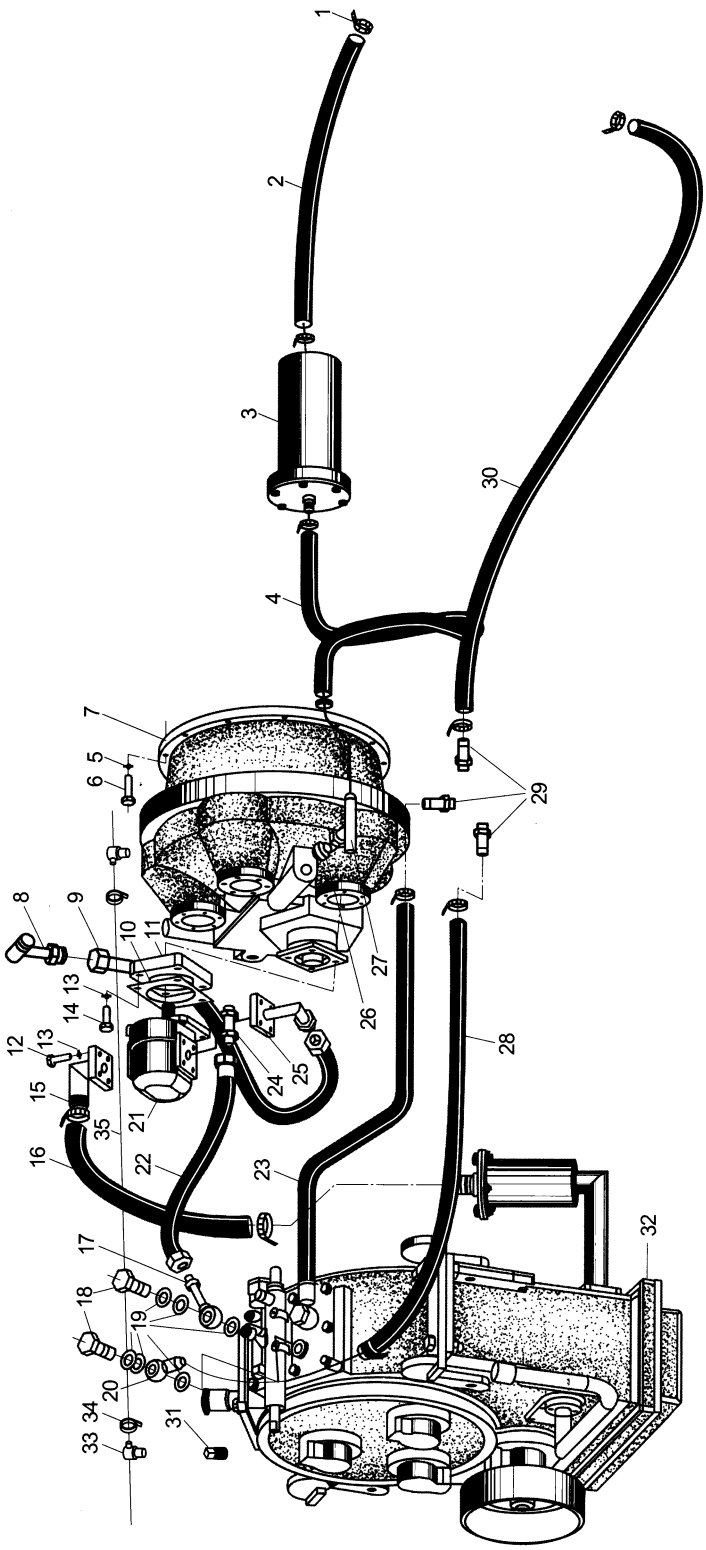
1.7 72006035 制动器总成 Disk Brake Ass.



车架与附件

CHASSIS AND ACCESSORIES

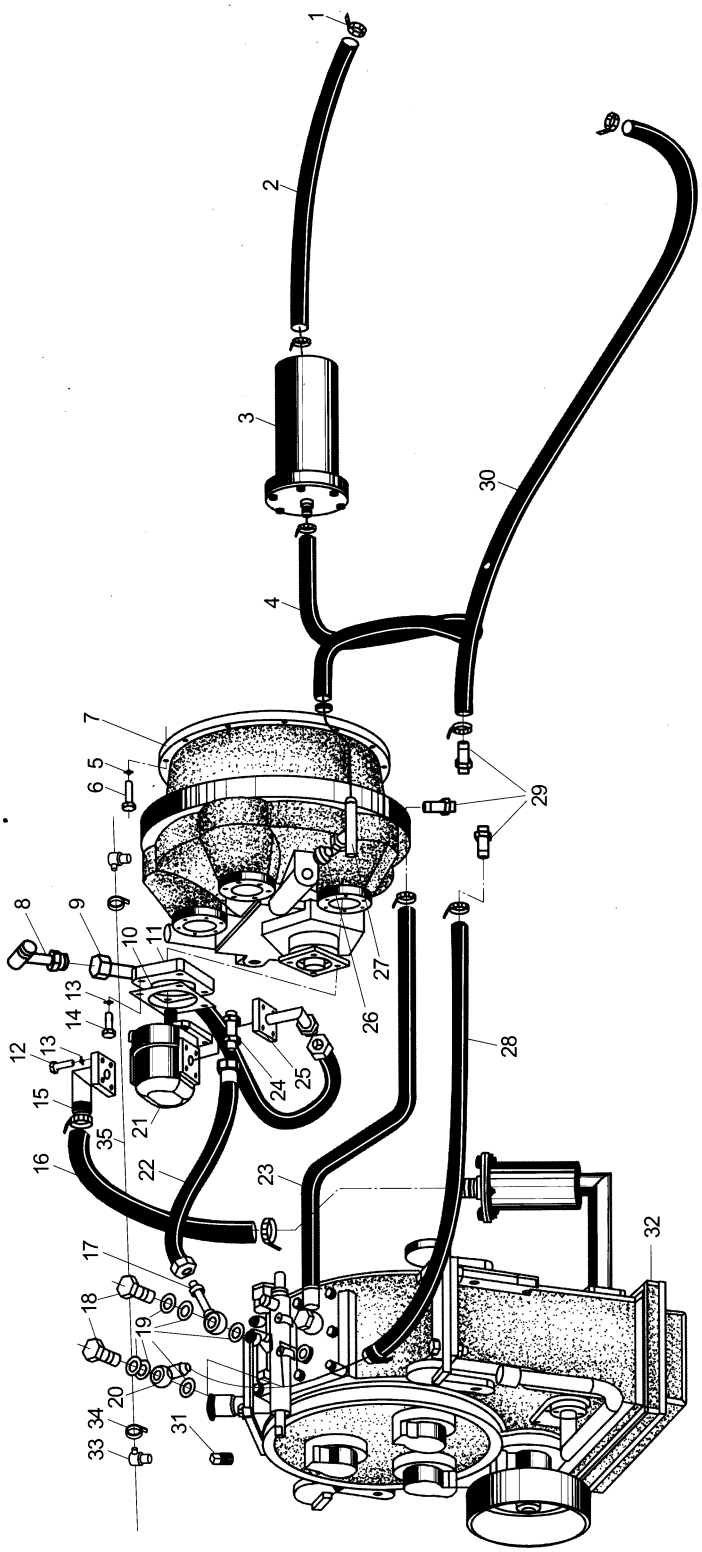
1.8 LW330F.3 变速箱变矩器系统 Transmission and Torqur Converter System



2.1 LW330F(II).08.1 前车架总成 Front Chassis Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	LW330F(II).08.1	前车架	Front Chassis	1
2	LW330F(II).08.4	动臂缸销轴	Lift Cylinder Pin	2
3	JB/T7940.1-1995	油杯 M10 × 1	Crease Cup	5
4	GB5783-86	螺栓 M16 × 25	Bolt	5
5	GB93-87	垫圈 16	Washer	5
6	GB96-85	垫圈 16	Washer	5
7	GB5783-86	螺栓 M8 × 20	Bolt	12
8	GB93-87	垫圈 8	Lock Washer	8
9	LW330F(II).08.12	右前大灯架	Front Lamp Bracket (R)	1
10	320E.8.3	转斗缸后销轴	Tilt Cylinder Pin Shaft	1
11	GB97.1-85	垫圈 8	Washer	4
12	GB95-85	垫圈 8	Washer	4
13	LW320F(I).18.2	前罩板	Front Cover Plate	1
14	LW330F(II).08.11	左前大灯架	Front Lamp Protector (L)	1
15	LW330F(II).08.9	动臂销	Lift Arm Pin	2
16	85Z.7-15	弹簧销	Spring Pin	2
17	85Z.7-12	固定杆	Lock Link	1
18	GB882-86	销 B32 × 70	Pin	2
19	GB5783-86	螺栓 M10 × 20	Bolt	2
20	Z3.8-13	垫圈	Washer	2
21	GB93-87	垫圈 10	Lock Washer	2
22	320E.8.4	前转向销	Front Steering Pin	2
23	JB982-77	垫圈 10	Washer	4
24	ZL40.8.4-1	通油螺栓	Bolt	2
25	Z3.8.12.1	注油管	Oil Injecting Tube	2
26	Z3.2-2	螺栓 M24 × 2 × 240	Bolt	8
27	Z3.2-1	螺母 M24 × 2	Nut	8
28	GB93-87	垫圈 24	Lock Washer	8

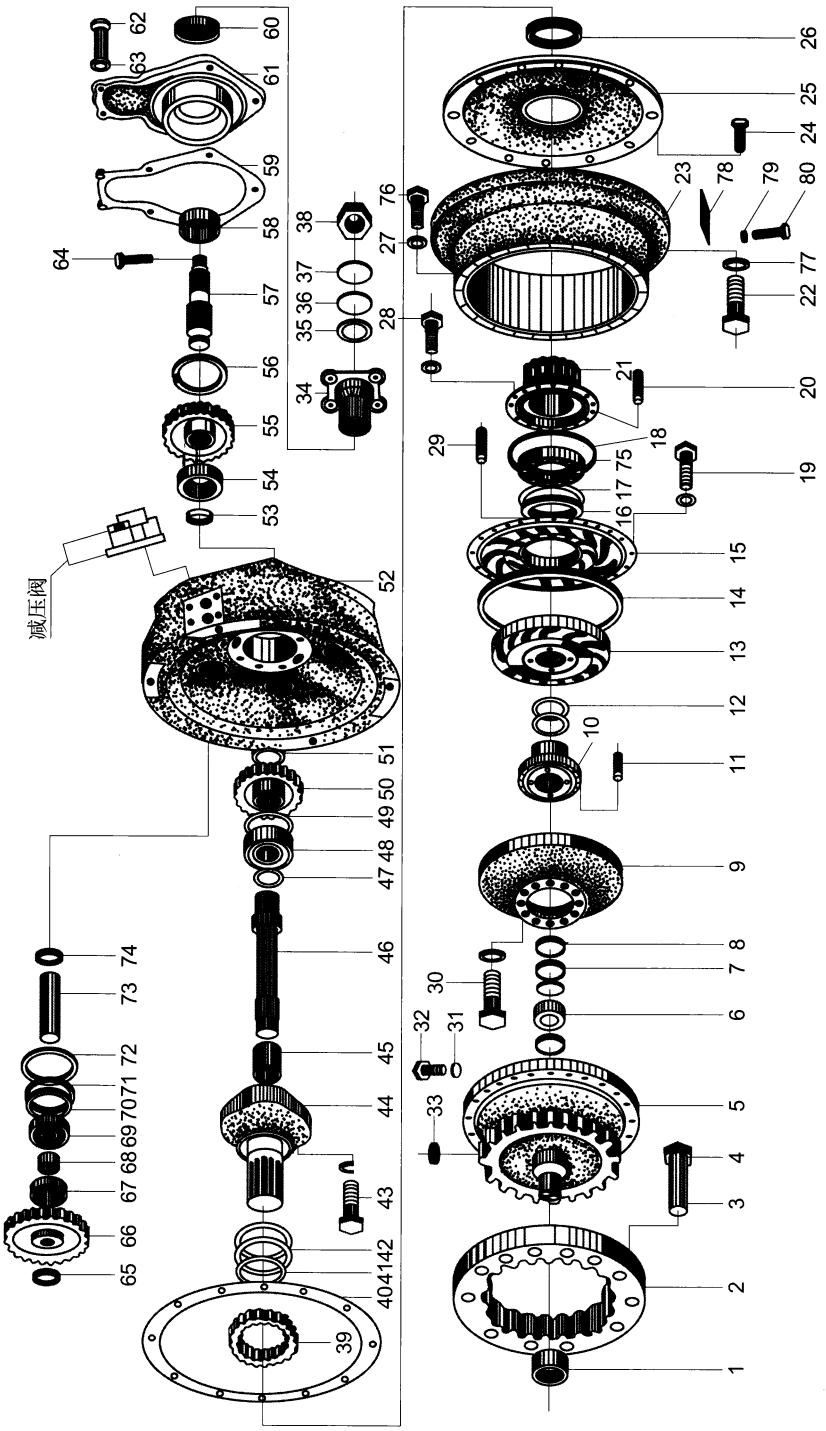
1.8 LW330F.3 变速箱变矩器系统 Transmission and Torqur Converter System



2.2 LW330F(II).08.2 后车架总成 Rear Chassis Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	LW330F(II).08.2	后车架	Rear Chassis	1
2	GB5783-86	螺栓 M10 × 20	Bolt	4
3	Z3.8-13	垫圈	Washer	4
4	GB93-87	垫圈 10	Lock Washer	4
5	320E.8.3	后转向销	Rear Steering Pin	2
6	Z3.8-7	钢套	Steel Sleeve	2
7	Z3.8-11	下法兰	Lower Flange	2
8	GB304.5-81	关节轴承 GE60ES	Knuckle Bearing	2
9	GB1235-76	O型圈	O-Ring	2
10	Z3.8-14	调整垫片	Washer	n
11	Z3.8-10	上法兰	Upper Flange	2
12	GB93-87	垫圈 12	Lock Washer	20
13	GB5782-86	螺栓 M12 × 60	Bolt	12
14	JB/T7940.2-1995	油杯45° M10 × 1	Grease Cup	2
15	Z3.8.6	铰接销	Articulating Pin	2
16	GB5783-86	螺栓 M12 × 30	Bolt	8
17	Z3.8.10A	注油管	Oil Injecting Pipe	2
18	Z3.8.5	副车架销	Chassis Pin	2
19	ZL40.8-11	铜垫	Copper Washer	2
20	Z3.8-2	套	Bushing	2
21	LW330F.8.7	副车架	Auxiliary Chassis	1
22	Z3.2-1	螺母 M24 × 2	Nut	8
23	GB93-87	垫圈 24	Washer	8
24	Z3.2-2	螺栓 M24 × 2 × 220	Bolt	8
25	LW330F(II).08.10	配重	Counter Weight	1
26	LW330F(II).08.10.3	右箱盖	Right Box Cover	1
27	530D.8.6	右后扶手架	Rear Handrail (R)	1
28	GB67-85	螺钉 M5 × 12	Screw	8
29	GB97.1-85	垫圈 5	Washer	12
30	Z5G.6.9-1	灯后盖板	Rear Cover Plate	2

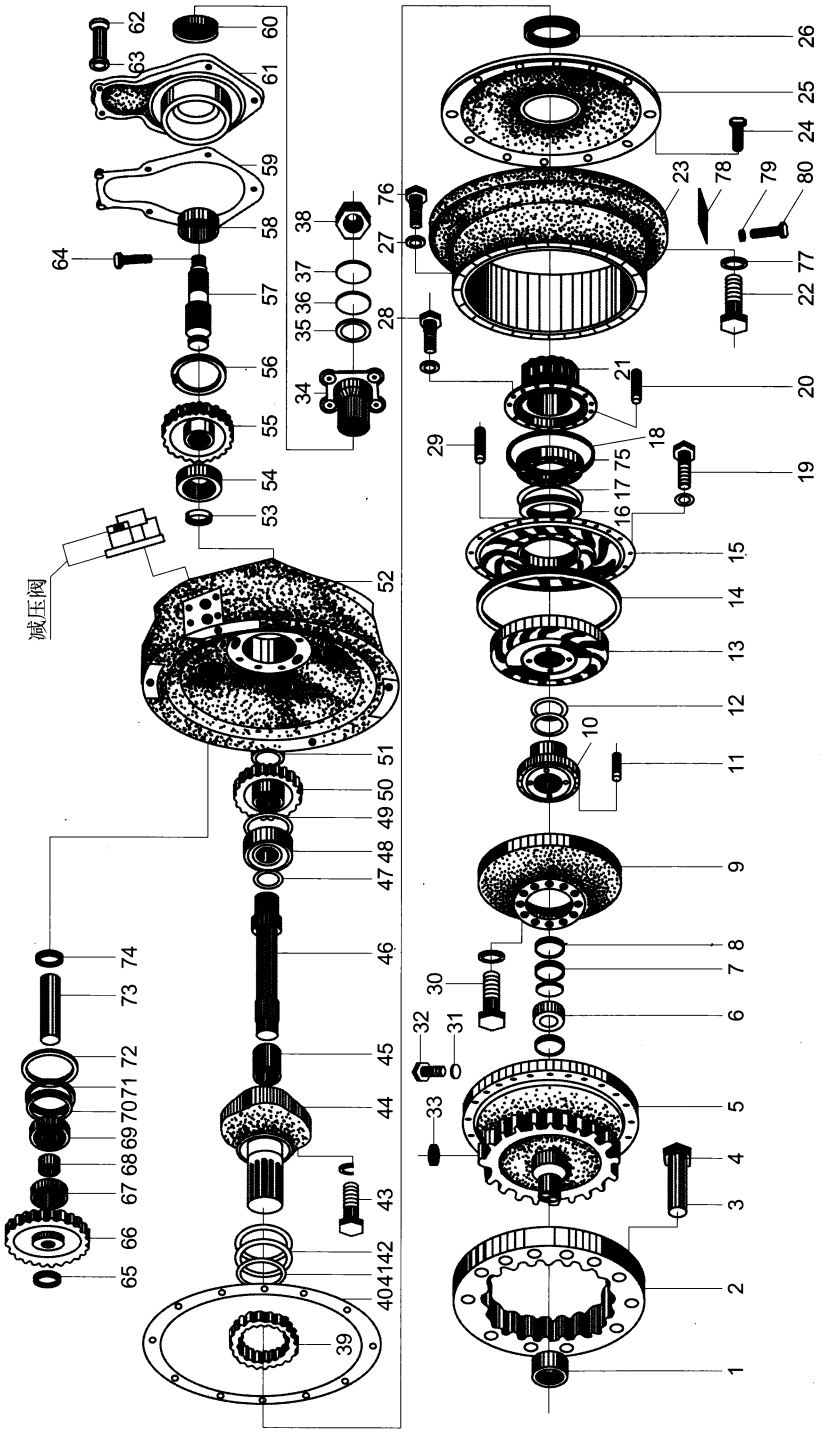
1.9 YJ315X 变矩器总成 Torque Converter Ass.



2.2 LW330F(II).08.2 后车架总成 Rear Chassis Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	GB93-87	垫圈 8	Lock Washer	12
32	GB5783-86	螺栓 M8 × 16	Bolt	12
33	Z5G.6.9.3	灯架	Lamp Bracket	8
34	GB97.1-85	垫圈 24	Washer	2
35	GB93-87	垫圈 24	Lock Washer	4
36	GB5782-86	螺栓 M12 × 60	Bolt	4
37	420F(II).08.7	牵引销	Towing Pin	1
38	GB6170-86	螺母 M8	Nut	4
39	GB97.1-85	垫圈 8	Washer	12
40	LW330F(II).08.10-1	紧锁角钢	Angle Steel	2
41	LW330F(II).08.10-2	紧固螺栓	Bolt	4
42	530D.8.5	左后扶手架	Rear Handrail (L)	1
43	GB97.1-85	垫圈 16	Washer	4
44	GB93-87	垫圈 16	Lock Washer	4
45	GB5783-86	螺栓 M12 × 30	Bolt	4
46	GB91-86	开口销 2 × 20	Pin	2
47	Z5G.6.9.6	撑杆	Stay Bar	2

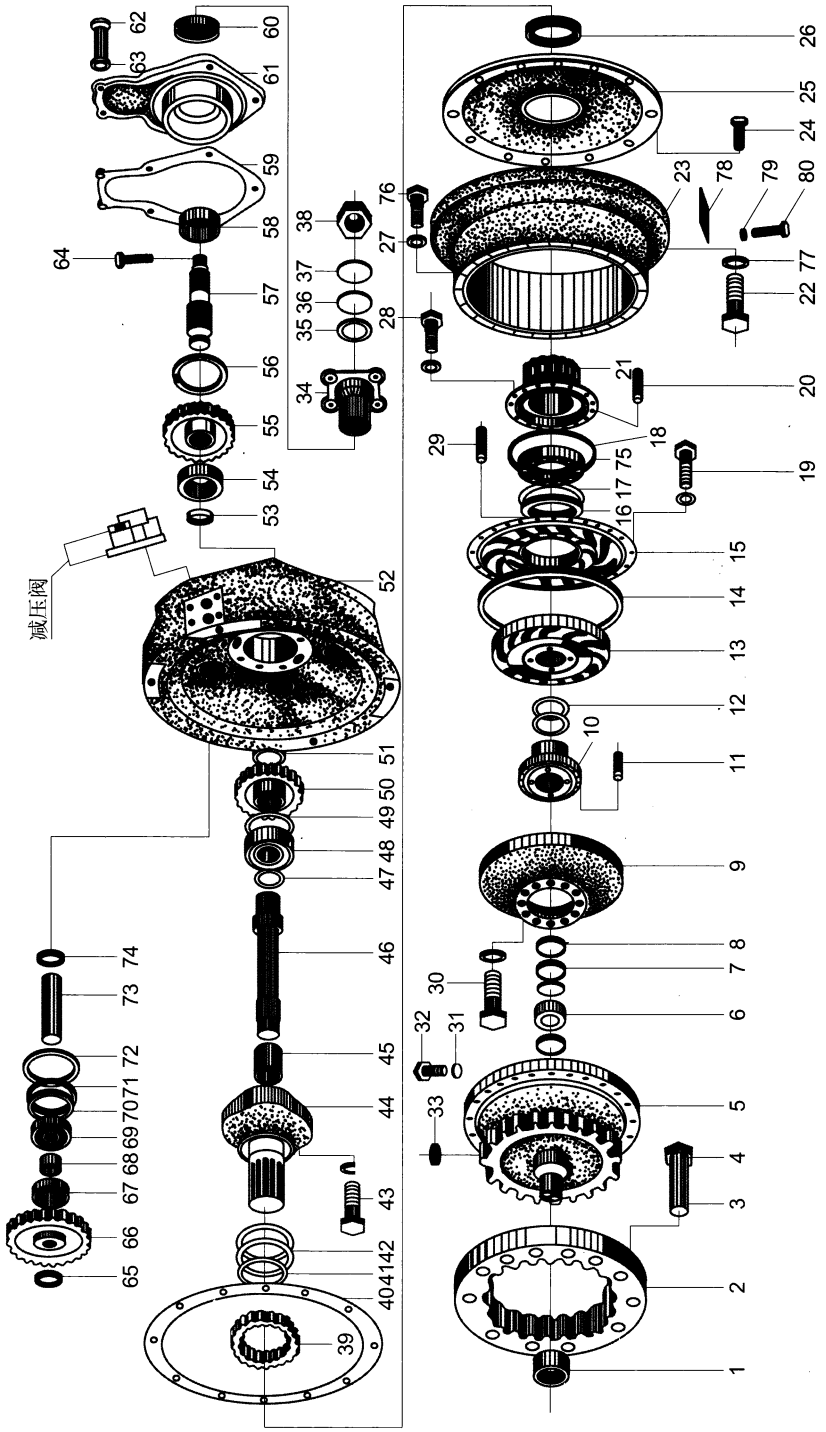
1.9 YJ315X 变矩器总成 Torque Converter Ass.



2.3 LW330F(Ⅱ).17 前后挡泥板 Front and Rear Fender

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	420F(Ⅱ).17.1	左挡泥板	Left Splash Fender	1
2	420F(Ⅱ).17.2	右挡泥板	Right Splash Fender	1
3	GB5783-86	螺栓 M10×40	Bolt	16
4	Z5G.6.5B-1	压板	Board	8
5	320E.17-1	橡胶板	Rubber Plate	4
6	GB97.1-85	垫圈 10	Washer	16
7	GB93-87	垫圈 10	Washer	16
8	GB6170-86	螺母 M10	Nut	16
9	320E.17-2	下脚板	Foot Supporter	2
10	320E.17.3	爬梯 (左)	Ladder (L)	1
11	GB889-86	螺母 M12	Nut	8
12	GB93-87	垫圈 12	Washer	14
13	GB97.1-85	垫圈 1	Washer	2
14	GB5782-86	螺栓 M12×90	Bolt	2
15	320E.17.4	爬梯 (右)	Ladder (R)	8
16	GB5781-86	螺栓 M12×40	Bolt	1

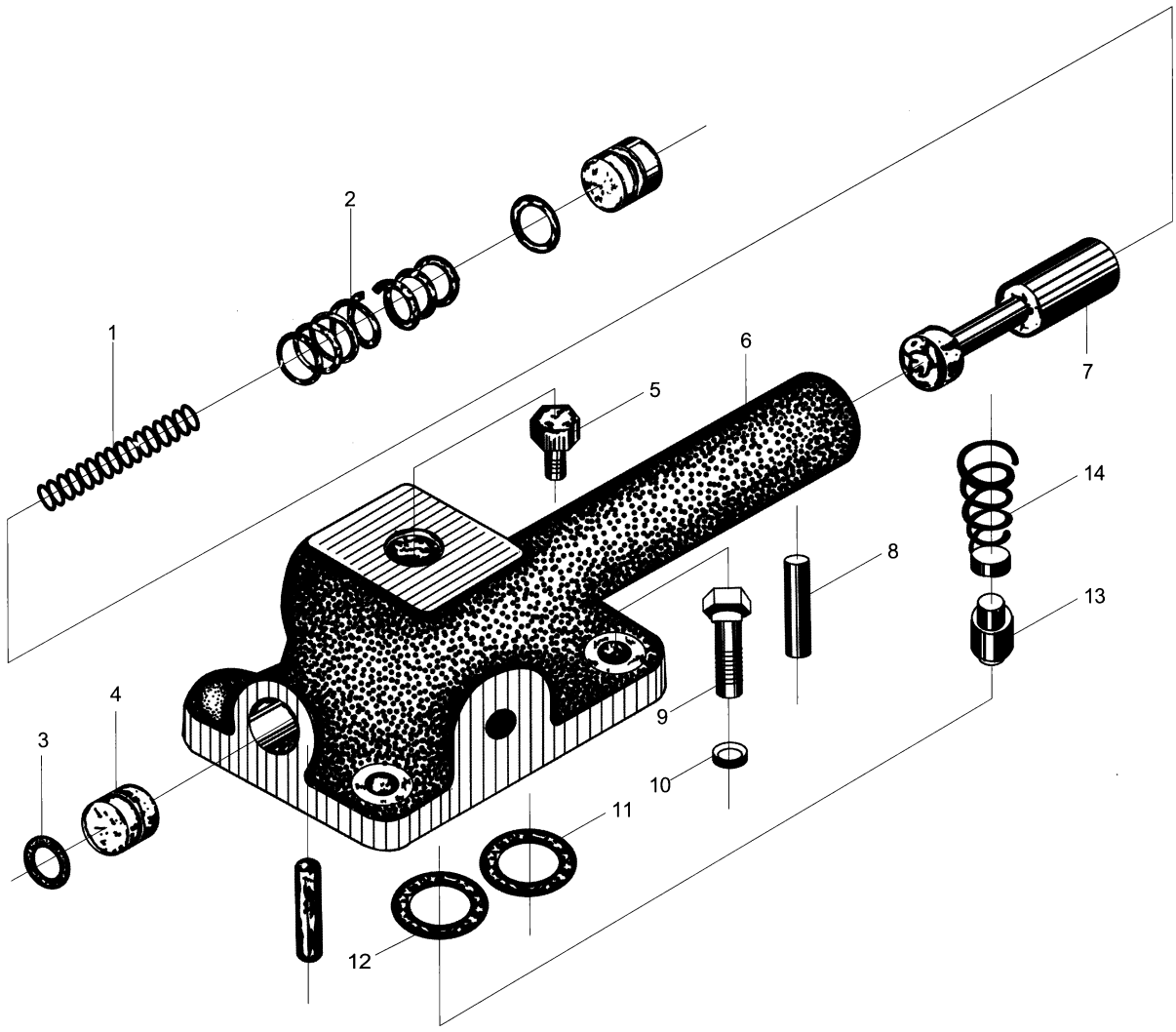
1.9 YJ315X 变矩器总成 Torque Converter Ass.



2.4 LW330F(II).18.1 机罩合件 Engine Hood

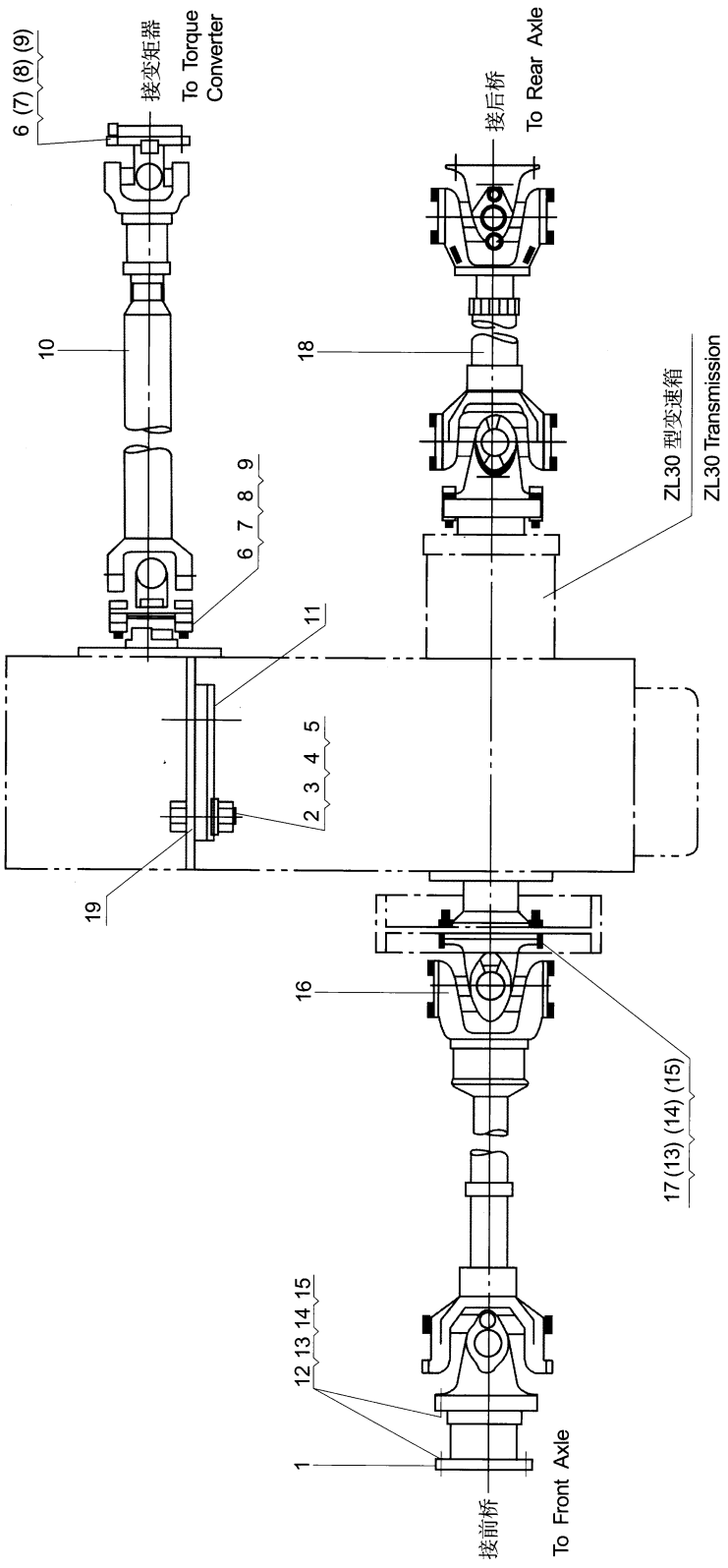
序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GJMB-6	门锁	Lock	2
2	LW330F.18II.1.2	左侧门	Left Side Door	1
3	QD19-4	气弹簧	Pneumatic Spring	2
4	GB96-85	垫圈 10	Washer	2
5	GB93-87	垫圈 10	Washer	14
6	GB5783-86	螺栓 M10 × 30	Bolt	2
7	LW330F(II).18.1.1	机罩体	Hood Body	1
8	GB97.1-85	垫圈 12	Washer	4
9	GB93-87	垫圈 12	Washer	4
10	GB5783-86	螺栓 M12 × 35	Bolt	4
11	LW330F.18.1.4	上罩板	Cover	1
12	LW330F.18II.1.3	右侧门	Right Side Door	1
13	LW330F(II).18.1.2	后挡罩	Backboard	1
14	GB97.1-85	垫圈 10	Washer	12
15	GB5783-86	螺栓 M10 × 25	Bolt	12
16	GB97.1-85	垫圈 8	Washer	6
17	GB93-87	垫圈 8	Washer	6
18	GB5783-86	螺栓 M8 × 20	Bolt	6

1.10 YJ315X 减压阀总成 Reducing Value Ass.



工作装置
WORKING DEVICE

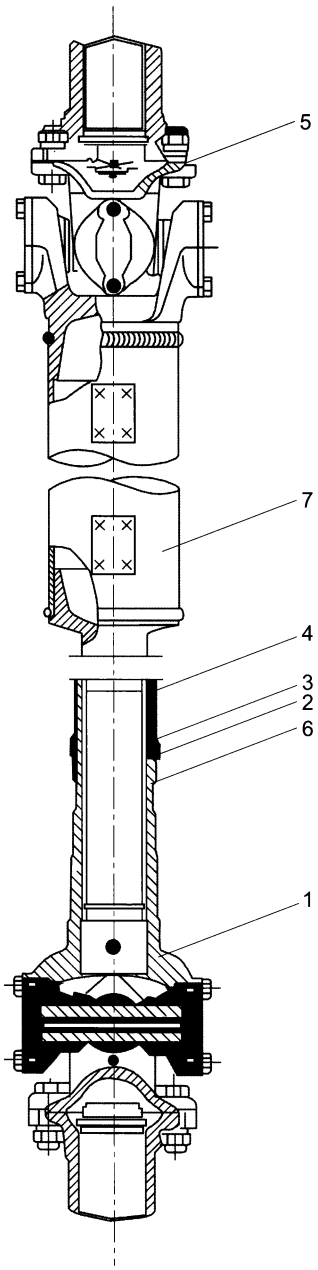
1.11 Z3.4 传动轴总成 Driving Shaft Ass.



3.1 LW330F.11/LW330F(G).11 工作装置 Working Device

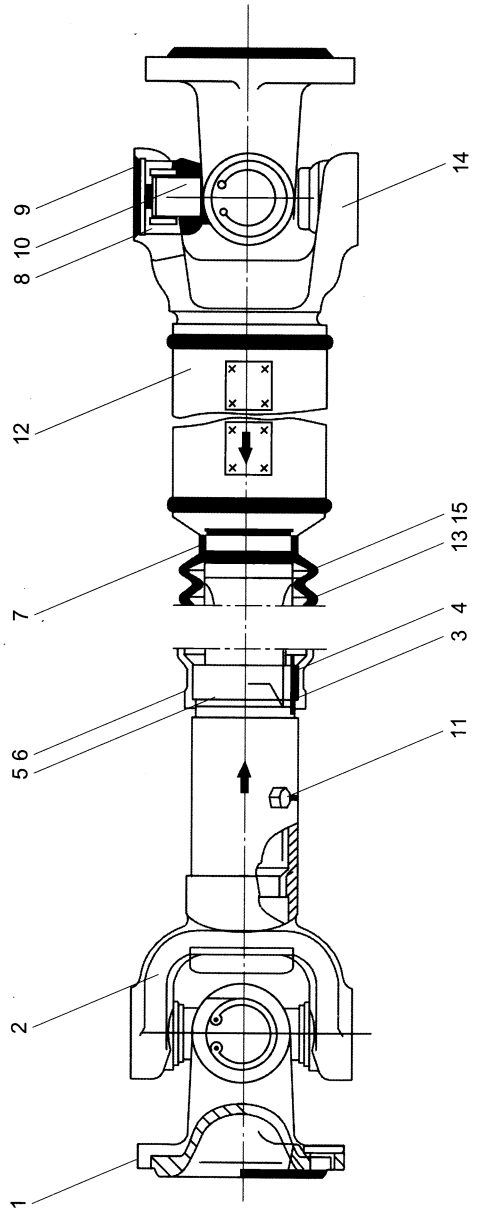
序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	LW330F.11-2	轴套	Shaft Sleeve	2
2	LW330F.11.2 LW330F(G).11.1	动臂	Lifting Arm	1
3	JB/T7940.1-1995	油杯 M10 × 1	Grease Cup	8
4	Z3.11.4	摇臂销轴	Rocker Pin Shaft	1
5	GB96-85	垫圈 1	Washer	8
6	GB93-87	垫圈 16	Lock Washer	8
7	GB5783-86	螺栓 M16 × 25	Bolt	8
8	Z3.11-4	轴套	Shaft Sleeve	2
9	Z3.11.6	动臂缸上销轴	Upper Shaft	2
10	GB9877.1-88	密封圈 B60 × 80 × 12	Ring	8
11	Z3.11-1B	轴套	Shaft Sleeve	4
12	Z3.11.7	铲斗销轴	Bucket Pin Shaft	3
13	Z3.11.5	摇臂端销轴	Rocker End Pin	2
14	LW330F.11.1IIA (LW330F.11.1III选用)	铲斗	Bucket	1
15	Z3.11.2 LW330F(G).11.2	拉杆	Link	1
16	Z3.11.8A	摇臂	Rocker	1
17	Z3.11-2	轴套	Shaft Sleeve	2

1.12 Z3.4.2 主传动轴 Main Driving Shaft



操纵与驾驶室
CONTROLS AND CAB

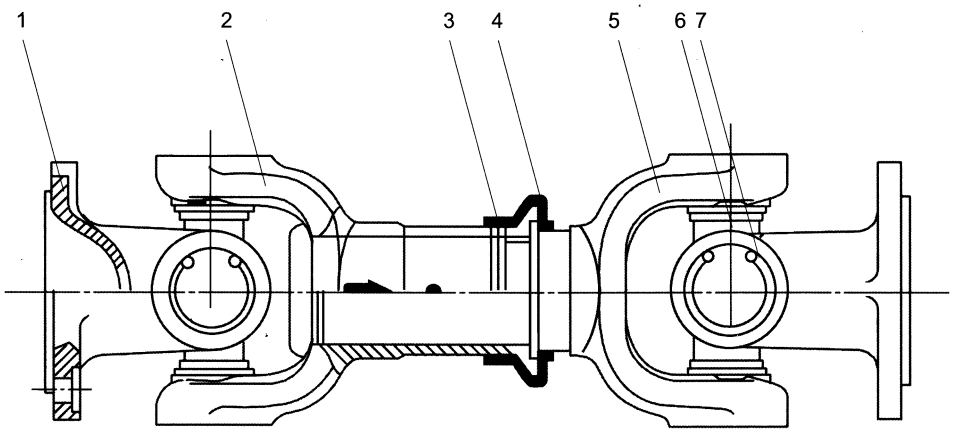
1.13 Z3.4.3 前传动轴 Front Driving Shaft



4.1 Z3.7.2 上部机构 Upper Mechanism

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB5783-86	螺栓 M5 × 12	Bolt	8
2	GB93-87	垫圈 5	Lock Washer	8
3	ZL40.7.1-1	盖板	Cover Plate	1
4	ZL40.7.1-11	挡圈	Snap Ring	4
5	ZL40.7.1-10	毡圈	Felt Ring	4
6	GB279-88	轴承 108101	Bearing	2
7	GB93-87	垫圈 8	Lock Washer	9
8	GB6170-86	螺母 M8	Nut	11
9	ZL40.7.1-16	手柄 M12	Knob	1
10	GB6170-86	螺母 M12	Nut	1
11	Z3.7.2-5	“U”形螺栓	U-Bolt	1
12	Z3.7.2-1	上轴承座	Upper Bearing Seat	1
13	Z3.7.2.1	手柄轴	Knob Shaft	1
14	ZL40.7.1-5	球头柱	Stud	1
15	ZL40.7.1-7	弹簧	Spring	1
16	ZL40.7.1-6	弹簧座	Spring Seat	1
17	ZL40.7.1-8	盖板	Cover Plate	1
18	Z3.7.2-6	下轴承座	Lower Bearing Seat	1
19	GB901-76	螺栓 M8 × 130	Bolt	2
20	Z3.7.2-485	联接杆	Link Rod	1
21	Z.05.1.8A	球铰接头	Ball Joint	2
22	Z3.7.1-1	联接杆	Link Rod	1
23	GB97.1-85	垫圈 8	Washer	3

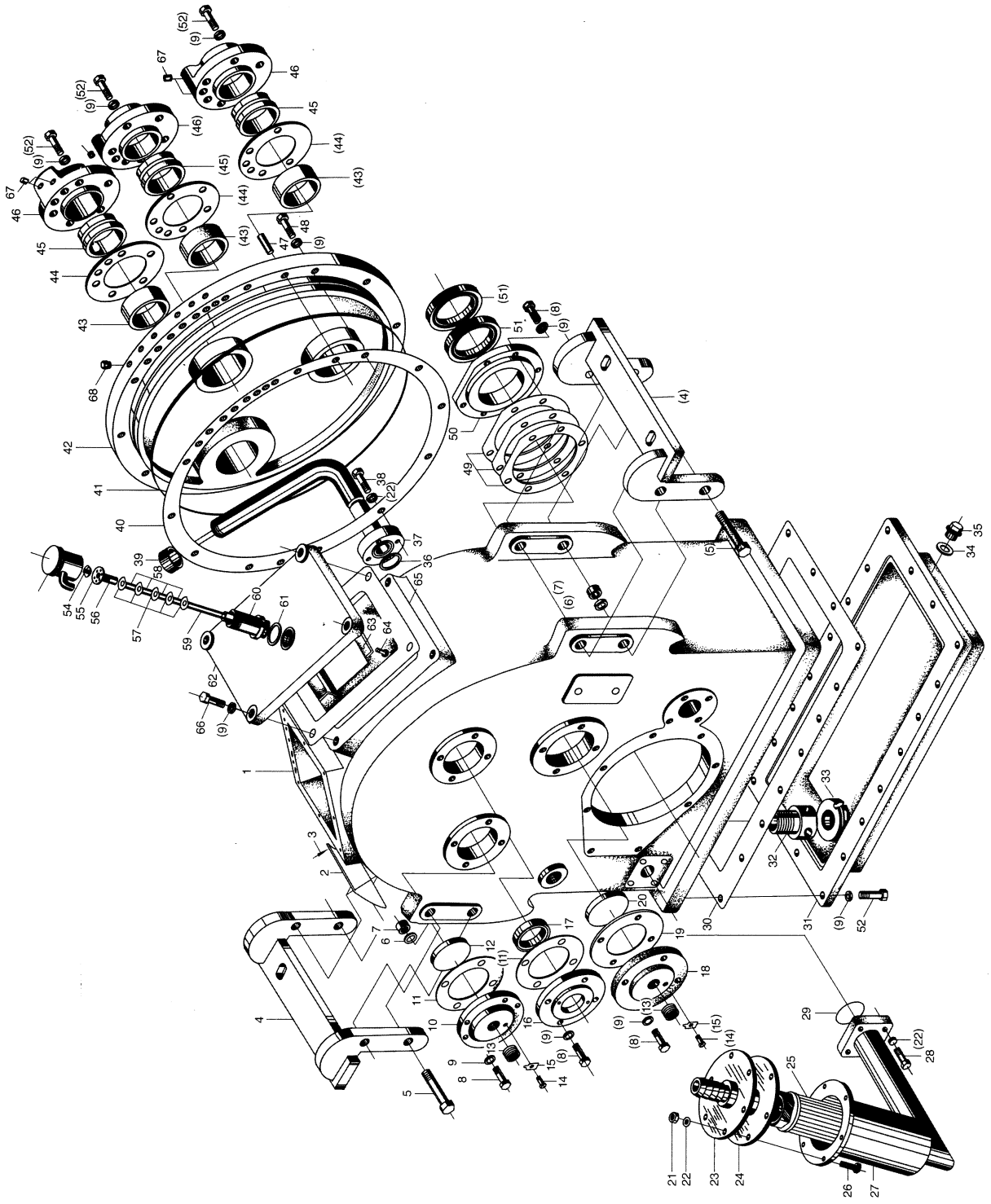
1.14 Z3.4.4A 后传动轴 Rear Driving Shaft



4.2 Z3.10.4A 操纵杆系 Control Lever System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL40.7.1-16	手柄球 M12	Knob	2
2	GB6172-86	螺母 M12	Nut	2
3	Z3.10.4A.2	转斗操纵杆	Tilt Control Lever	1
4	Z3.10.4A.1	动臂操纵杆	Lifting Arm Lever	1
5	ZL40.10.7-4A	固定座	Fixing Seat	2
6	Z3.10.6-3	轴	Shaft	1
7	GB93-87	垫圈 10	Washer	4
8	GB5783-86	螺栓 M10 × 25	Bolt	4
9	JB/T7940.2-1995	油杯 45°	Grease Cup	2
10	Z3.10.4A-1	连接板	Link Plate	4
11	GB91-86	销 B45 × 30	Pin	2
12	GB882-96	销轴 B12 × 30	Pin Shaft	2

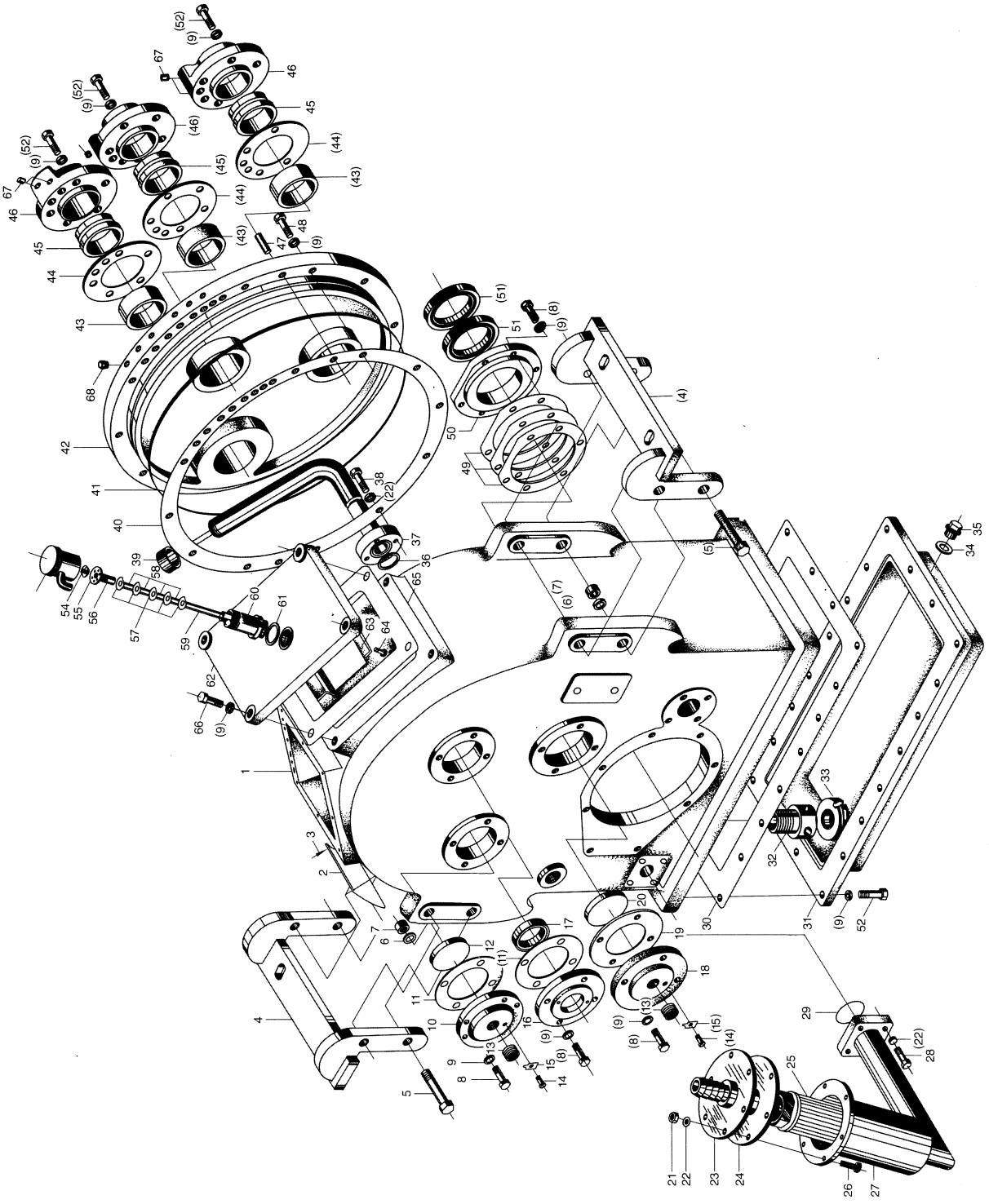
1.15 BS428 变速箱箱体部件 Transmission Ass.



4.3 ZL40.13.3A 操纵手柄 Operating Handle

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZL40.13.3.1-1A	臂板	Arm Plate	1
2	GB882-86	销轴 B10 × 32	Pin	1
3	ZL40.13.3-1A	套管	Sleeve	4
4	ZL40.13.3-2A	连杆	Link Rod	1
5	ZL40.13.3-3A	滑块	Slide Block	1
6	GB93-76	垫圈 6	Washer	4
7	GB6170-86	螺母 M6	Nut	4
8	ZL40.13.3.2A	操纵架	Control Bracket	1
9	GB97.1-85	垫圈 10	Washer	5
10	GB882-86	销轴 B10 × 55	Shaft Pin	2
11	GB5782-86	螺栓 M8 × 20	Bolt	4
12	GB93-87	垫圈 8	Washer	4
13	GB91-76	开口销 3.2 × 20	Cotter Pin	3
14	ZL40.13.3-4A	“U”形螺栓	U-Bolt	2
15	GB6170-86	螺母 M12	Nut	1
16	ZL40.7.1-16	手柄	Handle	1

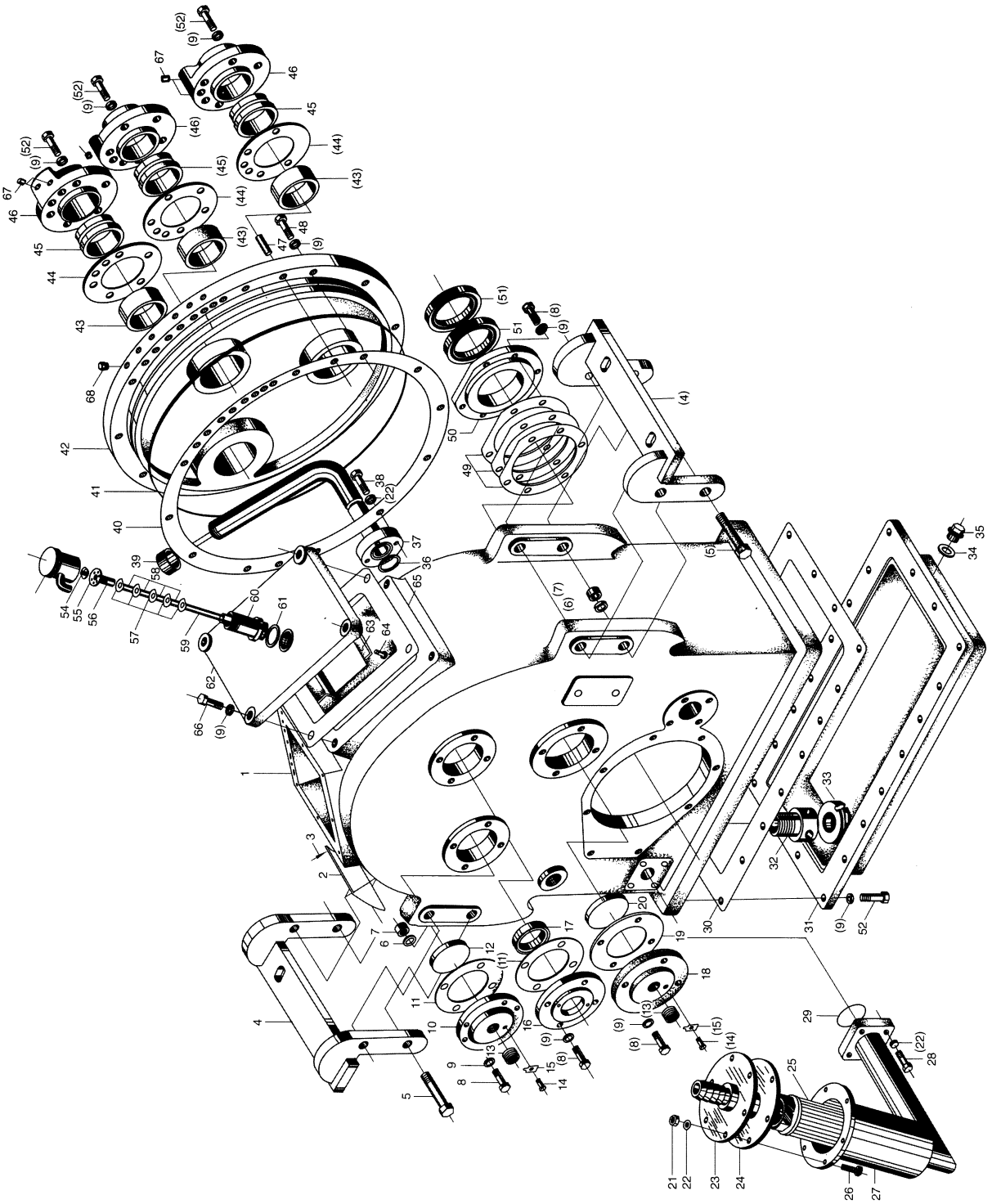
1.15 BS428 变速箱箱体部件 Transmission Ass.



4.4 ZLT15B 驾驶室 Cab

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZLT15B	驾驶室	Cab	1

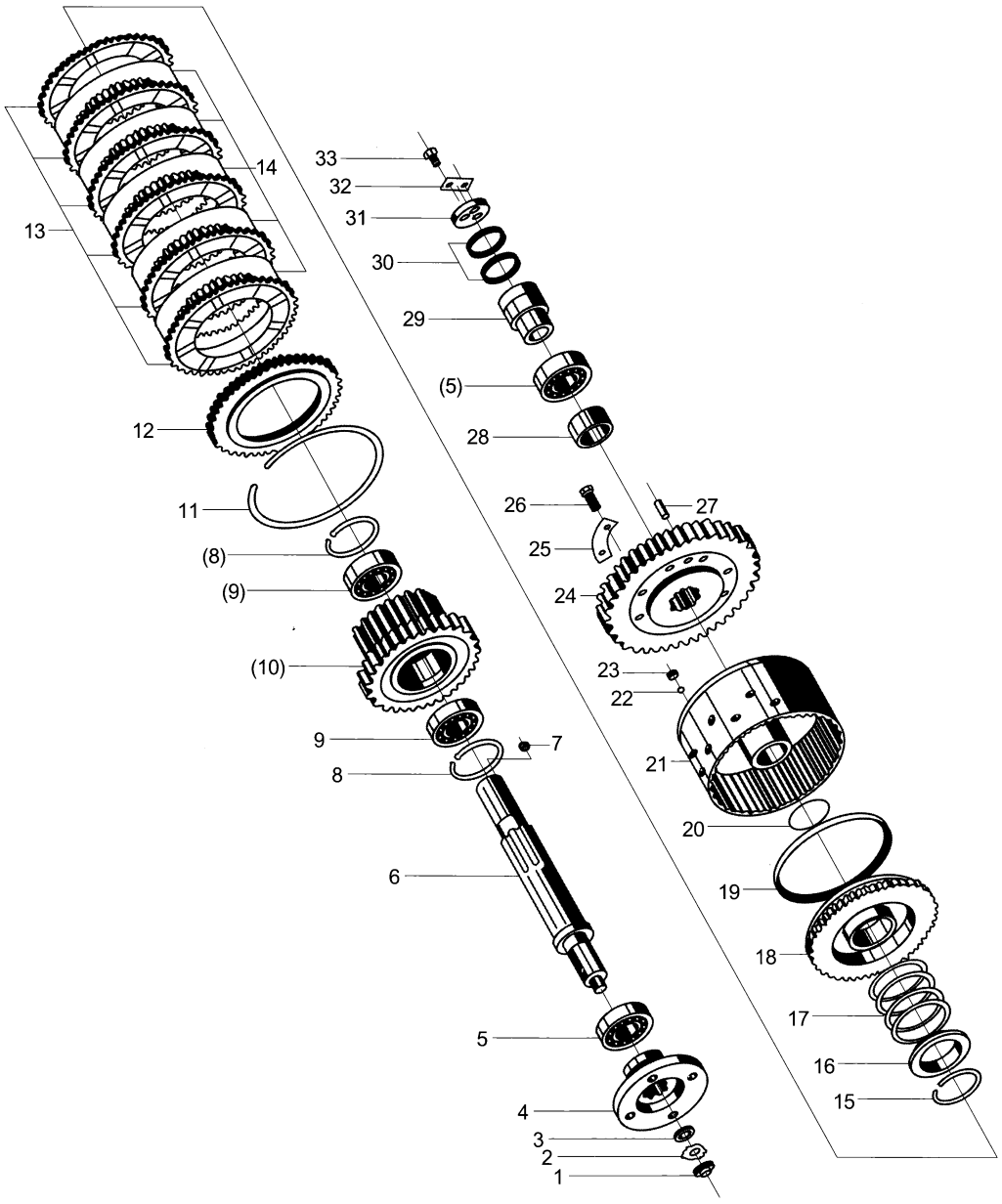
1.15 BS428 变速箱箱体部件 Transmission Ass.



4.5 Z3.16B 操纵台架总成 Operator's Platform Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.16B.1.1	操作台架	Operator's Platform	1
2	Z3.16B.1-2	板	Plate	1
3	GB96-85	垫圈 8	Washer	11
4	GB93-87	垫圈 8	Lock Washer	11
5	GB5783-86	螺栓 M8 × 20	Bolt	11
6	Z3.16.2B.2	固定板	Plate	1
7	GB6170-86	螺母 M8	Nut	4
8	Z3.16B.3A (Z3.16B.4暖风选用)	后底板	Rear Plate	1
9	XGZY01	司机座椅总成	Seat Ass.	1
10	B5783-86	螺栓 M12 × 25	Bolt	9
11	GB93-87	垫圈 12	Lock Washer	9
12	GB97.1-85	垫圈 12	Washer	9
13	Z3.16B.2	中底板	Middle Plate	1
14	GB5783-86	螺栓 M6 × 12	Bolt	4
15	GB93-87	垫圈 6	Lock Washer	4
16	GB97.1-85	垫圈 6	Washer	4
17	Z3.16B.1.2	罩	Hood	1

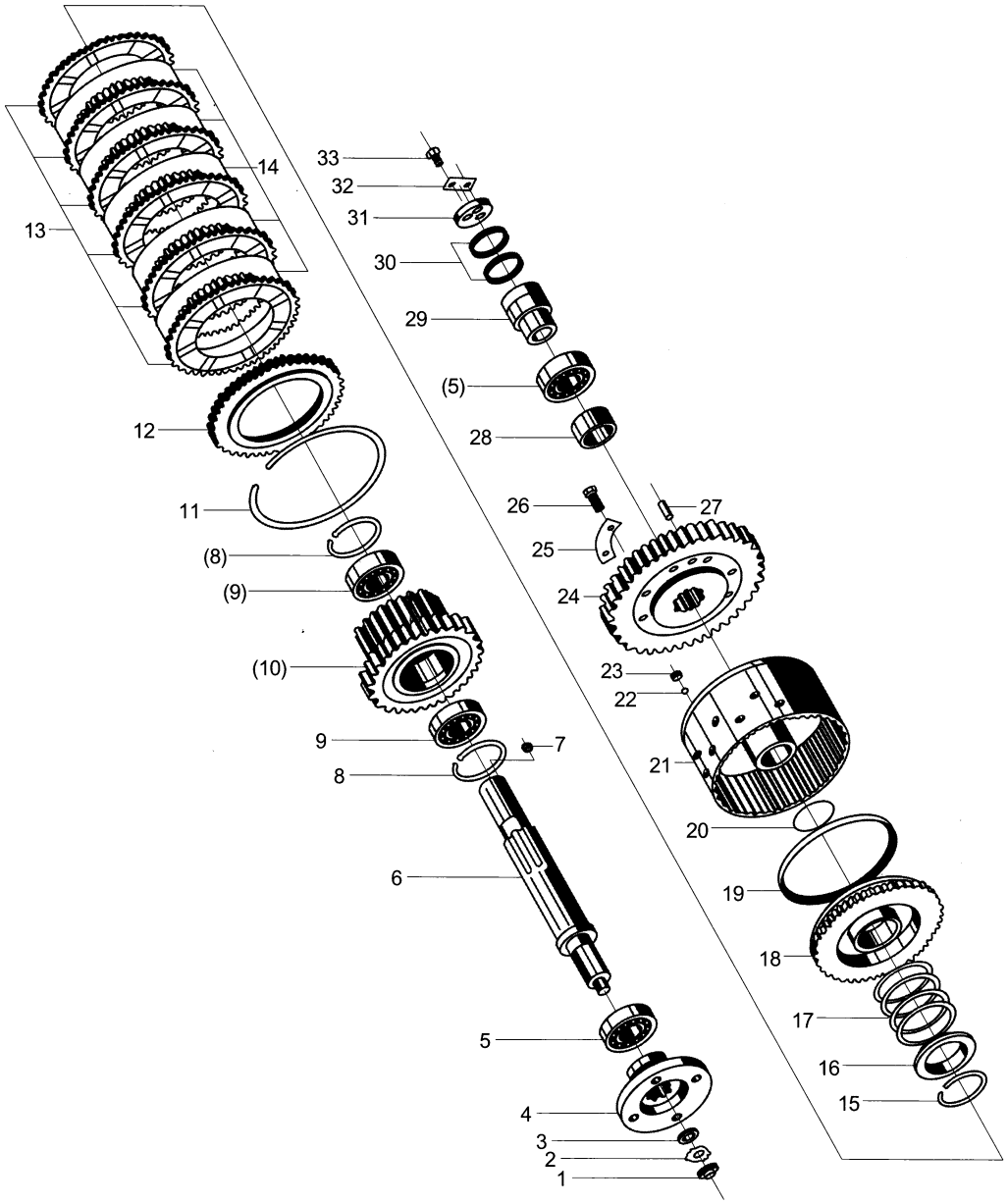
1.16 BS428 变速箱输入轴总成 Input Shaft Ass.



4.6 LW330F(Ⅱ).21 暖风系统 Heat Blower System

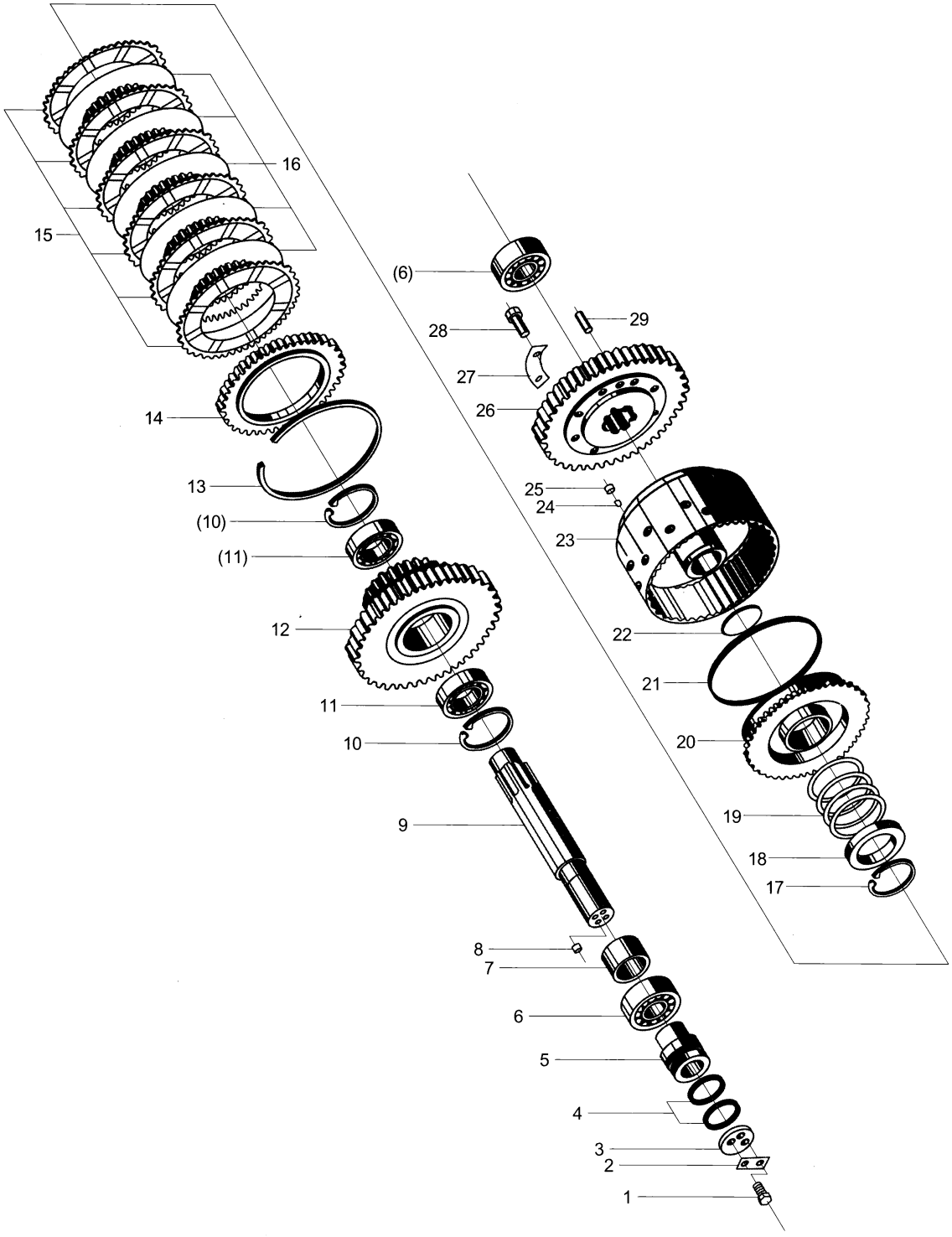
序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	XZ13024	暖风机	Heat Blower	1
2	GB5783-86	螺栓 M8 × 20	Bolt	4
3	GB93-87	垫圈 8	Washer	6
4	GB97.1-85	垫圈 8	Washer	6
5	JB3616.1-1984	双钢丝喉箍 22–26	Clamp Hoop	8
6	LW330F(Ⅱ).21-1	进回水管	Hose	2
7	ZL40A.12.4-1	放水阀	Drain Valve	2
8	LW330F(Ⅱ).21.1	暖风接头	Joint	1
9	GB5783-86	螺栓 M8 × 30	Bolt	2
10	GB6170-86	螺母 M8	Nut	2
11	LW330F(Ⅱ).21-2	进水管	Hose	1
12	ZL50.14-06	水温接头	Joint	1
13		截止阀	Cut-off Valve	1
14	ZL40A.15.3-5	接头	Joint	1
15	LW330F(Ⅱ).21-3	回水管	Water Return Pipe	1

1.16 BS428 变速箱输入轴总成 Input Shaft Ass.



制动系统
BRAKE SYSTEM

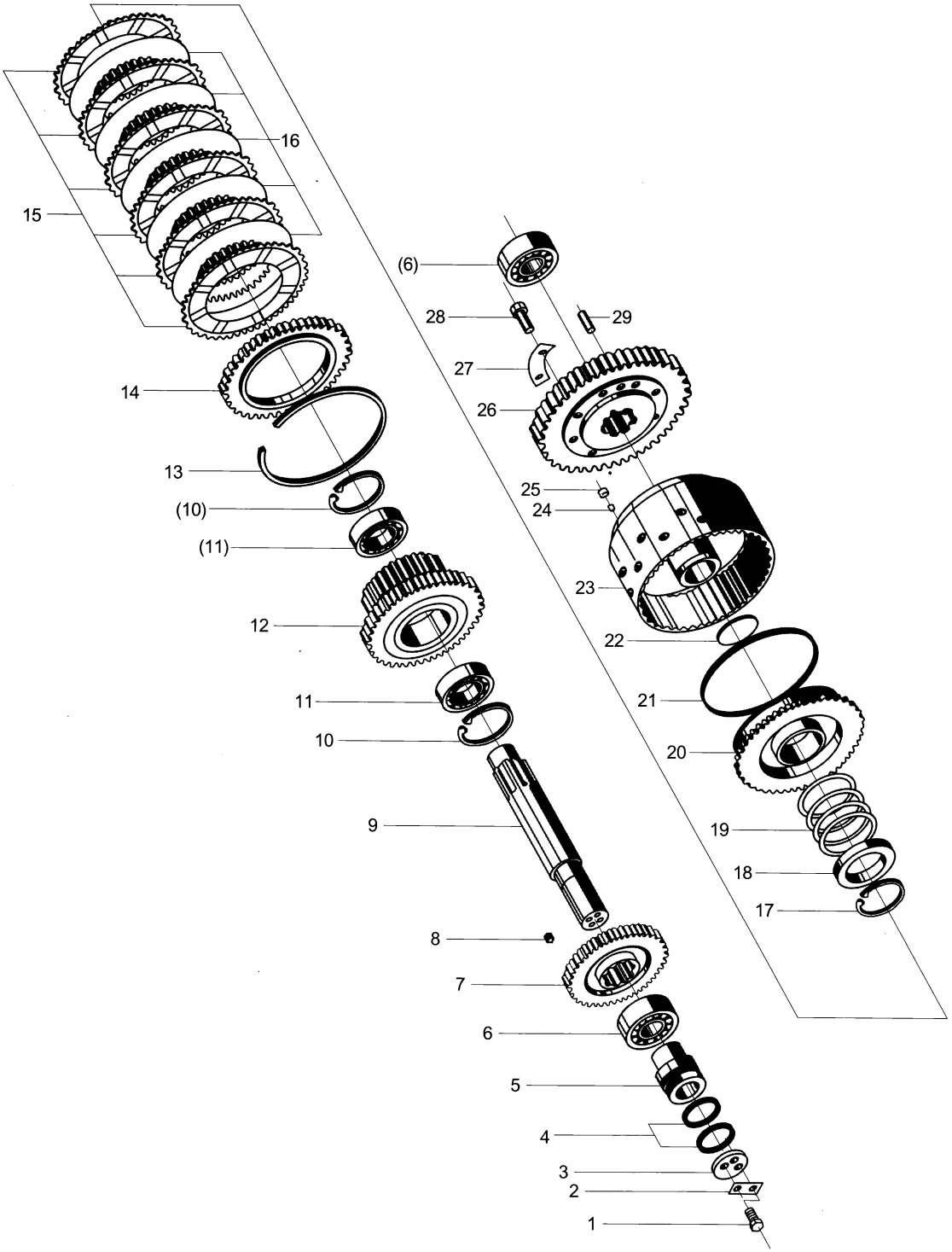
1.17 BS428 变速箱倒档轴总成 Reverse Shaft Ass.



5.1 LW330F(II).12 制动系统 Brake System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.12.12B	前桥左油管	Left Pipe	1
2	ZL40.12.1	前桥油路三通接头	Tee Connector	2
3	GB93-87	垫圈 8	Washer	6
4	GB5783-86	螺栓 M8 × 30	Bolt	6
5	Z3.12.1B	前桥右油管	Right Oil Pipe	1
6	ZL40.12.4-14A	管接头	Connector	4
7	GB3452.1-1992	O型密封圈 8 × 1.9	O-Ring	8
8	LW330F(II).12.1	前桥刹车软管	Braking Pipe	1
9	GB6170-86	螺母 M8	Nut	4
10	XM-60C-3514010	制动控制阀	Braking Control Valve	1
11	JB982-77	垫圈 22	Washer	8
12	ZL40.12.5-1	螺栓	Bolt	5
13	Z3.12.4-4	软管	Hose	6
14	LW330F(LT).12-1	胶管 B(8)- Ø13 × 950	Rubber Pipe	1
15	JB/T8870-1999	喉箍 d25	Hoop Clamp	6
16	ZL50.12.9A-1	接头	Joint	1
17	Z3.12-5A	左支架	Left Bracket	1
18	Z3.12.7	(L) 加力泵组	Air Master	2
19	Z3.12-1A	右支架	Right Bracket	1
20	LW330F(II).12.2	后桥刹车软管	Braking Hose	1
21	GB5783-86	螺栓 M10 × 20	Bolt	4
22	GB93-87	垫圈 10	Washer	1
23	Z3.12.16AV	后桥右油管	Right Pipe	2
24	Z3.12.9B	后桥左油管	Left Pipe	11
25	Z3.12.11A	储气缸	Air Tank	1z
26	GB5783-86	螺栓 M10 × 30	Bolt	8
27	GB6170-86	螺母 M8	Nut	4

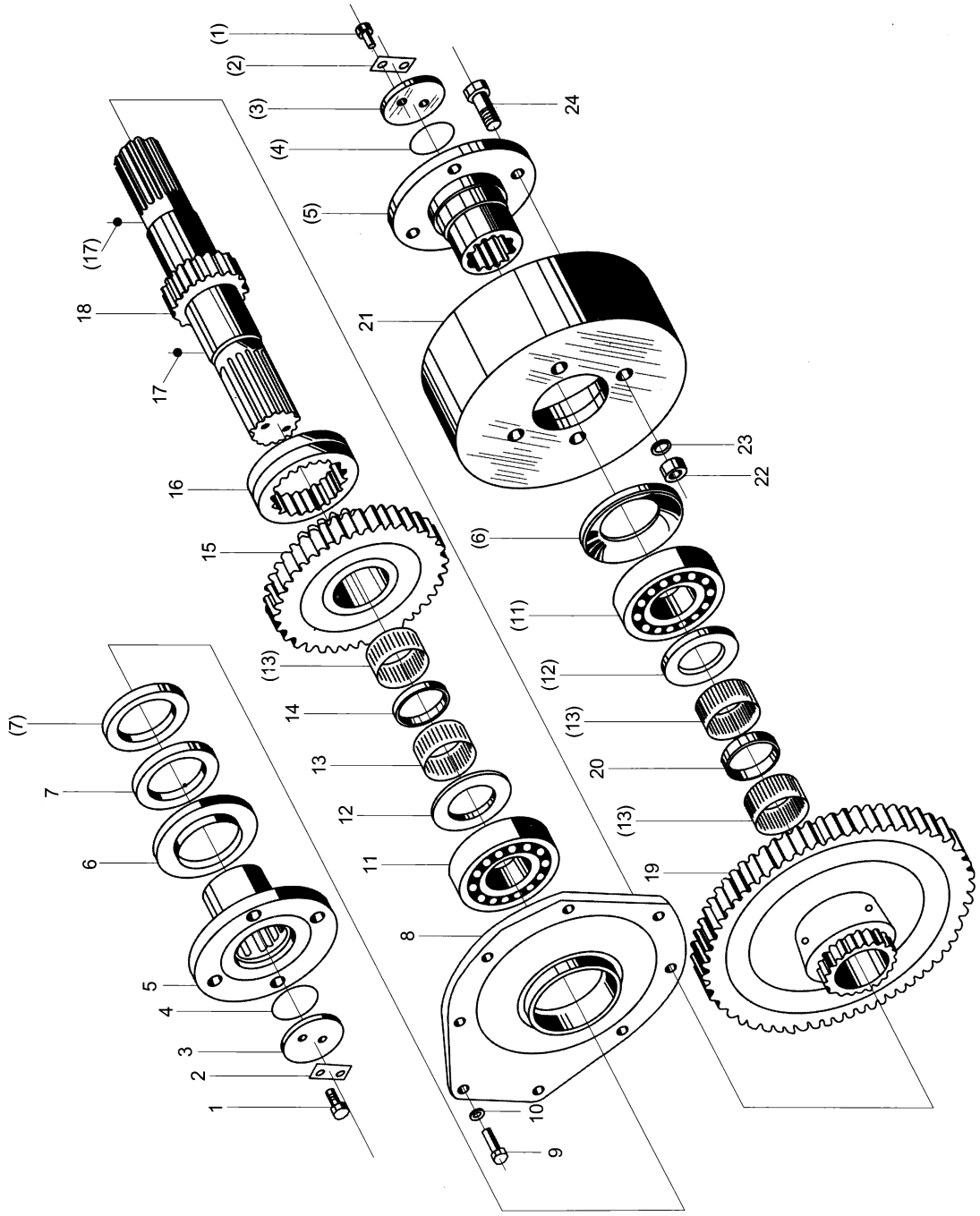
1.18 BS428 变速箱中间轴总成 Medium Shaft Ass.



5.2 Z3.13 手制动总成 Parking Brake Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB91-86	销 3.3 × 22	Pin	1
2	GB97.2-85	垫圈 10	Washer	1
3	Z3.13-1	接头	Joint	1
4	GB6172-86	螺母 M10	Nut	1
5	Z3.13.1	支架	Bracket	1
6	B5782-86	螺栓 M16 × 80	Bolt	2
7	GB93-87	垫圈 16	Washer	2
8	GB6170-86	螺母 M16	Nut	2
9	GB882-86	销轴 B10 × 32	Pin	1
10	Z3.13.2.1	软轴	Cable	1
11	Z3.13.2.2	钢丝软管	Steel Wire Cable	1
12	GB6172-86	螺母 M16	Nut	2
13	GB5782-86	螺栓 M8 × 25	Bolt	4
14	GB93-87	垫圈 8	Lock Washer	4
15	ZL40.13.3A	操纵手柄	Control Handle	1
16	Z3.06	变速箱手制动总成	Parking Brake	1

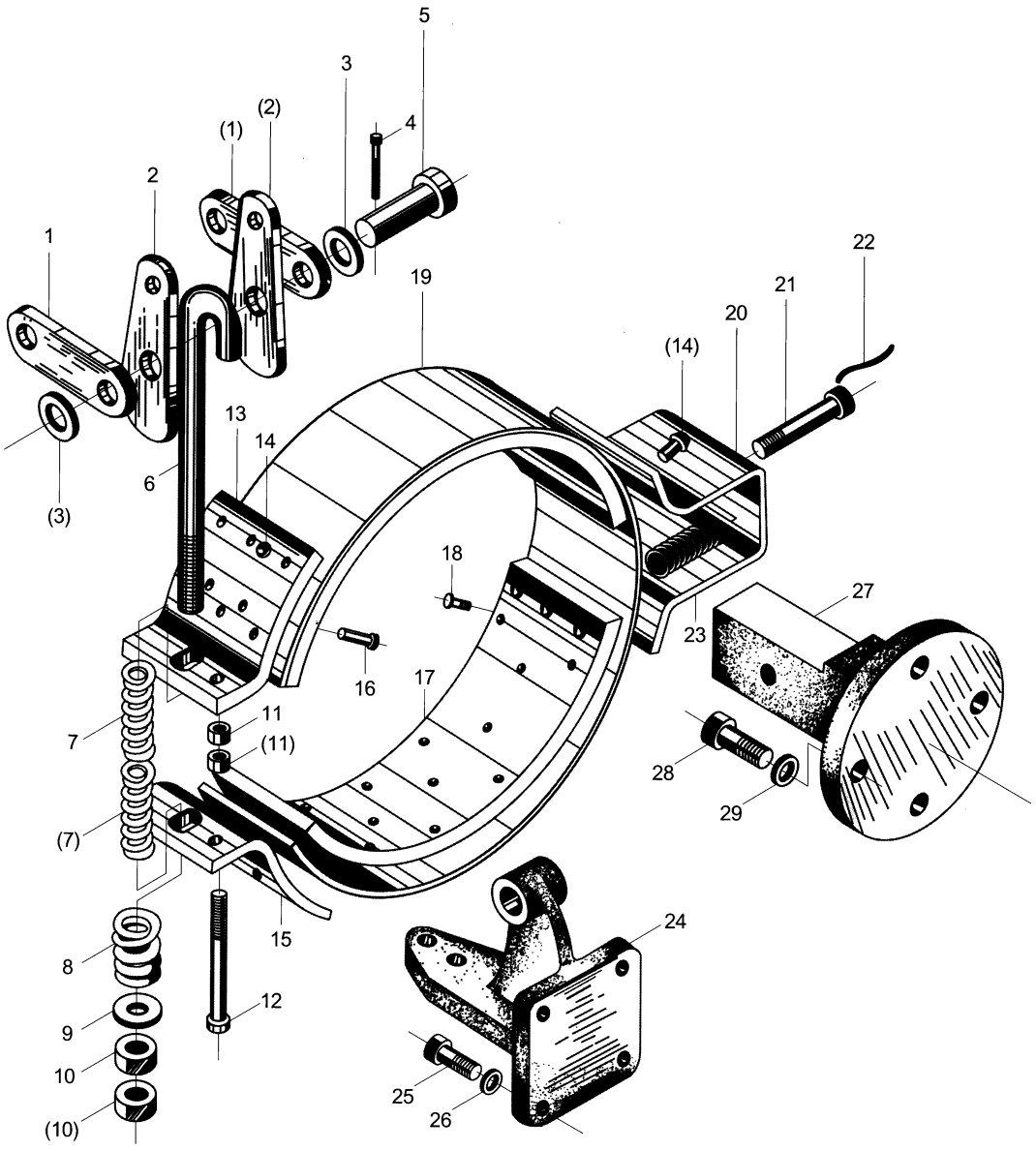
1.19 BS428 变速箱输出轴总成 Output Shaft Ass.



液压系统

HYDRAULIC SYSTEM

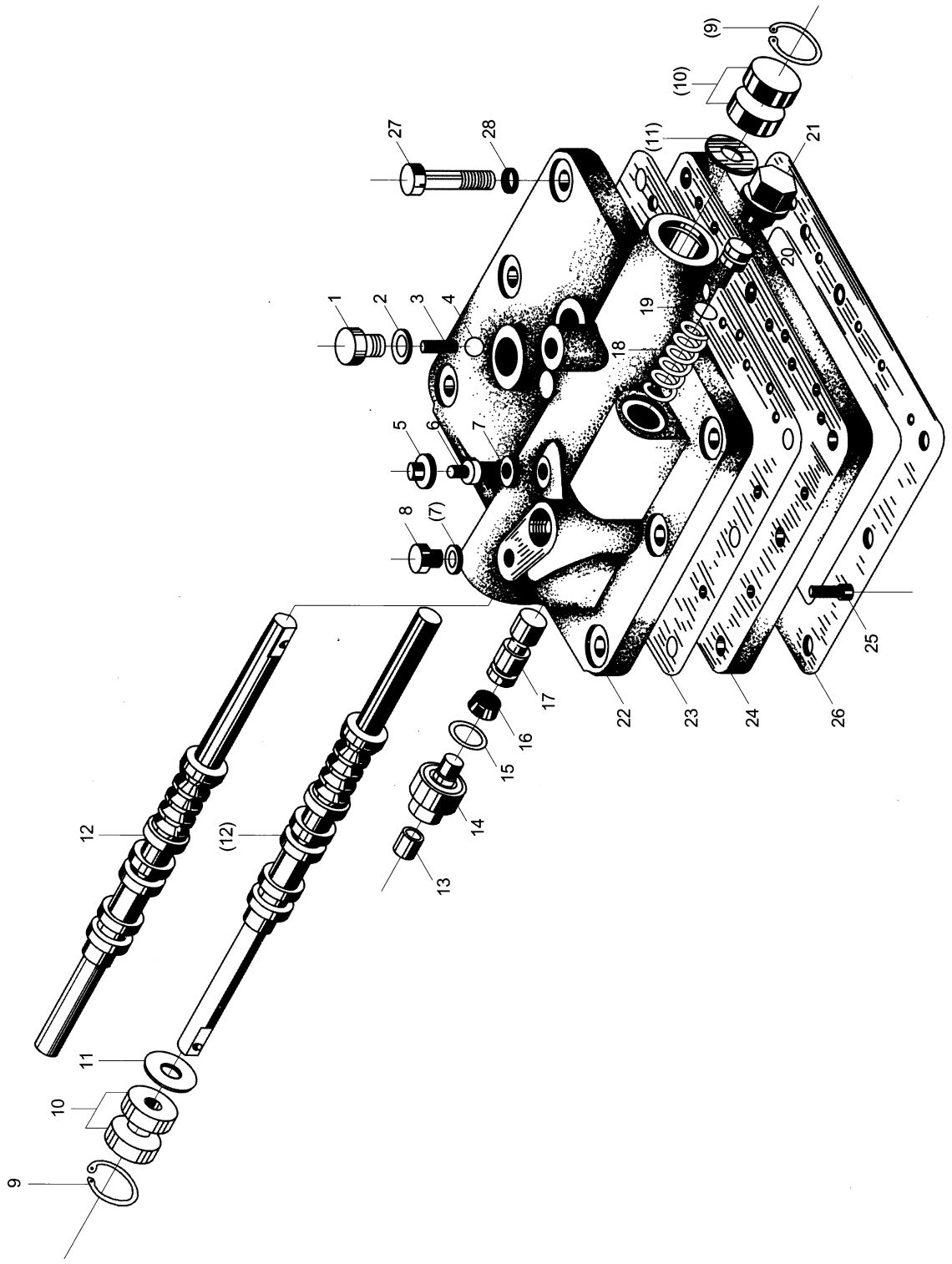
1.20 BS428 变速箱手制动总成 Parking Brake Ass.



5.3 Z3.12.11A 储气缸 Air Tank

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB5783-86	螺栓 M10 × 30	Bolt	8
2	GB93-87	垫圈 12	Washer	8
3	GB6170-86	螺母 M10	Nut	4
4	Z3.12.11A.1	储气缸	Air Tank	1
5	ZL40.12.5-1	螺栓	Bolt	2
6	GB982-77	垫圈	Washer	4
7	ZL40.12.9-4	接头	Joint	2
8	CA10	放水阀	Water Draining Valve	1
9	ZL40.12.6.4	轮胎充气阀	Inflating Valve	1
10	Z3.12.11A-1	固定板	Fixed Plate	2

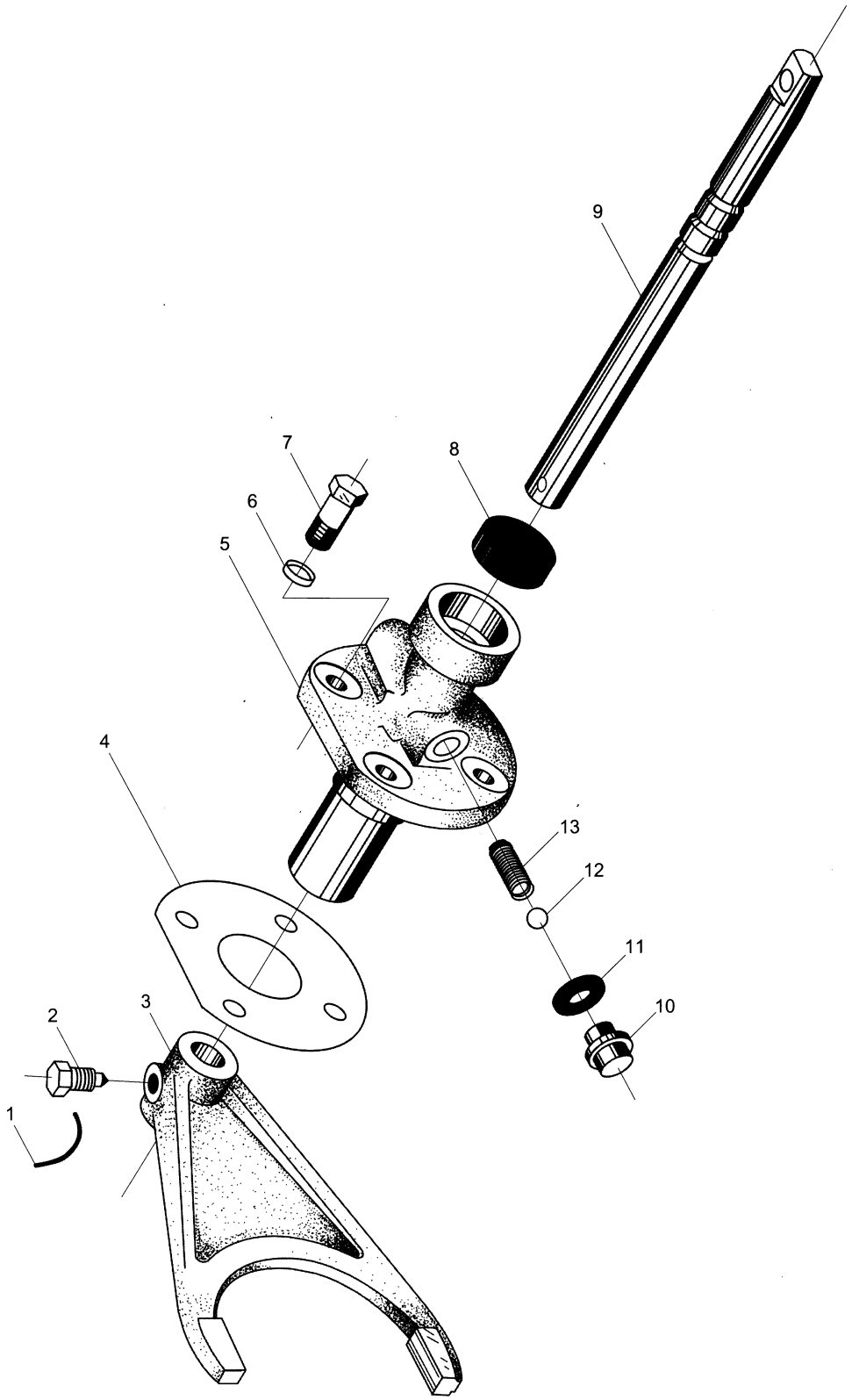
1.21 BS428 变速箱操纵阀总成 Transmission Control Valve Ass.



6.1 LW330F(II).9 转向液压系统 Steering System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.3-12A	连接套	Joint Tube	1
2	GB894.2-86	挡圈 25	Snap Ring	1
3	Z3.3-14	纸垫	Washer	1
4	Z3.3-11	连接盘	Connective Disc	1
5	GB93-87	垫圈 8	Washer	6
6	GB70-85	螺栓 M8 × 20	Bolt	6
7	Z3.3-15	纸垫	Paper Washer	1
8	GB93-87	垫圈 10	Washer	17
9	GB5782-86	螺栓 M10 × 75	Bolt	2
10	GB5783-86	螺栓 M10 × 30	Bolt	14
11	Z3.9-4	低压软管	Low Pressure Hose	1
12	LW330F(II).9.1	胶管总成	Hose	1
13	LW330F.9.9.1	泵出油管	Oil Output Tube	1
14	GB3452.1-1992	O型密封圈 37.5 × 3.55	O-Ring	2
15	GB550	转向泵	Steering Pump	1
16	Z3.9.15.1	泵进油管	Oil Input Tube	1
17	JB3616.1-1984	双钢丝环箍 45-50	Clamp Hoop	2
18	Z3.9-3	低压软管	Low Pressure Hose	1
19	XGZP370	方向盘	Steering Wheel	1
20	Z3.9.7	转向柱	Steering Column	1
21	BZZ1-400	转向器	Redirector	1
22	LW330F(II).9.3.1	油管总成	Tube	2
23	Q/SC1294-2000	垫圈 20	Washer	8
24	LW330F(II).9.2.1	油管总成	Tube	1
26	Z3.9.11-2	铰接螺栓	Bolt	4
27	JB3616.1-1984	双钢丝环箍 28-32	Clamp	2
28	LW330F(II).9.4	胶管总成	Hose	2
29	LW330F.9.12	接头体	Joint	1
30	LW330F.9.5	胶管总成	Hose	2
31	Z3.9.1	转向油缸	Steering Cylinder	2

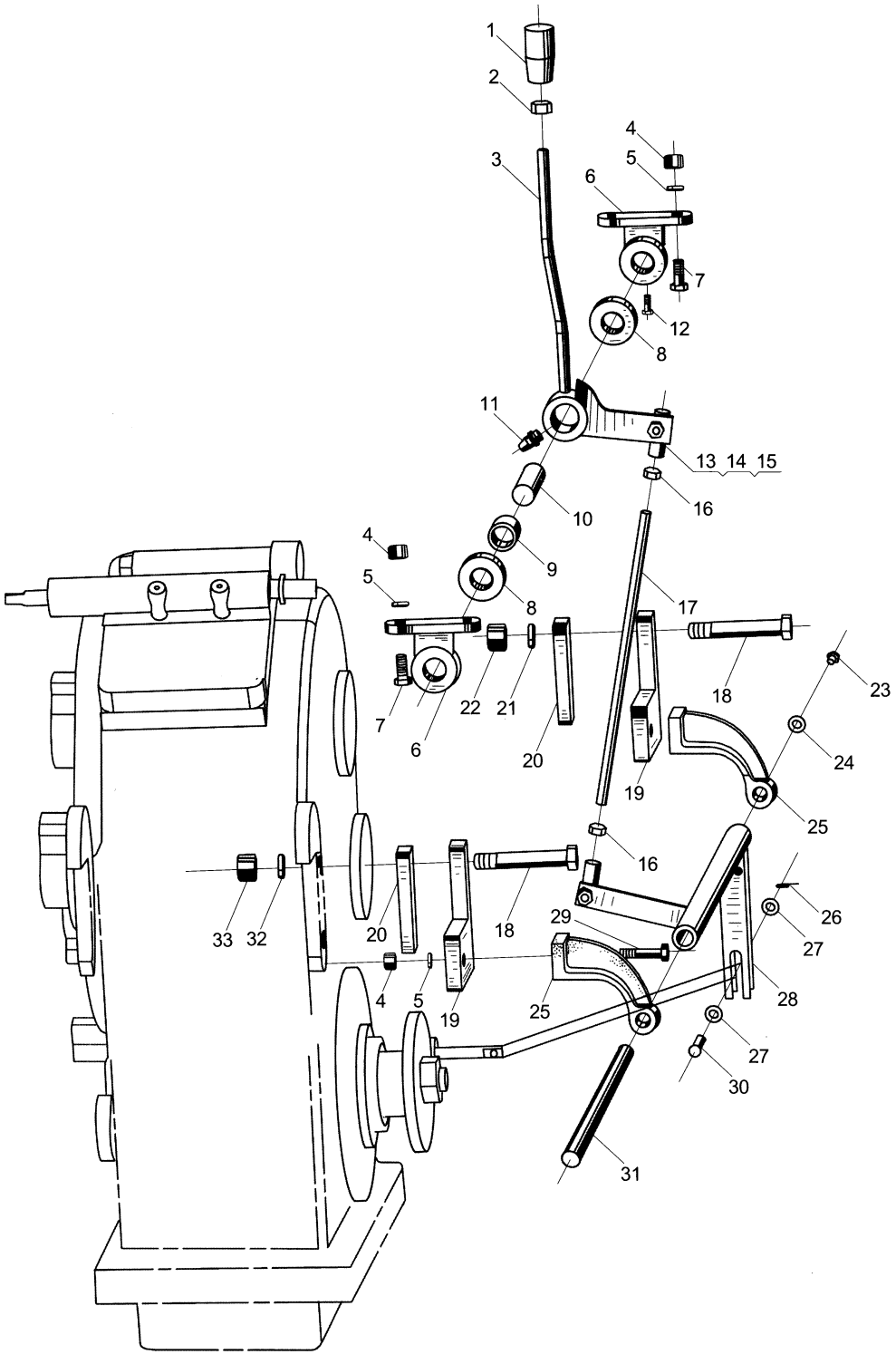
1.22 BS428 变速箱高低档拨叉机构 Yoke Ass.



6.1 LW330F(II).9 转向液压系统 Steering System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
32	Q/SC1294-2000	垫圈 18	Washer	4
33	LW330F.9.3.1	三通油管 (右)	Tee Oil Pipe (R)	1
34	Z3.9.2-3	铰接螺栓	Bolt	2
35	LW330F.9.4.1	三通油管 (左)	Tee Oil Pipe (L)	1
36	I15LM18 × 1.5ED	接头	Joint	2
37	LW330F.9.2	胶管总成	Hose	2
38	LW330F(II).9.5	胶管总成	Hose	1
39	GB21-76	螺栓 M10 × 65	Bolt	3
40	LW330F(II).9.7	胶管总成	Hose	1
41	390G.9-5	接头	Joint	1
42	Q/SC1294-2000	垫圈 24	Washer	3
43	FLD-30ZI	单稳阀	Valve	1
44	15LM27X1.5ED	接头	Joint	1
45	LW330F(II).9.6	三通接头	Joint	1
46	Z3.9.8A-1	铰接螺栓	Bolt	1

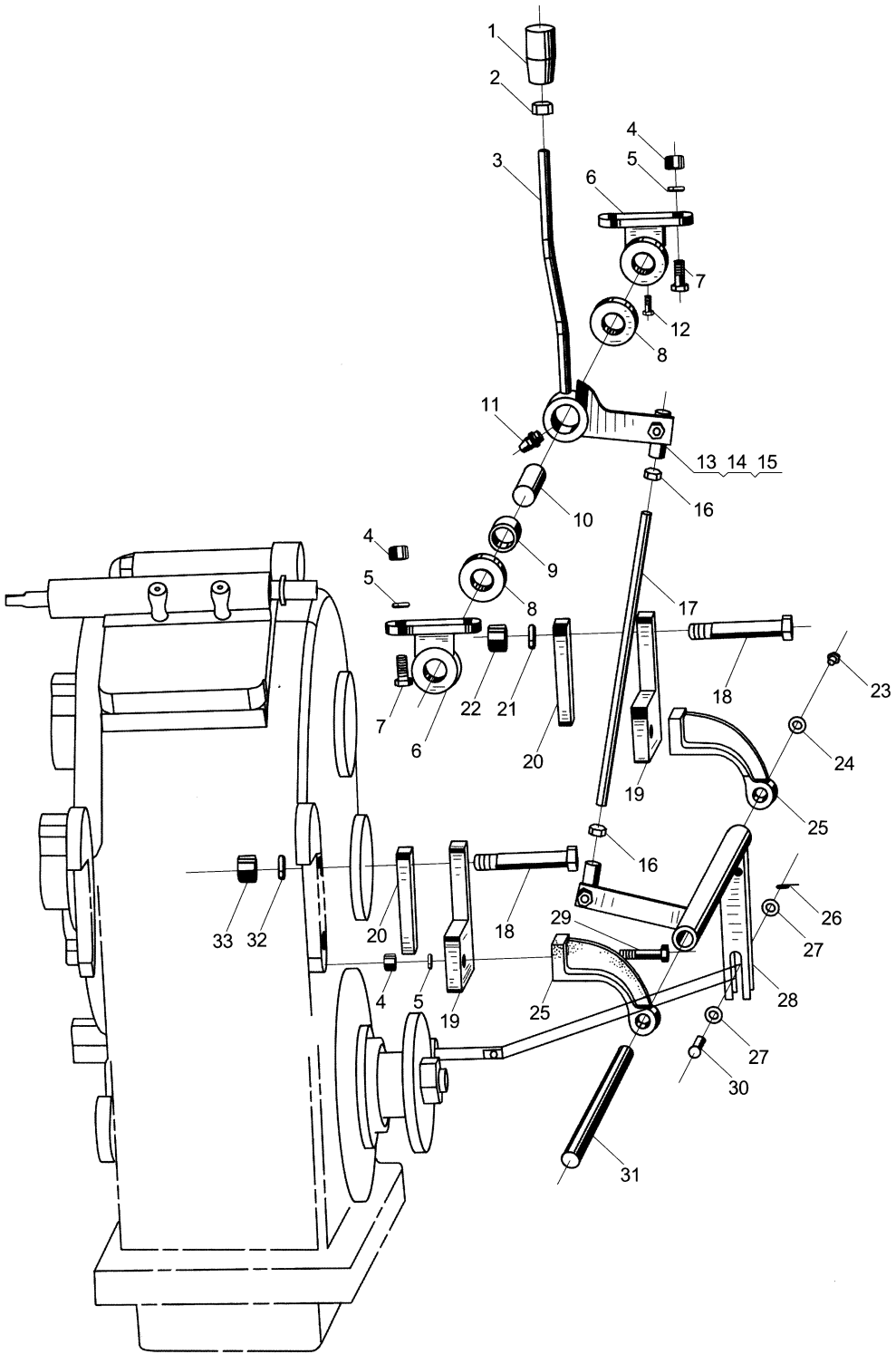
1.23 Z3.7 高低速操纵 Shift Control



6.2 全液压转向器 Hydraulic Steering Control Unit

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.9.18	方向盘	Steering Wheel Steering	1
2	Z3.9.7	转向柱	Column	1
3	GB5781-86	螺栓 M8 × 25	Bolt	3
4	Z3.9.2A	支架	Bracket	1
5	GB93-87	垫圈 8	Lock Washer	3
6	GB6170-86	螺母	Nut	3
7	GB5781-86	螺栓 M10 × 30	Bolt	4
8	GB93-87	垫圈 10	Lock Washer	4
9	GB70-85	螺栓 M12 × 50	Bolt	2
10	GB93-87	垫圈 12	Lock Washer	2
11	FKAR-103015	阀块	Valve Block	1
12	BZZ1-400	转向器	Steering Control Unit	1
13		阀芯	Spool	1
14		弹簧片	Spring Slice	1(组)
15		阀套	Valve Sleeve	1
16		拨销	Pin	1
17		螺套	Screw Sleeve	
18		钢球	Steel Ball	
19		阀体	Valve Body	1
20		滑环	Slide Ring	1
21		挡环	Washer	1
22		O型密封圈 50 × 3.1	O-Ring	1
23		X型密封圈 28 × 3.5	X-Ring	1
24		O型密封圈 24 × 2.4	O-Ring	1
25		前盖	Front Cover	1
26		弹簧垫圈	Lock Washer	4
27		螺钉	Screw	4
28		连接块	Connector	1
29		螺栓	Bolt	7
30		垫圈	Lock Washer	7

1.23 Z3.7 高低速操纵 Shift Control



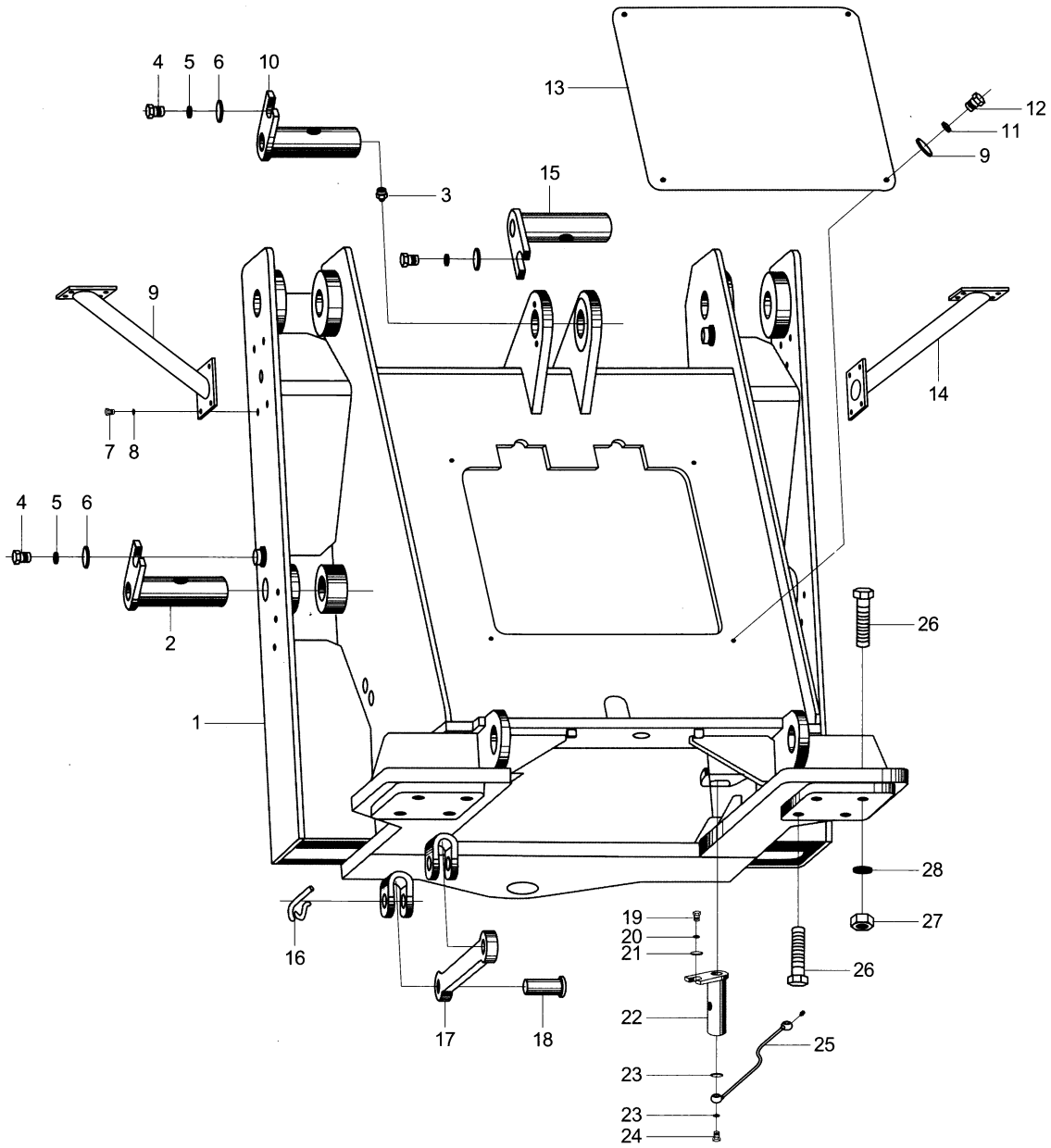
6.2 全液压转向器 Hydraulic Steering Control Unit

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31		限位螺栓	Bolt	1
32		铜垫圈	Copper Washer	1
33		限位销	Limit Pin	1
34		后盖	Rear Cover	1
35		限位柱	Limit Stud	1
36		O型密封圈 96 × 1.9	O-Ring	1
37		转子、定子组件	Rotator & Stator Ass.	1
38		O型密封圈 96 × 1.9	O-Ring	1
39		联动轴	Link Shaft	1
40		隔盘	Plate	1
41		O型密封圈 90 × 3.1	O-Ring	1

6.3 Z3.9.1 转向油缸 Steering Cylinder

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.9.1-9	防尘环	Dust Ring	4
2	GB893.1-86	挡圈 62	Snap Ring	4
3	GB304.5-81	关节轴承 GE40ES	Bearing	2
4	Z3.9.1.1	缸体	Cylinder	1
5	Z3.9.1-8	螺母	Nut	1
6	Z3.9.1-10	垫圈	Washer	1
7	Z3.9.1-6	孔用斯来圈	Slyd Ring	2
8	Z3.9.1-7	活塞	Piston	1
9	CKW-080	格来圈 D90	Glyd Ring	1
10	GB1235-76	O型密封圈 35 × 3.1	O-Ring	1
11	Z3.9.1-4	导向套	Guide Tube	1
12	Z3.9.1-3	轴用斯来圈	Slyd Ring	2
13	CKS-045	斯特封 d45	Step Seal	1
14	GB1235-76	O型密封圈 80 × 3.1	O-Ring	1
15	CKG-045	轴用密封圈 d45	Seal Ring	1
16	Z3.9.1-2	卡环	Snap Ring	1
17	Z3.9.1-1	挡环	Snap Ring	1
18	GB894.1-86	挡圈 72	Snap Ring	1
19	CK-045	防尘圈 d45	Dust Ring	1
20	GB91-86	开口销 5 × 50	Pin	1
21	Z3.9.1-5	活塞杆	Piston Rod	1

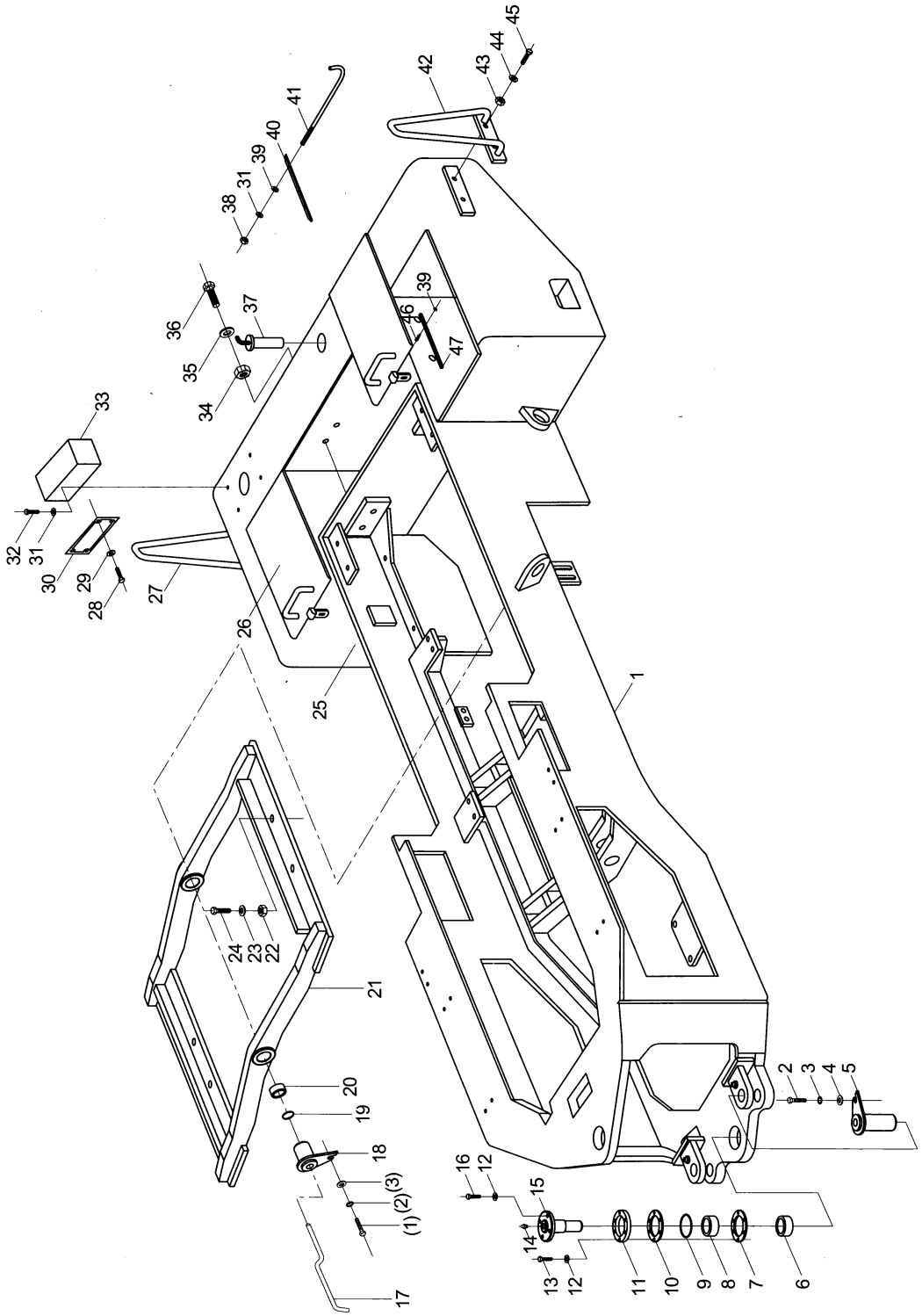
2.1 LW330F(II).08.1 前车架总成 Front Chassis Ass.



6.4 LW330F.10 工作液压系统 Working Hydraulic System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.10.1	转斗油缸	Tilt Cylinder	1
2	LW330F.10.18.1	转斗油缸前腔油管	Oil Tube	1
3	LW330F.10.19.1	转斗油缸后腔油管	Oil Tube	1
4	LW330F.10.3	胶管总成	Hose	1
5	GB93-87	垫圈 8	Lock Washer	8
6	Z3.10.4A	操纵杆系	Control Lever System	1
7	LW330F.10.16.1	分配阀至转斗油缸前腔油管	Oil Tube	1
8	LW330F.10.17.1	分配阀至转斗油缸后腔油管	Oil Tube	1
9	GB21-76	螺栓 M10 × 30	Bolt	4
10	GB93-87	垫圈8	Washer	8
11	GB3452.1-1992	O型密封圈 28 × 3.55	O-Ring	4
12	Z3.10.5	分配阀回油管	Hose	1
13	GB6170-86	螺母 M12	Nut	8
14	GB93-87	垫圈 12	Lock Washer	12
15	GB1235-76	O型密封圈 50 × 3.1	C-Ring	1
16	DF25B2(330F)	分配阀	Distributing Valve	1
17	Z3.10.25	分配阀支架	Distributing Valve Bracket	1
18	GB5780-86	螺栓 M12 × 140	Bolt	4
19	Z3.10.6A	低压软管	Hose	1
20	GB5780-86	螺栓 M10 × 30	Bolt	4
21	GB5780-86	螺栓 M10 × 65	Bolt	1
22	LW330F.10.13.1	泵出油硬管	Hard Tube	1
23	GB3452.1-1992	O型密封圈 30 × 3.55	O-Ring	1
24	CBG2100	工作泵	Working Pump	1
25	Z3.10-8	纸垫	Paper Cushion	1
26	Z3.10-5AJ	连接轴	Connective Shaft	1
27	Z3.10-4	接盘	Joint Disc	1
28	Z3.3-14	纸垫	Paper Cushion	1
29	JB3616.1-1984	双钢丝环箍 50-55	Clamp	4
30	LW330F.10.4	胶管总成	Hose	1

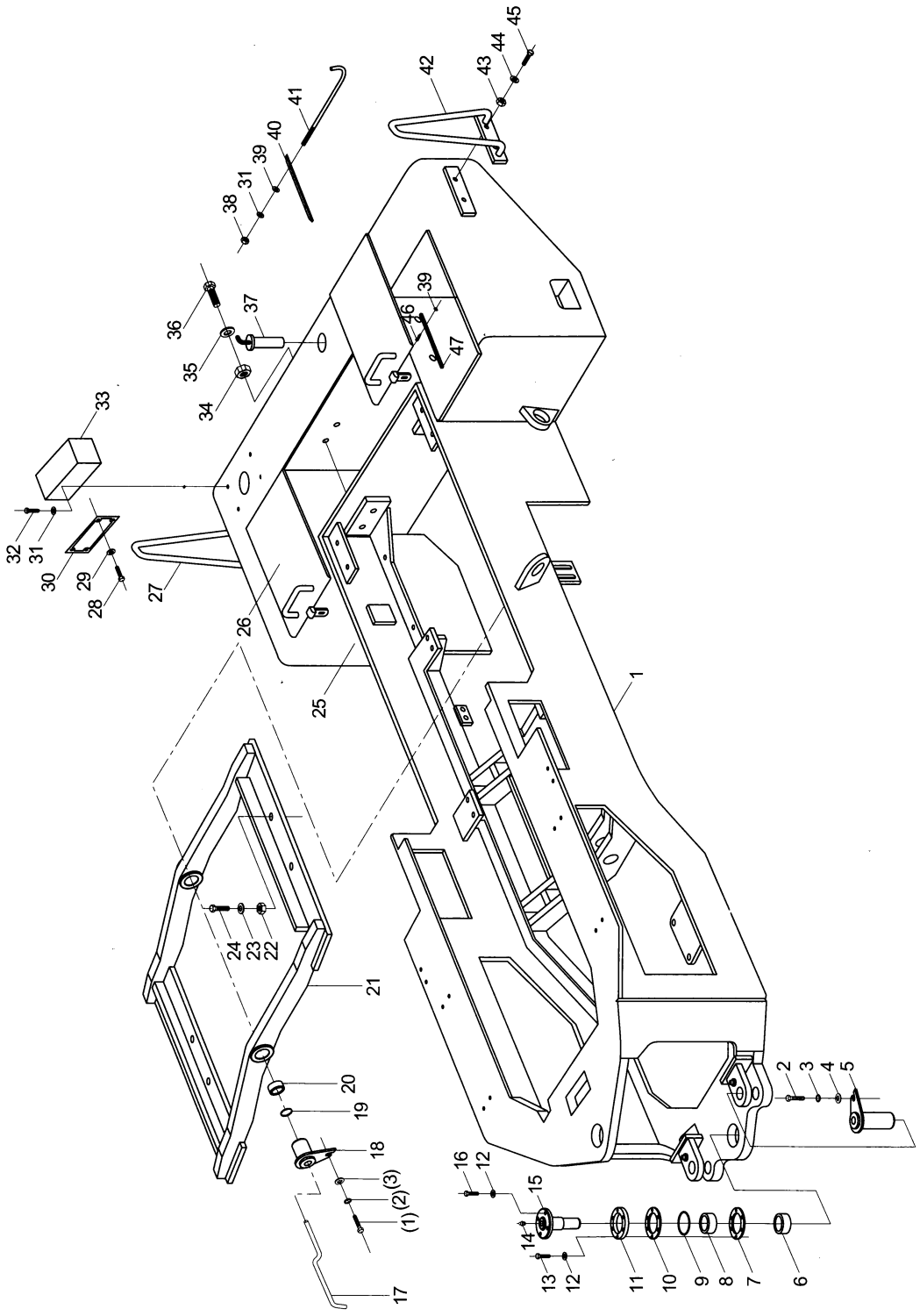
2.2 LW330F(II).08.2 后车架总成 Rear Chassis Ass.



6.4 LW330F.10 工作液压系统 Working Hydraulic System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31	Z3.10-7	低压软管	Low Pressure Hose	1
32	GB5782-86	螺栓 M12 × 55	Bolt	4
33	GB3452.1-1992	O型密封圈 42.5 × 3.55	O-Ring	1
34	Z3.10.7	泵进油管	Oil Tube	1
35	330E.10.7	管夹	Tube Clamp	2
36	GB5780-86	螺栓 M12 × 35	Bolt	4
37	LW330F.10.6.1	分配阀至动臂油缸后腔油管	Tube	1
38	LW330F.10.5.1	分配阀至动臂油缸前腔油管	Tube	1
39	LW330F.10.14	胶管总成	Hose	1
40	GB21-76	螺栓 M10 × 30	Bolt	4
41	LW330F.10.11A	钢管	Tube	1
42	LW330F.10.15.1	阀进油管	Tube	1
43	GB3452.1-1992	O型密封圈 40 × 3.55	O-Ring	1
44	LW330F.10.2	右动臂油缸	Right Lifting Arm Cylinder	1
45	LW330F.10.1	左动臂油缸	Left Lifting Arm Cylinder	1
46	LW330F.10.12A	钢管	Steel Tube	1
47	LW330F.10.10A	胶管总成	Hose	2
48	LW330F.10.9A	胶管总成	Hose	2
49	Z3.10-2	管夹	Tube Clamp	1
50	GB5781-86	螺栓 M10 × 30	Bolt	4
51	LW330F.10.7	胶管总成	Hose	1
52	LW330F.10.8	胶管总成	Hose	1
53	320E.10.6	管夹	Tube Clamp	1
54	Z3.10-10	管夹	Tube Clamp	2
55	GB5781-86	螺栓 M8 × 50	Bolt	1
56	GB6170-86	螺母 M8	Nut	1
57	Z3.10-1	管夹	Clamp	4
58	GB5781-86	螺栓 M6 × 40	Bolt	4
59	GB93-87	垫圈 6	Lock Washer	4
60	GB6170-86	螺母 M6	Nut	4

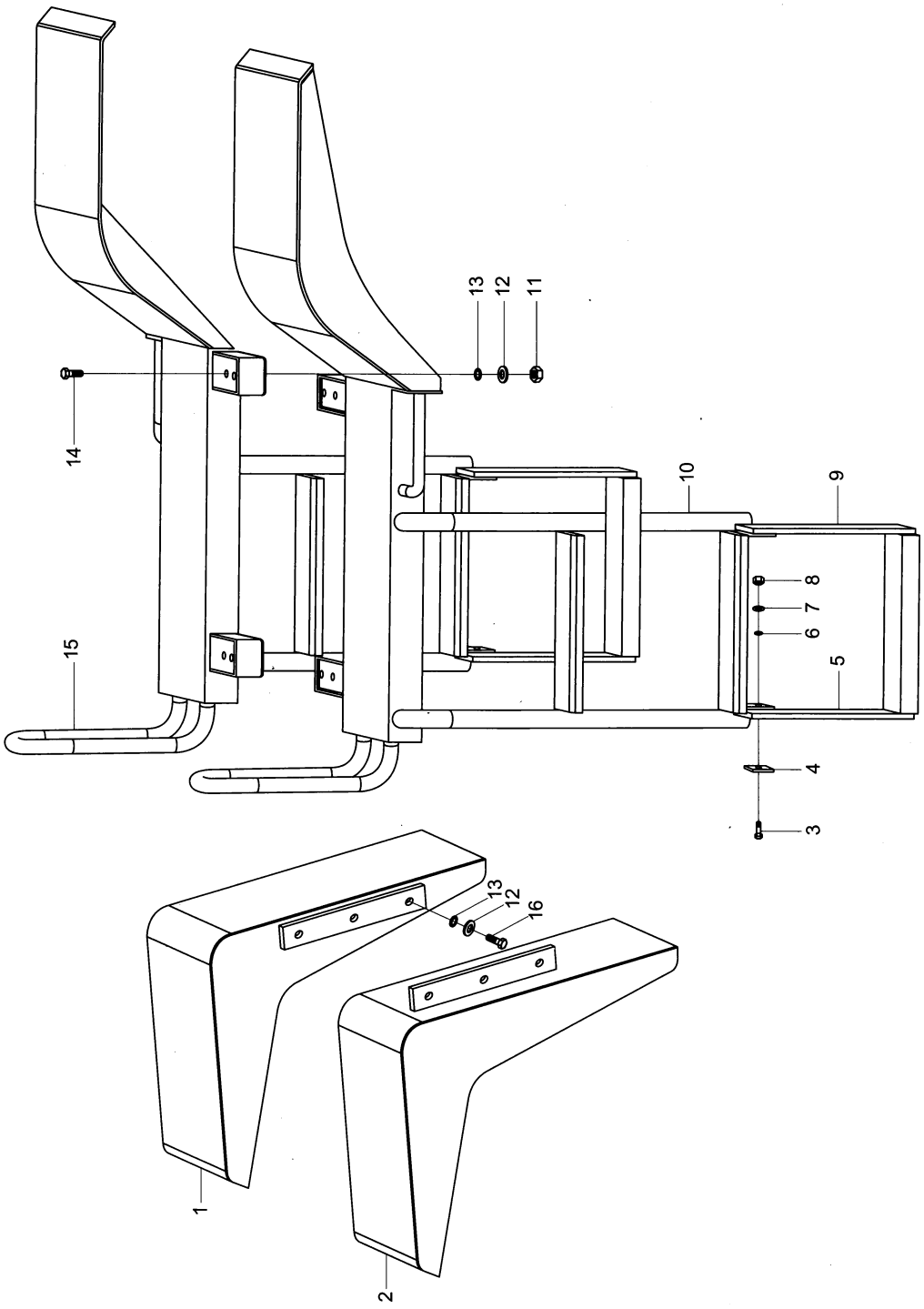
2.2 LW330F(II).08.2 后车架总成 Rear Chassis Ass.



6.4 LW330F.10 工作液压系统 Working Hydraulic System

序号 Sr. No.	代　号 Part No.	名　称 Part Description		数量 Q' ty
61	Z3.10-9	管夹	Clamp	4
62	GB5780-86	螺栓 M10 × 60	Bolt	1
63	Z3.10-3	管夹	Tube Clamp	1

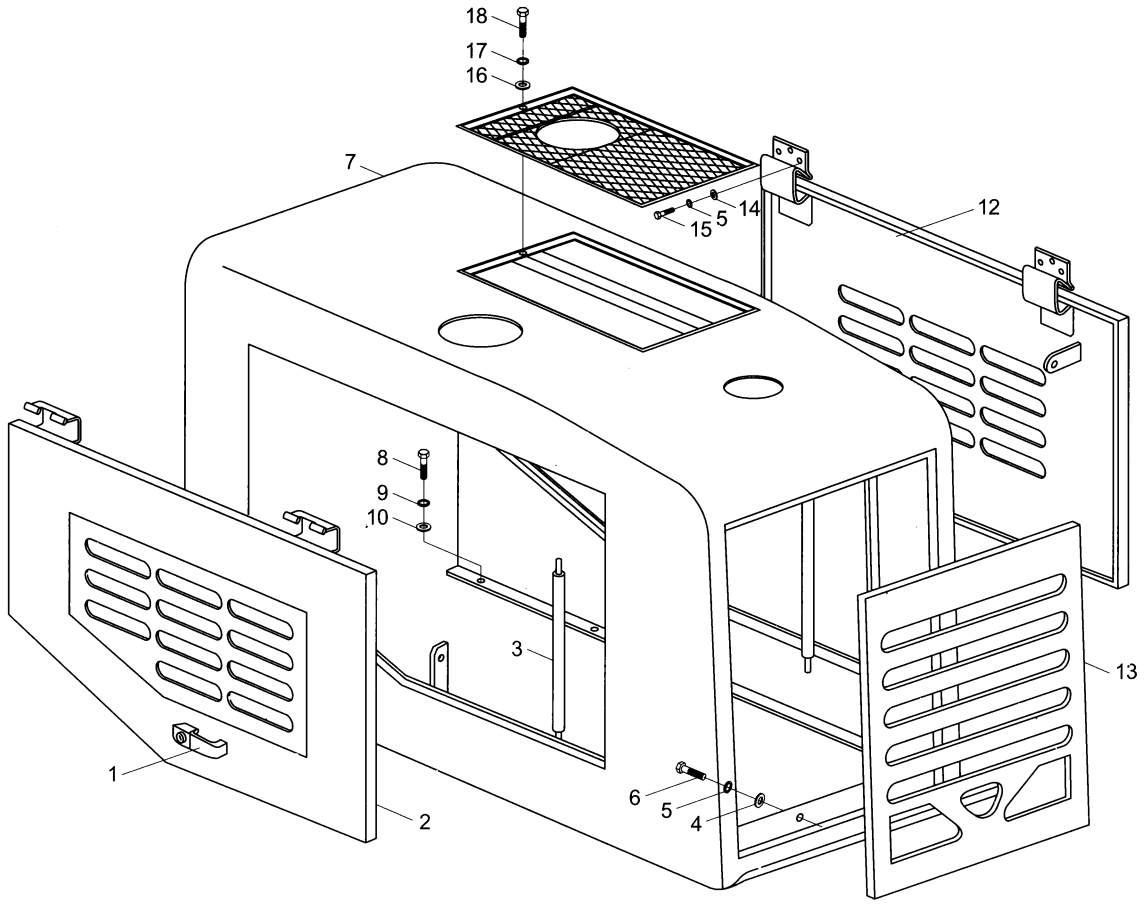
2.3 LW330F(Ⅱ).17 前后挡泥板 Front and Rear Fender



6.5 DF25B2 分配阀总成 Control Valve Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	GB882-86	销轴 A12f 9 × 35	Pin Shaft	2
2		弹簧座	Spring Seat	2
3	GB1235-76	O型密封圈 28 × 3.1	O-Ring	4
4		挡圈	Snap Ring	2
5		防尘圈	Dus Proof Ring	2
6	GB1235-76	O型密封圈 40 × 3.5	O-Ring	2
7	SG35 × 56 × 12	骨架油封	Skeleton Oil Seal	4
8	HG4-692-67	动臂滑阀	Slide Valve	1
9	GB1235-76	O型密封圈 16 × 2.4	O-Ring	1
10		螺塞	Screw Plug	1
11	GB5782-86	螺栓 M12 × 115	Bolt	2
12		螺塞	Screw Plug	3
13	GB1235-76	O型密封圈 24 × 2.4	O-Ring	3
14		单向阀	Single Direction Valve	3
15		弹簧	Spring	1
16		钢球 7/16	Steel Ball	2
17	GB308-64	弹簧	Spring	1
18		弹簧座	Spring Seat	1
19		定位套筒	Position Sleeve	1
20	GB93-87	垫圈 8	Washer	12
21	GB5780-86	螺栓 M8 × 25	Bolt	12
22	GB91-86	开口销 2 × 20	Pin	2
23	GB97.1-85	垫圈 12	Washer	2
24		弹簧	Spring	1
25		转斗滑阀	Tilt Plunger	1
26		弹簧	Spring	1
27		垫板	Washer	2
28		弹簧压座	Spring Gland Seat	2
29		回位弹簧	Return Spring	1
30		弹簧夹	Spring Seat	1

2.4 LW330F(II).18.1 机罩合件 Engine Hood



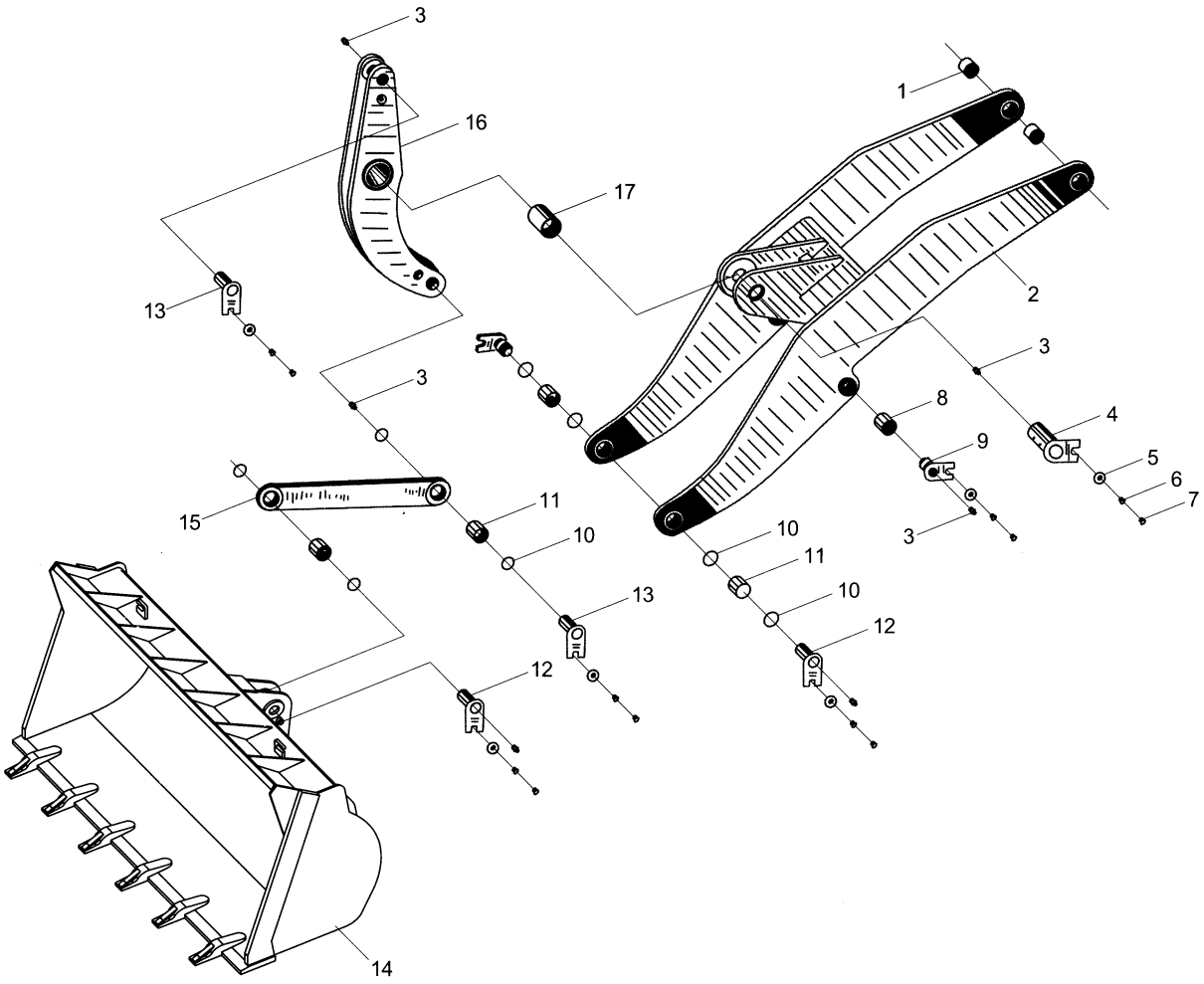
6.5 DF25B2 分配阀总成 Control Valve Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
31		端盖	End Cover	1
32		螺塞	Screw Plug	1
33	GB1235-76	O型密封圈 40 × 3.1	O-Ring	2
34		螺塞	Screw Plug	3
35	GB41-86	螺母 M12	Nut	3
36	GB895-67	挡圈 20	Snap Ring	4
37		回油阀芯	Outlet Valve Stem	1
38	GB1235-76	O型密封圈 20 × 2.4	O-Ring	1
39		柱塞阀芯	Valve Core	1
40		弹簧	Spring	1
41		圆柱销	Column Pin	1
42		安全阀套	Safety Valve Sleeve	1
43		弹簧	Spring	1
44	GB1235-76	O型密封圈 24 × 2.4	O-Ring	1
45		调整阀芯	Adjustable Valve Core	1
46		阀座	Valve Seat	1
47	JB982-77	O型密封圈 32 × 3.1	O-Ring	1
48		垫圈 12	Shim	1
49		压盖	Pressing Cover	2
50		调整丝杆	Adjusting Screw	1
51		螺母	Nut	1
52		垫圈	Washer	2
53		锁紧螺母	Lock Nut	1
54		阀体	Valve Body	1
55		螺栓	Bolt	4
56	GB1235-76	O型密封圈 50 × 3.1	O-Ring	1

6.6 LW330F.10 左、右动臂油缸 Left & Right Lift Cylinder

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	Z3.10.2-5	活塞杆	Piston Rod	1
2	GB894.1-86	挡圈 110	Snap Ring	1
3	Z3.10.2-1	挡环	Snap Ring	1
4	Z3.10.2-3	卡环	Snap Ring	1
5	GB3452.1-92	O型密封圈 100 × 5.3	O-Ring	1
6	Z3.10.2-12	挡圈	Snap Ring	1
7	CK-63	防尘圈 D63	Dust Proof Ring	1
8	CKG-063	轴用密封圈 d63	U-Ring	1
9	Z3.10.2-4	导向套	Guide Sleeve	1
10	CKS-063	斯特封 d63	Step Ring	1
11	Z3.10.2-2	轴用斯来圈	Steal Ring	1
12	GB79-85	螺钉 M8 × 30	Screw	1
13	GB3452.1-92	O型密封圈 63 × 5.3	O-Ring	1
14	Z3.10.2-6	活塞	Piston	1
15	Z3.10.2-7	孔用斯来圈	Slyd Ring	2
16	CKW-110	格来圈 d110	Glyd Ring	1
17	GB893.1-86	挡环 75	Snap	2
18	330E.10.3.1	右缸体	Cylinder Body (Right)	1
19	Z3.10.2-11	防尘环	Dust Proof Ring	2
20	GB304.5-81	关节轴承	Knuckle Bearing	1
21	3.10.2.1	活塞杆头	Piston Rod Head	1
22	30E.10.1.1	左缸体	Cylinder Body (Left)	1

3.1 LW330F.11/LW330F(G).11 工作装置 Working Device

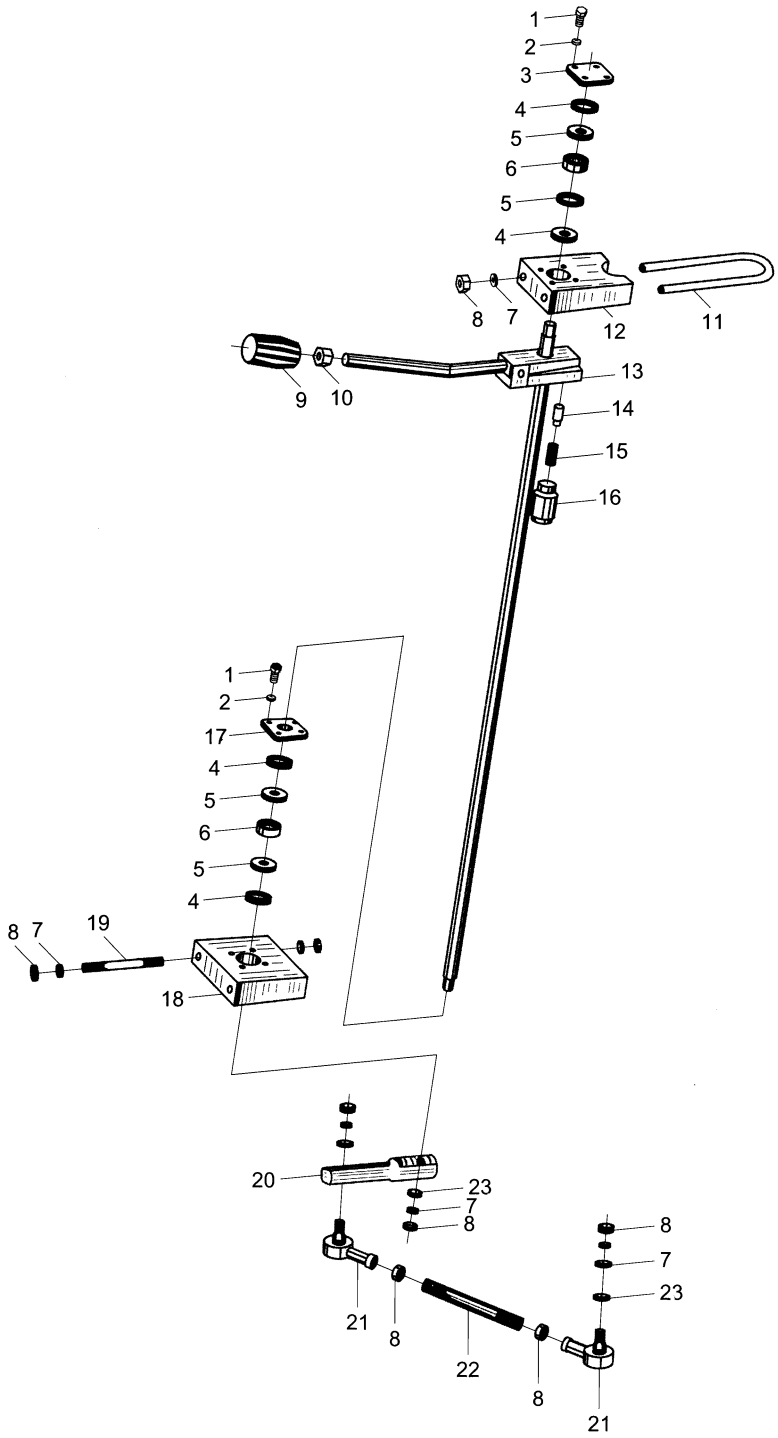


6.7 Z3.10.1 转斗油缸 Tilt Cylinder

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q'ty
1	Z3.10.1-10	防尘环	Dust Proof Ring	4
2	GB893.1-86	孔用挡圈 D90	Snap Ring	4
3	GB304.5-81	关节轴承 GE60ES	Knuckle Bearing	2
4	Z3.10.1.1	缸体	Cylinder Body	1
5	Z3.10.1-8	螺母	Nut	1
6	Z3.10.1-9	防松钢丝	Anti-Loose Steel Wire	1
7	Z3.10.1-7	孔用斯来圈	Slyd Ring	2
8	Z3.10.1-6	活塞	Piston	1
9	CKS-090	轴用斯特封 d90	Step Seal	1组
10	GB1235-76	O型密封圈 75 × 5.7	O-Ring	1
11	Z3.10.1-5	导向套	Guide Sleeve	1
12	Z3.10.1-2	轴用斯来圈	Steal Ring	1
13	CKS-090	轴用斯特封 d90	Step Seal	1组
14	GB1235-76	O型密封圈 160 × 5.7	O-Ring	1
15	Z3.10.1-4	挡圈 Ø 160 × 45 × 2	Snap Ring	1
16	CKG-090	轴用密封圈 d90	Seal Ring	1
17	Z3.10.1-3	卡键	Key	1
18	Z3.10.1-1	挡环	Snap Ring	1
19	GB894.1-86	轴用挡圈 d150	Snap Ring	1
20	CK-090	防尘圈 d90	Dust Proof Ring	1
21	Z3.10.1.2	活塞杆	Piston Rod	1
22	Z3.10.1-12A	指示杆	Indicating Rod	1
23	GB5783-86	螺栓 M10 × 20	Bolt	1
24	Z3.10.1-11	支架	Bracket	1
25	GB97.1-85	垫圈 10	Washer	1
26	GB93-87	垫圈 10	Washer	2
27	GB6170-86	螺母 10	Nut	1

电气系统
ELECTRICAL SYSTEM

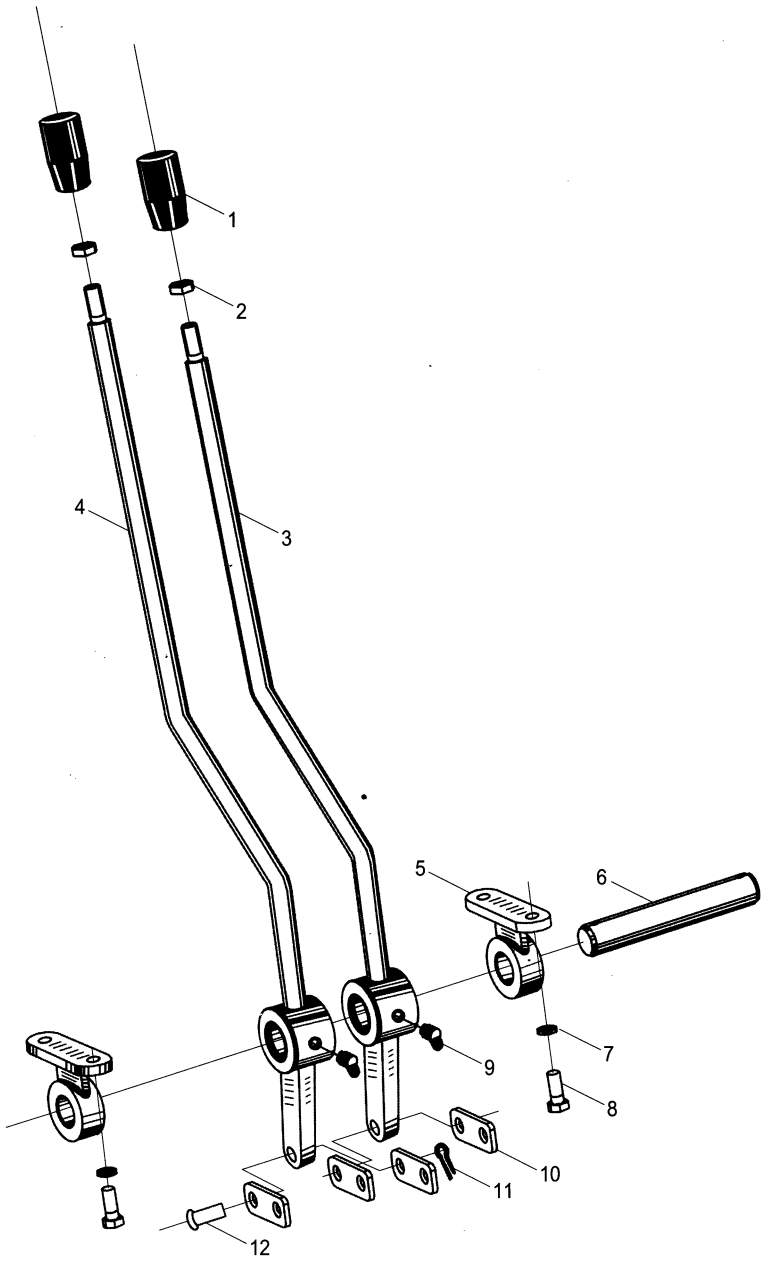
4.1 Z3.7.2 上部机构 Upper Mechanism



6.8 330E.10.4A 液压油箱总成 Hydraulic Tank Ass.

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	330E.10.4.1A	油箱体	Oil Tank	1
2	XGHL4-560 × 10	回油滤芯	Filter Ass.	1
3	Z3.10.6A-5	垫片	Washer	1
4	Z3.10.6-6A	法兰盖	Flange	1
5	GB93-87	垫圈 10	Lock Washer	22
6	GB5783-86	螺栓 M10 × 25	Bolt	18
7	GB93-87	垫圈 6	Lock Washer	12
8	GB5783-86	螺栓 M6 × 18	Bolt	6
9	JB1102-77	垫圈 14	Washer	1
10	JB1000-77	螺塞 M14 × 1.5	Screw Plug	1
11	Z3.10.6A.2	吸油盖板	Cover	1
12	XGXL2800 × 100	吸油滤芯	Filter Ass.	1
13	Z3.10.6A-1	垫片	Washer	1
14	GB5783-86	螺栓 M8 × 20	Bolt	4
15	GB93-87	垫圈 8	Washer	1
16	Z3.10.6A-3	盖板	Cover	1
17	Z3.10.6A-4	垫片	Washer	1
18	XGXL2-10 × 0.63	加油滤油器	Oil Filter	1
19	YBM42 × 1.5	油标	Level Gauge	1
20	Z3.10.6A.3	吸油接头	Joint	1
21	GB5783-86	螺栓 M6 × 30	Bolt	6
22	GB93-87	垫圈 6	Washer	12
23	Z3.10.6A.5	法兰接头	Joint	1
24	GB1235-76	O型密封圈 120 × 3.1	O-Ring	1
25	Q/SC1294-2000	垫圈 27	Washer	1
26	LW330F.10.21	接头	Joint	1
27	JB3616.1-1984	双钢丝环箍 28-32	Steel Wire Hoop	1
28	LW330F.10-1	低压软管	Hose	1

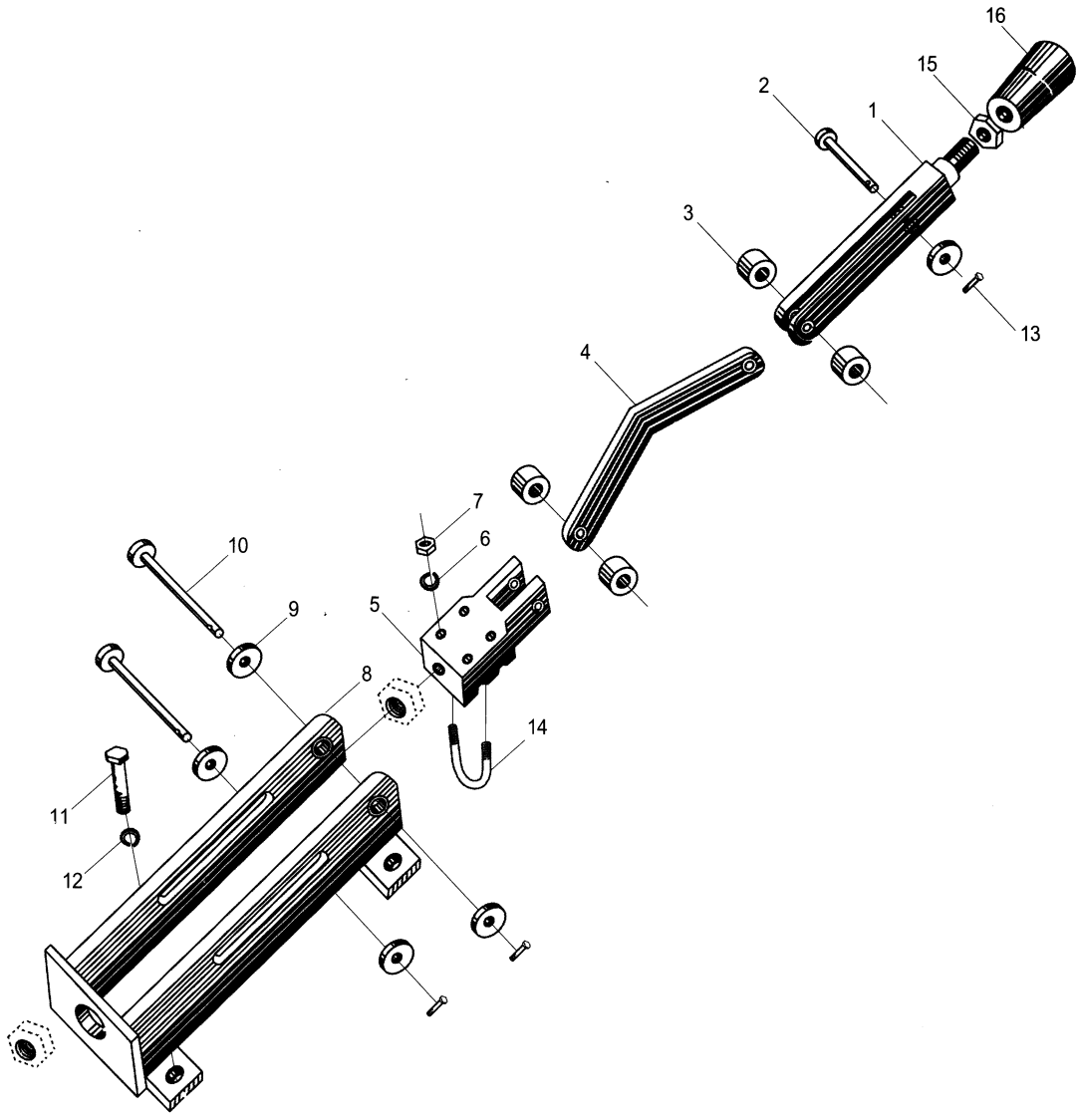
4.2 Z3.10.4A 操纵杆系 Control Lever System



7.1 LW330F.14 电器系统 Electrical System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
1	ZD2312-24V	雨刮器	Rain Wiper	1
2	YY242型-2K	发动机油压表	Engine Oil Pressure Meter	1
3	XGGD04	工作灯	Working Lamp	2
4	SW242型-2A	水温表	Water Temperature Meter	1
5	SGF-03	电风扇	Fan	1
6	8SQZ-30E	指示灯组	Signal Lamp	1
7	YY242型-2L	气压表	Air Pressure Meter	1
8	CS130	室内顶灯	Head Lamp	1
9	YW242型-2B	油温表	T/M Oil Temperature Meter	1
10	R8865	积时表	Timer	1
11	JK932-330F	翘板开关	Switch	1
12	FM211	蜂鸣器	Warning Buzzer	1
13	SG252	闪光器	Flasher	1
14	BX508	保险丝盒	Fuse Box	1
15	YG901C	发动机油压传感器	Engine Oil Pressure Meter	1
16	XGGD05	工作灯	Rear Lamp	2
17	WG1371	温度传感器	Temperature Sensor	1
18	XGXD850-10	电瓶线	Battery Wire	1
19	LW330F.14.4	后灯线束	Tail Lamp Wire Assembly	1
20	XGXD600-10	电瓶线	Battery Wire	1
21	YG901C2	气压传感器	Air Pressure Sensor	1
22	XH8-2L2	后信号灯	Rear Steering Lamp	2
23	FDJ	发电机	Alternator	1
24	6-QW-120B	蓄电池	Battery	2
25	XGXD2100-10	电瓶线	Battery Wire	1
26	LW330F.14.3	后车架线束	Rear Chassis Wire Assembly	1
27	MD	马达	Motor	1
28	DK2312A	电源总开关	Electrical Power Switch	1
30	WG1371D	温度传感器	Temperature Sensor	1
32	JK260	起动按钮	Start Button	1

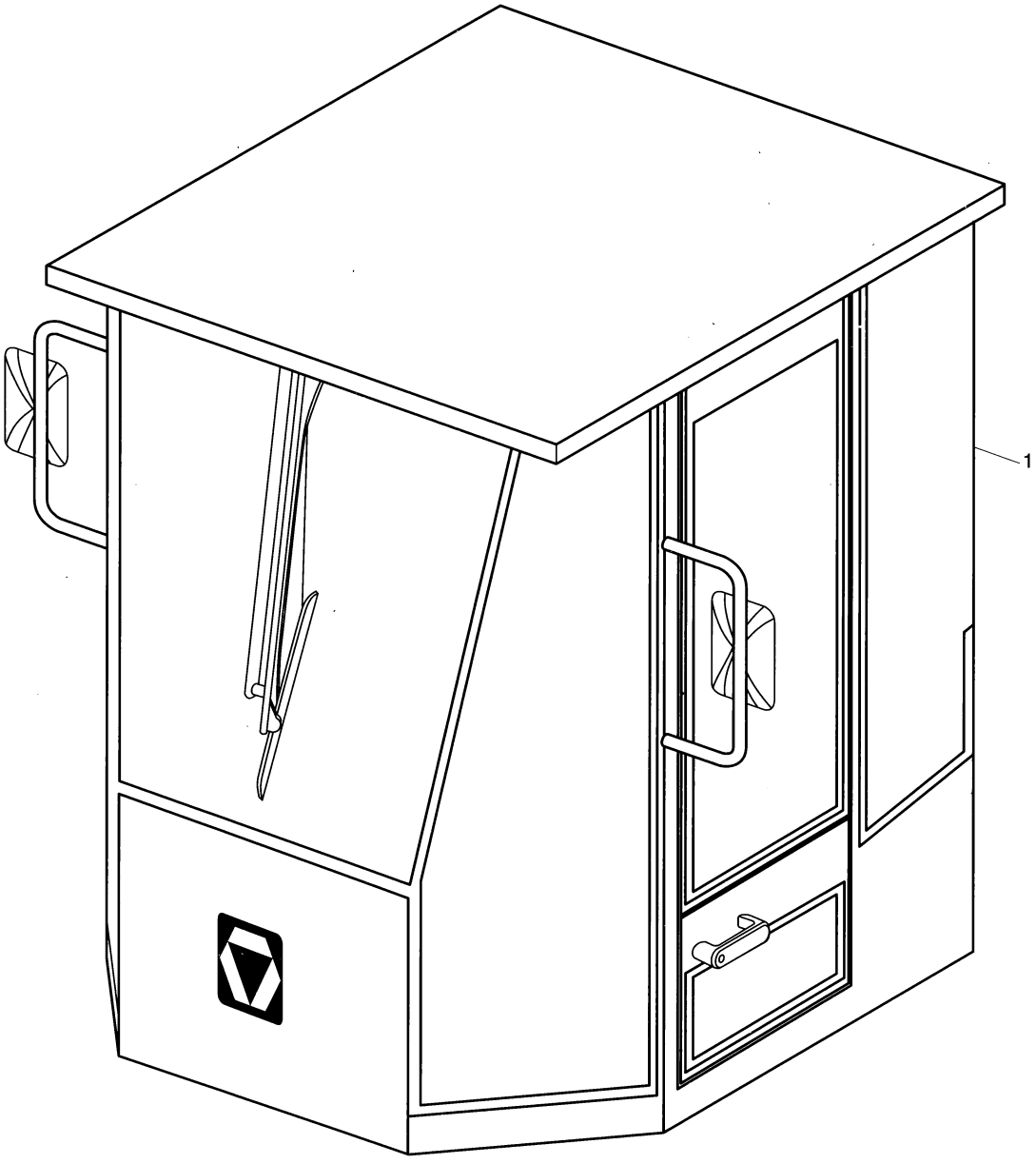
4.3 ZL40.13.3A 操纵手柄 Operating Handle



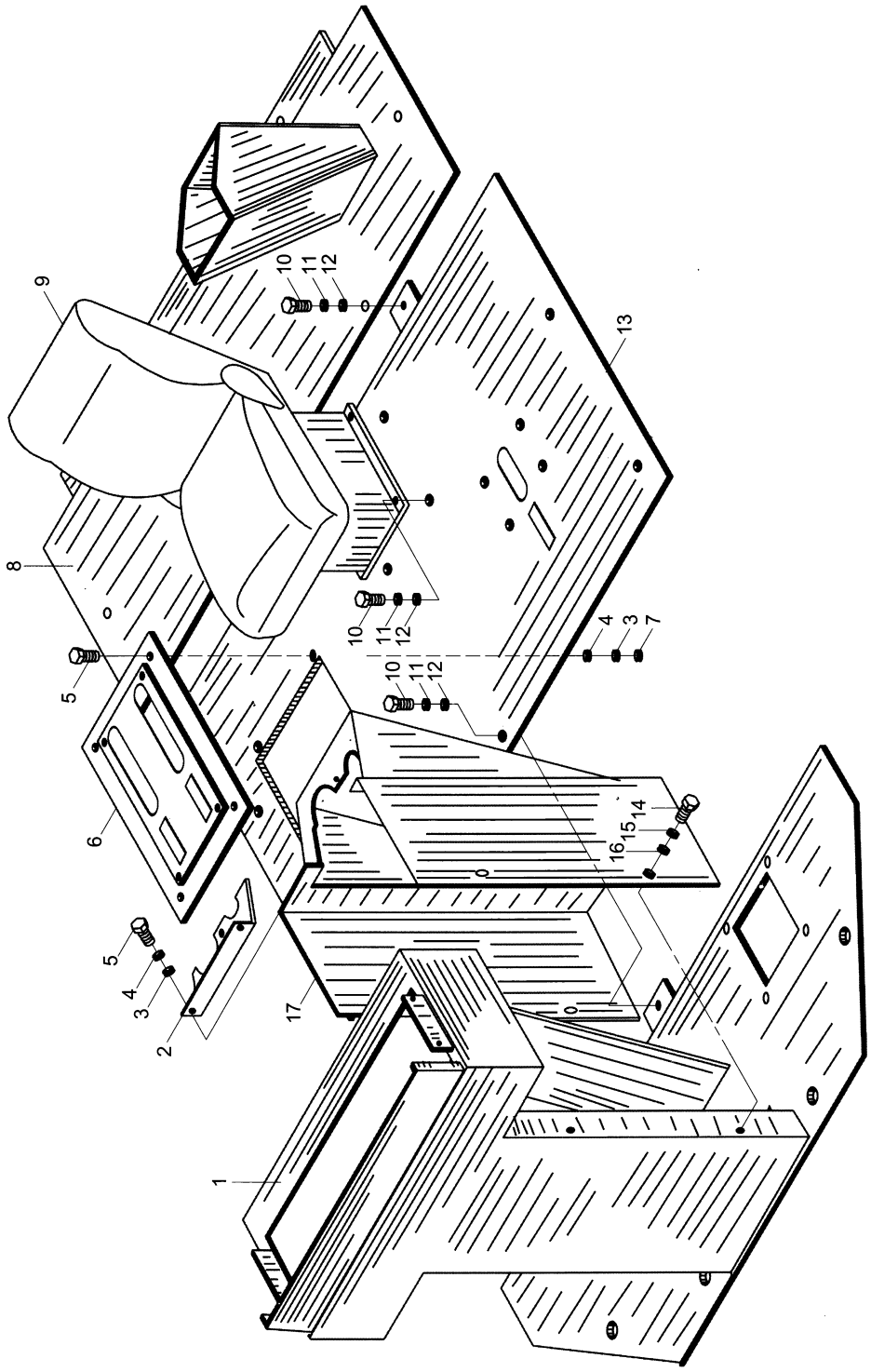
7.1 LW330F.14 电器系统 Electrical System

序号 Sr. No.	代 号 Part No.	名 称 Part Description		数量 Q' ty
33	JK424	钥匙开关	Key Switch	1
34	DY242型-2A(24V)	电压表	Voltage Meter	1
36	LW330F.14.2	仪表盘线束	Panel Wire	1
37	ZL40A.14-4A	仪表板	Panel	1
38	LW330F.14.1	前车架线束	Front Chassis Wire	1
39	DL50G(D)-24	喇叭	Horn	1
40	XGGD03	工作灯	Working Lamp	2

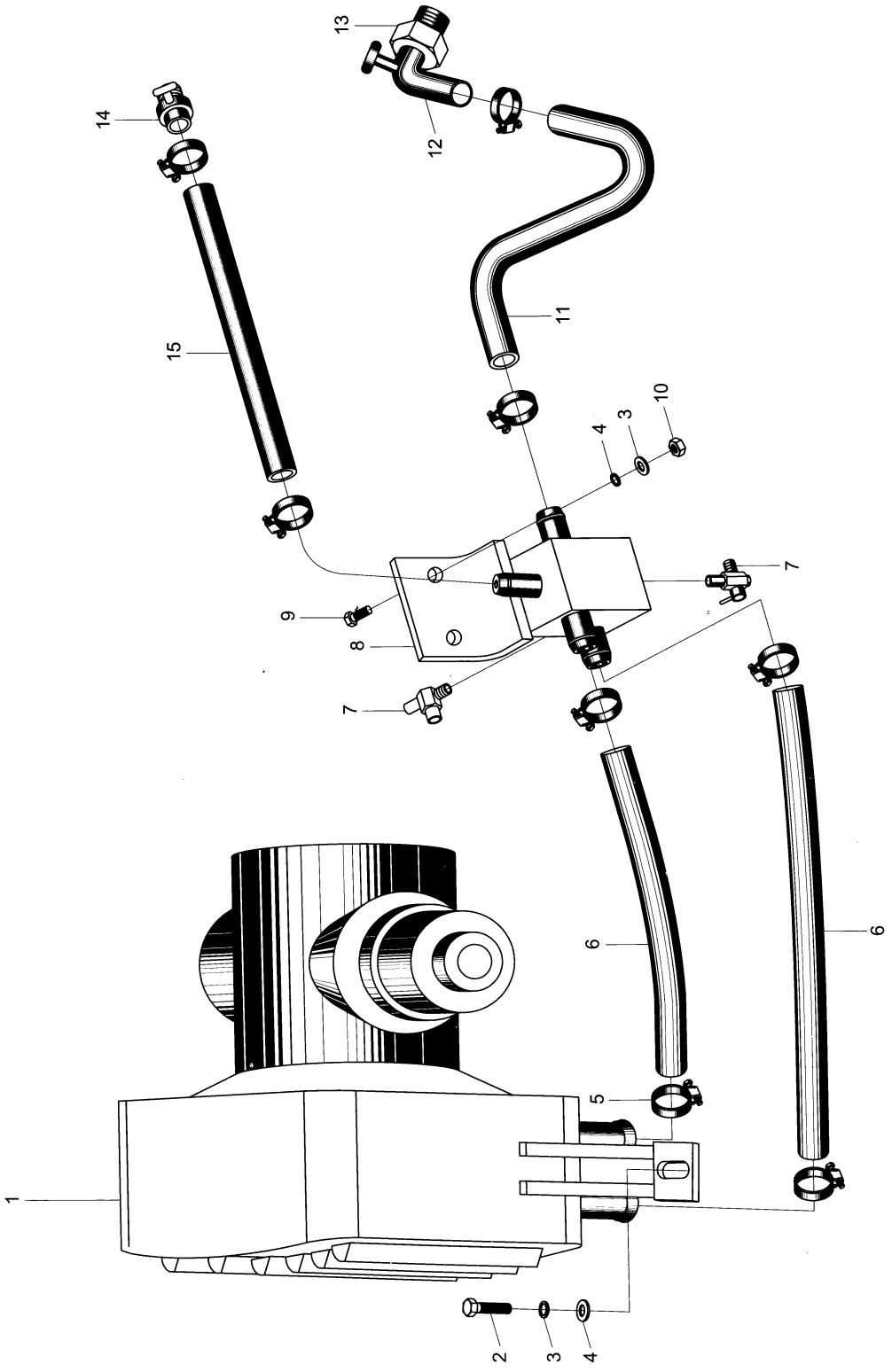
4.4 ZLT15B 驾驶室 Cab



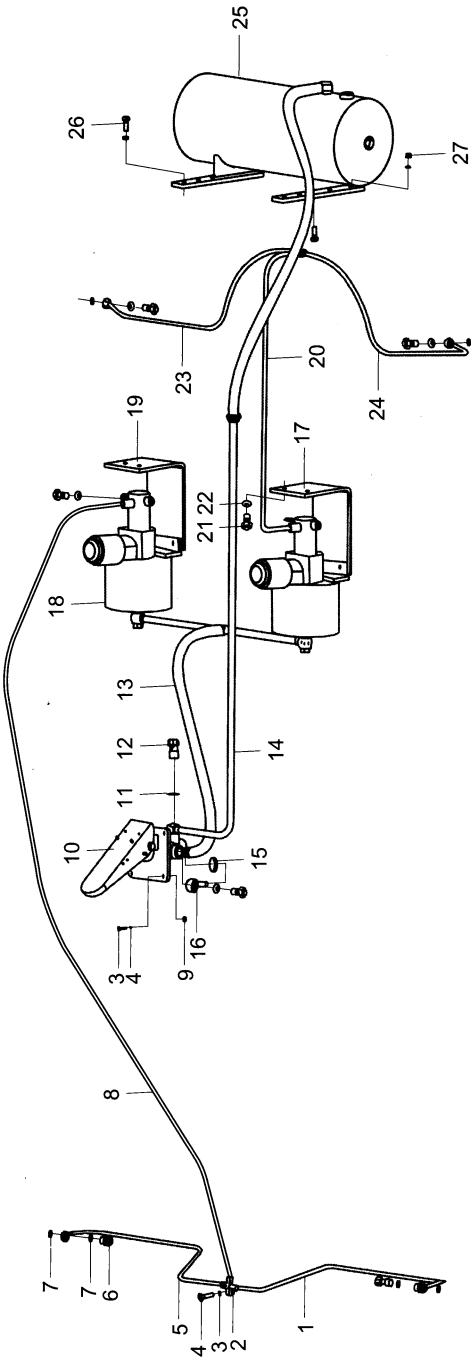
4.5 Z3.16B 操纵台架总成 Operator's Platform Ass.



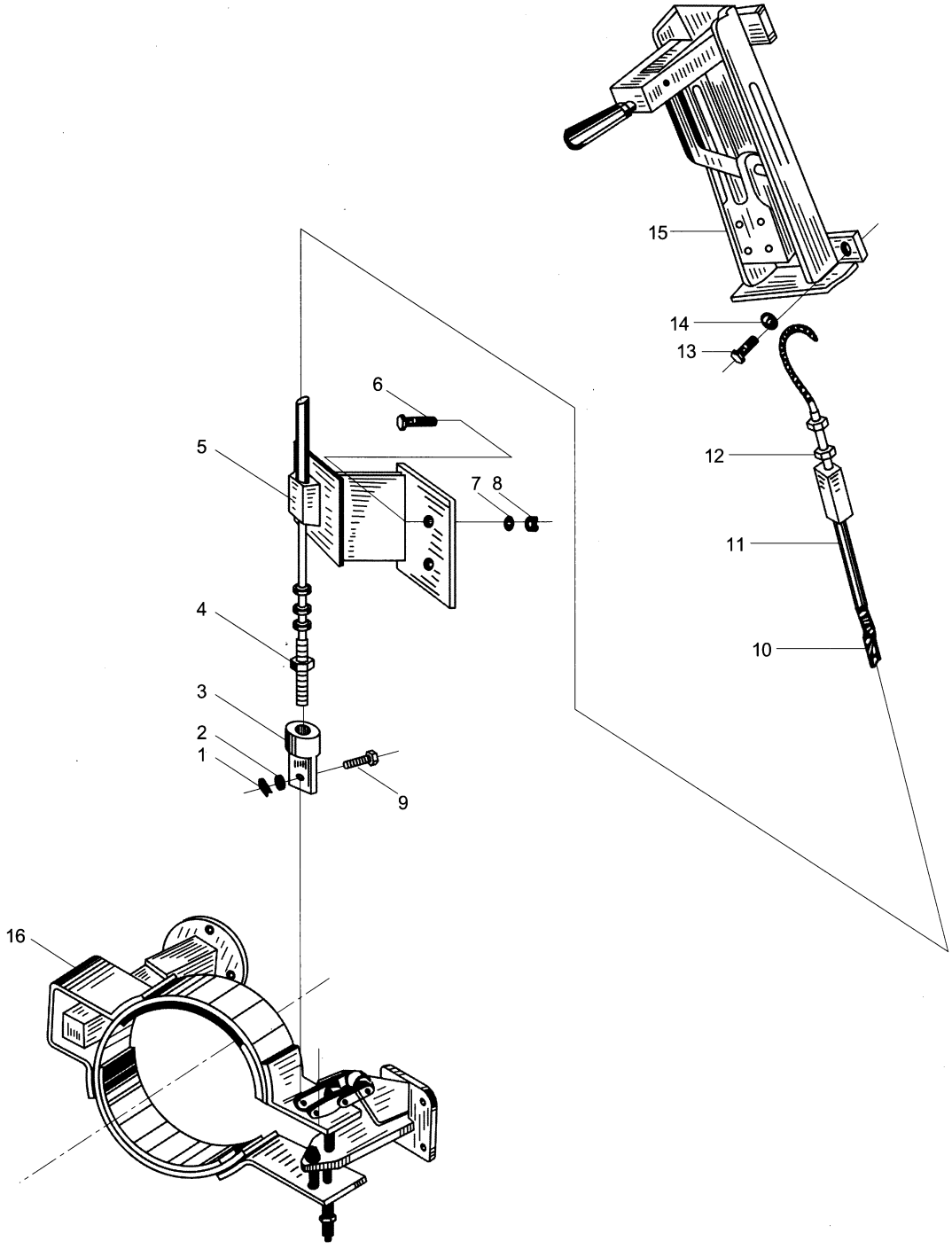
4.6 LW330F(Ⅱ).21 暖风系统 Heat Blower System



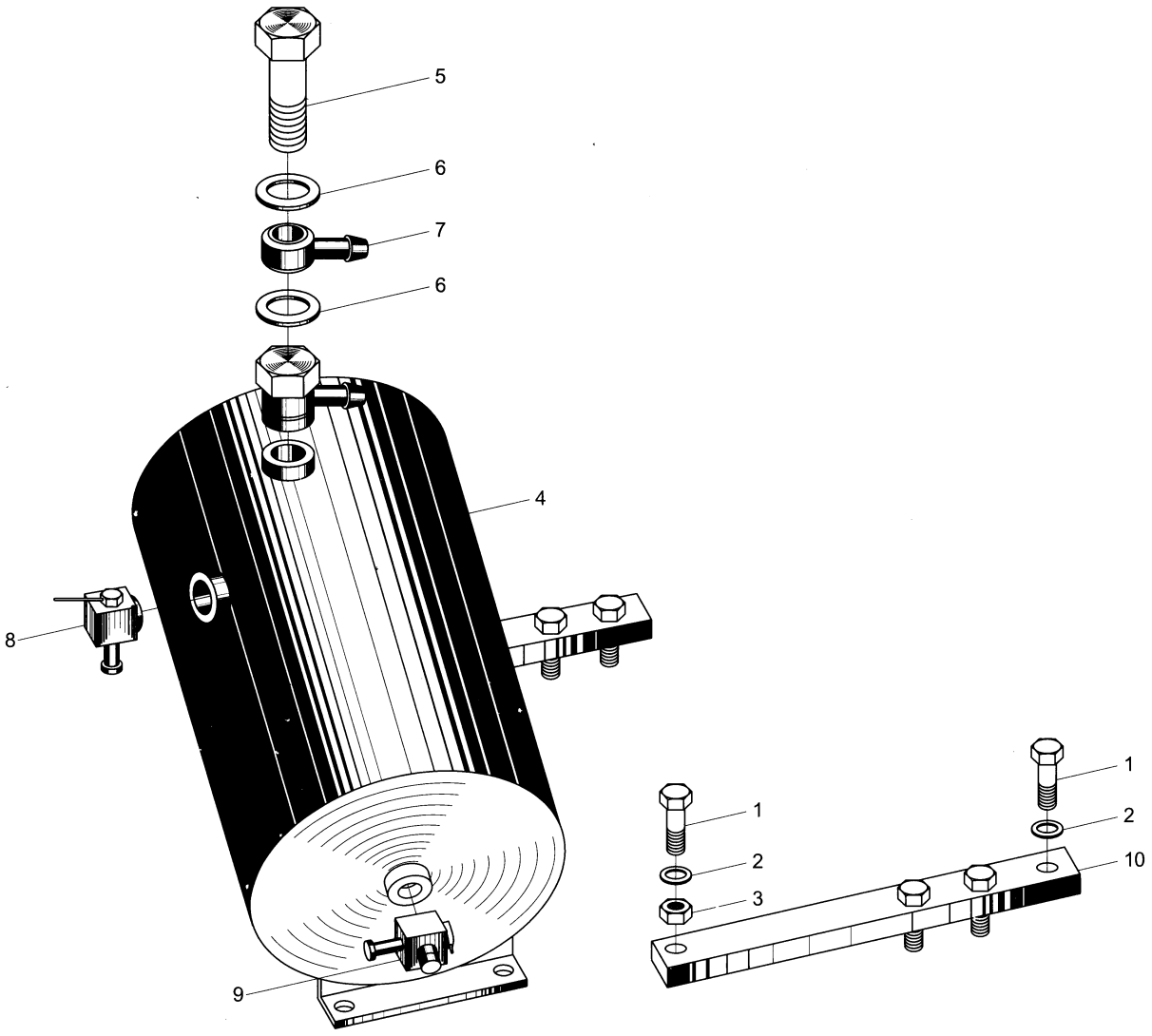
5.1 LW330F(II).12 制动系统 Brake System



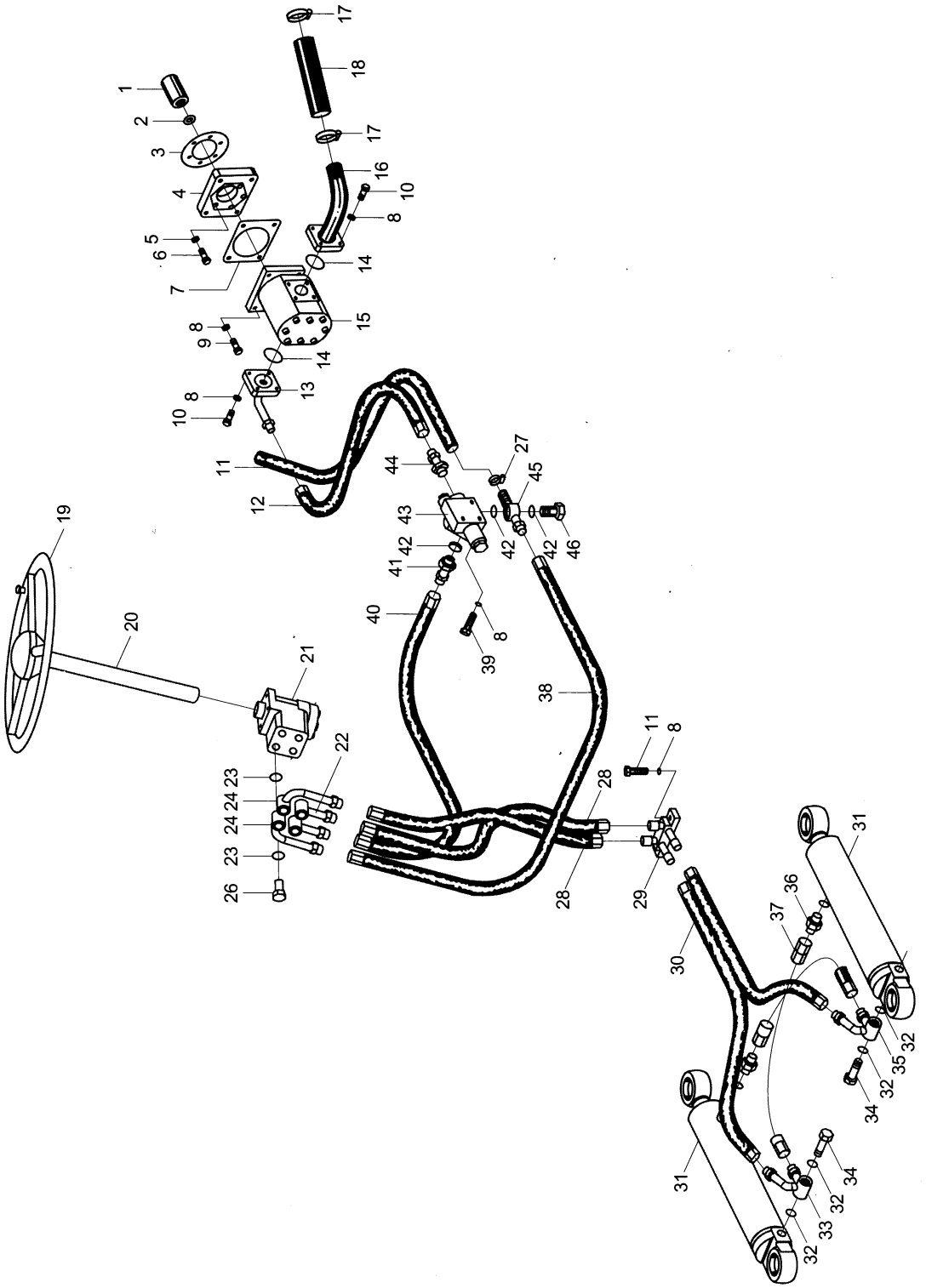
5.2 Z3.13 手制动总成 Parking Brake Ass.



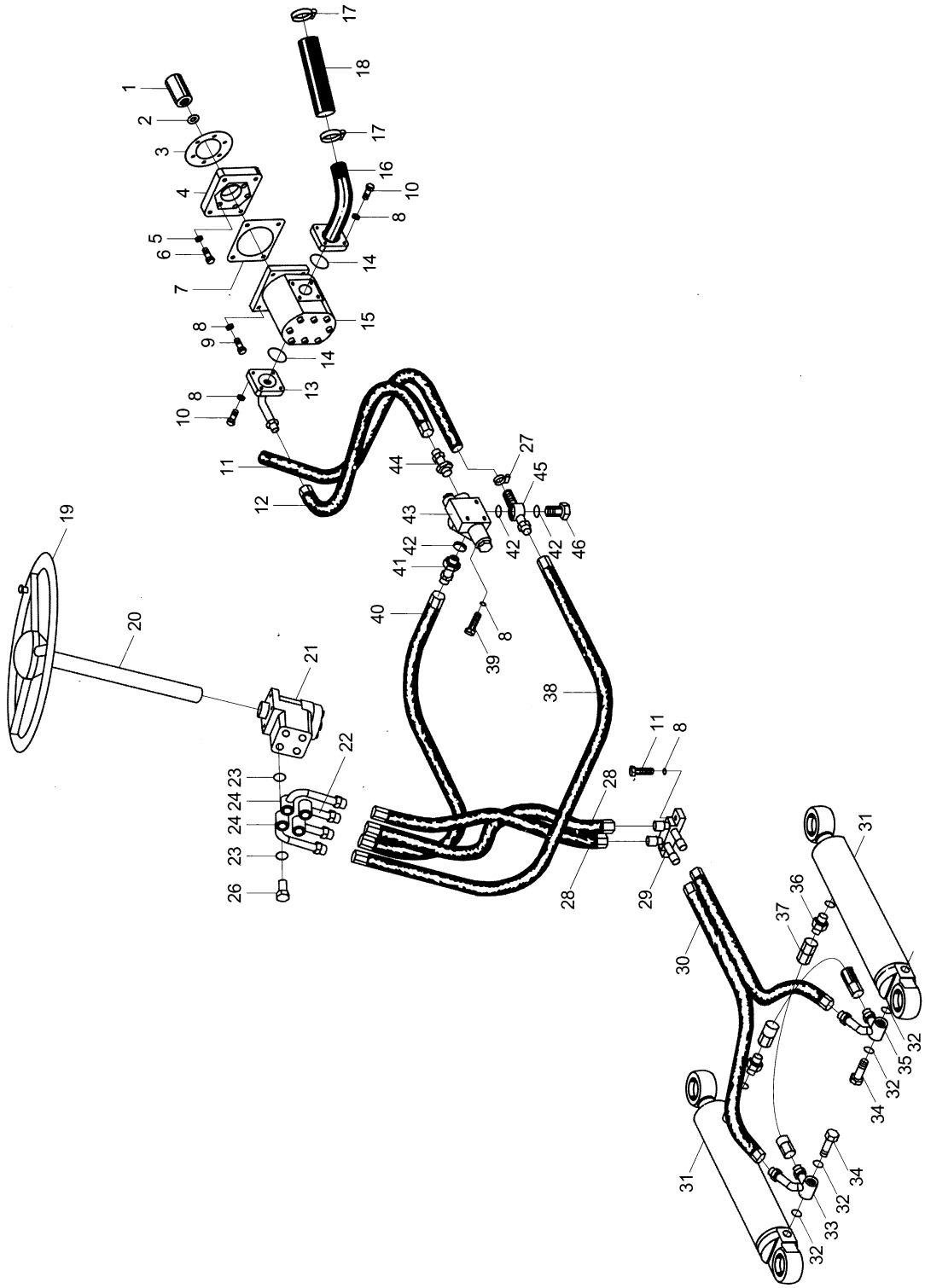
5.3 Z3.12.11A 储气缸 Air Tank



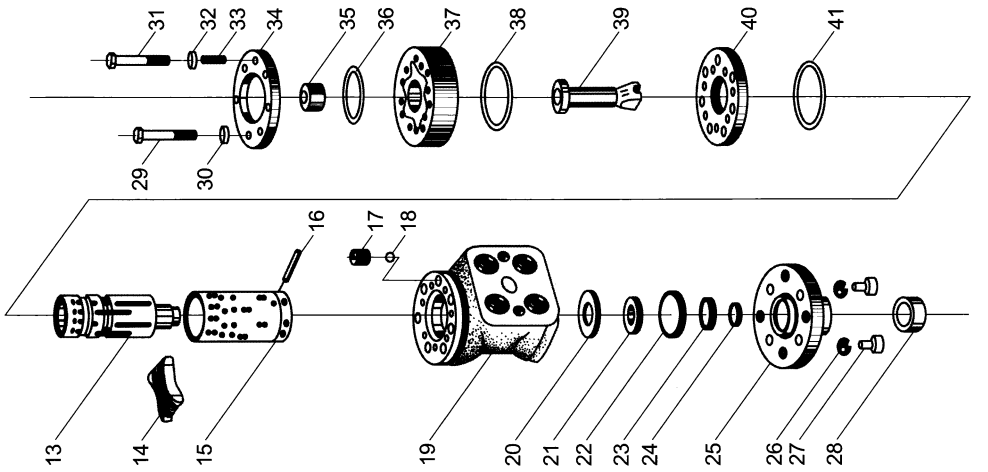
6.1 LW330F(II).9 转向液压系统 Steering System

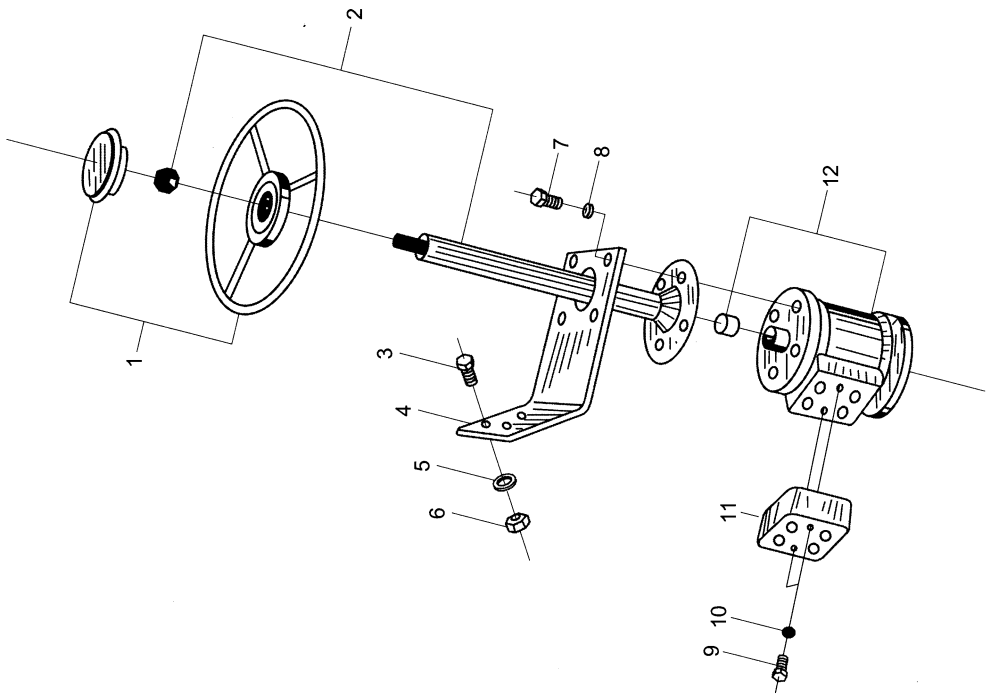


6.1 LW330F(II).9 转向液压系统 Steering System

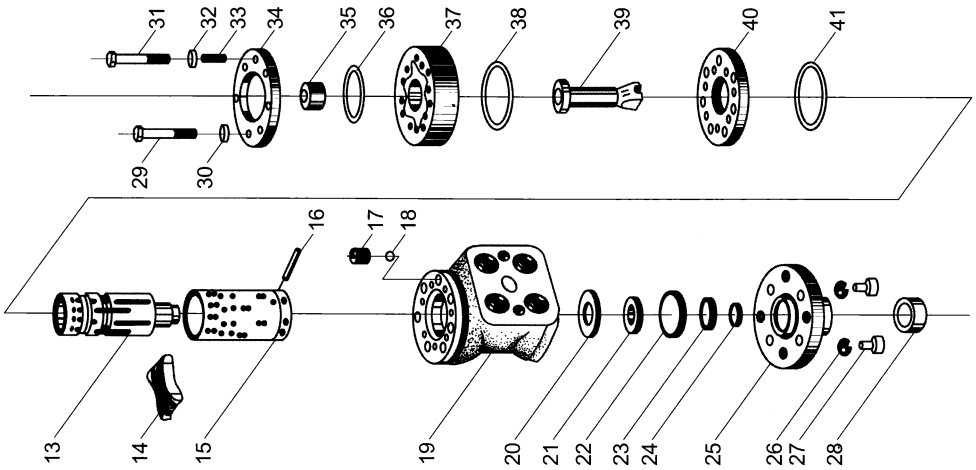


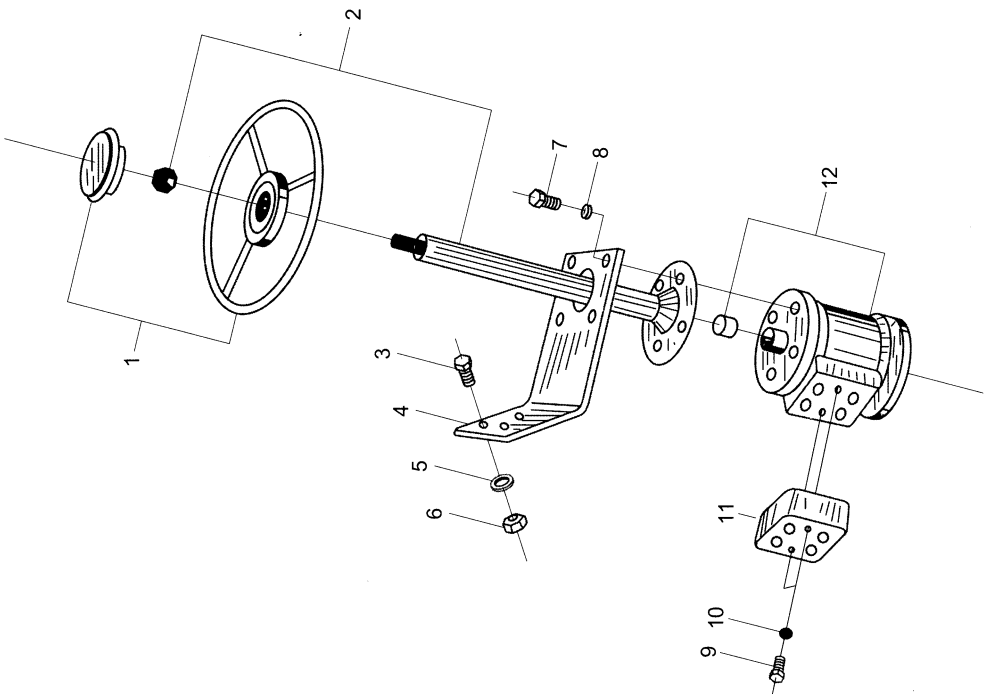
6.2 全液压转向器 Hydraulic Steering Control Unit



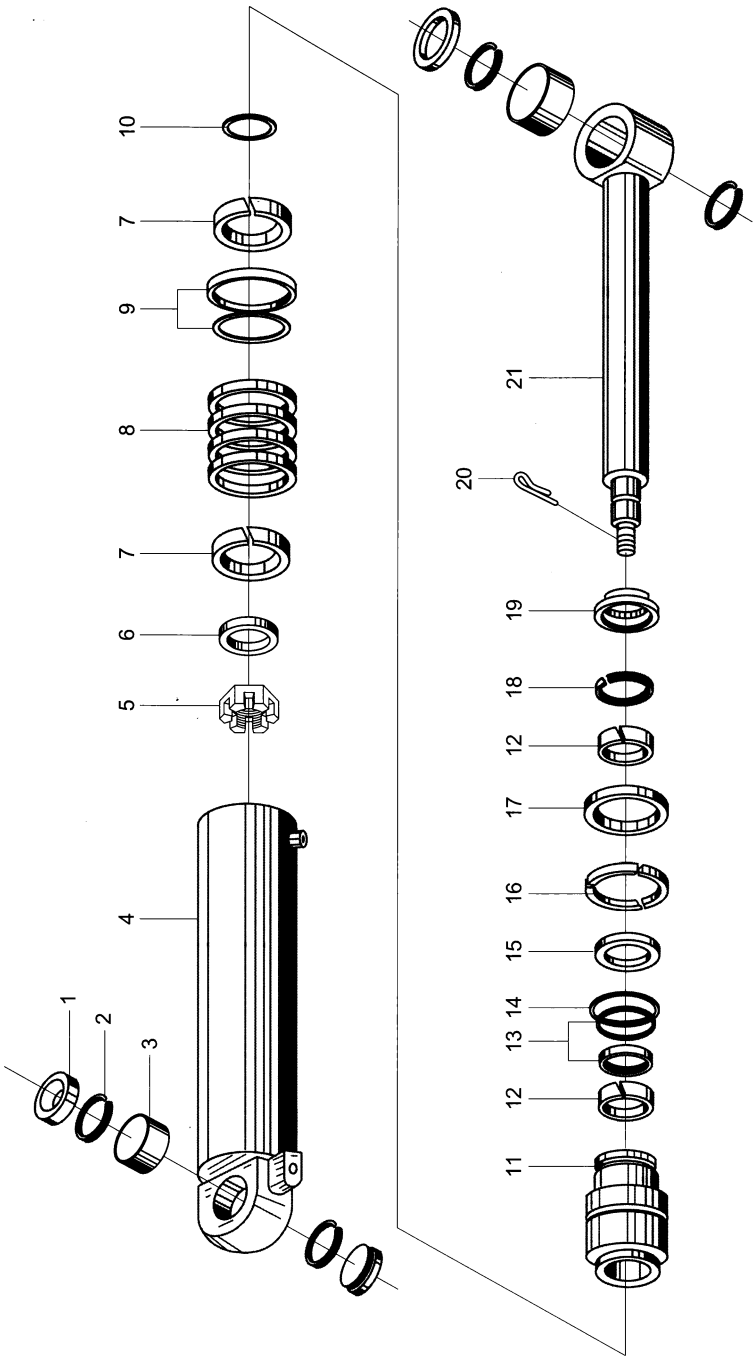


6.2 全液压转向器 Hydraulic Steering Control Unit

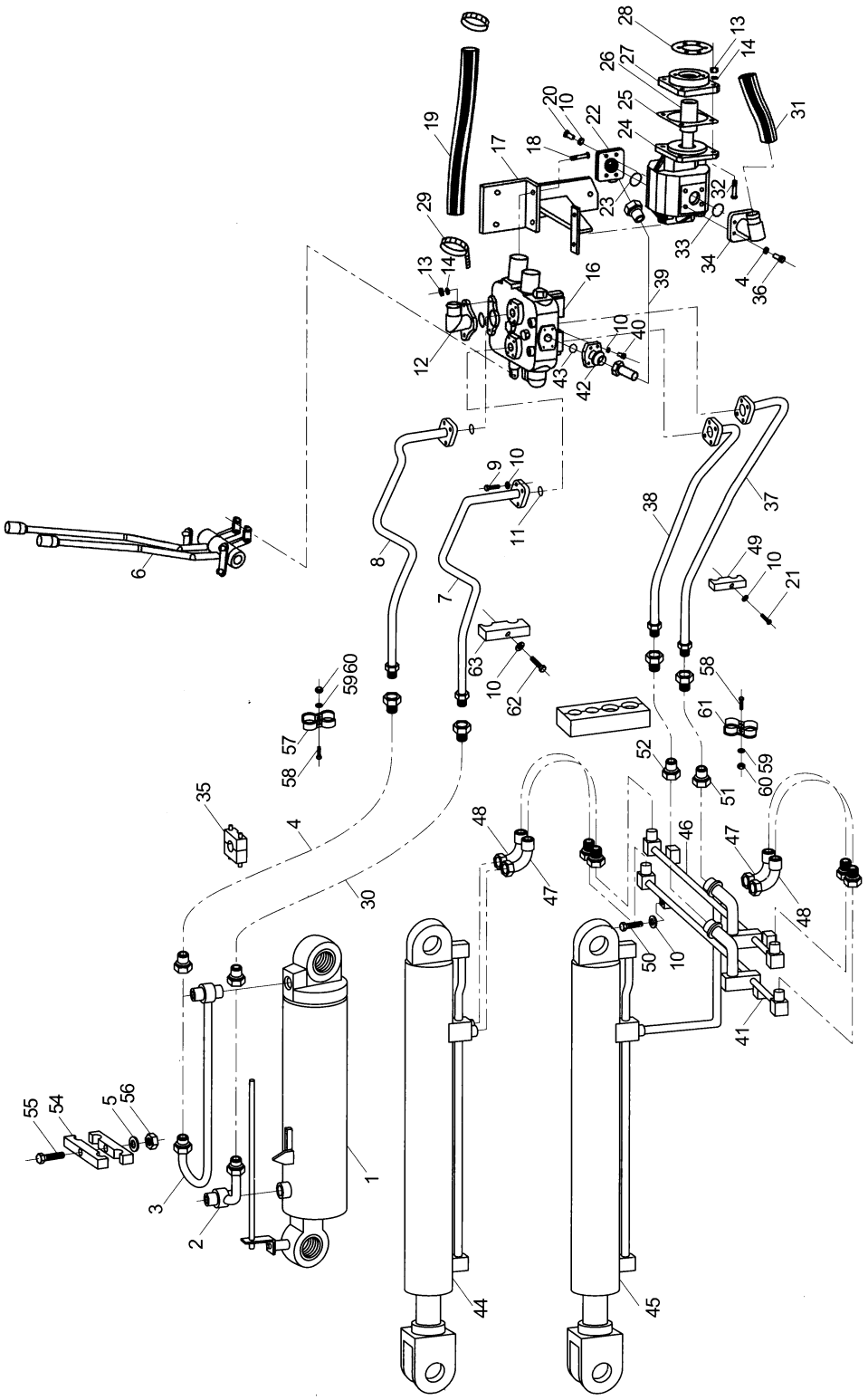




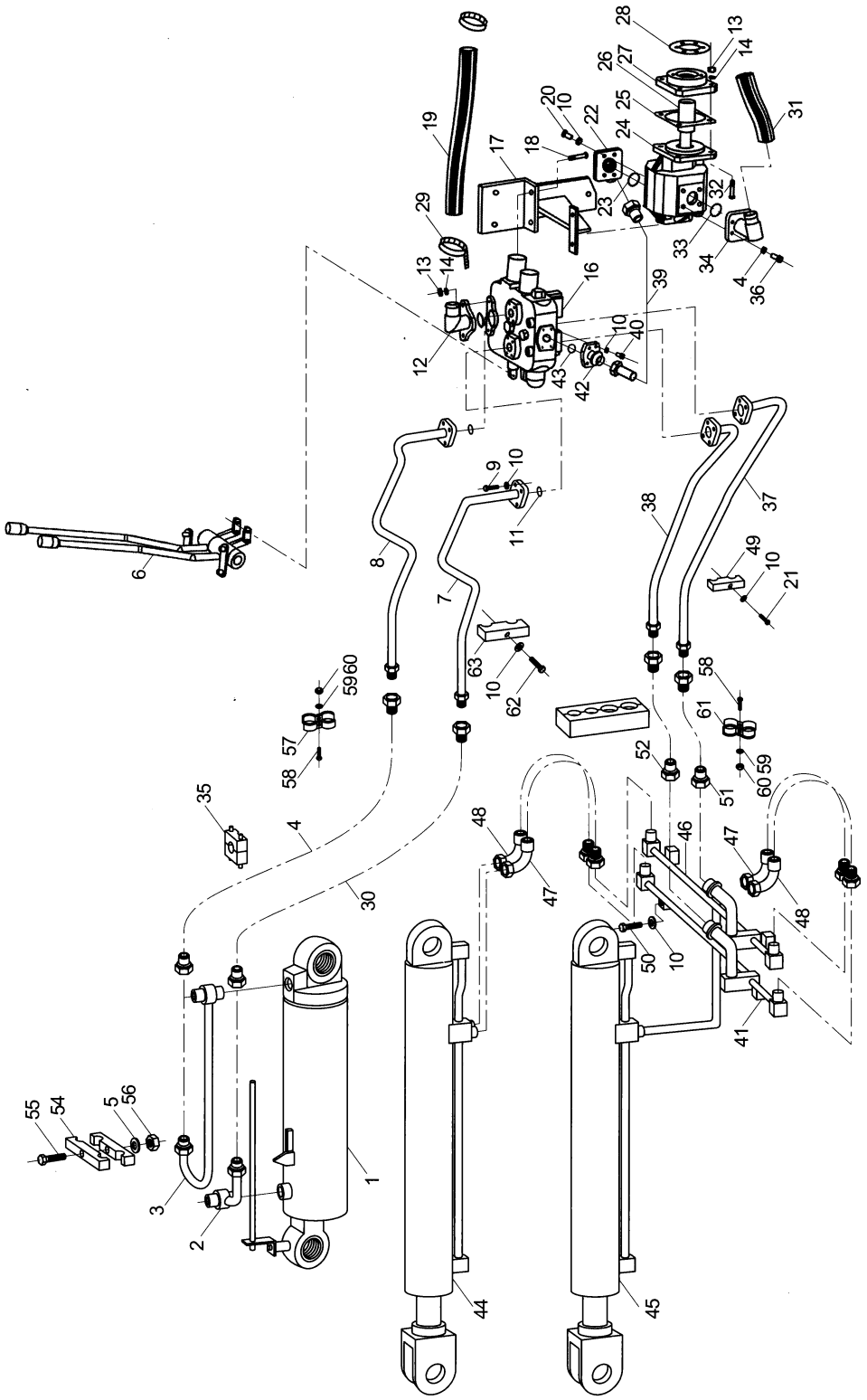
6.3 Z3.9.1 转向油缸 Steering Cylinder



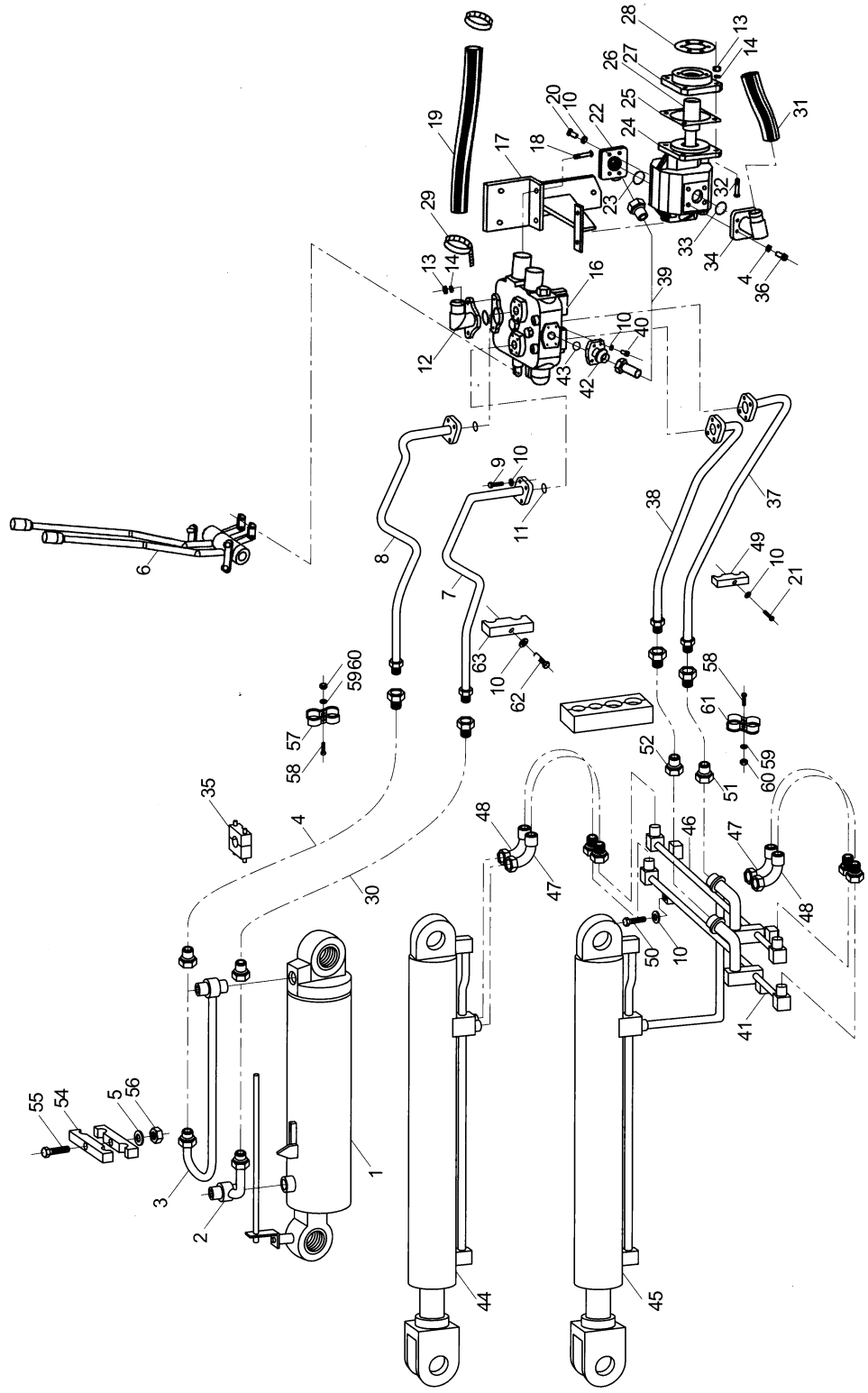
6.4 LW330F.10 工作液压系统 Working Hydraulic System



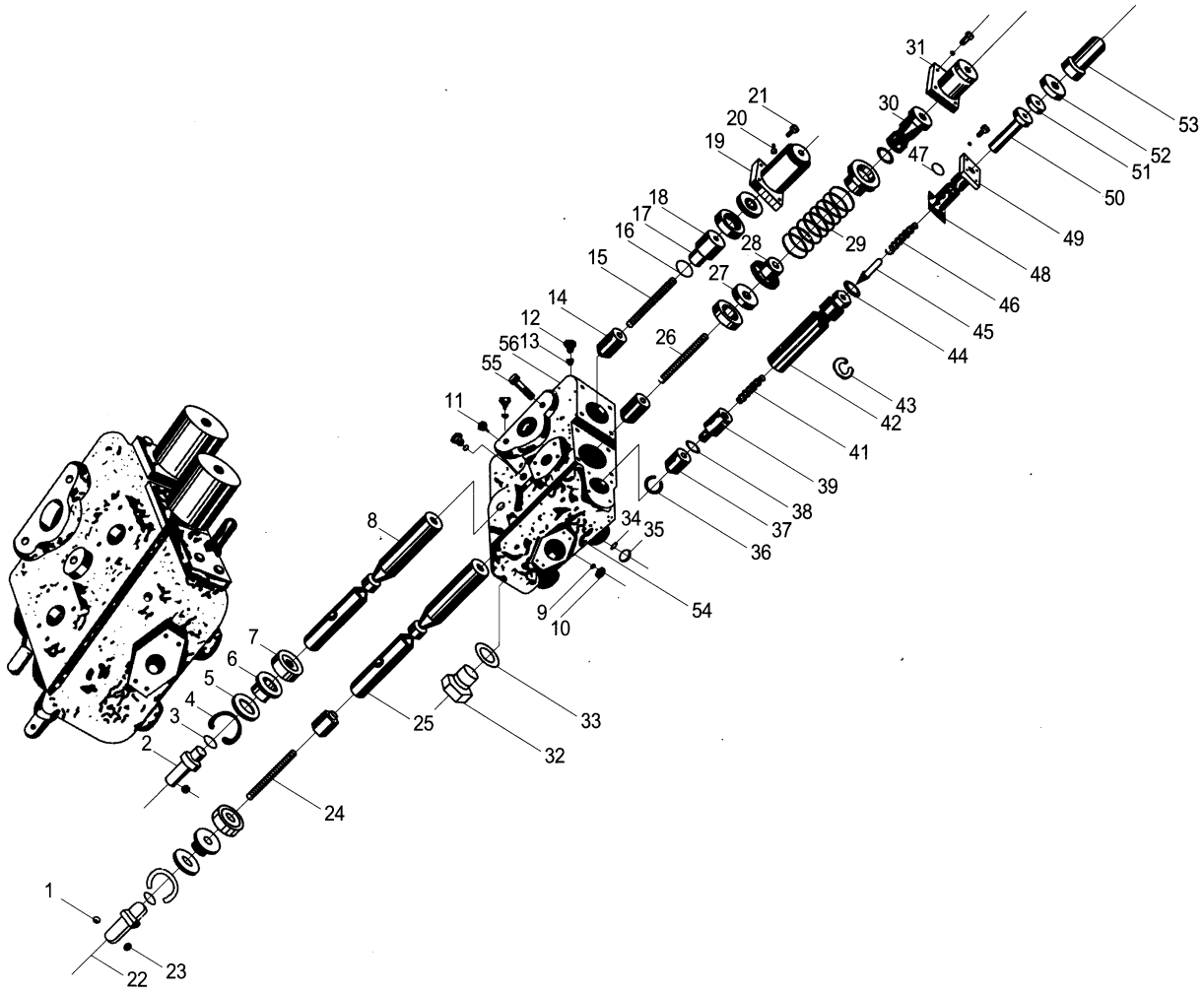
6.4 LW330F.10 工作液压系统 Working Hydraulic System



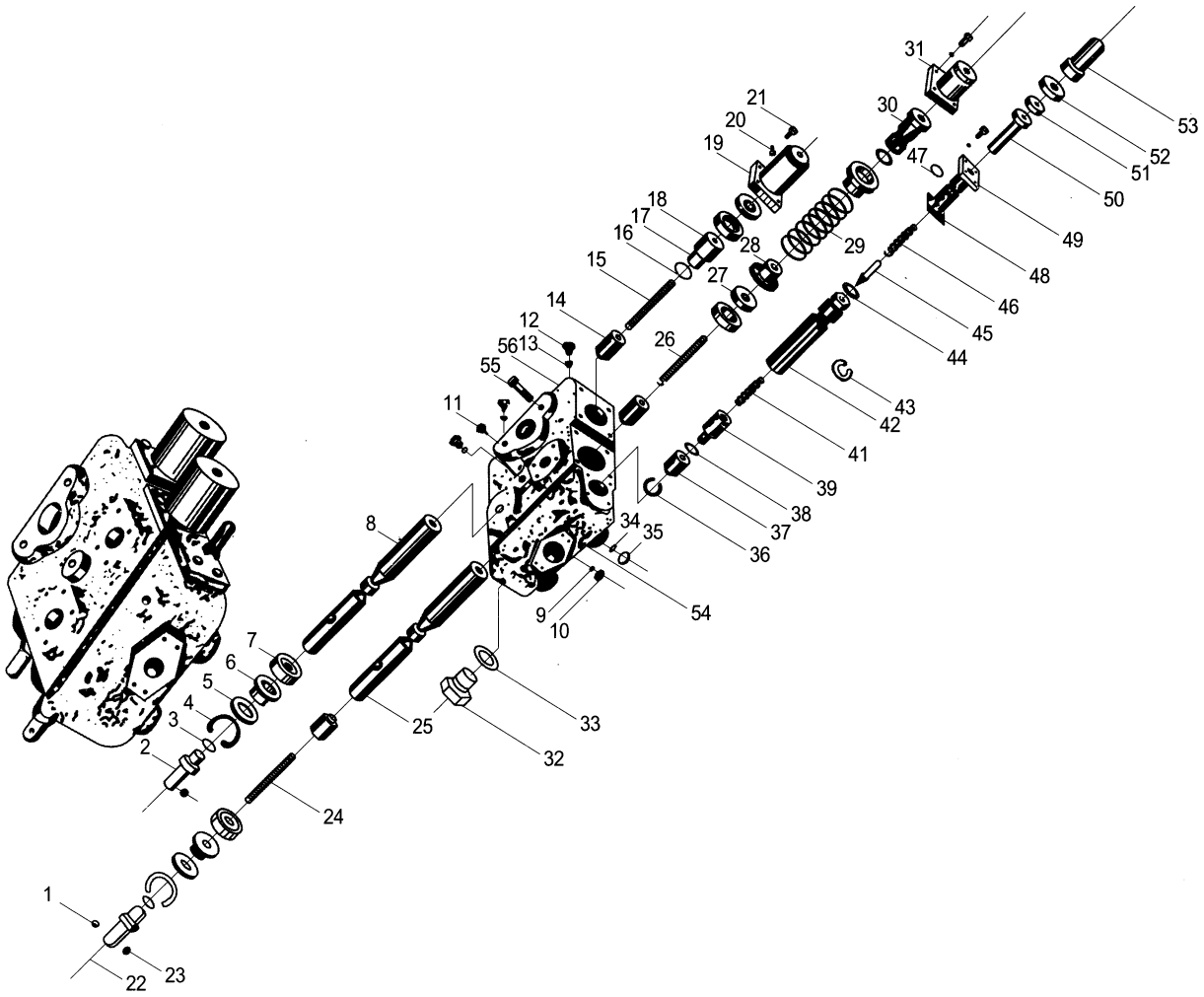
6.4 LW330F.10 工作液压系统 Working Hydraulic System



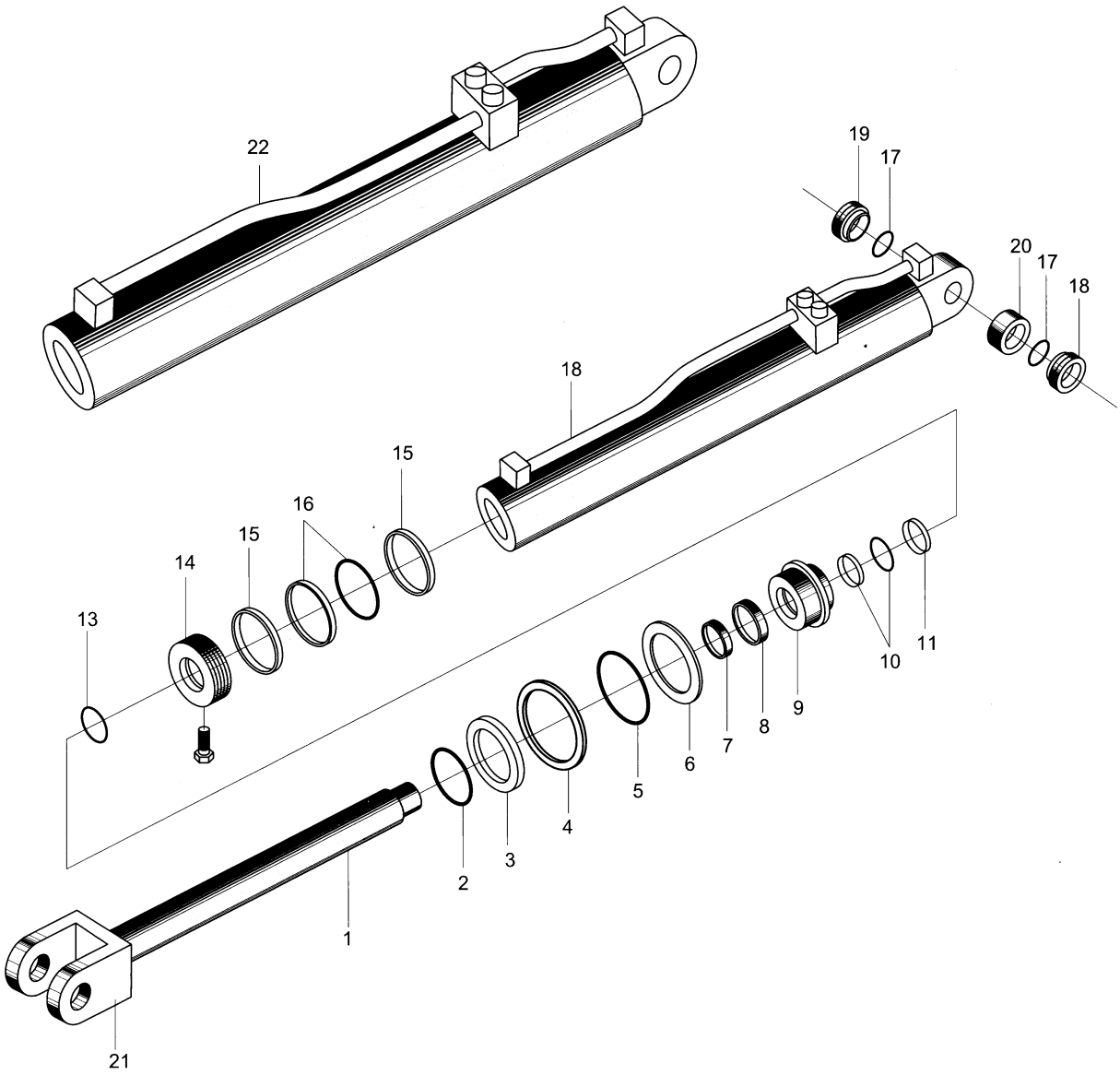
6.5 DF25B2 分配阀总成 Control Valve Ass.



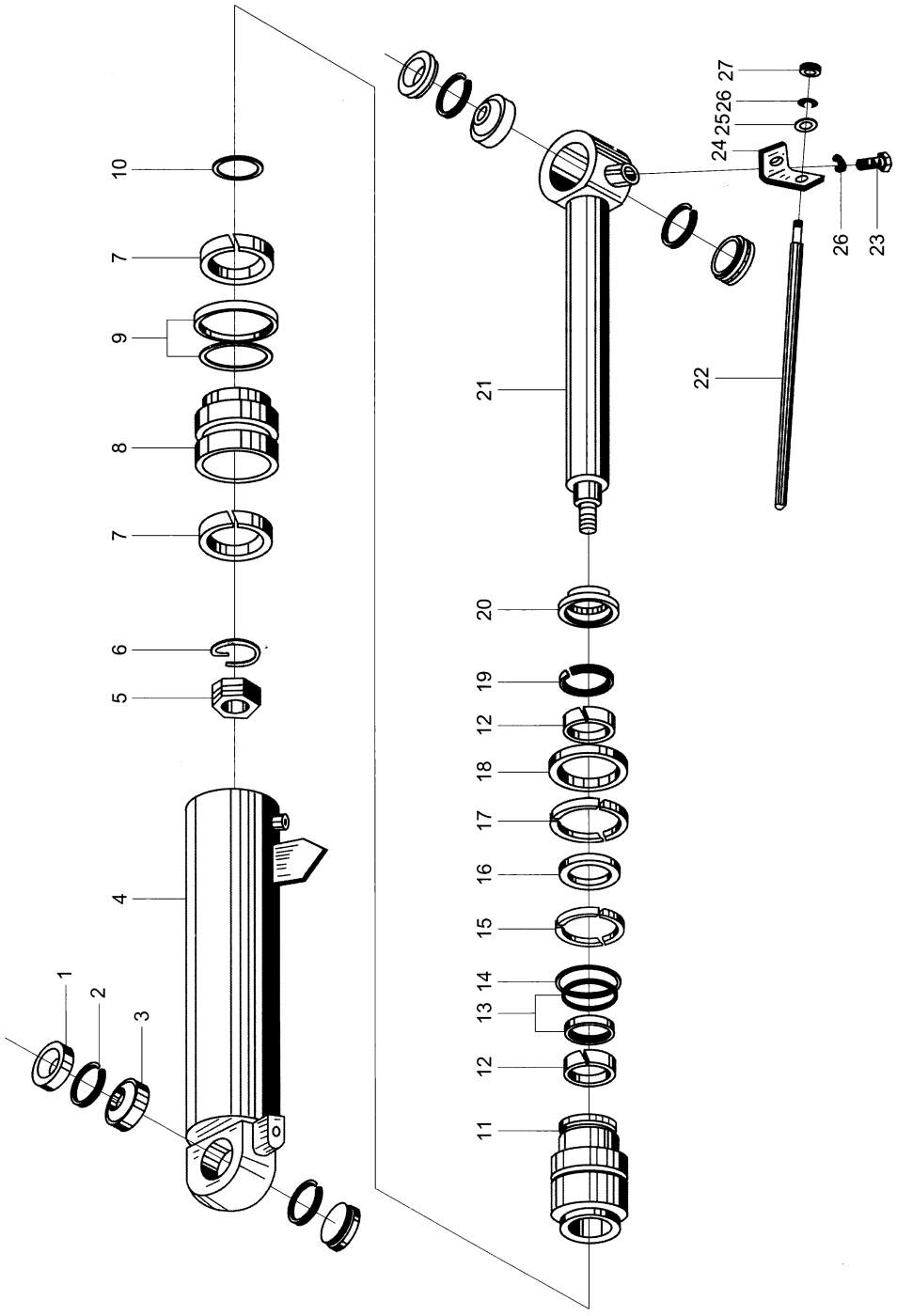
6.5 DF25B2 分配阀总成 Control Valve Ass.



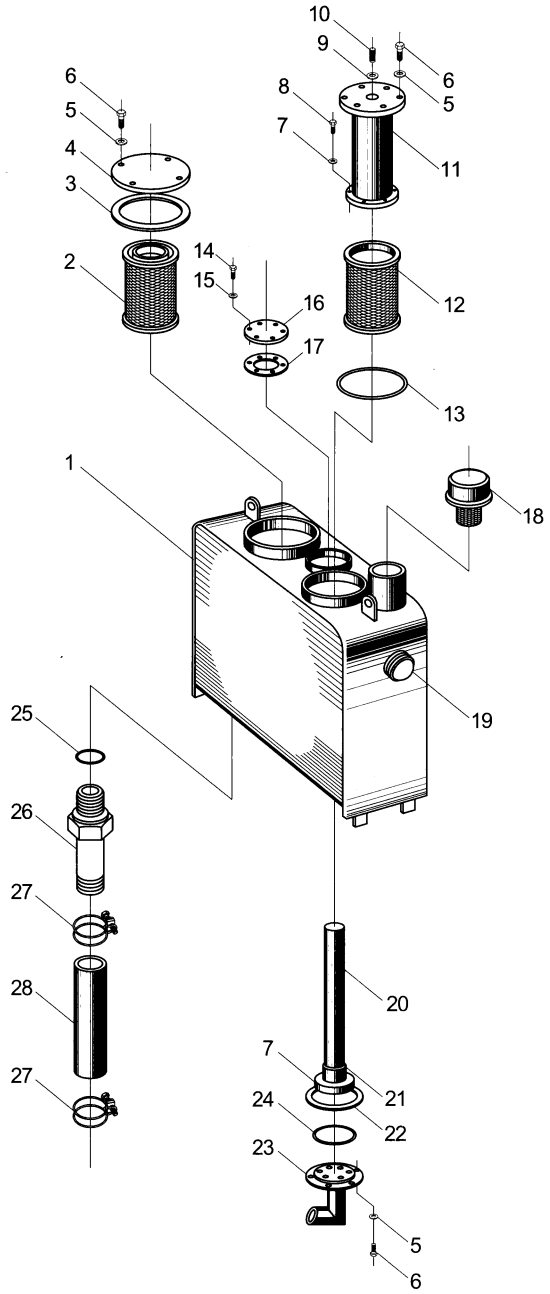
6.6 LW330F.10 左、右动臂油缸 Left & Right Lift Cylinder



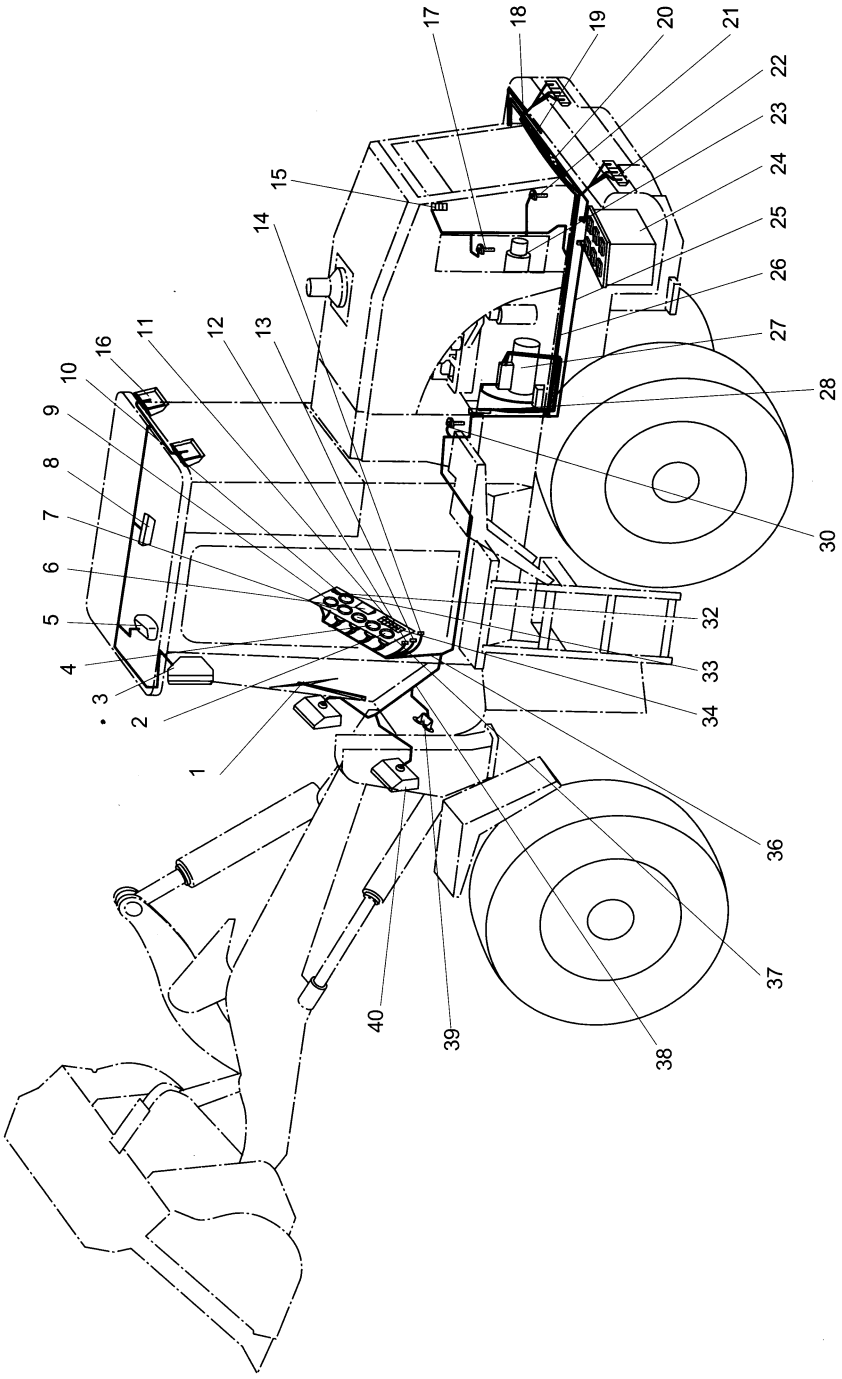
6.7 Z3.10.1 转斗油缸 Tilt Cylinder



6.8 330E.10.4A 液压油箱总成 Hydraulic Tank Ass.



7.1 LW330F.14 电器系统 Electrical System



7.1 LW330F.14 电器系统 Electrical System