FOREWORD

This manual contains a number of instructions and safety recommendations regarding driving, handling, lubrication, maintenance, inspection and adjustment of the excavator.
The manual is to promote safety maintenance and enhance machine performance.

Keep this manual handy and have all personnel read it periodically.

If you sell the machine, be sure to give this manual to the new owners.

1. **Read** and **understand** this manual before operating the machine.

This operator's manual may contain attachments and optional equipment that are not available in your area. Please consult your local Hyundai distributor for those items you require.

Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.

Some actions involved in operation and maintenance of the machine can cause a serious accident, if they are not done in a manner described in this manual.

The procedures and precautions given in this manual apply only to intended uses of the machine.
If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in prohibited uses of actions as described in this manual.

2. **Inspect** the jobsite and **follow** the safety recommendations in the **safety hints** section before operating the machine.

3. Use **genuine Hyundai spare parts** for the replacement of parts.

We expressly point out that Hyundai will not accept any responsibility for defects resulting from non-genuine parts or non workmanlike repair.
In such cases Hyundai cannot assume liability for any damage.

Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult Hyundai or your Hyundai distributor for the latest available information for your machine or for questions regarding information in this manual.

BEFORE SERVICING THIS MACHINE

It is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury by keeping this machine properly maintained.

It also is the responsibility of the owner and all service and maintenance personnel to avoid accidents and serious injury while servicing the machine.

No one should service or attempt to repair this machine without proper training and supervision.

All service and maintenance personnel should be thoroughly familiar with the procedures and precautions contained in this manual.

All personnel also must be aware of any federal, state, provincial or local laws or regulations covering the use and service of construction equipment.

The procedures in this manual do not supersede any requirements imposed by federal, state, provincial or local laws.

Hyundai can not anticipate every possible circumstance or environment in which this machine may be used and serviced.

All personnel must remain alert to potential hazards.

Work within your level of training and skill.

Ask your supervisor if you are uncertain about a particular task. Do not try to do too much too fast.

Use your common sense.

TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine Serial No.	
Engine Serial No.	
Manufacturing year	
Seller Address	Hyundai Construction Equipment India Pvt., Ltd. Plot No. A-2, Chakan industrial area, Vill. Khalumbre, Talut-Khed., Dist. Pune 410 510, India

Table of Contents

I. Safety Precautions

WARNING! 
Please read and be familiar with all safety precautions in advance. Otherwise, serious casualties will occur.

1.1 Description of Safety Warning Signs

DANGER! 
1) There is a danger that may affect your personal safety; 2) Please do not operate at will. Any action may affect the normal state of the loader, cause damage to the loader or result in dangerous accidents.

WARNING! 
1) There is a potential danger that may affect your or others' personal safety; 2) Please do not operate at will. Any action may affect the normal state of the loader, cause damage to the loader or result in dangerous accidents.

CAUTION! 
1) There is a danger that may affect your safety; 2) Please follow the instructions. Any incorrect operation or non-operation may affect the normal working state of the loader and cause damage to the loader.

1.2 Description and Locations of Safety Signs

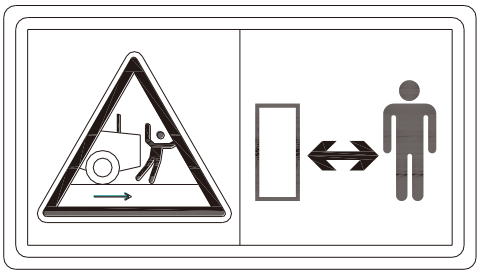
There are safety signs stuck on the loader. This section will explain in detail the locations and meanings of the signs. Please be familiar with these signs before operating the loader.

These signs should be kept clean. If the graphics and texts of these signs are not clearly legible, please replace them or scrub them with soft cloth, water and soapy water. Do not use solvents, gasoline or other irritant chemicals.

If these safety signs are damaged, lost or cannot be read after scrubbing, please replace them in time.

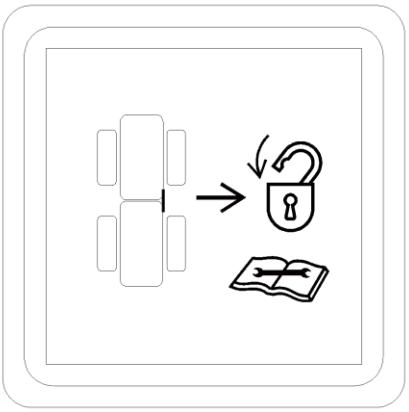
If you want to replace a part with a safety sign, a new safety sign must be stuck on the replaced part.

1.2.1 Backup Warning Sign



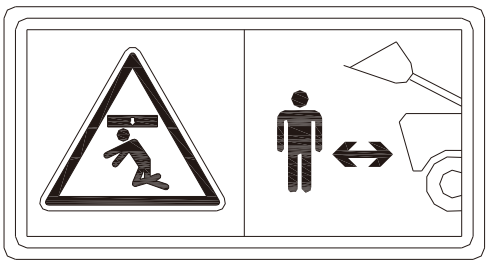
- Location: It is located at the rear counterbalance weight
- Content: The user should make sure to keep a certain distance between the loader and the surrounding workers when backing up to avoid accidents. The driver should carefully confirm the pedestrians and vehicles nearby when backing up to avoid accidents.

1.2.2 Maintenance and Transportation Warning Sign



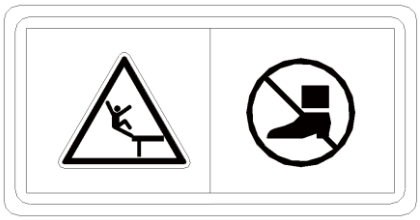
- Location: Left side of frame articulation
- Content: It reminds the user that the frame should be locked with a fixing rod before transporting and repairing the load, so as to avoid accidents. Before the loader works normally, remove the fixing rod and put it in a fixed position.

1.2.3 Boom Warning Sign



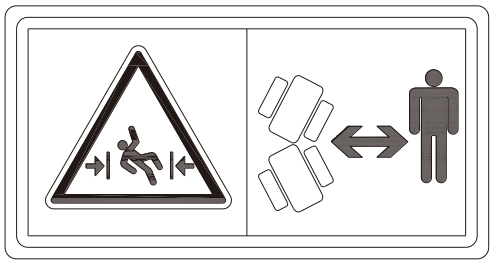
- Location: Front end of the lift arm
- Content: It prompts the user to make sure no persons are standing under the boom when lifting the arm to avoid accidents.

1.2.4 “No Stepping” Warning Sign



- Location: It is located above the fender of the front frame
- Content: Because the bearing capacity of the steel plate at the fender is limited, it is forbidden to trample on the fender to avoid accidents.

1.2.5 Articulation Safety Warning Sign



• Location: Front and rear articulations on the left side of the front frame

• Content: 1. Risk of squeezing! Do not stand here when the loader is turning. There may be serious casualties due to squeezing; 2. Risk of squeezing! To avoid dangers, be sure to lock the front and rear frames of the loader when transporting the loader or repairing the articulations.

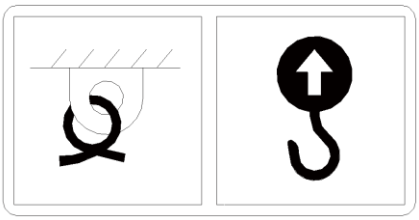
1.2.6 Fan Warning Sign

• Location: Left and right sides of the hood

• Content: This sign prompts the user to open the hood only when the engine is stopped. Otherwise, serious damage may occur.

1.2.7 Lifting and Binding Signs

- Location: Rear end of the frame and near the tire
- Content: 1. This sign prompts the user about the suspension location when it is necessary to lift the loader. 2. This sign prompts the user about the binding location of the loader to be transported.



1.2.8 Anti-extrusion Sign

- Location: Rear end of the frame and near the tire
- Content: It reminds the user that any part of the body should not be put between the frame and the swing frame to avoid safety accidents.

1.2.9 Hydraulic Oil Sign

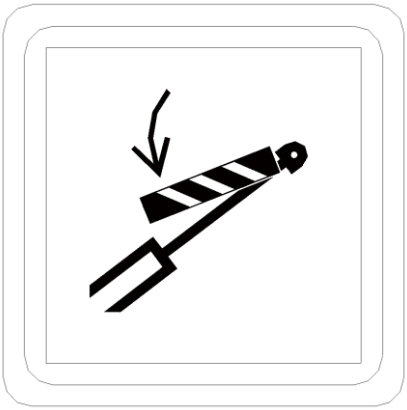
- Location: It is located on the hydraulic tank
- Content: This sign prompts the user that the hydraulic oil to be filled shall be the oils designated by Hyundai or the hydraulic oil of the same specification.

1.2.10 Fuel Sign

- Location: It is located on the fuel tank
- Content: This sign prompts the user that the fuel tank is on the right side of the frame. The user should add clean fuel suitable for the ambient temperature.

1.2.11 Anti-sinking Warning Sign

- Location: It is located on the boom
- Content: It reminds the user that the loader should be operated according to the content, otherwise the loader may be damaged or personal safety accident may be caused.



1.2.12 Safety Exit Sign

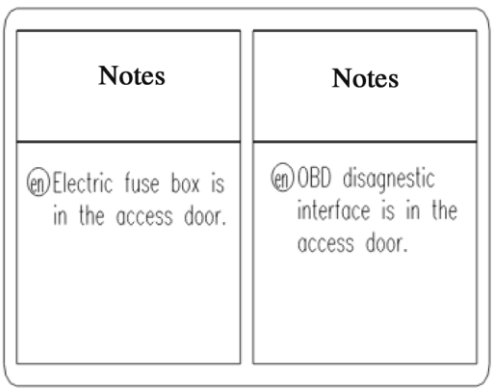
- Location: It is located on the right door glass of cab
- Content: If the main exit is blocked, push the right side window frame and leave from that area.

1.2.13 Anti-scald Warning Sign at High Temperature Positions

- Location: Left and right sides of the hood
- Content: Carefully open the hood to prevent injury by high temperature from the high heat emitted from the working engine (the maximum temperature of the exhaust pipe can reach 500°C). If conditions permit, wear high-temperature resistant gloves to prevent your body from being burned.

1.2.14 Position Signs of Electrical Elements

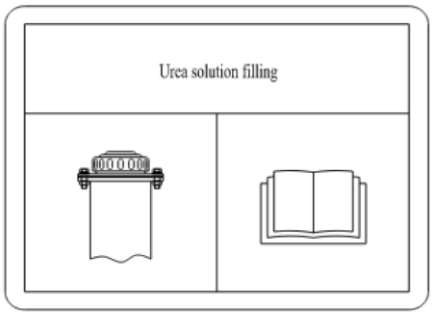
- Location: It is located on the lower left rear glass of the cab
- Content: It reminds the user that electric fuse boxes and OBD diagnostic interfaces are installed in the access door.



1.2.15 Urea Solution Filling Sign

• Location: It is located at the right upper cover plate of the balance weight

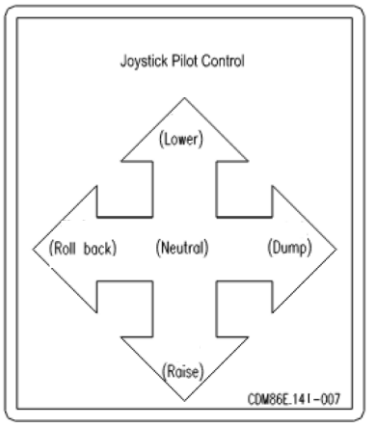
• Content: This sign prompts the user to add appropriate clean urea. Before filling, impurities around the filler shall be cleaned up to prevent falling into the urea tank.



1.2.16 Single Handle Pilot Sign

• Location: It is located on the pilot box

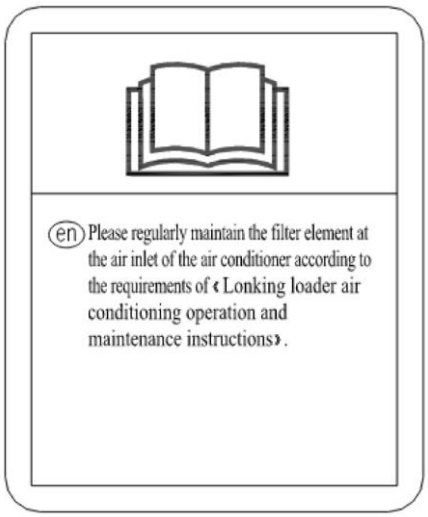
• Content: The loader should be operated according to the content.



1.2.17 Maintenance Sign of A/C Filter Element

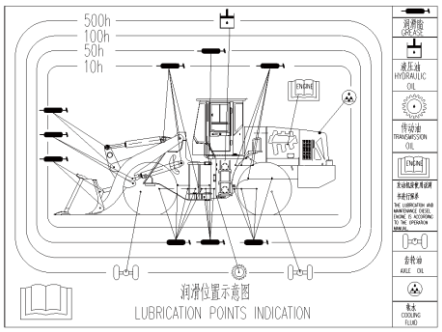
• Location: It is located on the right rear column of the cab

• Content: It reminds the user not to pile up sundries at the air inlet of the air conditioner to avoid blockage of the air inlet. Please regularly maintain the air inlet filter element of the air conditioner according to the requirements of the HYUNDAI loader air conditioner operation and maintenance manual.



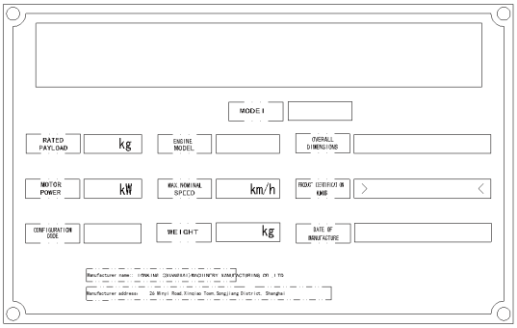
1.2.18 Grease Fitting Scattergram and Lubrication Point Scattergram

- Location: Left side of frame articulation
- Content: The scattergram calculated in hours according to the lubrication points for filling lubricating oil required by the loader reminds the user to fill and replace different oils at the lubrication points shown in the scattergram within the specified time.



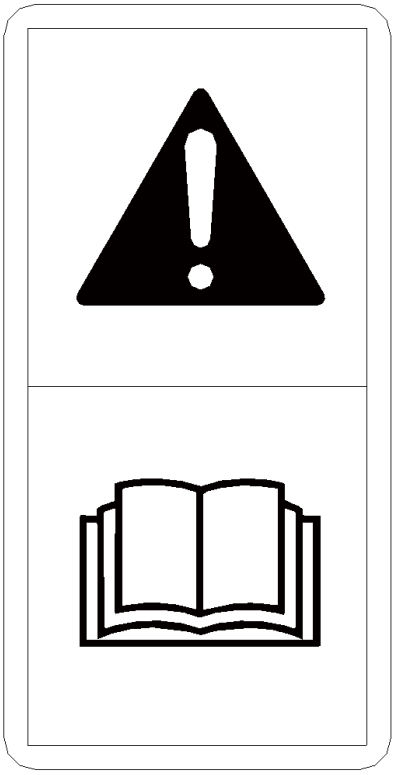
1.2.19 Machine Nameplate

- Location: Left side of frame articulation
- Content: Description of basic information of the loader.



1.2.20 Alarm Combination Sign

- Location: It is located on the right front column of the cab
- Content: It reminds the user that it is necessary to read all the content described in the Manual carefully. The violation or neglect of the Manual may lead to casualties. It is the driver's duty to strictly abide by the operating procedures.



1.3 Unauthorized Modification

For the sake of safety, all oils and accessories shall be of the correct grade and the accessories should be pure.

When purchasing diesel engine oil, the user should select the special oil designated by HYUNDAI and should purchase the oil with the grade above CK-4. Otherwise, the loader may be damaged.

The loader is a wheel loader meeting the China IV emission requirements; therefore, the diesel fuel used for the loader must meet or exceed the China IV emission requirements for motor pollutants.

When purchasing urea, the user should select the special urea designated by HYUNDAI. Otherwise, the loader may be damaged.

Any modification to the loader without authorization or written permission of HYUNDAI may result in safety accidents, and the user shall bear all the consequences arising therefrom.

The parts and components may exceed the safety limit for use if the correct spare parts are not used and fasteners are not replaced regularly.

Any modification to the loader without authorization or written permission of HYUNDAI may result in safety accidents, and the user shall bear all the consequences arising therefrom.

The parts and components may exceed the safety limit for use if the correct spare parts are not used and fasteners are not replaced regularly.

1.4 General Safety Precautions

1.4.1 Safety Requirements

Only the specially trained or qualified professionals can operate and maintain the loader.

The loader must be operated and maintained in strict accordance with all safety rules, warnings and requirements.

Do not operate and maintain the loader if feeling unwell, tired from taking medicine or unadaptable to the environment or after drinking. Such circumstances will reduce your emergency response ability and lead to misjudgment, resulting in possible accidents.

When working with other operators or traffic controllers at the work site, make sure that all the persons are familiar with the sign language used.

Keep an eye on all the surrounding factors affecting safety.

Observe all safety regulations.

Do not use the loader in polluted environment.

Do not use the loader in the environment with falling objects.

Check the operating handle before starting the loader to ensure that the handle is in the neutral position.

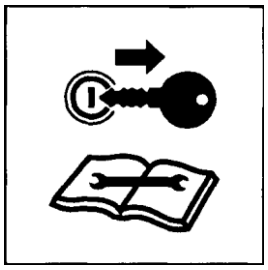
The left door of the cab of the loader is both the entrance and exit (with the forward direction of the loader as the forward direction).

If there are no special circumstances, place the lift arm and the bucket on the ground before the engine is shut down.

1.4.2 Safety Protection Device

Make sure all protection devices and hoods are in the correct position, and repair them in time if they are damaged. Please use safety protection devices correctly, such as control lever locking devices and seatbelts. Do not remove safety protection devices and ensure they are always in good working condition. Improper use of safety protection devices can also lead to personal injury or death.

1.4.3 Safety Precautions for Interior of Cab



Before entering the cab, remove the mud and oil stains adhered to the soles. Otherwise, it is likely to slip when stepping on the accelerator pedal or brake pedal and thus cause an accident.

Do not attach suction cups to the cab glass, as the suction cups will act as lenses which can cause fire.

Do not leave lighters in the cab at will. Otherwise, the lighters may explode if the temperature in the cab is high enough.

Do not use mobile phones when driving and operating the loader. Otherwise, distraction will lead to accidents.

Do not bring inflammables and explosives into the cab.

Do not wear earphones when driving and operating the loader. Otherwise, serious accidents will occur. Do not stick your head and hands out of the window while driving and operating the loader.

When leaving the seat, make sure the safety protection devices are locked, pull up the parking brake button and place it in the braking position. Otherwise, accidentally touching the unlocked control lever will lead to sudden movement of the working device, causing serious damage.

When leaving the loader, lower the working device to the ground, lock the safety protection devices, shut down the engine, lock all devices, and pull out the key and carry it with you.

1.4.4 Overalls and Personal Protective Equipment

Avoid wearing loose clothes, jewelry or other articles that can hook the control rod or other components of the loader. They may get caught in control systems or moving components, causing severe injury or death.

Do not wear greasy clothes to avoid burning.

Wear safety helmets, safety glasses, safety shoes, masks and gloves when operating or maintaining the loader.

Wear safety goggles, safety helmets and thick gloves when metal chips and small debris are generated, especially when hammering pins or using compressed air to remove impurities from the air filter, and check to make sure no one is near the loader.

Compressed air may cause personal injury. Wear masks, safety clothing and safety shoes when cleaning with compressed air. The maximum pressure of compressed air for cleaning should be lower than 0.3 MPa.

Before using all protective articles, check whether they are in normal working conditions.

1.4.5 Getting on / off the Loader

Before getting on / off the loader, remove oil marks, lubricants or sludge from handrails or stairs. Repair any damaged parts and tighten loose bolts.

Do not jump on or off the loader. Do not get on or off the loader while it is moving.

When getting on / off the loader, face the loader, put your hands on the handrail, step on the stair, and keep three points of contact (two feet and one hand or two hands and one foot) to ensure balance and stability.

Do not grasp any control lever when getting on / off the loader.

Do not get into the cab from the stair behind the loader or get off the loader from the tires next to the cab.

Do not try to climb on or off the machine when carrying tools or other objects.

1.4.6 Fire Prevention of Oils

Open flames can light the fuel and engine oil used in the diesel of the loader, hydraulic oil used in the hydraulic system, hydraulic transmission oil and gear oil used in the transmission system, brake fluid used in the brake system, and antifreeze used in the engine coolant tank. Fuel is especially flammable and dangerous. Therefore, attention must be paid to the following safety precautions:

Be sure to keep flame away from the flammable liquids mentioned above.

When filling the above flammable liquids, be sure to proceed in a ventilated place, shut down the engine and do not smoke.

Tighten the covers of the tanks storing all the above flammable liquids.

Store the above flammable liquids in containers marked with corresponding labels, place them in a fixed place, and store them by categories. Prevent use by persons other than the workers.

Put oil-stained wipes or other flammable materials in protected containers and place them in a safe place.

Do not electrically weld or flame cut the pipes or containers containing flammable liquids. Before electrical welding or cutting, be sure to clean with non-flammable liquid.

Be sure to remove the flammable materials such as fuel, lubricating oil or other debris deposited on the loader.

Do not put the loader in flames, burning bushes, etc.

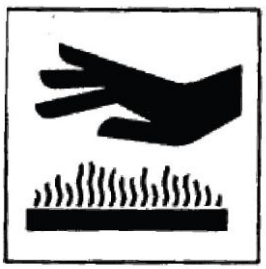
Do not use the loader in inflammable and explosive environments as it is a common construction machine.

1.4.7 Precautions during Operation under High Temperature

When the loader just finished operation, the temperature of hydraulic oil, oil and water in the engine, and oil and water in the radiator were still high and there was still pressure. At this time, any operations such as opening the tank cover or radiator cover, pouring oil or water, or replacing the filter may cause serious burns. Such operations can only be carried out according to the prescribed procedure after the temperature drops.

To prevent hot coolant from spraying out, turn off the engine and let the coolant cool down. Slowly loosen the cover to release the pressure when opening it. (To check whether the coolant temperature has decreased, you can put your hand near the front of the coolant tank to check the air temperature, and be careful not to touch the radiator.)

To prevent hot oil from spraying out, turn off the engine and let the oil cool down. Slowly loosen the cover to release the pressure when opening it. (To check whether the oil temperature has decreased, you can put your hand near the front of the radiator to check the air temperature, and be careful not to touch the radiator.)



Do not touch the relay when heating the engine to avoid scalding.

Do not remove the engine oil temperature sensor, coolant temperature sensor, torque converter sensor and air conditioning water pipe when heating the engine to avoid scalding.

1.4.8 Protection against Asbestos Dust Hazard

Inhaling asbestos dust can be harmful to health.

The products of HYUNDAI Holdings Limited do not contain asbestos but if the materials you touch contain asbestos fibers, please follow the following rules:

Do not clean with compressed air.

Please clean with water so that the asbestos dust does not rise.

Asbestos dust in the air is dangerous. The loader should be operated at the uptake if possible.

If necessary, use a qualified dust filter mask.

1.4.9 Masks and Earplugs

Do not ignore the factors that will not cause immediate harm to your health. Exhaust gas and noise pollution are invisible, but they can cause disability or permanent injury.

1.4.10 Fire Extinguisher and First- aid Kit

In case of personal injury or fire, please take rescue actions according to the following measures:

Be sure fire extinguishers are available, read the instructions carefully and know how to operate and use them.

Be sure to equip the work site with first aid kits and check them regularly to supplement some medicines in time. Make sure to know what to do in case of fire or injury.

Be sure the phone numbers of some personnel such as doctors, first aid center and fire station are available so that you can contact them in time in case of emergency. Post these phone numbers in designated locations and ensure that all personnel know these numbers and how to contact them.

In case of fire of the loader during operation, please make an emergency escape according to the following requirements: turn off the start switch and stop the engine. If conditions permit, take fire extinguishers as far as possible to put out the fire. Get out of the loader through the escalators.

1.4.11 Prevention against Rolling Injury or Cut-off

Do not place your hand or any other part of your body between movable components, such as between the working device and the oil cylinder, and between the loader and the working device. With the movement of the working device, the space at the linkage mechanism will increase or decrease, and if you are close to it, serious accidents or personal injuries may occur. If you have to enter between moving parts of the loader, be sure to shut down the engine and lock the working device.

When working under the loader, properly support the equipment or accessories. Do not support with hydraulic cylinders. If the control mechanism moves or the hydraulic pipeline leaks, any accessories will fall off.

Unless otherwise stated, do not make any adjustments while the loader or the engine is running.

Be sure to keep away from all rotating and moving parts.

Be sure to that there are no foreign matters in the fan blades of the engine.

1.4.12 Ether (if your loader is equipped with ether cold start device)

Ether is a poisonous and combustible substance. Inhaling ether vapor or frequent skin contact with ether can cause injury. Ether should be used in well ventilated places and it should be prevented against fire. Do not smoke when replacing the ether cylinder.

Do not store the ether cylinder in the living area or in the cab; do not place the ether cylinder under direct sunlight or in a place with the temperature exceeding 39°C (120°F).

Please keep the waste ether cylinder in a safe place and do not perforate or roast on the cylinder.

Place the ether cylinder away from the non-working personnel.

1.4.13 Ensure Ventilation When Working in Confined Space

If you have to start the engine or handle fuel, clean parts or paint in a confined or poorly ventilated place, open the doors and windows to ensure adequate ventilation to prevent gas poisoning.

If adequate ventilation cannot be provided by opening doors and windows, install a fan.

1.4.14 Cautions Concerning Lines, Tubes and Hoses

Do not bend or hammer HP pipelines, or install abnormally bent or damaged hard pipes or hoses on the machine. Repair any loose or damaged fuel and lubricating oil lines, hard pipes and hoses of the hydraulic system timely.

Leakage may cause a fire. For repair or replacement, please contact the dealer designated by LonkingZ Holdings Limited.

Please check the pipelines, hard pipes and hoses carefully and tighten all connectors to the specified torque. Use boards or cardboards instead of bare hands to check leakage.

Even the pressure liquid leakage of pinhole size may penetrate the muscles and cause death. If the solution touches the skin, it should be handled within a few hours by a surgeon familiar with this injury. If any of the followings are found, replacement is necessary.

1) Damaged or leaking connectors; 2) Hoses with worn or torn outer layers and exposed reinforced steel wires; 3) Hoses with local uplift; 4) Hoses with obvious torsion or bias; 5) Hoses with the steel wires of the reinforced layer embedded in the outer layer; and 6) Dislocated end connectors.

Be sure that all pipe clamps, guards and heat shields are installed correctly to avoid vibration or overheating due to friction with other parts. When removing pipelines connected to the air conditioner’s compressor, do not allow open flames nearby. Otherwise, toxic gases may be produced, resulting in poisoning.

1.4.15 Coolant

When working, the coolant of the engine has high temperature and pressure, and there is hot water and steam in all the pipelines to the radiator or engine, which, if being contacted, can cause serious burns.

When checking the coolant level, shut down the engine and cool the filler cap until it can be unscrewed with bare hands.

Loosen the filler cap of the cooling system slowly to release pressure.

The coolant in the cooling system contains alkali. Do not let it touch your skin and eyes, or drink it.

Cool the coolant before discharging.

1.4.16 Protection against Falling Objects or Flying Objects

When a falling or flying object strikes the cab on the work site, it will bring danger. Please choose a protection device suitable for the operating conditions to protect the driver.

When working in mines, tunnels, deep pits or soft and wet surfaces, there may be a danger from falling rocks or flying objects. It is very necessary to install protective equipment on the cab and the protective equipment must meet the requirements of FOPS (falling object protective structure) or window protective structure.

It is not allowed to reinforce the devices, such as drilling and welding on protection devices.

If the protection device is severely impacted or damaged, its strength will decrease and its normal function will not be satisfied. In such a case, contact the dealer designated by HYUNDAI Holdings Limited tc consult the repair methods.

When working with a crusher, install a protection device on the front windshield. Please contact the dealer designated by HYUNDAI Holdi Limited for suggestions.

If any glass on the loader is damaged, please replace it immediately.

1.5 Operation Safety Precautions

Warning

1. **Before use, be familiar with the performance, characteristics, and operation precautions of the diesel engine and supporting equipment; make inspection and preparation before starting the diesel engine; start, run, and stop the diesel engine in strict accordance with the methods specified in the corresponding maintenance manual/operation manual. During operation, pay attention to observe whether the data of relevant instruments are normal and the running condition of diesel engine. In case of any abnormality or fault, the vehicle shall be shut down immediately. The diesel engine can only be used after troubleshooting. Make sure that the emission of the diesel engine meets China VI vehicle emission requirements;**
2. **Without permission, users are not allowed to tamper with or abuse the emission control system of diesel engines and stop using and maintaining EGR or fuel injectors without authorization.**

1.5.1 Work Site Safety

Before starting the engine, check the surroundings carefully and see if there are any abnormal conditions that will cause danger.

Check the terrain and ground conditions of the work site and determine the best and safest operation method.

Trim the ground as solid and level as possible before operation. Spray water before operation if there is heavy sand on the work site.

For operation on streets, appoint a specially-assigned person to direct traffic or provide fences and “No Entry” labels around the work site to protect pedestrians and vehicles.

Where there are buried facilities, such as water pipes, gas pipes, telephone lines or high-voltage lines, contact the competent company to determine the location of the buried facilities and take care not to damage them during construction.

When working in water or passing through sandy embankments, check the ground condition, water depth and water velocity first. Do not operate beyond the allowed water depth.

Any object around the boom is potentially dangerous and can cause accidents if the driver is unprepared. When working near bridges, cables, work site scaffolds or other obstacles, be sure there are persons assisting in commanding.

Insurance coverage, work permit or certificate, minimum standards for protection of barriers around the work site or work time limit may be the responsibility of government authorized units. Please also comply with local regulations, guidelines, standards or equipment restrictions. There may also be provisions for performing specific tasks. If you want to know whether your loader and the work site environment comply with laws and regulations, please contact the local authority.

Avoid driving the loader onto a soft road. Otherwise, it will be difficult to drive the loader away.

Avoid working on cliff edges or overhangs or in deep pits. If these grounds collapse, the loader will fall or tip over, causing serious casualties. Especially after rain, blasting operations or earthquakes, the soil is very loose and extremely likely to bring danger.

The soil piled up on the ground or near the ditches is very loose. Vibration of the loader will cause the soil to collapse and thus cause the loader to tip over.

In places where there is the risk of falling stones, please install protection devices for cab and head|.

1.5.2 Check before Starting the Engine

At the beginning of each day's work, before starting the engine, perform the following checks. Otherwise, there may be the risk of serious injury or damage:

Check for flammable materials around the engine and the battery;

Check for leakage of fuel, lubricating oil and hydraulic oil;

Check whether the rearview mirrors, handrails and steps are contaminated by fuel;

Do not leave parts and tools around the operator’s seat. In case of vibration generated during traveling and operation, such articles may fall and damage the control handle or switches, or cause the control handle to move to start the working devices, resulting in accidents.

Before getting on the loader, remove the mud and fine sand from the shoes. Otherwise, the mud and sand will accumulate on the fulcrum of the accelerator pedal and the brake pedal, hindering the reset of the pedals. If there is mud and sand accumulated in these places, clear them immediately.

Check the coolant level, the fuel level and the oil level in the engine oil pan, check the air filter for blockage and check for damage to the electric wires.

Adjust the operator's seat to an easy-to-operate position and check whether the seatbelt and its fixing device are damaged. After three years of use, the seatbelt must be replaced.

Check whether the instruments are working properly and whether the control lever can be put in the parking position.

Remove all dirt from the window glass and lights of the cab to ensure good visibility.

Adjust the positions of the rearview mirrors to ensure there is a best view from the operator's seat. Clean the surface of the rearview mirrors. If the glass of the rearview mirrors is damaged, replace it with a new one.

Check whether the headlamps and work lights are on properly. If the check shows any abnormality, fix it.

Be sure there is a fire extinguisher available and be familiar with its usage.

Do not put the loader close to open fire.

1.5.3 Start the Engine

Before getting on the loader, inspect your loader again and check whether there are persons or objects on, under or near the loader, and notice whether there are persons in the work area.

If there is a warning label of “Do not operate” on the control lever, do not start the engine or pull the control lever.

When starting the engine, honk the horn to give a warning.

The operator can start and operate the engine only when sitting on the operator's seat. Only the operator is allowed to stay in the cab. **No one is allowed to sit on the engine body outside the loader.**

If the loader has not been used recently or the temperature is extremely low, please carry out maintenance before starting.

Before starting the engine, check whether the instruments display normally and whether the sound is normal, and notice whether there is abnormal noise and potential unsafe factors at the start of operation.

The engine can only be started in the cab. It is strictly prohibited to start the engine by short-circuiting the starting motor, otherwise the electrical system of the loader will be damaged and this operation is very dangerous.

Be sure that the backup alarm works properly.

1.5.4 Checks after Starting the Engine and Before Operating the Loader

If proper check is not carried out after the engine is started, the abnormal condition of the loader may be ignored, resulting in personal injury or damage to the loader.

Be sure to carry out the checks in a spacious place without obstacles. No one is allowed to approach the loader during the checks.

Check the operation of instruments and devices, and check whether the bucket, boom, brake system, transmission system and steering system are working properly;

Check the sound, vibration, heat, smell or instruments of the loader for any abnormality;

Check for leakage of hydraulic oil, lubricating oil, air or fuel.

If any abnormal condition is found, repair immediately, otherwise the abnormal condition may cause accidental injury or damage to the loader.

Before traveling or starting work, check the frame fixing rods used by the loader to lock the front and rear frames. The frame fixing rods should be firmly locked in the “release" position.

Before operating the loader, warm the engine and hydraulic oil and torque converter oil to the normal operating temperature.

Remove all obstacles from the loader's traveling path.

Keep the windows clean and make sure they are in a safe position to open or close.

Adjust the rearview mirrors to the best view state, and ensure that the horn, alarm and other warning devices are in good working condition.

1.5.5 Precautions when the Loader Starts to Travel

Before the loader starts to travel, check around the loader again to ensure there are no persons or obstacles. When the loader starts to travel, honk the horn to give warnings.

The operator can operate the loader only when sitting on the operator's seat and shall fasten the seatbelt.

1.5.6 Precautions during Travelling

Never turn the key to the start switch to the OFF position during traveling. When the machine is traveling, the engine will shut down and the steering will become heavy, which is dangerous. If the engine shuts down, apply a brake immediately to stop the loader.

During operation, it is dangerous to look around, and you should concentrate on your work.

It is dangerous to drive too fast, start suddenly, stop suddenly, turn sharply or zigzag.

If the loader is found to have such abnormalities such as noise, vibration, smell, incorrect instrument display, air leakage and oil leakage during operation, drive the loader to a safe place immediately and find out the causes.

Adjust the height of the working device to the position of the lower hitch pin of the lift arm that is 500-600 mm from the ground and make sure the loader travel on flat ground. Do not operate the control handle of the working device during traveling. If it is inevitable to operate the control handle, stop the loader first.

Do not operate the steering wheel suddenly, otherwise the working device may hit the ground and cause the loader to lose balance or damage the loader or surrounding structures.

When the loader is traveling on uneven ground, travel at low speed and avoid sudden change of direction.

Avoid crossing obstacles whenever possible when driving. If the loader must cross obstacles when driving, keep the working device close to the ground as far as possible and travel at low speed.

When the loader is traveling or working, it should keep a distance from other machines or structures to avoid collision.

The loader should never travel or work in the water at the depth exceeding the specified depth.

When passing through a bridge or a structure on private territory, check whether the strength can support the weight of the loader in the first. When the loader is traveling on public roads, comply with and follow the relevant regulations of the authorities. When driving on public roads, follow traffic regulations. The speed of the loader should be lower than the normal speed of the car, and the loader should travel near the side of the road. Leave the center of the road to other vehicles.

If the loader drives at high speed for a long time, the tire will overheat and its internal pressure will become abnormally high, which may cause the tire to burst. If the tire bursts, it will cause great damage and may cause serious injury or accident.

1.5.7 Checks When Changing the Driving Direction

In order to prevent injury or death, even if the loader is equipped with a backup alarm and rearview mirrors, be sure to follow the following rules before moving the loader or working device:

Honk the horn to warn the persons present.

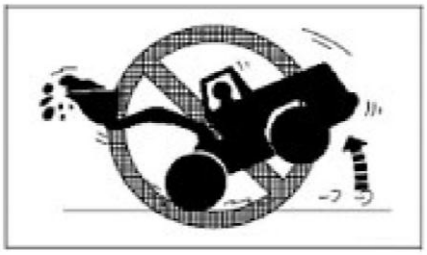
Check the vicinity of the loader to make sure there is no one. Pay special attention to the rear of the loader, as this area is not clearly visible from the operator's seat.

When working in places with dangerous conditions or poor visibility, appoint a person to direct the traffic at the work site.

Unauthorized persons must not enter the area in the turning direction or traveling direction.

Do not change the direction when driving at high speed.

1.5.8 Prohibitions



In order to prevent the loader from tipping over or damage to the working device due to overload, the load of the loader must be kept within the specified maximum load, and the loader must not exceed its specified capacity when in use.

Excavation of the operation surface under the highland is not allowed, otherwise the highland may collapse and hit the top of the loader.

No deep excavation is allowed under the front of the loader, otherwise the soil under the loader will collapse and thus cause the loader to fall.

When the loader is operating under load on soft, uneven or cracked ground, it may lead to dangerous lateral stress conditions and the possibility of tipping over. It is also dangerous to travel without load or with unbalanced load.

Overload operation is forbidden;

Self-modification of equipment is forbidden;

Unbalanced operation is forbidden;

It is forbidden to shovel stones and make a turn on the ramp;

It is forbidden to drive at high speed for a long time.

1.5.9 Precautions During Traveling on Slopes

Be especially careful when traveling on slopes, otherwise the loader may tip over or slide to one side.

When the loader is traveling on slopes, the bucket should keep 200-300mm above the ground.

In case of emergency, lower the bucket to the ground quickly to facilitate stopping the loader.

Do not turn on slopes or travel laterally on slopes. Drive the loader back to a flat ground to complete these operations.

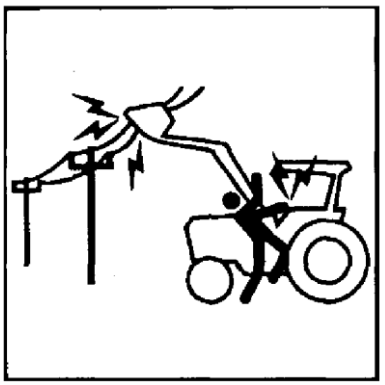
Do not drive at high speed on grasslands, fallen leaves or wet steel plates. Otherwise, even a small slope will cause the loader to slide to one side. Therefore, the loader should travel at a low speed and go straight up and down when traveling on slopes.

When traveling downhill, put the transmission shift lever in the low gear position; never shift gears or put the transmission shift lever in the neutral position; instead, use the engine as the braking force to control the driving speed. If necessary, use the brake pedal simultaneously to control the driving speed. Otherwise, danger will occur.

When the loader is traveling on a slope, if the engine stops, immediately depress the brake pedal completely to apply the brake, lower the bucket to the ground, and then apply the parking brake to fix the loader position.

If the bucket is loaded when the loader is going uphill or downhill, the bucket should be directed to the uphill direction (i.e. forward when going uphill and backward when going downhill) when traveling, otherwise the loader may tip over.

1.5.10 Beware of High Voltage Cables



Do not allow the loader to touch overhead cables. Even approaching to high voltage cables can cause electric shock. The loader and the cable should keep a safe distance as shown in the table below.

To prevent accidents, please do the following:

When there is a risk that the loader may touch the cable at the work site, consult the electric power company before starting the operation to check whether the action determined according to the current relevant laws and regulations is feasible.

Wear rubber boots and rubber gloves. Put a rubber gasket on the operator's seat and be careful to keep any exposed part of your body away from the metal chassis.

Designate a signal commander, who will issue a warning signal if the loader is too close to the cable.

If the working device touches the cable, the operator should not leave the cab.

When working near a high voltage cable, be sure no one approaches the loader.

Check the voltage of the cable with the local electric power company before starting the operation.

Voltage (kv)	Minimum safe distance (m)
0.1-0.2	2
6.6	2
22	3
66	4
154	5
187	6
275	7
500	11

The minimum safe distances listed in this table are for reference only. The safe distance will be reduced greatly in case of high voltage and rainy days.

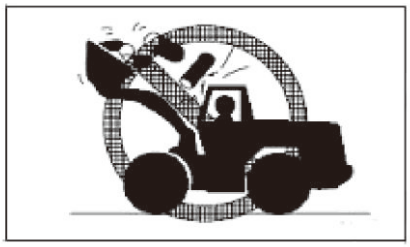
1.6 Precautions for Operation

Do not get too close to cliff edges.

When the loader pushes the soil down the cliff or to the top of the slope, the load will suddenly become light. In this case, the traveling speed will suddenly increase, which is dangerous and therefore, the speed must be reduced.

When the bucket is fully loaded, never start, turn or stop the loader suddenly.

When handling unstable loads, such as round or cylindrical objects and laminated plates, if the working device is raised, the load may fall to the top of the cab, causing serious injury or damage. When handling unstable loads, be careful not to lift the working device too high or tilt the bucket too much backward.



If the working device suddenly drops or stops, its reaction force may cause the loader to tip over. Be careful with the operation of the working device especially when there is a load.

Notice the followings to ensure good visibility:

- When working in a dark place, turn on the work lights and headlamps and install lighting equipment on the work site if necessary.
- Do not work under foggy, hazy, snowy, rainy or other conditions with poor visibility. Do not work until the sky is bright enough to provide sufficient visibility.

Notice the following to prevent the working device from colliding with other objects:

- When working in tunnels, under bridges, under wires or other places with limited height, be especially careful not to let the bucket touch anything.
- When loading the dump truck, check that there should be no one around the loader and be careful not to let the bucket touch the cab of the dump truck. To prevent accidents caused by collision with other objects, the loader should work at a safe working speed, especially when working in confined space, indoors and places where there are other vehicles.

1.6.1 Method of Using Brakes

Do not put your foot on the brake pedal unless it is really necessary.

Do not depress the pedal repeatedly unless it is really necessary.

When traveling downhill, use the engine as a brake and never shift gears or put the transmission in neutral.

1.6.2 Precautions for Operation in Snowy Days

When working on snowy or icy roads, even a small slope may cause the loader to slip off, so drive at low speed to avoid sudden start, stop or turn. Otherwise, there is a risk of slipping, especially when going uphill or downhill.

On frozen roads, when the temperature rises, the ground becomes soft, making the traveling conditions unstable. In this case, drive with special care.

After heavy snow, the road shoulder and roadside items are buried in the snow and can be barely seen, so sweep the snow carefully.

When driving on snow-covered roads, install tire chains.

When driving on a snow-covered slope, never apply brakes suddenly. To slow down, use the engine as the brake and step the brake pedal intermittently several times. If necessary, lower the bucket to the ground to stop the loader.

The adhesion of the ground will change greatly due to the influence of snow. Therefore, adjust load accordingly to prevent the loader from slipping while traveling.

1.6.3 Operation Precautions in Cold Areas

When completing the work, remove all water, snow or sludge from the wires, wire connectors, switches or sensors and the covers of these parts.

Carry out preheating operation thoroughly. Before you start to operate the control handle, if the loader is not completely preheated, the reaction of the loader will be slow, which may lead to unexpected accidents.

Operate the pilot control handle to circulate the hydraulic oil in the hydraulic system (raise the system pressure to the system set pressure, and release the pressure to return the oil to the hydraulic tank) to warm the hydraulic oil. This ensures that the loader responds well and prevents malfunction.

If the electrolyte of the battery has frozen, do not charge the battery, nor use another power source to start the engine. This is dangerous and can set the battery on fire. When charging or starting the engine with another power source, melt the electrolyte of the battery before starting and check for leakage.

1.6.4 Do not Work on Soft Ground

Do not work on soft ground.

Do not let the loader get too close to cliff edges, suspended parts or deep ditches.

The soil stacked on the ground and the soil near ditches are soft, and such soil may collapse under the weight or vibration of the loader, causing the loader to tip over.

When there is a risk of falling rocks in the workplace, a falling object protective structure (FOPS) should be installed.

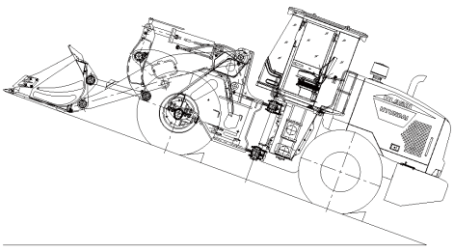
When there is a risk of falling rocks in the workplace or the loader has the risk of tipping over, a roll-over protective structure (ROPS) and a seatbelt should be installed.

1.6.5 Precautions for Parking the Loader

Park the loader on flat ground and then lower the working device to the ground.

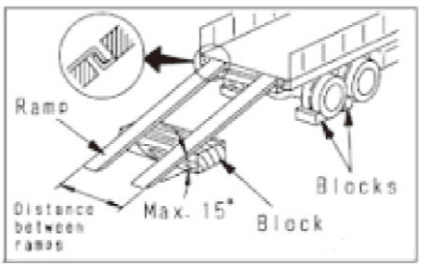
If it is necessary to park the loader on a slope, place wedges under the wheels to prevent the loader from moving. Then, lower the working device to the ground.

When parking on a highway, set up fences, signals, flags or warning lights, and place other necessary signals to ensure that the passing vehicles can see the loader clearly. In addition, make sure that the loader, fences and flags do not interfere with traffic.



When leaving the machine, lower the bucket completely to the ground, lock the control lever with the locking device, turn off the engine, pull up the parking brake button and put it to the braking position, lock all equipment with the key and take the key off and carry it with you.

1.6.6 Precautions for Loading/Unloading the Loader



When you load / unload the loader, the engine should run at a low speed and the loader should travel at a low speed.

Load/Unload the loader on solid and flat ground, and keep a safe distance from the roadside.

When loading/unloading the loader, be sure to fix the wheels of the transport vehicle and place cushion blocks under the springboard.

Be sure to use the ramps of enough strength. To ensure that the ramps have enough width and length to provide a safe loading and unloading slope, the included angle between the ramps and the ground should not exceed 15°. The distance between the ramps should be adapted to the wheel pitch of the loader.

Ensure that the ramps are firmly positioned, with both sides at the same height.

Ensure that the ramp surface is clean and free from lubricants, oil stains, ice and loose materials. Remove the dirt from the tires of the loader.

Never turn on the ramps. If necessary, drive the loader away from the ramps, and drive up the loader again after adjusting the direction.

After loading, wedge the tires of the loader and tie the loader tightly with ropes.

1.6.7 Precautions for Transporting

When transporting the loader with a trailer, it is required to comply with national and local laws on the weight, height, width and length of heavy objects, as well as all relevant traffic regulations.

Take the weight, height, width and length of the loader into consideration when determining the transportation route.

When passing through a bridge or a structure on private territory, check whether the strength can support the weight of the loader in the first.

When the loader is traveling on public roads, comply with and follow the relevant regulations of the authorities.

During transportation, it may be necessary to divide the loader into several parts. Therefore, when transporting the loader, please contact the distributor designated by HYUNDAI Holdings Limited to carry out these tasks.

1.6.8 Precautions for Hauling

If you drag a loader that cannot travel in an incorrect way, or if you choose a wrong wire rope, injury or death will be caused, so you should observe the following precautions:

Wear leather gloves when handling wire ropes;

When preparing for hauling with other workers, agree on the signals to be used before starting the operation;

If the engine of the loader cannot be started or the brake system is faulty, please contact the dealer designated by HYUNDAI Holdings Limited for repair;

It is dangerous to haul the loader on slopes, so you should choose a place with a gentle slope; if there is no such a place, choose the place with the smallest slope whenever possible;

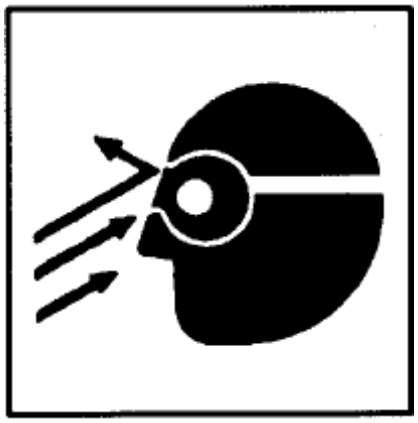
If the faulty loader is hauled by another loader, be sure to use the wire ropes that are strong enough to carry the weight of the faulty loader and must not have cut strands, kinks or reduced diameters;

Do not stand on the hauling cables or wire ropes with your feet wide apart;

When connecting the loader to be hauled, be sure no one walks between the hauling loader and the hauled loader;

Keep the coupler of the hauled loader in the same straight line as the hauled part of the loader and ensure that it is in place.

1.6.9 Usage and Maintenance Precautions for Battery



The electrolyte of the battery contains sulfuric acid, which can generate hydrogen. Therefore, handling the battery incorrectly may lead to serious injury or fire. Therefore, be sure to observe the following precautions.

Never put a lighted cigarette or open fire near the battery.

Wear safety glasses and rubber gloves when you have to contact the battery during work.

If the electrolyte in the battery splashes on your clothes or skin, rinse immediately with plenty of clear water.

The electrolyte in the battery may cause blindness if splashing into your eyes. If electrolyte splashes into your eyes, rinse immediately with plenty of clear water and see a doctor immediately.

If you drink electrolyte carelessly, drink plenty of water or milk, raw eggs or vegetable oil, and immediately call for help from a doctor or emergency center.

Shut down the engine before carrying out battery-related work.

Avoid short-circuiting between the positive (+) terminal and the negative (-) terminal of the battery due to inadvertent contact with metal objects such as tools.

When installing the battery, connect the positive (+) terminal first. When removing the battery, disconnect the negative (-) terminal (on the ground wire side) first.

When removing or installing the battery, check which is the positive (+) terminal and which is the negative (-) terminal first and tighten the nuts firmly.

When cleaning the top surface of the battery, wipe it with a cloth. Never use gasoline, solvent, any other organic solvent or detergent.

Tighten the battery cover firmly. If the electrolyte of the battery has frozen, do not charge the battery, nor use another power source to start the engine. This is dangerous and can set the battery on fire. When charging or starting the engine with another power source, melt the electrolyte of the battery before starting and check for leakage. Before charging, remove the battery from the machine.

1.6.10 Precautions for Starting with Booster Cable

Any mistake in the connection method of the booster cable may cause a fire, so the booster cable should be connected according to the following methods.

Two operators (one operator sitting on the operator's seat) are required for the start-up operation.

When starting another loader, make sure that the two loaders will not touch each other.

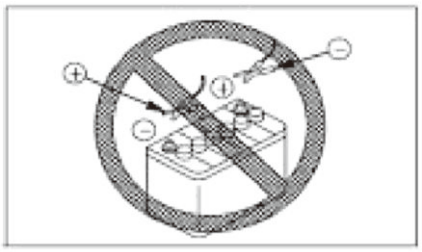
When connecting the booster cable, turn off the start switches of both the normal loader and the faulty loader.

When installing the booster cable, be sure to connect the positive (+) cable first. When removing the booster cable, disconnect the ground wire or the negative (-) cable first.

The final ground wire connection is to connect the ground wire to the engine cylinder block of the faulty loader. However, this will produce sparks, so the connection should be performed as far away from the battery as possible.

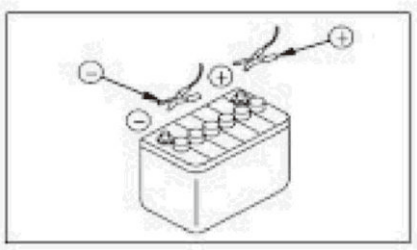
When removing the booster cable, be careful not to let the clamps of the booster cable touch each other or the loader.

1.6.11 Precautions for Battery Charging



When charging the battery, if you handle the battery improperly, the battery may explode. Therefore, you should handle the battery in accordance with the handling procedures of the battery and the charging procedures in the instructions, and observe the following precautions.

Charge the battery in a well-ventilated place and remove the top cover of the battery. This will allow hydrogen to diffuse and prevent explosion.



Set the voltage of the charger to match the voltage of the charged battery. If the voltage is set incorrectly, the charger will overheat and catch fire, which may cause explosion.

Connect the positive (+) charging clip of the charger to the positive (+) terminal of the battery, and then connect the negative (-) charging clip to the negative (-) terminal of the battery. Be sure to tighten these two terminals firmly.

If the charging rate of the battery is less than 1/10, perform high-speed charging and set the dispersion value below the rated capacity of the battery. If the charging current is too high, it may cause electrolyte leakage or evaporation, which may lead to fire or explosion.

1.7 Precautions for Maintenance

1.7.1 Fault Notification

If the maintenance carried out is not covered in the Operation and Maintenance Manual, it may cause unexpected faults. Please contact the dealer designated by HYUNDAI Holdings Limited for repair.

1.7.2 Cleaning before Overhaul and Maintenance

Please clean up the loader before repair and maintenance, which can not only ensure that dirt will not enter the loader, but also ensure that maintenance can be carried out safely.

Pay attention to the following when cleaning the loader:

1. Wear antiskid shoes to prevent slipping on wet or oily surfaces.
2. Wear protective clothing when washing the loader with high pressure water, to prevent the high-pressure water from impacting or pricking your skin or prevent dirt and sludge from splashing into your eyes.
3. Never spray water directly on electrical system components (such as sensors and wire connectors) to prevent water from entering the electrical system and causing operation failure.

1.7.3 Keep the Workplace Clean and Tidy

Do not leave any maintenance tools around the workplace.

Please wipe off all grease, lubricating oil or other things that may cause slip.

Always keep the workplace clean and tidy, so as to work safely and prevent tripping, slipping, falling, etc.

1.7.4 Designate Person in Charge

When repairing the loader or loading/unloading working devices or cooperating with others, designate a special person in charge to avoid misunderstanding each other and causing serious accidents.

1.7.5 Radiator Water Level Check

When checking the radiator water level, shut down the engine, wait for the engine and radiator to cool down, and then check the water level of the water tank.

If you have to open the top cover of the radiator, proceed as follows:

- Make sure the radiator coolant temperature drops before checking the coolant level;
- When the filler cap is cool enough to be unscrewed with bare hands, slowly loosen the filler cap to release the internal pressure, and then open the top cover.

1.8 Operations before Repair and Maintenance

Before repair and maintenance, park the loader on flat ground and ensure that there is no risk of falling rocks or landslides. If the terrain is low, make sure there is no risk of flooding, and then shut down the engine.

After shutting down the engine, operate the control handle of the working device to the "raise" and "lower" positions several times to release the residual pressure from the hydraulic oil circuit, then lower the working device to the ground and lock the control lever with the locking device.

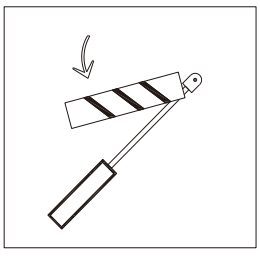
Pull up the parking brake button, apply the brake, and then put the wedge under the tire.

Fix the front and rear frames with frame fixing rods.

When carrying out maintenance, be especially careful not to be touched or hooked by moving parts.

1.8.1 Support of Working Device

When carrying out maintenance and repair with the bucket lifted, be sure to firmly support the working device to prevent the working device from falling down, put the control lever in the "neutral" position, and then lock the control lever with the locking device.



1.8.2 Suitable Tools

Be sure to use tools suitable for work tasks. Using damaged, low-quality and defective tools may cause personal injury.

1.8.3 Regular Replacement of Safety Critical Parts

Hoses and other parts of the fuel system, hydraulic system and brake system are critical parts to ensure safety, so they must be replaced regularly.

The replacement of safety critical parts requires certain technology and you should contact the dealer designated by HYUNDAI Holdings Limited for replacement.

Safety critical parts will age with time, and once oil leaks, serious accidents will occur. If a safety critical part is found to have any problems during use, it should be replaced or repaired in time, even if the specified time has not yet been reached. Whether safety critical parts fail or not, they must be replaced regularly.

For regular replacement of safety critical parts, please refer to the **Safety Critical Parts Catalog and Replacement Cycle** in this chapter.

1.8.4 Use of Lighting

When checking fuel, lubricating oil, battery electrolyte or window glass detergent, please use the lighting equipment with explosion-proof function to avoid the risk of explosion.

If you work in a dark place without lighting facilities, there will be the risk of injury; therefore, appropriate lighting equipment should be installed. It is forbidden to use lighters or open fire for lighting. Otherwise, there will be a risk of fire, and the gas emitted by the battery may explode in case of fire.

When using the loader as a lighting power source, follow the instructions in the **Operation and Maintenance Manual**.

1.8.5 Fire Prevention

The gas emitted by fuel and battery may ignite during maintenance, so the following precautions should be observed during maintenance:

Keep fuel, lubricating oil and other flammable materials away from open fire.

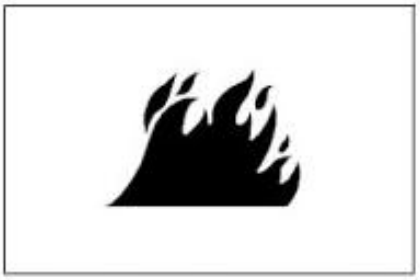
Do not use diesel or gasoline, as they have the risk of ignition. Use non-combustible materials as cleaning agents to clean parts.

Smoking is allowed in designated places. Smoking is forbidden during repair or maintenance.

When checking fuel, lubricating oil or battery electrolyte, use the lighting equipment with explosion-proof function, and do not use lighters or matches for lighting.

When grinding or welding on the frame, move all flammable materials to a safe place.

Be sure there are fire extinguishers available at the place of repair and maintenance.



1.8.6 Maintenance Personnel

Only qualified personnel can maintain and repair the loader;

Personnel not related to maintenance and repair work are not allowed to enter the work area;

If necessary, a special person should be appointed to watch.

Take great care when grinding, welding or using sledge hammers.

1.8.7 Accessories

Before starting the disassembly or installation of accessories, designate a special person to take charge;

Persons other than the workers are not allowed to approach the loader or its accessories.

Place the removed accessories in a safe place and ensure they will not fall. Put railings around the accessories and mark “No admittance" to prevent unauthorized personnel from approaching.

1.8.8 Maintenance under the Loader

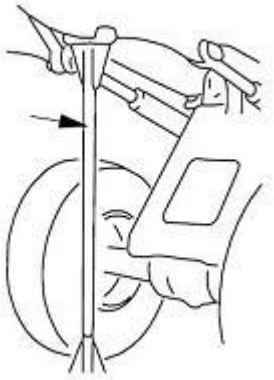
Before carrying out maintenance or repair, stop the loader on a solid flat ground, lower the working device to the ground and fix the tires with wedges;

It is forbidden to work under a poorly supported loader. With tires off the ground and the loader supported only by a working device, it is very dangerous to carry out maintenance or repair work under the loader.

1.8.9 Maintenance of Frames When Working Device is Supported

When maintaining the frames with the working device raised, lock the front and rear frames with frame fixing rods. Put the control lever in the "neutral" position, lock the control lever with the locking device and support the working device with the support rod.

Before supporting the working device, wedge the tires from the opposite side, lift the boom, and place the support rod under the boom.



1.8.10 Maintenance on the Top of the Loader

When carrying out maintenance work on the top of the loader, make sure that the anchor points are clean and free of obstacles, and observe the following precautions to prevent falling:

Ensure there is not spilled lubricating oil or grease;

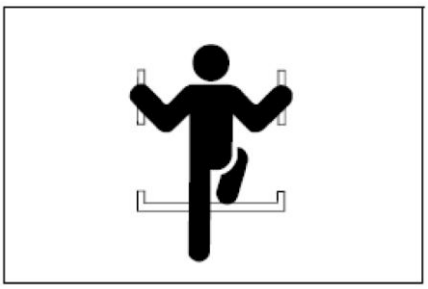
Do not place tools or parts around;

Pay attention to your pace when walking;

Do not jump off the loader. Be sure to use ladders and handrails when getting on or off the loader. Be sure to keep three-point contact (two feet with one hand or two hands with one foot).

Use protective equipment if necessary;

No one is allowed to stand on the top of the engine hood and the top of the tire, as they are smooth and dangerous.



1.8.11 Maintenance during Engine Running

In order to prevent injury, do not carry out maintenance work when the engine is running.

If maintenance must be performed while the engine is running, follow the following precautions:

Arrange a worker to sit on the operator's seat and be ready to shut down the engine at any time. All workers must keep in touch with others.

Take great care when the operating point is close to the rotating part. Otherwise, there is a risk of being caught in the rotating part.

Be sure that tools or any part of your body will not touch fan blades or fan belts.

When cleaning the interior of the radiator, lock the control lever with a locking device to prevent the working device from moving. In addition, pull up the parking brake button and apply the brake.

Do not touch any control lever. If you have to operate a control lever, send a signal to other workers to warn them to go to a safe place.

1.8.12 Do Not Abandon Foreign Matters Inside the Loader

When opening the maintenance window or tank filler for maintenance, be careful not to drop any foreign matters (such as nuts, bolts, cotton yarn or tools) inside the loader. If such matters fall inside the loader, they will damage the loader and cause operational errors and other faults.

If any foreign matter falls into the loader, be sure to take it out from the loader.

Do not carry any unnecessary tools and parts in your pocket during repair.

1.8.13 Precautions for Using Hammer

When using a hammer, be sure to wear safety glasses, safety helmet and protective clothing, and pad a copper bar between the hammer and the hammered part. Hammering hard parts, such as pins or bearings, may generate flying debris which will cause injury to your eyes.

1.8.14 Welding Repair

Electrical welding operations shall be carried out by qualified welders in places equipped with appropriate equipment. Electrical welding will produce gas; therefore, there is the risk of fire and electric shock when welding.

Please observe the following precautions when welding:

- Disconnect the battery terminals to prevent the battery from exploding.
- Disconnect the output and input wiring harnesses from the engine controller and the complete loader.
- Remove the paint from the positions to be welded to prevent production of harmful gases.

- Welding on or near hydraulic equipment and pipes will produce flammable vapors and sparks, which have the risk of ignition. Therefore, avoid welding in such places.
- Sparks splashed during electrical welding will fall directly on rubber hoses, electric wires or pressurized pipes. The pipes may burst suddenly or the insulation layers of the electric wires may be damaged; therefore, cover them with fire-proof baffles.
- Wear protective clothing when welding.
- Ensure that the electrical welding work site is well ventilated.
- Clean up all flammable materials before welding, and be sure to equip the work site with fire extinguishers.

1.8.15 Precautions during Battery Maintenance

When repairing the electrical system or performing electrical welding on the loader, disconnect the negative (-) pole of the battery to cut off the circuit and ensure safety.

1.8.16 Handling of Abnormal Phenomena

If any abnormal phenomenon is found during maintenance, repair in time. In particular, if there is any abnormality in the brake system, steering system or working device system when the loader is in use, it may lead to serious accidents.

Please contact the dealer designated by HYUNDAI Holdings Limited for repair according to the type of the fault.

1.8.17 Add Fuel or Lubricating Oil

Fuel, lubricating oil, hydraulic oil, antifreeze, brake fluid and window glass detergent can all be lit by open fire. Observe the following rules:

When adding fuel or lubricating oil, shut down the engine.

Do not smoke.

Immediately clean up spilled fuel, lubricating oil, hydraulic oil, antifreeze, brake fluid or window glass detergent.

Tighten the top covers of all containers of fuel, lubricating oil, hydraulic oil, antifreeze, brake fluid or window glass detergent firmly.

Add or store fuel, lubricating oil, hydraulic oil, antifreeze, brake fluid or window glass detergent in well ventilated places.

1.8.18 Handling of High Pressure Hoses

Leakage of high pressure hoses may result in operation failure which will result in personal injury or equipment damage. If it is found that a hose is damaged or a bolt is loose, stop working and contact the dealer designated by HYUNDAI Holdings Limited for repair.

The replacement of high pressure hoses requires high skill. The installation torque should be determined according to the type and size of the hose, so you shall not repair it by yourself. Please ask the dealer designated by HYUNDAI Holdings Limited for replacement.

1.8.19 Precautions for High-pressure Oil

When repairing or replacing the pipes of the hydraulic system, check whether the system pressure has been released. If there is still pressure in the pipe, it will cause serious injury or damage, so you should proceed as follows:

- Never carry out maintenance or replacement until the pressure is completely released.
- Wear safety glasses and leather gloves.
- If the pipe leaks oil, the pipe and its surroundings will be wet, so check the steel pipe or hose for cracks, and check the hose for bulges. If it is difficult to locate the leakage, please contact the dealer designated by HYUNDAI Holdings Limited for repair.
- Use boards or cardboards instead of bare hands to check leakage.
- If you are hit by the spouted high-pressure oil, immediately contact a doctor for treatment.

1.8.20 Preventive Measures for Maintenance under High Temperature or High Pressure

When the loader just stopped working, the cooling water and oil in all parts of the engine were under high temperature and pressure. If you open the engine cover, drain oil, drain water, or replace the filter at this time, burns or other injuries will be caused. Wait for the temperature to drop, and then carry out maintenance according to the requirements specified in the Manual.

1.8.21 Waste Disposal

To prevent pollution, especially in places where people or animals live, be sure to observe the following rules:

- It is forbidden to pour waste oil into sewers, rivers and other places.
- Please keep the oil discharged from the loader in a container and do not discharge the oil directly to the ground.
- When handling harmful substances such as lubricating oil, fuel, coolant, solvent, filter, battery and other substances, abide by relevant laws and regulations.

1.8.22 Precautions for Tire Maintenance

Explosion of a tire filled with gas is due to the heating of the gas inside the tire, which is usually caused by welding or rim heating, external flame or too frequent braking.

The power of tire explosion is very strong. The explosion may cause the tire, rim and some transmission parts to fly 500 meters away from the loader. The explosion force and debris may cause casualties and property damage.

Proper equipment and personnel training are needed to avoid excessive inflation of tires. Air leakage or rim damage is caused by wrong or improper use of inflation equipment. When inflating, stand on the side of the tire and use an automatic clamping chuck.

There may be dangers when repairing and replacing rim tires; therefore, such tires shall be repaired and replaced by trained personnel in strict accordance with the operation specifications provided by tire or rim maintenance personnel or agents.

If the tire or rim is handled incorrectly, the tire may explode or burst, and the rim may break and spread, possibly causing serious injury or death.

For the sake of maintenance safety, observe the following precautions:

- The maintenance, disassembly, repair and installation of tires and rims require special equipment and technology, so please ask the tire repair shop to perform such tasks.
- Only the specified tires can be used and inflated to the specified air pressure.
- When inflating the tires, irrelevant personnel are not allowed to enter the work area.
- You should stand on the side of the tire and use an automatic clamping chuck, and check the inflation pressure from time to time to ensure it will not be too high.
- If the rim is not properly installed, the rim may be damaged or spread out after the tire is inflated. Therefore, place a guard around the tire and do not work in the front of the rim but on the side of the tire.
- If the tire inflation pressure drops abnormally or does not fit properly with the rim, it indicates that there is a problem with the tire or rim. In this case, please ask the tire repair shop for repair.
- Do not adjust the inflation pressure after high-speed traveling or heavy-load operation.
- Heating or combustion of the gas filled in the tire will result in explosion of the tire. Heating is generally caused by rim heating or welding, external flame, or too frequent braking which cause the gas to expand or burn.
- The explosion of tires is much more powerful than deflation. The explosion may cause the tires, rims and parts of the final drive to fly 500m away from the loader. The explosion force and debris may cause casualties and property damage.
- Dry nitrogen (N2) is recommended for tire inflation. If the tire was originally filled with air, it is recommended to use nitrogen to adjust its air pressure. Nitrogen can be mixed with atmospheric gas. Nitrogen is non-flammable. A tire filled with nitrogen can reduce the possibility of explosion. Similarly, nitrogen can help prevent oxidation and aging of rubber and corrosion of rim parts.
- Proper equipment and personnel training are needed to avoid excessive inflation of tires. Air leakage or rim damage is caused by wrong or improper use of inflation equipment.

1.8.23 Precautions for Tire Storage

Store tires in a warehouse where persons without permission shall not enter. If it is necessary to store the tires outdoors, provide fences around the tires. Erect the tire on a horizontal ground and firmly wedge it with a wedge so that it will not fall even if someone touches it without permission. If the tire is laid upside down with its side touching the ground, it will be flattened and its quality will be degraded. If the tire is about to fall, keep away from it as soon as possible. The tires of construction machinery are very heavy. If you try to hold the tires, you may be seriously injured.

1.9 Safety Critical Parts Catalog and Replacement Cycle

In order to ensure the safety of the loader in use, the user must persist in regular maintenance. In addition, in order to further improve safety, the user should regularly replace the parts shown in the table. The materials of these parts will deteriorate with time and will be more prone to wear and corrosion. It is difficult to judge the condition of these parts simply by regular maintenance. Therefore, regardless of their use status, these parts should be replaced regularly to ensure the use performance of safety critical parts.

If the safety critical parts have already started to work abnormally before the specified replacement time, they should be repaired or replaced immediately.

If the pipe clamp fixing the hose has any damage, such as deformation or crack, it should be replaced together with the hose.

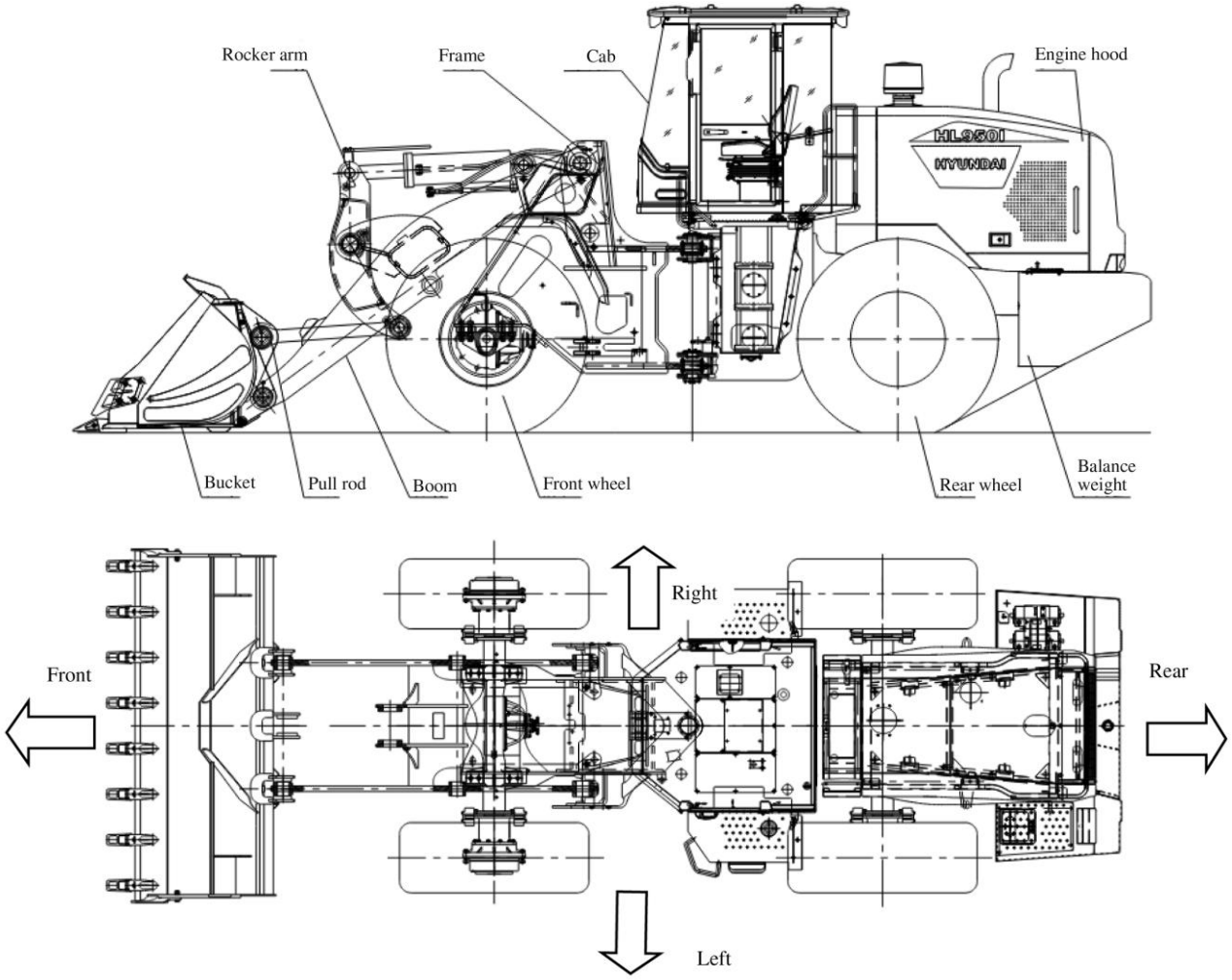
When replacing hoses, be sure to replace O-rings, gaskets, etc. at the same time.

Please contact the dealer designated by HYUNDAI Holdings Limited for replacement of safety critical parts.

Table of Regular Replacement of Safety Critical Parts

S/N	Critical parts to be replaced regularly	Quantity	Replacement cycle
1	Filter element of hydraulic oil tank	2	Every year or 2000 hours (whichever comes first)
2	Rubber hose (fuel coarse filter to fuel tank)	1	Every two years or 4000 hours (whichever comes first)
3	Rubber hose (oil return hose of diesel engine)	1	
4	Rubber hose (oil inlet hose from steering pump to priority valve)	1	
5	Rubber hose (priority valve to converging valve block of working pump)	1	
6	Hose from priority valve to steering gear	1	
7	Hose from steering gear to steering cylinder	2	
8	Rubber hose between steering cylinders	2	
9	Hose from multi-way valve to bucket cylinder	2	
10	Hose from working pump to multi-way valve	1	
11	Boom cylinder hose	4	

II. Operation and Control



Schematic Diagram of All Components of the Loader

2.1 Main Performance Parameters and Specifications

Parameters of the Machine		
Rated bucket capacity (m^3)		3.0
Rated capacity (kg)		5000
Unit weight (kg)		17500±300
Boom lifting time (s)		≤5.8
Boom descent time (s)		3.5
Total cycle time (s)		≤11
Dumping height (mm)		3400
Dumping reach (mm)		1254
Vehicle speed (km/h)	Forward gear I	0-10.2
	Forward gear II	0-36
	Reverse I	0-16
Maximum breakout force (kN)		≥170
Maximum traction (kN)		175±5
Maximum steering angle		35°
Rated power/speed		172kW/2150rpm

Note: The parameters in this table are only applicable to the standard bucket. The technical parameters involved in the Manual do not serve as the basis of inspection or test. A separate notice will not be given in case of any change in such parameters.

2.2 Purpose

The loader is large construction machinery mainly for loading and unloading bulk materials and can be widely used for loading, bulldozing, shoveling, hauling, transportation and other operations in mines, capital construction, road construction, ports, freight yards, etc. It is a kind of multi-purpose high-efficiency construction machinery.

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

The loader is not suitable for long-term bulldozing, traction and heavy loading on ramps. Otherwise, it may cause high coolant temperature or temperature of oil for torque converter and gearbox.

Please strictly follow the operating rules when configuring special working devices for the loader. Otherwise, it may affect the stability of the whole loader.

The loader cannot be used in environments with tumbling or falling objects.

Work environment requirements:

1. Altitude: ≤4000m
2. Environmental temperature: -15°C to 40°C (without auxiliary cold start device additionally)

Note: The precautions regarding operation, maintenance and safe operation rules given in this Manual are only applicable when the loader is used for specified purposes. If the loader is used beyond the scope of use specified herein, HYUNDAI Holdings Limited will not assume any safety responsibility which shall be borne by users instead. Do not use the machine beyond the stipulated application scope.

III. Operating Instructions

3.1 Steering Wheel

The loader adopts articulated full hydraulic power steering, and the steering wheel is in the cab and connected with the full hydraulic steering gear. When the loader works normally, turn the steering wheel clockwise to turn the loader right; turn counterclockwise to turn the loader left.

The features of full hydraulic steering are as follows:

1. If the turning angle of the steering wheel is not equal to the steering angle of the loader, continuously turn the steering wheel to increase the steering angle of the loader until reaching the required steering position.
2. The faster the steering wheel turns, the faster the machine turns.
3. The steering wheel will not return automatically after turning and the steering angle of the machine will remain unchanged. Therefore, when the steering of the loader is completed, turn the steering wheel in the reverse direction to make the loader run in a straight direction.

3.2 Master Power Switch

The master power switch is installed on the left side of the counterweight.

The master power switch is different from the start switch. Turn off the master power switch to turn off the electrical system of the whole loader. However, when the start switch is turned off, the battery is still connected to the electrical system of the whole loader and some electrical components can still work.

OFF state of master power switch:

To turn off the power supply of the electric system of the whole vehicle, it is necessary to switch the master power switch handle counterclockwise to the off state.

ON state of master power switch:

Before starting the vehicle, turn the handle of the master power switch clockwise to the ON state.

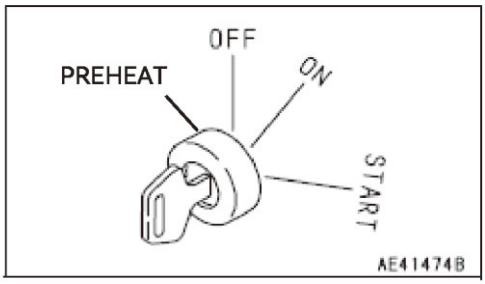
⚠ Warning

Do not turn off the main switch of the battery while the engine is still running, otherwise, the entire electrical system will be damaged!!! ! !

In winter, after the start switch is turned off, the urea pump will depressurize and suck back. The main power supply can be turned off 3 min later to prevent the urea in the pipeline from freezing at low temperatures.

3.3 Start Switch

The start switch (also known as the electric lock) is on the control box panel on the right side of the cab and has 4 positions in a clockwise direction.



1. **PREHEAT (reserved function)** - A gear that rotates counterclockwise after inserting the key of the start switch, which is an automatic reset gear (it will automatically turn back to "OFF" after releasing).
2. **OFF** - In this gear, the power control circuit of the whole loader is cut off, after which the engine is turned off.

⚠ Warning

Only in this gear can the start switch key be inserted or removed!

3. **ON** - The first gear that is rotated clockwise after the key of the start switch is inserted. In this gear, the electric system of the whole loader is powered up and works normally.
4. **START** - The second gear that is rotated clockwise after the key of the start switch is inserted. In this gear, the starting motor is electrified to start the engine. Please release the key of the start switch immediately after the engine is started successfully. This gear cannot be automatically maintained. After releasing, the key of the start switch will automatically turn to "ON".

⚠ Warning

Before starting the engine, make sure that the disconnect switch is on and the gearshift handle is in the neutral position.

⚠ Warning

The start switch has the function of preventing secondary starting. If the engine fails to start, the start switch must be turned to "OFF" before starting again, otherwise the start switch will be damaged! The time for each start-up shall not exceed 15 seconds. At least 30 seconds must elapse between two starts, and the number of consecutive starts cannot exceed 3, if exceeding, the starting motor should not be started until being sufficiently cooled. Otherwise, the service life of the battery will be reduced and the starting motor will be damaged!

3.4 Service Brake Pedal

The service brake pedal (foot brake) is on the front left side of the cab floor. The service brake system of the loader is a single-line dry brake system. Step on the service brake pedal to brake the front and rear drive axles, and turn on the brake light switch and the brake light will be on.

Release the service brake by releasing the service brake pedal.

3.5 Accelerator Pedal

The accelerator pedal is on the front right side of the cab floor. When the engine is idle in the natural position, step on the accelerator to increase the fuel supply of the diesel engine and the power output of the diesel engine.

3.6 Shift Control Handle

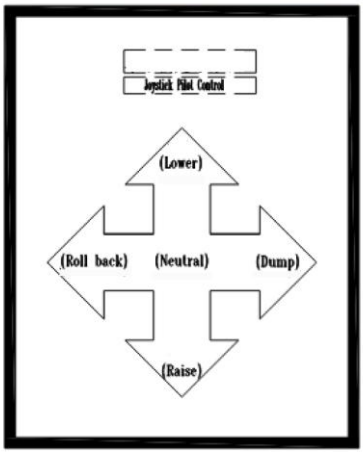
The shift control handle is installed under the steering wheel.

The vehicle can be operated to move forward (the handle is in the "I/II" position) and backward (the handle is in the "R" position) by toggling the handle back and forth. In the middle position, it is neutral (the handle is in the "N" position).

Forward/reverse shift operation;

Forward gear II, reverse gear I, and neutral gear.

3.7 Pilot Control Handle



The pilot control handle is installed on the right side of the seat to control the operating device.

The left and right movements of the handle are used to control the moving direction of the bucket, and the back and forth movements of the handle are used to control the moving direction of the boom. In a natural state, these two handles are at a neutral position. When the engine is running, the boom will drop when the pilot control handle is pushed forward. When the pilot control handle is pulled back, the boom will rise; push the pilot control handle to the right, and the bucket will turn over; pull the pilot control handle to the left, and the bucket will retract. If the handle moves forward or backward in a small range, the movement position and speed of the operating device can be controlled more accurately with the control of valve port opening and coordination of throttle opening of the diesel engine.

In addition, the pilot control handle has a floating function:

When the pilot control handle is pushed forward to the front, it is attracted by the floating electromagnet of the boom (when the driver can release, and the boom control lever will not bounce back to the middle position). At that time, the boom is in the floating state. To release the boom from the floating state, pull the boom control handle back to the middle position. In scraping operation, push the boom operating handle to the floating position, then the bucket will rise and fall with the ground, thus avoiding the damage to the road surface.

3.8 Lamps/Lanterns and Their Switches

The lamps and lanterns of the whole loader are divided into front combination lamps (one for each left and right), rear combination lamps (one for each left and right), ceiling lamp, front work lights (one for each left and right), reversing working lamps (one for each left and right).

The front combination lamps include headlamps, clearance lamps and front steering lamps, while the rear combination lamps include clearance lamps, rear steering lamps, stop lamps and backup lamps.

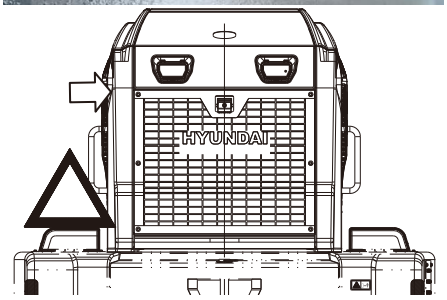
The turn signal light is controlled by the combination switch on the instrument panel.

Front combination lamp

Front work light

Rear combination lamp

Hood lamp



Ceiling lamp

Warning

Before driving, please check whether the brake lights, steering lights and small lights are damaged or faulty, if damaged or faulty, please fix them before driving! ! !

Rocker switch assembly (on the right side of steering wheel)

1. *Front work lamp switch: It controls the front work light on and off;
2. *Rear work lamp switch: It controls the rear work light on and off;
3. Front wiper switch: The front wiper switch controls the front wiper and the scrubber to be turned on or off;
4. Instrument light switch: the instrument light switch controls the on/off of the instrument light;
5. Alarm switch: the switch controls the emergency fault alarm lamp of the loader, and the left and right steering lamps flash simultaneously to remind passers-by;
6. Warning light switch: The warning light switch controls the turning on or off of the warning light;
7. Rear wiper switch: The rear wiper switch controls the rear wiper and the scrubber to be turned on or off;
8. Multi-state switch: Switch the corresponding gear according to the load condition of the vehicle to realize running under different engine powers;

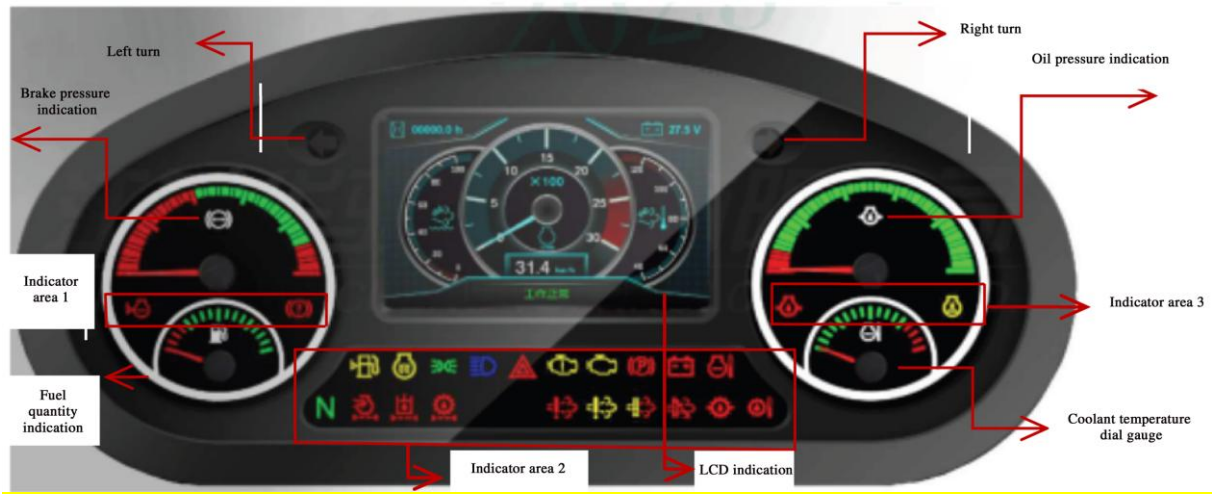
Each rocker switch has a backlight indicator. When the instrument lamp switch is closed, the backlight and the indicator are on.

**** Worklamps only to be used on worksite. Do not use while travelling on road***

3.9 Instrument Assembly

All monitoring instruments and alarm and steering indication systems of the loader are integrated into the instrument assembly under the steering wheel. The instrument system displays the engine coolant temperature, engine oil pressure, engine speed, brake air pressure, fuel quantity, transmission oil temperature, system voltage, charging indicator, low brake pressure alarm, low transmission oil pressure alarm, machine service hour meter, left and right turn indicators, and high beam lamp indicator, etc.

3.9.1 Instrument Assembly



3.9.2 Key Board

The instrument has 4 keys in total, i.e. Up, Down, Mute/Back and Menu/OK. The interface displayed can be switched by pressing down the Menu/OK key, and the buzzer can be muted by pressing down the Mute/Back key in case of any alarm.

3.9.3 Instrument Display Indicator Light

Area	Name	Icon	Color	Description
Indicator area 1	Low coolant level alarm		Red	Reserved
	Brake air pressure fault alarm		Red	When the brake air pressure is less than 0.4Mpa or more than 0.9Mpa and the speed is greater than 650rpm, the indicator light will be on and the text display "Brake air pressure low. Please check!" or "Brake air pressure high. Please check!".
Indicator area 2	Low fuel level alarm		Yellow	When the fuel level is less than 20%, the buzzer sounds and the text displays "Low Fuel Level. Please check!"

Area	Name	Icon	Color	Description
	Preheating indicator		Yellow	When there is a preheating signal, the indicator light will be on after a delay of 2s, the buzzer will sound and the text will display "Preheating in progress".
	Clearance lamp		Green	When the clearance lamp switch is turned on, the indicator lights up and the instrument panel backlight illuminates; when the clearance lamp is turned off, the instrument panel backlight goes out.
	High beam		Blue	When the high beam switch is turned on, the indicator lamp will be on.
	Hazard indicator		Red	Reserved
	SVS fault light		Yellow	1. When there is an SVS light-red flashing signal, the indicator will flash in red; 2. When there is an SVS light-red signal, the indicator will flash in red.
	OBD lamp		Yellow	Reserved
	Parking brake		Red	After the parking brake button is lifted, the indicator lamp will be on.
	Charging indicator		Red	When the power supply voltage is lower than 26V, the indicator lights up. After startup, when the power supply voltage is lower than 26V and the engine speed is greater than 650rpm, the indicator lights up, the buzzer sounds, and the text displays "Abnormal charging, please check!"
	Engine coolant temperature		Red	When the temperature is ≥105°C, the indicator light will be on, and the buzzer will sound. The text displays "The engine coolant temperature is too high, please check!
	Neutral indication		Green	External control. When the neutral gear is engaged, the indicator light will be on.
	Air filter blockage fault alarm		Red	Reserved
	Hydraulic oil filter cleanliness alarm		Red	When the hydraulic oil filter cleanliness alarm is given, the indicator light will be on, the buzzer will sound and the text will display "Hydraulic oil filter blocked. Please check!" When there is no alarm, the indicator light goes out and the text prompt disappears.
	Fault alarm for the cleanliness of oil filter of the torque converter and transmission		Red	When an alarm is given, the indicator light will be on and the buzzer will sound. The text displays "oil filter of the torque converter and transmission is blocked. Please check!
	Driver Performance Limits		Red	NOT APPLICABLE

Area	Name	Icon	Color	Description
	Driver alarm indication		Yellow	NOT APPLICABLE
	DPF regeneration state		Yellow/red	NOT APPLICABLE
	DPF regeneration inhibited		Red	NOT APPLICABLE
	Low transmission oil pressure alarm		Red	When the engine speed is ≥100rpm and the pressure is <1.0Mpa for 5s, the indicator light will be on and the text displays "Transmission oil pressure is too low. Please check!" When the engine speed is ≥100rpm and the high level is connected for 5s, the indicator light will be on and the text displays "Transmission oil pressure low. Please check!"
	Transmission high oil temperature alarm		Red	When the transmission oil temperature is ≥120°C, the indicator light will be on and the text displays "Transmission oil temperature high. Please check!
Indicator area 3	Prompt and alarm for low oil pressure		Red	When the oil pressure is lower than 0.07 MPa, the indicator lights up; When the oil pressure is lower than 0.07 MPa and the engine speed is higher than 650 rpm, the indicator light will be on, the buzzer will sound, and the text displays "The oil pressure is too low. Please check!
	Oil-water separation warning		Yellow	In the case of an oil-water separation alarm, the indicator light will be on and the buzzer will sound. The text displays "Abnormal oil-water separation, please check!
	Urea level	LCD virtual meter		0-100% LCD. When the urea level is lower than 10%, the text displays "The urea solution level is too low, please check!".
	Urea temperature	LCD virtual meter		40°C-120°C liquid crystal display. When the temperature is ≧100°C, the text displays "The temperature of urea solution is too high, please check!

Warning

When the emission control system does not work normally, the driver's cab will receive an alarm from the driver warning system. Ignoring the alarm of the driver warning system will activate the driving performance limitation system, resulting in functional failure of the machine. As long as there is an alarm signal, stop the vehicle for maintenance, and then continue driving or working after fault is removed!

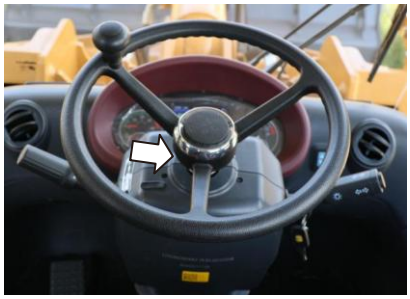
3.9.4 Main Interface LCD

The main interface display includes hour meter①, urea level ②, system voltage③, speed display④, urea temperature⑤, vehicle speed display⑥ and alarm and text prompt⑦

If there is an alarm, the alarm and text prompt area will display the alarm text, which will alternately display the alarm of analog quantity and switching value during operation; under normal circumstances, it will display "Normal Operation".

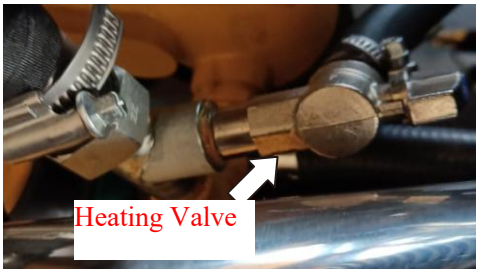
3.10 Horn Switch

The horn switch is in the center of the steering wheel. The horn switch will beep after being pressed.

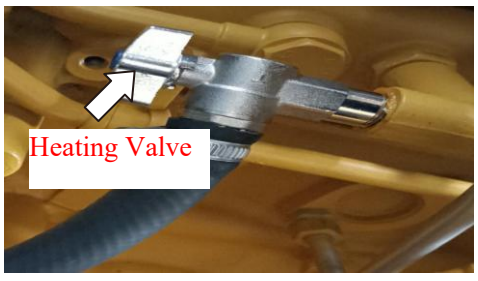


3.11 Heating Valve

The heating function of the A/C system is realized by releasing heat from the coolant of the engine flowing through the evaporator of the A/C system. Two manual heating valves are installed on the water intake and the water return port connected between the engine and the evaporator.



During normal operation, the two manual heating valves should be in the ON position (rotate counterclockwise to open). If the A/C system fails to be repaired, first close the two manual heating valves (lock by rotating clockwise) to prevent the engine coolant from losing. When replacing the engine coolant, the heating valve should be opened so that the coolant in the evaporator can also be replaced and the correct level of the engine coolant can be ensured.



Note: When an air conditioner is provided, both water valves have an opening/closing function. When an air conditioner is not provided, the water inlet pipe has an opening/closing function, while the water return pipe valve has no such function.

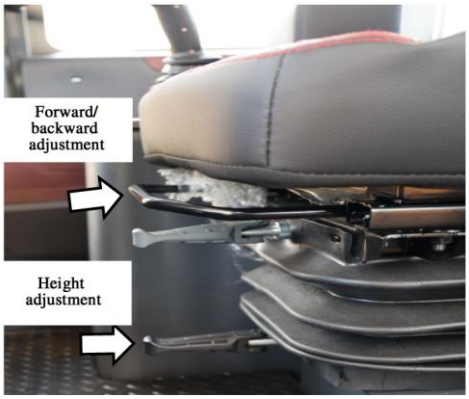
Warning

When the ambient temperature is lower than 0 °C, if the coolant of the engine is not mixed with antifreeze and the engine does not work, the engine coolant tank should be emptied, and the heating valve should be opened at the same time to discharge the coolant in the evaporator or heater; otherwise, the heat dissipation pipe will rupture because of the low temperature.

3.12 Adjustment of Seat

The driver's seat configured on the loader can be adjusted for the degree of hardness (rigidity), forward and backward, height and backrest angle, and can meet the needs of different drivers and different work situations.

Forward/backward adjustment of the seats



- The seat is equipped with a handle at the front of the lower side. Move the handle back and forth to move the seat back and forth. During the movement, several obvious locking positions will be felt. Move the seat to the locking position. Release the handle and the seat will be fixed at the locking position. The effective forward and backward stroke of the seat of the loader is 180 mm, which can be moved forward by 90 mm and backward by 90 mm. The seat can only be fixed at the clamping position.
- The seat height of the loader can be adjusted by turning the handle at the lower part of the seat clockwise or counterclockwise. The height of the shock absorber of the seat delivered is adjusted to the highest position and can be adjusted by 60 mm downwards

Backrest angle adjustment

There is a handle at the left side of the seat. Turn the handle clockwise to pull the backrest forward or backward to a comfortable position. After the handle is released, the backrest will be fixed at this position. The seat backrest of the loader can be moved forward for 44° and backward for 32°.

Seat hardness adjustment (stiffness adjustment)

There is a weight adjusting handle in the front lower part of the seat with which the seat hardness (stiffness) can be adjusted for adapting to drivers of different weights. Rotate the weight adjusting handle clockwise or counterclockwise. A weight indicator is designed beside the handle, and the value displayed on the indicator will change while rotating such handle, indicating that the current softness of the seat is suitable to the driver of such weight. The maximum suspension stroke of the shock absorber is 110 mm, and can be subjected to stepless adjustment (50 kg~130 kg) as per the weight of the driver.

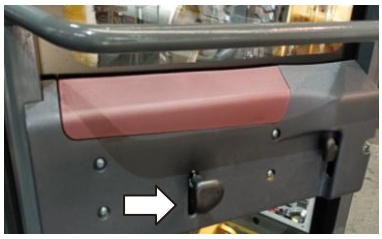
3.13 Use of Cab Door Lock

The keys to the left and right door locks of the cab are universal. If the cab door lock is locked and the lock core cannot be pressed with the thumb, insert the key and rotate it 180 degrees clockwise and take it out. Hold the door lock with the hand, press the lock core downward with the thumb and simultaneously pull the door outward to open the door. To lock the big door, close the door first, insert the key and turn 180 counterclockwise and then take it out.

3.14 Use of Positioning Lock

When the left and right doors are opened to 180 degrees, the positioning lock on the door hits the lock on the outside of the cab and catches, thus fixing the door in this position. The control handle of the positioning lock is in the middle of the door. When the positioning lock is locked, press down the handle to release the lock and close the door.

Positioning lock



Warning

The driver must close the left and right doors to ensure safety when operating the loader.

3.15 Adjustment of Rearview Mirror

The cab is equipped with rearview mirrors on the left and right sides in front of the top. Before operating the loader, the rearview mirror must be adjusted to ensure that the driver has a good rear view when sitting in the seat.

Loosen the bolts connecting the rearview mirror bracket to the cab and turn the bracket to adjust the position of the rearview mirror relative to the cab. Loosen the connecting bolt between the rearview mirror and the bracket, turn the rearview mirror, and adjust the elevation angle of the rearview mirror. After the above adjustment is completed, tighten the bolt.

3.16 Combined Charging Stand

Reserved for cigarette lighter and mobile phone charging. Pay attention to the adaptability of the charger while charging. It is strictly forbidden to refit or install consumers without permission, or otherwise we will refuse to shoulder the liabilities from faults such as battery power loss, circuit fire, etc.

The specifications of the three charging bases are as follows:

24V 100W, 5V 1A, 5V 2A

115W in total

3.17 Sunshade

1. Pull the handle in the middle by hand, and the curtain will unfold accordingly. When it reaches the appropriate position, release it and the sunshade will stop at that position; if it is not suitable, you can continue to pull the handle and pull it down to the maximum stroke position. When the handle is pulled to the position close to the maximum stroke, the pulling force should be reduced to avoid damage to the sunshade.

2. When the sunshade is at the maximum stroke below, pull the bell on the left side, and the sunshade will move upwards. At this time, if the sunshade is released quickly, it will stop at the corresponding position. Pull the bell again, and the sunshade will continue to move upwards until returning to its initial position.

IV. Operation

4.1 Instructions for Operation of New Excavators

All loaders are inspected and adjusted before leaving the factory, but the following steps are still required during the initial start-up process. Otherwise, the equipment will be damaged or the performance will be degraded.

If a full load operation is carried out before the start-up period, it will have a negative impact on the service life and safe operation and eventually lead to failure.

Note:

1) Check whether coolant, fuel, oil, urea and hydraulic oil leak every day.
2) Check the lubricating fluid every day and fill it when necessary.
3) During operation, attention should be paid to the display of the dashboard and various instruments.
4) Avoid engine overload.
5) Maintain 80% load until the engine and other components reach the operating temperature.
6) Pay attention to whether working devices are normal.
7) Check whether parts become loose or damaged during transportation.
8) Check whether the wire or terminal is loose, whether the instrument works, and whether the electrolyte is enough.

4.2 New Vehicle Running-in

Running-in of new vehicle plays an important role in prolonging the life of the machine, eliminating hidden troubles, and avoiding major faults. After purchasing the loader, the user must operate and maintain it in accordance with the regulations of this Manual regarding the running-in of new vehicle before normal operation.

4.2.1 Run-in Requirements for New Machine

1. Running-in period of the new vehicle is 100 hours
2. The loader shall idle for 5 minutes after being started
3. During the running-in, each gear should be evenly arranged. The loader should start with a small throttle at a steady low speed, then gradually increase the speed and avoid sharp braking.
4. It is advisable to load loose materials during the running-in period and not rush too hard. During the running-in period, the load shall not exceed 70 % of the specified load.
5. Note the lubrication condition of the machine, and replace or refill lubricating oil and grease at the specified time interval.
6. Always pay attention to the temperature of transmission, torque converter, front and rear bridges, hub, parking brake, intermediate support shaft, hydraulic oil, engine coolant, and engine oil. If there is overheating, find out the reason and eliminate it.
7. Check whether all bolts and nuts are tight.

4.2.2 The following work will be carried out after the new vehicle runs in eight hours:

1. Check once all parts of the bolt and nut fastening, especially the diesel engine cylinder head bolts, exhaust pipe bolts and nuts, front and rear bridge fixing bolts, rim nuts, transmission shaft connecting bolts, diesel engine fixing bolts, transmission fixing bolts, fan connecting bolts and nuts, water tank fixing bolts, frame hinge bolts, etc.
2. Check the tightness of generator belt and air conditioning compressor belt.

3. Check the transmission oil level, drive axle oil level and diesel oil level.
4. Check the airtightness of hydraulic system and brake system.
5. Check the connection and fixation of each control lever and throttle lever.
6. Check the temperature and connection of various parts of the electrical system, the power supply status of the engine, lighting and steering signal lights, etc.

Note: Oil levels shall be checked in accordance with relevant operating procedures.

4.2.3 The following work will be carried out after the end of new vehicle running-in:

1. Thoroughly check the tightening of the bolts and nuts of each component, especially the diesel engine cylinder head bolts, exhaust pipe bolts, post-processing mounting bolts and front and rear bridge captive bolts, rim nuts, drive shaft connecting bolts, diesel engine captive bolts, transmission captive bolts, front and rear frame hinge bolts, etc.
2. Check the tightness of generator belt and air conditioning compressor belt.
3. Check the airtightness of hydraulic system and brake system.
4. Replace the transmission oil and drive axle lubricating oil.
5. Replace the filter elements of the transmission oil filter, diesel engine oil filter and diesel oil filter.
6. Clean the return oil filter element of the hydraulic oil tank.

Note: When replacing transmission oil, drive axle lubricating oil and transmission oil filter, follow the relevant operation procedures.

4.3 Machine Operation

4.3.1 Check before Starting the Engine

1. Check the engine coolant level.
2. Check the engine oil level and urea level.
3. Check the oil level of hydraulic oil tank.
4. Check the airtightness of each oil pipe, water pipe and each component.
5. Check the battery wiring. If the connection between the battery electrode and the cable is loose, please tighten it in time.
6. Check whether the tire pressure is normal.

Photo: Inspection of Battery Wiring

4.3.2 Engine Start

1. Clear the personnel around the loader and clear the obstacles in the driving direction. Pay attention to whether there are repair personnel under the vehicle. No one is allowed to stand in any part of the machine except the driver can sit in the cab to operate.

2. Turn on the disconnect switch.

3. Get on and off the ladder in accordance with relevant safety regulations.

4. Adjust the rearview mirror to have a good rearview and make it as close to the loader as possible.

5. Close the left and right cab doors.

6. Check whether the seatbelt is normal and fasten it.

7. Check whether the shift control handle is in the neutral position; if not, place the shift control leveler in the neutral position.

8. Check whether the fan switch and warm air conditioning switch of the A/C system are in the OFF position, and if not, put them in the corresponding position.

9. Insert the key into the electric lock and rotate it clockwise by one grid, turn on the power supply, beep the horn, and declare that the loader is about to start. No other personnel may approach the loader.

10. Check the fuel level.

11. Step on the accelerator pedal slightly and rotate the key clockwise by one grid to turn on the diesel engine starting motor. Under normal circumstances, the engine will start to work within 10 seconds. And immediately release to return the starting electric lock.

Note: The starting time should not exceed 15 seconds at a time (the continuous working time of the starting motor should not exceed 15 seconds) and if exceeding, immediately release the start switch and start again the engine after more than 30 seconds. This is determined by the characteristics of the starting motor and the battery. If the machine still fails to start for three consecutive times, it should be checked and the engine should not be started until the fault has been eliminated and at least three minutes later. The engine has a neutral start protection function and the gear must be kept in neutral before the loader can be started more quickly.

12. Warm up the engine at idle speed (700~800r/min) after start-up, and run the engine at full load only after the outlet temperature of the diesel engine reaches 55℃ and the engine oil temperature reaches 45℃.

13. Listen to whether the engine works normally and whether the transmission has abnormal sound during low-speed operation.

14. Check whether the instruments are running well and whether the lighting equipment, indicator, horn, wiper and brake lights can work normally.

Note: Special attention should be paid to that the indication value of engine oil pressure should not be lower than 0.07MPa (idle state), if it is lower than this value, stop the vehicle to check whether there is a fault in the diesel engine. After the electric lock is unlocked, when the air pressure is lower than 0.4 MPa, an alarm buzzer will give an alarm. After the loader is started, the air pressure will rise. When it is higher than 0.4 MPa, the low-pressure alarm buzzer will stop alarming. If this is not the case, please check the brake system for faults.

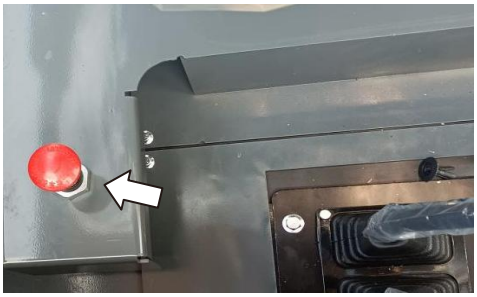
15. In the cold season, preheat the hydraulic oil. First pull the control handle backward and hold it for 4~5 minutes, and at the same time increase the throttle to make the bucket limit block rest on the boom so that the hydraulic oil overflows and the oil temperature of the hydraulic oil will rise faster.

16. If there are no obstacles around the loader, turn the steering wheel slowly and observe whether the loader has left and right steering movements.

4.3.3 Loader Running Operation

1. Operate the control handle to turn the bucket back to the limit state. Raise the lift arm to the transport position, i.e. the position where the lower hinge point of the lift arm is about 50-60 cm from the ground.

2. Shift the shift control handle to the neutral position. When the whole machine is started, step on the service brake pedal, press the parking brake button, release the parking brake, slowly release the service brake pedal, and observe if the machine will move.



Warning: If the loader moves, please immediately step on the service brake pedal and pull up the parking brake button to brake. Then check whether there is any fault in the transmission control system of the loader. If on the slope, please pad the wheels with wedges to prevent the loader from moving before operating.

3. Push the shift control handle forward to the forward gear I/II or backward to the reverse gear, and step on the accelerator pedal properly at the same time, the loader can move forward or backward.

4. Check the combination of each gear. Drive the loader to an open and flat area and check the shift of the machine in combination with each gear. If the steering performance check cannot be carried out due to the narrow space in the previous stage of operation, the steering wheel should be turned at this time to check whether the loader can steer left and right in situ.

Note: When shifting gears, first release the accelerator pedal, and then operate the shift control handle to shift gears to protect the shift clutch.

5. Check the performance of the service brake. In an open and flat field, the loader will walk at the speed of forward gear I or forward gear II, release the accelerator pedal and step on the brake pedal smoothly at the same time, and the loader should obviously decelerate and stop.

Note: If the loader does not slow down obviously after the brake pedal is stepped on, immediately pull up the parking brake button and implement the emergency brake. At the same time, operate the control handle; lower the boom to the lowest position; turn the bucket forward; insert the bucket teeth or bucket edges into or against the ground, and force the loader to stop to ensure safety.

6. When taking a turn in front of the road, please follow the relevant local traffic laws and regulations. When turning, turn the steering lamp handle to the corresponding direction, as shown in the figure, push it forward to turn left and pull it backward to turn right. At this time, the steering lamp on the corresponding side of the front and rear and the corresponding turn indicator lamp on the electronic monitoring instrument assembly will be on, informing the adjacent machines and pedestrians before and after that the loader is about to turn.

The loader is of fully hydraulic steering. If the turning angle of the steering wheel is not equal to the steering angle of the loader, continuously turn the steering wheel to increase the steering angle of the loader until reaching the required steering position. The faster the steering wheel turns, the faster the machine turns.

The steering wheel will not return automatically after turning and the steering angle of the machine will remain unchanged. Therefore, when the steering of the loader is completed, turn the steering wheel in the reverse direction to eliminate the relative angle between the front and rear frames of the loader so that the loader can run in a straight direction. After the turning operation is completed, turn the steering lamp switch to the middle position and turn the steering lamp and the turn indicator lamp off.

When turning at a high speed, first release the accelerator pedal, use the service brake to lower the speed of the loader when necessary, and then turn to ensure safety.

Warning: It is strictly prohibited to turn on the slope and the loader should be driven down to the flat ground to complete these operations.

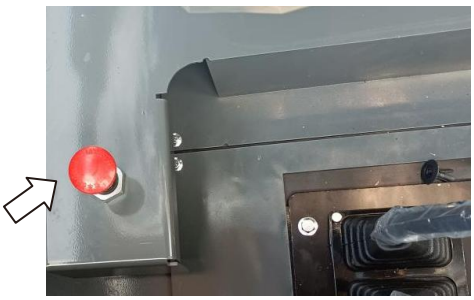
7. To brake the loader, release the accelerator pedal first and then step on the brake pedal smoothly to implement the service brake.

Warning: When the loader is running at high speed, unless there is an emergency, the brake pedal cannot be stepped on sharply, so as not to cause safety accidents and damage to the machine.

4.3.4 Parking of Loader

- Drive the loader to a level ground where the vehicle is free from danger of falling rocks, landslides or floods.
- Use service brake to stop the loader.
- Toggle the shift control handle to the neutral position.
- Pull up the parking brake button to apply parking braking.

Photo: Parking Brake Button



- Operate the control handle to lower the boom, lay the bucket flat on the ground, and press the bucket slightly downward.
- Run the engine at idle speed for 5 minutes to dissipate the heat of all parts.
- Turn the key of the electric lock to the "OFF" position in the counterclockwise direction, turn off the engine, cut off the control circuit of the whole loader, and pull out the key.
- Turn each switch to the middle position or "OFF" position.
- Close the left and right doors and descend the escalator according to relevant regulations.
- If the loader is parked for a long time (such as overnight), open the hood rear door, turn the negative battery switch to the "OFF" position, and turn off the power supply of the loader.
- When the loader leaves the factory, if no antifreeze is added, open all the drain valves of the engine in time after the vehicle stops in winter, and drain all the coolant in the evaporator of the cooling system and A/C system to prevent the parts from freezing and cracking. If antifreeze has been added to when the loader leaves the factory, please refer to the instructions on the antifreeze label.
- Lock all the equipment and take off the key and carry it with you.

Note: The loader should be parked on the flat ground. If the loader must be parked on a slope, apply a wedge against the wheel to prevent the loader from moving.

If the loader is stored for a long time, please follow the following requirements:

2. Before Storage

1) Clean each part of the loader, dry it and store it in a dry warehouse. If the loader can only be stored in the open air, it should be parked on the concrete ground with easy drainage and covered with canvas.

2) Before storage, fill the fuel tank with oil, fill the moving pins and transmission shafts with grease, and replace the hydraulic oil.

3) Toggle the shift control handle to the neutral position.

4) Pull up the parking brake button to apply parking braking.

5) Place the bucket flat on the ground, and turn the control handle to the neutral position.

6) Turn each switch to the middle position or "OFF" position and lock the vehicle door.

7) Apply a thin layer of grease on the exposed parts of the hydraulic oil cylinder piston rod.

8) Remove the batteries from the machine and store in a separate place.

9) If the air temperature may drop below 0 °C, add antifreeze to the coolant in the engine, so that the antifreeze can reach the engine body and the evaporator of the A/C system. Or clean the coolant in the cooling system and pay attention to clean the coolant in the evaporator of the air conditioning system on the same time.

10) Fix the front and rear frames with frame fixing rods.

3. In storage

1) Start the loader once a month to run each system, and add lubricating grease to each moving pin shaft and transmission shaft so that each moving part can be lubricated. Charge the batteries.

2) Wipe the butter from the piston rod of the hydraulic cylinder before starting the loader.

3) Apply rust inhibitor to parts that are easy to rust.

Note: If rust inhibitor is used in the house, open doors and windows to keep ventilation to remove toxic gas.

4. After storage

After the completion of long-term storage of the loader, carry out the following operations:

- Replace lubricating oil of engine, transmission and drive axle, hydraulic oil and antifreeze which are not replaced before storage.
- Apply lubrication grease on all moving pivots and drive shafts.
- Before starting the machine, wipe off grease from the hydraulic oil cylinder piston rods.

4.4 Loader Operation

4.4.1 Preparation before Operation

- Before operation, use the loader to level the operation site, remove the bumps, fill up the pits and remove the slippery surface of the ground. Clean up the large and sharp stones on the site to prevent the tires from being scratched.
- Reduce the speed of shovel loader to less than 4 km/h.

4.5 Loader Loading and Transportation

Before loading and transportation, investigate the height, width and allowed load of the transportation route. The total height, width and weight of the loader after being placed on the transportation machine should follow relevant regulations. In case of over-height or over-width, please consult HYUNDAI.

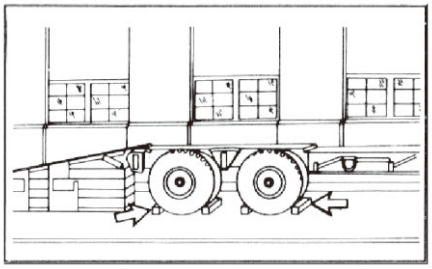
In order to prevent safety accidents caused by machine sliding during loading and transportation, clean the ice and snow or other slippery materials on the dock and wagon before loading and transportation.

Note: Please comply with national and local regulations on the height, width, length and weight of loading and transportation.

Carry out loading and transportation according to the following procedures:

1. Before loading and transportation, wedge the wheels of the trailer or truck (trailer shown in the figure).

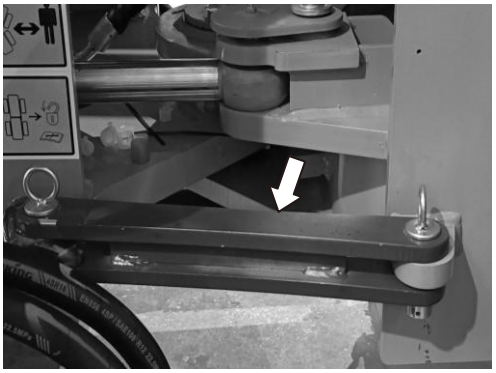
Photo: Wedging of Trailer Wheels



2. When the loader is on a trailer or truck, it is not allowed to steer halfway. If steering operation is required, drive the vehicle to the ground before steering operation.

3. After the loader is stopped, fix the front and rear frames with frame fixing rods.

Photo: Frame Fixing Rod



4. Place the bucket flat on the transport vehicle.

5. Toggle the control handle to the neutral position.

6. Pull up the parking brake button.

7. Shut down the engine, toggle all switches to the middle position or "OFF" position, and take out the key to the electric lock.

8. Close and lock all the doors and take out keys.

9. Turn the negative battery switch to the OFF position.

10. When transporting the loader by truck or trailer, wedge the wheels and fix the loader with wire ropes to prevent the loader from moving during transportation.

4.5.1 Lifting the Machine

1. Professional personnel with lifting knowledge shall be responsible for command and operation.

2. Calculate the maximum lifting weight of the crane and the bearing capacity of the spreader to ensure lifting safety, and ensure that the four hooks on the spreader shall be uniformly stressed during lifting.

3. Make the following preparations before hoisting:

① Place the control handle in the neutral position.

② Place the boom and bucket at the lowest position and set the control handle to the neutral position.

③ Pull up the parking brake button.

④ Turn off the engine and take out the key of the electric lock.

⑤ Close and lock all doors.

⑥ Turn the negative battery switch to the OFF position.

⑦ Fix the front and rear frames with frame fixing rods to prevent the loader from rotating.

⑧ The lifting device should be attached to the lifting eyes marked with lifting decals on the machine.

Warning: Improper hoisting may shift the loader, causing personal injury or death and losses.

Hauling the Faulty Loader

The loader cannot be hauled unless an emergency occurs. Dragging is only used for moving at close range. Drag the loader to the maintenance place. When dragging, the speed should not exceed 2km/h. Otherwise, the transmission will be damaged due to insufficient oil supply. For long-distance movement when necessary, use a dedicated trailer.

Warning: Incorrect dragging of inoperable loader can cause personal injury or death.

Dragging a faulty loader on a bad road will cause further serious damage to the faulty loader.

If the brake system fails, the brake cannot be used and special care must be taken when dragging.

Precautions during dragging:

1. People are not allowed to sit on the towed loader unless the driver can control the direction and/or brake.

2. Before towing, make sure that the rope or rod is in good working condition and has enough strength to pull the loader. The strength of the tow rope or tow bar used is at least 1.5 times the gross weight of the towed loader so that the loader can be pulled down from the mud or slope.

3. To maintain the minimum angle of the tow rope, the angle between the tow rope and the front position should not be greater than 30°.

4. Moving the loader too fast can cause the rope or rod to break. Moving the loader slowly and smoothly works better.

5. During hauling, all personnel should stay away from both sides of the tow rope to prevent casualties if the tow rope breaks.

6. In general, the trailer should be the same size as the machine being hauled. Ensure that the trailer has sufficient braking capacity, weight and power to control the machines when going uphill and adjust driving distance between the two machines.

7. When the towed loader goes downhill, in order to have enough control and braking capability, a larger trailer or other machines should be connected behind the towed loader, so as to prevent it from rolling down when being out of control.

8. If the towed loader can be controlled by the driver, the driver must turn in the direction of the tow rope.

Note: Before releasing the brake, wedge the wheels of the loader to prevent the loader from moving. The loader will slide if not being properly wedged. Remove the wedges after starting towing.

1) Towing during engine running

1. If the power transmission system and the steering system can work, start the engine to tow the loader in a short distance out of the dirt road or to the side of the road.

2. If the service brake system and parking brake system work well, put down the hand brake and release the parking brake before towing.

3. The driver of the towed machine must turn in the forward direction.

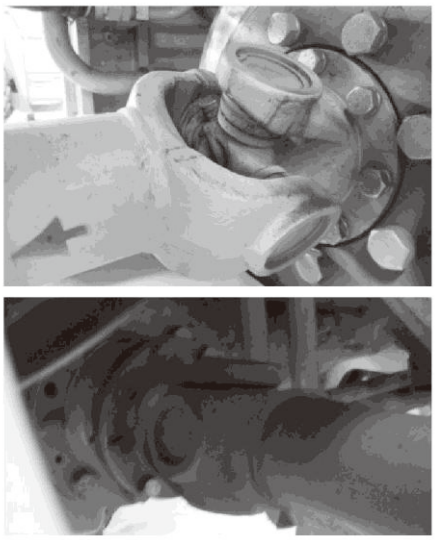
2) Towing during engine shutdown

If the engine fails, conduct towing as follows.

1. If the service brake system and parking brake system are good without leakage, the service brake can be pushed by the gas in the air tank. At this time, press the parking brake button to release the parking brake. The gas in the gas receiver can only be used for service braking 6-7 times. Please use it carefully.

2. If the transmission is suspected to be faulty, remove the front and rear drive shafts before towing.

Photo: Removal of Front and Rear Drive Shafts



4.6 Operation in Cold Weather

4.6.1 Precautions at Low Temperature

If the ambient temperature is too low, it is difficult to start the engine and the radiator may freeze, carry out the following work:

1. Use low viscosity fuel, hydraulic oil and lubricating oil for all parts, and fill antifreeze in cooling water.
2. Precautions for using antifreeze:

- Do not use antifreeze containing methanol, ethanol and propanol.
- Never use any anti-leakage agent, whether it is used alone or in combination with antifreeze.
- Do not mix different grades of antifreeze.
- When replacing antifreeze, please refer to the instructions on the rear antifreeze plate for the proportion of antifreeze used.

Note: Keep antifreeze away from open flames and do not smoke when filling antifreeze.

3. Precautions in using battery
2. When the ambient temperature drops, the battery capacity will also drop. If the charge rate is low, the electrolyte may freeze, keep the charge rate as close to 100% as possible and keep it as warm as possible so that the engine can start easily the next day.
2. Cold-resistant batteries should be used in cold areas.

4.6.2 Precautions after the Completion of Daily Work

In order to prevent the sludge, water or snow on the loader from freezing and affecting the start of the loader the next day, carry out the following work:

1. Thoroughly clear the sludge, water or snow on the loader to avoid damaging the sealing performance due to the sludge, water or snow entering the sealing place and freezing.

2. Park the loader on a dry hard ground, and if it is not possible, park the loader on a wooden board. The use of wooden boards can prevent the loader from being frozen on the ground so that it can be started the next day.

3. In the low temperature state, with the extension of the parking time, the storage battery capacity decreases significantly, and the storage battery should be covered or moved to a warm place, and then installed the next day.

4.6.3 After Cold Weather

After seasons change and weather turns warm, carry out the following work:

1. Replace with semi-viscous fuel, hydraulic oil and lubricating oil for all parts.
2. If permanent antifreeze is not used, all water in the cooling system must be drained, the cooling system cleaned and new cooling water replaced.

4.7 Operation under Special Conditions

4.7.1 Operation under Extremely Cold Conditions

If the loader works in cold weather, take protective measures to ensure normal operation. The following detailed inspection can ensure the normal operation of the loader in cold temperatures.

1. Check whether the cooling system has the correct antifreeze at a specific temperature. Check the cooling system carefully and record the leakage
2. Keep the battery fully charged to prevent freezing. If distilled water is added to the battery, the engine will run for at least one hour to mix with the electrolyte.
3. Keep the engine in the best condition so as to be easy to start and operate in adverse weather conditions.
4. Select engine oil of appropriate specifications according to the temperature.
5. Make sure the fuel tank is full of fuel at all times and drain condensate from the tank before operation. Repair the fuel tank filter element, discharge the wax-like substance solidified therein, and ensure that the cloud point of the fuel used is lower than the minimum ambient temperature.
6. Fully lubricate the loader according to the "Maintenance Schedule" in this Manual and the lubrication chart on the loader.
7. Start the engine to reach the normal temperature before working under load.
   ① When the loader is idle, such as when the running parts are frozen with soil and ice, heat and melt the ice before operating the loader.
   ② Carefully operate the hydraulic components until they reach the temperature at which they can operate normally.
   ③ Check all machine controls to ensure normal operation.
8. Store a spare external air filter in the cab to replace frozen parts and parts that restrict engine suction.
9. For cold weather, use auxiliary starting. See start in the cold weather of "Engine Starting".
10. To prevent icing, clean all soil, snow and ice. When possible, cover the loader with canvas and prevent the edges of canvas from freezing on the ground.

4.7.2 Operation in Particularly Hot Conditions

Continuous operation of the loader at high temperature will cause overheating of the loader. If necessary, monitor engine and transmission temperatures and stop the loader for cooling.

1. Check and maintain the fans and radiators regularly. Check the coolant level in the radiator. Check whether there is dust, sand and insects on the cooling fins that block the cooling pipes.
   ① High temperature will accelerate the generation of dirt in the cooling system. The antifreeze should be replaced every year to maintain the preservative effect.
   ② If necessary, flush the cooling system regularly to keep the channel clean. Avoid using water with high alkali content, otherwise, dirt and rust will be more easily generated.
2. Check the electrolyte level every day. Maintain an appropriate electrolyte level to prevent damage to the battery. Use weak electrolyte in high temperature environment.

Dilute the electrolyte with the ratio of 1.280 into the electrolyte with a ratio of 1.200-1.240 and fully charge it. Whenever a specific ratio reading of 1.160 is reached, recharge it. If placed at high temperature for a long time, the battery will discharge itself at a higher rate. If the machine is parked for several days, remove the battery and put it in a cool place.

Note: Do not store acid batteries near tires, because acid gas is harmful to rubber.

3. Repair the fuel system according to "Engine Fuel System" in this Manual. Check the liquid level before refueling. High temperature and cooling will cause the concentrating of materials in the storage barrel.

4. Lubricate according to "Regular Maintenance Chart" or the lubrication label on the loader.

5. Do not park the loader in the sun for a long time. Stop the machine under the cover to prevent it from sunlight and dust.

   ① If there is no suitable cover, please cover the loader with canvas. Prevent dust from entering the engine, transmission and hydraulic system.

   ② In hot and humid climate, all parts of the machine will corrode and will be more susceptible to corrosion during the rainy season. Rust and paint bubbles will appear on the metal surface and spots will appear on other parts.

   ③ Apply anticorrosive lubricating oil to unpainted or exposed surfaces. Protect wires and terminals with an insulating mixture. Use paint or suitable rust inhibitor on the damaged surface to prevent rust or corrosion.

4.7.3 Operation in Areas with Dust or Sand

1. Operating the loader in most places will cause dust. However, where there is a large amount of dust and sand, take protective measures.

2. Keep the cooling system and cooling area clean, blow it with compressed air and take such measure as often as possible.

Warning: Wear eye protection when using compressed air

3. When repairing the fuel system, take care to prevent dust and sand from entering the oil circuit.

4. Maintain the air filter regularly, check the air control indicator every day and keep the dust cover and dust valve clean. Prevent dust and sand from entering engine components as much as possible.

5. Lubricate the loader according to the lubrication chart and lubrication schedule on the loader. Before lubricating, clean all lubricating joints. Mixing sand with lubricating oil will cause wear of parts or wear acceleration.

6. Try to keep the equipment clean. Park the loader under the awning or cover it with tarpaulin to protect the equipment from wind and sand.

4.7.4 Operation in a Rainy and Humid Environment

The operating instructions under rainy conditions are similar to those under high temperature conditions mentioned earlier.

Apply lubricating oil to all exposed surfaces, pay special attention to damaged or unpainted surfaces, and apply lubricating oil as soon as possible to prevent corrosion where the paint breaks.

4.7.5 Operation in Saline Water

Salt water and sea waves are highly corrosive. When equipment is operating in saline water, special attention should be paid to the following matters:

1. Immediately after the equipment is eroded by saline water, clean it with clear water and completely dry it.

2. Apply anti-corrosion lubricating oil to the surface in contact with saline water, and pay special attention to the damaged paint surface.

3. Trim the damaged paint surface in time.

4. Lubricate the loader according to the lubrication chart and lubrication schedule on the loader. Properly shorten the lubrication interval period of equipment operating in saline water environment.

4.7.6 Operation at High Altitude

Measure the operating temperature of the engine and check whether the engine is overheated. Tightly seal the radiator cap to prevent the coolant pressure from releasing.

V. Maintenance and Service

5.1 Preparation before Maintenance

Follow the "Maintenance Safety Matters" in the previous chapter.

Improper installation, use or maintenance of diesel engine and its parts will lead to possible faults in the emission control system and unsatisfactory emissions. Therefore, product maintenance shall be carried out according to the corresponding operation and maintenance instructions/operation manual for diesel engines.

5.2 Regular Maintenance

Operation instruction:

1. Before carrying out any operation or maintenance procedures, please carefully read and understand the instructions on the safety information, warning information and instructions of the loader.
2. The user is responsible for the loader, including the adjustment of the mechanism during use, the addition of lubricant during use, the supplement of working fluid for the loader, the replacement of filters, and the replacement of parts due to normal wear and aging. Failure to follow correct maintenance intervals and procedures may result in reduced product performance and accelerated component wear.

Note:

1) Before each successive maintenance cycle, complete all maintenance of the previous cycle, i.e. carry out the first several stages of maintenance items at smaller intervals than the specified time at the same time. For example, when conducting maintenance every 500 working hours or every 3 months, it is also necessary to conduct maintenance items every 250 working hours or every month, every 100 hours or half a month, every 50 hours or every week, every 10 working hours or every day.

2) It is required to determine the maintenance period by working time. If a more convenient maintenance plan can be provided according to calendar time and that is similar to the reading displayed by working time, adopt calendar period (daily, annual, etc.) instead of working time period. In the case of normal operation of the loader, whether it is timed by work or calculated by calendar, the first maintenance period shall prevail for maintenance;

3) Under extremely bad, dusty and humid working conditions, it is necessary to shorten the specified time in the maintenance schedule and carry out more frequent maintenance for the whole machine;

Daily maintenance items every 10 hours or every day

1. Check whether the engine coolant is full. If the whole machine is equipped with auxiliary water tanks, check whether the coolant level in the auxiliary water tanks is within the normal range and supplement it if necessary.
2. Check whether the levels of the engine oil and oil injection pump speed governor oil are within the normal range and supplement them if necessary.
3. Check whether the hydraulic oil level in the hydraulic oil tank is within the normal range and supplement it if necessary.
4. Check whether the oil level in the transmission is within the normal range and supplement it if necessary.
5. Check whether the diesel oil in the diesel tank is sufficient and supplement it if necessary.
6. Check the cleanliness of the engine air filter and replace it if necessary.
7. For the whole pneumatic brake machine, please carry out one-time water discharge operation on all air storage tanks. This step is not necessary for the hydraulic brake system.
8. According to the requirements of the lubrication schematic diagram of the loader, fill lubricating grease in the hinge points, transmission shafts, pin sleeves and other parts.
9. Check whether the whole tire pressure is normal and all tires are abnormally worn. Check all hydraulic components, hydraulic components and pipelines of the loader for oil leakage or abnormal wear.
10. Check to ensure that there is no leakage of oil, water and gas in each system. Conduct visual inspection to ensure that the engine fan and drive belt are not loose or damaged.
11. Check the fixing bolts and nuts of the engine, transmission, drive axle and rim to ensure they are not loose. Check bucket teeth and main knife plate of bucket and replace them if necessary.
12. Check and ensure the starting performance, exhaust smoke color and running sound of the diesel engine are normal. Follow up and pay attention to the loader for 10 minutes, and check whether there is abnormal sound or local overheating in each part.
13. Check to ensure that the loader instrument, the loader work light, the seat belt, the backup alarm, the generator, the loader brake system and the loader steering system can work normally. At the same time, ensure the normal operation of switches, quick connectors, control levers, pedals, handles and buttons in all parts of the loader.

Maintenance items every 50 hours or every week

1. Drain the water and sediment from the primary filter (oil-water separator) of the engine fuel system.
2. Check and supplement the brake fluid of the whole machine; (Note: The supplemented brake fluid must be the same as the original type of brake fluid, or completely release the original brake fluid at the wheel brake caliper position before adding new brake fluid).
3. Check the wheel gear oil level on both sides of the drive axle and the main drive gear oil level in the middle of the axle housing and supplement it if necessary; (Note: The supplemented oil must be the same as the original type. Otherwise, it will affect the life of the oil).
4. After starting the loader to complete one or two working cycles, put the lift arm on the ground and stop the engine to check the oil level of the hydraulic oil tank and the oil level of the transmission. When necessary, supplement the oil products. (Note: The supplemented oil must be the same as the original type. Otherwise, it will affect the life of the oil).
5. Check the clearance between brake caliper and brake pad of parking brake and replace them if not suitable. Tighten the fixing bolts and nuts of all transmission shafts to ensure they are not loose.
6. If the loader is maintained for the first time for 50 hours, please conduct the following operations: replace engine oil, engine oil filter and engine diesel filter. Otherwise, please ignore them.

Maintenance items every 100 hours or every half a month

1. Remove all sundries on the surface of the air-cooled radiator of the whole loader to ensure the normal heat dissipation of the heat dissipation system.
2. If the loader is maintained for the first time for 100 hours, please perform the following operations: replace transmission oil of transmission, oil filter and primary filter of torque converter and transmission (the filter is optional and is not available in all machines), otherwise please ignore them. Open the transmission oil pan, carefully clean and then reinstall the filter screen and magnet.

Maintenance items every 250 hours or every month

1. Check the intake system of the engine and visually inspect the air filter service indicator. If the yellow piston of the indicator rises to the red area, clean or replace the air filter element (Note: the air filter element can be cleaned up to 6 times and must be replaced after exceeding 6 times).
2. Adjust the tightening force of the engine drive belt, air conditioning compressor belt, and generator belt; check the damage and replace them if necessary. Tighten all battery retaining bolts and clean the top of the battery.
3. Check whether there are cracks and looseness in the stress welds and fixing bolts of the working device and the front and rear frames.
4. If the loader is maintained for 250 hours for the first time, please conduct the following operations: collect and filter the working hydraulic oil, replace the oil absorption filter of the hydraulic oil tank, replace the oil return filter of the working hydraulic oil, clean the inside of the hydraulic oil tank, add the filtered hydraulic oil to the hydraulic oil tank again, and then supplement appropriate oil to ensure the oil tank level is enough, otherwise, please ignore them. (Note: When replacing the hydraulic oil filter element, filter or replace the original hydraulic oil).

Maintenance items every 500 hours or every three months

1. Tighten connecting bolts between the front/rear axle and the frame and the hinge bearing press plate bolts of the front and rear frames. Check whether the structural parts, hood and cab of the loader are cracked and repair them if necessary;
2. Check and remove the moisture and impurities in the diesel tank, and clean the filter screen and respirator at the refueling port;
3. Check the wear and tear conditions of the brake pads and brake discs, and replace brake pads less than 2/3 thick and damaged brake discs.
4. Collect and filter the working hydraulic oil, replace the oil absorption filter of the hydraulic oil tank, replace the oil absorption and return filter element of the hydraulic tank, clean the hydraulic oil tank, add the filtered hydraulic oil to the oil tank again, and then supplement appropriate oil to ensure the oil level is enough, otherwise, please ignore them. (Note: When replacing the hydraulic oil filter element, filter or replace the original hydraulic oil).
5. Replace transmission oil of transmission, oil filter and primary filter of torque converter and transmission (the filter is optional and is not available in all machines), otherwise please ignore them. Open the transmission oil pan, carefully clean and then reinstall the filter screen and magnet.
6. Replace the wheel gear oil on both sides of the front/rear (drive) axle of the loader and the main drive gear oil in the middle of the axle housing. If the working hours are less than 500 hours, replace the drive axle gear oil at least once a year

7. The urea pump filter element needs to be replaced every 500 hours of use. If the application environment is harsh and the urea aqueous solution is seriously polluted, replace it according to the actual situation.
8. Replace the oil, engine oil filter, fuel filter and oil-water separator element (this filter is optional and not available in all machines).

Maintenance items every 1000 hours or every half a year

1. Replace with new hydraulic oil, hydraulic oil return filter element, hydraulic oil absorption filter element and clean the hydraulic oil tank.
2. Clean impurities at the bottom of the diesel tank, replace the oil absorption filter element of the diesel tank and the fine filter element of the engine block.
3. Check the anti-roll protection structure; (the configuration is optional and can be replaced according to the model).
4. Replace the brake system dryer. (the configuration is optional and can be replaced according to the model).
5. Check the brake system, clean the booster pump and replace the brake oil.

Maintenance items every 2000 hours or every year

1. Replace the engine coolant.
2. Check the differential mechanism of the front/rear axle and wheel reducers, and repair them if necessary.

Maintenance items every 4000 hours or every two years

1. Check the engine performance and replace the engine fuel system hose.
2. Check the tightness of the distribution valve and the working cylinder, and repair or replace them if necessary.
3. Check the working condition of torque converter and transmission and repair them if necessary.

Maintenance items every 6000 hours or every three years

1. Check the high-pressure oil pipe and sealing element of the hydraulic system and replace them as appropriate.

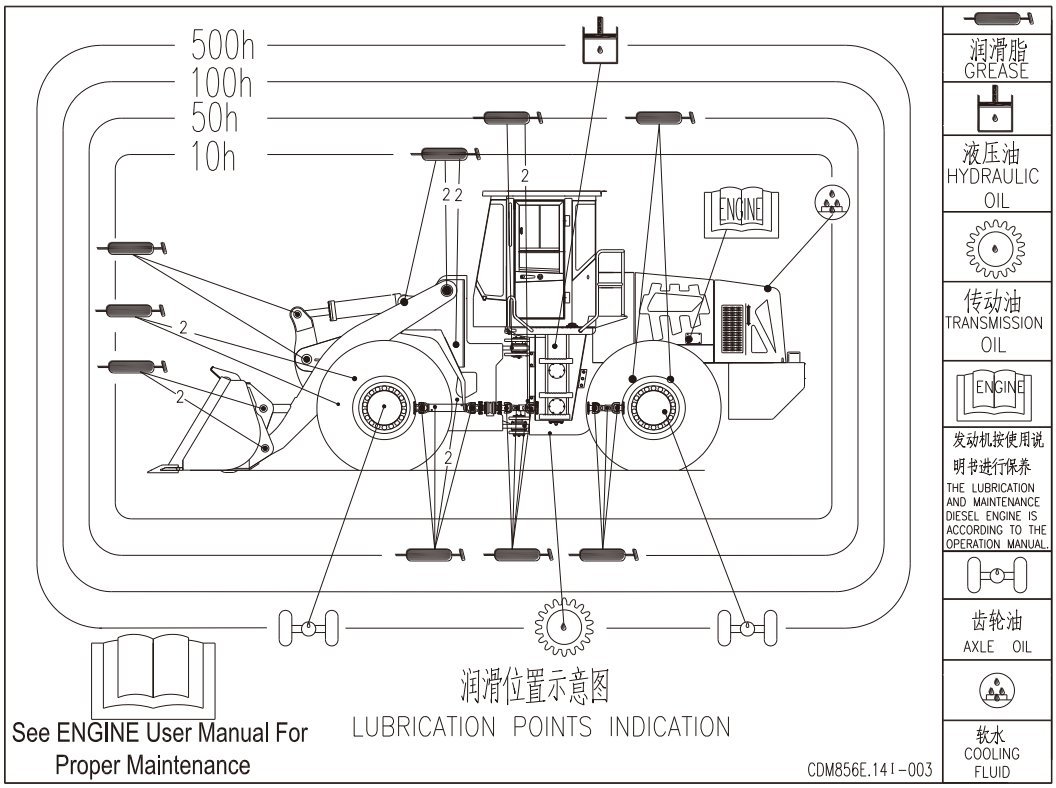
Maintenance items every 10000 hours or every five years

1. Check the transmission and drive axle and disassemble and repair them if necessary.

Notes:

1. The hinged bearings of the front and rear frames should be inspected after 5000 hours of use. If there is abnormal sound, please replace them;
2. Three years from the date of manufacture or 6000 hours of operation of the loader (whichever comes first), replace the seat belt once.

5.3 Lubrication Chart



The parts where lubricating grease is applied are at each sliding bearing or rolling bearing include:

1. Bearing for transmission shaft cross fork;
2. Pin bush sets at both ends of all cylinders;
3. Front and rear frame hinge pin bush sets and auxiliary frame swing pin bush sets;
4. Each bush pin set in the working device.

Inject grease into the above-said parts by pressurization according to the requirements in the drawing. Please do this in time according to the working conditions.

5.4 General Torque Table

Unless otherwise stated, tighten the threads used in the loader according to the following table.

Metric Thread General Torque Table		
Specification	Tightening torque (N.M)	
	Grade 8.8	Grade 10.9
M6	9~12	13~16
M8	22~30	30~36
M10	45~59	65~78
M12	78~104	110~130
M14	124~165	180~210
M16	193~257	280~330
M18	264~354	380~450
M20	376~502	540~650
M22	512~683	740~880
M24	651~868	940~1120
M27	952~1269	1400~1650
M30	1293~1723	1700~2000
M33	1759~2345	2743~3298
M36	2259~3012	2800~3350
M39	2932~3898	4111~5481

Torque Table for Plug with Sealant Applied	
Pipe thread size code	Tightening torque (N.M)
3/8	15±2
3/4	24±4
1/2	23±3
1	45±4

5.5 Maintenance of Engine Coolant

The engine cooling system has a great influence on the overall performance, reliability and durability of the engine. Therefore, the correct maintenance is extremely important to the engine cooling system. Overheating, undercooling of the engine, seizure of the piston, piston ring and cylinder liner, thermal fatigue cracks of the cylinder head, and the lubricating oil quick deterioration, pitting corrosion and cavitation of lubricating oil are common faults of the cooling system, which will not only cause the overall deterioration of the engine's power, economy, reliability and durability, but also cause serious damage to the engine.

5.5.1 Composition of Coolant

The engine coolant consists of water, antifreeze and additives in a certain proportion.

HYUNDAI recommends using a mixture of 50% ethylene glycol or propylene glycol based antifreeze and 50% soft water as engine coolant under most climate conditions.

① Coolant water

Coolant water must be soft water (preferably distilled water) and untreated water is not allowed to be used as engine coolant. Hard water or water with high calcium and manganese ions is easy to generate insoluble compounds, which will generate scale in the engine water jacket, block the coolant channel, hinder heat transfer and cause the engine to overheat. Water with high sulfate or chloride content will corrode.

② Antifreeze

The antifreeze has the dual characteristics of anti-freezing and anti-boiling, and also has the functions of anti-corrosion. Therefore, antifreeze should be used when the engine is operating at a lower temperature to prevent water in the engine cooling system from freezing, causing the engine to overheat due to the termination of cooling water circulation, or causing the engine body, cylinder head and radiator to crack due to the volume expansion when the water freezes. As the mass ratio of antifreeze in the coolant increases, the boiling point of the coolant increases and the freezing point decreases. The concentration of antifreeze should not exceed 68.1% (freezing point is -68℃), otherwise the performance will deteriorate: instead, the freezing point of coolant will rise and silica gel will easily be formed. The normal concentration range is 40%~60%. It is recommended to use a coolant with 50% antifreeze. At this time, the freezing point of the coolant is -35.5 ℃, the boiling point at atmospheric pressure is 103℃, and the boiling point in the cooling system is about 110℃.

⚠ Warning

The antifreeze is flammable. Do not approach open flames

③ Additive

Additive usually contains rust inhibitors, foam inhibitors, colorants, etc. Rust inhibitors can delay or prevent corrosion of engine water jacket wall and radiator. The air in the coolant will generate a lot of foam under the agitation of the pump impeller, which will hinder the heat dissipation of the water jacket wall. Foam inhibitor can effectively inhibit the generation of foam. Colorants generally make the coolant blue-green or yellow for identification. During the use of the engine, the additives will be gradually exhausted, so it is necessary to change the coolant regularly.

Therefore, the normal maintenance of the engine coolant not only has good rust prevention, corrosion prevention and scale prevention effects on various metals in the cooling system, but also can effectively reduce cavitation of the diesel engine cylinder liner (cavitation is a damage phenomenon in fluid engineering, and the outer wall of the diesel engine cylinder liner will be damaged by small metal spalling due to cavitation, gradually forming honeycomb holes with different diameters and depths).

⚠ Warning

1. When the temperature is lower than 0 ℃, check the coolant concentration regularly.

2. For equipment running above 0℃ all the year round, use antirust and antiscaling water as coolant, and untreated water is prohibited as coolant for engines.

5.5.2 Coolant Addition

If it is needed to add coolant to the new machine or the engine with cooling system being cleaned, or if it is need to replace coolant due to weather reasons, it should be noted that the freezing point of the selected coolant is about 5℃ lower than the local minimum temperature. The total volume of the engine cooling system is about 63L.

Actually, the volume of antifreeze required by the cooling system is about 63L (Make sure that the coolant in the previous cooling system, including that for heating part of the air conditioning, has been drained).

1. Turn on the negative switch of the manual battery, insert the key into the start switch and turn the first gear clockwise to turn on the power supply of the whole vehicle to turn on the warm air function of the air conditioning system.

2. Unscrew the two heater water valves of the inlet return pipe from the engine to the evaporator of the air conditioning system counterclockwise.

See the right figure for the heating valve for controlling the water inlet of the air conditioning system:

3. Open the pressure cover at the upper end of the radiator, and slowly add the coolant with a speed kept at 19 L/min, and make sure over 90% of the radiator is filled one time.

4. After the coolant level is stable, start the engine with the pressure cover open, run for 25 minutes at low and high idle speeds, and ensure that the coolant temperature reaches above 82 °C, so as to eliminate the air accumulated in the cooling system during the initial filling.

5. Check the coolant level in the radiator and replenish the coolant. After filling the radiator coolant, tighten the pressure cap of the radiator. Then replenish the coolant in the auxiliary water tank to ensure that the coolant level in the auxiliary water tank is between the full and low scales of the liquid level.

Tighten the pressure cover of the radiator.

⚠ Warning

Do not open the pressure cover of the radiator immediately when the engine is in the heat state, so as to avoid high-temperature coolant or steam hurting the skin, and slowly open the radiator gradually or wait until the coolant drops to about 50℃.

1. Slowly unscrew the pressure cover on the upper part of the radiator and gradually release the pressure.

2. Keep the coolant in an appropriate position, and replenish it if necessary.

3. At the same time, check the urea capacity of the urea tank. The instrument has a liquid level display to ensure that one tank of fuel corresponds to one tank of urea.

⚠ Warning

Replenishing coolant at high engine temperatures can cause the coolant to tumble and even damage the engine block. Wait until the coolant temperature is below 50 ℃ before proceeding.

4. Tighten the pressure cover of the radiator.

5.5.3 Cleaning of Cooling System

4800 hours or two years (whichever comes first) are one period for the loader, and it is necessary to change the coolant and clean the cooling system.

Prior to this, if the coolant is contaminated, the engine overheats, rust or foam occurs in the cooling system, clean the cooling system and replace the coolant in advance.

1. Turn on the negative switch of the manual battery, insert the key into the start switch and turn the first gear clockwise to turn on the power supply of the whole vehicle to turn on the warm air function of the air conditioning system.

2. Unscrew the two heater water valves of the inlet return pipe from the engine to the evaporator of the air conditioning system counterclockwise.

3. Start the engine, turn off the engine after idling for 5 minutes, then turn on the power supply, wait until the coolant temperature is lower than 50 ℃, then slowly unscrew the radiator pressure cover to release the pressure.

4. Open the drain valve at the bottom of the radiator to drain the engine coolant.

⚠ Warning

Do not drink and discard the engine coolant for its toxic characteristic.

5. Close the drain valve at the bottom of the radiator after draining the engine coolant.

6. Re-inject soft water into the engine and add a proper amount of special cleaning liquid, and fill it according to the method of cooling liquid filling.

7. Repeat the above steps 4, 5 and 6 until the cleaning solution is discharged without excessive dirt.

8. Fill the coolant according to the coolant filling method.

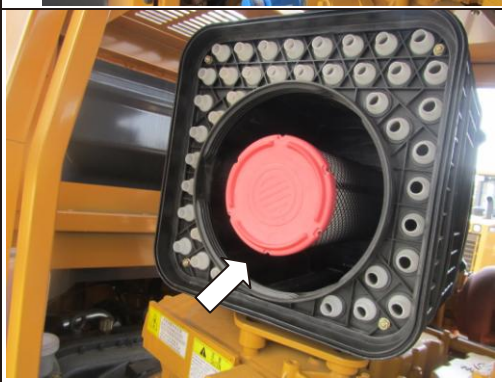
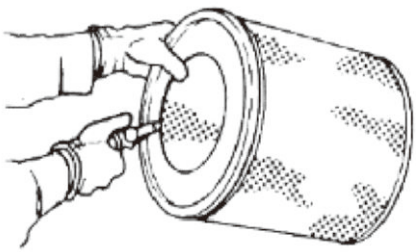
5.5.4 Maintenance of the Engine Air Filter

During the engine working, air filter should provide clean and fresh air, and proper maintenance plays a role in reducing the wear of cylinder liners, pistons, piston rings, valves and other parts. The air cleaner also has the function of reducing the intake noise.

⚠ Warning

1. **The air filter element must be replaced if it is damaged**
2. **During maintenance, do not pollute the inside of the filter element**
3. **It is strictly prohibited to drive the loader without air filter element or air filter**

5.5.5 Maintenance and Replacement of Main Air Filter Element

1. Turn off engine and remove the air filter cover.		 
2. Remove the main filter element from the air filter housing.		
3. Clean the inner wall of the air filter housing.		
4. Blow off the dust on the filter paper of the main filter element with dry compressed air (pressure is not more than 300KPa) without oil mist and moisture.		

5. After cleaning the main filter element, use electric light to check it. If it is found that there are small holes or particles in it, and the gasket or seal is damaged, replace it with a new main filter element.

6. Install the clean main filter element into the air filter housing to ensure that the end of the main filter element is in sealed and even contact.

7. Clean and install the cover of the air filter and tighten the bolts on the cover by hand.

8. Press the indicator to reset.

If the yellow piston of the air filter indicator moves to the red area after the engine is started, or if the engine emits black smoke and the power drops, replace a new main filter element. Check the air filter maintenance indicator at any time, and regularly clean (when the indicator is on) and replace (every 1000 hours) the main filter element. If the working environment is bad, shorten the cleaning and replacement cycle as appropriate.

5.5.6 Replacement of Safety Filter Element of Air Filter

After cleaning the main filter element of the air filter 5 times, the safety filter element of the air filter can only be replaced instead of being used again after cleaning.

1. Turn off engine and remove the air filter cover.

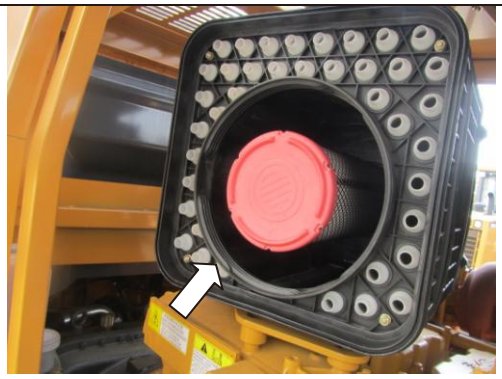
2. Remove the main filter element and clean the inner wall of the air filter housing.

3. Carefully remove the safety filter element.

4. To install a new safety filter element, the sealing ring on the end face of the safety filter element must be in uniform contact and sealed well.

5. Install the main filter element and air filter cover.

6. Press the indicator of the air filter to reset it.



5.5.7 Cleaning of Dust Cup of Air Filter

The dust cup has the function of collecting dust and water inside the air filter and should be squeezed regularly to discharge water and dust.

⚠ Warning

1. **The air filter element must be replaced if it is damaged**
2. **Regularly maintain the air filter according to the requirements of the air filter operation and maintenance instructions**
3. **During maintenance, do not pollute the inside of the filter element**
4. **It is strictly prohibited to start the engine without air filter element or air filter**

5.6 Use and Relevant Maintenance of Fuel System

5.6.1 Cleaning of Fuel Tank

Removal of moisture and impurities from fuel:

1. If conditions permit, precipitate the diesel for 24 hours before adding to the fuel tank.

2. Before refueling, unscrew the drain plug at the bottom of the fuel tank once a week to drain moisture and impurities from the bottom of the tank.

3. At the end of each day's work, fill up the diesel oil and drain the wet air from the fuel tank.

4. After filling the fuel tank every time, stay for 5 to 10 minutes to precipitate moisture and impurities in diesel oil at the bottom of the fuel tank.

5. After working every day, loosen the drain plugs at the bottom of the diesel prefilter, the diesel primary filter and the diesel fine filter to drain water and impurities.

Repeat the above steps until the moisture and impurities in the oil are removed.

5.6.2 Fuel Level Inspection

1. Drive the loader to a level ground and turn off the engine.

2. Turn the key switch clockwise to the first gear to energize the whole vehicle.

3. Check the indicated quantity of fuel gauge on the instrument panel.

4. Check the upper and lower circular oil marks of the fuel tank.

5. If the fuel level is lower than the center of the lower oil pointer (about 20L), it is necessary to add fuel and observe it at any time to ensure that the fuel level is not lower than the center of the lower oil pointer.

At the same time, check the urea capacity of the urea tank. The instrument has a liquid level display to ensure that one tank of fuel corresponds to one tank of urea.

5.6.3 Application and Replacement of Fuel Filter

The engine fuel filter can filter out the particulate impurities in the fuel to reduce the wear of precision fittings in the fuel injection pump and injector. After the fuel is filtered by the filter element, dirt is trapped on the outer surface of the filter element, and the filter element is made of diesel filter paper, so the fuel filter should be regularly maintained and replaced. The regular replacement cycle is every 500 hours of engine operation.

The replacement procedures of fuel filter are as follows:

1. First, clean the fuel filter (coarse and fine filters) and the mounting base.

2. Remove the fuel filter from the mounting base with strap wrenches.

3. Remove the sealing gasket on the threaded joint of the mounting base and clean the sealing surface of the mounting base with a non-fiber cloth.

4. Install a new gasket on the threaded joint of the fuel filter mounting base; apply a layer of engine oil on the sealing surface of the filter; fill the filter with clean diesel.

5. Screw the filter onto its mounting base by hand. Right when the filter gasket gets in contact with the mounting base, tighten for another 1/2 ~ 3/4 thread. Do not screw the filter excessively by mechanical means to avoid damage to it.

5.6.4 Application and Replacement of Fuel Prefilter

The function of the engine fuel prefilter is basically the same as that of the filter, except that the prefilter has a slightly lower filtering precision and is provided with a water accumulation cup, which can discharge water and impurities in the fuel system. Pre-filter replacement cycle is the same as that of filter.

The fuel prefilter replacement procedure is as follows:

1. Clean the area near the fuel prefilter mounting base.

2. Remove the fuel prefilter from the mounting base and clean the sealing surface of the mounting base with a non-fiber cloth.

3. Remove the lower transparent water cup from the fuel pre-filter.

4. Clean up the water cup, replace with the new sealing ring, and then install it on the new fuel prefilter element.

5. Fill the fuel prefilter with fuel, replace with the new sealing ring, coat the sealing ring with engine oil, and then install it on the mounting base.

5.6.5 Maintenance of Engine Oil

Inspection of engine oil level

1. Drive the loader to a level ground, turn off the engine and pull up the parking brake button.

2. Wait for ten minutes after the engine shuts down to allow the engine oil in the crankcase to fully flow back to the engine oil pan.

3. Open the engine hood, with the engine oil level gauge and oil filler on the right side of the engine.

4. Loosen and pull out the oil level gauge, wipe it clean with a clean cloth, reinsert it into the engine oil level port to the end, and then pull it out for inspection. The oil level should be between the "L" scale and the "H" scale of the oil level gauge.

5. If the oil level is below the "L" scale, replenish the oil. If the oil level is above the "H" scale, loosen the drain plug at the bottom of the oil pan to drain some oil.

Warning

Both too much and too little oil in the engine can easily damage the engine.

5.6.6 Replacement of Engine Oil

1. Change engine oil when the specified oil change period is reached. Stop the loader on a flat playground and start the engine until the coolant temperature reaches 60 ℃ and the engine shuts down. Pull up the parking brake button. Remove the drain plug of the engine oil pan, drain and hold the oil in a container, and replace the engine oil filter.

2. Screw on the oil drain plug and fill clean oil from the engine filler to the "H" scale of the oil level gauge. Run the engine at idle speed to check the oil filter and drain plug for leaks.

3. Turn off the engine, wait for about 10 minutes, allow the oil to flow back to the oil pan, check the oil level again, and if the oil is insufficient, replenish the oil until the oil level gauge is between the "L" scale and the “H" scale.

Warning

Change the oil filter every time changing the oil

5.6.7 Replacement of Engine Oil Filter

1. Clean the area near the engine oil filter mounting base.

2. Remove the oil filter with a belt wrench.

3. Clean the contact surface of the sealing gasket on the mounting base with a clean cloth. If the old O-ring is stuck on the mounting base, replace it.

4. Install a new O-ring, fill the new oil filter with clean oil, and coat a layer of clean oil on the gasket surface.

5. Install the oil filter to the mounting base and tighten it to the surface of the oil filter gasket to the mounting base. Tighten the oil filter to the specified requirements with a strap wrench.

6. Check the oil level. Please replenish if it is insufficient.

Warning

Excessive tightening of the oil filter will damage the seal and result in oil leak

5.7 Inspection of Electrical System

The electrical system of the Loader is mainly composed of storage battery, energy conversion device (generator and starter) and electrical appliance (instrument, device, etc.).

5.7.1 Check of Battery

1. Inspection in cold weather

In cold weather, if the electrolyte of the storage battery has frozen, do not charge the battery nor start the engine with another power source. This will set the battery on fire. Before startup, melt the electrolyte of the storage battery and check for leaks.

2. Check the storage battery case

The battery with broken battery case or acid leakage cannot be recharged. Replace the battery after finding out the cause.

3. Check the liquid level of the battery

The storage battery installed on the Loader is maintenance-free and no extra electrolyte (distilled water) is needed to the battery. When the charging indicator grizzles, it indicates that there is little electrolyte, possibly due to leakage or fault of the charging system. The fault must be immediately found out and the battery must be replaced.

4. Check the charging state

Check the charging state by looking at the indicator color set internally.

1) Green: normal.

2) Black: insufficient charging.

3) Whitish: no longer available and unable to charge.

5. Check the battery terminal posts

1) The battery with broken terminal post should not be re-charged, but should be replaced after the cause is found out.

2) If oxide scale is deposited on the surface of the terminal post, please clean the terminal post before charging to remove the oxide scale on the surface.

5.7.2 Inspection of Electrical Appliances

1. Inspection in cold weather

In cold weather, remove all the water, snow or sludge stuck on the wires, wire connectors, switches or sensors and the covers of these parts to avoid component failure;

2. Inspection of lighting equipment, etc.

1) First check whether there is no fault in the use of lamps, horns, wipers and other electrical components;

2) If there is a fault, find out whether there is a fault in the corresponding fuse according to the marks on the schematic diagram, and if so, replace it;

3) If there is no fault in the relevant fuse, check whether the power line (cathode) of each electrical component has a voltage of 24V when the whole Loader is powered on, and if there is no voltage, check whether the power line from the electrical component to the fuse has been broken;

4) If voltage is measured, replace relevant electrical components.

3. Inspection of instrumentation

1) After the whole Loader is powered on and started, check whether all the indications of instruments on the instrument panel have no fault;

2) If there is a fault, first check whether each sensor is damaged or not. If there is no damage, check whether each resistance value meets the requirements in the following table according to the corresponding temperature in the following table.

Temperature (°C)	Comparison of temperature sensor parameters						
	Resistance (Ω)						
60	2401±192						
80	1195±95.6						
100	637.1±19.1						
120	361.1±10.8						
Comparison of pressure sensor parameters							
S/N	1.0 MPa barometric sensor						
	Pressure (MPa)		Voltage (V)		Permissible error (V)		
1	0.0		0.5		0.65		
2	0.2		1.3				
3	0.4		2.1				
4	0.6		2.9				
5	0.8		3.7				
6	1.0		4.5				
General parameters of fuel quantity sensor							
Oil level	Empty oil level	1/8 Oil level	1/4 Oil level	1/2 Oil level	3/4 Oil level	7/8 Oil level	Full oil level
Resistance (Ω)	10±5	33±5	58±5	95±5	132±5	157±5	180±10

3) If there is no fault in the sensor, check whether the circuit from the sensor to each instrument is normal and free of damage;

4) If there is no damage, loosen the signal line of each instrument, ground and connect a small resistor in series. The instrument should indicate the maximum value, the pointer does not indicate and the pointer corresponds to a scale. If it cannot indicate normally, replace the instrument.

5.7.3 Welding Operation

Welding the whole Loader on the Loader should be conducted according to the following regulations so as to avoid damaging the Loader and causing safety accidents.

1. Disconnect the battery terminals to prevent the battery from exploding;

2. Disconnect the output and input wiring harnesses from the engine controller and the complete loader;

3. Keep away from the wiring harness and rubber hose of the whole Loader during welding, and take protective measures to avoid damage caused by splashing sparks;

4. Do not use a voltage of more than 200V continuously;

5. Keep the distance between the welding area and ground cable within 1m;

6. Avoid keeping the seal ring and bearing between the welding area and ground cable;

7. Do not weld pipes containing fuel, engine oil and hydraulic oil;

8. Do not weld sealed or poorly ventilated containers.

5.8 Maintenance of Transmission Oil

5.8.1 Transmission Oil Level Check

The transmission oil filler is on the right side of the frame hinge and the transmission oil level should be checked periodically.

If the transmission oil level is too high or too low, the transmission will be damaged. Please keep the transmission oil level in the correct position.

Add oil from the transmission oil filler.

Judging criteria:

When the engine stops, the upper oil level plug cannot release oil, but the lower oil level plug can;

When the engine is running, the lowest oil level must not be lower than the lower oil level plug.

In the process of checking the transmission oil level, replacing the transmission oil and replacing the transmission fine filter, great care must be taken to keep the dirt from entering the transmission system to avoid damage to the transmission.

5.8.2 Transmission Oil Replacement

The transmission oil should be replaced during the specified oil replacement period. The replacement procedures are as follows:

1. Park the Loader on a flat ground, put the shift control handle in the neutral position, pull up the parking brake button, and install the frame fixing rod to prevent the Loader from moving and rotating.

2. Start the engine and run at idle speed. When the oil temperature of the transmission reaches the working temperature (about 80 °C ~ 90 °C), the engine shuts down.

3. Unscrew the drain plug at lower rear side of transmission to drain oil, and collect it with container.

As the oil is still at a high temperature, so please wear protective equipment and handle it with care to avoid personal injury.

4. Unscrew the drain plug under the torque converter oil radiator to drain oil and hold it in a container, and then unscrew the bleeder plug above the torque converter oil radiator to speed up the drain.

5. Replace the transmission oil fine filter at the same time when replacing the transmission oil.

6. Add clean transmission oil from the transmission oil filler pipe, check the transmission oil level according to the above method, and add it to the specified oil level.

7. Before replacing the gearbox oil, attention is needed to cover the parking brake so as to prevent the friction discs of the parking brake from being stained with oil and influence the performance of the braking .

5.9 Maintenance of Drive Axle Oil

5.9.1 Inspection of Drive Axle Oil Level

Check the transmission oil level according to the specified period.

Too high or low drive axle oil level will cause damage to the drive axle. Please keep the drive axle oil level in the correct position.

Drive axle oil filling and judging criteria of oil level:

Fill oil from the oil fillers on the left and right wheel housings until the oil spills when the middle oil plug of axle housing is open.

Inspection procedures:

1. Drive the Loader to a flat ground, and slowly move the Loader with a small accelerator so that the oil level scale on the front drive axle wheel end face is in a horizontal position.

2. As the oil level scale of the front and rear drive axles cannot be in the horizontal position at the same time, so the oil levels of the front and rear drive axles should be checked twice separately.

3. Pull up the parking brake button, put the gear shifting control lever in neutral position, and install the frame fixing rod to prevent the Loader from moving and rotating.

4. Clean up the area near the oil drain plug on both wheel sides of the drive axle and remove the drain plug. The oil level inside the drive axle should be at the lower edge of the oil drain hole. Add clean drive axle oil if the oil level is lower than the lower edge of the oil outlet. Observe for about 10 minutes after oil filling, until the oil level remains stable.

5. Screw on the oil drain plug.

6. Check the oil level of the rear drive according to the above steps.

5.9.2 Replacement of Drive Axle Oil

The drive axle oil should be replaced during the specified oil replacement period.

The procedures for replacing drive axle oil are as follows:

1. Drive the Loader to a flat ground and slowly move the Loader with a small accelerator so that the oil drain plug on the front drive axle wheel end face is in the lowest position.

2. As the oil drain plugs on the front and rear drive axle wheel end faces cannot be in the lowest position at the same time, so oil of the front and rear drive axles should be replaced twice separately.

3. Pull up the parking brake button, put the shift control handle in neutral position, and install the frame fixing rod to prevent the Loader from moving and rotating.

4. Unscrew the oil drain plug on the front axle wheel end face and the oil drain plug in the middle of the axle case to drain the oil and hold it in the container.

5. Fill oil according to the “drive axle oil filling and judging criteria of oil level” mentioned above.

6. Screw on the oil drain plug.

7. Check the oil level of the rear drive according to the above steps.

8. As the oil may be at a relatively high temperature, so please wear protective equipment and handle it with care to avoid personal injury.

5.10 Inspection and Replacement of Tires

Warning

If the tire or rim is handled incorrectly, the tire may explode or burst, and the rim may break and spread, possibly causing serious injury or death.

The maintenance, disassembly, repair and installation of tires and rims require special equipment and technology, and they must be carried out by a tire repair shop or by specially trained personnel in accordance with all relevant safety regulations.

Dry nitrogen (N2) is recommended for tire inflation. If the tire was originally filled with air, it is recommended to adjust its air pressure with nitrogen that can be mixed with atmospheric gas. A tire filled with nitrogen can reduce the possibility of explosion.

Checking and adjusting the tire pressure should be carried out after the tire has cooled sufficiently.

The pressure of tire filled with nitrogen is the same as that of tire filled with air.

5.11 Maintenance of Long-term Parking

If the Loader is to be stored for more than 1 month, please operate following the following procedures.

1. The Loader should be stored in a dry room. If the Loader can only be stored outdoor, it should be parked on a concrete floor that is easy to drain and covered with canvas.

2. Before the Loader is stored for a long time, all components of the Loader should be thoroughly cleaned and no dirt should be attached to it and then it is dried.

3. The bucket is laid flat on the ground with the transmission control lever in neutral position. Pull up the parking brake button, switch the cathode switch to the off position, and lock the cab door.

4. Fill the fuel tank with diesel oil, fill the pin shafts with lubricating oil, and apply a thin layer of grease to the exposed part of the piston rod of the hydraulic cylinder.

5. Remove the storage battery and store it separately.

6. If the temperature may drop below 0 °C, add antifreeze to the engine cooling system so that the antifreeze can reach the engine body and evaporator of the air conditioning system.

7. Or clean the water in the cooling system and pay attention to clean the water in the evaporator of the air conditioning system on the same time.

8. Start the loader once a month and run it for at least 30 minutes to run each system, and add lubricating oil to each moving pin shaft so that each moving part can be lubricated. Before starting the engine, remove the grease from the piston rod.

5.12 Maintenance under Special Conditions

Maintenance of operations in mud, water or rain
Check whether the connector is loose, the Loader is damaged or leaks around the Loader. Clean the mud, rocks, grit, etc. on the Loader after operation. Check the weld joint for cracks and loose parts. Complete daily lubrication and maintenance. Wash the affected parts with clean water if working in acid rain or corrosive medium.
Maintenance of operations in particularly dusty or hot environments
Clean the air filter element more frequently. Flush the exterior of the radiator block to remove dust and dirt embedded in it. Replace the fuel filter more frequently. Check and clean the starting motor and electric generator if necessary.
Maintenance of operation in rocky environment
Check the hub and tire assembly for damage or excessive wear. Check the joints and fasteners for looseness or damage. Check the bucket or crusher more frequently for damage or excessive wear. Install anti-falling barriers at the top of the cab and at the front windshield if necessary.
Maintenance of operations in particularly cold areas
Use fuel suitable for the ambient temperature. Use antifreeze suitable for the ambient temperature. Confirm the ambient temperature of the storage battery. Remove it at night and store it in a warm place when ambient temperature is especially low. Clear the mud on the Loader in time to prevent it from freezing and causing damage to the Loader.

5.13 Maintenance of Hydraulic Oil

5.13.1 Inspection of Hydraulic Oil Level

The hydraulic oil tank is located on the left side of the cab, and there is an oil pointer indicating the hydraulic oil level in front of the hydraulic oil tank.

In checking the hydraulic oil level, the Loader should be parked on a flat ground and the bucket should be put flat on the ground. At this time, the hydraulic oil level should reach the middle position between the upper and lower oil pointers.

5.13.2 Regular Replacement of Hydraulic Oil

Replace the hydraulic oil every 2000 working hours or every year. Please replace the hydraulic oil in time if the hydraulic oil deteriorates due to bad working conditions or contamination, such as blackening and foaming.

⚠ Warning

In the process of oil replacement, various operations should be carried out on the Loader. Please pay attention to safety and operate according to relevant safety regulations. In the process of oil replacement, great attention should be paid to cleanliness and dirt should is prevented from entering the hydraulic system.

1. Remove the debris from the bucket, park the Loader on a flat and open field, install the frame fixing rod, pull up the parking brake button, and put the transmission control lever in the middle position.
2. Start the engine and run it at idle speed for ten minutes, during which the actions of lifting the boom, lowering the boom, tilting the bucket forward, and tilting the bucket backward need to be repeated many times.
3. Lift the boom to the highest position, tilt the bucket backward to the maximum position to shut down the engine.
4. Pull the control handle to the right to turn the bucket forward under its own weight and drain the oil from the rotating bucket cylinder. Push the handle forward after the bucket is rotated into position, and the boom falls under its own weight to drain the oil from the boom cylinder.
5. Turn the control handle to the neutral position.
6. Clean the oil drain cover at the bottom of the hydraulic tank, unscrew the drain plug, drain the hydraulic oil, and hold it in a container. At the same time, unscrew the air cleaner to speed up the oil drain process.
7. Remove the top cover of the hydraulic oil return filter from the hydraulic oil tank and replace the oil return filter element.
8. Use a piece of clean cloth to block the oil suction and return ports of the hydraulic oil tank, flush the inner wall of the hydraulic oil tank with diesel oil from the top cover port of the oil suction and return end of the hydraulic oil tank, and drain it from the oil drain pipe. Finally, dry the bottom and walls of the hydraulic tank with a piece of clean cloth and take out the cloth stuck in the oil suction port.
9. Install the oil drain plug, oil return filter, oil suction filter and top cover of the hydraulic oil tank.
10. Add clean hydraulic oil from the oil filler of the hydraulic oil tank to allow the oil level to reach the upper scale of the hydraulic oil pointer, and tighten the filler cap.
11. Remove the frame fixing rod, start the engine, operate the control handle, lift/lower the boom and tilt the bucket forward/backward, and turn left and right to the maximum angle 2-3 times, so that the oil cylinder is

filled with hydraulic oil. Then run the engine at an idle speed for 5 minutes in order to exhaust the air in the system.

12. Turn off the engine, open the filler cap of the hydraulic oil tank and add clean hydraulic oil to the scale of the liquid level gauge.

⚠ Warning

If the hydraulic oil is seriously contaminated, in addition to draining the hydraulic oil from the hydraulic oil tank, hydraulic oil radiator, boom cylinder and bucket cylinder according to the above method, one end of the pipe should be disassembled to drain the hydraulic oil from the cylinder and inner cavities of various pipes. Then clean hydraulic oil is added to the upper scale of the level gauge.

5.14 Maintenance of Service Brake System

Maintaining the service brake system regularly and correctly is important to ensure braking performance and improve traveling safety.

- The system should be checked regularly for leakage, loose joints and connections, and no air leakage is allowed in the gas path system or the oil piping system. When brake pads are worn to 2/3, please replace them in time.
- The brake fluid should be DOT4 brake fluid. If it needs to be replaced, only vegetable brake fluid is allowed. At the same time, the original brake fluid must be cleaned and then injected with a new grade of brake fluid. If the fluid level is insufficient, the fluid should be added in time. For each filling, a filter bowl should be used and the level should be 20-25mm away from the oil filler. Brake fluid must not be mixed with mineral oil and water, otherwise it will quickly damage the rubber components of the system and reduce the braking effect.
- The gas in the oil piping system will affect the braking performance. After replacement of parts and maintenance, air should be bled as follows:

1. Remove sludge deposits from pipelines, oil storage chambers, oil fillers and air bleeding position of the oil piping system;

2. Add brake fluid to the top as required;

3. Start the power engine and stop the Loader when the atmospheric pressure reaches 0.67~0.69MPa;

4. Sheathe the air nozzle with transparent plastic pipe and put the other end of the pipe into the oil holder;

5. Tramp the brake pedal several times in a row, then tramp the brake pedal, release the deflating valve at the top of the front and rear disc brakes to bleed air until the bubble-free liquid column is drained. Tighten the deflating valve, release the brake pedal, and pay attention to replenishing brake oil into the brake oil cup in time during air bleeding to prevent air from entering the system again;

6. Open the drain valve at the bottom of the gas storage tank to drain liquid while the gas storage tank is still under pressure after air bleeding. Otherwise, it is easy to rust the tank due to uncleanness, thus affecting the service life of the rubber components of the gas path system.

The user should pay attention to the following items when using the gas storage tank:

1. General service life of air reservoir: five years if the loader is continuously used, or shorter if its use is interrupted, or about three years if it is unused for over one month. When the service life expires, replace the air reservoir with one bearing our trade mark.

2. Regular visual inspection should be carried out on gas storage tank. If any peeling of anticorrosive coating is found, rust removal should be carried out again and antirust paint should be sprayed. If any weld crack or deformation is found, immediately stop using it and replace the gas storage tank.

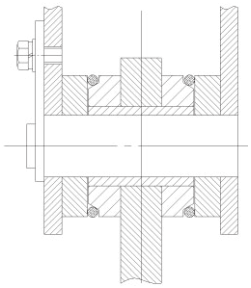
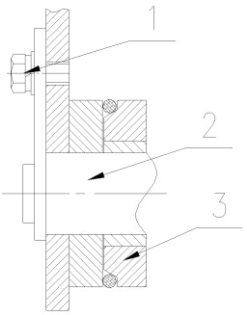
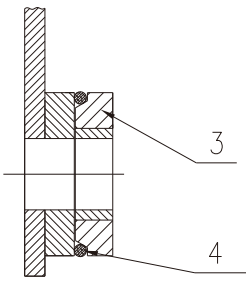
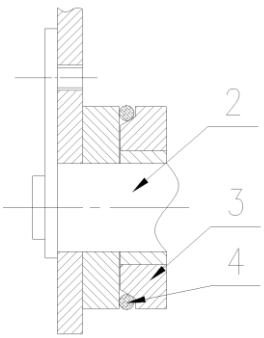
3. Every year, the pressure test is carried out on the gas storage tank at a pressure of 1.2MPa; if the Loader is not used for more than 3 months, endurance test must also be carried out before it can be reused.

5.15 Maintenance of Bucket

5.15.1 Replacement of Bucket O-ring

⚠ Warning

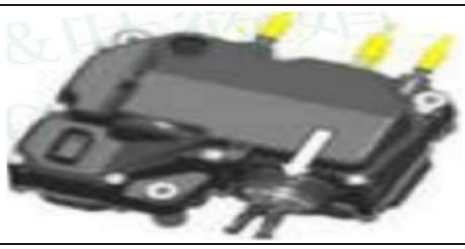
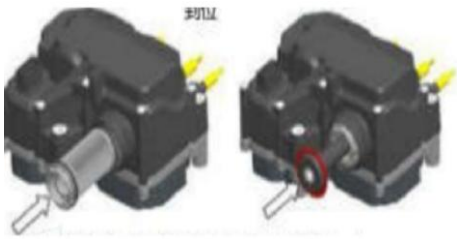
Wear safety helmets, gloves and guard for eyes when replacing pins because metal objects may fly out

Check the O-ring on the bucket and replace it if it is worn or damaged.		 Fig. 1
Loosen the follower bolt of bucket pin shaft (1, Fig. 2), then remove the bucket pin shaft (2) and pull out the pull rod or boom (3). Remove the old O-ring, install a new O-ring (4, Fig. 3), and verify that the O-ring groove on the pull rod or boom (3) has been cleaned.		 Fig. 2
		 Fig. 3
Align the lift arm or pull rod pin hole with the bucket pin hole and install the bucket pin shaft (2, Fig. 4). Tighten the follower bolt of bucket pin shaft (1, Fig. 2).		

5.16 Maintenance of Urea Pump

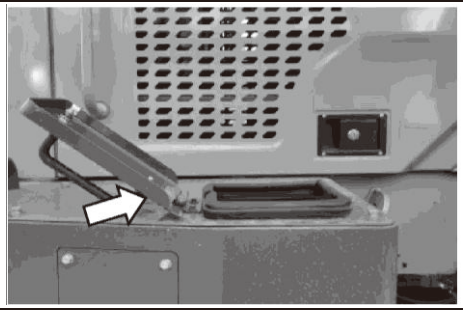
5.16.1 Maintenance of Urea Pump Filter Element

1. Clean the accessory area of the urea pump filter cover housing with clean water to prevent contamination by impurities. Unscrew the filter cover, with a wrench size of 27 mm (DIN3124/ISO2725-1).		

2. Take out the balancing unit.		
3. Observe the color of the filter element. If it is gray, use the gray end of a professional tool; if it is black, use the black end to insert the correct tool into the filter element until a "click" sound is heard, indicating that the tool has been installed in place.		
4. Pull out the filter element. If necessary, use the slot of the tool to help pull it out with other tools.		
5. Wash the outer surface of filter element cover with water.		
6. After lubricating the O-rings at both ends of the HCF filter element, install the filter element (MobilVelocite No.6 is recommended; using other lubricants may cause failure).		
7. Screw the filter cover tightly with torque of 20Nm+5Nm. The torque wrench shall be 27 mm (DIN3124/ISO2715-1).		

5.16.2 Urea Filling

Precautions for Protection and Filling of Urea Tank

1. Open the cover plate of the small cover plate assembly on the balance weight assembly.		

2. Remove the dust cover of the urea tank from the filler, and clean up impurities around the filler to prevent them from falling into the urea tank.		
3. Unscrew the filler cap of the urea tank and fill qualified urea solution. Unqualified urea solution may block the urea pump and nozzle, and metal impurities in unqualified urea solution are easy to cause permanent poisoning of the SCR catalyst.		
4. Rotate and tighten the filler cap, and cover the dust cover of the urea tank.		

- The quality and performance of the urea solution shall meet the requirements specified in GB 29518.
- The urea solution should be stored in a tightly closed container, in a cool and dry space, away from strong oxidants. As the urea solution is corrosive to the skin if it accidentally contacts the skin or eyes during addition, wash with water as soon as possible; if it continues to hurt, please seek medical help. If swallowed, do not induce vomiting and seek medical attention immediately.

Warning

1. Unqualified urea solution may block the urea pump and nozzle, and metal impurities in unqualified urea solution are easy to cause permanent poisoning of SCR catalyst, resulting in reduction of efficiency of SCR catalytic converter.

2. Urea solution must be added through regular channels or to designated units. It is forbidden to use any liquid instead of urea solution during normal use.

3. The liquid level of urea tank should be kept between 30% and 80% of the total volume of urea tank. When the urea level is lower than 10%, the alarm system will be activated and the driver's alarm lamp on the instrument will flash. At this time, it is necessary to add urea solution in time. If not, the engine may be used with limited power. Please replenish it in time!

VI. Common Faults and Troubleshooting

Features of fault	Fault cause	Troubleshooting method
The Loader cannot run when the diesel engine is started	The gear is not engaged.	Re-engage the gear or readjust the transmission control lever.
	Transmission oil level too low	Fill oil to the specified level.
	The brake control lever of the transmission control valve cannot return	Find out the reason why it cannot return to the original position and solve this problem.
	Transmission oil pump damaged or oil seal leakage	Replace the oil pump or oil seal.
	Poor pumping of oil pump	Check whether the oil suction pipe fails.
Insufficient driving force	Low oil pressure at the outlet of torque converter and invalid pressure regulation of torque converter	Check the transmission oil level and clean the oil filter of the oil pan and outlet oil filter
	Low engine speed	Check the speed of diesel engine.
	The clutch slips	Check clutch transmission oil pressure and piston oil seal
	The oil temperature of torque converter is too high.	Stop cooling when the torque converter oil temperature exceeds 120 °C
Too low shift pressure	Pressure reducing valve group failure	Find out the cause and repair.
	Blocked oil filter	Clean the oil filter.
	Oil pump failure	Replace the oil pump.
	Serious oil leakage at clutch oil seal	Replace the oil seal.
The transmission oil level is increased.	Oil leakage at steering pump shaft end	Replace the oil seal at the shaft end of steering pump.
	Oil leakage at working pump shaft end in the working hydraulic system	Replace the oil seal at the shaft end of steering pump.
The oil temperature of torque converter is too high.	Too high or too low transmission oil level	Add oil to the specified level.
	The clutch slips	Check clutch oil pressure
	Blocked filter	Clean the transmission oil bottom filter screen and oil filter.
	Poor oil pumping of transmission pump	Check whether the oil suction hose of the transmission pump is flat or blocked
	Worn-out transmission pump and insufficient oil supply	Check whether the internal leakage of the transmission pump is abnormal, if so, troubleshoot it.
	Partially blocked oil cooler	Check and clean the transmission oil radiator
	Oil deterioration	Check whether the oil volume of torque converter and transmission (additive amount and oil quality) meets the requirements
		Check whether the return oil pressure of the torque converter is too high and the oil temperature rises rapidly due to too large hydraulic resistance in the return oil system.
		Check whether the oil temperature gauge and oil temperature sensor are accurate.
Too large idle stroke of steering wheel	Loose steering wheel nut	Adjust as required
	Worn or damaged connection between steering column and steering	Dismantle, inspect and repair

Features of fault	Fault cause	Troubleshooting method
	gear	
Insufficient steering torque	Insufficient wear flow of steering pump	Check or replace the steering pump
	Variable pressure of safety valve	Adjust the pressure
	Serious internal leakage of steering pump	Overhaul or replace it.
Insufficient foot brake force	Oil leakage of master cylinder for brake or the wheel cylinder	Replace foot brake valve or rectangular seal ring
	Air in the brake hydraulic pipeline	Bleed the air in the brake caliper
	Low compressed air pressure	Check the unloading valve of air compressor, air tank and pipeline tightness
	Damaged booster cup	Replace booster pump
	Oil leakage of rim onto the brake pads	Check or replace the hub oil seal
	Worn-out brake pads	Replace brake pads
Insufficient boom lifting force or bucket tilt force	Worn or damaged oil seal of oil cylinder	Replace the oil seal.
	Excessively worn distribution valve, and fitting clearance between the valve stem and the valve body exceeding the specified value	Dismantle and repair the distribution valve to reach the specified fitting clearance or replace the distribution valve.
	Oil leakage of pipeline system	Find out the oil leakage and troubleshoot it.
	Serious inner leakage of working pump	Replace the working pump.
	Improper adjustment of safety valve and low system pressure	Adjust the system pressure to the specified value.
	Blocked oil suction pipe and oil filter	Clean the oil filter and replace the oil.
Rapid pressure drop of air reservoir after parking	Air brake intake valve stuck by dirt or damaged	Blow off the dirt by several successive braking and replace the valve
	The pipe joint is loose or the pipeline is broken	Tighten the joint or replace the brake hose
	Air tank inlet one-way valve not sealed or pressure controller not sealed	Check for the cause of poor sealing and replace the seal if necessary
Oil leakage of the brake system	Air source pollution: oil, water, dust and impurities	Clean the pipeline.
	Use of unacceptable brake oil.	Use acceptable brake oil.
	Air leakage caused by worn leather ring	Clean the cylinder block and replace the piston leather ring.
Slow pressure rise shown in brake air pressure gauge	Loose pipe joint	Tighten the joint
	The air compressor does not work normally	Check the working condition of the air compressor.
	Oil drain plug of oil-water separator not fastened	Fasten it again.
	The air intake valve or drum membrane of the brake valve is not sealed	Check and clean the inside of the brake valve, and find out the reason for poor sealing.
	Air-bleed hole of pressure controller blocked, or air leakage at check valve and drum membrane	Clean the air-bleed hole, find out the cause of poor sealing of check valve and drum membrane, and troubleshoot it.
		Replace the dryer of the whole loader
Brake failure	No or little fluid in the oil cup of the	Add oil into the oil cup of the booster pump

Features of fault	Fault cause	Troubleshooting method
	booster pump	
	Oil inlet valve and hydraulic leather ring worn	Replace the oil inlet valve and hydraulic leather ring.
	Piston stuck	Replace the whole brake.
Weak braking	Air in the hydraulic pipeline not fully exhausted	Fully exhaust the air in the hydraulic pipeline
	Wear part worn	Replace the wear part.
Oil leakage of brake system	Oil leakage at the connection between the end cover and the hydraulic cylinder body	Replace the wear part.
	Oil leakage of central seal ring	
	Oil leakage at the connection between oil cup and end cover	Check whether or not the oil cup assembly is tightened or replace the wearing parts

VII. Requirements for Environmental Protection

During the maintenance of the machine, the replaced components and parts shall not be discarded at will, and shall be recycled.

During the maintenance of the roller, coolant, oil products (fuel oil, engine oil, hydraulic oil, transmission oil, gear oil, grease, etc.), electrolyte or other substances causing environmental pollution should not be directly discharged on the ground, but collected in special containers and disposed according to relevant regulations.

Pollutants shall be disposed of in accordance with local laws and regulations.

Attachment 1: Common Materials Proportion Reference

S/N	Material Name	Specific Category	Reference Weight Value Kg/m^3	Remarks
1	Ordinary soil	Fine clay dry soil	1250	
		Dry caking soil	1520	
		Powdery dry soil	1550	
		Wet soil	1725	
		Muddy soil	1730	
		Tight soil	1840	
2	Clay	Wet soil	1750	
		Dry soil	1485	
3	Sand	Loose dry sand	1440	
		Moist sand	1680	
		Wet sand	1850	
4	Sandstone	Broken sandstone	1500	
		Solid sandstone	2300	
5	Gravel	Dry gravel	1485-1650	
		Wet gravel	2015	
		Mine gravel	1900	
		Dry clay mixed	1185	
		Wet clay mixed	1650	
		Dry sand mixed	1730	
		Wet sand mixed	2000	
6	Alumina		1425	
7	Broken stone		1600	
8	Slag	Dry	650	
9	Coal	Anthracite raw coal	1190	
		Bituminous raw coal	950	
		Dry peat	415	
		Wet peat	1125	
10	Weathered rock-soil	75% rock-soil	1955	
		50% rock-soil	1725	
		25% rock-soil	1585	
11	Gypsum	Crushed block	1600	
		Broken block	1810	
		Solid block	2780	
12	Limestone	Crushed block	1550	
		Solid block	2600	
13	Slag		1760-2100	
14	Granite	Crushed block	1650	
		Integral	2800	
15	Hematite		2460	
16	Magnetite		2780	

Attachment 2: Oil Table

Item	Name & Grade	Filling amount (L)	Application Position	Remarks
Fuel	0# diesel fuel	280	Diesel tank	Only BS-6 norms with low sulfer content fuel need to be used
Diesel engine oil	CK-4 15W/40 or 15W/40 CI4 CK-4 15W/40 or 15W/40 CI4	22	Diesel engine	
Torque converter oil	No. 8 hydraulic transmission oil	48	Torque converter and transmission	
Gear oil	85W/90 GL-5 80W/90 GL-5	56	Drive axle main drive and wheel reducer	
Hydraulic oil	L-HM 46#/VG68LL antiwear hydraulic oil	265	Steering hydraulic system and working hydraulic system	L-HV 46#/VG68LL low temperature antiwear hydraulic oil; L-HV 46#/VG68LL synthetic low-temperature antiwear hydraulic oil is used
Brake oil	Tin smelting 719 synthetic brake fluid HZY DOT3/DOT4 motor vehicle Brake fluid	2.7	Brake system	
Grease	Molybdenum disulfide lithium-based grease	2 kg	Bearing, hinge part and pin shaft	Operating temperature range: -20°C-120 °C, suitable for all regions
Urea	AUS-32	30	Urea tank	It is recommended to fill up the urea tank at the same time when refueling by GB 29518. Loss of urea will lead to non-compliance with emission and torque limits.

Note: The above oil volume is only used as a reference value, and the specific oil level through oil inspection shall prevail. If the oil is not enough, it needs to be replenished.