OPERATOR'S MANUAL

MOVING YOU FURTHER

WHEEL LOADER

HL660V
HL665V

HYUNDAI
CONSTRUCTION EQUIPMENT

Attention Please

Subject : Matters needing attention for maintenance and accessories

1. First welcome you to have used our product and thank you for great coordination in business.
2. In case the equipment is in faults, it should be maintained by our Company or the company appointed by our Company using standard parts.
3. At present, In some markets there have been some forged and fake imported parts and some unauthorized and untrained companies or persons to maintain the products of our company, causing many problems left and seriously affecting the equipment performance and operation life.
4. In view of the above, the customers are requested to pay attention to followings:
   1) The adopting of non-standard parts may not have obvious effects on the equipment in short time, however, it will certainly have a series of harmful effects later. In order to prevent the damage to the equipment or the performance deterioration causing severer loss, never use non-standard parts.
   2) When the customer is purchasing the parts, it is necessary to purchase products from our company or the company authorized by our company for selling the parts, and be careful for the discrimination. Welcome to contact our company if there is doubtful phenomenon.
   3) If the customer requires to maintain the equipment, it is requested to contact our company or the company authorized by our company.
   4) In case of the equipment faults arising from the maintenance with non-standard parts or by the unauthorized company or persons, our Company do not bear the responsibilities for the warranty service, even within the Warranty period.
   5) With the improvement of products, the contents of this manual may be lagging behind. Customers in order to obtain the latest product information, please contact our company or our authorized dealer.
5. Thank you once again for the business cooperation at normal times.

With best regards

Special Explanation

Topic: Special explanation of fuel system operation and maintenance for loader

In order to let HYUNDAI loader for you to create greater economic benefits, please read this article seriously.

Fuel quality is the important factors of make the engine to obtain fine performance and prolong service life and realize low emission.

The main function of fuel is provide the required energy for diesel engine work and provide cooling and lubrication for fuel inside the system precision components .The market supply of most of the diesel oil can meet loader installed diesel engine use requirement, but it has to meet the viscosity, cetane number, sulfur content, cloud point, water and sediment content and performance requirements. Among them, the viscosity, cetane number, cloud point and indicators in selecting the right after the diesel brand generally its performance does not change, but the water and sediment index will because transportation, storage, add and maintain undeserved causes such overweight, exceed the prescribed content requirements (less than 0.05 volume percent). So as to increase the wear and tear of diesel engine fuel system, causing the engine starting difficulty, power loss, smoke when fault.

To this end, we request the HYUNDAI loader users and operators must do the following points:

1) Choose conform to the requirements of the use of diesel, don't use small smelter and other production the inferior diesel oil;
2) In diesel oil transportation, storage, added to take appropriate measures to reduce moisture and impurity interfuse;
3) In strict accordance with "The operation maintenance manual "provisions of the maintenance period of fuel system for drainage, filter replacement and maintenance work, and can shorten appropriately according to working environment drainage and filter cartridge replacement cycle.

Thank you again for you choosing the products.

With best regards

Operation & Maintenance Manual

Our Company has the right to continuously improve the products so as to promote the best products to the market as possible as we can. These improvements can be implemented at any time; however, we will not change the materials for the products being sold at that time.

The consumers should particularly be reminded of that they should regularly contact with the Agent to ask for the newest information of the equipment.

These information may include the auxiliary equipment or optional that are not available for your equipm-net. So please contact the Agent when you need other devices.

The pictures used in this Manual are only to visually depict the related sections of the equipment and they may be different from the actually installed equipment.

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ADVICE FOR OPERATION OF LOADER

DANGER

The irregular operation of the loader can cause serious injure and death. When conducting equipment operation, maintenance, traveling or shipment, if the following safety rules are not obeyed, there may be serious and even fatal injury to the persons or heavy damages to the equipment and periphery.

For the sake of your safety and the safety of others whose safety is subject to your actions, please seriously check important factors causing hazards.

NOTICE

1. The equipment are not allowed on the road, if it must be on the road temporarily, should in accordance with the provisions of the laws and regulations related formalities and obtain permission to run on the road.

2. The equipment implementation GB25684.1 and GB25684.3 which compulsory standard of earth moving machinery (not scale standard reign title, according to the equipment factory of the latest national standards).

WARNING

The incorrect operation and maintenance may bring about hazards and even the personal death.

Before operation and maintenance, the driver and maintainer must fully understand the details in this manual.

If you perform the operation and maintenance without the correct method specified this manual, the accidents may occur.

Before using the equipment, it is necessary to read through the operation procedures and matters to be attended described in this manual.

The sold equipment follows all relative local laws and regulations. If you purchase the machine from other country, it may lack of the safety equipment specified in local laws and regulations. If so, please consult the Agent before operation.

Safety Alert Symbols

Preparation - understand the description of all operations and safety.

This is a Safety Alert Symbol. When working together with other persons, you must ensure that all persons shall be able to understand the sign language being used and warn the people of injury dangers. Please follow the recommended safety measures and safety operation regulations. Memorize the sign languages used in alert symbol.

Signal Words

The “CAUTION”, “WARNING”, “DANGER” used in this manual and on the machine. They indicate the hazardous level for harms and non-safety operations, and they also represent the three degree of safeties. Whenever you see the delta label for safety warning, you should seriously read the content of the warning no matter what warning text is followed.

CAUTION

CAUTION indicates a potential hazardous situation which, if not avoided, could result in minor or moderate injury. It is also used for reminding operator to prevent the unsafe operation factors during operating.

WARNING

Warning indicates a potential hazardous situation which, if not avoided, could result in serious injury or death. It is also used for warning operator to prevent the severer unsafe operations.

DANGER

Danger indicates a direct dangerous situation which, if not avoid, will cause death or extremely severe injury accidents. Meanwhile, it is also used to warn that the equipment will explode or be destroyed if not operated properly.

The safety warning starts from Page 1-4 of Safety Section in this manual.

It is impossible to pre-list all potential hazards in all working environments. Therefore, if you want to perform the operations un-recommended, you must ensure the safety of yourself and others and must ensure the equipment not to be damaged. If you cannot ensure the safety of some operations, please contact with the agent.

SAFETY DECALS

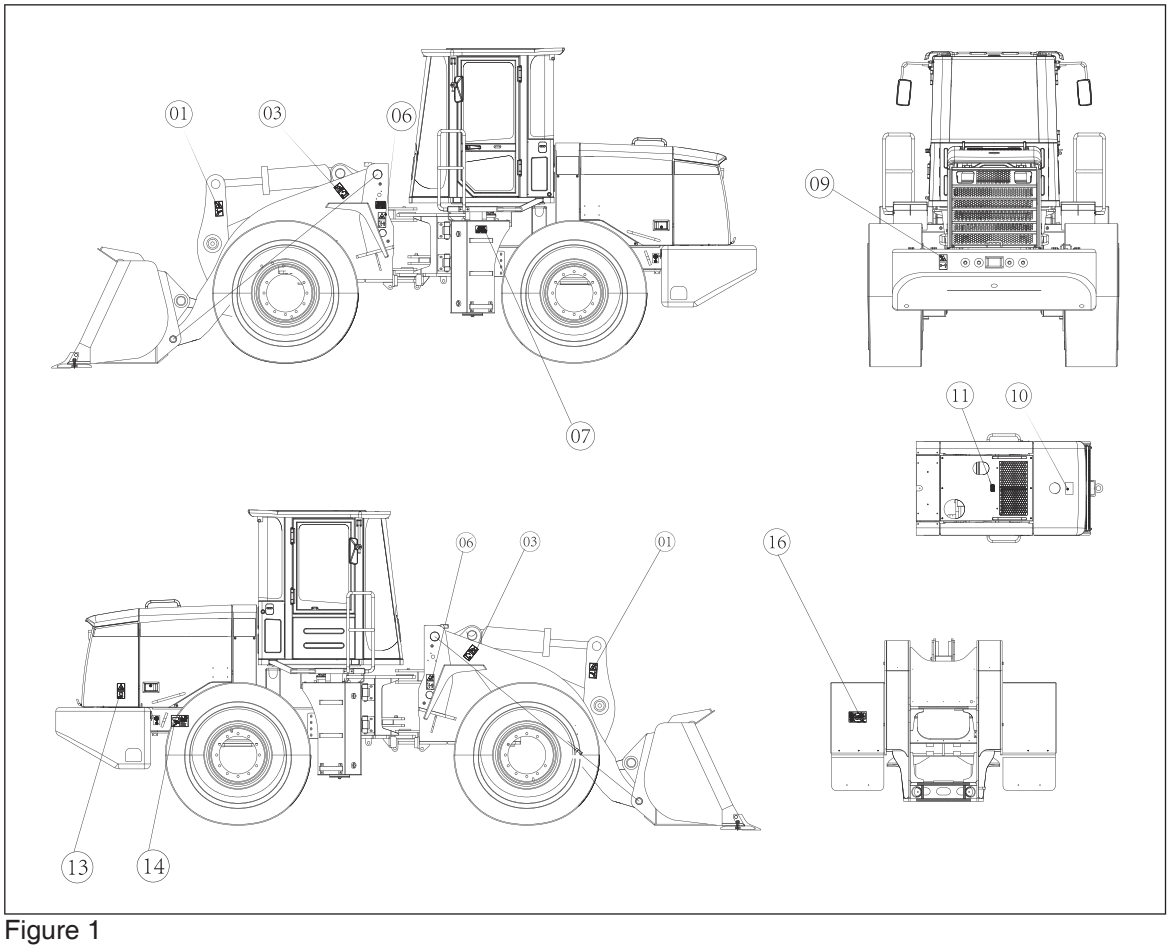


Figure 1

The safety decals are attached to the machine. In this Chapter, the locations and descriptions of these decals will be reviewed in the following section. Please become familiarized with all safety decals and their messages.

Make sure that all the decals are in correct locations and legible. Clean or replace the safety deals if the decals are missing or damaged, or the texts and pictorials are not legible. Use cloth, water and soap to clean the labels. Do not use solvent, gasoline or other harsh chemicals to clean the decals because they may lead the adhesive that secures the labels to the machine, thus causing the labels to come off.

Replace the damaged or lost labels. Remember, if a safety decal is attached to a part that is replaced, install a new safety deal on the replacement part.

1.Never stand under the moving arm.

Sudden or accidental movement of boom may cause injury or death.

Securely brace boom before working or walking under raised boom.

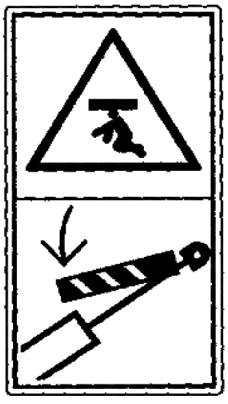


Figure 2

2.Never stand under the bucket.

Figure 3

3. Standing here is strictly prohibited while the machine is moving. Otherwise, it will cause serious injury or death accidents.

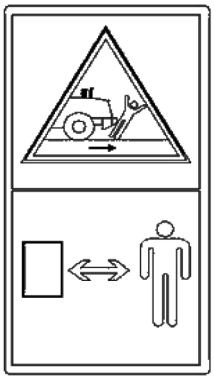


Figure 4

4. Severe injury and death from crushing could occur in articulation position when machine turns.

Make sure people are clear of machine before starting engine or moving steering wheel.

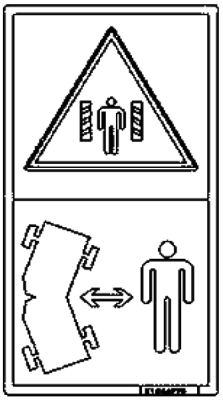


Figure 5

5. Keep your hands away from the fan during operation. Entanglement in the fan can cause serious injury.

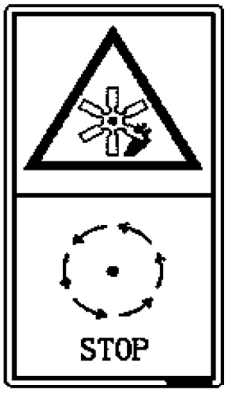


Figure 6

6. High temperature, NO touch.

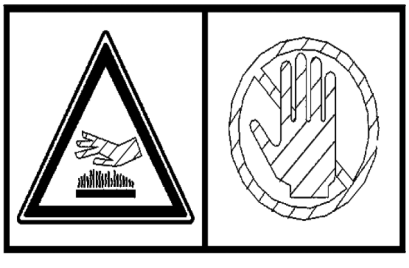


Figure 7

UNAUTHORIZED MODIFICATIONS

In case of the safety accidents arising from any modification without authorization by Hyundai, the Owner shall bear the responsibilities.

As a safety precaution, all OEM parts must be replaced with the correct authorized or genuine Parts. If the fasteners, bolts or nuts are not regularly replaced with correct spare parts, it may cause these parts to exceed the safety limit of operation.

GENERAL HAZARD INFORMATION

Safety Regulation

Operation and maintenance of the loader should only be carried out by authorized professionals with the requisite training.

Strictly follow all safety regulations, warnings and requirements when performing operation and maintenance.

When feeling ill or tired for taking medication or not adapt to the environment,you should not operate the machine. These problems will interfere with your sense of judgment in emergencies and may cause accidents.

When working together with another operator or with a person on work site traffic duty, it is necessary to ensure that all persons know the nature of the work and understand all hands signals that are to be use.

Always observe strictly any other rules related to safety.

Safety Features

Ensure all the guards and covers are installed in proper position. Repair immediately if damaged.

Be sure that you understand the methods of all safety features such as seat belt, and perform the correct operation.

Never remove the safety features, and keep them in good operating condition.

Incorrect operation of the safety features may also cause serious bodily injury.

Matters needing attention in cabin

When entering the cabin, remove the mud and oil from the soles of your shoes, otherwise, the accident will occur when you step on the accelerator pedal due to the slippage on the sole.

Do not stick suction pads on the window glass, because the suction pads could act as a lens which can cause the fire.

Do not leave lighters laying around the cabin. If the temperature inside the cabin becomes high, there is a danger that the lighter may explode.

Do not use mobile phone when you are operating the loader.

Never bring any dangerous objects such as explosives, inflammable goods into cabin.

To ensure the safety, do not wear earphone when you are operating the machine. Otherwise, the serious accident will occur.

Do not put your head and hands out of the window when you are operating.

Ensure the engine has already been shut off when you are leaving the seat. Otherwise, if you negligently touch the operation lever, the equipment will move and the accident will occur.

Lower the working device down to the Ground and shut off the engine when you leave the equipment. Use the key to lock all places and then pull out the key to carry it with you.

Work clothes and personal protective items

Secure long hair, and avoid loose clothe and jewelry. These items have the tendency to catch on controls or into parts and cause serious injury or death.

Do not wear oily clothes, because they are Flammable.

Use the goggle, helmet, safety shoes, and gloves in the working area.

Do not use the tools without enough strength when performing the maintenance of the equipment. Otherwise it will cause the injury arising from breakage or slippage, or make the installation unqualified.

Figure 8

Breathing masks & Ear Protection

Do not neglect the factors which do not have direct hazardous impact on the health. The waste gas and noise pollutions are invisible, but they can cause disability or permanent injury.

Getting on and off the loader

Before getting on or off machine, if there is any oil, grease, or mud on handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.

Never jump on or off machine. In particular, never get on or off a moving machine. These actions can result in death or serious injury.

When getting on or off machine, always face machine. Maintain a three-point contact (both feet and one hand or one foot and both hands) with handrails and steps to ensure that you support yourself securely.

Never hold onto any control levers when getting on or off machine.

Securely latch door. If you grip handrail inside door when moving on platform outside of door, and door latch is not securely engaged, door may move and cause you to fall resulting in death or serious injury.

Use points marked by arrows in diagram when getting on or off machine.

Do not carry tools or supplies when you mount or dismount the machine.

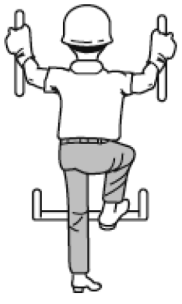


Figure 9

Fire Hazards for Fuel, Oil and Hydraulic Oil

If fuel, oil and anti-freeze fluid are put close to the fire source, it is easy to cause fire. In particular, the fuel may cause extreme danger.

Pay strictly attention to the following conditions:

Make sure the premises are well ventilated when the fuel, oil, anti-freeze-fluid and hydraulic oil are filled in. Switch off the lamp, control lever and the starter switch after the machine is shut off. Shut off the engine. The equipment should be far away from the flame and heating element. The auxiliary heating element or the equipment which may cause sparks must be quenched, switched off and move away from the loader.

Static can produce electric sparks at the oil filler. When it is cold or dry, or in other conditions which easily cause the static, it is necessary to make the oil filler always contact with the oil-filling pipe, so as to guarantee a good grounding.

The covers for fuel tank and other liquid tanks shall be tightened. Strictly prohibit from starting the equipment before tightening.

Figure 10

Precautions When Fluids at High Temperature

When the operation has just been stopped, the temperature of coolant, engine oil and hydraulic oil is very high, and there is still pressure in Radiator and hydraulic tank. In this case, opening the cover to drain the oil or the coolant, or replacing the filtration element will cause burns. It is necessary to wait for the temperature to go down and perform the operation according to the specified procedures.

In order to prevent the splashing of HT coolant and oil, it is necessary to shut off the engine, and wait for cooling of coolant oil, then slowly loosen the cover to release the pressure.

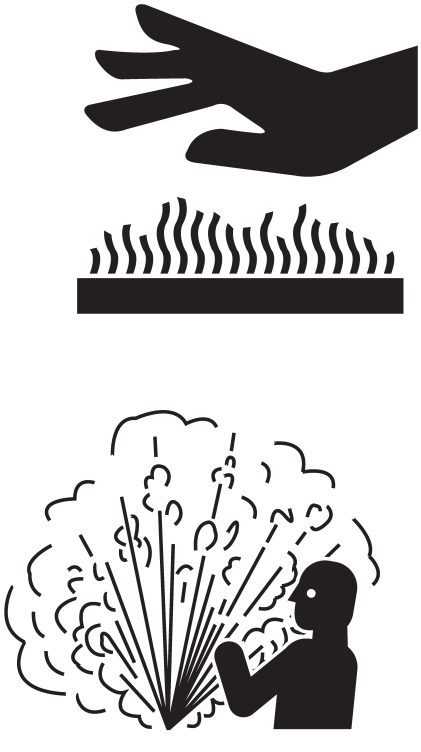


Figure 11

Coolant

- During operation, the temperature of the engine coolant is higher and there is pressure in the engine. All piping lines connected to radiator or to engine have hot water or steam in them. The contact with them will cause severe burns.
- When checking the coolant liquid level, the engine must be shut off, and the water filler cover must be cooled down to the extent that it can be opened by naked hand.
- Slowly loosen the water filler cover for the cooling system to release the pressure.
- The coolant of cooling system contains Alkali, so it is prohibit to make it contact with skin and eyes. It is not appropriate to be drunk. Moreover, cooling down the coolant before drain it out.

Asbestos Dust Hazard Prevention

Inhaling asbestos dust can be hazardous to your health. If the material you work with contain asbestos fiber, please obey the following regulations:

- Use dust-filtration mask.
- Prohibit using compressed air to purge.
- Use water to clean to prevent from kicking up dust.
- Whenever you operating the machine, make the air blow against your back.
- Obey the related laws and regulation on site.

Figure 12

Injury arising from working equipment

Do not put hands, arms, or other body parts between the moving components (e.g., between the working devices and cylinder or between equipment and working devices).

The gaps between equipment and working devices will change during operating the operation lever. In this case, the careless operation will cause serious faults or personal injury.

If it is necessary to enter the places between moving parts, fix securely the working equipment to make it not move.

Figure 13

Fire extinguisher and first-aid kit

In case of personal injury or fire happened, please operate as follows

- Find the Fire extinguisher and carefully read the operation description on it to ensure that you can use it. It is recommended to use the multi-functional “A/B/C” Fire extinguisher with a weigh of greater than 2.27 kg [5 lb]. Put the fire extinguisher in the cab. Regularly check and maintain the fire extinguisher and conduct the effective training for the field personnel.

Put one first-aid kit inside the reserved box, and put another on the site. Regularly check for the necessary of supplement of first-aid kit.

- Know what to do in case of injury from fire.
- Keep emergency numbers for doctors, ambulance service, hospitals and fire stations and put them by the side of the telephone set.

If the equipment catches fire, it may cause serious personal injury or even death. In case of fire during operation, escape from the machine as follows

- Shut off the starting switch, and stop the engine.
- If there is time, use the fire extinguisher to put out the fire as far as possible.
- Use handrail and steps to escape from the machine.

The above is the basic method to escape from the equipment. However, the method can be changed if necessary according to the actual conditions. Therefore, it is necessary to conduct the escape practice on site.

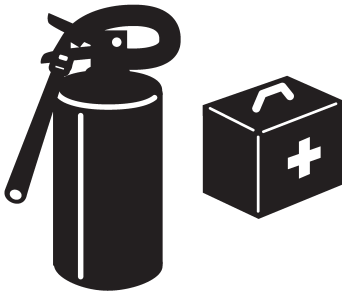


Figure 14

Prevent from falling objects or flying objects

The collision of falling objects or flying objects on site with the cab may cause dangers. Please select the protective devices under appropriate operation conditions to protect the drivers.

Working in mine, tunnel, deep pit or on soft and wet surface, it is possible to have the dangers from the falling stones or flying objects. The protective facility must be installed for the cab, and it should accord with the requirements from FOPS (protective devices for falling objects) or from protective devices for windows

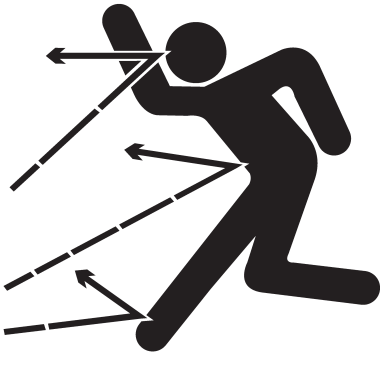


Figure 15

Prohibit reforming or changing any forms of protection structure by adding reinforcing devices (e.g., drilling hole, welding, re-installing or re-installing fasteners etc.). The re-identification of the whole protective system is needed for the protective system which has suffered severe impact or damage. Re-installation, re-authentication, or replacement of system is needed if necessary.

If there is the danger for the persons to be injured by the object impacting the cab, please contact with the Agent and ask for the effective safety protective devices and related recommendations. Ensure all other field personnel should be away from the loader and not threatened by potential dangers.

Figure 16

When you use crusher in operation, the protective devices should be installed on front windshield glass. Please contact with the branch organization for the recommendations

When performing the crushing operation,it is needed to install the thin plate on the front glass. We recommend you should contact with Agent.

When performing the cutting and destroying operation,it is needed to install the front and top protective plate, meanwhile, it is needed to install the thin plate on the front glass.

At the places where there is the danger of falling stones such as in mine quarry etc., please install FOPS (protective devices for falling objects), and install thin plate to protect the front glass.

If any glass of the machine is broken, please immediately replace it with a new one.

Protective measures for attachments

The optional attachments shall be provided by agent. If you need unidirectional action and bidirectional action hard pipe, flange and auxiliary control devices, please contact with our Company. Because we can not expect, prove or check all working devices the customers want to install, please contact with our Company to ask for the authentication certificate for the attachments and the compatibility authorization certificate for the equipment and working device.

Battery

- During operation, the battery can produce combustible gases which may cause explosion.
- Do not smoke while checking the level of electrolyte of the battery.
- The electrolyte is an acidic substance, and it will hurt the persons when it touches with skin or eyes.

Aether (if your machine is equipped with Aether cold starter)

- Aether is a toxic and combustible substance.
- Inhaling Aether vapor or frequent touching of skin with Aether will cause personal injury.
- There shall be adequate ventilation in the areas where Aether is used.
- Do not smoke while replacing the Aether tank.
- Pay attention to fire protection when using Aether.
- Do not put the replaced Aether tank in the living area or in the cab.
- Do not put the Aether tank in a place with direct sunlight or with an ambient temperature exceeding 39 ℃ (120 F).
- Put the discarded Aether tank at a safety place. Do not drill hole in it or heat it up.
- Put the Aether tank far away from the place where the non-working persons are living.

Tire

That the fully inflated Tire may be exploded is due to the heating inside of the Tire. Generally, heating is caused from the welding or heating of rim, the external flames or the too frequency of braking.

The explosion of Tire is much more powerful than air bleeding. It can make Tire, rim, and driving parts fly off over a distance of more than 500 meters. The explosion power and fragments may cause the personal death and property damage.

In order to prevent the excess air charging, the appropriate equipment and personnel are needed. The air leakage or rim damage are due to the incorrect use or misuse of the air charging device.

When charging the air, you should stand on the side of the Tire and use the cock with auto-clamping clamp.

The replacement and maintenance of the Tire may be dangerous. Therefore, the trained persons are needed to perform the maintenance and replacement of Tire, and shall perform the maintenance strictly according to the operation specifications provided by Tire or rim provider or by agent.

Indoor ventilation

The exhaust from the engine may cause fatal injury and death accidents, making people lose consciousness and lose alertness, judgment and control ability, thus inducing severe accidents.

Confirm a good ventilation before starting engine in an enclosed area.

Be careful for the opened doors and windows, because the waste gases may enter or may be blown in through them, thus inducing dangers.

Figure 17

BEFORE STARTING ENGINE

Matters needing attention on site

Before starting, completely check the working area for the abnormal conditions which may cause dangers.

Check the terrain and ground surface on site, and identify the best and the safest operation method.

Before operation, please make the ground hard and smooth as possible as you can. Please sprinkle some water on the ground before operation if there is a lot of dust or sand on site.

If it is needed to work on the street, please arrange one person to ensure the safe operation for the vehicles on the site or erect a fence and stick the labels on site such as “NO ADMISSION” as well as use other methods to prevent the pedestrians from getting near or entering the site. If somebody wants to approach the machine in operation, he (she) may be stricken or hooked so that he (she) may be caused serious injury or death.

There may water piping, gas piping, telephone cables or HV cables buried underground. Please contact with Utility Department and identify the positions where you are to avoid cutting any piping or lines.

Before conducting the operation or passing the river in water, please check the riverbed, the depth as well as flow of water. You must not work in the water with a depth greater than the allowed ones.

There is the potential danger for any objects around the moving arm where the accident easily occurs because there is little time for the driver to act. When you are working in the vicinity of bridge, telephone lines, site scaffoldings or other obstacles, the observer or signaler are needed for the assistance.

When the minimum standard or operation restrictions for barrier protection on site is less strict, the insurance responsibilities scope and the operation license or certificates can be issued by the institutions authorized by the Government; it may be needed to follow the restrictions on laws and regulations, policies, standards or equipment required by local authorities; Moreover, you may have to implement the regulations related to the special operations. Please contact with local authorities and related departments if you want to know whether your machine and the site environment comply with the laws and regulations.

Avoid entering the soft ground. Otherwise it is difficult for the machine to leave.

Avoid working on the edge of cliff, on the suspensory or in the deep pit, because the grounds in these areas are easily broken. If the ground surface is collapsed, the machine will fall or tip-over to cause serious injury or death. Please remember that the earth is very soft in this area after raining, explosion operation or earthquake.

The soils piled up on the ground or by side of the channels are very soft which will be collapsed under the vibration of the machine to cause the machine to tip over.

Please install cab protection device at the places where there is the danger of stone falling.

Check before starting engine

Perform the following checks before the starting of engine and before starting your work every day. Otherwise, it will cause serious injury or damage.

Check the surrounding of engine and battery for combustible materials Check fuel and lubrication oil and hydraulic oil for the leakage. Check rear-view mirror, handle and steps for the pollution by fuel.

Do not leave over parts or tools around the operator seat. The control lever or switch can be damaged by the falling objects caused from the vibration induced from the operating or walking, or the control lever will be caused to move to make the working device moving , thus causing the accident.

Clear thoroughly off the mud and fine sand on your shoes before you get on this machine, because these sand and mud will accumulate on the pivots of the accelerating pedal and brake pedal, interfering the reset of these pedals. Clear immediately and thoroughly the sand and mud accumulated at these places if any.

Check the level of coolant and hydraulic oil and the oil level in Oil sump of the engine. Check air filter for blocking or the cables for damaging.

Adjust the operator seat to the position at which the operation is easily performed. Check the seat belt and its fasteners for the damage or wear. The seat belt must be replaced after 3 years operation.

Check each instrument for normal operation. Check that the control lever shall be put at the “Parking” position. Clear off all dirt on the window glass and on the lamps in cab to ensure a good visibility.

Adjust the position of rear-view mirror to make the operator have a great rear view from the seat. Wipe up the surface of the rear-view mirror. Replace with a new one if the rear-view mirror glass is damaged.

Check front lamp and work lamp for normal operation. Please perform the maintenance if any abnormality is found from the inspection result. Be sure to have fire extinguisher, and familiar with its operation method. Do not put the machine close to open Flames.

Start the engine

Walk around and check the loader before entering the cab. Check for oil leakage, loose, improper adjustment of components or the possible damage phenomenon of other equipment.

In order to prevent the accidents, all cover plates and protective devices for the equipment shall be complete when operating the machine.

Check the working area for any potential dangers or for any other threatening factors to the safety during operation.

Please follow the warning sign on the control lever, and strictly prohibit starting engine during repair or maintenance.

If the machine has been used recently or if the temperature is too low, it is needed to preheat and perform the maintenance before starting.

Before starting the engine, check the instrument and monitor for the normal conditions, the sound for the normal conditions. When the operation begins, be alert for abnormal sound and the potential unsafe factors.

When starting the engine, do not make the motor being started short circuited. This will be not only dangerous, but also be a risk of damage to the machine.

When starting the engine, it is necessary for the horn to sound to issue the warning.

Starting and operating machine by sitting on the seat.

Figure 18

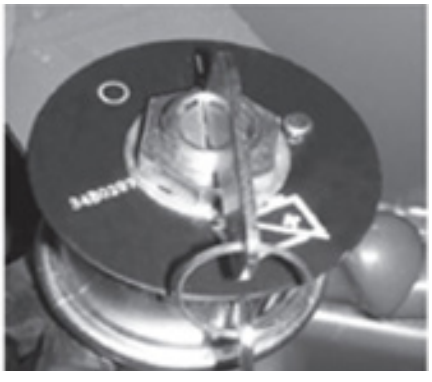


Figure 19

Before Operating loader

If you do not correctly check after the engine is started up, then you may not timely find the abnormalities of the machine so that the personal injury or machine damage could occur.

• Check the machine at a place without any obstacles, and do not let anybody to approach the machine while you are checking.

• Check the operation of the equipment, and the actions of big arm, travelling and rotary system.

• Check the machine for the abnormal noise, vibration and overheat, peculiar smell or the abnormality of Instrument. Check for the air leakage, oil leakage.

• Please perform the maintenance immediately if the abnormalities are found. Otherwise it may cause accidental injury or machine failure.

• Do not let any person to stay near the machine or in the working area.

• Remove all obstacles on the path along which the machine travels. Be aware of the dangers.

• Keep the windows clean. Ensure the doors and windows are at the safety positions: OPEN or CLOSE.

• Adjust the rear-view mirror to have the best view. Ensure that the horns, travel alarm device (if any) and other alarm devices are in good working conditions.

• Fasten the seat belt.

• Warm up the engine and hydraulic oil before operating the machine

OPERATION OF LOADER

Matters needing attention on travelling

Do not shut off the engine while the machine is travelling. The shutting off engine while the machine is travelling is dangerous. You cannot manipulate the steering wheel effectively.

Do not operate the control handle of the attached device while the machine is travelling.

Do not change the selected travel mode (quick/slow) while the machine is travelling.

Fold the working device, making the outer end of the big arm close to the machine as much as possible, and over 40-50cm (16-20in) above the ground.

Do not travel on the obstacles or on the slope where the tip-over of the machine is easily caused. Please bypass in advance when you meet a slope or obstacle which can make the loader tilt more than 10º from left side to right side and more than 30 º from front side to rear side.

Please not suddenly turn a direction. Otherwise the working device will strike the ground, making the machine lose balance so that the machine or the devices in working area will be damaged.

Drive slowly and avoid suddenly turn a direction while travelling on the coarse ground.

Keep the permissible water level. The permissible water level refers to the central line of the bridge.
Check first whether the bridge or the building can withstand the weight of the machine while the machine is travelling on the bridge or building. Observe the local authorization and follow its instruction while the machine is travelling on the highway.

Matters needing attention on travelling on slope

Do not jump onto the incontrollable machine to shut it off, otherwise you will have the risk of serious injury.

Travelling on the slope will cause the machine to tip-over or slipping.
Keep the bucket at a position 20-30cm (8-12in) over the ground while the machine is travelling on the hill, on the dyke or on the slope. Please immediately lower the bucket onto ground in an emergency to assist the stop of the machine

Do not travel on grasses, tree leaves or wet steel plate. Even a small slope can make the machine slip towards one side. Therefore, drive slowly to ensure the machine always travelling right under the slope or right over the slope.

Avoid changing the travelling direction while the machine is travelling on the slope, otherwise it will cause tipover or sideslip.
Operate the machine under or over the slope as much as possible. Avoid traversing the slope

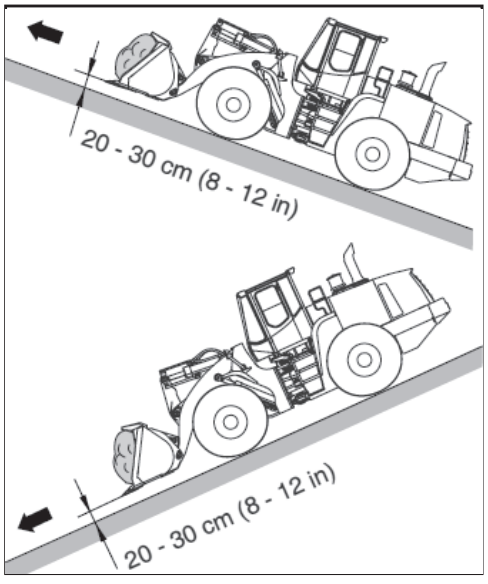


Figure 20

Prohibited operation

Do not shovel the working face under the highland, otherwise it will cause the highland to collapse, making falling objects tramp onto the top of the machine.

Working with heavy load on soft, unsmooth or cracked ground may cause the possibility of dangerous side force and tipover. Travelling without load or with unbalanced load is also dangerous.

Do not use jack or other inappropriate objects as the support while working.

Do not exceed the load ability of the machine (the maximum load and stability depend on the equipment structure) while operating in order to prevent the accidents induced from the equipment damage and tipover for the overload of the machine.

Matters needing attention on operating

Be careful not to approach the edge of the cliff.

If the machine is used for other operation, it will cause the operation to fail.

In order to ensure a good view, please obey the following items:

- Be equipped with work lamp and head lamp while working in a dark place. Install the lighting device on site if necessary.
- Stop working when the light is darker, such as in smoke, raining, snowing. The work could not be restarted until the view is restored to the extent that the operation can be guaranteed to perform without problems.

In order to avoid the striking the working device, please obey the following items:

- When the machine is working or stored in the tunnel, bridge, under electric cables or in a place where there is the restriction on the height, please particularly pay attention to not touching with the bucket or other parts. In order to prevent the collision, please operate the machine at the safety speed in a tight space, in the room, or in a crowded area.
- Do not put the bucket over the head of the worker or over the cab of the dump truck.

Accidents can be avoided under correct and safe operation, please operate the braking system according to the following advises.

- Don’t put your foot on the brake pedal except when it is necessary .Because the brake valve may be pressed by your foot when the loader is running on the rough road, which may put the loader into brake status, and accidents result from failure of the braking system, which is caused by the improvement of the temperature of the brake system, may happen if the loader is in brake status for a long time.
- Please don’t press the pedal time and again except when it is necessary. Repeated brake will improve the temperature of the brake caliper and it may bring bad effect. When repeat brake is needed under serious conditions, it is suggested to stop for 10mins after continuous working for 2 hours or take other measures to cool down the brake caliper and the braking fluid.
- When the loader is travelling down a slope, please set the transmission on low speed gear, with which the engine can be used to brake. Never shift the gears or put set the transmission to neutral.
- When the loader is travelling up a slope ,keep the bucket above the ground at the height ranging from 200mm to 300mm and put the bucket to the ground immediately under emergency to stop the loader effectively.

Be careful for HV cables

Do not let the machine touch with overhead cable. The electric shock could be caused even you are only near the HV cable. A safety distance shown in following table should be kept between the machine and the cable.

Accomplish the following items of work in order to prevent the accidents: when the machine is possibly in the danger of touching the cable on the site, you should consult with Electric Power Company before operation, and check whether the actions identified according to the existing laws and regulations are applicable.

Wear rubber shoes, and wear rubber gloves. Put a rubber pad on the operator seat, and pay attention not let any exposed portion of your body touch to the metal chassis.

Designate one signalman to send the warn signal if the machine is too close to the cable.

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

When you work in the vicinity of HV cable, do not let anybody close to the machine.

You should consult with Electric Power Company for the voltage of the cable before operation.

	Voltage	Minimum safety distance	
LV	100~200V	2m	7tf
	6.600V	2m	7tf
HV	22.000V	3m	10tf
	66.000V	4m	14tf
	154.000V	5m	17tf
	187.000V	6m	20tf
	275.000V	7m	23tf
	500.000V	11m	36tf

The minimum distances listed this table are only for reference. The strong electric shock may still occur even the distance from the big arm or the bucket to the electric cable is 4- 6m (13-20ft) when the voltage and atmosphere condition changes. The safety range will be greatly reduced under HV or raining conditions.

Note: *Make contact with Electric Power Company and stipulate a safety plan together with the said company before approaching to the electric cables (cables above or underground) to perform any forms of operations.*

Pay attention to follows to prevent the working device from colliding other objects:

When performing operation in tunnels, under bridges, beneath cables or in other places where the height is restricted, especially pay attention not to let bucket touch anything.

When loading materials into a tipper, pay attention not to let bucket touch with tipper's cab.

In order to prevent the accidents induced from collision with other objects, the machine shall work at the safety speed, especially in a limited space, in the room or in a place where there are other vehicles.

Method of use of brake

Do not rest foot on brake pedal unless definitely necessary.

Do not repeat depress the pedal repeatedly.

When driving down the slope, use the engine as a brake, and it is absolutely not to shift gear or put the gearbox onto Neutral Gear.

Accidents can be avoided under correct and safe operation , please operate the braking system according to the following advises.

- Do not put your feet on the brake pedal except when it is necessary .Because the brake valve may be pressed by your foot when the loader is running on the rough road, which may put the loader into brake status ,and accidents result from failure of the braking system, which is caused by the improvement of the temperature of the brake system, may happen if the loader is in brake status for a long time.
- Please do not press the pedal time and again except when it is necessary. Repeated brake will improve the temperature of the brake caliper and it may bring bad effect. When repeat brake is needed under serious conditions, it is suggested to stop for 10mins after continuous working for 2 hours or take other measures to cool down the brake caliper and the braking Fluid.

- When the loader is travelling down a slope , please set the transmission on low speed gear, with which the engine can be used to brake. Never shift the gears or put set the transmission to neutral .
- When the loader is travelling up a slope ,keep the bucket above the ground at the height ranging from 200mm to 300mm and put the bucket to the ground immediately under emergency to stop the loader effectively

Operation in snowing

When you are working on the road with snow or ice,even the small slope could make the machine slip. Therefore, it is necessary to travel slowly to avoid the sudden starting, stopping or turning. Otherwise, the machine will slip, especially when it goes up or down the slope.

The frozen road will be soften when the temperature rises, so the traveling conditions become unstable. In this case, be particularly careful for driving.

After snowing, the road shoulder and the objects on the side of road could not be seen clearly. Therefore, be careful for sweeping the snow.

When traveling on the slope covered with snow, it is necessary to install the tire chain.

Then traveling on the slope covered with snow, never apply braking suddenly. To decelerate, you can use engine as the brake, and at the same time depress the brake pedal for several times continuously. You shall, if necessary, lower the bucket down to ground to stop the machine.

The ground adhesive force varies dramatically due to the impacting from the accumulated snow. Therefore, you shall make corresponding adjustment to avoid the slipping when traveling.

Matters needing attention in cold area

Remove thoroughly the water, snow or sludge covered on the parts such as wires, cable connectors, switches, or sensors. If not, the water contents in them will be iced, and the machine will be ineffective when it is used next time, causing unexpected faults.

Perform thoroughly preheating operation. If the machine is not preheated before operation of the control lever, the reaction of the machine becomes slowly, thus possibly causing the unexpected accidents. Operate each control lever to let hydraulic oil in the hydraulic oil system to perform circulation,raising the system pressure up to the ones set by system, releasing it, and returning the oil to hydraulic oil tank,for heating the hydraulic oil. This can guarantee good reaction from the machine and prevent from working improperly.

If the electrolytes of the battery is iced, do not charge the battery,nor use other power supply to start the engine. This is dangerous, because it will make the battery on fire. When you conduct the charging or use other power supply to start the engine, you should first melt the electrolytes in the battery before starting and check for the leakage.

Do not operate on the soft ground.

Do not operate the machine on the soft ground. Because if working on such ground, the machine will easily sink into the ground, and difficult to come out.

Do not let the machine to be too close to the edge of the cliff, to the suspended portion or to deep ditch. If these portions are collapsed due to the weight or the vibration of the machine, the machine will possibly fall down or tip over, thus causing serious injury or death. Be sure to keep in mind that the earth at these places will be softened after heavy rain, explosion or earthquake.

The earth piled up on the ground or by the side of the ditch is soft. It will collapse under the weight or the vibration of the machine to cause the tip over of the machine.

Operation on slope

Be especially careful for that traveling on the slope will cause the machine to sideslip or tip-over.

The bucket must be 200-300mm over the ground while the machine is traveling on the slope. In an emergency, lower the bucket quickly down to the ground to assist the stop of the machine.

Do not make a turn on slope, nor traverse on slope. You should drive the machine down to the flat ground to perform these operations.

When driving down the slope, it is absolutely not to shift gear or put the gearbox onto Neutral Gear. Not using the braking force of the engine is dangerous. Put the gearbox onto low speed gear when the machine begins driving down the slope.

When driving down the slope, it is necessary to use the braking force of the engine, and travel at lower speed. Use also, if necessary, the braking pedal while using the braking force of the engine, so as to control the traveling speed.

Do not travel at a high speed on grasses, tree leaves or wet steel plate. If doing so, even a very small slope also make the machine slip towards one side. Therefore, it is necessary to travel at a low speed. The machine shall be right up or down the slope while the machine is traveling on the slope.

When the machine is traveling on slope, if the engine is switched off, it is necessary to immediately and completely depress the brake pedal and lower the bucket to the ground, then fix the machine by the parking system.

If the machine travels up or down the slope with load, you should let the bucket face the UP slope direction (i.e., face forward when traveling up, and face backward when traveling down). If the machine travels on the slope with load on the bucket, if you let the bucket face the DOWN slope direction, the machine will have the risk of tip over.

Parking the machine

After the operation, avoid sudden switching-off or shutting-off. Park the loader on a hard plane, far away from traffic lines and high walls, cliffs, and edges of pools and drainage ditch. If the machine must be parked on the slope, it is necessary to stop up the Tires to prevent from moving, and lower the bucket and other working devices down to ground or on the supporting bases. There should be no possibility of unexpected actions.

When parking on the highway, you should set the guard bars, marks, warning labels to ensure that the passing vehicles can see clearly the machine, and make the machine, flags and guard bars not hinder other vehicles.

All switches and operation levers must be switched off after the parking the vehicles during night.

Close the cab doors

Prohibit other persons sitting on the working device

Do not let anybody ride on the attachments such as bucket, crusher, otherwise it will cause the persons falling off or serious injury.

Figure 26

Others

The oils filled in must be clean, without containing impurities.

Frequently clean the filtration screen of the diesel fuel delivery pump (hand pump)

MAINTENANCE

Warning labels

Warn of that others persons are performing the maintenance, and hang the warning sign on cab control device and other necessary places.

Our company branch organizations provide control warning signs

ARO1320L

Figure 27

Requirements on personnel

Operation and maintenance of this machine may only be carried out by personnel equipped with corresponding resources. The persons irrelevant with current maintenance and repair work shall keep away from the work area. You can specially designate the persons to watch if necessary.

Be especially careful for performing cutting, welding or using hammers.

One person in charge shall be designated before starting of disassembling or mounting operation in the vicinity.

Do not let any non-working persons to approach the machine or accessories.

Perform the cleaning work before maintenance

Perform the cleaning work before inspection and maintenance to prevent the dust from entering the machine and ensure the maintenance can be securely performed.

If the machine is dirty when it is checked, it is difficult to locate the fault, and there is the risk of dust and mud entering the eyes or of the personal injury. Please obey the following items when you clean the machine:

- Wear the shoes with anti-slippage heels to prevent from slipping at the wet places.
- Wear goggles and work clothes when you clean the machine by using HP water gun.
- Adopt the protective measures to prevent HP water flow from cutting skin or prevent the mud from entering the eyes.
- Do not sprinkle water directly onto the electronic components (sensors, connectors) (1, Fig. 32). If the water enters the electrical system, it will cause the failure or faults

Pick up any tools in working area, rub up all lubrication oil, oil and other lubrication substances, and clean the working area to facilitate the safety operation. If the working area is not clean or tidy, it will cause tumbling or injury.

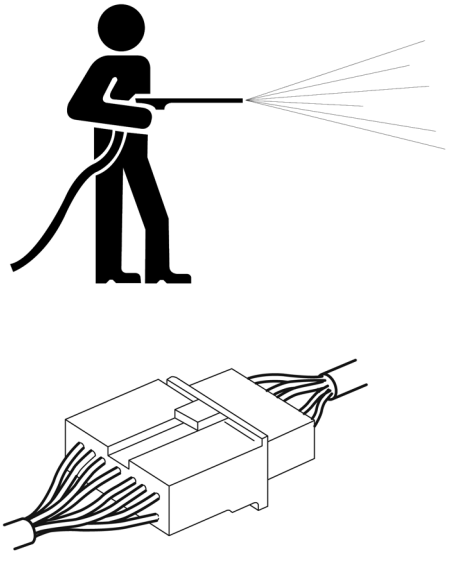


Figure 28

Proper tools

Use tools which are proper for the operation. The use of damaged, low quality, unqualified or temporary tools may cause the personal injury. The scraps from chisel or hammer are very dangerous, and they will cause the persons to be blind.

Figure 29

Operation of lighting devices

The explosion-proof lighting devices should be used for checking fuel, oil, battery electrolyte or detergent. Otherwise, there will be the risk of explosion.

Working in dark without using lighting devices may cause persons to be injured. Therefore, it is necessary to use appropriate lighting devices.

Do not use lighter or flames to replace the lighting devices even it is dark in working area, otherwise, it will cause fire. Tourmaline (gas) lamp also has the risks on fire and of explosion.

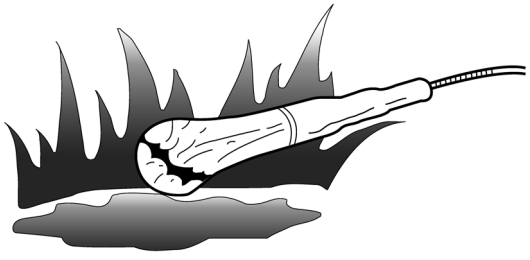


Figure 30

Fire protection and anti-explosion

All fuels, most lubrication oils and some coolant mixture are combustible. If the fuels are leaking or splashing onto the HT surface or on the electronic components, the fire will break out.

Put all fuels and lubrication oils at the specified places and make them far away from the unauthorized persons.

Put the oil foot and the combustible substances in the protective containers.

Prohibit smoking when the machine is oil-filled or is in the oil-filling area.

Prohibit smoking in the Battery Charging Area or in places where there are combustible substances.

Clean and tighten all cable connectors and check the cables for loose or wear every day. Tighten all loose cables and repair all worn cables before operating the machine.

Timely clear the combustible substances accumulated on the machine.

Do not weld the pipes containing the combustible liquids. Do not weld the pipes containing the combustible liquids. Please use anti-combustion solvent to thoroughly rub up the pipes before welding the pipes or cutting the pipes using flames.

Avoid burns

Stop the engine when checking the level of radiator to let the engine and radiator cool down.

Slowly open the cover to release the pressure before opening the cover of the radiator.

If the coolant in the recycling tank approaches the lower limit, add the coolant.

There is Alkali in coolant. First cool down the components of cooling system before draining out the coolant.

Hot components can cause personal injury. Do not let it contact the skin.

Slowly open the vent valve of hydraulic oil tank to release the pressure after engine stops operation, and ensure it is cooled down before screwing up the vent valve of hydraulic oil tank.

Release completely pressure in hydraulic oil system, fuel system or cooling system before disconnecting all pipes, connectors or connected components.

Battery can produce the combustible gases which may cause explosion.

Do not smoke while checking Battery electrolytes.

The electrolytes are acidic which may cause the personal injury. Therefore, do not let it contact the skin and eyes.

Be sure to wear goggles when performing he maintenance of battery.

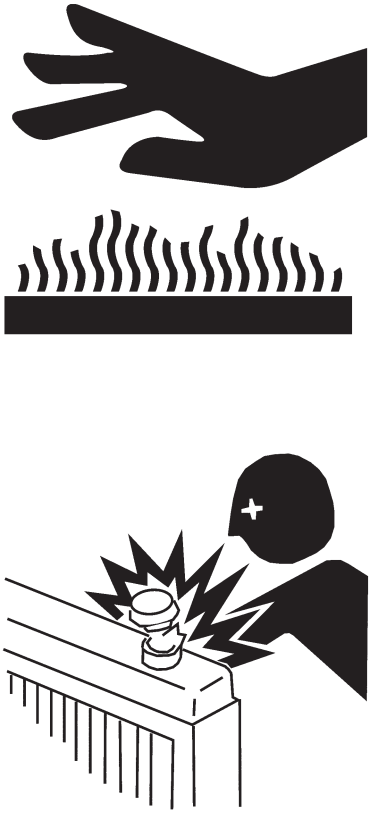


Figure 31

Welding maintenance

Welding maintenance

The welding operation should be performed at the specified place. The welding operation should be performed by qualified persons. The toxic gases and flames etc will be produced during welding, therefore, do not allow the unqualified persons to perform the welding operation.

The qualified welders must accomplish the following:

- The battery terminals must be removed and the battery must be moved away to prevent the explosion of battery.
- Remove the paints and coatings from electric welding site to prevent the toxic gases from being produced.
- If the hydraulic equipment, pump or actuator is very hot, they may produce the combustible toxic gases or smokes to cause fire. Therefore, do not heat these components.
- Do not weld the pipes containing the combustible liquids. Do not weld the pipes containing the combustible substances. Please use anti-combustion solvent to thoroughly rub up the pipes before welding the pipes or cutting the pipes using Flames.
- The direct heating up rubber pipe or pressured pipe may cause sudden breakage. Therefore, please use fire-protection cover to keep the fire out.
- Please wear protective work clothes.
- Make sure the premises are well ventilated where the work is per-formed.
- Remove all combustible substances, and prepare the Fire extinguisher.

WARNING

Warning to customers: remove the counterweights from the machine. The front devices or other accessories may affect the balance of the machine, thus causing the accidental movement and serious injury or death. Our company bears no legal responsibilities for the faults induced from misusing the equipment.

Matters needing attention for attachment moving, installation and storage

Select the leader for the operation before starting removal and installation.

Do not let any unauthorized persons to approach the machine or attachments. Put the attachments removed from the machine at the safety places to prevent from falling. The guard bars are set around the attachments and corresponding measures should be adopted to prevent unauthorized persons from entering.

Figure 32

Maintenance and protection measures on the machine

When performing maintenance of the machine, please keep the area around your feet clean so as to prevent from slipping, and accomplish the following:

- Do not spill over the oil or lubrication oil.
- Do not leave your tools all over.
- Mind the Step when walking.

Do not jump on or off the machine. In order to ensure the safety, use the guard bars and step board when you get on/off the loader, and at least have three points contact (i.e., two foot and one hand, or one feet and two hands).

Please wear protective work clothes if necessary.

When you are working on the engine hood, you can only use the inspection passage with corollary anti-slipping pad. Do not use other components

Figure 33

Avoid being crushed or cut

When performing maintenance,if you must operating the engine, ensure at least two persons must work together. One person is sitting on the driver seat to operate the control device and shut off the engine.

Unless otherwise instructed by others, Do not adjust the machine when the machine or the engine is running.

Be far away from the running or moving parts.

Keep objects far away from the fan blades which may throw off or cut the objects.

Do not use bent or peeled cables. When handling the cables, please wear the gloves.

The dowels will fly off when you knock them. The flied dowel may cause the personal injury. Ensure that there is nobody around when you knock the dowels. Wear the protective goggles when you are knocking to prevent the eyes from being hurt.

Equipment supports and stops

Do not let any load and equipment hang in the air. Please lower all objects down to ground before you leave the cab. Do not use hollow, cracked, unstable or rocking objects to support. Never work under the equipment supported only by a jack.

Figure 34

Measures which should be taken when you find the abnormalities during inspection

Measures which should be taken when you find the abnormalities during inspection

Perform the maintenance if any abnormality is found during inspection. Especially, if there is abnormality in brake or working device, it will cause the severe accidents.

Depending on the fault types, please consult the distributor specified by Hyundai.

Matters needing attention for HP pipes and hoses as well as LP hoses

Do not install the bent or damaged pipe or hose on the machine.

Repairing any loose or damaged fuel and lubrication oil way, pipes or hoses will possibly cause fire. Please consult the distributor specified by Hyundai for repair or maintenance.

Carefully check the pipeline, pipe and hose. Do not use naked hands to check the leakage. Check the leakage using one plate or paper plate. See “Penetration of solution” in Section “Safety” for more information. Tighten all connectors according to the specified torque. If the following problems are found, replace the items:

- The Joint is damaged or leaking.
- The external layer is worn or cut apart and exposure of reinforcing steel wires.
- Local upheaval in outer layer.
- Obvious torsion or squeezed.
- The reinforcing layer steel wires insert into external layer.
- The terminal end is wrong positioned.

Ensure all pipe clamps, protective plates and heat-insulations are correctly installed to prevent from vibrating, wearing other components or overheating.

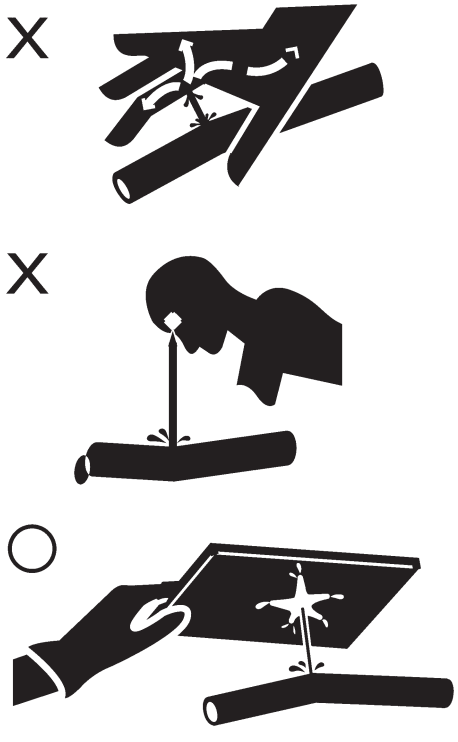


Figure 35

Compressed air

Compressed air may cause the persons to be injured. Wear protective mask, protective clothes and shoes when using compressed air. Use clean compressed air at pressure less than 0.3MPa, with a maximum pressure of 0.3 MPa.

Penetration of solution

Check the leakage using one plate or paper plate. Even the liquid leakage from a hole with a size of needle diameter can penetrate the human body, to cause the personal death. If the solution is splashing onto the skin, you must, within several hours, see a doctor for the treatment.

Scraps

Contacting with used engine oil may cause threats to the health.

Immediately rub off the engine oil from your hands, and wash away the remaining oil foot.

The used engine oil is a pollutant to the environment, and it can be only disposed by using the approved recycling equipment. Please accomplish the follows in order to prevent the environment pollution:

- Do not drain the waste oils into sewages or rivers.
- Collect the engine oil drained from the machine into the containers. Do not drain it directly onto the ground surface.
- Follow the corresponding laws and regulation when you dispose engine oil, fuel, solvent, filter or battery.

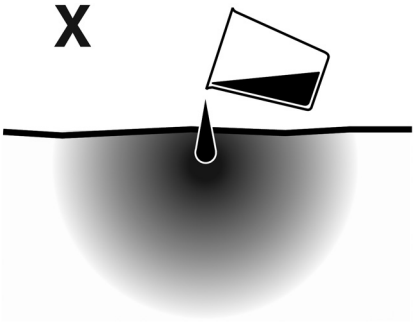


Figure 36

BATTERY

Prevention of battery risks

The battery electrolytes contain sulphur acid, and battery can produce Hydrogen. Hydrogen is highly explosive. If disposing incorrectly, it will cause serious injury or fire. In order to prevent these problems, please accomplish following items:

- Prohibit smoking or flame approaching the battery.
- Please wear protective goggles and rubber gloves when you performing inspection, maintenance or charging of battery.
- Rinse immediately with water if the battery electrolytes spills over your body on your clothes.
- Rinse with plenty of water and see the doctor immediately if the battery electrolytes enters your eyes.
- Drink plenty of water or milk, and eat raw eggs or vegetable oils if you carelessly drink the battery electrolytes. And immediately go to a doctor or a poisoning prevention center.
- Please use clean wet cloth to scrub the upper surface of the battery. Do not use gasoline, diluent, other organic solution or detergent.
- Tighten the cover of battery box.
- If the battery electrolyte is frozen, do not charge the battery or use other power supply to start the motor, otherwise it will cause the risk of explosion.
- If you want to charge the battery or use other power supply to start the motor, you should let the battery electrolytes molten and check for the leakage before operation.
- Remove the battery from the machine before charging.

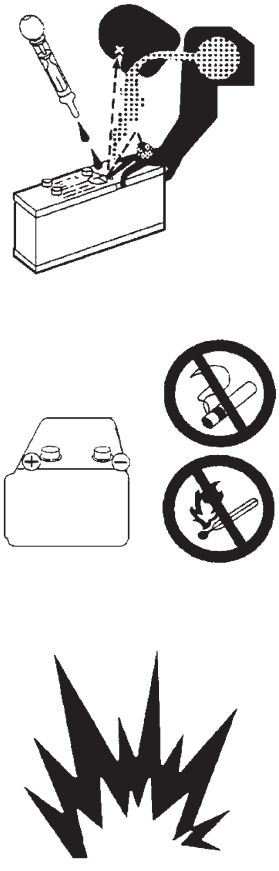


Figure 37

Auxiliary starting or charging the engine battery

The incorrect connection of battery cables may cause explosion or fire. Please obey the following items:

- Switch off all electrical equipments before connecting to battery, including the electric switch for battery charger and auxiliary starting device.
- When using other machine to perform the auxiliary starting, Do not let two machines contact each other. Wear protective goggles when connecting battery.
- 24 V battery combination consists of two 12 V batteries in serial. One wire connects to the Positive pole of one battery and the negative pole of the other battery. Connect the two positive poles of two batteries not in serial connection, and connect the negative pole of the booster battery and the metal support for the charged equipment.
- When connecting wires, first connect the positive pole wires; when disconnecting wires, first disconnect the negative pole wires. Finally connect the negative pole of the booster battery and the metal support for the charged equipment. The connection shall be as far away from the battery as possible.

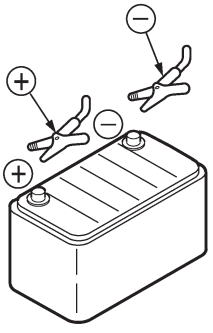


Figure 38

Air-conditioning System

Filling the refrigerant matters needing attention

- Refrigerant tank should be far away from fire, otherwise will produce the aura and gas, make the operator suffocation;
- Refrigerant tank should avoid direct sunlight, otherwise easy to occur the explosion;
- Connection or remove quick connector, should take goggles, avoid refrigerant burn eyes. If they into the eye, the application of medical treatment after rinse;
- In the compressor work, it is strictly prohibited to open the compound pressure gauge of the high side valve, otherwise it will cause high pressure refrigerant flow back to the refrigerant tank explosion;
- It is strictly prohibited to join the system special refrigerant and frozen oil (this system refrigerant is: R134a, refrigeration oil for: PAG100). Otherwise it will cause the entire system scrapped serious consequences.

When using the matters needing attention

- The warranty period it is strictly prohibited to remove their air conditioning system;
- Shut down the engine before air conditioning, start the engine after the open air conditioning,
- When summer refrigeration must be closed heater water valve. (winter heating season must open the heater, shut off the water valve empty adjustable temperature control switch)
- When using air conditioning, air conditioning indoor unit (evaporator) air inlet must not place such as clothing sundry, or it will cause into the wind not free, affect refrigeration effect don't even refrigeration;
- When winter will come, the temperature will be lower than 0 ℃, should be in the car to join antifreeze fluid, then must open the air conditioning wind water valve, make antifreeze liquid in the system in full circulation, to prevent air conditioning core body residual water, the temperature is below zero freezes when inflation will core body frost crack; (this is very important, core body frost crack will bring great economic losses, and not in the warranty range.
- Once every month in the winter should be open air conditioning refrigeration system (will bridge the temperature rise to about 5 degrees, open air conditioning three files and temperature control switch) running ten minutes or so, in order to make the system within the refrigeration oil can infiltrate the whole system, prevent the system from leakage

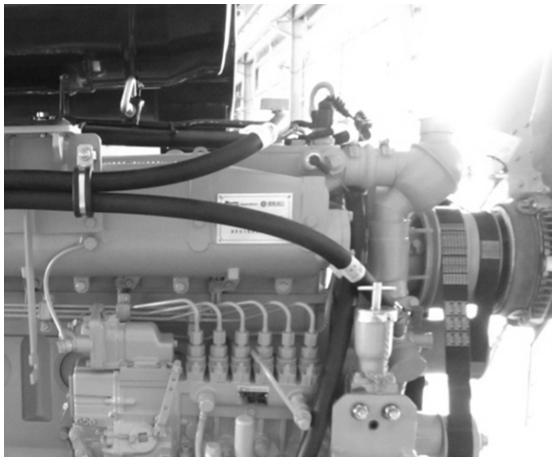


Figure 39

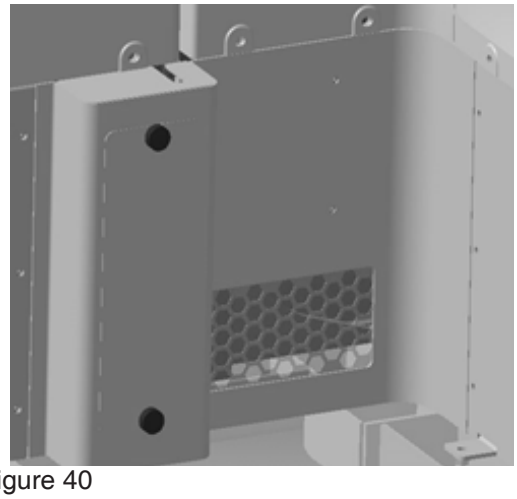


Figure 40

TRACTION

Matters needing attention on towing

If fault occurs during the selection or inspection of the traction string or during performance of traction, it will cause serious injury. Please obey the following items:

- Use the methods introduced in Operation and Maintenance Manual.
- Please wear the leather gloves for disposing string and ropes.
- When there are two or more persons to do the preparation, unify the signals and use them correctly.
- If there is fault in the machine or in the brake system, or the engine could not be started, please contact with the agent.
- When performing the traction operation, do not walk between the tractor and the towed machine.
- It is dangerous to perform the traction on slope, therefore, you should select a gentle slope. If there is no gentle slope, please reduce the slope angle before performing traction operation.
- Please use the string and ropes with enough traction force to tow the fault machine.
- Do not use the worn, kinked rope or the rope with too small cross-section.

Transportation of loader

Investigate the height, width and the allowed carrying capacity in the passage of transportation line. The total height, total width and total weight should not exceed the related regulations. Please consult HYUNDAI Infracore China Corporation or other agents for the solutions.

In order to prevent the safety accidents from being occurred during the shipment of the machine, clear the ice and snow as well as other slippery materials on the dock and wagon

NOTE:***During shipping, please follow the laws and regulations about the shipment height, width, length and weight issued by State and local authorities.***

Perform the shipping according to the procedures shown below:

1. Use wedges to stop the wheels of trailer or truck before shipping.
2. Do not allow the steering operation on the way for the machine being driven on to the trailer or the truck. You should back the vehicle to the fl at ground, and then perform the steering operation
3. After the machine is fixed, use frame-fixed bumper to fix the front and rear frames.
4. Lay the bucket down to the transportation vehicle, put the shifting manipulating handle on “Neutral Gear” position, and put the neutral gear locking plate on “Locking” position.
5. Pull up the button of parking brake to apply parking braking.
6. The engine is switched off, and all switches are put to Middle position or “OFF position. Pull out the starter key.
7. Close and lock all doors, then take away the cab key.
8. When you use truck or trailer to transport the machine, you must use wedges to stop the wheels and use steel cables to fix the machine, so as to prevent the machine from moving during transportation

Lifting of loader

1. It is necessary to let the professionals with lifting knowledge be responsible for the command and operation.
2. You should calculate the crane's maximum lifting weight and the sling's bearing capacity to ensure the lifting safety. Meanwhile, the 4 hooks on the sling shall bear load evenly.
3. Accomplish the following preparation before lifting:
   - Put the shifting manipulating handle on "Neutral Gear" position, and put the neutral gear locking plate on "Locking" position.
   - Put the arm and bucket to the lowest position.
   - Pull up the button of parking brake to apply parking braking.
   - Switch off the engine and pull out the starter key.
   - Close and lock all doors.
   - Use frame-fixed bumper to fasten the front and rear frames, making the machine unable to rotate.
4. The sling should be securely fixed to the lifting eyes of the machine on which the lifting marks are indicated.

WARNING

Incorrect lifting may cause the offset of the machine, thus inducing personal injury or death as well as property loss.

TOWING

Tow the fault machine

This machine cannot be towed unless in the emergency. Towing is only used for towing this machine to a place where the overhaul can be performed, instead of transporting over a long distance. The towing distance for this machine should not exceed 10km, and the towing speed should not exceed 10km/h, otherwise the gearbox will be damaged for short supply of oil. If you must move this machine, you should use special trailer.

WARNING

Incorrect towing of inoperable machine may cause the personal injury or death.
Towing the fault vehicle on bad road surface may cause the fault vehicle to be further damaged severely.
If the brake system is in fault, the brake shall not be applied. In this case, you should be quite careful during towing.

Matters needing attention for towing:

1. Be sure to release the parking braking.
   NOTE: ***you should use wedges to stop the wheels of the machine to prevent the machine from moving. If the machine wheel is not properly stopped by wedges, the machine will move. The wedges shall be removed after towing begins.***
2. Nobody shall be allowed to sit on the towed machine unless the driver can control the direction and brakes.
3. Ensure, before towing, the towing rope and the tow bar are in good working conditions and have adequate strength to pull the machine. The strength of the available towing rope and tow bar shall be at least 1.5 times of the gross weight of the towed machine, so as to pull up the machine from the mud or beneath the slope.
4. Keep the minimum angle of the supporting rope, and the angle between the tow rope and the right ahead should not exceed 30º
5. The too quick movement of the machine may cause the breakage of tow rope or tow bar. It is better to slowly and stably move the machine.
6. When towing the machine, all persons shall be far away from both sides off the rope to prevent the tow rope from injuring persons due to the breakage.
7. Under normal conditions, the trailer shall be of a size as the machine. It is necessary to ensure the trailer shall have adequate braking capacity, weight and power to control the slope ascending of two machines and the travel distance etc.
8. When the towed machine is descending the slope, in order to have adequate controlling and braking capacity, it is necessary to connect a bigger trailer or other machine to the back of the machine so as to prevent from out-of-control and rolling.
9. If the travel direction of the towed machine is controlled by the driver, the driver shall make the turn along the direction of tow rope.

Operation Controls

Description of each component position and each control switch, instrument and valve through drawings or photos.

Indicator lights work besides the gauges on the instrument panel. The operator should monitor machine pressure on the instrument panel with indicator lights. These lights will only show there is a problem.

WARNING

VOID DEATH OR SERIOUS INJURY

Warning lights. When any one or more of the warning lights on the control console come “ON”, immediately stop operation and shut down unit. Investigate and correct problem before proceeding with operation.

COMPONENT LOCATIONS

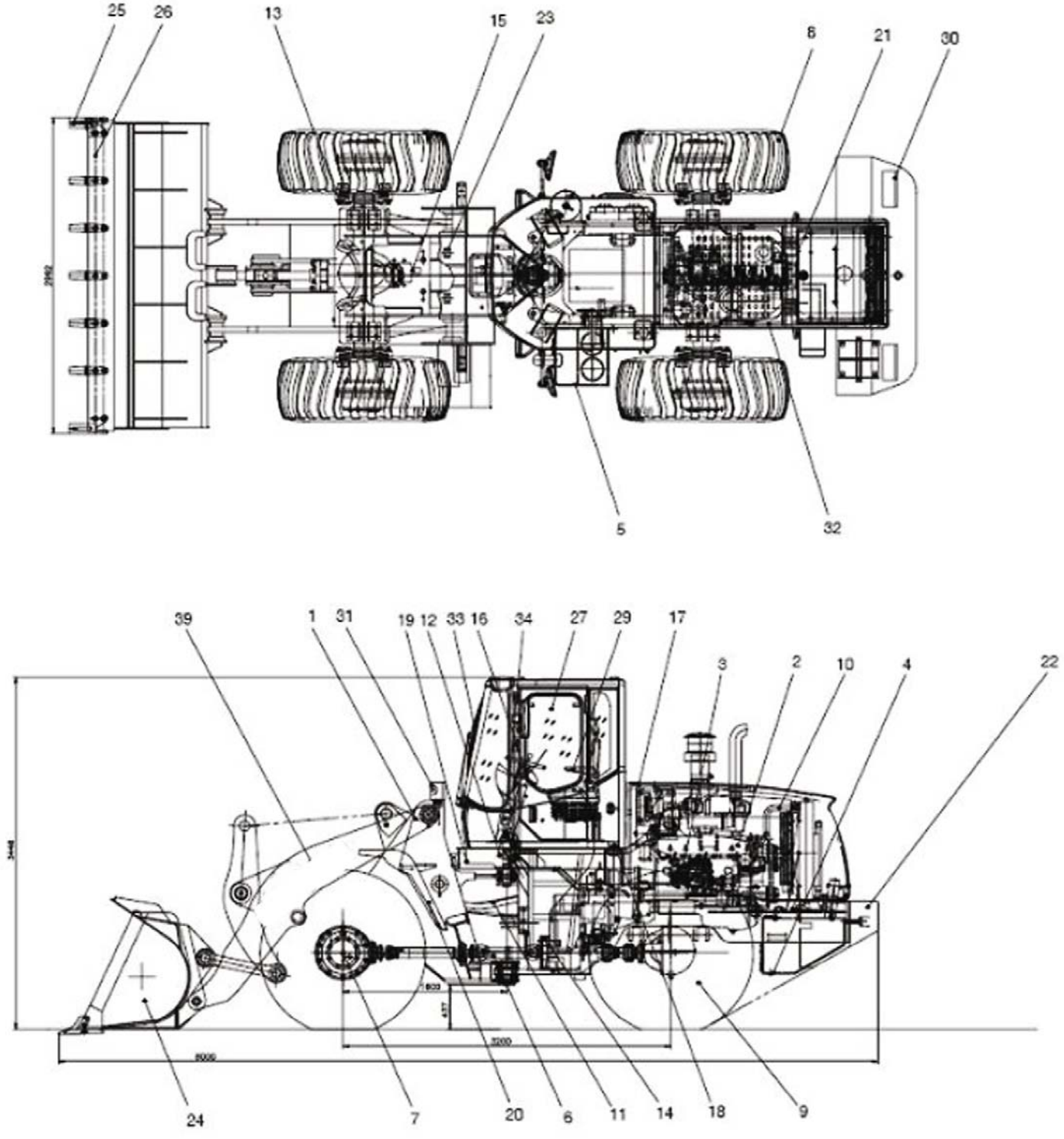


Figure 1

Reference Number	Description
1	Main frame
2	Engine and gearbox
3	Engine controls
4	Fuel tank
5	Hydraulic oil tank
6	Driving shaft
7	Axle
8	Tire
9	Tire hub
10	Cooling pipeline
11	Main pipeline
12	Steering oil piping
13	Brake pipeline
14	The Brakes
15	Control valve pipeline
16	Handrail
17	Cover

Reference Number	Description
18	Cab seat
19	Trims in cab
20	Pedal
21	Stop
22	Counterweight
23	Front additional device
24	Bucket module
25	Bucket lip
26	Bucket knifing edge
27	Cab
29	Seat
30	Lighting lamp-rear
31	Lighting lamp-front
32	Electrical part - engine
33	Electrical part - cab
34	Electrical part - electrical
39	Nameplate

OPERATION LEVER AND DASHBOARD

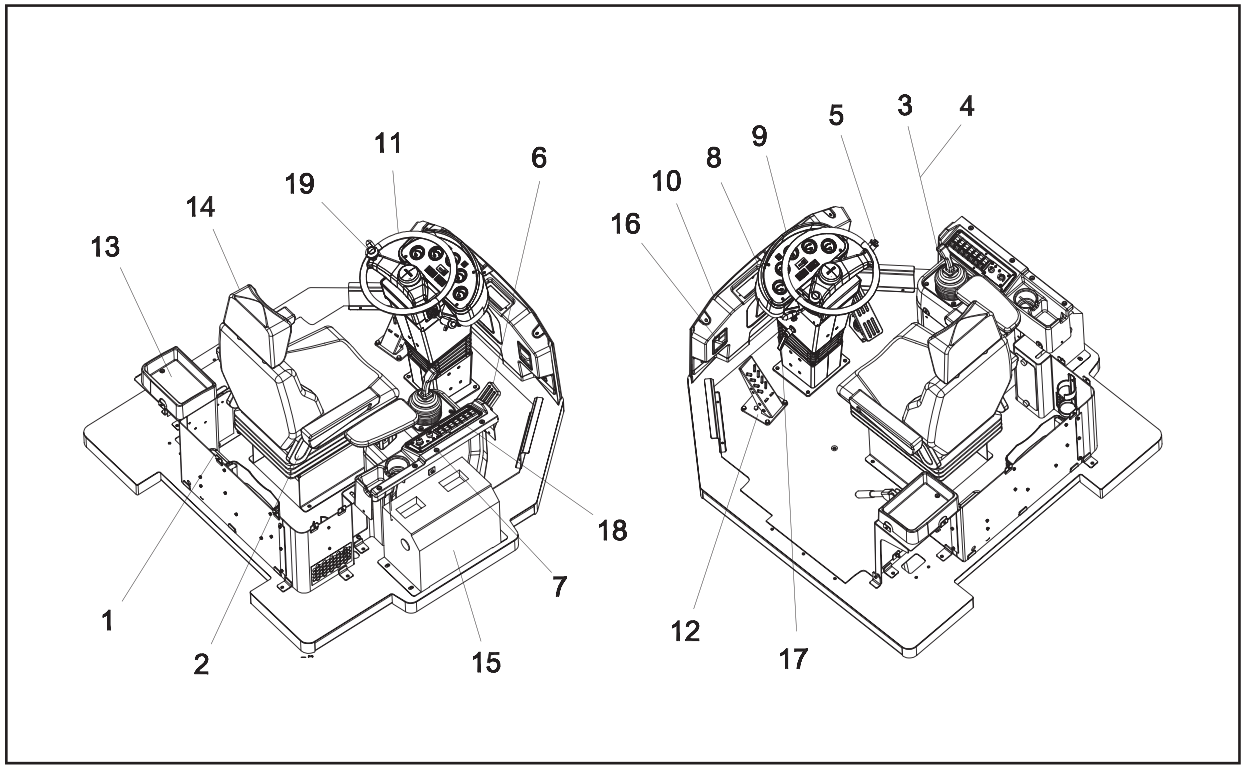


Figure 2

Reference Number	Description
1	Washing pot
2	Adjusting handle for seat
3	Bucket manipulating handle
4	Arm manipulating handle
5	Combo switch handle
6	Throttle pedal
7	A\C Panel
8	Dashboard base
9	Dashboard assembly
10	Panel

Reference Number	Description
11	Steering wheel
12	Brake pedal
13	Electrical element box
14	Seat
15	A\C evaporator assembly
16	Control switch such as OFF
17	Air outlet
18	Lamp switch assembly
19	Steering Wheel Adjustment Handle
20	Gearshift handle

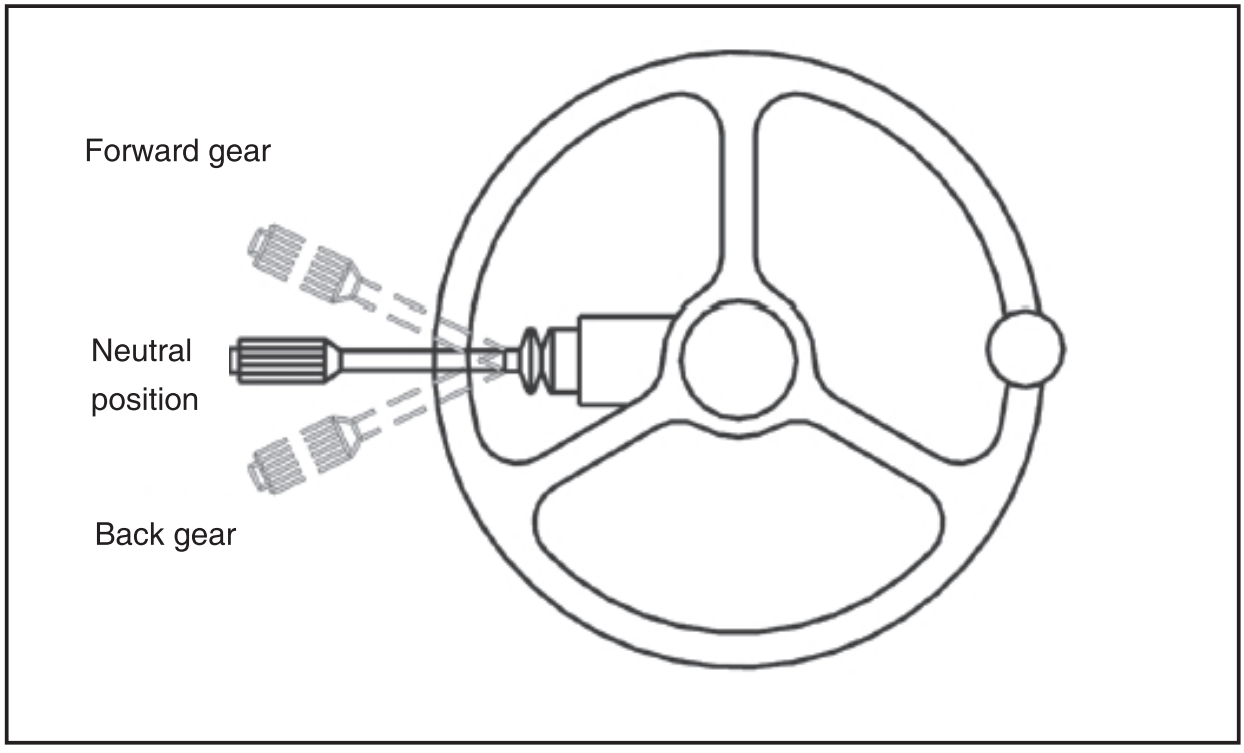


Figure 3

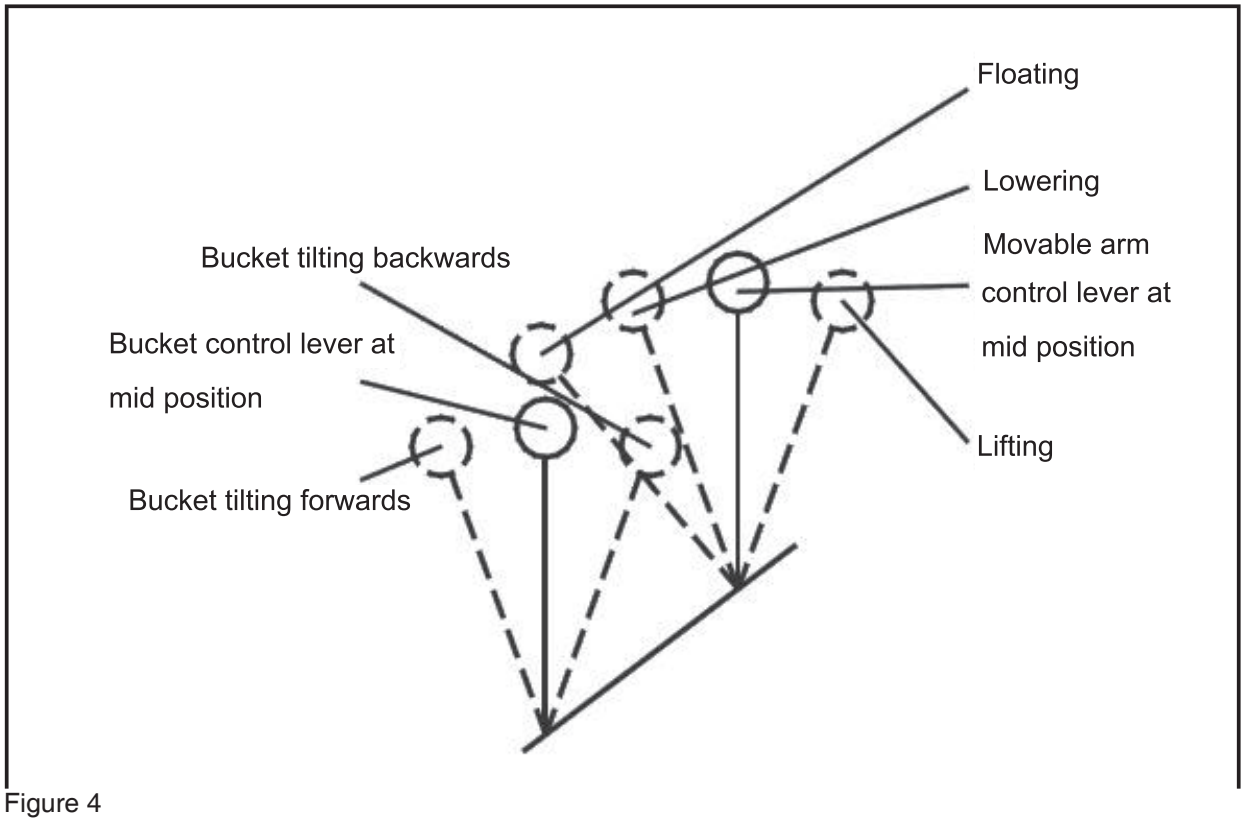


Figure 4

Manipulating facility

Steering Wheel

1. The steering wheel rotation angle is not equal to the machine's rotation angle. Continuously rotate the steering wheel to increase the rotation angle until to the required position.
2. The quicker the steering wheel rotates, the quicker the machine rotates.
3. The steering wheel cannot restore to original position after rotation, and the machine rotation angle is kept unchanged. Therefore, after the machine finishes the steering, you should reversely rotate the steering wheel to make the machine drive along the straight direction.
4. The intermediate round button of the Steering Wheel is horn switch. (this switch can be automatically reset)

Figure 5

WARNING

Do not switch off the negative pole switch of the battery while the engine is still running, otherwise it will damage the whole electrical system!!

Shifting lever

Rotating the shifting lever can control the speed of the loader frontward or backward.

Note: *Before starting the engine, please confirm the negative pole switch is in "ON" state and the shifting manipulating handle is at "Neutral" position.*

When the engine is working ,the back buzzer will ring and the back lamp will light if the shift lever is on R position;

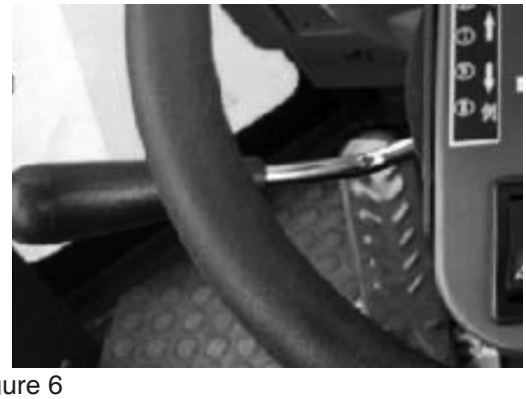


Figure 6

Starting switch

Starting switch (also called as electric lock) is located on the right side panel of the steering wheel

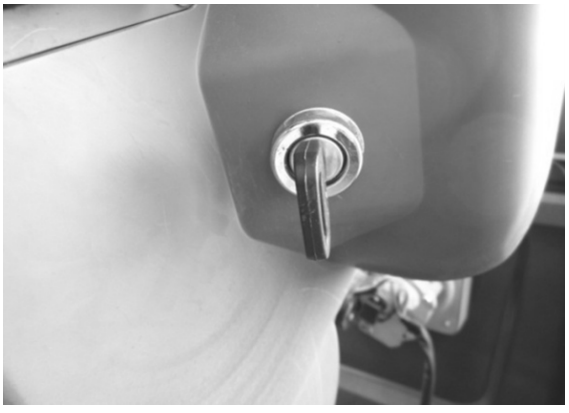


Figure 7

1. Auxiliary – the first position you meet when you insert the starter key and rotate it counterclockwise, and this gear position can be auto reset (i.e., the button will return to “OFF” position when you release your hand). This gear position is not available at present.
2. OFF – at this gear position, the power supply control circuit for the whole machine is cut off, but at this time the machine is still powered by the generator. When you want to stop the machine, first use the switch off handle to stop the engine, and then rotate the starting switch to “OFF” position.

   Note: ***Only at this position, is it possible to insert or pull out the starter key!***
3. ON – the first gear position you meet when you insert the starter key and rotate it clockwise. At this position, the electrical system of the whole vehicle can be powered to operate normally.
4. START – the second gear position you meet when you insert the starter key and rotate it clockwise. At this position, the starter motor can be powered to operate and start the engine. After the engine is successfully started, you should immediately release the starter button. This gear position can not be held by itself. As soon as you release the starter button, it will auto return to “ON” position of the starter switch.

   Note: ***Before starting the engine, please confirm the negative pole switch (fig.8)is in “ON” state and the shifting manipulating handle (fig.9)is at “Neutral” position.***

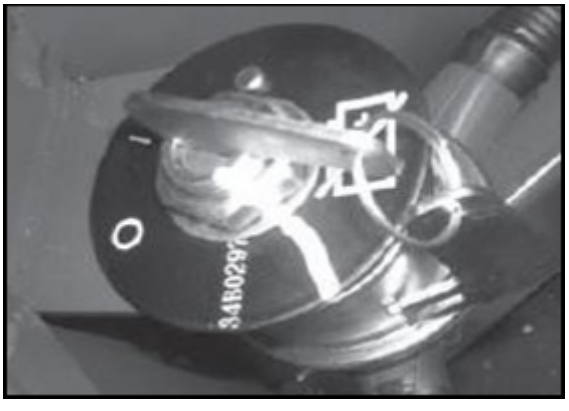


Figure 8

Figure 9

WARNING

If the engine starting operation fails, it is necessary to turn the switch to "OFF" position then you can restart. Otherwise it will damage the starter switch!

The time for each start should not exceed 15 s; the interval between two starts shall be at least 30s and the times to continuously start should not exceed 3 times; if it exceeds 3 times, you should wait for the starter motor to be fully cooled down, then you can start again. Otherwise, it will reduce the operation life of the battery; meanwhile it may damage the starter motor.

Operation of pre-heater system

The pre-heater system can be used in some regions and states where the cold weather may affect the starting ability of the engine. Please read the following specification carefully before operation

1. Turn the starter switch to the position 'ON'
   Starter Switch ('ON')

   When the resistivity of the engine coolant sensor is less than 2700 ± 300 Ω (which means that the engine coolant temperature is above 0 ℃), the controller won't go to pre-heat status and the pre-heat indicator will be on for 2s before goes out

2. When the resistivity of the engine coolant sen sor is more than 2700±300Ω (which means that the engine coolant temperature is below 0 ℃) ,the controller will go to pre-heat status and the pre-heating time is associated with the voltage (please refer to the following table)

Voltage(V)	18	20	22	24
Time(S)	55±5	41±4	30±3	26±2

3. When the pre-heat time is up, the pre-heat indicator (DL) goes out (If the start switch is turned off during the pre-heat time, the controller will stop) and the pre-heat system then wait to start the engine for 30s.
   a. During the waiting time (the pre-heat plug is in ON position),if you switch on the start switch (K2),the fuel supply valve is open and the pre-heat indicator will be lighted on again with the pre-heat plug energized .
   b. If the start switch(K2) is not switched on during the waiting time,the 24V voltage will not input to 50 port, the engine does not start and the pre-heater controller will stop working

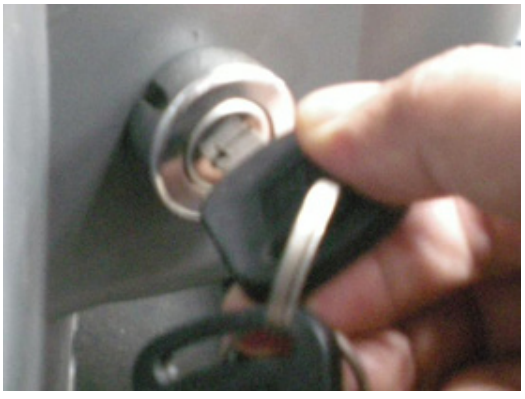
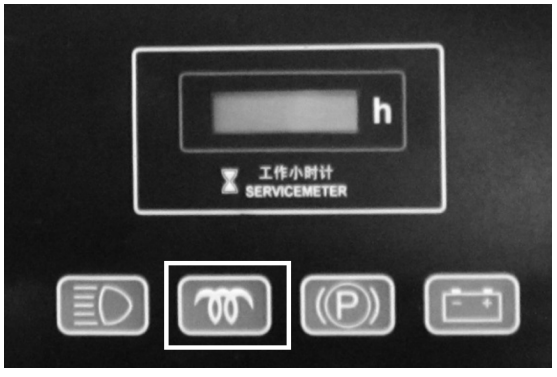


Figure 10



Pre-heat indicator

Figure 11

Figure 12

4. If the generator don't send D+ signal to the controller after the reset of the start switch, which means that the engine fail to be started, the controller will stop working after 6s;if the generator send D+ signal to the controller (which means that the engine is started),it begin to heat and the heat time is presented as a function of the resistance of the engine coolant sensor whose range is between 60s and 120s.
5. If the circuit of the engine coolant sensor is open, the pre-heat system works. The pre-heat indicator(Fig.11) twinkle for 15s to give a warning after all start procedure is over, and it is the longest heating time.
6. When the voltage is less than 15V, the pre-heat system doesn't work and the pre-heat indicator(Fig.11) (DL) twinkle for 15s to give a warning.
7. No matter the controller stop working at any state, turn off the pre-heat switch (K1) which means cancel the 15th terminal voltage. Turn on the pre-heat switch (K1) again, the controller is into per-heat state.

Schematic Diagram

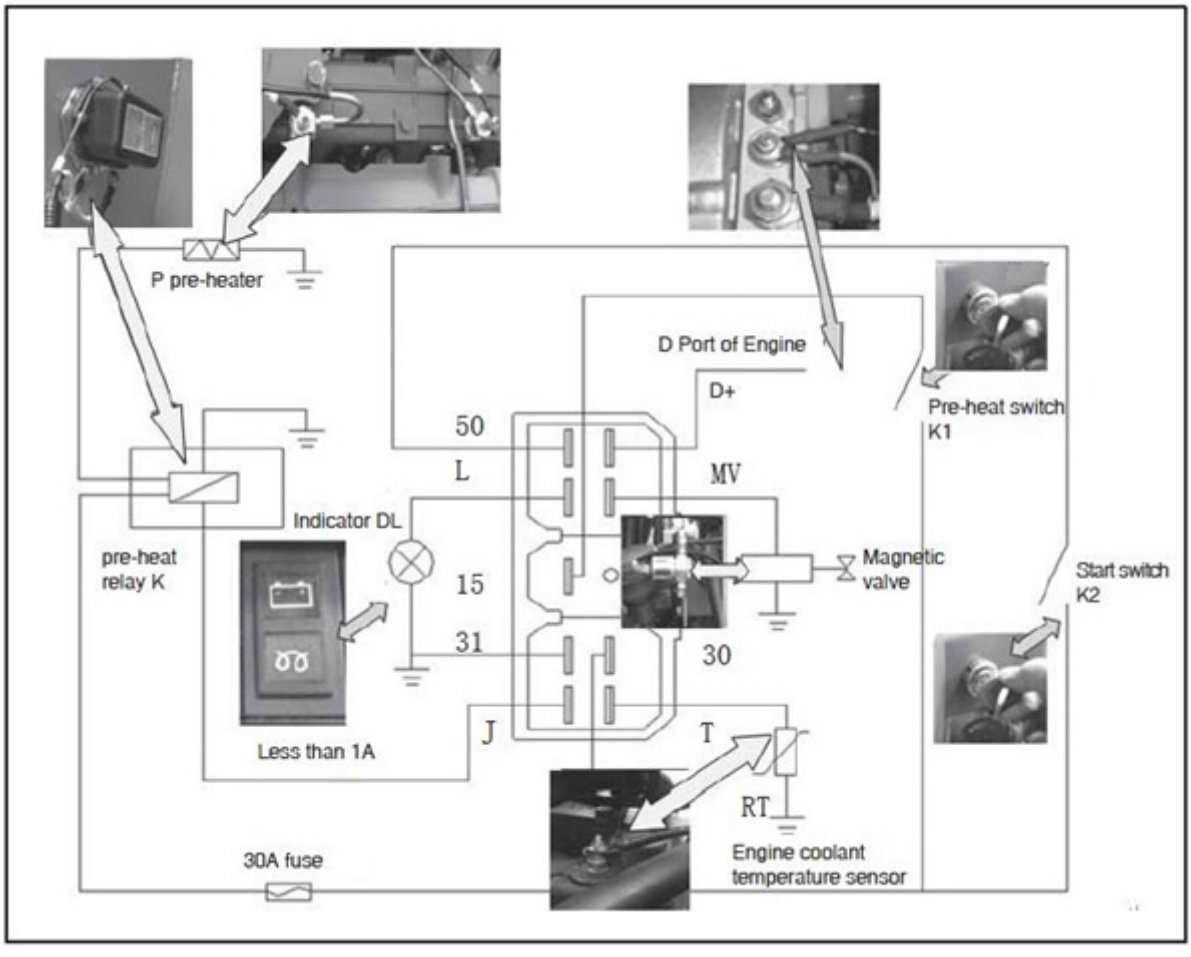


Figure 13 Preheating System Schematic Diagram

Parking braking

Parking braking switch (Hand brake) is located on the console on the left side of the cab. When it is pulled up, the braking applies. (Fig.14)

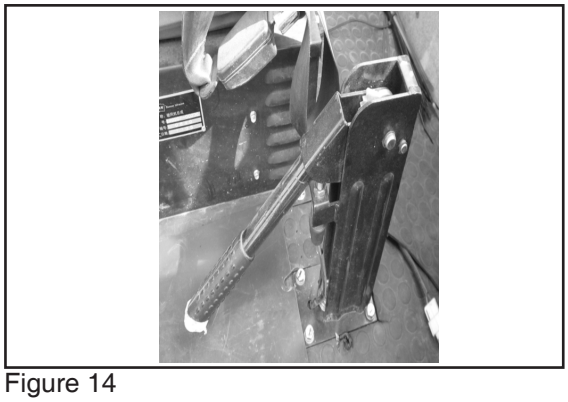


Figure 14

Service braking pedal

Service braking pedal (foot brake) is located in front left of the cab Floor. (Fig. 15)

Depress the service braking pedal; the braking applies onto front and rear driving axles. Meanwhile, the braking lamp switch is energized, and the braking lamp is lit up. Release the Service braking pedal to release the service brake

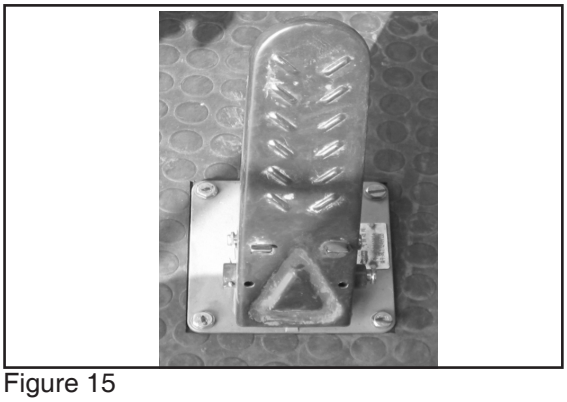


Figure 15

Throttle pedal

The throttle pedal is located in front right of the cab Floor. When it is at the position shown in (Fig.14) the engine is in the idle state. Depress the throttle pedal, the amount of fuel supply will be increased to increase the power output of the diesel engine.

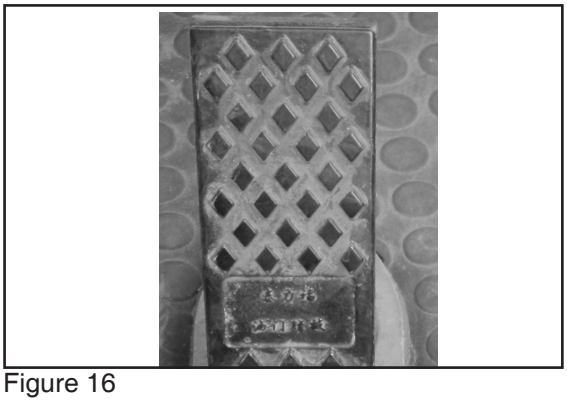


Figure 16

The engine STOP cable

The engine cutoff of this machine is realized by pulling the cutoff cable. When the engine is running, if you pull up the cutoff cable, the engine will be flame-out. (Fig.17)

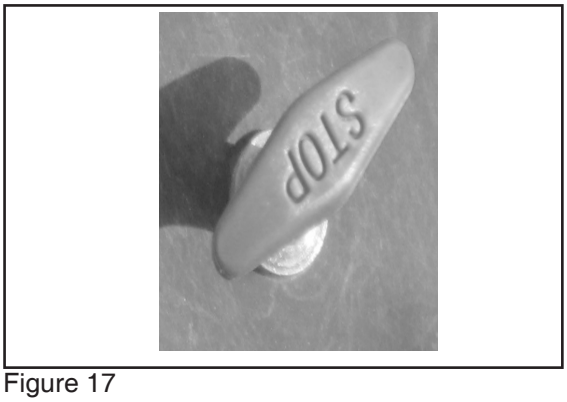


Figure 17

Gearbox manipulating handle

Gearbox manipulating handle is located under the steering wheel.

Toggling the handle back and front, may operate gears “Forward I”, “Forward II”, “Reverse” and “Neutral” respectively. (Fig.18)

Figure 18

Immediate direction-changing function

here is no direction-changing interlocking function for shifting manipulating handle of this machine. The driver can, based on the vehicle speed, immediately change the direction of the vehicle (it is required that the vehicle speed shall be less than 10Km/h when the direction is changed):

- For forward 1 and 2 positions, you can engage them to reverse position at any time. However, because this machine has only Reverse 1 Position, therefore, if you toggle the lever to the Reverse position, it is always the Reverse 1 Position

NOTE

Do not selfishly change the shifting manipulating system when the shifting manipulating system of the vehicle is in fault !

If the fault cannot be removed, please contact ₩ith autho rized maintenance station and after sales service company of Hyundai for the maintenance.

Working Device control Leverar

1.Mechanical

Working lever is installed on the right side of the seat. It is used for controlling the working device to perform the operation. The inner side is bucket control lever, used to control the movement of the bucket. The outer side is boom control lever, used to control the movement of the booms. Both handles are at the “HOLDING” position under natural state, i.e., at the middle position. When the engine is running, if you push the bucket control lever forwards, the bucket will tilt forward; if you pull the bucket control lever backwards, the bucket will tilt backward. If you push the boom control lever forwards, the boom will get down; if you pull the boom control lever backwards, the boom will rise. If you slightly move these two handles forwards or backwards, you can control the openness of the main valve, which, together with the throttle openness, can control the movement position and speed of the working device in a comparatively accurate mode.(Fig.19-1)

Figure 19-1

2.Pilot manipulating handle (Standard configuration)

Pilot manipulating handle is installed on the handle manipulating box on the right side of the driver seat. It is used for controlling the working device to perform the operation. The inner side bucket manipulating handle is used to control the bucket's movement and the outer side arm manipulating handle is used to control the arm's movement. Both handles are at the "holding" position under natural state, i.e., at the middle position.

When the engine is running, if you push the bucket manipulating handle forward, the bucket will tilt forward; if you pull the bucket manipulating handle backward, the bucket will tilt backward.

If you push the arm manipulating handle forwards, the arm will lower; if you pull the arm manipulating handle backwards, the arm will rise.

If you slightly move these two handles forwards or backwards, you can control the openness of the main valve, which, together with the throttle openness, can control the movement position and speed of the working device in a comparatively accurate mode.

Besides, the pilot manipulating handle also has the following special functions:

1) Arm lifting limit:

If the arm manipulating handle is pulled backwards to the extreme rear position, the arm manipulating handle will be stuck by arm rise holding magnet (the arm manipulating handle will not return back to the middle position even you release your hand), and the arm will be rising all the time; when the arm reaches the limit position, the arm limit switch is actuated, the arm rise holding magnet is de-energized and loses the suction force, and the arm manipulating handle will automatically rerun to the middle position under the force of spring and the arm will no longer be lifted.

2) Arm Floating device:

If the arm manipulating handle is pushed forward to the extreme front position, the arm manipulating handle will be stuck by arm floating holding magnet (in this case, the driver can release his hand, and the arm manipulating handle will not return back to the middle position), and at this time, the arm is in floating state. If you want to remove the floating state, you only need to pull the arm manipulating handle back to the middle position.

When you manipulate the arm to lower down, you can push the arm manipulating handle to the Floating position and the will then descend under the action of gravity. At this time, the driver can use his right hand to perform other operations (e.g., lay down the bucket), thus improving the working efficiency.

When you performing scraping or shoveling & loading, push the arm manipulating handle to the Floating position, and the bucket will fluctuate as the fluctuation of the ground surface, thus avoiding the damaging of the road surface.

3) Bucket leveling limit device

When the bucket is in the unloading state, if the bucket manipulating handle is pulled backwards to the extreme rear position, the bucket manipulating handle will be stuck by Bucket Receive holding magnet and will be held at the extreme rear position (the bucket manipulating handle will not return back to the middle position even you release your hand), and the bucket will be rotated backwards all the time; when the bucket reaches the limit position, the bucket leveling limit switch is actuated, the Bucket Receive holding magnet is de-energized and loses the attractive force, and the bucket manipulating handle will automatically rerun to the middle position under the force of spring and the bucket will no longer rotate. In this case, lower the arm. When the bucket contacts with the ground surface, the bucket bottom is fLush

with ground surface. When the bucket manipulating handle is again pulled backwards to the extreme rear position, the bucket manipulating handle will not be stuck by Bucket Receive holding magnet (it will return back to the middle position under the force of spring when you release your hand) because the Bucket

Receive holding magnet is de-energized all the time due to the Limiting and Holding function of the bucket leveling limit switch. Only when you push bucket manipulating handle forwards and the tilting of bucket (unloading) exceeds the bucket leveling position, can the bucket leveling limit switch be reset and the bucket auto leveling function be restored. At this time, if the bucket manipulating handle is again pulled backwards to the extreme rear position, the bucket manipulating handle will be held at the Extreme Rear Position.

The bucket manipulating handle does not have holding function when it is at the front position. When the bucket tilts forwards from the maximum bucket receive angle to the unloading angle, you need, at all time, push the bucket manipulating handle in ahead(bucket manipulating handle will return back to the middle position under the force of spring when you release your hand), which will not stop even when the bucket passes the leveling position.

When shoveling and loading, you should fully use arm lifting limit, arm floating device and bucket leveling limit device, which will effectively reduce the labor intensity, thus improving the comfort of operation

Figure 19-2

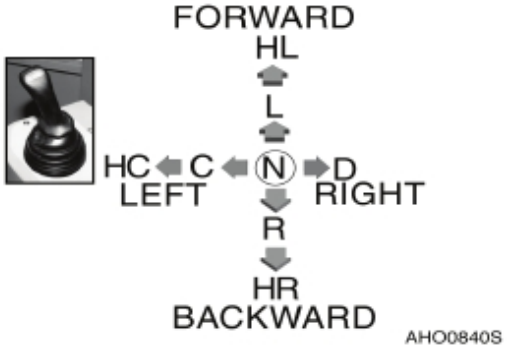


Figure 19-3

Lamp and Switch

The lamps of the whole vehicle include front combination lamp (there is one at each side), front working lamp (there is one at each side), rear combination lamp (there is one at each side), room lamp, and rear working lamp (there is one at each side). (Fig.20-24)

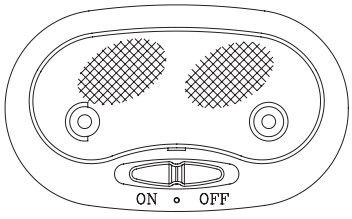


Figure 20

The front combination lamp include headlights, front position lamp, former turn light

Figure 21

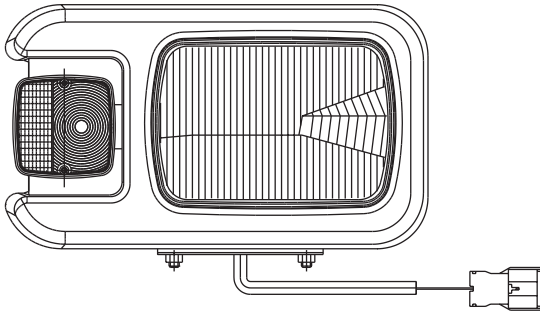


Figure 22

Rear combination lamp include after turn light, brake lamp, rear position lamp, reversing light.

Figure 23

Figure 24

ROCKER SWITCH

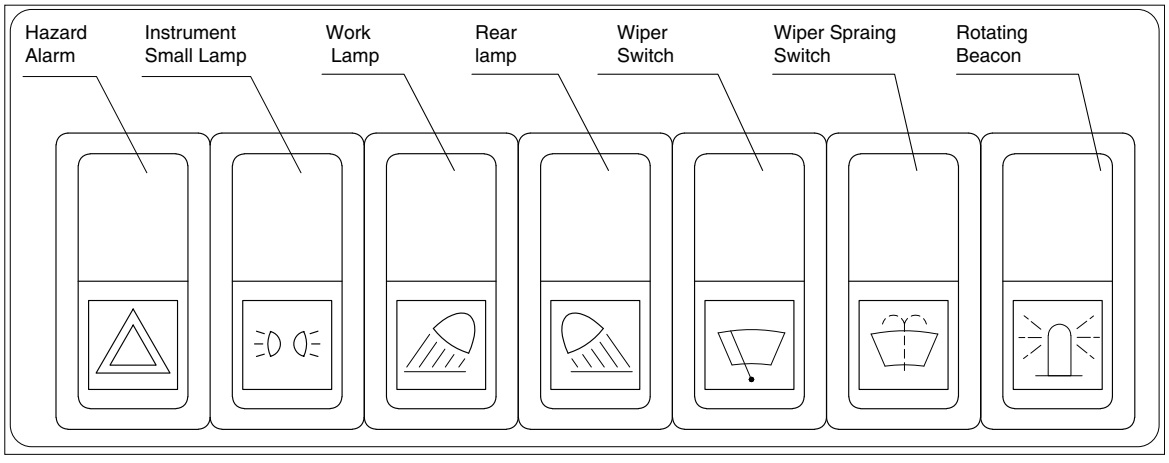


Figure 25

1. Hazard Warning Light Switch

This warning light is used when the equipment is stopped due to a malfunction or when an emergency occurs. When this switch is pressed the directional indicator lights in front and back of the machine light up and flash, warning others in the area. At the same time the directional indicator lights.on the instrument panel will turn “ON” to warn the operator. The hazard warning lights operate independent of the starter switch.

O. In this position, this switch turns “OFF” hazard warning lights.

I. In this position, this switch turns “ON” all turn signals and they flash simultaneously.

NOTE: ***Hazard warning lights will function with starter switch in “OFF” position.***

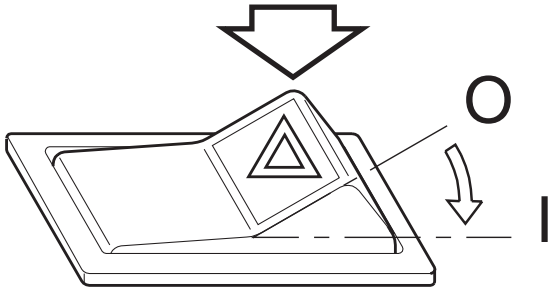


Figure 26

2. Headlight Switch

The small lamp switch can control the four small lamps in front and rear to be lit up or off simultaneously. In addition, it can also control the indicators for all rocker switches and instrument lighting.

O. In this position, this switch turns “OFF” clearance, tail,instrument panel, switch and headlights.

I. In this position, this switch turns “ON” clearance, tail, instrument panel and switch lights.

II.In this position, this switch turns “ON” clearance, tail, instrument panel, and headlights.

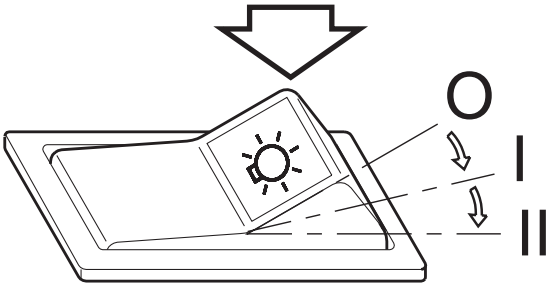


Figure 27

3. Front Work Light Switch

Work light switch control the two work lamps in the ceiling of the cab to be lit up or off simultaneously

O. In this position, this switch turns “OFF” work lights mounted on the front top of cabin.

I. In this position, this switch turns “ON” work lights mounted on the front top of cabin.

NOTE: ***Do not turn “ON” the work lights when traveling on public roads***

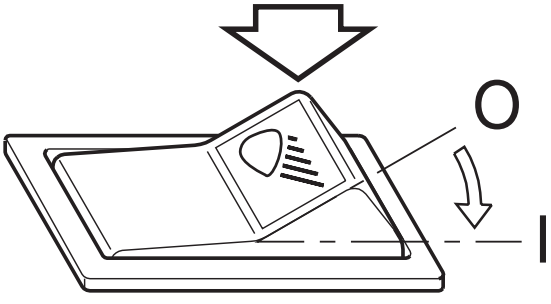


Figure 28

4. Rear Work Light Switch

O. In this position, this switch turns “OFF” work lights mounted on the side of radiator.

I. In this position, this switch turns “ON” work lights mounted on the side of radiator.

NOTE: ***Do not turn “ON” the work lights when traveling on public roads***

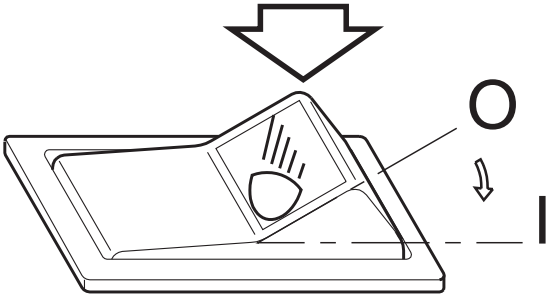


Figure 29

5. Rear Wiper Switch

O. In this position, this switch turns “OFF” windshieldwiper mounted on rear windshield of operator’s cabin.

I. In this position, this switch turns “ON” windshieldwiper mounted on rear windshield of operator’s cabin.

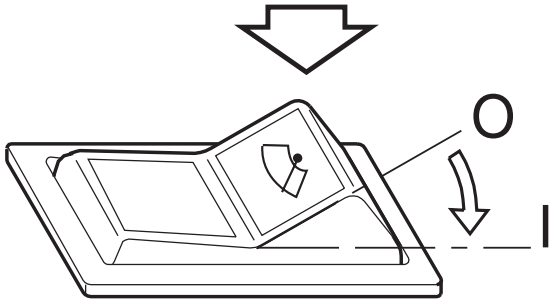


Figure 30

6. Rear Washer Spray Switch

O. In this position, this switch turns “OFF” washer motor mounted on inside rear of cabin

I. In this position, this switch turns “ON” washer motor mounted on inside rear of cabin

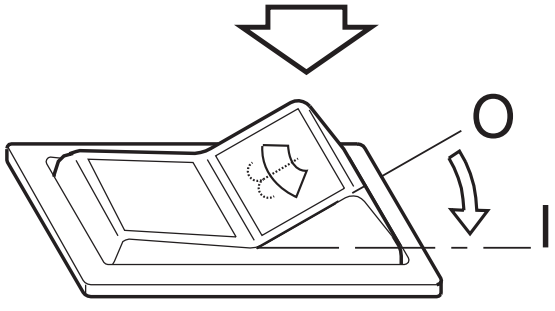


Figure 31

7. Rotating Beacon Light Switch(optional)

O. In this position, this switch turns “OFF” rotating beacon light.

I. In this position, this switch turns “ON” rotating beacon light.

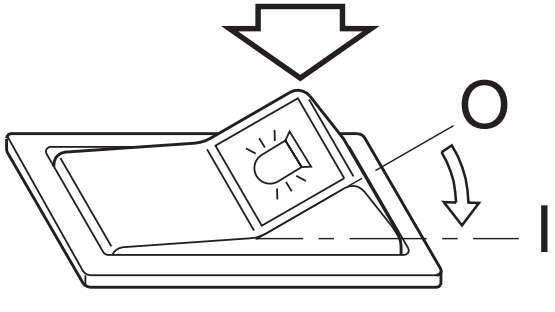


Figure 32

NOTE:***Turn lights are controlled by the handle on console assembly. In the case of before turning off the switch of battery, the room lamp can be opened out of control of the ignition key.***

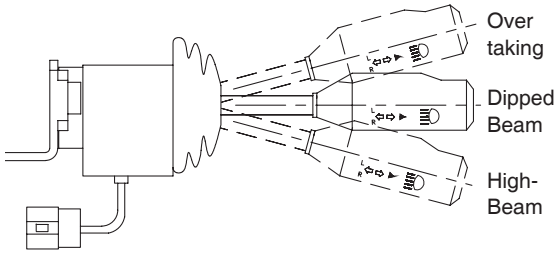


Figure 33

WARNING

Before driving, check all braking lamps, steering lamps, small lamps for damage or fault. If any, please repair and then begin driving.

MONITORING SYSTEM

Monitoring instrument and horn switch

Most of monitoring instrument and meters and indicators are integrated in the instrument ass`y below the steering wheel. The Instrument include: totaling to 8 meters for cooling water temperature, gearbox oil level, timer, braking air pressure, engine oil pressure, torque converter oil temperature, power supply voltage; the indicators include: steering indicator, charging fault indicator, high beam indicator, stopping (parking) braking indicator etc.. In addition, there is LP alarm device in the empty paper box on the left side of the seat

1. Monitoring Instrument

When the pointers of various monitoring instrument(except timepiece)are within green zones, this means that this monitoring item is now in the normal range, and the loader can normally work;; on the contrary, if the indicated positions are not within the green zones, you must confirm the states for this monitoring item and adopt corresponding measures to correct. You can not enter the normal working conditions until the indication is normal.

2. Indicating lamp

When the left steering lamp or right steering lamp is switched on, the corresponding left steering or right steering indicators shall be lit up;

When the high beam lamp is switched on, the corresponding high beam indicators shall be lit up; When the loader is in stopping (parking) braking state, the parking braking indicators shall be lit up;

When the ignition switch is rotated to “ON”, the charging fault indicator is lit up before the starting of engine; the charging fault indicator is OFF after the starting of engine

3. Detailed descriptions for Monitoring instrument and Indicating lamp

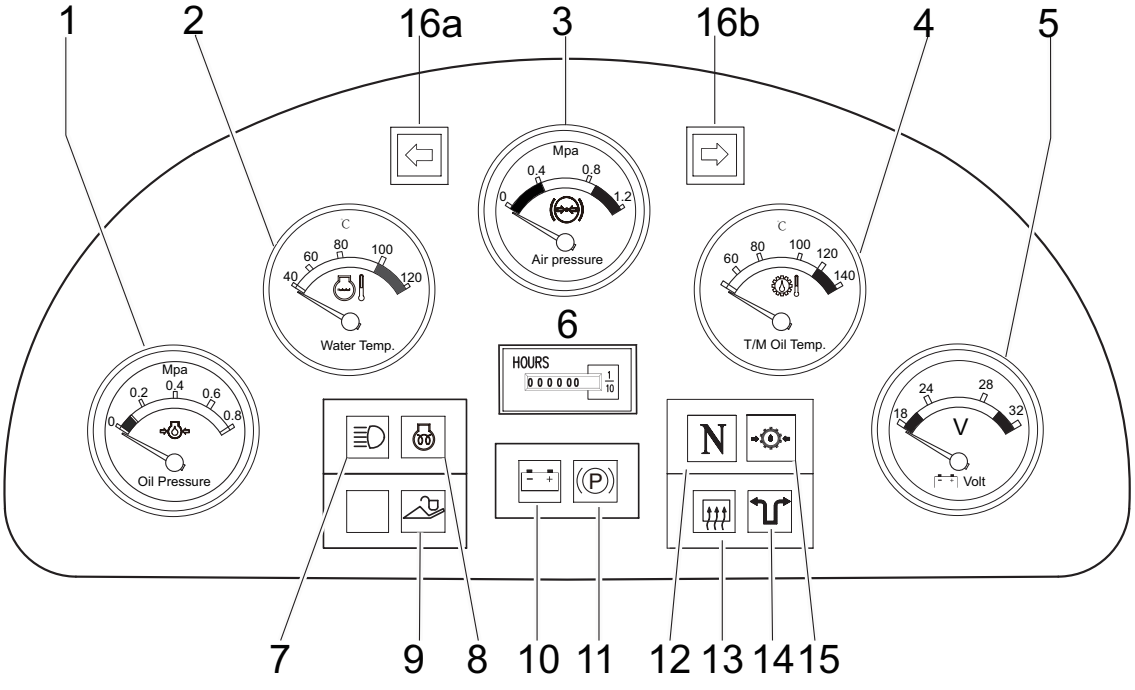


Figure 34

Reference Number	Description
1	Engine oil pressure Gauge
2	Engine coolant temperature Gague
3	Air pressure Gauge
4	Engine coolant temperature Gague
5	Voltage
6	Hour Meter
7	High Beam Indicator
8	Preheat Indicator
9	Pilot unlock Indicator

Reference Number	Description
10	Battery Warning Indicator
11	Parking Brake Indicator
12	N Indicator
13	Defrost Indicator
14	Emergency steering indicator
15	TM oil pressure warning light
16a	Left turn and Hazard Warning light
16b	Right turn and Hazard Warning light

1. Engine oil pressure Gauge

The meter displays the engine oil pressure;
caution：when the engine running, the pointer comes close to red zone means the engine oil pressure lower,and need to be checked.

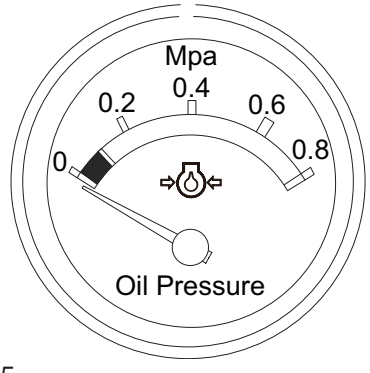


Figure 35

2. Engine Coolant Temperature Gauge

This gauge displays temperature of engine coolant;

Caution:

When the pointer indicates red zone, it means the engine is overheated. Stop the operation, let the engine run at low rpm and wait for it to cool down.

Do not stop engine. If engine is shut down heat-surge can occur.

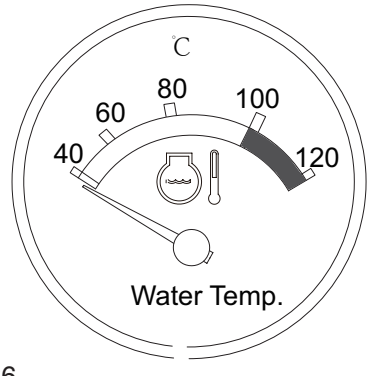


Figure 36

3. Air pressure Gauge

The meter displays the Service braking System pressure.

Caution:

when the air pressure lower than normal value,the warning light turn on.

Never operate or travel machine when this light is “ON” or when alarm is sounding. Always investigate cause of the drop in brake air pressure, and repair problem before operating or traveling machine.

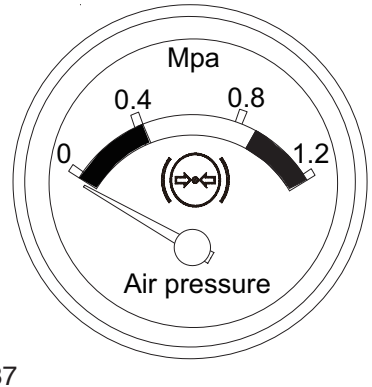


Figure 37

4. Transmission Oil Temperature Gauge

This gauge displays temperature of oil in transmission converter and transmission circuit.

Caution:

When the pointer indicates red zone, it means the transmission is overheated. Stop the operation, let the engine run at low rpm and wait for transmission to cool down.

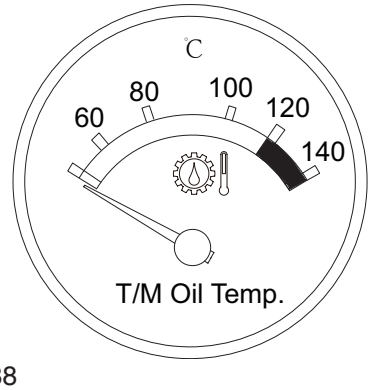


Figure 38

5. Battery Voltage Gauge

This gauge displays the battery Voltage

caution:

When the pointer indicates red zone, it means the Battery or generator is abnormal.the engine should be shut down to check the charging system

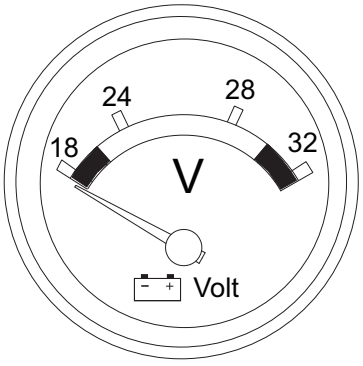


Figure 39

6. Hour meter

ALCD Meter that records total time. When engine isrunning,the hourglass icon blinks every four seconds.Thisshows that the hour meter is working.

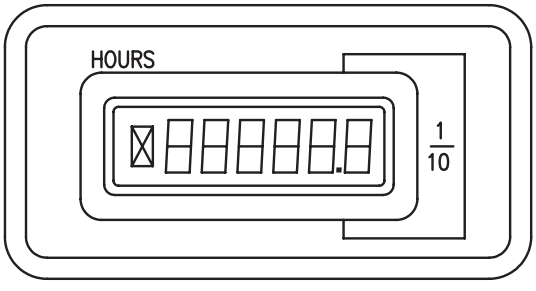


Figure 40

7. High Beam Indicator Light

This indicator light will turn “ON”, when the headlights are turned to “HIGH BEAM”.

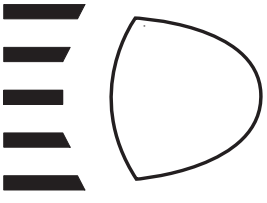


Figure 41

8. Preheat Indicator Light

This indicator light will turn “ON,” when the engine preheatfunction is operating. Do not start engine as long as thislight is “ON.””

Figure 42

9. Pilot unlock indicator light

when the pilot lock is released,the indicator turn on.

Figure 43

10. Battery Warning Light

When starter switch is first turned to “ON” position, this red warning light should turn “ON”. When engine is running this red light should turn “OFF”. If light remains “ON” when engine is running, alternator is defective.

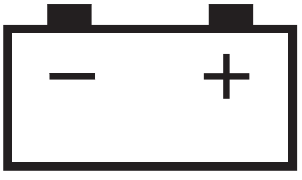


Figure 44

11. Parking Brake Indicator Light

This indicator light will turn “ON.” when the parking brake is”APPLIED.:” If vehicle is moved while parking brake is applied.a warning alarm will sound.

caution:

If vehicle is moved while this light is turned “ON,” itcould cause premature wear or damage the brake.

Always “RELEASE” parking brake and make sure this light is “OFF” before traveling machine.

Figure 45

12. N Indicator Light

when the shift lever is on Neutral position,the indicator light turns on;

Figure 46

13. Defrost Indicator Light

NOT USED

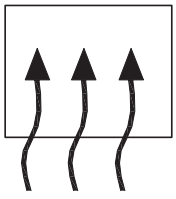


Figure 47

14. Emergency Steering Indicator Light

NOT USED

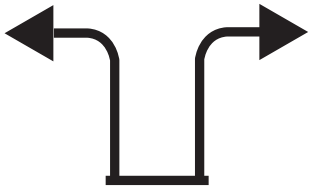


Figure 48

15. TM Oil Pressure Warning Indicator

When the Transmission Oil Pressure is abnormal,this indicator turn “ON”

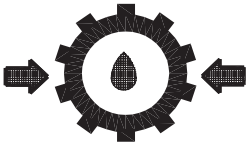


Figure 49

16a. Left Turn and Hazard warning Lighta-tor

This light blinks when left turn signal is tumed “ON.”Bothlights blink when warning lights are turned “ON.”

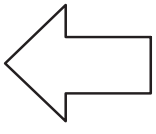


Figure 50

16b. Right Turn and Hazard warning Light

This light blinks when rigth turn signal is tumed “ON.”Bothlights blink when warning lights are turned “ON.”

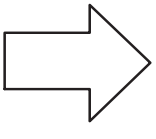


Figure 51

A/C System Switch

Figure 52

The left knob is the blowing rate switch of evaporator, divided into low, medium, high gear; The right knob is the temperature control switch of air conditioner. Clockwise rotation of the knob, gradually reduce; Rotate the knob in a clockwise direction, the temperature of air conditioning systems will reduces gradually. The middle lamp is air-conditioning refrigeration indicator lamp. When the lamp is on, air conditioner refrigeration system is in working state

1. Refrigeration
   A. Close the heater water valve;
   B. After the engine working normal, turn the blowing rate switch to the proper position;
   C. Rotate the temperature control switch to the proper position (Green indicator lit up), and the refrigeration system starts working and the cooled air begins to be sent out from the air outlet;
   D. You may adjust the temperature of the cooled air by adjusting temperature control switch
2. Heating
   A. After the engine working for a moment, turn the blowing rate switch to the proper position;
   B. Rotate the temperature control switch counterclockwise to the leftmost position, and the heating system starts working and the hot air begins to be sent out from the air outlet

WARNING

When the ambient temperature is lower than 0 º and the engine is not working, If there is no anti-freeze fluid filled into the engine coolant, you should empty the engine water tank, and, at the same time, open the hot water valve and solenoid valve to drain out the coolant in the radiator, otherwise the radiator will be frost cracked due to too low temperature of the radiator pipeline!!!

Audio system---multimedia

Audio system is located in the cab, including multimedia, speaker, and antenna.

Host panel(Fig.52)

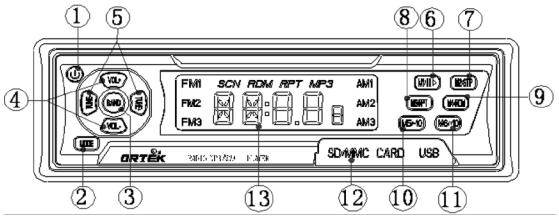


Figure 53

Speaker(Fig.53)

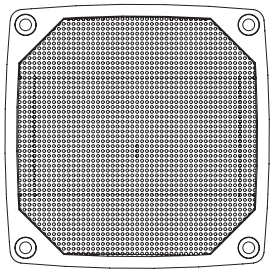


Figure 54

The multimedia speaker has many functions such as digital radio, USB/SD/MMC, MP3/WMA, clock, adjustable volume.

1. The system configuration
   Digital tuning radio; USB/SD/MMC ; MP3 PLAYER.
2. Radio function
   Support FM FM/AM medium wave
   Support six FM1, six FM2, six FM3, six AM1, six AM2, six AM3, Channel storage, at the same time memory these radio station in case of outages.
3. MP3 Function
   Support USB/SD/MMC insert automatically play.
4. Auto save channels function.
   When the power is off, the channels can be saved automatically.
5. Other
   1) support the clock display type for 24-hours
   2) The mobile phone can be charged through USB port (cable is needed)

Button directory

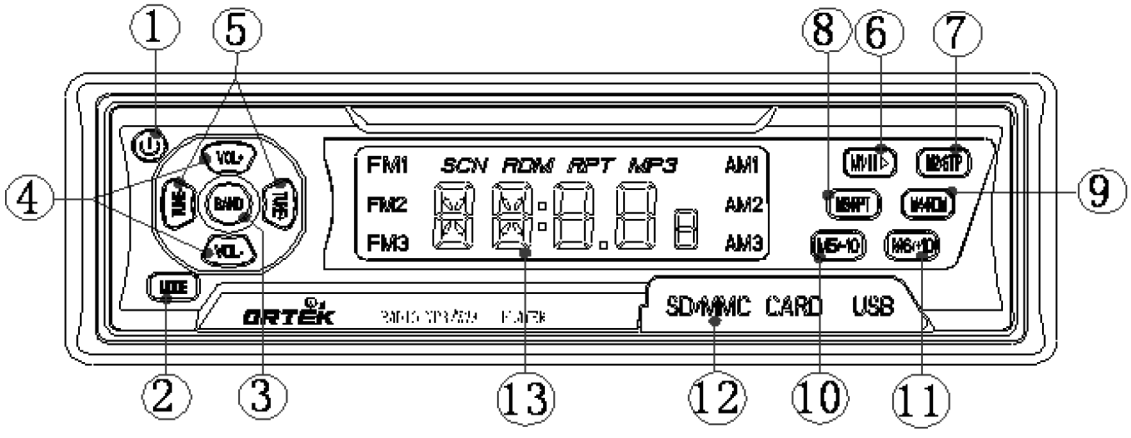


Figure 55

1. POWER Power supply switch control key
2. MODE Mode switch / Clock control key
3. BAND The radio band selection; Automatic search station storage key
4. VOL+/VOL- Volume control key
5. TUNE+/TUNE- Automatic sorting table; Last/ Next song ; Clock Settings key
6. M1/ II▶ Station storage; Suspension control key
7. M2/STP Station storage; Stop control key
8. M3/RPT Station storage; Repetitive control key
9. M4/RDM Station storage; Random control key
10. M5/-10 Station storage; Next 10 song control key
11. M6/+10 Station storage; Last 10 song control key
12. SD/MMC Card /USB Memory socket
13. LCD Liquid crystal display

Operation Specification

1. Operation

1) M1,M2,M3,M4,M5,M6 are used to memorize the date of FM1,FM2,FM3,AM1,AM2,AM3 respectively.

   Push the button for shorter than 2s, you can pick up the corresponding pre-saved channels.

   Push the button until more than 2s, you can store the current channel in corresponding internal storage.

2) BAND is used to switch band between FM1, FM2, FM3, AM1, AM2, AM3.

   When you push the button for shorter than 2s, the radio band will circulate as FM1→FM2→FM3→AM1→AM2→AM3...; If you push the button until more than 2s and it was FM before you push it, it will search upward automatically from 87.5M of FM1 and store them automatically. When the search for FM1~FM3 is finished (18 channels totally) which means the search from 87.5M to 108M is finished, the first channel of FM1 is picked up automatically and the previous stored channels are replaced.

   When it was in AM before you push the button, it will search automatically upward from 522K of AM1. When the search for AM1~AM3 is finished (18 channels totally) which means that the search from 522K to 1620K is finished, the first channel of FM1 then is picked up automatically and the previous stored channels are replaced.

3) TUNE+/TUNE- is used to search automatic or step by step manually.

   If you push the button shorter than 2s, it will search forward or backward automatically and pick up one when it is found.

   If you push the button until more than 2s, and push it step by step again to search forward or backward automatically and it won't switch to automatical model until one channel is found.

2. Operation for USB/SD/MMC

1) M1/ MP3
   Suspension control key
2) M2/STP
   Stop play songs,At this time click this button will not restore play;
   pressM1/II▶key to play from the very beginning
3) M3/RPT
   Repeat function switch button
   Repeat play the current songs
4) M4/RDM
   Random function switch button
   Random broadcast songs of the current album
5) M5/-10
   Move 10 songs down
6) M6/+10
   Move 10 songs up
7) TUNE-/TUNE+
   Next song/last song,adjust time; clock adjustment key

3. Specification for other functions

MODE switching and clock control key

1) Push the button shorter than 2s,it will switch among FM→USB→SD.
2) Push the MODE button until more than 2s for the first time, time appears.
   Push the MODE button longer than 2s when time appears to reset the time. Push TUNE+ to adjust hour upward and TUNE- downward when it is twinkling. Push MODE again to switch to Minute adjust model after you have adjusted the hour and the operation is the same with that of the hour.

Note: *Time can be adjusted even the switch of the radio is off.*

Wiper and Scrubber

This machine is equipped with wiper for front window. The control switch is located handle-type combo-switch below the steering wheel.

1. Front wiper switch
   Front window wiper switch has three positions: STOP, LOW SPEED and HIGH SPEED. The wiper can automatically reset when the wiper in STOP state.
2. Scrubber switch
   Push scrubber switch, the scrubber will begin operation to sprinkle the cleaning solution onto window glass. The scrubber switch will automatically reset and the scrubber will stop sprinkling after you release your hand. The scrubber pot is located at the rear of driver seat.

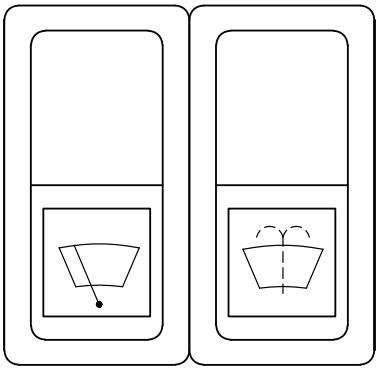


Figure 56

WARNING

Frequently check whether the cleaning solution in the sprinkler pot is exhausted to prevent the sight line being obstructed due to the window which could not be cleaned by the scrubber.

When the ambient temperature is lower than 0 ℃, it is necessary to use anti-freeze cleaning solution, otherwise the sprinkler will be iced or even be frozen and which will result in its failure.

Reversing auto alarm system

Reversing alarm device is located by side of the lift cylinder of the engine cover (Fig.68). When you operate the gearshift handle to back the vehicle, the reversing alarm device will automatically hoot.
Lifting device for engine hood
The rising and dropping of the integrated engine hood of this machine is controlled by hand-operated cylinder and cylinder mechanism which is installed in the right battery box of the machine. The action of the lifting device is realized by using the attached handle, and the rising and dropping of the engine hood through the switching of the reversing valve on the hand-operated pump

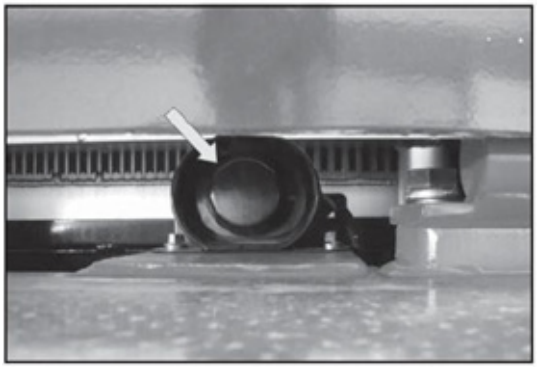


Figure 57

Adjustment of steering gear

The inclination of steering gear of this machine may be adjusted within a certain range to adapt to driver's operation customs.
There is a spanner at the middle of steering gear (Fig.69). The method of adjusting the inclination angle of the steering gear is as follows.
Use angle adjustment handle to raise the spanner to adjust the steering gear to a proper position, and then release the spanner

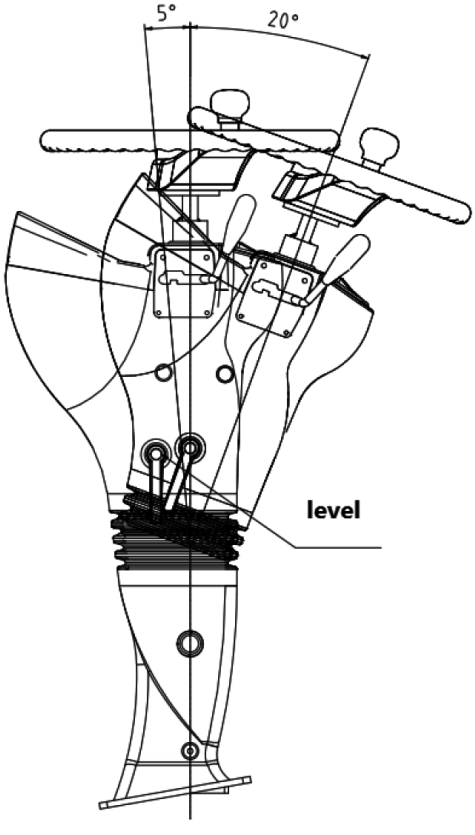


Figure 58

Adjustment of driver seat

The driver seat equipped for this machine can be adjusted in aspects of soft and hard extent (i.e., height, front and rear direction, backrest angle and headrest height) to adapt requirements from different drivers and different work situations.

1. Adjustment of front and rear positions

   There is a handle in front sections of low left side of the driver seat. If you toggle this handle towards the outside of the driver seat, the seat may move back and fro. During the movement, you will feel the obvious clamping positions at some places. Move the seat to the clamping position, release your hand and the seat will be fixed to the clamping position. This machine seat can be moved back and fro within the scope of 75mm, and the seat can only be fixed at the clamping position

2. Adjustment of height

   This machine seat has 3 positions able to be adjusted and you will obviously feel that there are 3 clamping positions. The driver seat is adjusted to the middle position when the machine was delivered from the factory. The driver can adjust the height as required. When adjusting, you should hold the base beneath the seat with your hands, and pull up smoothly. There are several clamping positions to be met during the moving up of the seat, where you can release your hands, and then the driver seat will be fixed at this position

3. Adjustment of backrest angle

   There is a handle in the middle on the right side of the driver. First you toggle the handle clockwise, then toggle the backrest forward or backward to a comfort position and release your hands. The backrest will be fixed at this position. The backrest of the driver seat for this machine can be folded forward, and adjusted backward within 28º.

   The height of seat headrest can be adjusted by using hands holding seat headrest and forcibly pull it up or push it down.

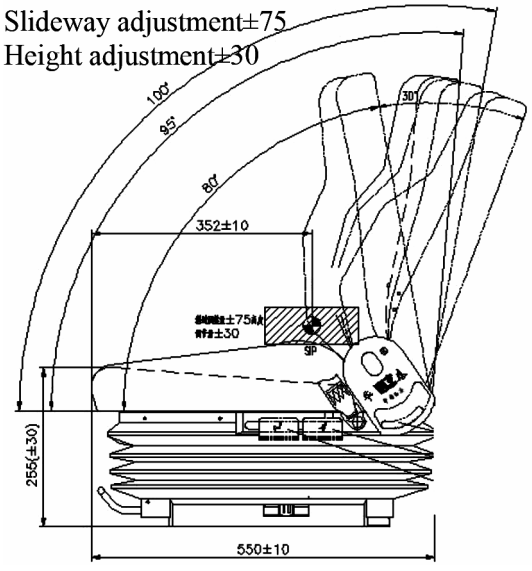


Figure 59

4. Adjustment of softness of the driver seat
   There is one handle at the lower front portion of the driver seat which is used to adjust softness of the driver seat, to adapt the drivers with different weights. Rotate the handle along the vertical plane clockwise or counterclockwise. When the handle reaches to the other side, make it change to other side in the horizontal plane, then rotate in the vertical plane. A weight indicator is located by the side of the handle. When the handle is rotated, the readings of the weight indicator will also change, indicating that the softness of the driver seat is adapt to the driver whose weight is equal to this reading value. The softness of the driver seat of this machine can be infinitely variable controlled within 50-130kg, and it is adjusted to be 70kg when the machine is shipped from the factory.
5. Adjustment of seat headrest height
   The height of seat headrest can be adjusted by using hands holding seat headrest and forcibly pull it up or push it down

Usage of seat belt

The driver seat of this machine is equipped with seat belt. The driver shall tie the seat belt when operating the machine. Check the wear and security of the seat belt before using it. Replace it if necessary.

Adjust the length of the seat belt before using to ensure the seat belt can play the role of safety guarantee and have certain flexibility. You can adjust the length of the seat belt by changing the spring bolt position on the seat belt. The locking device of the seat belt is located at rear right side of the seat. Insert the spring bolt into the opening of the locking device, the locking device will clamp the spring bolt. There are two Red buttons by side of the opening of the locking device. Push this red button, and the spring bolt will spring out from the locking device. Before using seat belt, please check whether the locking device of the seat belt can normally be locked or opened.

Adjustment of rear-view mirror

There is one rear-view mirror each above, on the left and right side of the cab of this machine. Before operating this machine, you must adjust the field of view to ensure the driver has a good field of rear view.

Release the bolt connecting rear-view mirror support and cab and rotate the support to adjust the position of the rear-view mirror relative to the cab; Release the bolt connecting rear-view mirror and support and rotate the rear-view mirror to adjust the elevation angle of the rear-view mirror. After the above adjustment, it is necessary to tighten the bolt.

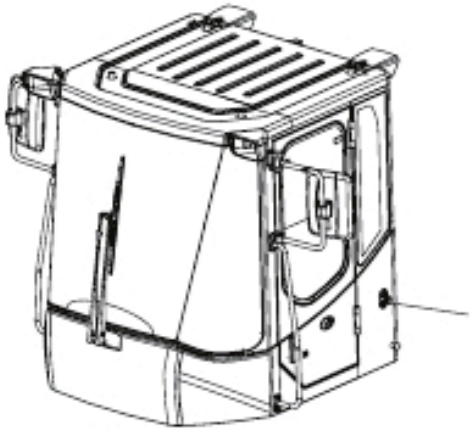


Figure 60

ADVICE FOR OPERATION OF NEW LOADER

All loaders were checked and adjusted before delivery from the factory. However, during the initial running-in process, you should still obey the following procedures, otherwise the equipment could be damaged or its performance degraded.

If perform the operation with full load before running-in period, it will produce adverse effect on the operation life and safety running, and cause accidents finally.

Note: *1) Check coolant, fuel, oil and hydraulic oil for leakage each day.*

2) Check lubrication oil every day and replace it if necessary.

3) Frequently watch the displays on dashboard and various instruments during operation.

4) Avoid the overload of engine.

5) Keep a load of 80% before engine and other components reaching their operating temperatures.

6) Pay attention during operation whether the working device is working normally

7) Check for the component loose or damage due to transportation.

8) Check the electric wires or terminals for not loose, the instrument for normal operation, and electrolytes for sufficiency.

9) Check Tire air pressure for normality.

Lubrication oil and filter element

1. Change engine oil and renew filter element after working for first 50 hours.
2. Change axle gear oil after working for first 100 hours.
3. Change the filter element in hydraulic oil line and renew filter element after working for first 250 hours.
4. Change transmission oil and renew filter element after working for first 100 hours.

Note: *Refer to "Inspection, Maintenance and Adjustment" on Page 4-1 of this manual for replacement of lubrication oil or grease.*

Running-in of new vehiche

Running-in of the new vehicle plays an important role in extending the operation life, eliminating fault and hidden troubles, as well as avoiding major faults. After buying this machine, the user must perform the machine operation and maintenance according to the regulations on the running-in of new vehicles specified in this manual, and then you can normally use this machine.

Requirements on running-in of the new vehicle

1. The period for running-in of the new vehicle is 100 hours.
2. Start the engine and run at idle for 5 minutes.
3. During the running-in period, you should evenly arrange the running-in test for each gear of Forward Ⅰ and Ⅱ Reverse Gears.
4. Run the vehicle in a sequence at low speed (small power) first, and then at a high speed gradually. Except in emergency, you should avoid sudden start, acceleration, steering and abrupt braking.
5. It is appropriate to operate the vehicle with a load of loose materials during the running-in period, without too abrupt or too urgent actions. During the running-in period, the loaded weight should not exceed 70 % rated load,and the travel speed should not exceed 70% rated maximum speed.

6. Pay attention to the lubrication of the machine, change the lubrication oil and lubrication grease as per the specified interval.
7. You must pay attention to the temperatures of gearbox, torque converter, front/rear axles, hubs, parking brake, immediate supporting shaft, and hydraulic oil, cooling fluid, engine oil. Perform the troubleshooting if the overheat phenomenon is found.
8. Check bolt and nut of each component for the tightening.

Perform the following operations after 8 hours of running-in period:

1. Completely check bolt and nut of each component for the tightening. Especially you should check the following components one time: diesel engine cylinder head bolt, exhaust pipe bolt, and front/rear axle fixing bolts, rim nuts, propeller shaft connecting bolt, diesel engine fixing bolt, gearbox fixing bolt, front/rear frame hinged-type bolt.
2. Check fan belt, generator belt, A\C compressor belt for the degree of tightness.
3. Check gearbox oil level, driving axle and diesel engine oil levels.
4. Check the hydraulic system and braking system for the leakage tightness.
5. Check the connecting and fixing of each manipulating pull rod and throttle pull rod.
6. Check the temperature and connections of each component in electrical system, the status of generator power supplying and the working conditions of lamps and lighting as well as steering signal lamps.

Perform the following operations after expiry of running-in period:

1. Completely check bolt and nut of each component for the tightening. Especially you should check the following components one time: diesel engine cylinder head bolt, and front/rear axle fixing bolts, rim nuts, propeller shaft connecting bolt, diesel engine fixing bolt, gearbox fixing bolt, front/rear frame hinged-type bolt.
2. Check fan belt, generator belt, A\C compressor belt for the degree of tightness.
3. Check the hydraulic system and braking system for the leakage tightness.
4. Change the transmission oil in gearbox, and lubrication oil for driving axle.
5. Replace gearbox oil filter, diesel engine oil filter, filter element of diesel oil filter.
6. Wash return oil filter element in hydraulic oil tank .

Note: *Before changing gearbox transmission oil, driving axle lubrication oil and diesel engine oil, it is necessary to perform according to the related operation regulations.*

Adjustment of bucket auto leveling device

1. Place the machine on a flat ground and the shifting manipulating handle at the Neutral position. Operate the pilot manipulating handle and put the bucket on a fl at ground, then pull up parking braking valve button, shut off the engine. Install the frame-fixed bumper.
2. Untighten the bolt “1” as shown in the diagram, move the approach switch assy “2” forward to make the approach switch “2” completely coincide with limiting plate “4”.
3. Switch the starter key to ON position and connect the power supply for the vehicle. Toggle the pilot valve bucket manipulating handle backwards to the extreme rear position and stuck by the magnetic force.
4. Move the approach switch assy backward to make the approach switch “2” in line with the rear end (left end) of the limiting plate “4”. At this time, the magnetic force on pilot valve just disappeared (the approach switch indicator “5” is just OFF), and the bucket control lever auto returns to the middle position; and tighten bolt “1”. The distance between the approach switch “2” and the limiting plate “4” shall be kept within4~6mm.
5. After completion of the above operations, remove frame-fixed bumper, start the engine and check whether the adjustment is appropriate.

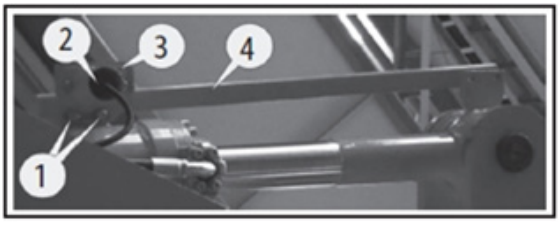


Figure 1

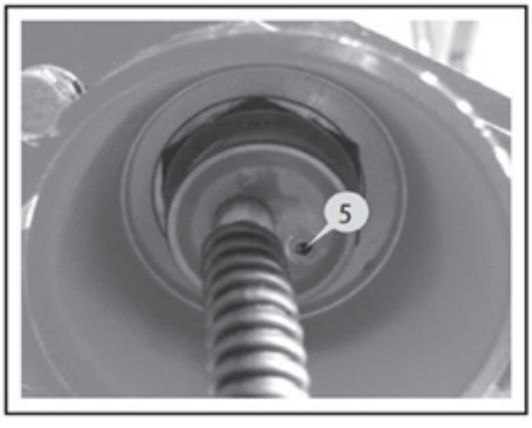


Figure 2

Adjustment of lifting arm auto lifting divice

WARNING

Be careful for the personal safety when performing the adjustment of arm lifting height limit. Non-working persons shall not approach the machine, and nobody shall stand in the area near arm.

1. Place the machine on a flat ground and the shifting manipulating handle at the Neutral position. Pull up parking braking valve button, operate the pilot valve control lever to raise the arm to the required unloading height, shut off the engine and install frame-fixed bumper.
2. Switch the starter key to ON position and connect the power supply for the vehicle. Toggle the pilot valve arm manipulating handle backwards to the extreme rear position and stuck by the magnetic force.
3. Untighten Bolt “1” shown in diagram and rotate the limiting plate “4” towards approach switch “2”, making the approach switch “2” in line with the rear end (left end) of the limiting plate “4”. At this time, the magnetic force on pilot valve just disappeared the approach switch“2” indicator is just OFF), and the pilot valve control lever auto returns to the middle position; and tighten bolt “1”.
4. The distance between the approach switch “2”and the limiting plate “4” shall be kept within 4~6mm. When rotating the limiting plate “4”, rotating it counterclockwise will decrease the limiting height, and rotating it clockwise will increase the limiting height.
5. After completion of the above operations, remove frame-fixed bumper, start the engine and check whether the accomplished adjustment is appropriate.

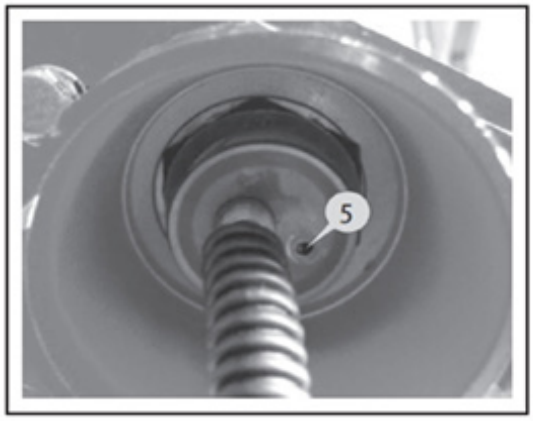


Figure 2

Operationg machine

Before starting engine, check follows:

1. Check the engine coolant level.
2. Check the engine oil level.
3. Check hydraulic oil level.
4. Check the leakage tightness for each oil pipe, water pipe and each component.
5. Check battery connecting wires. If the connecting wires between battery and cables are found loosened, tighten them timely.
6. Check Tire air pressure for normality.

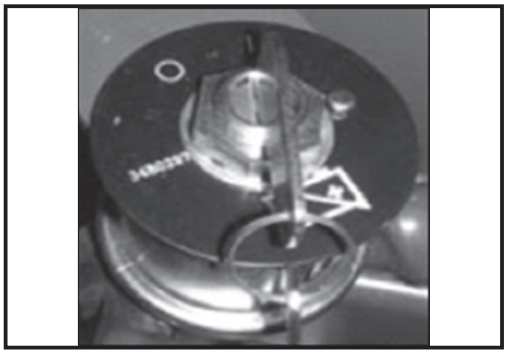


Figure 4

Start engine

1. Remove the obstacles along the driving direction; pay attention whether there is still repair man under the vehicle; except the driver can operate in the cab, nobody is allowed to stand at any position of the machine or sit in the cab.
2. Switch on the negative pole switch.
3. Get on or off the staircase according to the related regulations.
   The correct attitudes to get on/off the staircase (see Fig.1).
4. Adjust the rear-view mirror to have a good rear sight line, and approach the equipment as much as possible.
5. Close the cab left and right doors.
6. Check seat belt for abnormality, and tie the seat belt securely.
7. Check whether the shifting manipulating handle is at “Neutral” position; if not, please toggle it to “Neutral” position.
8. Check whether the manipulating handle is at the middle position. If not, please toggle it to the middle position.

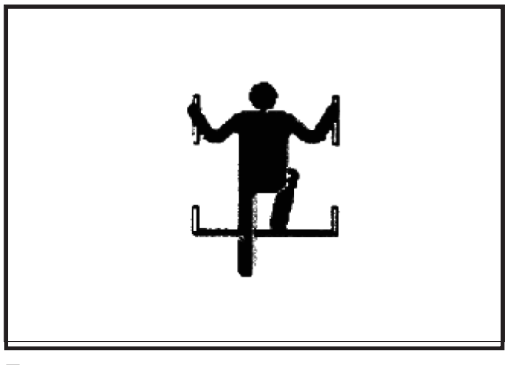


Figure 5

Note: ***The instrument noted in the picture can pump oil automatically when it is necessary,and this course can last for up to 15 mins.Please wait for several minutes after you switch on the start switch when the vehicle has parked for a long time.***

Figure 6

9. Check whether the air flow switch for A/C system is at “O” position and the transfer switch at “O” position. If not, please toggle it to corresponding position.
10. Insert the key into electric lock and rotate clockwise one increment. Switch on power supply and hoot the horn to warn that this machine is to be started and that other persons are not allowed to approach this machine.
11. Check fuel quantity.
12. Slightly depress the throttle pedal, and rotate clockwise for another one increment to switch on diesel engine starter motor. The engine will be started to work within 10s. Now it is necessary to immediately release your hand to let the starting electric lock reset.

Note: ***The time for one start should not exceed 15s (the continuous working time for the starter motor should not exceed 15s). If the engine cannot be started now, it is necessary to immediately release the starter switch and wait a little time (over 30s) and then re start the engine again. This is jointly determined by the characteristics of starter motor and the battery. If it cannot be started for 3 times continuously, it is necessary to search for the causes. The engine cannot be re-started until the faults are removed and three minutes later.***

13. The engine, after starting up, shall be warming up at the idle speed (600—750r/min). The full load operation cannot be started until the cooling water temperature of the engine is 55℃ and the hydraulic oil temperature is 45℃.
14. Listen to the engine at the low speed operation. Check the gearbox for abnormal sound and normal operation.
15. Check the instrument for normal operation and each lighting device, indicator, horn, wiper, braking lamp for normal operation.

Note : ***Pay special attention to the indicated position for the engine oil pressure, which should not be less than 0.07MPa (at idle speed). If it is less than this value, it is necessary to stop the machine to check the engine for the faults.***

16. If it is in cold weather, you should heat the hydraulic oil. Toggle the bucket manipulating handle backwards and hold it for 4-5 minutes. Meanwhile, increase the throttle actuation to make the bucket limit stop against the arm and make the overflow of hydraulic oil, thus increasing the oil temperature in a quicker way.
17. Check service braking and Parking braking systems for the normality.
18. If there is no obstacle around the machine, it is necessary to slowly rotate the steering wheel and observe whether the machine has the actions for leftwards or rightwards rotation.

Operation of driving loader

1. Operate the manipulating handle and transfer the bucket backwards to the limit position; then raise the arm to the transportation position, i.e., the distance from the hinged point below the arm to the ground is about 500mm.
2. Depress service brake pedal and meanwhile press down the parking brake button to release the parking braking. Slowly release service brake pedal and observe whether the equipment is moving.

⚠ WARNING

If the machine moves on the flat ground, please immediately depress brake pedal and pull up the parking brake pedal handle to apply the braking. Check the shifting control system of this machine for the faults. If it is on the slope, please first use the wedge to stop the wheel to prevent the vehicle from moving, then check the machine again.

3 .Check whether the Neutral locking switch of the shifting manipulating handle is at “D”. If not, please toggle it to the position “D”;

4. Drive the machine to the flat ground. If the steering inspection is not performed due to narrow space during the operation in previous stage, now it is necessary to rotate the steering wheel. Check whether the machine can make a turning leftwards or rightwards.
5. Check service braking performance of the vehicle. Drive the machine at gear Forward I or II on the flat ground. First release the throttle pedal and smoothly depress the service brake pedal, then the machine can obviously slow down and stop.

Note : ***If you depress the service brake pedal, but feel that the machine cannot obviously slow down, please immediately pull up parking brake handle to apply the braking.***

Meanwhile, operate the manipulating handle to lower down the arm to the lowest position, and tilt the bucket forward to make the bucket lip or knife edge insert in or go against the ground to force the machine to stop, thus ensure the security.

6. Check the engagement states of each gear. Drive the machine to the flat ground. Check the gear shifting of the machine respectively with combination of each gear.
7. Steering operation of the machine:
   When the machine needs to turn due to the bend ahead in the driving direction, please perform the operation following the local traffic laws and regulation. At time when you are about to make a turn, you should first put the control handle of the steering lamp to the corresponding direction. When the combo switch handle is toggled forward, it is to turn leftwards, and when it is toggled backward, it is to turn rightwards. At this time, the steering lamps on corresponding side in front of or at the rear of the machine and the corresponding steering indicators on the panel will flash, indicating to the adjacent vehicles and pedestrians around that this machine will implement the steering operation. Then, rotate the steering wheel towards the side you want to make a turn, and the steering immediately begins.
   This machine adopts hinged-type full-hydraulic coaxial flow amplifying power steering. The steering wheel rotation angle is not equal to the machine's rotation angle. Continuously rotate the steering wheel to increase the rotation angle until to the required position. The quick the steering wheel rotates, the quick the machine rotates.
   The steering wheel cannot restore to original position after rotation, and the machine rotation angle is kept unchanged. Therefore, after the machine finishes the steering, you should reversely rotate the steering wheel to eliminate the relative angle between front and rear frames of the machine and make the machine drive along the straight direction.

After completion of the steering operation, you should toggle the steering lamp to the middle position, and the steering lamp and the steering indicator will go off immediately. When performing the steering at higher speed, you must release the throttle pedal and, if necessary, use service braking to decrease the machine speed and then conduct the steering operation so as to ensure the driving safety.

WARNING

Strictly prohibit conduct the steering operation on the slope. You should drive the machine down to the flat ground to perform these operations.

8. Braking operation of machine
   When the braking is needed for the machine, it is necessary to first release the throttle pedal and then smoothly depresses the service brake pedal. At this time, the braking can be applied.

WARNING

When the machine is driving at high speed, you cannot abruptly depress the throttle pedal to the bottom to prevent from the safety accidents or machine damage due to braking too suddenly unless in the emergency.

Parking of manchine

1. Drive the machine to a flat field. Confirm that there is no risk of falling stones, landslip or Flood.
2. Apply service braking to stop the machine.
3. Toggle the shifting manipulating handle to Neutral position.
4. Push parking brake handle to apply parking braking.
5. Operate the manipulating handle of working device to lower down the arm, and lay down bucket on the ground, then slightly press down the bucket.
6. Let the engine operate at idle speed for 5 minutes to dissipate the heat from each component.
7. After using ENGINE STOP button and making engine shut off, rotate electric lock key counterclockwise to “OFF” and cut off the power supply for the vehicle, then pull out the key.
8. Toggle each switch to middle position or “OFF”.
9. Close left and right doors, and get off the staircase according to the related regulations.
10. If you want to park the vehicle for a long time (e.g., for a night), it is necessary to open the battery box cover to toggle the power supply negative pole switch to SWITCH OFF.
11. If the machine is not added with anti-freeze solution when it is delivered from the factory, you should timely open all water valves after parking the vehicle in winter to drain out all cooling fluid in radiator of cooling system to prevent from frost crack. If the machine is added with anti-freeze solution when it is delivered from the factory, you should operate with reference to the description on the Anti-Freeze Fluid Label at the tail of the vehicle.
12. Lock up all equipments and take away the key with you.

Note: ***Park the machine on the flat ground. If it is necessary to park the vehicle on the slope, please use the wedge to stop the wheel to prevent the vehicle from moving.***

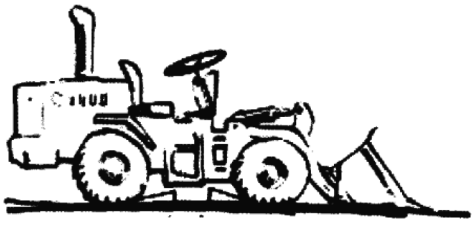


Figure 7

If the machine needs to be stored for a long time, operate according to the following requirements:

A.Before storage

- Wash each part of the vehicle, dry and store in a dry warehouse. If the machine is only allowed to be stored in the open, it is necessary to park the machine on the concrete road surface where the drain is easy, and use the canvas to cover.
- Before storage, the fuel tank must be filled with fuel, and fill lubrication grease to each axis pin, drive shaft, and replace hydraulic oil.
- Put the shifting manipulating handle on “Neutral Gear” position.
- Pull up the handle of parking brake to apply parking braking.
- Put the bucket on a flat ground, and toggle the working device handle to the middle position.
- Toggle each switch to middle position or “OFF”, and lock all doors.
- Coat a thin layer of grease on the open part of the piston rod of the hydraulic cylinder.
- Remove battery from the vehicle, and store it separately.
- Air temperature decreases to below 0℃, add anti-freeze fluid into cooling water for engine, and make anti-freeze fluid able to access engine body and A\C system radiator. Or you can drain out the water in the cooling system. Pay attention that you should also drain out the water in the radiator of A\C system.
- After the machine is fixed, use frame-fixed bumper to fix the front and rear frames.

Figure 8

B. In the process of storage

- Start the vehicle once a month to operation each system, and fill lubrication grease to each movable axis pin, propeller shaft, thus lubricating each movable part. Meanwhile, charge the battery also.
- Wipe off the grease on the piston rod of hydraulic cylinder before starting vehicle.
- Coat the anti-rust agent on the easily corrosive part.

Note: ***If the anti-rust agent is used in the room, it is necessary to open the door and window to remove toxic gases.***

C. After storage

When the machine is stored for long time, you must operate as follows:

- Replace the lubrication oil and hydraulic oil as well anti-freeze fluid in engine, gearbox, driving axle.
- Fill lubrication grease to each movable axis pin, propeller shaft.
- Wipe off the grease on the piston rod of hydraulic cylinder before starting vehicle.

OPERATION OF LOADER

Preparation before operation

Before operation, first use this machine to level the working site, remove the protrusions, fill and level up the pits, shovel the surface of wet ground, clear large and sharp stones on the site to prevent from scratching Tires.

If you want to use this machine to load the materials onto or unload them from the truck or hopper,you should adjust the limit height of the arm limiting device to make the bucket of the loader able to safely access the truck or hopper, and to prevent the truck or hopper from being damaged due to the impact by materials because the unloading height is too high.

General technologies

●Common shoveling and loading method

Common shoveling and loading method is suitable for shoveling and loading of loose materials.

The loader travels at a speed of Gear 2 to approach the materials, and align the bucket middle portion to the materials. The driver holds the steering wheel with left hand and operate, with right hand, arm control lever to lower down the arm to a height 500 mm above the ground.

When the machine is 1 meter away from the stock pile, then lower the arm to make it contact with the ground and change machine's Gear Forward II into Gear Forward I.

Note: ***When the bucket touches the ground, you should prevent the bucket from producing excessive force on the ground and inducing unnecessary resistance for the advance. Meanwhile, the front and rear frames of the loader should be laid straight, and there shall be no included angle between front and rear frames.***

Depress the throttle pedal to make the bucket fully insert into the stock pile. When the machine could not advance further, the driver toggle backwards the bucket manipulating handle to move the bucket backwards and then push the bucket manipulating handle back to the middle position. At this time, the machine will continuously insert into the stock pile and repeat such insertion and retraction of the bucket until the bucket is full with materials.

●United shoveling and loading method

United shoveling and loading method is suitable for shoveling and loading of hard or stickier materials. The operation before the bucket is inserted into the stock pile is the same with that of common shoveling and loading method. When the bucket is inserted into the stock pile and the machine could not advance further, the driver toggle backwards the bucket manipulating handle with right hand, and then toggle back to the middle position to move the bucket upwards and the bucket thus insert forward a distance. And then the driver toggle rightwards the bucket manipulating handle, and then toggle back to the middle position to rotate the bucket rightwards and the bucket thus could continuously insert forward. Repeat such insertion, lifting, re-insertion and retraction of the bucket until the bucket is full with materials.

●Exit from stock pile

After the bucket is full with materials, the driver should operate the bucket manipulating handle to rotate the bucket backwards until the bucket's stop dog touches backing plate, and then toggle the manipulating handle back to the middle position. You can thus get the maximum bucket retraction angle.

Lift the boom to a certain height so that when the machine retreats, the bucket can avoid the stock pile. The driver holds the steering wheel with right hand and toggle, with left hand, the manipulating handle back to the Gear Reverse position to operate the machine to retreat.

After the machine retreats from the stock pile, the driver operate the arm control lever to lower down the boom to a height of 500 mm above the ground.

●Transportation of materials

Transport materials with the loader in following conditions:

1) The heavy-duty truck cannot be used for transportation due to the road surface is too soft or the site is not leveled.
2) The heavy-duty truck is not economical for transportation over such a short distance (The handling distance is within 500 m).

During handling, the boom lower hinged point should be kept at the transportation position (500 mm above the ground), and the bucket should be rotated backwards to the limit position (the limit stop on the bucket touches the boom)othus ensuring a smooth and safe handling, not easily scattering the materials.

The vehicle speed for handling is determined according to the handling distances and road surface conditions. When the machine is crossing the pits or juts, you should release throttle pedal. You can use service braking to conduct “snub” if necessary, to reduce the machine speed to slowly go across the obstacles, thus reducing the impact on the machine and material scattering.

WARNING

Prohibit lifting the bucket to a higher position to conduct the transportation operation; otherwise it will cause the tip-over of the machine

●Unloading

1) Unloading the materials to truck or hopper

When the loader with full materials is 15m away from the truck or hopper, you should release throttle pedal. You can use service braking to conduct “snub” if necessary, to reduce the machine speed to slowly approach the truck or hopper. Meanwhile, the driver shall toggle the boom manipulating handle backwards to the limit position. At this time, the driver can release hand and the handle will not return back to the middle position under the force of magnet. During this process, the driver shall be careful for driving the machine and closely watching the approaching of the bucket to the truck or hopper, not causing the collision of the bucket and the truck or hopper.

When the bucket is located right above the truck or hopper, the driver shall depress the brake pedal to make the machine stop. Then, push the bucket manipulating handle forward to make the bucket tip-over forward to dump the materials into the truck or hopper. Here, the driver shall closely watch the movement of the bucket, not causing the collision of the bucket and the truck or hopper edge. If the material is stickier, it is necessary to repeatedly push the bucket manipulating handle back and fro, to make the bucket limit stop repeatedly impact the boom, making the materials attached onto the bucket fall off.

If the length of the vehicle body is two times as width of the bucket, the unloading operation shall begin from the front portion of the vehicle body.

During unloading, the impacting force of bucket limit stop and the arm shall not be too large, and the impacting times shall not be too many to avoid the damage to the machine.

After completion of unloading, the driver shall toggle the bucket manipulating handle backwards to the limit rear position. The driver release hand and the bucket will automatically return back to the middle position. Then, the driver shall toggle the shifting manipulating handle to the retreat position, and then release the brake pedal to make the machine leave the truck or hopper. When the machine is leaving the truck or hopper, the driver shall be careful for driving the machine and closely watching the approaching of the bucket to the truck or hopper, not causing the collision of the bucket and the truck or hopper. After the bucket fully leaves the truck or hopper, the driver can lower the bucket while driving to prepare the next operation cycle.

Figure 9

2) Unloading at lower position

When performing the materials handling between sites, the unloading at lower position is needed some time, i.e., the bucket unloads the materials at a place with lower height from the ground.

Here, after completion of unloading, it is necessary to rotate the bucket backwards to horizontal position, and then conduct the operation of lifting the arm. Otherwise, it is possible unable to lift the arm because of the interference from the link internal mechanism of the working device.

- **Handling by pushing**

  With bucket flatly close to the ground, put the shifting manipulating handle at Gear Forward I and depress the throttle pedal to push forward. During the pushing process, if some obstacles are found to hinder the advance of the vehicle, it is possible to slightly lift the arm to advance continuously. The operation of lifting or dropping of the arm shall be performed between the lifting and dropping the control lever (not to toggle to either lifting or dropping position) to ensure the pushing handling operation can be accomplished smoothly.

- **Scraping**

  Lift the arm and make bucket tip-over until the knife plate touches the ground. The included angle between the knife plate and the ground shall be kept to be about 60 º. For the hard road surface, the arm control lever shall be put at the Float position; while for the soft road surface, it should be put to the middle position. Toggle the shifting manipulating handle to the Retreat gear, depress the throttle pedal to make the machine retreat, and use knife plate to scrape the ground surface.

- **Traction**

  It is possible to equip 20 ton trailer to perform traction transportation. The method is as follows:

  1)Connect securely the trailer to the traction pin of this machine.

  2)Trailer should equipped with good braking system

  3)Put bucket at “Transportation” position.

  4)Smoothly execute the starting and stopping operation of the vehicle, and pay attention to apply the braking before going down the slope.

Note: When executing the braking, it is necessary to first apply braking for the trailer, and then for this machine.

Operation method

● V-type operation method

Loader is dead against stock pile, and the included angle between truck and loader driving direction is 60 º, and it stops at a place 12-15m away from the stock pile. When the loader is fully loaded, it will retreat directly back to the place 12-15m away from the stock pile. It can make turn while driving, and lifting the bucket simultaneously. After unloading, it will retreat to the original place to perform the next shoveling and loading operation.

● Shuttling operation method

The Shuttling operation method is mainly used for the united operation between loader and fleet. When the loader is fully loaded, it will retreat back to the place with a distance of 2-3 times of the truck width. Then, one truck travels from one side of the loader to be in front of the loader and stops, and then the loader travels further forward and lifts the arm. After unloading, the loader retreats back to the original place. If the truck is not fully loaded, the truck will travel forward another truck space. After the loader accomplishes the next shoveling and loading operation, it will retreats to the original place, and the truck which has not been fully loaded then retreats to be in front of the loader, and the loader will perform the unloading. In this way, repeat the operations until the truck is fully loaded, then start the loading and unloading for the next truck. This operation method requires the loader driver and the truck driver to cooperate skillfully. They can use horns, lights or gesture to communicate if necessary.

Operation in cold weather

Matters needing attention in cold weather:

If the ambient temperature is too low, the engine will be started difficultly and the radiator may be frozen. Therefore, you should obey the following instructions:

1. When the environmental temperature is below 6 ℃, you should wait for about 8 or 10 minutes after you turn on the starting switch, and then start the engine

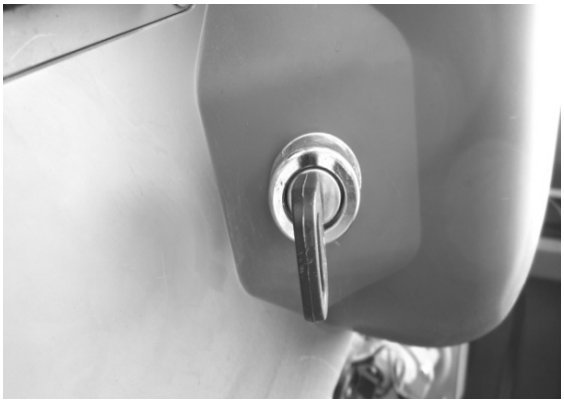


Figure 10

2. Use low-sticky fuel, hydraulic oil and lubrication oil, and add the anti-freeze fluid into the cooling water.
3. Matters needing attention for anti-freeze fluid
   - Do not use anti-freeze fluid containing methanol, ethanol, propanol.
   - Absolutely no use of any leakage proof water aqua, no matter whether it is used separately or together with anti-freeze fluid.
   - Do not mixedly use anti-freeze fluids with different brands.
   - When changing anti-freeze fluid, please refer to the description on the Anti-Freeze Fluid Label at the tail of the vehicle.

Note: ***Keep the anti-freeze fluid away from flame, and do not smoke when filling anti-freeze fluid.***

4. Matters needing attention for battery:
   - When the ambient temperature is decreased, the battery capacity will also decrease. If the charge rate of the battery is low, the electrolytes may be frozen. Therefore, it is necessary to keep the rate as close to 100% as possible and perform the heat preservation as possible so that the engine can easily be started up the next day.
   - Use chill-proof battery in severe cold district

Figure 11

In order to prevent the vehicle from being not started next day due to the congelation of sludge, water or snow stuck on the machine, the following work must be done after completion of the operation each day:

1. Thoroughly remove sludge, water or snow stuck on the machine to prevent from them entering the seals to impair the seal performance.
2. Park the vehicle on the dry hard ground. If not possible, park it on the plank. Using plank may prevent the vehicle from being frozen onto the ground. This is convenient for the start of the vehicle next day.
3. In low temperature conditions, the battery capacity will decrease as the storage time of the vehicle increases. So it is necessary to cover the battery or remove it to a warm place and reinstall it before operation the next day.

After the cold weather and when it is warmer, you should perform as follows:

1. Replace with proper-sticky fuel, hydraulic oil and lubrication oil for all components.
2. If the permanent anti-freeze fluid was not used, it is necessary to fully drain out the water in the radiator, clean the radiator, and replace the cooling water.

OPERATION UNDER SPECIAL CONDITIONS

Operation under extreme cold conditions

If the machine is working in extremely cold weather, it is necessary to adopt protective measures to guarantee the normal operation. The following detailed inspection can ensure the machine to work normally in cold temperature.

1. Check whether the cooling system has used proper anti-freeze fluid under extreme low temperature. Carefully check cooling system and record the leakage situations.
2. Keep the battery fully charged to prevent from freezing. If you add water into the battery, run the engine for at least one hour to make it mixed with electrolytes.
3. Keep the engine in the optimal conditions to realize the easy start and operation in unfavorable weather.
4. Select proper engine oil according to the temperature. For more information see “Lubrication and specifications” in Engine Manual.
5. Ensure the fuel tank is fully filled with fuel at any time. Drain out the condensates in the fuel tank before operation. Check fuel tank the filter element, drain out the condensates in it (e.g., wax-like substance), and ensure the freezing point of the used oil is lower than the lowest ambient temperature.
6. Perform the full lubrication for the machine according to the instructions in Section 4 of “Maintenance Period Chart” and to the lubrication diagram attached on the machine.

7. Start the engine to make it reach the normal temperature before working with load.
   A. When the machine is in idle state, if the mud and ice are attached on the running components, please heat to melt the frozen substances.
   B. Be careful to operate the hydraulic components until they reach the temperature at which they can normally work.
   C. Check all machine control device and/or functions to ensure the normal operation.
8. Put a backup external air filter in the cab to replace the frozen components in case.
9. Perform auxiliary startup in cold weather, see Section “Start in Cold Weather” in this Manual.
10. In order to prevent from icing, remove all mud, snow and ice. If possible, use canvas to cover the machine, and prevent the canvas edges from being frozen onto the ground.

Operation under high temperature conditions

Operating the machine continuously under high temperature may cause overheat of the machine. Monitor the engine and gearbox temperature if necessary, and stop the machine to cool it down.

1. Frequently check and maintain the fans and radiator. Check the coolant level for the radiator. Check whether the radiator fins are accumulated with dust, sands or insects etc which blocks the cooling pipeline.
   A.Under high temperature, the dirt is generated more quickly in the cooling system. Change the anti-freeze fluid each year to keep the preservative function.

2. Regularly flush the cooling system, if necessary, to keep the cleanness of the pipeline. Avoid using the water containing high Alkali, otherwise, the dirt will be generated more easily. Check electrolytes level every day. Keep proper electrolytes level to prevent from damaging the battery. In high temperature environment, use weaker electrolytes. Dilute the electrolytes with a specific weight of 1.280 into one with a specific weight of 1.200-1.240, and fully charge it. Whenever the specific weight of 1.160 reaches, it is necessary to re-charge the battery. If stored under high temperature for a long time, the battery will self discharge quickly. If the machine stops for several days, please put it in a cool place.

WARNING

Do not store acidic batteries near tires, because the acidic gases will be harmful to rubber.

3. Check fluid level before oil filling. High temperature and cooling will cause the concentration varying of the fluid in the reservoir.
4. Perform the full lubrication for the machine according to the instructions in Section 4 of “Maintenance Period Chart” and to the lubrication diagram attached on this machine.
5. Do not store the machine in the sun for a long time. Put the machine under the covering to prevent sun, dirt or dust.
   A. If there is no appropriate covering, please use canvas to cover the machine. Prevent dust from entering engine, gearbox, and hydraulic system.
   B. Under the high temperature and wet weather, all parts of the machine will be corroded, and they will be more easily corroded in rainy season. The metal surface will be rusted and paint blistered, and other surfaces will have speckles.
   C. Coat the anti-corrosive lubrication oil onto unpainted or naked surface. Use insulation mixture to protective wires and terminals. Use paint or proper anti-rust materials on the damaged surfaces to prevent from being rusted or corroded.

Operation in the dusty or sandy area

Dust will be produced in most places during operating machines. However, you must adopt the preventive measures in severely dusty or sandy places.

1. Keep the cooling system and cooling area clean. You can use compressed air to purge them for cleaning, and shall adopt this measure as much as possible.

WARNING

Wear protective goggles when using compressed air.

2. When maintaining the fuel system, you must be careful to prevent dust and sand from entering the oil way.
3. Frequently maintain air filter, check air control indicator everyday, and keep dust cover and dust screen clean. Prevent dust and sand from entering engine parts and components as much as possible.
4. Perform lubrication and maintenance according to the lubrication diagram attached on the machine and to the instructions in Section 4 of “maintenance Period Chart”. Clean all lubrication oil connectors. The mixing of sand and lubrication oil will cause the wear and expedite the wear of parts.
5. Keep the equipment clean as much as possible. Put the loader under the shed to prevent the machine from being impaired by sand or dust.

Operation under rainy weather

Advice for operation under rainy weather is the similar to the under high temperature conditions.

1. Coat lubrication oil onto all naked surfaces. Be especially careful, as early as possible, for the damaged or unpainted surfaces. Coat lubrication oil on the damaged paint surfaces to prevent from being corroded.

Operation in brine

The brine and sea wave are highly corrosive. When the equipment is working in brine, pay attention to follow items:

1. When the equipment is corroded by brine, immediately use clean water to wash and dry it completely.
2. Spread lubrication oil on the surface which contacts to brine. Pay especially attention to the damaged paint surface.
3. Timely refit the damaged paint surface.
4. Perform lubrication according to the lubrication diagram attached on the current machine and to the instructions in Section 4 of “maintenance Period Chart”. The equipment working in brine environment should shorten lubrication interval.

Operation at high altitude area

Normally, the operation at high altitude area is the same with that under low temperature conditions. Before operating at high altitude area,you must perform the necessary adjustment on the engine according to the related engine manual.

1. Measure the working temperature of the engine and check the engine for overheat. The radiator must be strictly sealed to prevent the coolant pressure from being released.

ON THE LAST PAGE OF OPERATION UNDER SPECIAL CONDITIONS

Working in Water

After working in water, lubricate all lubrication points on front and rear frames which have been under water so water is removed.

The water depth is an important factor to take into consideration when the machine is working in swampy areas. Do not enter water whose depth exceeds the machine's minimum ground clearance height or is high enough to wet the bottom of the axle housing.

As a rule of thumb, the allowable water depth is about 400mm (16 inches).This means that the machine should not be used in a river.

Observe the following conditions:

1. Check the water depth in advance when crossing across a river.
2. Use the same precautions before crossing across a swampy area.
3. Do not enter rivers whose riverbed in steep or has a rapid flow.

WARNING

Avoid use of the loader in salt water .salt water will cause the development of rust which will shorten the life of loader.

Inspection, Maintenance and Adjustment

The maintenance and inspection of the equipment are necessary in order to keep the equipment working in normal conditions. The time interval, each system and components position and inspection method are listed as follows:

Note: *The following items list the content and time interval for the maintenance and inspection. The maintenance period may be shorten depending on actual conditions. The extreme heat or dirty environment is needed to be maintained more frequently. For maintenance period, refer to the engine working time shown on the cluster display of the console in cabin. (Fig.1)*

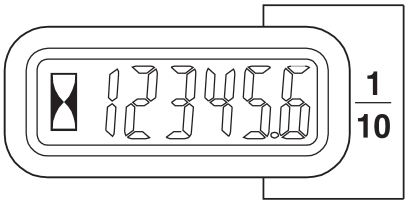


Figure 1

Series No.

There two Series NO plate attached on the body of the loader. The main Series NO. plate is positioned in the front of the front frame. (Fig.2a) The engine Series No is stuck to the left of the engine body and above the oil sump. Other descriptions related the engines are positioned on a label on the cylinder head. (Fig.2b)

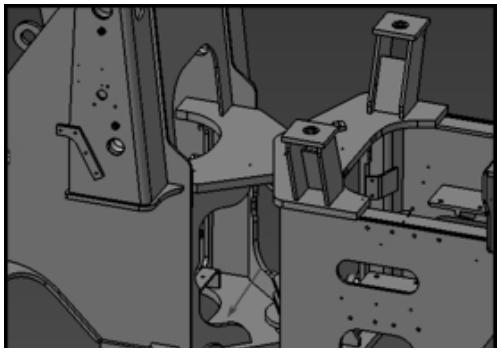


Figure 2a

Note: *These numbers and their positions are very important to the maintenance at any times during Warranty period.*

Figure 2b

Safety instructions

1. In order to prevent some accidental operation during maintenance, you must first identify the hydraulic system control level be positioned in the middle and hang the Warning mark (warning sign).
2. Confirm that the overflowed liquids are thoroughly cleared, especially those liquids around the engine.
3. Check all fuel pipeline for the tightening of joint, pipeline, fuel filter, and O-ring seal.
4. If it is needed to start engine for check or experiment, ensure that all irrelevant personnel have left and that the operation shall be performed according to the standard.

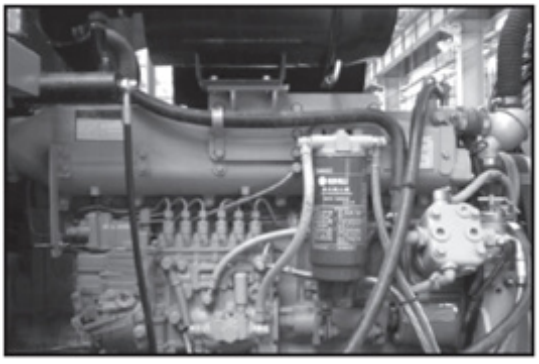


Figure 3

PREPARATION AND SETTING OF THE EQUIPMENT BEFORE MAINTENANCE

Park the vehicle as the following requirements before performance of maintenance according to the regulations in this manual.

Note: *Some special maintenance requires the machinery has different parking mode. However, after completion of maintenance, the machine must be reset to the following positions.*

1. Park on the hard plane.
2. Put the Bucket on the ground.
3. Switch off the engine and pull off the key
4. Put the control lever at middle position

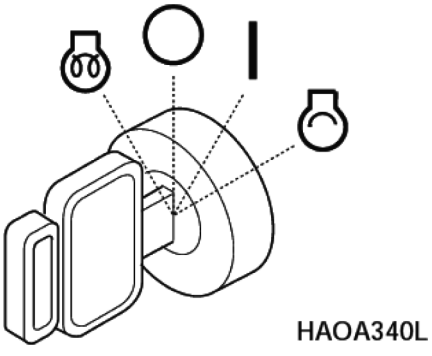


Figure 4

WARNING

Especially be careful for running the engine during the maintenance. When the engine is running, let one person always stand in the cab without leaving.

5. Before starting work,hang a warning sign “Do Not Touch When Performing Inspection Or Maintenance” on the cab door or on the working pole.

RECOMMENDED LUBRICATION TABLE

KEY POINT

Do not use un-recommended lubrication oil. Do not use unapproved products.

Note: *Refer to maintenance time interval table to make lubrication for the specified positions.*

Matters needing attention on lubrication

- The oil must be cleaned and the diesel oil must be sedimented for 72 hours; hydraulic system cleanness must meet the requirements from 18/15(GB/T14039-93) or NAS10 (American Standard), otherwise, the failure of the hydraulic system or pump excess wear will be caused.
- The oil filling device and oil position must be clean.
- The machine must be kept to be horizontal during inspection of oil flow.
- For oil filling of front and rear axles, you should fill the oil into the oil filler on the left hub and the right hub, the oil filling quantity is subject to the overflow at the oil level plug of the axle.
- Oil filling for the transmission: Fill oil into oil filling pipe of the transmission. After start the engine 5 minutes, keep engine at idle speed , check the oil level must be between the L and H level on the dipstick.
- Filling of hydraulic oil tank: Open the cover of hydraulic oil tank, and fill oil into the tank. When the oil level reaches 10-15 on the tank scale label, this indicates the oil in the tank is to be about full; if this is the first time to fill oil into hydraulic oil tank, you should start the engine to run for 5 minutes, then check the oil level again.
- Do not mix using, replacing of various kinds of oils, otherwise it will cause aging and ineffectiveness of rubber parts and the premature wear of the parts.

See following table for oil varieties and brands

Classification	Name		Application location
Lubrication grease	#3 molybdenum disulfide Lithium-based grease		Various rolling bearing, working device axis pin for rolling bearing, frame pin for steering cylinder axis pin, propeller shaft spline of sub-frame pin, and water pump
Torque converter oil	Engine Oil : SAE15W40 *Do not mix with other oils. *It is filled with engine oil when delivery.		Torque converter, power shift gearbox
Hydraulic oil	HM46(Summer)	HV46(Winter)	Working device hydraulic system and steering hydraulic system
Engine oil	CF 15W/40(Summer)	CF 5W/40 (Winter)	Diesel engine
Engine fuel	#35 light diesel oil		Diesel engine
Gear oil	GL-5 85W/90 heavy load vehicle gear oil		Main transmission and hub reduction inside the axle
Brake fluid	Mobil DOT3		Brake system

KEY POINT

Do not mix different brands of oil varieties from different companies. Our company disapproves to use other brands of oil varieties. If you must select other brands of oil varieties, the oil specification shall meet or exceed the standards we specified.

We use the oils from the specified excellent factories when the equipment is delivered.

But for the hydraulic oil temperature fluctuations every day and every week, or when it is operated below 0℃ air temperature, please select the lubrication oil with a lighter specific weight. The best recommendation is to select lubrication oil according to the air temperature conditions.

FLUID CAPACITY

Item			Size
Engine	Crankcase(Engine oil)		19Litres
	Cooler system		42Litres
Fuel tank			260Litres
Hydraulic oil Tank Capacity			260Litres
Gearbox system			49Litres
Driving axle		Front Axle housing	17Litres
		Front Hub wheel	5Litres(each single side)
		Rear Axle housing	17Litres
		Rear Hub wheel	5Litres(each single side)

LUBRICATION OIL & MAINTENANCE CHART

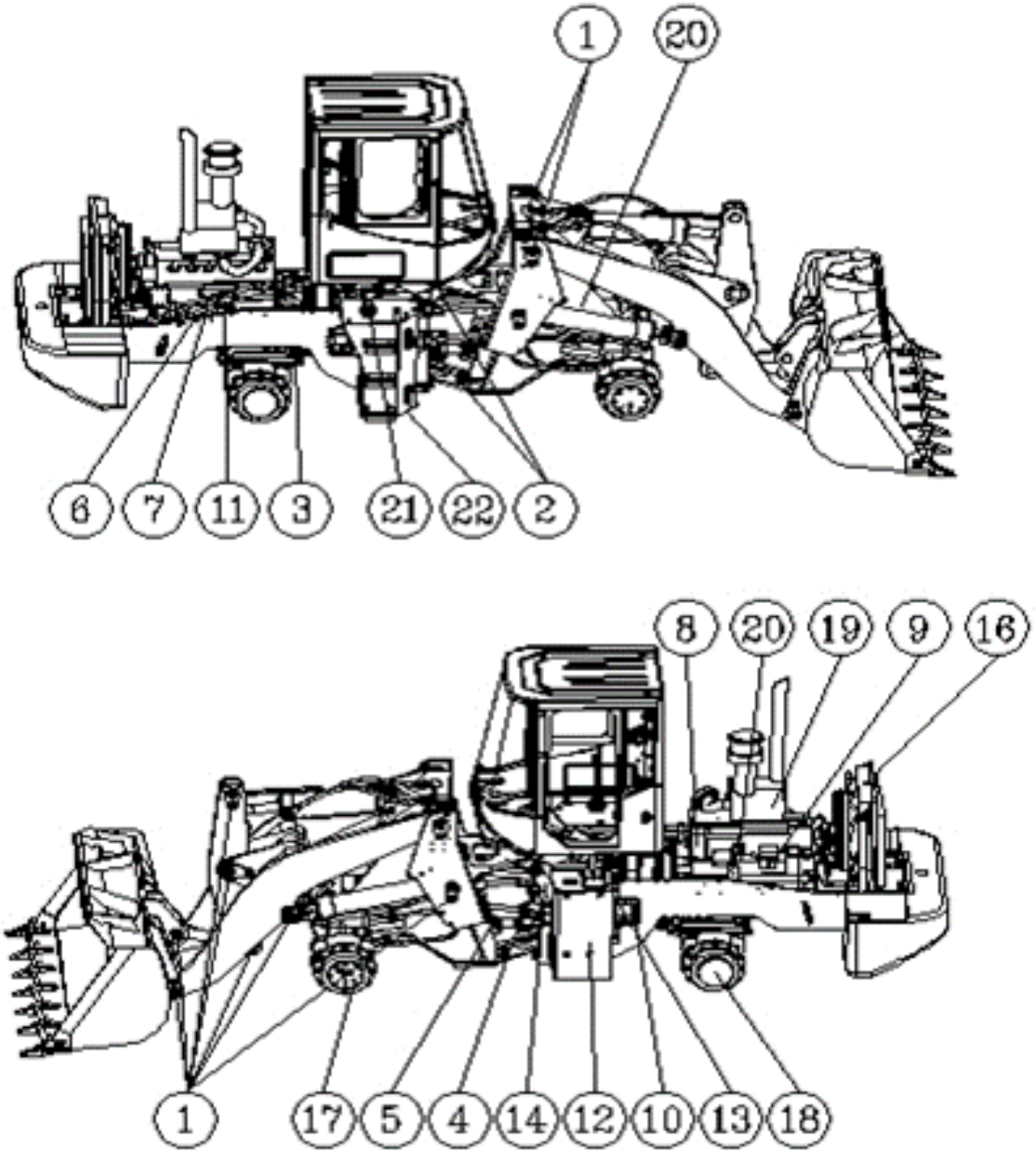


Figure 5

Maintenance period

No.	Items To Check	Service	Qty	Service Interval（h）						
				10	50	100	250	500	1000	2000
1	Front Joint Pin	Grease	13	V						
2	Articulation Pin	Grease	2	V						
3	Stabilizer pin	Grease	2	V						
4	Steer Cylinder	Grease	4	V						
5	Shaft Bearing	Grease	6	V						
6	Engine Oil	Engine Oil	19L	V	F			●		
7	Engine Oil Filter	Cartridge	2		F			●		
8	Fuel Pre-Filter	Cartridge	1					●		
9	Fuel Filter	Cartridge	2					●		
10	Transmission	Engine Oil	49L	V		F		●		
11	Transmission Filter	Element(Primary)	1					C		
		Element(fine)	1			F		●		
12	Hydraulic oil Tank Capacity	Hydraulic Oil ISO #46	260L	V						●
13	Oil Tank Return Filter	Element	1				F		●	
14	Oil Tank Breather Filter	Element	1						C	
15	Pilot Filter	Cartridge	1				F		●	
16	Radiator	Coolant	42L	V						●
17	Front Axle	Gear Oil	27L	V		F			●	
18	Rear Axle	Gear Oil	27L	V		F			●	
19	Air Filter	Element (Outer)	1		C			●		
		Element (Inner)	1					●		
20	Brake Pump	Brake Oil	2.8L	V				●		
21	Fuel Cap Filter	Element	1				C			
22	Fuel Suction Filter	Element	1				C			

V: Maintenance and Fill	Grease	NLGI-3 or NLGI-2
C: Cleaning	Engine Oil	API: CF-4, SAE: 15W40
F: First Time Exchange Only	Transmission Oil	#8 T/M OIL
●:Replacement On Every Interval	Gear Oil	API: GL-5, SAE: 85W/90
NOTE: For additional service items see list of“Maintenance Intervals” on page 4-9,4-10.	Hydraulic Oil	ISO: VG46, HV46
	Coolant	50% Water + 50% $(HOCH_2)_2$
	Brake Fluid	DOT 3

Maintenance Items

10 Hours/Routine maintenance

- Visually check around the machine for informalities or oil leakage.
- Check the engine and transmission oil level.
- Check hydraulic oil level.
- Lighting and instrument
- Check tire for damage and wear patterns.
- Gunning grease into drive shaft
- Drain water from air reservoir each day.
- Check the brake pipe and make sure no air and Fluid leak.
- Gunning grease into front/rear frame articulated point, rear axle swinging rack, intermediate bearing and other bearings.

50 Hours/Weekly maintenance

- Tighten the connecting bolt for front/rear drive shaft.
- Clean the outer element of the air cleaner.
- Check tire for damage and wear patterns.
- Check oil level of the brake pump (from 1/2 to 2/3 of the full capacity of recommended) and the quality of the brake Fluid (turbid or pollutional)
- Check and adjust the parking brake system if necessary.
- On first 50th hours working day, change engine oil and the filter of the engine oil. From then on, repeat this operation every 500 hours
- Repeat Daily check list.

100 Hours/Half-monthly maintenance

- Clean engine cylinder head and torque converter cooling device.
- Check battery liquid level, and coat a thin layer of vaseline.
- On first 100th hours working day, change gearbox oil filter and oil as well as torque coverter oil.radiator oil. From then on, repeat this operation every 500 hours.
- On first 100th hours working day, change front/ rear axle gear oil. From then on, repeat this operation every 1000 hours.

250 Hours/Monthly maintenance

- Check tightening torque of fixing bolt of rim.
- Check oil level of front/rear axle.
- Check load-carrying welds and fixing bolts of working device and front/rear frame for cracks and looses.
- Check engine fan belt ,compressor belt and generator belt for loose and damage
- Check and adjust service brake and parking brake system.
- On first 250th hour working day.change pilot filter element and hydraulic return filter.From then on,repeat this operation every 1000 hours.

500 Hours/Quarterly maintenance

- Tighten the connecting bolt between front/ rear axle and frame.
- Replace engine diesel oil filters.
- Check the engine valve clearance.
- Clean the oil filling and oil sucking filtration screen of fuel tank,replace fuel filter.
- Check and clean the seal components of the brake pump and replace the brake oil.
  When replace the brake oil, the air must be exhausted from the brake system.

1000 Hours/Half-yearly maintenance

- Inspect various temperature gauges and pressure gauges.
- Check the tightening of engine exhaust pipe.
- Check engine operation.
- Replace the oil return filter element, breather and pilot the filter element of the hydraulic oil tank.

2000 Hours/Yearly maintenance

- Replace hydraulic oil, clean oil tank and oil sucking filter screen, and check oil sucking pipe.
- Check service braking and parking braking operations. Disassemble and check the wear of friction lining if necessary.
- Clean and check seal and spring of brake pump,replace brake oil and check the braking Flexibility.
- Check the tightness of distribution valve and working cylinder by measuring the natural sediment.
- Check Flexibility of the steering system.
- Replace the Coolant of the radiator and cooler piping

ELECTRICAL SYSTEM

Note: *Strictly prohibit disassemble electric circuit and components. You should consult the agent to solve such problems.*

Battery

WARNING

The electrolyte is the diluted Sulfuric acid which can quickly burn the skin and pierce in the clothes. Rinse immediately with water if the battery electrolyte spills over your body on your clothes for your careless operation.

If the battery electrolytes enter eyes, immediately use plenty of water to clean and call a doctor as much as possible. Otherwise, it will cause the person to be blind.

Drink plenty of water or milk, and eat raw eggs or vegetable oils if you carelessly drink the battery electrolytes. And immediately go to a doctor or a poisoning prevention center.

Wear protective goggles when assembling battery.

The battery can generate Hydrogen. The battery has risk of explosion, especially the one without charged. Do not smoke near the battery, or perform anything which may cause sparks.

Before the maintenance of the battery, it is necessary to confirm the engine has stop running and the Start switch is at "OFF" position.

Prevent the accidental short circuit due to the contact between battery terminals with metal objects such as tools.

When disassembling the battery, you should check Positive (+) terminal and Negative (-) terminal of the battery.

When disassembling the battery, you should first disassemble Negative (-) terminal. When assembling the battery, you should first assemble Positive (+) terminal.

If the terminal is loose, the bad contact will cause electric sparks or arcs, as a result of that the explosion will occur. When assembling the battery, you should assemble it securely.

Battery in cold weather

The battery will consume a lot when performing starting and pre-heating operation in cold weather. Meanwhile, when the temperature decreases, the performance of the battery will also decrease.
In extremely cold weather, it is possible to remove the battery and put it in a warmer place, thus helping the improvement of battery performance.

Check fluid level of battery

The battery installed in this machined is the one without needing maintenance, and you need not add electrolyte into the battery. When the charge indicator is transparent, it indicates that the electrolyte is less, and the possible reason is leakage or the faults in charging system. Immediately perform the troubleshooting and replace the fault battery. (Fig.6)

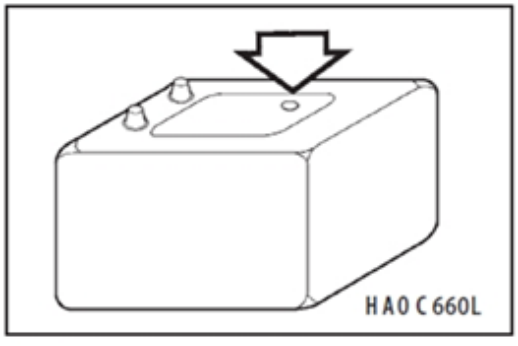


Figure 6

Check the charge state

Check the charge state by observing the indicator color set inside.

- Green: Normal
- Black: Charge is inadequate. Check the generator.
- Transparent: Electrolyte is inadequate. Replace with a new battery

Check terminals of battery

Ensure the battery is fixed securely. Clean the battery terminals and battery wire connectors. The soda and water can neutralize the electrolyte on battery surface, terminals and wire connectors.
Coat Vaseline or grease on the connector to prevent the corrosion (Fig.7).

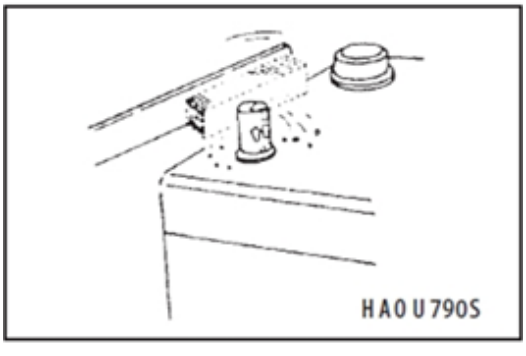


Figure 7

Maintenance of Air-conditioning System

- **Clean radiator of outside air conditioning regularly—Condenser**

  Checking approach:

  Clean condenser with plenty water after removing the condenser fan and exposing condenser completely, but it can't be rinsed with large water pressure to prevent lodging of condenser fins and affecting the cooling effect.

  Maintenance standards:

  Generally,condenser need to be cleaned monthly in the summer and please increase the number of cleaning appropriately if the working conditions are serious bad.(It is very important and you will feel cool and extend the life of air conditioning)

Figure 8

- **Please check fixing blots and belt of compressor fixed regularly**

  Checking approach:

  Check the blots of conditioning with visual inspection. The approach to check the degree of tighten:Press the central of belt with approximate 10Kg down and the margin of belt is about 10~15mm and the belt can't be too high or too low.

  Maintenance standards:

  Please check it weekly in the summer

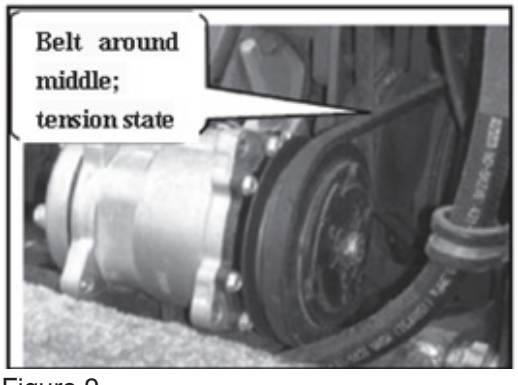


Figure 9

- **Checking procedure for not cooling of air conditioning:**

  Confirm the reasons of faults of above 80 percent and after-sales department can judge the faults quickly and help you resolve the problems as soon as possible if you could provide the following information during the warranty


Figure 10

- **Checking of bottom of the loader and static state**

  1.Check the belts of condenser are too loose or not.

  Approach of checking: As same as above steps

  2.Check whether there is refrigerant in system.

  Approach of checking: Find the filling port of Freon (Fig.10) and use a key or other sharp object to stab the cap after unscrewing the plastic blocking cap (the structure just like the gas nozzle of the tire)

- **Checking of loader's top and energizing of whole loade.**

  1.Open the control panel and knob third gear to H gear to check if there is some airflow out and whether the air volume is large or notMaintenance standards:

  2.Knob the temperature control switch button of the right of control panel to max clock-wisely to check if the indicator is light and to check whether the regulator machine is closed with ears.(The compressor will make a snapping sound when the temperature control switch is open and close repeatedly.

Figure 11

- **Dynamic checking of bottom and top of loader**

  1.Start the air conditioner after launching the loader and check if there is cold air blowing out. You also observe the liquid sight glass of accumulator to judge fault.

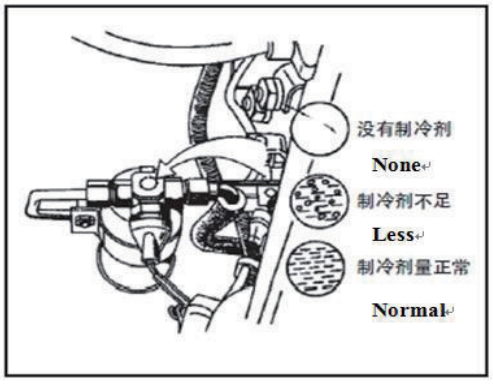


Figure 12

  2.Comparison table between liquid sight glass state of reservoir and trouble analysis.

Status of liquid endoscopic	Failures analysis
Liquid sight glass is lacte, bubbles can be seen at the moment of turning on and turning off A/C, and bubbles become transparent suddenly.	Freon charging quantity is proper
Few bubbles flowing, compressor head is hot, refrigeration output is not enough, high and low pressure of the system are both very low.	Freon charging quantity is not enough or the system is leaking
Turn on and turn off AC, it is hard to see bubbles flowing, compressor head is cold, high and low pressure of the system are both high	Freon is over charged
Freon charging is proper, AC does not refrigerate, it is hard to see bubbles flowing in reservoir, low pressure is negative.	Expansion valve is dirty and blocked or frozen and blocked, it shall be solved by professional personnel

BUCKET

Replace O-ring seal for the bucket

WARNING

Wear safety helmet, gloves and goggles when you replace pins because metal objects may fly off.

1. Check the O-ring seal for the bucket, and replace it if it is worn or damaged

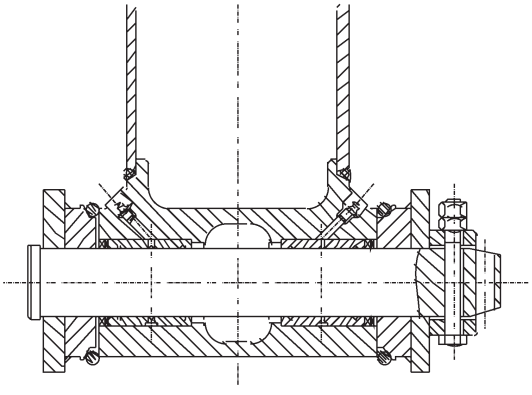


Figure 13

2. Move O-ring seal (1, Fig.14) onto bushing (2) , then , remove the bucket pin (3) and extract the bucket connecting rod(4) .

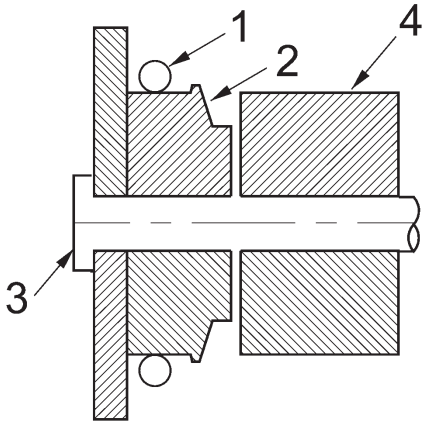


Figure 14

3. Remove old O-ring seal and install new O-ring seal (1, Fig. 16) onto bushing (2). Confirm that the O-ring seal on connecting rod cover (4) and bucket bushing has been thoroughly cleared
4. Align the bucket connecting rod cover and the bucket link pin hole, and install bucket pin (3, Fig. 14).
5. Install new O-ring seal 1(1, Fig. 15) into O-ring seal.

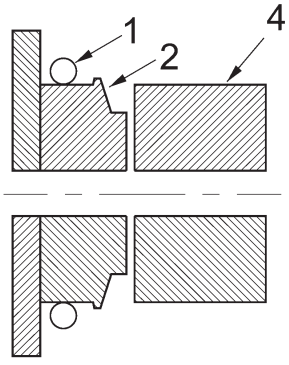


Figure 15

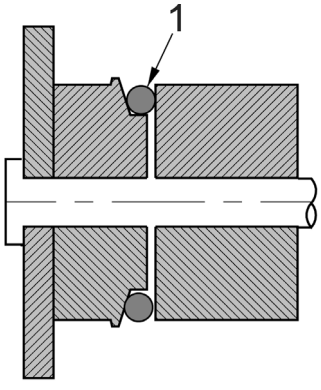


Figure 16

ADD SHIM TO BUCKET

Install a new bucket

1.If you want to install new bucket, you should measure the dimension of between internal lugs of the bucket and the dimension of bucket link width.

2.Subtract one dimension from the other, and you will get the dimension of the shim you want to add on both sides. Add the sheet before assembling

WARNING

When you check the gap at bucket connection, the bucket is in free status. Otherwise, you should lower down the bucket to the ground and use supporting block to fix the bucket. Stop the engine, lock the safety lever, hang the warning sign and prevent the bucket from moving.

The method with which the shim is added when the bucket is installed

1. When the bucket is being connected, the bucket will be retracted and the bucket link will extend outwards to lower arm to make the bucket teeth several centimeters away from the ground. At such position, it is easy to measure the dimension.
2. After the O-ring seal is installed, you should push the bucket to one side to check the gap between the other side of the bucket and bucket link. The total gap between the bucket internal lug and the bush end face (Y, Fig.17) shall be 1MM. If the fit is too tight (less than 1 MM), it will aggravate the wear, and if the fit is too loose, it will generate too much noise and the action will be slack.
3. Push the bucket to other side to check the above gap again.
4. When it is needed to adjust, you should remove the back cap(1,Fig.17) and bolt (2) from the pin (3) , remove or add shim (4). The same quantity of shims shall be used on both sides. Install bolt (2) and nut (1). A gap of 1-2MM shall be retained between the nut and the bush at the point “X”

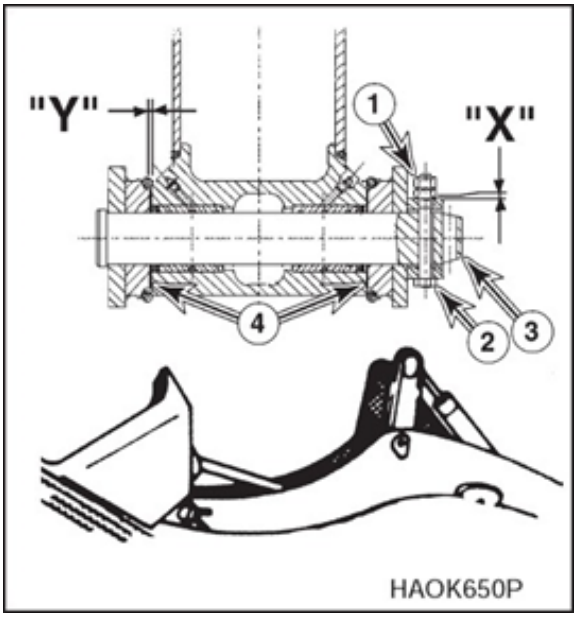


Figure 17

TIRES

The proper charging of the tire (2. Fig 18) is the important factor to determine tire life and performance. If tire is inadequately charged (1. Fig 18), it will not support the equipment, and will be worn quickly; if tire is excessively charged (3. Fig 18), the friction is less and it is easily to be pierced. Use pressure gauge to measure the Tire pressure before operation of the equipment, refer to following table:

Determine the pressure of front/rear Tires when the machine is running. Check the Tire for damage and for the insertion of any objects

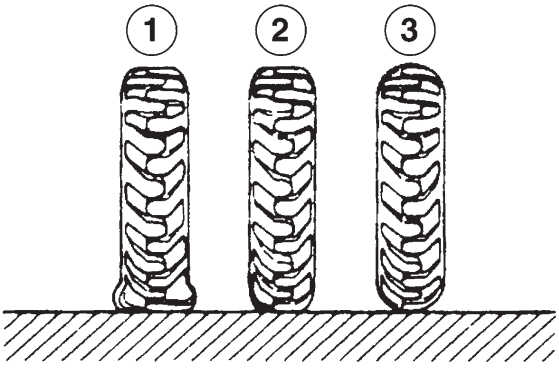


Figure 18

Recommended air pressure

Tire	Operating pressure		Remarks
	Front tires	Rear tires	
Bias Ply Tire (Tube Tire)	3.8kg/cm2(3.8bar(54psi))	3.4kg/cm2(3.4bar(48psi))	Standard
Radial Ply Tire (Tubeless Tire)	4.3kg/cm2(4.3bar(psi))	3.1kg/cm2(3.1bar(44psi))	

Check Tires for damage

WARNING

Improper maintenance or replacement of Tires may cause explosion to cause serious injury or death.
The maintenance and replacement of Tires may only be carried out by trained person who is properly equipped.
For maintenance of Tires, please contact with the nearest Tires agent or Tires manufacturer.

WARNING

The overheating of the Tire will cause explosion and serious injury or death.
Overheated tires may explode causing death or serious injury.
If an overheated tire is suspected, keep away at least 15m (50 ft).
Stay away until tire and rim cools down.

In case of following situation, you should replace with new Tires for the sake of safety, and contact with the nearest Tire agent or manufacturer.

- Tire bead metal wires are broken, damaged or bent, or the Tire is deformed.
- The wheel carrier is excessively worn, with an exposure of more than 1/4.
- The wear of the Tire carrier of the tread exceeds 1/3.
- The inner tube is separated.
- When the radius is worn to the wheel carrier.
- The Tire is deformed or damaged.

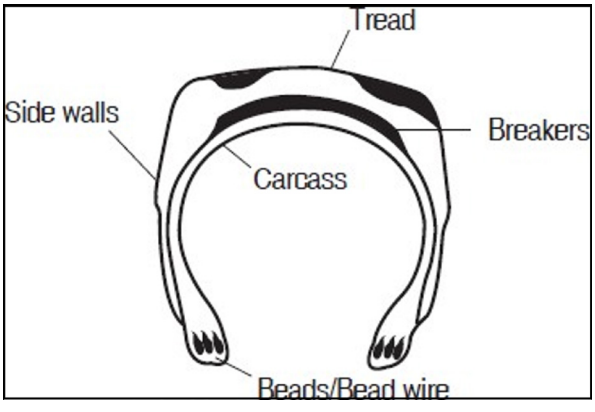


Figure 19

Replacement of Tire

WARNING

If a wheel and tire must be removed from machine and replaced, or if a tire must be replaced on wheel, use only experienced and trained service personnel. A tire rim could be propelled off wheel and cause death or serious injury. See Figure 20.

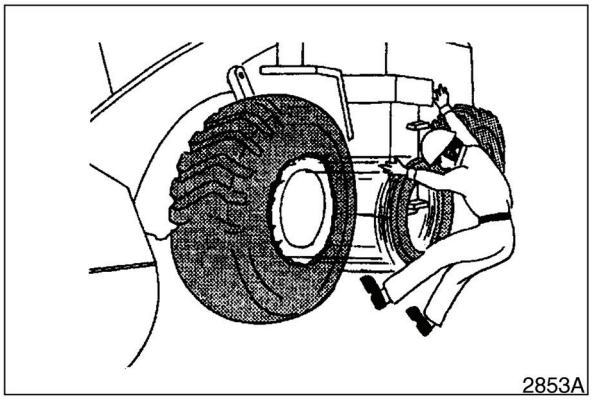


Figure 20

NOTE

1. **Before replacement of Tire, pull up and lock the hand brake, hang the warning label on the control lever to prevent others to operate the equipment.**
2. **Lower the external support (if any) down to ground to fix the machine.**
3. **When you use wheel wedges, ensure that there is no other Tire is being replaced.**

When you install the Tires, pay attention to the rotation direction marked on the Tire. If there is no such marks, check the threads to make it orient towards the front of the machine

Note: *Please use standard Tires. Using uncommissioned Tires may cause accidental wear to increase the load for the end drive.*

Figure 21

1. Park the equipment on the Flat ground.
2. Use a jack which can support the weight of the equipment to jack-up the equipment, making an adequate clearance between the Tires and the ground, and put proper strut under the support to sustain the equipment.
3. Lower the bucket down to the ground

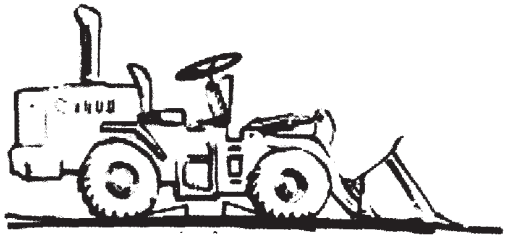


Figure 22

4. Remove the wheel nuts and tire assy from the hub (refer to Fig 23). Check the wearness of nut and replace the nut if necessary.
5. Check all components for excessive wear, and replace them if necessary

Figure 23

6. When you tighten the wheel nuts, refer to the pattern shown in Fig.24. Tighten the nuts to the specified torque (tightening torque: 600-680N. m and coat tightening glue on the mounting bolts)

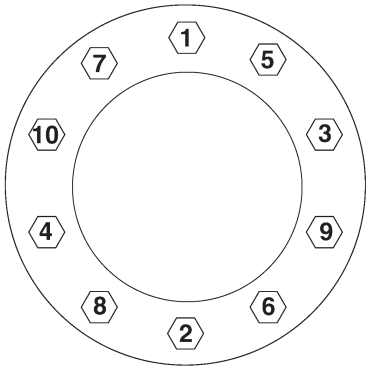


Figure 24

7. Rotate the wheels forward and backward, drive the machine to ensure the correct installation of the Tires. Re-tighten the Tire nuts with the required torque

Figure 25

INSPECTION OF BOLT AND NUT

Check all fasteners after working for 50 hours for the first time and every 250 hours from then on. If loose or loss is found, it is necessary to re-tighten or add new products. You must use torque wrench.

KEY POINT

Clear the fasteners before tightening.

If the counter weight of the bolt is loose, please consult the agent to solve the problems.

NO.	Check points		Bolt dia.	Qty.	Bolt head dimension	Torque	
						kg·m	Nm
1	The connecting bolts and nuts between engine mounting support and engines		M12	8		12	
2	The connecting bolts and nuts between engine mounting support and main frame		M24x2	2		46±4.6	
3	Mounting bolts for radiator		M12	4	40mm	15	
4	Tighten the mounting bolts for hydraulic oil tank		M16	8	24mm		193~257
5	Tighten the mounting bolts for fuel tank		M20	4	30mm		540~650
6	Tighten the mounting bolts for oil pump		M12	4	35mm		78~104
7	Tighten the mounting bolts for control valve		M12	4	115mm		78~104
8	The bolts between cab mounting rubber and main rack		M16	4	69mm	20	
9	The bolts between cab mounting rubber and cab		M10	16	30mm	6~67	
10	Tighten front/rear axles		M30x2	16	260mm	150	
11	Connecting bolt and nuts for propeller shaft	Bolt	M12x1.25	16	65mm	11	
		Nut	M12x1.25	16		11	
12	Tire nut		M22x1.5	48			600~680
13	The connecting bolt between gearbox and main frame		M20X1.5	2		70±4.6	

MAINTENANCE UNDER SPECIAL CONDITIONS

Conditions	Maintenance requirements
Working in mud, water or rain	1. Walk around and check for the loose connector, obvious damage or leakage. 2. After working, clear the mud, rocks and sand on the ma chine. Check the welded parts for the cracks and components for the loose. Accomplish lubrication and maintenance every day. 3. If the equipment is working in acid rain or in the corrosive materials, you should use water to clean the affected parts.
Working in a particularly dusty or in a very hot environment	1. Clean the air filter element more frequently. 2. Clean radiator to remove the inserted dust and dirt . 3. Clean the fuel sucking filter and fuel filter more frequently. 4. If necessary, check and clear the starter and engine. 5. Replace more frequently the filter element, breather and pilot the filter element of the hydraulic oil tank
Working in rock environment	1. Check the chassis and wheel assy for damage or excessive wear. 2. Check connector and bolt for loose or damage. 3. Check hubs and Tires for damage. 4. Check more frequently the bucket or crusher for damage or excessive wear. 5. If necessary, install a top frame and front frame to avoid the damaging from falling objects
Working in extremely cold area	1. Use the proper fuel which is adapted to the ambient temperature. 2. Use gravimeter to check anti-freeze fluid to ensure having corresponding anti-freeze performance. 3. Confirm the ambient temperature of the battery. In extremely cold weather, it is necessary to remove the battery during night and put it in a warmer place. 4. Timely remove the slime on the machine body to prevent the equipment from being damaged due to the freezing

STORAGE FOR A LONG TIME

Store the machine as shown in the following table if it will stop for more than one month

Conditions	Maintenance requirements
1. Cleaning	1. Flush the chassis and wheel drive assy using HP water gun. Check for the damage or the loose components.
2.Lubrication	1. Execute all routine lubrication operations. 2. Coat a layer of oil on the surface of the exposed metal parts, such as hydraulic oil cylinder lever. 3. Coat oil on all control connecting components and at the control oil cylinder (control valve plug etc)
3.Battery	1. Fully charge the battery, remove battery or battery wires, and keep them in reserve.
4. Cooling sytem	1. Check whether the anti-freeze fluid level in cooling fluid reservoir is correct. 2. Check every 90 days or 750 hours the anti-freezing conditions of anti-freeze fluid or coolant using gravimeter. Refer to the required level for filling anti-freeze Fluid.
5.Hydraulic system	1. Start the engine once every month by referring to “Temperature Increase Method for Hydraulic System” specified in this manual.

Investigate the height, width and the allowed carrying capacity in the passage of transportation line. The total height, total width and total weight should not exceed the related regulations. Please consult Hyundai or other agents for the solutions.
In order to prevent the safety accidents from being occurred during the shipment of the machine, clear the ice and snow as well as other slippery materials on the dock and wagon.

TRANSPORTING MACHINE

CAUTION

During shipping, please follow the laws and regulations about the shipment height, width, length and weight issued by State and local authorities.

- Use wedges to stop the wheels of trailer or truck before shipping.
- Do not allow the steering operation on the way for the machine being driven on to the trailer or the truck. You should back the vehicle to the flat ground, and then perform the steering operation
- After the machine is fixed, use frame-fixed bumper to fix the front and rear frames.
- Lay the bucket down to the transportation vehicle, put the shifting manipulating handle on “Neutral Gear” position.
- Pull up the handle of parking brake to apply parking braking.
- The engine is switched off, and all switches are put to Middle position or “OFF position. Pull out the electric lock key.
- Close and lock all doors, then take away the buttons.
- Toggle the power supply Negative switch to “OFF” position.
- When you use truck or trailer to transport the machine, you must use wedges to stop the wheels and use steel cables to fix the machine, so as to prevent the machine from moving during transportation.

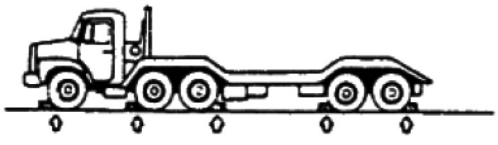


Figure 1

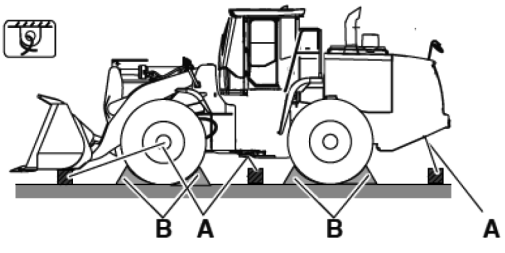


Figure 2

Lifting of loader

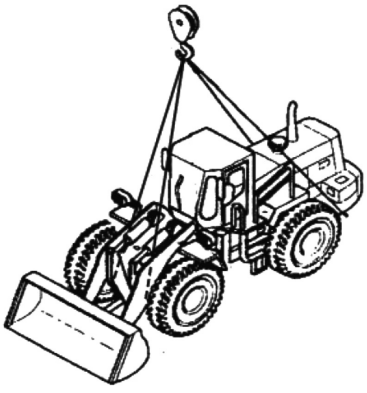
It is necessary to let the professionals with lifting knowledge be responsible for the command and operation.

You should calculate the crane's maximum lifting weight and the sling's bearing capacity to ensure the lifting safety. Meanwhile, the 4 hooks on the sling shall bear load evenly.

Accomplish the following preparation before lifting:

- Put the shifting manipulating handle on "Neutral Gear" position.
- Put the boom and bucket to the lowest position.
- Pull up the handle of parking brake to apply parking braking.
- Switch off the engine and pull out the electric button
- Close and lock all doors.
- Toggle the power supply Negative switch to "OFF" position.
- Use frame to fix the bumper and fasten the front and rear frames, making the machine unable to rotate.

The sling should be securely fixed to the lifting eyes of the machine on which the lifting marks are indicated.



Lifting marks

Figure 3

WARNING

Incorrect lifting may cause the offset of the machine, thus inducing personal injury or death as well as property loss.

Towing of the fault machine

This machine cannot be towed unless in the emergency. Towing is only used for towing this machine to a place where the overhaul can be performed, instead of transporting over a long distance. The towing distance for this machine should not exceed 10km, and the towing speed should not exceed 10km/h, otherwise the gearbox will be damaged for short supply of oil. If you must move this machine, you should use special trailer.

WARNING

Incorrect towing of inoperable machine may cause the personal injury or death. Towing the fault vehicle on bad road surface may cause the fault vehicle to be further damaged severely.

If the brake system is in fault, the brake shall not be applied. In this case, you should be quite careful during towing.

Matters needing attention for towing: Be sure to release parking braking

Note: *1. You should use wedges to stop the wheels of the machine to prevent the machine from moving. If the machine wheel is not properly stopped by wedges, the machine will move. The wedges shall be removed after towing begins.*

2. Nobody shall be allowed to sit on the towed machine unless the driver can control the direction and brakes.

3. Ensure, before towing, the towing rope and the tow bar are in good working conditions and have adequate strength to pull the machine. The strength of the available towing rope and tow bar shall be at least 1.5 times of the gross weight of the towed machine, so as to pull up the machine from the mud or beneath the slope.

4. *Keep the minimum angle of the supporting rope, and the angle between the tow rope and the right ahead should not exceed 30 º*
5. *The too quick movement of the machine may cause the breakage of tow rope or tow bar. It is better to slowly and stably move the machine.*
6. *When towing the machine, all persons shall be far away from both sides off the rope to prevent the tow rope from injuring persons due to the breakage.*
7. *Under normal conditions, the trailer shall be of a size as the machine. It is necessary to ensure the trailer shall have adequate braking capacity, weight and power to control the slope ascending of two machines and the travel distance etc..*
8. *When the towed machine is descending the slope, in order to have adequate controlling and braking capacity, it is necessary to connect a bigger trailer or other machine to the back of the machine so as to prevent from out-of-control and rolling.*
9. *If the travel direction of the towed machine is controlled by the driver, the driver shall make the turn along the direction of tow rope. Check the regulations on the width, height, and load-restriction and traffic restriction for the roads you want to go through. It is possible to need special application or permit.*

TRANSPORTATION DIMENSION

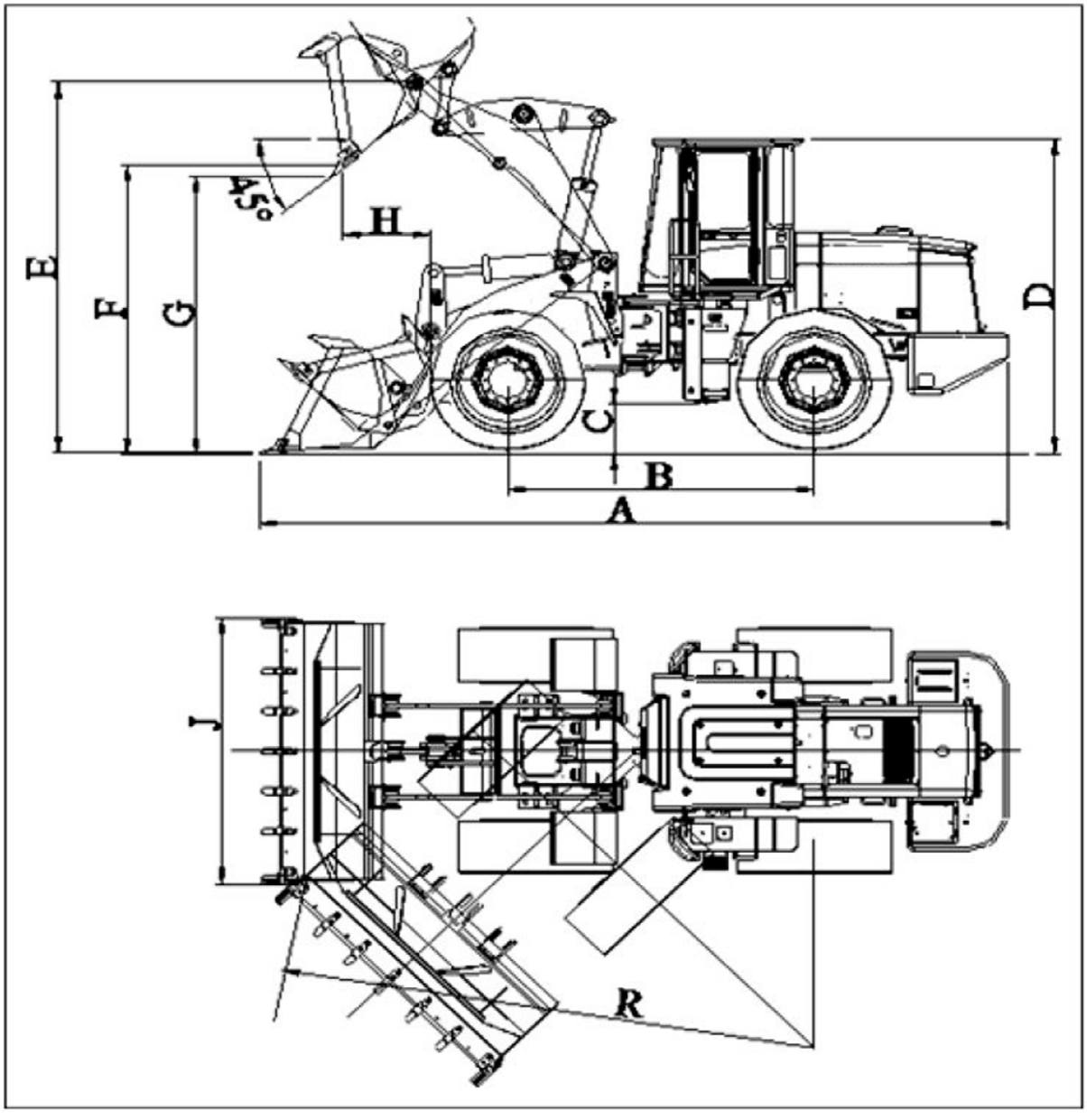


Figure 4

Basic dimension		
Sign	**Description**	**Dimensions**
A	Transportation length	7780mm
J	Transportation width	2990mm
D	Cab height	3470mm
C	Ground clearance	480mm
B	Space between front and rear Tires	3900mm

TRANSMISSION SYSTEM

Characteristics of faults	Cause	Remedy
Shifting pressure low for each position	1. Oil level too low in gearbox oil pool	1. Add oil to the specified oil level
	2. Leakage in main oil way	2. Check main oil way
	3. Gearbox oil filter blocked	3. Clean or replace variant pump
	4. Variant pump ineffective	4. Replace working pump
	5. Pressure regulation spring of shifting manipulation valve improper	5. Re-adjust according to the regulations
	1. Pressure regulation spring of shifting manipulation valve ineffective	1. Replace spring of regulation valve
	2. Shifting manipulation valve, Pressure regulation valve or accumulator piston blocked.	2. Dismantle and eliminate the blocking phenomenon
Shifting pressure at some position is low	1. Seal ring for piston of this position damaged	1. Replace seal ring
	2. Seal ring in oil way of this position damaged	2. Replace seal ring
	3. Leakage in oil way of this position	3. Locate the leakage point and repair
Torque converter oil temperature Over high	1. Oil level too low in gearbox oil pool	1. Add oil to the specified oil level
	2. Oil level too high in gearbox oil pool	2. Add oil to the specified oil level
	3. Shifting pressure low, and clutch slippage	3. See I, II
	4. Torque converter radiator blocked	4. Clean or replace torque converter
	5. Torque converter works with high load for too long time	5. Stop working for cooling properly
Engine speed high, Engine is running, but the vehicle could not be driven	1. The valve stem of shutoff valve for shifting manipulating valve not return	1. Remove shutoff valve, find the cause of unable returning, and perform trouble shooting
	2. Gear not engaged	2. Re-push to the proper position, or re-adjust the control lever system
	3. Pressure regulation spring of shifting manipulation valve broken	3. Replace spring of regulation valve
	4. See items 1,2,3,4 in (I)	4. See items 1,2,3,4 in (I)

Characteristics of faults	Cause:	Remedy
Driving force not adequate	1. Shifting pressure low	1. See I, II
	2. Torque converter oil temperature too high	2. See III
	3. Impeller of torque converter damaged	3. Disassemble torque converter and replace impeller
	4. Big overrunning clutch damaged	4. Disassemble big overrunning clutch and replace damaged parts.
	5. Poor engine output power	5. Repair the engine
Gearbox oil level increase	1. Steering pump shaft end mixing oil	1. Replace oil gland at steering pump shaft end
	2.Working pump of working hydraulic system mixing oil	2. Replace oil gland at working pump shaft end

BRAKING SYSTEM

Characteristics of faults	Cause	Remedy
Foot braking force not adequate	Air in braking hydraulic pipeline	Bleed the pipeline
	Oil leakage in brake pad ass'y	Replace seals on the brake pad ass'y
	Brake air pressure low	Check tightness of air compressor, combo valve, accumulator and pipeline
	Seals for bake pump worn	Replace seals
	The hub is leaking, and the oil is leaked onto the brake pad	Check or replace hub oil seal
	Brake pad worn to the limit	Replace brake pad
Gear not engaged	Brake valve fault	Check brake valve
Brake can`t opened normally	Brake valve fault	Check brake valve
	Brake pump not act normally	Check brake pump
	Slave pump piston can not return	Check or replace rectangular coil
Pressure in air reservoir quickly decreases (drops more than 0.1MPa in 3 minutes)	Intake valve of the brake valve blocked by dirt or damaged	Perform several times of braking to blow off the dirt or replace brake valve
	Pipe joint loose or pipeline ruptured	Tighten joint or replace pipe
Pressure indicated by barometer rises slowly	pipe joint loose	Tighten joint
	Air compressor works abnormally	Check working conditions of air compressor
	Intake valve of the brake valve or drum membrane not sealed	Check or replace brake valve
Emergency or parking braking force inadequate	Clearance between brake drum and brake pad too large	RE-adjust according to the operation requirements or replace brake pad
	Oil on the brake pad	Clean brake pad

HYDRAULIC SYSTEM FOR WORKING DEVICE

Characteristics of faults	Cause	Remedy
Arm lifting force or bucket digging up force inadequate	Wear or damage of cylinder oil seal	Replace oil seal
	Distribution valve excessively worn. Fit clearance between valve stem and valve body exceeds the specified value	Disassemble, check and repair to make the clearance meet requirements on specified value , or replace distribution valve
	Oil leakage in pipeline system	Locate the leakage point and repair
	Severe internal leaking of working pump	Replace working pump
	Improper adjustment of safety valve, and system pressure too low	Adjust the system pressure to the specified value
	Oil suction pipe and oil filter blocked	Clean oil filter and change oil
Bucket or arm rises slowly even at high speed of engine	See above	See above
	Dual action safety valve blocked	Disassemble the dual action safety valve to check

STEERING HYDRAULIC SYSTEM

Characteristics of faults	Cause	Remedy
Hard to make steering	Oil temperature too low	Increase the oil temperature , then start working
	Load sensing oil way blocked	Clean it
	Pressure of steering pump low	Adjust overflow valve block pressure according to the regulations
	Partial bolts for metering motor of full hydraulic steering gear tightened too tightly	Loosen the bolts
Vehicle steering not stable	Priority valve acts not sensitively	Maintain or replace priority valve
Both leftward and rightward steering slowly	Regulation valve leaking	Repair or replace priority valve
	Steering pump flow inadequate	Repair or replace steering pump
Steering normally when steering resistance is small; Steering slowly when steering resistance is large	Steering overflow valve seat leaking severely	Repair vale seat or replace seal ring
	Steering cylinder leaking severely	Repair or replace steering cylinder seal ring
Vehicle not steering while steering wheel is rotated	Steering gear fault	Repair or replace steering gear
	Steering overflow valve fault	Repair steering overflow valve
	Steering column fault	Repair steering column
Steering wheel auto rotates while driver nor operating	Full hydraulic steering gear valve housing blocked	Remove impurities in valve
	Full hydraulic steering gear spring plate broken	Replace spring plate
Steering pump noisy and steering cylinder acts slowly	Air in steering oil way	Start vehicle, make several times of leftward/rightward steering
	Steering pump worn, and flow inadequate	Replace steering pump
	Oil viscosity inadequate	Change oil as per correct brands
	Hydraulic oil inadequate	Fill enough hydraulic oil
	Internal leaking in steering cylinder	Repair cylinder or replace seal

ELECTICAL SYSTEM

Characteristics of faults	Cause:	Remedy
Generator not working, or output low voltage	Commutator oil stained or worn	Wipe using clean cloth dipping with gasoline, or grind using #00 emery cloth
	Remanence coil open circuit	Check external magnetic field , and check exciting circuit using light bulb
	Remanence disappeared	Perform magnetizing or replace with new generator
Generator overheat	Bearing worn or lubrication oil inadequate	Replace and add lubrication oil
	Commutator or armature coil short-circuited internally	Disassemble generator and check commutator and armature coil , and eliminate the short-circuit faults
Battery not charged or charged at low flow	Generator magnetic field coil short-circuited or open circuited	Generator magnetic field connected well, and resistance of magnetic field coil is about 20Ω
	The positive pole connecting wire dropped off	Turn on the electric lock but do not start, there should be 24V on the generator “+” pole
	Battery connecting wire too loose or dropped off	Visual check and tighten the wire
	Generator transmission belt too loose	Visual check and tighten the wire
Battery charge time too long	1. Battery feed supply severely. 2. One or two cells in the battery short-circuited or damaged. 3. Generator negative pole connecting wire dropped off	Start the generator and use multimeter to check charge current or battery voltage. If the charge current is too large and battery voltage is below 25V, the battery is in fault. If the generator “+” pole voltage is greater than 30V, check generator “-” pole grounding for the normality. Connect voltmeter “-” pole to ground and “+” pole to generator “-” pole. If there is voltage indication on voltmeter, the Grounding wire is open circuited.. Otherwise, the problem is in the generator.
No indication on electric sensing instrument instrument	Instrument damaged	Replace instrument
	Sensor damaged	Replace sensor
	Generator or battery is in fault	Check whether the terminal voltage of generator or battery is normal
	Sensor drops off	Re-tighten it

Characteristics of faults	Cause:	Remedy
Engine could not start or start difficultly	Battery damaged or its capacity inadequate	Replace with new battery or charge the old battery
	Electric lock damaged	Replace electric lock
	Electric circuit contact badly or short-circuited	Check and repair
	Starter motor electromagnetic switch or fork damaged	Check the coil for perfection , the contact for smooth, the fork for moving freely, the spring for broken and for tooth picking. Repair if necessary
	Rotor of starter motor burnt	Replace starter motor
	Main power supply relay, starter relay or gear position/start interlocking relay damaged	Replace relay
Lamps not lit up	Lines fault	Check switch, fuse, light bulb, and lines. Replace or repair if necessary
Maximum range indicated by instrument	Instrument connecting wires loose	Re-tighten or connect the grounding wire
Air conditioning system without electricity	1.Air conditioning line fuse 2.Air conditioning power supply wire harness not connected	
Evaporation fan turn, open the temperature control switch, light not bright, condensation fan and compression machine doesn't work	1.The cabin indoor temperature is below zero 2.The temperature probe break or not connected 3.Air conditioning temperature control switch is bad	
Evaporation fan turn and condensing wind machine turn, compressor doesn't suck together	1.The compressor clutch coil is bad; 2.High and low voltage switch bad; 3.Freon leakage 4.High and low voltage switch to the compressor line break	
Evaporation fan not turn, condensation fan turn, compressor suction together	1.The evaporation fan ground fall off, or ground bad contact; 2.Three gears switch is bad 3.Evaporation fan is bad	

STANDARD SPECIFICATION

	Item		Size
Performance	Bucket capacity		2.7m^3
	Rated load		5000kg
	Boom lifting time(full load)		≤5.3s
	Cycle time		≤10.3s
	Highest speed at each gear	Gear Forward I	12.2km/h
		Gear Forward II	38.4km/h
		Gear Reverse I	16.8km/h
	Maximum traction force		164±5kN
	Maximum digging up force		160±5kN
	Maximum gradability		30°
	Min. bend radius	Center of tier	5670±50mm
		Outside of bucket	6780±50mm
	Geometry dimension	Vehicle length(with bucket laid down the ground)	7780±100mm
		Vehicle width(outside of wheel)	2750±20mm
		Bucket width	2990±10mm
		Vehicle height(top of cab)	3470±50mm
		Axle base	2900±20mm
		Wheel base	2150±10mm
		Min. Distance above Ground (at the bottom of the oil-tank)	480±10mm
		Maximum unloading height	3160±20mm
		Maximum unloading distance	1210±20mm
	Machine weight(with cab)		16500±200kg
	Driver seat		Over the articulation position

ENGINE

Item	Size
Type	WD10G220E23 diesel engine
Rated rotation speed	2000r/min
Maximum torque	900N.m/1500r/min
Fuel consumption at rated working conditions(rig-test)	≤215g/kw.h
Fuel	#40 in summer
Fan diameter (exhaust)	760mm

TRANSMISSION SYSTEM

Item		Size
Hydraulic torque converter	Type	Single turbine
	Torque ratio	3.25
	Cooling mode	Air cooling
Gear box	Type	- Single Stage, two phase, - Four elements(dual turbine)
	Shifting gear	- 2 gears for Forward, - 1gears for reverse
	Variable -speed oil pump(gear pump)	- 54.5 ml/r
	Operating pressure	- 1.1~1.5MPa
Main transmission and hub reduction	Main transmission type	1st stage reduction spiral bevel gear
	Hub reduction type	Planetary reduction straight spur gear
	Reduction ratio	22.848
	Main transmission reduction ratio	4.625
	Hub reduction ratio	4.94
Driving axle and wheel	Type	4- wheel driven
	Tire	23.5-25
	Tire air pressure	0.28~0.32MPa

BRAKING SYSTEM

Item		Size
Service braking	Service braking (foot braking)：	Single pipeline, air-poppet oil 4-wheel caliper disc brake
	Brake disc diameter	ϕ 460mm
	Braking slave cylinder	ϕ 70mm
	Friction lining dimensions (L×W×H)	182×72×15mm
	System Pressure	0.71~0.784 MPa
Parking and emergency braking		Auto, manual, hand-operated pneumatic
	Brake drum diameter	ϕ 305mm
	Brake band dimensions (L×W×H)	325×76×6.5mm

STEERING SYSTEM

Item	Specification
Type	Articulation frame, full hydraulic steering system
Steering cylinders — I.D. × stroke	2- ϕ 90× ϕ 45×383mm
Steering pump	CBAK2080/CBGj2080
	CBGq2080/0010
System pressure	14MPa
Steering angle	36º each on left and right

HYDRAULIC SYSTEM FOR WORKING DEVICE

Item	Specification
Boom cylinders -I.D.× stroke	2- ϕ 160×712mm
Bucket cylinders -I.D.× stroke	1- ϕ 190×576mm
Distribution valve	Hydraulic manipulation type
	Pilot hydraulic manipulation type
Main pump Model	CBGj3100/CBAK3100
System pressure	17.5MPa
Working device	Single rocker, reversal, 6-connecting rod mechanism

ELECTRICAL SYSTEM

Item	Size
System voltage	24V
Battery	Two 12V120AH in series
Light bulb voltage	24V
Diesel engine starting	24V, electric startup

OIL FILLING CAPACITY

Item		Size
Fuel tank		260L
Hydraulic oil Tank Capacity		260L
Crankcase		19L
Gearbox system		49L
Axle (differential and planetary system)	Front axle	27L
	Rear axle	27L
Front/Rear booster		

A/C SYSTEM (optional)

	Item	Size
Hot air	Working medium	Diesel engine cooling water
	Heating capacity	5000W
Refrigeration	Working medium	R134a
	Refrigerating capacity	4000W
System voltage		24V

INTEGRAL DIMENSION

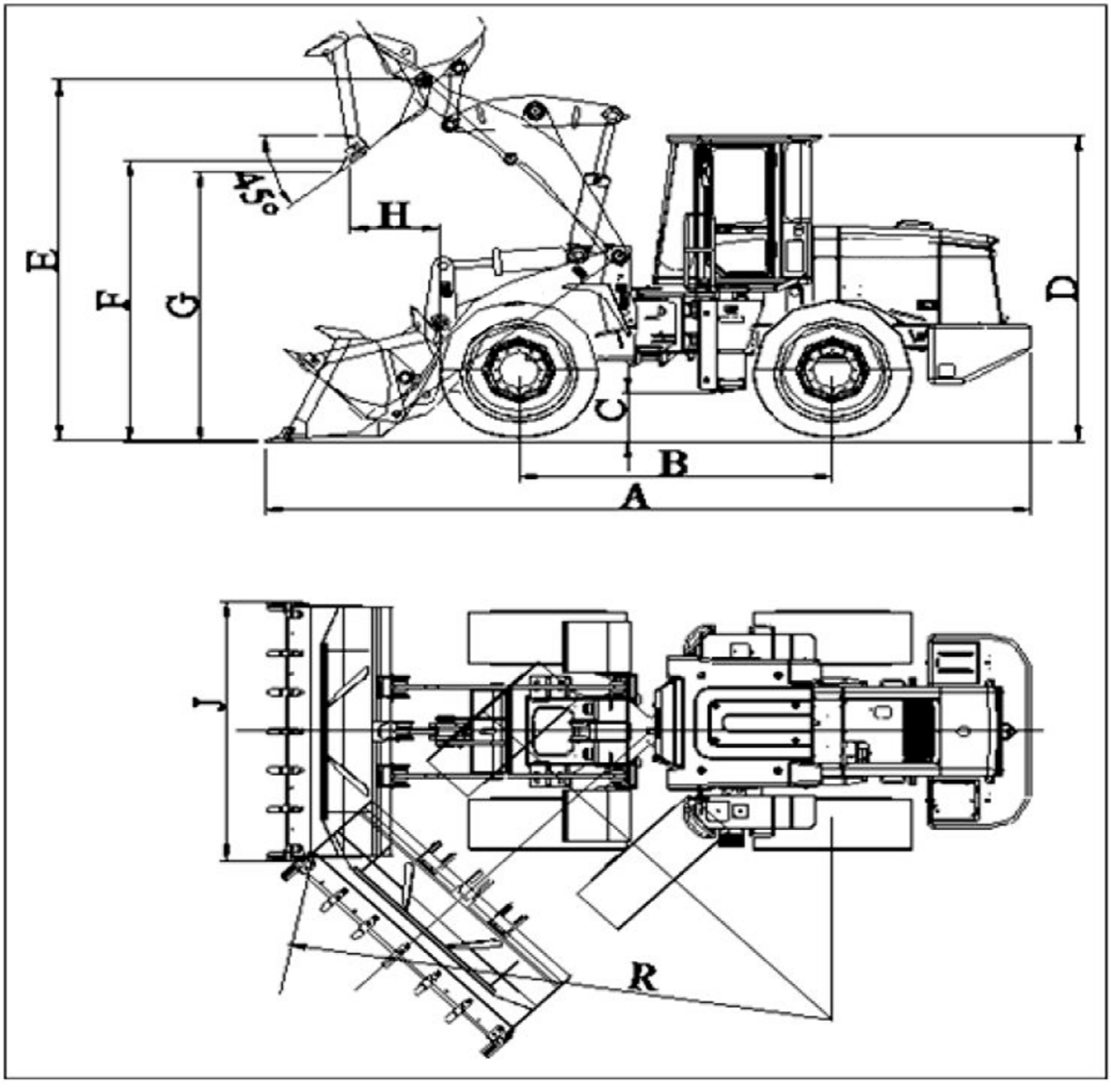


Figure 1

Intergral dimension		
sign	**Description**	**Dimension**
A	Transportation length	7780mm
J	Transportation width	2990mm
D	Cab height	3470mm
F	Ground clearance	3160mm
B	Space between front and rear tyres	2900mm

OPERATION SCOPE

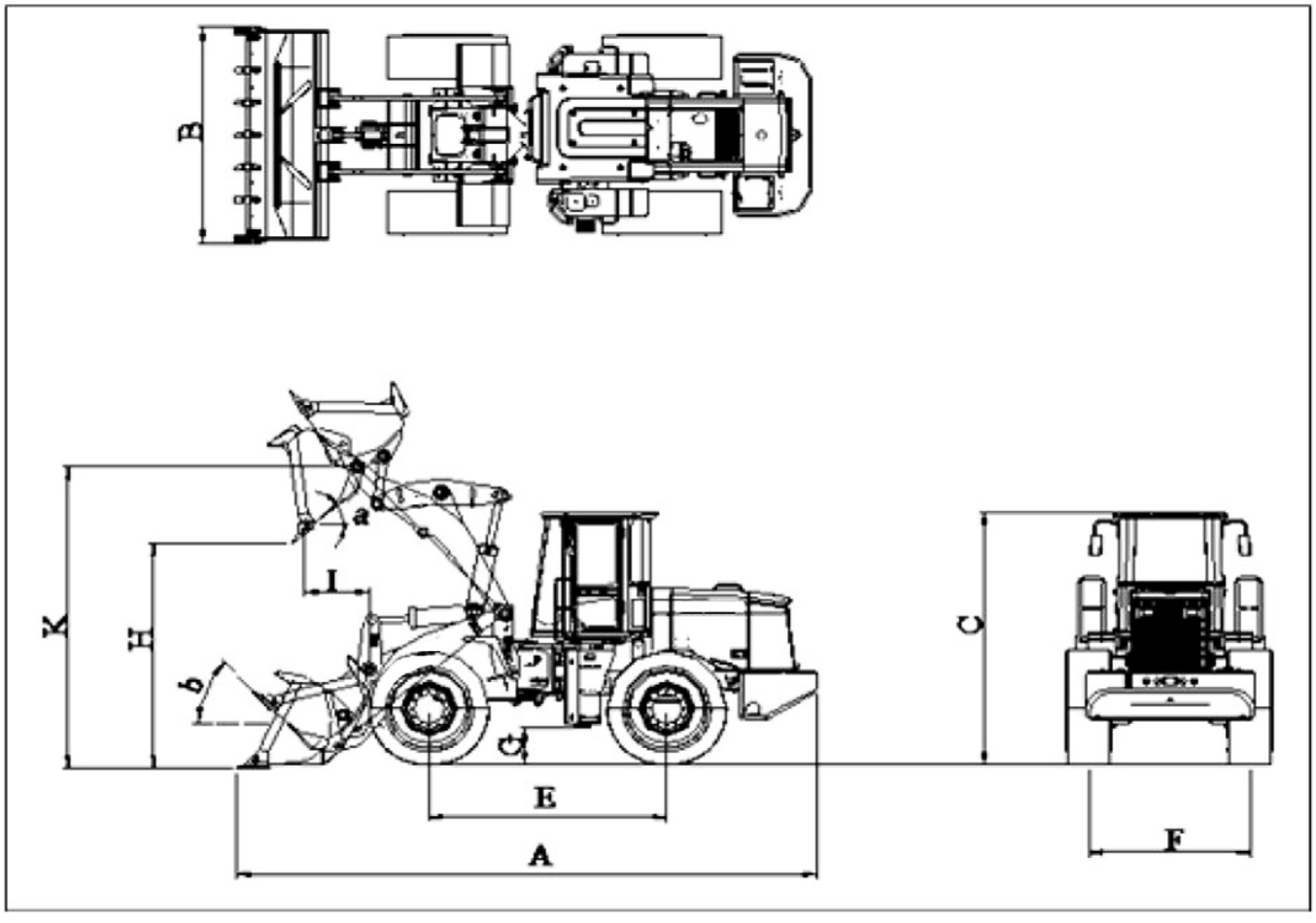


Figure 1

Intergral dimension		
NO.	**Description**	**Dimension**
A	Machine length	7780mm
B	Machine width	2990mm
C	Machine height	3470mm
E	Axle base	2900mm
F	Wheel base	2150mm
G	Min. Distance above Ground	480mm
H	Unloading angle(Bucket teeth)	≥3030mm
I	Unloading distance(Main knife plate)	≥1210mm
K	Hinged pin height at maximum lifting position	4100mm
a	Maximum unloading angle	45°
b	Maximum tilting angle(transportation position)	50°

WEIGHT OF OPERATION LOAD

WARNING

KEY POINT

The weight refers to the approximate value of the estimated average volume. With exposure to rain, snow or underground water, because of the condensation or compression produced from the indirect weight and chemical industrial treatment, or because of the changes induced from heat or chemical conversion, the parameters listed in the table will increase.

Material	A little weight or density 1,100KG/M3 (1,850LB/YD3),OR LESS	Moderate weight or density 1,100KG/ M3(1,850LB/YD3),OR LESS	A lot weight or density 1,100KG/M3 (1,850LB/YD3),OR LESS
Charcoal	401kg/m3 (695 lb/yd3)	- - - - -	- - - - -
Blast furnace charcoal size	433kg/m3 (729 lb/yd3)	- - - - -	- - - - -
Foundry factory charcoal size	449kg/m3 (756 lb/yd3)	- - - - -	- - - - -
Coal, bituminous coal and fuel assembly	801kg/m3 (1,350 lb/yd3)	- - - - -	- - - - -
Coal, bituminous r..m and fuel assembly	881kg/m3 (1,485 lb/yd3)	- - - - -	- - - - -
Coal, anthracite	897kg/m3 (1,512 lb/yd3)	- - - - -	- - - - -
Sun-crack clay block	1,009kg/m3 (1,701lb/yd3)	- - - - -	- - - - -
Wet clay on natural roadbed	- - - - -	1,746kg/m3 (2,943 lb/yd3)	- - - - -
Dry grains of common cement	- - - - -	1,506kg/m3 (2,583 lb/yd3)	- - - - -
Dry slag of common cement	- - - - -	1,362kg/m3 (2,295 lb/yd3)	- - - - -
Dolomite chips	- - - - -	1,522kg/m3 (2,565lb/yd3)	- - - - -
Fertile, dry, soft soil	- - - - -	1,202kg/m3 (2,025 lb/yd3)	- - - - -
Solid, dry mud	- - - - -	1,522kg/m3 (2,565 lb/yd3)	- - - - -

Material	A little weight or density 1,100KG/M3 (1,850LB/YD3),OR LESS	Moderate weight or density 1,100KG/ M3(1,850LB/YD3),OR LESS	A lot weight or density 1,100KG/M3 (1,850LB/YD3),OR LESS
Wet muddy clay	- - - - -	- - - - -	1.762kg/m3 (2.970lb/yd3)
Calcinated plaster stone (hot, powder)	961kg/m3 (1.620lb/yd3)	- - - - -	- - - - -
3” broken plaster stone	- - - - -	1.522kg/m3 (2.565lb/yd3)	- - - - -
Accumulated grit dry chips	- - - - -	- - - - -	1.810kg/m3 (3.051lb/yd3)
Accumulated grit wet chips	- - - - -	- - - - -	1.922kg/m3 (3.240lb/yd3
Lime stone with a grade higher than Grade 2	- - - - -	1.282kg/m3 (2.160lb/yd3)	- - - - -
Lime stone with a grade of 1-1/2 or 2	- - - - -	1.362kg/m3 (2.295lb/yd3)	- - - - -
Broken lime stone	- - - - -	1.522kg/m3 (2.565lb/yd3)	- - - - -
Excellent lime stone	- - - - -	- - - - -	1.602kg/m3 (2.705lb/yd3)
Phosphorite	- - - - -	1.282kg/m3 (2.160lb/yd3)	- - - - -
Salt	929kg/m3 (1.566lb/yd3)	- - - - -	- - - - -
Snow with less density	529kg/m3 (891lb/yd3)	- - - - -	- - - - -
Dry, soft sand	- - - - -	1,202kg/m3 (2,025 lb/yd3)	- - - - -
Accumulated wet sand	- - - - -	- - - - -	1.922kg/m3 (3.240lb/yd3
Broken shale	- - - - -	1.362kg/m3 (2.295lb/yd3)	- - - - -
Broken sulfur	592kg/m3 (1.620lb/yd3)	- - - - -	- - - - -

COMPARION TABLE OF BUCKET CAPACITY AND SELECTION

comparison table of bucket loading capacity and supply selection

boom arm type	bucket type	bucket tooth / blade	bucket capacity	tilting load	rated load	ratio of supply density[ton/m³] and load				comparison of supply density [kg/m³] and loading capacity(m³)														
			[m³],SAE	(ton)	(ton)	load ratio	115%	100%	95%	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
stan-dard boom arm	normal bucket	bucket tooth	2.7	9.5	5.0	supply density	1.47	1.69	1.78						3.1m³				2.6m³					
		bucket tooth	3	9.5	5.0	supply density	1.32	1.52	1.60					3.5m³					2.9m³					
		bucket blade	2.9	9.5	5.0	supply density	13.7	1.57	1.66					3.3m³					2.7m³					
		bucket blade	3.2	9.5	5.0	supply density	1.24	1.43	1.50				3.7m³					3.0m³						
	large bucket	bucket blade	4	9.5	5.0	supply density	0.99	1.14	1.20	4.6m³					3.8m³									

boom arm type	bucket type	bucket tooth / blade	bucket capacity	tilting load	rated load	ratio of supply density[ton/m³] and load				comparison of supply density [kg/m³] and loading capacity(m³)														
			[m³],SAE	(ton)	(ton)	load ratio	115%	100%	95%	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200
long boom arm	normal bucket	bucket tooth	2.7	9.0		supply density									3.1m³				2.6m³					
		bucket tooth	3	9.0	4.3	supply density	1.25	1.44	1.52					3.4m³					2.8m³					
		bucket blade	2.9	9.0	4.3	supply density	1.30	1.49	1.57						3.3m³				2.7m³					
		bucket blade	3.2	9.0	4.3	supply density	1.17	4.35	1.42					3.7m³					3.0m³					
	large bucket	bucket blade	4	9.0	4.3	supply density	0.94	1.08	1.14	4.6m³					3.8m³									

Environment protection

ENVIRONMENT PROTECTION

When you perform the maintenance of the equipment and the disassembling of any pipeline, connector or other associated parts, you should use the special containers to collect coolants, oil liquids, fuel, electrolytes or other materials which may cause environment pollution. Meanwhile, you should dispose the related pollution materials at the specified authorized places or containers, and should comply with the requirements from local laws and regulation when you perform the disposals.