



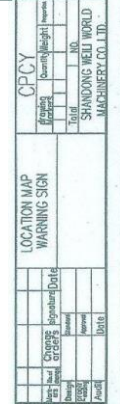
4WD FORKLIFT CPCY-30





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Safety Information



Please read and become familiar with all of the safety information. Failure to do so may result in serious injury or death. This “Safety Information” section also contains precautions regarding options and attachments.

Safety Messages and Attached Locations

There are several specific safety messages on this machine. This section introduces the exact locations of those safety messages and description of related potential risks. Please become familiar with all safety messages. Make sure that all of the safety messages are legible, clean the safety messages or replace the safety messages if you cannot read the words or illustrations. When cleaning the safety messages, use a cloth and soapy water. Do not use solvent, gasoline to clean the safety messages. Replace any safety message that is damaged, missing or illegible after cleaning. If a safety message is attached to a part that has been replaced, install a new safety message on the replacement part.

No Entry

(No 1: located in the articulation area of frame)



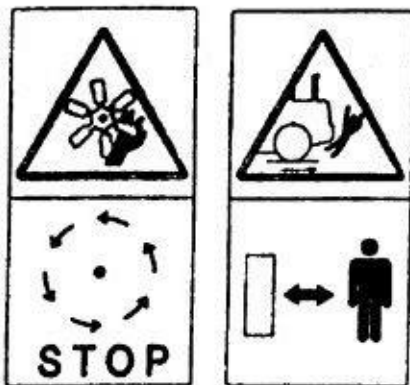
Do not Walking Beneath Work Tools

(No 2: located on both sides of lift arms)



Never Put Hands Close to Rotary Fan and Do not Get Too Close to the Machine

(No. 3 and 4: located at the rear end of engine hood)





General Precautions

Safety Rules

- If the operator becomes aware that there is something dangerous or that may compromise safety, he/she should immediately remedy faults to ensure the safety of oneself and others.
- Only a trained and qualified person is authorized to operate and maintain the machine.
- Follow all safety rules, precautions and instructions while operating or performing maintenance on the machine.
- Do not operate the machine if you are sick, sleepy, after taking medicine, or after drinking alcohol. Operating in such cases will adversely affect your judgment and may lead to an accident.
- When working with another operator or a flag person on the job site, ensure that all persons understand all hand signals that are to be used.
- Follow all rules and regulations concerning safety.

Safety Devices

- Make sure that all protective guards and all covers are secured in place on the machine. Repair immediately if damaged.
- Use safety devices properly, such as control levers lockout device and seat belt.
- Never remove any safety devices. Always keep them in good operating condition.
- Improper use of safety devices could result in serious injury or death.

Always Lock the Lockout Device When Leaving Operator's Seat

- Engage the parking brake by using the lever before leaving seat, otherwise the work tools may suddenly move by bumping control levers resulting in serious injury or damage.
- When leaving the loader, lower the work tools completely onto the ground, engage the parking brake lever into on position, stop the engine and use key to lock all devices, then carry the key with you.
- If the right window is closed, insure that it is rolled up tightly; if it is loose it could open.
- When locking up be sure that the seat is locked in place to prevent the glass from locking and the seat from moving when the operator enters the cab.

Clothing and Personal Protective Items

- Do not wear loose clothing or jewelry and maintain short hair. These things can snag on controls or other parts of the equipment and cause serious injury or death.
- Do not wear oily clothing in order to avoid ignition.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves when operating or maintaining the machine. Always wear safety goggles, a hard hat and heavy gloves particularly if your job involves scattering metal chips or minute materials. Also, when driving pins with a hammer and when cleaning the air cleaner element with compressed air make sure that no one is around the machine.
- Pressurized air can cause personal injury. When pressurized air is used for cleaning, wear face shield, protective clothing, and protective shoes. The maximum air pressure for cleaning purposes must be lower than 0.3Mpa.

- Check before using that all protective items will function properly.



Unauthorized Modification

- Any modification made without authorization from SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD may result in hazards. Consult authorized distributor appointed by SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD before making any modification. SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD is not responsible for any injury or damage caused by any unauthorized modification.

Mounting and Dismounting

- Before getting on or off the machine, check the handles and steps. If there is any oil, lubricants, or mud on them, wipe it off immediately. In addition, repair any damaged parts and tighten any loose bolts.
- Never jump on or off the machine. Never get on or off a moving machine.
- When getting on or off the machine, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handholds and steps to ensure that you support yourself.
- Never hold any control levers when getting on or off the machine.
- Do not get on the machine from the step at the rear of machine and never get off the machine from the tire beside cab.
- Do not get on or off the machine while carrying tools or other items. Use ropes to lift the required tools up to the operator station



Fire Prevention

- Fuels, lubricants in the engine, hydraulic oil in the hydraulic system, converter oil and gear oil in the transmission, brake oil in the braking system, and antifreeze in radiator system are all flammable by direct flame. Fuel is particularly flammable and hazardous. Therefore, be sure to pay attention to the following precautions:

- Keep the above-mentioned flammable fluids away from direct flame.
- When refilling, park machine in a ventilated area, and stop the engine. Do not smoke when refilling.
- Tighten caps of storage containers for all the above flammable fluids.
- Store flammable fluids in properly marked containers, and in a specified place as per categories. Do not allow unauthorized person to use.
- Store oily rags and any flammable materials in protective containers, and in a secured place.
- Do not weld on or flame cut lines that contain flammable fluids. Clean any such lines thoroughly with a nonflammable solvent prior to welding or flame cutting.
- Remove all flammable materials such as fuel, oil, and debris from the machine.
- Do not operate the machine near any flame or burning brush.
- This wheel loader is of general construction equipments. Therefore, do not operate under any flammable and explosive environment.



Fire Extinguisher and First Aid Kit

- Follow the precautions below in case of injuries or fire.
- Make sure that a fire extinguisher is available. Read the usage guide carefully and be familiar with the operation of the fire extinguisher.
- Make sure that a first aid kit is available at the job site. Check it regularly and add medical contents if necessary.
- Know what to do in the event of a fire or personal injury.
- Be sure you know the phone numbers of the people who should be contacted in case of an emergency, such as, doctors, first-aid centers, firehouses. Put up those numbers in a specified place, and make sure that all personnel know the numbers, location and the correct contact method.

Asbestos Dust Hazard Prevention

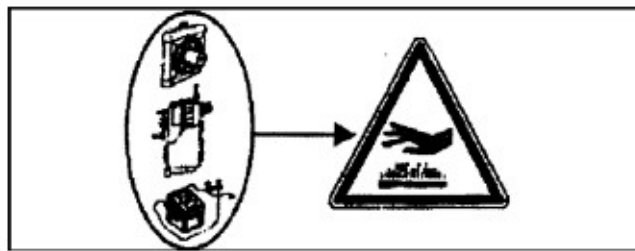
Asbestos dust can be hazardous to your health if it is inhaled. Use the following guidelines when you handle any materials that contain asbestos:

- Never use compressed air for cleaning.
- Use water for cleaning so that the dust will be dissolved in the water.
- Areas that may have asbestos particles in the air are hazardous. Operate the machine in the same direction as the wind, whenever possible.
- Use an approved respirator if necessary.



Precautions When Operating Under High Temperature

- Immediately after operations hydraulic oil, oil and water in the engine and radiator will be at high temperatures and under pressure. Attempting to remove the filler cap and radiator, to drain oil or water, or to replace the filters may lead to serious burns. Allow components to cool and follow the specified procedures.
- To prevent hot oil from spurting out, stop the engine first, and wait to allow oil to cool.



Remove the filler cap slowly in order to relieve pressure. (When checking if the oil is cool enough, put your hand near the front face of the radiator of hydraulic oil and converter oil, and check the air temperature. Be careful not to touch the radiator.)

- When engine is hot, do not touch the relay with your hand to avoid being burned.
- Do not remove the engine oil temperature sensor, water temperature sensor, converter oil sensor and air conditioner water tube when the machine is hot, to avoid being burned.

Crushing Prevention and Cutting Prevention

- Keep your hands, arms and all body parts clear of all moving parts such as, the area between the work tools and cylinders or the area between the machine and work tools. The clearance in the linkage area will change with the movement of the work tools. This may lead to serious accident or personal injury. If entrance between the machine and moving parts is necessary, always stop the engine, and then lock the work tools.
- Support the machine properly before you perform any work beneath the machine. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks.
- Unless otherwise stated, never make any adjustment when the machine is operating or the engine is running.
- Stay clear of all rotating and moving parts.
- Keep objects away from moving fan blades. The fan blade will throw or cut the tools or objects in between.



Precautions When Using ROPS (Rollover Protective Structure)

If ROPS is installed, do not operate the machine with the ROPS removed. The ROPS is installed to protect the operator if the loader should roll over. It is designed not only to support the tipping load, but also to dampen the impact.

- The ROPS meets international specifications and standards. Its strength may be reduced after rolling over or being damaged by falling objects, and its protection function may be weakened. In such a case, contact your dealer for repair.
- Even if ROPS is installed, when operating the machine, the operator should wear the seat belt, and use other the safety devices to provide proper protection.

Precautions for Attachments

- When installing and using an optional attachment, read the instruction manual for the attachment and the information related to attachments in this manual.
- Do not use attachments that are not authorized by SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD or your SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD distributor. Use of unauthorized attachments could create a safety concern and adversely affect the proper operation and service life of the machine.
- SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD is not responsible for any injuries, accidents, machine damages resulting from the use of unauthorized attachments.

Ventilation for Enclosed Areas

- In an enclosed or poorly ventilated area, if it is necessary to start the engine, handle fuel, flush parts, or paint, immediately open the doors and windows to ensure that adequate ventilation is provided to prevent gas poisoning.
- If opening the doors and windows does not provide adequate ventilation, fans should be installed.

Lines, Tubes and Hoses

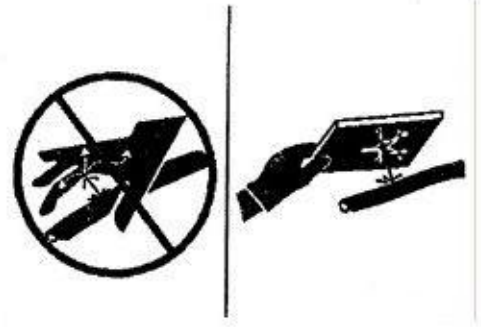
- Do not bend high-pressure lines or strike high-pressure lines. Do not install any tubes or hoses that are bent or damaged.
- Always repair any loose or damaged tubes and hoses in fuel or oil circuits and hydraulic system because any leaks can cause fire. Consult your SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD distributor immediately for repair or replacement parts.
- Carefully check lines, tubes and hoses. Tighten all connections to the recommended torque. Always wear safety glasses and thick gloves, and use a piece of cardboard or a sheet of wood to check for oil leakage. Even a pinhole leak can penetrate your skin causing severe injury or death. If fluid is injected into your skin, you must immediately seek treatment from a doctor that is familiar with this type of injury.

- Replace the parts if any of the following conditions are present:

1. Fittings are damaged or leaking.
2. Outer coverings are chafed or cut so that the steel wires are exposed.
3. Part of the hose is ballooning.
4. Hoses are obviously kinked or pressed.
5. Outer covers have embedded armoring.
6. End fittings are displaced.

- Make sure that all clamps, guards, and heat shields are installed correctly, to prevent vibration, rubbing against other parts, and excessive heat.

When the connecting pipe of the air conditioning compressor is removed, direct flame is strictly prohibited, because poisonous gas could be produced, resulting in poisoning.

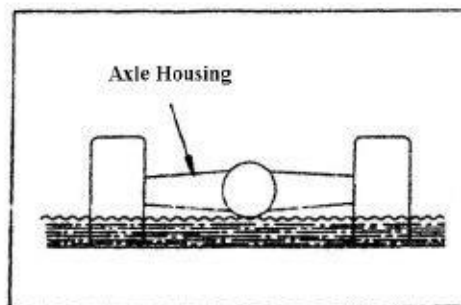


Operating Precautions

Turning on the Machine

Plan Your Operation Procedure

- Before starting operations, thoroughly check the area for unusual conditions that could be dangerous.
- Check ground conditions concerning machine stability to ensure that the ground is stable and it is safe to run the machine.
- Examine the shape of the ground, the quality of the soil, the jobsite, and determine the optimum method of operation.
- Make sure the ground is firm and level before starting engine. When working at dusty worksites, the ground should be watered.
- When working on public roads, position a flagman and warning signs, such as “NO ENTRY” to ensure the safety of passing traffic and pedestrians.
- In places where there are buried objects, such as water pipes, gas pipes, or pipes for high voltage cables, contact the company in charge to confirm the position of the buried object, and be careful not to damage the object during operations.
- When working in water or when crossing sand banks, first check the condition of ground, the water depth and flow speed. Be sure not to exceed the permitted water depth. When working in water or on swampy ground, do not let the water come above the bottom of the axle housing. After finishing the operation, wash and check all lubricating points.





Before Starting Engine Checklist

Carry out the following checks before starting the engine at the beginning of the day's work.

Failure to carry out these checks may lead to serious injury or damage.

- Completely remove all the flammable materials accumulated in the engine compartment and around the battery. Check fuel, lubrication, and hydraulic systems for leaks, and have any leaks repaired. Remove any dirt from the mirrors, handrails, and steps. Return all fuel containers to their proper place.
- Remove all parts and tools from the operator's compartment. The oscillation of walking and operating may get the tools fall off, then destroy the joy stick and switch, or make the joy stick starting again, it may lead to serious injury or damage.
- Clean your shoes before you get on the machine, and if there is dirt, clear immediately in order to prevent dirt from accumulating on the accelerator pedal and brake pedal, and to prevent pedal replacement
- Check the coolant level, fuel level, and oil level in the engine oil pan, clogging of the air cleaner, and damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check for wear or damage to the seat belt and mounting equipment. Change the seat belt after three years.
- Check that the gauges work properly, and check that the control levers are at the PARK position.
- Remove all dirt from the surface of the window glass and lights to ensure good visibility.
- Adjust the side mirror to a position, which gives the best view from the operator's seat, and clean the surface of the mirror. And clean the surface of the mirror. If the mirror glass is damaged, replace with a new part.
- Check that the front lamps and working lamps light up properly. If the results of the inspection show any abnormality, carry out the necessary repairs.
- Be sure a fire extinguisher is present and check the method of using it.
- Do not operate the machine near any fire or flame.

When Starting Engine

- Walk around your machine and check for people and objects that might be in the way just before getting on.
- If a warning label, such as "DO NOT OPERATE", has been attached to control lever, DO NOT start the engine.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while sitting in the operator seat.
- Only the operator is allowed in the cab. Do not allow anyone to ride on the machine body.
- Start the engine in the cab; never start the machine by creating a short circuit of the electromotor, this may damage the electro circuit, and it is very dangerous.
- If there is a backup alarm, please check that it works properly.

After Starting Engine Check-list

Failure to carry out the checks properly after starting the engine will lead to delays in discovery of abnormalities. And, this may lead to serious injury or damage to the machine. When checking the area one must ensure that there are no obstacles and do not allow people to come near the operation area.

- Check the functionality of the gauges, work tools, and hydraulic system, brake system, travel system and lubricating system.
- Check for any abnormalities in the sound of the machine, vibration, heat, or smell; also check that there is no leakage of air, oil or fuel.
- If any abnormalities are found, carry out repairs immediately. If the machine is used when it is not in proper condition, it may lead to serious injury or damage to the machine.
- Before traveling or starting operations, check that safety bar is securely placed in the “unlocked” position.

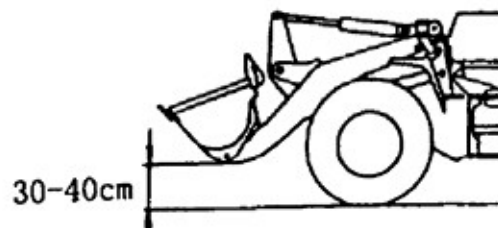
Operation

Precautions When Starting Off

- Before starting off, check again that there is no one in the surrounding area and that there are no obstacles.
- When starting off, sound the horn as an alert.
- Operate the machine only when seated in the operator’s seat.
- Always fasten the seat belt. (If equipped)
- Only the operator is allowed in the cab. Do not allow anyone ride on the machine body.
- If there is a backup alarm, please check that it works properly.

Precautions When Traveling

- When traveling, never turn the key/start switch to the off position. It is dangerous if the engine stops when the machine is traveling because the steering becomes heavy. If the engine stops, apply the brake immediately to stop the machine. However, if the machine is steering into trouble, it may be necessary to first steer out of trouble and then apply the brake.
- It is dangerous to look around when operating. Always concentrate on the work.
- It is dangerous to drive too fast, to start/stop suddenly, turn sharply, or zigzag.
- If you find an abnormality in the machine during operation (noise, vibration, smell, incorrect gauges, air leakage, oil leakage, etc.), move the machine immediately to safe place and look for the cause.
- Set the work tools to travel position. (Lift 30-40cm from level ground)



- When traveling, do not operate the work tool control levers. If the work tool control levers have to be operated, stop the machine first and then operate the levers.
- Do not operate the steering wheel suddenly. The work tools may hit the ground surface causing the machine to lose its balance, or may damage the machine or other structures in the area.
- When traveling on rough ground, travel at low speed and avoid sudden changes in direction.
- Avoid traveling over obstacles as often as possible. If the machine has to travel over an obstacle,

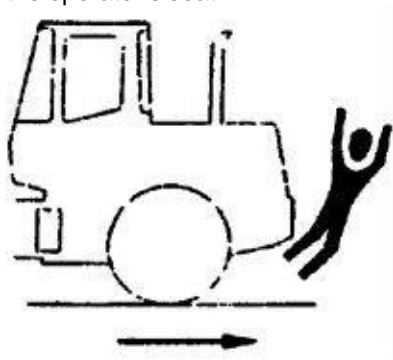
keep the work tools as close to the ground as possible and travel at low speed.

- When traveling or carrying out operations, always keep your distance from other machines or structures to avoid coming into contact with them.
- Never drive in water that is in excess of the permissible water depth. Do not let the water come above the bottom of the axle housing.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the mass of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- Always obey the traffic regulations when traveling on public roads. This machine travels at lower speed than normal automobiles, so keep to the side of the road and be careful to leave the center of the road free for other vehicles.
- If you drive the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may result in the tires bursting. If a tire bursts, it produces an extremely large destructive force, and this may cause a serious injury or accident.
- If you are going to travel continuously, please consult your SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD agent.

Check When Changing Direction

To prevent serious injury or death, even that machine is equipped with a back up alarm and mirrors always do the following before moving the machine or the work tools:

- Sound the horn to warn people in the area.
- Check that there is no one near the machine. Be particularly careful to check behind the machine. This area cannot be seen clearly from the operator's seat.



- When operating in the areas that may be hazardous or have poor visibility, designate a person to direct worksite traffic. Ensure that no person can come within the direction of turning or direction of travel.
- When traveling at a high speed, never change direction.
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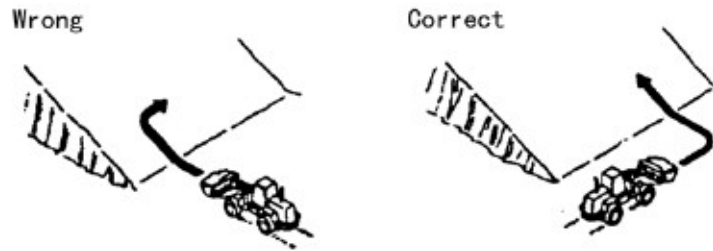
Restricted Operation

- To prevent the machine from turning over or the work tools from being damaged due to overload, always keep within the maximum load specified for the machine and within capability of the ROPS.
- SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD is not responsible for any injuries, accidents or machine damage resulting from overload.

Traveling On Slopes

- Be careful traveling on slopes can result in the machine tipping over or slipping to the side.

- When traveling on slopes, keep the bucket approximately 20-30cm (8-12in) above the ground. In case of emergency, quickly lower the bucket to the ground to help the machine to stop.



- Do not turn on slopes or travel across slopes; always go down to a flat place to perform these operations.
- When traveling downhill, never shift gears or shift to neutral. Always shift to a low gear before starting to travel downhill.
- When traveling downhill, use the engines braking force and travel slowly. If necessary, use the brake pedal to reduce the speed.
- At high speeds, do not travel on grass, fallen leaves, or wet steel plates. Even slight slopes may cause the machine to slip to the side, so travel at low speed and make sure that the machine is always traveling directly up or down the slope.
- If the engine shuts off when traveling downhill, using the brake pedal and fully the apply the brakes. However, if the machine is steering into trouble, it may be necessary to first steer out of trouble and then apply the brake.
- Lower the bucket to the ground, and then apply the parking brake to hold the machine in position.
- When traveling up or down hills with a loaded bucket, always travel with the bucket facing uphill (travel forward when going uphill and in reverse when going downhill). When traveling on a slope with a loaded bucket, if the machine travels with the bucket facing downhill, there is danger that the machine may tip over.

High-Voltage Cables

Do not let the machine touch electric cables; even getting close to high-voltage cables can cause electric shock. Always maintain the safe distance given below between the machine and the electric cable.

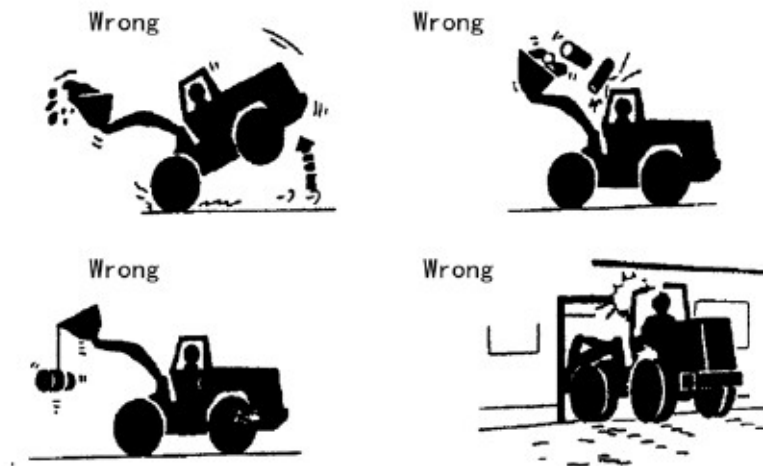
	Voltage V	Min. safety distance	
Lower voltage	100-200	2m	7ft
	6,600	2m	7 ft
Higher voltage	22,000	3m	10 ft
	66,000	4m	14 ft
	154,000	5m	17 ft
	187,000	6m	20 ft
	275,000	7m	23 ft
	500,000	11m	36 ft

- To prevent accidents, always do as follows:
 - On the jobsite where there is danger that the machine may touch the electric cables, consult the electric company before starting operations to confirm that the appropriate precautions are taken and that the work abides to regulations.

2. Wear rubber shoes and gloves. Lay a rubber sheet on top of the operator's seat, and be careful not to touch the chassis with any exposed part of your body.
3. Use a signalman to give warning if the machine approaches the electric cables.
4. If the work tools should touch the electric cable, the operator should not leave the operator's compartment.
5. When carrying out operations near high voltage cable, do not let anyone come close to the machine.
6. Check with the electricity company about the voltage of the cables before starting operations.

Driving Precaution

- Be careful not to get too close to the edge of cliffs. When marking embankments, landfills, or when dropping soil over a cliff, dump one pile and then use the next pile of soil to push the first pile.
- The load suddenly becomes lighter when the soil is pushed over a cliff or when the machine reaches the top of a slope. When this happens, there is danger that the travel speed will suddenly increase, so be sure to reduce the speed.
- When the bucket is fully loaded, never start, turn, or stop the machine suddenly.
- When handling unstable loads, such as round or cylindrical objects or piled sheets, if the work tool is raised high, there is danger that the load may fall on top of the operator's compartment and cause serious injury or damage. When handling unstable loads, be careful not to raise the work tools too high or tip the bucket back too much.
- If the work tools is suddenly lowered or suddenly stopped, the reaction may cause the machine to tip over. Particularly when carrying a load, be sure to operate the work tools carefully.
- Do not use the bucket or lift arm for crane work.
- Do the following to ensure good visibility:
 1. When operating in dark places, turn on the working lamps and front lamps, and install lighting at the jobsite if necessary.
 2. Do not carry out operations in fog, snow, or heavy rain, or other conditions where the visibility is poor. Wait for the weather to clear so that visibility is sufficient to carry out work.
- Always do the following to prevent the work tools from hitting other objects
 1. When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, be extremely careful not to let the bucket hit anything.





2. When loading dump trucks, check that there is no one in the area around the machine and be careful not to let the bucket hit the operator's compartment of the dump truck.
3. To prevent accidents caused by hitting other objects, always operate the machine at a speed, which is safe for operation, particularly in confined spaces, indoors, and in places where there are other machines.

Using Brakes

- Do not put your foot on the brake pedal unless necessary.
- Do not depress the brake pedal repeatedly unless necessary.
- When traveling downhill, use the engine as a brake, and never shift gear or place the transmission in neutral.

Operating on Snow

- When working on snow or icy roads, even a slight slope may cause the machine to slip to the side, so always travel at low speed and avoid sudden starting, stopping, or turning. There is danger of slipping particularly on uphill or downhill slopes.
- With frozen road surfaces, the ground becomes soft when the temperature rises, so the travel conditions become unstable. In such cases be extremely careful when traveling.
- When there has been heavy snow, the road shoulder and objects placed beside the road will be buried in the snow and cannot be seen, so always carry out snow-removal operations carefully.
- When traveling on snow-covered roads, always add tire chains.
- When traveling on snow-covered slopes, never apply the brakes suddenly. Reduce the speed and use the engine as a brake while applying the foot brake intermittently. If necessary, lower the bucket to the ground to stop the machine.
- The load varies greatly according to the characteristics of the snow, so adjust the load accordingly and be careful not to let the machine slip.

Working on Loose Ground

- Do not operate the machine on soft ground because it will be difficult to get the machine out again.
- Avoid operating your machine too close to the edge of cliffs, overhangs, and deep ditches. If these areas collapse under the mass or vibration of your machine, the machine could fall or tip over and this could result in serious injury or death. Remember that after heavy rain, blasting, or earthquakes, the soil will be weak in these areas.
- If the soil on the ground or near the ditches is loose. It can collapse under the mass or vibration of your machine and cause your machine to tip over.
- Install the head guard (FOPS) when working in areas where there is danger of falling stones or rocks.
- Install the ROPS and wear the seat belt when working in areas where there is danger of falling rocks or of the machine turning over.

Parking the Machine

- Park the machine on level ground and lower the work tools to the ground. Where there is no danger of falling rocks or landslides. Or of flooding if the land is low.

- If it is necessary to park the machine on a slope, set blocks under the wheels to prevent the machine from moving. Then, dig the work tools into the ground.
- When parking on public roads, provide fences, signs, flags, or lights, and put up any other necessary signs to ensure that passing traffic can see the machine clearly. And park the machine so that the machine, flags, and fences do not obstruct traffic.



- When leaving the machine, lower the bucket completely to the ground, parking brake lever to the on position, stop the engine, and lock all the equipment. Always remove the key and take it with you.

Operating in Cold Areas

- After completing operations, remove all water, snow, or mud stuck to the wiring harness, connector, switches, or sensors, and cover these parts. If the water freezes, it will cause malfunctions of machine when it is next used, and this may lead to unexpected accidents.
- Carry out the pre-heat/deicing operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.
- Operate the control levers to relieve the hydraulic pressure (raise to above the set pressure for the hydraulic circuit and release the oil to the hydraulic tank) to warm up the oil in the hydraulic circuit. This ensures good response from the machine and prevents malfunctions.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that this will ignite the battery. When charging or starting the engine with a different power source, melt the battery electrolyte and check for leakage of battery electrolyte before starting.

Moving the Machine

Load and Unload the Machine

- The potential danger factors always exist when loading and unloading the machine, so the workers should take care. The engine should be at low speed and the machine should run with a low speed.
- The machine should be loaded and unloaded in a hard flat ground. Keep safety distance from the roadside.
- Fix the shipping vehicle wheels all the time and put the seat pad under the access board.
- Use a ramp with enough intensity. Make sure the ramp is wide and long enough to provide a sloping ground for the loading and unloading. The angle between the sloping ground and the floor should not be larger than 15°. The distance of the ramp should be adaptable to the distance of the



machine wheels.

- Make sure the ramp is fixed well and the height of the two sides should be the same.
- Make sure the machine surfaces are clean, no lube, oil, ice or loose material, remove ice, mud, debris where it has collected on the machine to avoid it coming off during transportation and creating a road hazard. Clear up the contamination on the machine tires.
- Do not turn the direction off the ramp. If necessary, the machine should move away from the ramp, adjust the machine direction and then run up on the ramp.
- After the wheel loader is loaded on the trailer, wedge the tire and tie and tighten the machine with a cord.

Delivery

- When using the tow truck to deliver the machine, the operator should obey by the regulation for the weight, width, length and the national and regional laws.
- When confirming the delivery route, the operator should consider of the machine's weight, height, width and length.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the mass of the machine. When the tow truck is running on the road, the delivery must meet the requirement of the related regulations and obey by them.
- When delivering the machine, the machine might be divided into several parts. So please contact the SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer to conduct this work

Towing

Pulling the Machine

Improperly towing a machine that or by using an improper connection may result in damage or death, so please obey by the following regulations:

- Follow the towing instruction of the "O&MM".
- Wear leather gloves when using a steel wire line.
- When doing the work together with the other workers, make sure to use signals that everyone knows before starting the work.
- If the machine engine cannot start or there is a failure in the brake system, please contact the SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer to repair the machine.
- It is very dangerous to pull a machine on an incline. The worker should select an area with a small gradient. If this does not exist, then select the area with the smallest possible gradient.
- If using the machine to tow another machine that has failed, the steel wire line must be strong enough to support the failed machine's weight.
- There should not be any broken braided wire, knots or reduced diameter on the steel wire line.
- Do not stride two feet to stand on the tow wire or the steel wire line.
- When connecting the machine that needs towed, do not stand between the machine being towed and the towing machine.
- To make sure the hook is in the correct position, the hook of the towed machine should be in line with the towing part of the machine.
- People should not stand on the towed vehicle unless operator can control the direction and / or detent.



- Before towing you must confirm that the towrope or tow rod is in good condition and has enough strength to pull vehicle. The strength of the towrope or tow rod must be at least 1.5 times the gross weight of the towed vehicle; this will allow it to pull the vehicle from the mud or a slope.
- Keep the towrope at an angle, the angle between dragrope and forefront location should not be more than 30 degrees.
- Vehicles moving too fast may make the towrope or tow rod to break or crack. Moving vehicle slowly and smoothly will result in effective work.
- When towing, all people should be far away from both sides of the towrope. This will prevent injury if the towrope were to break.
- Generally, the trailer should be the same size as the towed vehicle. Confirm the trailer has enough brake capability, weight and power to control and move two vehicles up a slope.
- In order to have enough control or brake capability when a towing a vehicle down slope, there should be a bigger trailer or other machine behind it to prevent rolling when out of control.
- The operator must steer along with the towrope direction so that the towed vehicle direction can be controlled.

Maintenance Precautions

Before Maintenance

Attention: If maintenance that is not instructed in this “Operation and Maintenance Manual” is done, unexpected failure may arise. Please contact the dealers appointed by Mountain Raise for service.

Warning Label

- If somebody starts the engine or shifts gears during fueling or maintenance, serious injury or death may arise.
- Attach a warning tag or sign on the shift levers in the cab to remind people that you are maintaining the machine. If necessary, put warning labels around the machine.

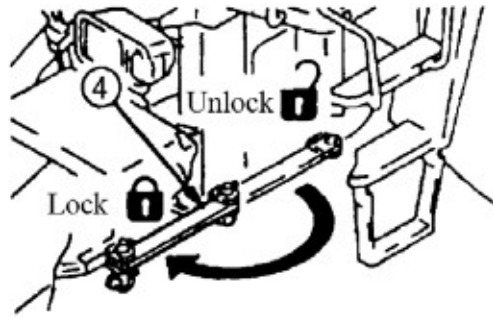
Clean Before Overhaul and Maintenance

- Clean machines before overhaul and maintenance. This is to prevent dirt from falling into the machine and to make sure that the maintenance can be done safely.
- If the machine is dirty in the course of overhaul and maintenance, it is difficult to avoid dirt or mud going into eyes or slipping and getting injured.
- A few tips for cleaning wheel loaders:
 1. Wear anti-slip shoes to avoid slipping on wet surface.
 2. When cleaning wheel loaders with high-pressure water, wear safety clothing. This way, your eyes and skin can be protected from the impact of high-pressure.
 3. Do not spray water directly onto the electrical components (e.g. sensors, wire connectors). If water get into electrical system, operation failure may arise.

Keep the Working Place Clean and Tidy

- Do not leave any service tools at the working place. Wipe up grease and lubricant etc. to protect people from slipping. Clean and tidy working place to ensure safe maintenance

- If the working place is not tidy, danger such as slipping and tripping may arise.



Identify the Responsible Person for the Group

- Identify the person responsible during maintenance and while loading/unloading the wheel loader. Everybody should follow his instruction.
- When working together, misunderstanding may lead to a serious accident.

Water Level in the Radiator

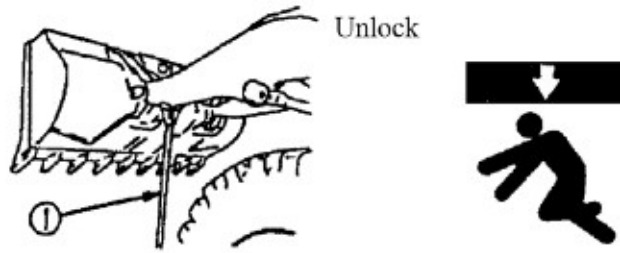
- When checking water level in the radiator, stop the engine. After engine and radiator cools down, check the water level of radiator. Do not randomly open the radiator cover.
- If it is necessary to open the radiator cover, follow the below instructions:
 1. Check the water level after water temperature in the radiator cools down. (When checking if the water temperature has gone down, put your hand near the engine or the front face of the radiator and check the air temperature. Be careful not to touch the engine or the radiator.)
 2. When the water fill cover can be opened with a bare hand, unfasten the fill cover to release the inner pressure.
- If the top cover of the radiator needs to be open, do not open it until the water temperature cools down and the inner pressure is released.

Shut Down Engine Before Overhaul and Maintenance

- In the course of overhaul and maintenance, park wheel loader on the flat ground where there is no danger of falling rocks or land slides. If it is a low terrain, there should be no danger of flooding. Then shut down engine.
- After engine stops, move the work tool control lever to the “lifting”, “lowering” and “rack back” positions a few times as to release the remaining inner pressure in the hydraulic systems. Lower the work tools to the ground.
- Pull up the brake lever to implement the brake and then put the block under tires.
- Lock front and rear frame with lock bar.
- Be careful not to get hurt by moving components and parts.

Support of Work Tools

- During check and maintenance when the bucket is lifted, support the lift arm so that it doesn't fall.



- Move the control lever to the “Center” position.

Proper Tools

Only use the proper tools. Injury may result from using damaged, low quality, flawed or interim replacement tools.

Periodic Replacement of Critical Parts and Components

Hoses in fuel system, hydraulic system and brake system and some other parts and components are the key to ensure safety, so they must be replaced periodically.

Specific skills are needed to replace these key parts and components. Please contact the appointed SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer.

- These parts and component must be replaced with new ones no matter if they are failed or not.

These parts can age gradually resulting in oil leakage or failure in the work tool system. And then serious accident may arise.

- Replace these parts and components right away if there is any issue, even of they are still within the usage period. Refer to the “Periodic Replacement of Critical Parts and Components” for the replacement of safety parts and components.

Illumination

- Use the anti-explosive lighting equipment when checking the fuel, lubricant, and electrolyte of battery or window glass solvent. If such illumination equipment is not used, there is an explosive danger.
- If the application is dark without lightening equipment, injury may occur, so proper lightening equipment should be mounted.
- Though it is in the dark place, a lighter or flame should not be used for lightening, because there is possibility of fire. If the gas of the battery meets fire, explosion may occur.
- Follow the guide of Operation Maintenance Manual when using the machine to lighten.

Fire Prevention

The gas diffused from fuel or battery might be flammable. Follow the following attentions when repairing or maintaining.

- The storage of fuel, lubricant and other combustible material should be far away from the flame.
- Use non-combustible material such as a solvent to wash the parts. Do not use diesel or gas because it is flammable.
- No smoking when repairing or maintaining equipment. Smoke in the appointed places.
- Use non-flammable lightening equipment when checking the fuel, lubricant or electrolyte of battery. Never use a lighter or match.

- Move the combustible material to the safe place when grinding or welding the frame.
- Have an extinguisher at the repair and maintenance place.

During Maintenance

Maintenance People

- Only a qualified person can do maintenance and repair. Unauthorized personnel are not allowed to enter the work area. If necessary, designate a person to guard.
- Pay special attention, while grinding, welding, or using a sledgehammer,.

Attachment

- Before we attach/detach an attachment or equipment, first designate an owner.
- A non-operator is not allowed to get close to machine or attachment.
- Detach the attachment to a safe place and make sure it will not fall down, Put a rail around the attachment, with the mark "do not enter", to avoid people to get close.

Work Under the Machine

- At the beginning of maintenance or before repair under the machine, put the machine and all attachments on solid flat ground.
- Secure the tire with a wedge.
- If the tire is supported only by equipment, it will be dangerous for people to work under the machine, never work under poor quality support.



Maintenance by Hanging the Frame

- When the equipment or if the frame is hanging, use the lock bar to lock the front and rear frame, put the handlebar in the middle and wedge the equipment and frame. Move the control lever to the "Center" position. Use the blocks to stop the work tools and frame from moving.
- Before hanging, wedge the wheel on one side; put blocks under the machine when finished.

Work on Top of the Machine

- When working on the top of the machine, make sure the footing is clear and follow the rules to avoid falling.
 1. Wipe up spilled lubricant oil or grease.
 2. Work without tools around.
 3. Watch your steps.
- Never jump from the machine. When climbing or down the machine, use the lift and handrail and keep three points of contact (two feet and one hand or two hands and one foot)
- Using protective equipment if necessary.
- At the top of the engine, the hood may be slippery and dangerous. Do not stand on it.
- The top of the tire may be slippery and dangerous. Do not stand on it.
- When cleaning the glass in the front of the cab, stand on the fender of front frame.

Do Not Drop Foreign Material in Machine

- When repairing the window or oil tank, be careful not drop foreign objects (such bolts, nuts, twine

or tools). These things may cause damage to the machine or cause other problems if dropped into the machine.

- If there are some foreign objects dropped inside, remove them immediately
- When repairing the machine, do not take unnecessary tools or parts.



Maintenance when the Engine is Running

To avoid getting hurt, do not do any maintenance when the engine is running. If

it is necessary to do maintenance while the engine is running, abide by the following rules:

- One operator should sit in the operation chair and also prepare to shut off the engine when necessary. All the workers should keep contact with each other.
- When the working in a place close to the rotating parts, pay special attention to avoid being rolled up.
- Never allow any tools or any parts of body to touch the fan vane or fan belt. This is dangerous.
- When washing the inside of the radiator, prevent the equipment from turning. Also, pull the brake lever to implement braking.
- Do not touch any control levers. If you must touch them, first signal for other workers and warn them to go to a safety place.

Using a Hammer

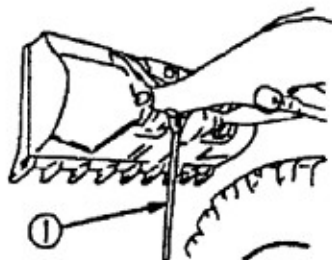
- When using a hammer, put on the safety glasses, safety helmet and other protection. Use copper stick as a mat between the hammer and the part, which is hit.
- When using the hammer to hit hard parts, such as pins or bearings, fragments may fly into ones eyes and result in harmful danger.
-

Electrical Maintenance

While fixing the electrical system or performing electric welding, discharge the storage battery negative pole (-) or close the power supply totally, in order to prevent of electric current flow.

Finding the Problem

- When finding a problem, it should be repaired immediately. Especially if it is in the braking system, steering system or other working equipment that will cause serious trouble.



- Please contact the SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD appointed dealer according to the failure type.

Rules for Adding Fuel or Lubricant Oil

Fuel, lubricant, hydraulic oil, antifreeze, brake fluid and window cleaner can all be caught by open flame. Abide by the following rules:

- Turn off the engine when adding fuel or lubricant.
- No smoking.
- Any of the fuel, lubricant, hydraulic oil, antifreeze, brake fluid and window cleaner that has overflowed should be wiped immediately.
- Tightly screw the cover of all the fuel, lubricant, hydraulic oil, antifreeze, brake fluid and window cleaner containers.
- The place where fuel, lubricant, hydraulic oil, antifreeze, brake fluid and window cleaner is added should be kept well ventilated.

High-Pressure Hose

- A high-pressure hose leakage may hinder operation, cause personnel injury, or damage equipment. Stop working and contact your appointed SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer.
- When replacing the high-pressure hose, the operator should be aware of the height. The installation torque, should be according the type and size of hose, so do not repair by yourself, contact your appointed SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer.

Notes for High-Pressure Oil

When repairing or replacing, pipes in hydraulic systems, inspect system pressure (whether it has been released or not). If there is still pressure in pipes, it will cause serious injury or damage, so should follow the rules:

- Relevant detail about releasing pressure, see Hydraulic System Maintenance included in the Maintenance section of this manual. Do not continue work, check or replace before the pressure releases completely.
- Put on safety glasses and gloves.
- If the pipe leaks oil, the pipe and its surroundings will be wet, so check whether or not the steel pipe or hose has cracks or whether or not it has swelled up. If it is difficult to identify the location of leakage, please contact your appointed SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD dealer.
- Always wear safety glasses and thick gloves, and use a piece of cardboard or a sheet of wood to check for oil leakage.
- If shot by the high pressure oil spout, see a doctor immediately.

Check Under High Pressure

- When the engine stops, the cooling water and oil for each part of the machine will be warm and highly pressurized. Opening the cover, removing the oil and water, or replace a filter, at this time all will cause burning or other harm. Wait for temperature to descend, and then operate according to operation maintenance manual.
- For other check items see Periodic Maintenance in the "Maintenance section of this manual for related contents.

Waste

To prevent pollution, obey the following procedure especially with environment where people and animal living.

- Do not release oil to the sewer or river etc.
- Put the waste oil in a container, do not pour onto the ground directly
- While handling harmful material, such as lubricant, fuel, and coolant, melting agent, filter, storage battery and other materials, obey relevant laws.



Repair and Check after Maintenance

Unexpected problems may occur if the proper checks and maintenance procedures are not performed. It may even damage the machine or cause injuries, and so pay attention to the following issue.

- Checking when the engine is off
 1. Are all repair and maintenance parts checked?
 2. Are repair and maintenance items correct?
 3. Are there tools or parts dropped into the machine? It is dangerous if they are wedged into the linkage systems of the control levers?
 4. Is the leaking water or oil repaired? Are the bolts screws down?
- Checking when engine running

Pay attention to safety and the following items:

1. Do the repair and maintenance parts work normally?
2. Does the hydraulic system leak oil when the engine running, speeding up or adding load?

Battery and Maintenance

Danger Precaution

- The electrolyte of battery contains vitriol and the battery can produce the hydrogen. So the wrong battery treatment can cause the serious injury or fire. Therefore, do follow the following attentions.

Never make the lightened cigarette or fire close to the battery.

- Wear the safe glasses or rubber gloves when you need to touch the battery during work.
- If the electrolyte of battery spatters onto the clothes or skin, please wash and clean with water immediately.
- The electrolyte of the battery spatters into one's eyes, it may result in loss of sight. If the electrolyte spatters into the eyes, please clean the eyes with a lot of water to wash and see a doctor immediately. Attention: If electrolyte is swallowed inadvertently, drink large quantities of water, milk, beaten eggs or vegetable oil. Call a doctor immediately.
- Stop the engine before working with the engine.
- Avoid contacting with the metal that may cause a short circuit between positive terminal (+) and negative terminal (-).
- First connect the positive terminal (+) when asswmbing the battery. First disconnect the negative (-) terminal (on the side of ground cable) when disasswmbing the battery.
- First check which one is positive terminal (+) or negative terminal (-) when disasswmbing or asswmbing the battery. And tighten the nut.

- Wipe with the cloth when cleaning the top of the battery. Never use the gas, solvent, any other organic solvent or cleanser. Tighten the cover of battery.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that this will ignite the battery. When charging or starting the engine with a different power source, melt the battery electrolyte and check for leakage of battery electrolyte before starting.
- Disassemble the battery from the machine before charging.

Before Charging the Battery

- Do not charge the battery has a broken cover or accumulator. Replace the battery if this is the case.
- The battery with the damaged post cannot be recharged. Replace this battery if this is the case.
- Clean the post and remove the external oxidized cover before recharging.

When Charging

- Wear the safety glasses.
- Keep vent when charging and charge at the normal temperature.
- No smoking and avoid fire when charging.
- After charging, first connect the positive wire when connecting the wire. After charging, first disconnect the negative wire.

Battery Charging Operation

- After cleaning, confirm the battery and charging circuits have a good connection.
- The positive side of charger connects with the positive terminal of the battery. The negative side of charger connects with the negative terminal of the battery. Do not charge in-line battery (24 v).
- It is suggested to use constant voltage 16.0 V (If it is higher than 16.2 V, the water will be electrolyzed, which will cause level decreases and battery condemned), limited current 25 A charger charge battery until charging indicator becomes green. The green charging indicator means that the charging is complete.
- If the batteries voltage is lower than 11.0 V, the battery cannot be charged in the initial charging period because the specific gravity of the sulfuric acid in the battery with very low power is near that of the pure water. This causes the internal resistance of the battery to be very high. At this time, reduce the charging current or change to a higher power charger. As the charging process is completed, the specific gravity of the sulfuric acid in the battery increases and the charging current returns to normal slowly.
- During charging, if lots of acid is sprayed out of the vent hole, stop charging immediately and find out the reason.
- If the battery temperature exceeds 45°C during charging, stop charging until the battery temperature reduces to the room temperature. Reduce the charging current to a half and continue to charge.

Jump-Starting the Battery

If the connection method of boosting cable is wrong, fire might be caused. Jump-start the machine

according to the following method:

- Two operators are necessary when starting (one operator should sit down at the operator's seat.)
- Do not allow the 2 machines to touch when starting another machine.
- Turn off the two starting switches of normal machine and failed machine when connecting the boosting cable.
- Connect the positive (+) jump start cable to the positive (+) battery terminal on the stalled machine.
- Do not allow positive cable clamps to contact any metal except for the positive (+) battery terminal.
- Connect the positive (+) jump start cable to the positive (+) terminal of the boost source. Use the procedure from the previous Step in order to determine the correct terminal.
- Connect one end of the negative (-) jump start cable to the negative (-) terminal of the electrical source.
- Make the final connection. Connect the negative (-) cable to the frame of the stalled machine. Make this connection away from the battery, the fuel tank, the fuel lines, the hydraulic lines, or moving parts.
- Start the engine on the machine that is being used as a power source. If you are using an auxiliary power source, energize the charging system on the auxiliary power source.
- Wait for a minimum of two minutes while the batteries in the stalled machine partially charge.
- Attempt to start the stalled engine. Refer to Operation and Maintenance Manual, "Engine Starting".
- Immediately after you start the stalled engine, disconnect the jump start cables from the machine that is being used as a power source. First disconnect the negative (-) battery cable. Then disconnect the positive (+) battery cable.
- Disconnect the other end of the jump start cables from the stalled machine.

Warning: Maintain a safe distance from the battery when connecting.

- Pay attention not to allow the boosting cable clips touch with each other or let the clip touch to the machine when removing the boosting cable.

Battery Charging

If the battery is not correctly charged, it may have the possibility to explode. Therefore, charge the battery according to the correct procedure and following rules.

- Charge it under proper ventilation and remove the battery cover. This allows the hydrogen to diffuse and prevents explosion. The air from the battery might cause explosive.
- Do not have fire or spark near the battery and no smoking when charging.
- Set the voltage of charger to agree with one of charged battery. If there is something wrong with voltage, the charger will overheat and may catch fire, which might cause explosive.
- Connect the positive charging clip (+) to the battery the positive terminal (+) and tighten the two terminals.

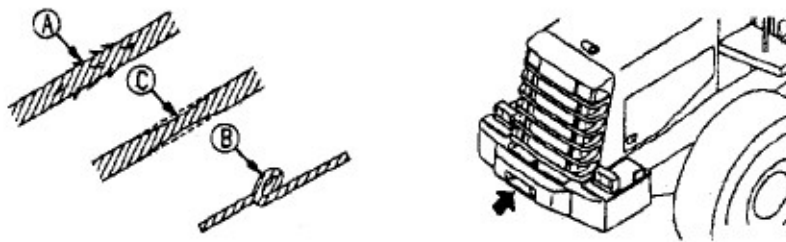
If the charging rate of battery is less than 1/10, charge it highly. Set the discrete value under the battery rated volume. If the charging current is too large, the electrolyte may leak or evaporate, which could cause fire or explosion.



Welding Repair

Welding repair should only be done in a designated place and by qualified personnel. The gas emitted by welding can cause fire and electricity danger. Never allow and unqualified operator to enter. When welding abide by the following the rules:

- Before welding, read and understand the relevant safe regulations of welding.
 - Before welding, shutdown the engine starting switch and disconnect the power negative switch.
 - Before welding, remove the connector of dashboard to prevent damaging the dashboard.
- Disconnect between the cab harness (underneath the cab right side and close to the frame joint) and machine harness.
- Break the battery connector to avoid explosion. Remove the painting in the welding post and dangerous gas generated.
 - When welding on the hydraulic system, pipes, or any place close to them, they may produce combustible fumes and sparks. There is danger of fire; so electric welding should be avoided in these areas.



- If electric welding spark falls directly onto a rubber hose, electric wire or pressure pipes, the electric wire may be damaged and the pipes may break suddenly. In such cases the anti-fire blanket should be used to cover up.
- Wear a protective coat while carrying things before and after welding.
- Keep the welding ventilated.
- Clean up all flammable materials, and a fire extinguisher should be available.
- Continuous use of voltage above 200Volts is not recommended.
- The distance between welding area and ground cable should be 1m.
- Avoid the seal ring and bearing exists between welding area and ground cable.

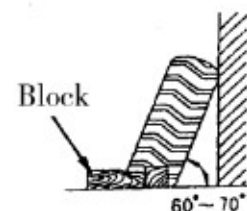
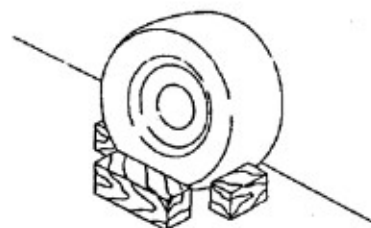
- Do not weld or cut the pipes and container with fuel, engine oil and hydraulic oil.
- Do not weld or cut the sealed or poor ventilated container.

Tires

Handling of Tire

It is necessary for to use special equipment and special techniques to maintain, remove, repair and install the tires and rims. So ask the tire repair shop or people with special training to repair and follow all the related safety regulations. If a tire or a rim is handled in a wrong way, the tire may burst or may be damaged and the rim may be broken and scattered, which can cause serious injury or death. For the safety of maintenance workers, comply with the flowing proceedings

- Since maintenance, disasswmbly, repair and asswmbly of the tires and rims require special equipment and skills, be sure to ask a tire repair shop to carry out the work.
- The specified tires must be used; inflate them to the specified pressure. The stated tires and pressure are in the "Tires" section in the Maintenance chapter.
- When inflating a tire, check that no one will enter the working area. And use an air chuck, which has a clip and can be fixed to the air valve. While inflating the tire, check the inflation pressure occasionally so that it will not rise too high.
- If the rim is not fitted normally, it may be burst or deflate while the tire is being inflated. To ensure safety, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.
- Abnormal drop of inflation pressure and abnormal fitting of the rim indicate trouble in the tire or rim. In this case, be sure to ask a tire repair shop to carry out repairs.
- Do not regulate the inflation pressure after working at high speeds or high loads.
- Explosions of air-inflated tires have resulted from heat-induced gas combustion inside the tires. Explosions can be caused by heat that is generated by welding, heating rim components, external fire, or excessive use of brakes.



- The energy of tire explode are stronger than deflation. Explode can make tire rim and parts of transmission fly out more than 500 meter. It can arouse loss of property and personnel.

- It is recommended to fill tire with N₂. If the tire has original air, it is suggested that nitrogen should be used to adjust the pressure. The nitrogen can be mixed with air. The tires inflated with nitrogen gas can prevent the tires from exploding because N₂ is inflammable. The N₂ can prevent from oxidation, rubber aging and rim parts corrosion.
- Avoid excessive charging; this requires the appropriate equipment and personnel for instruction.

Storage of Tires

- Tires should be stored in a depot. People must not enter to the depot unless allowed. If tires are stored outside, it should be have barrier around tires, and hold up the sign of "NO ENTRY".
- Stand the tires on the ground and fixated them with a wedge so that they will not fall down when any unauthorized person touches them. If the tire is laid on the ground and one side is in contact with the surface, it will be staved and debased quality.
- Stand aside if the tires are fall down. Machines tires are very heavy and may cause injuries while attempting to control them.

Catalog and Change Cycle Parts Critical to Safety

- To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the user should also carry out periodic replacement of the parts given in the table. These parts are closely connected to safety and fire prevention.
- With these parts, the material may change as time passed, or may easily wear or deteriorate. It is difficult to judge the condition of the parts simply by periodic maintenance. So regardless of the condition they should always be replaced after a fixed time has passed. This is necessary to ensure that they always maintain their function completely.
- However, if these parts show any abnormality before the replacement interval has passed, they should be repaired or replaced immediately.
- If the hose clamps show any deterioration, such as deformation or cracking, replace the clamps at the same as the hoses.
- When replacing the hoses, always replace the O-ring, gaskets, and other such parts.
- Ask your SHANDONG MOUNTAIN RAISE HEAVY INDUSTRY MACHINERY CO.,LTD distributor to replace the parts critical to safety.

Periodic Replacement of Critical Parts and Components

NO.	Safety critical parts for periodic replacement	Qty	Replacement interval
1	Filter of hydraulic tank	1	Every half years or every 1000 hours (whichever comes first)
2	Fan belt	1	
3	Fuel hose (fuel tank - fuel pre-filter)	1	
4	Fuel hose (fuel pre-filter - transfer pump)	1	
5	Fuel hose (transfer pump - fuel filter)	1	
6	Fuel hose (fuel filter - high pressure pump)	1	
7	Fuel hose (return fuel tube)	1	
8	Seals of steering cylinder	2	
9	Steering hose (pump - priority valve)	1	
10	Steering hose (priority valve - steering unit)	1	
11	Steering hose (steering unit - steering cylinder)	6	
12	Brake hose (air storage tank - air brake valve)	1	
13	Brake hose (air storage tank - manual brake valve)	1	
14	Brake hose (air brake valve - air boosting pump)	2	
15	Brake hose (air boosting pump - T connector of F/R driving axle)	2	
16	Brake hose (air controlled cut-off valve - parking brake chamber)	1	
17	Brake hose (air controlled cut-off valve - speed shift valve)	1	
18	Brake hose (manual brake valve - T connector of air-controlled cut-off valve)	1	
19	Brake hose (T connector of manually controlled brake valve - barometer)	1	
20	Wiper Blades	2	
21	Air storage tank	1	Every 3 years or every 6000 hours (whichever comes first)

I. Instructions for Operation

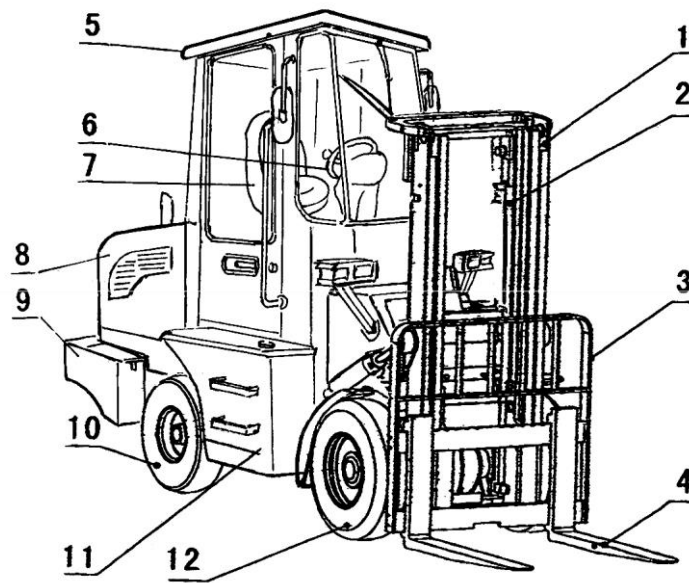
To ensure the personal and equipment safety, the operators should abide by the following instructions:

1. The forklift can only be operated by an operator that has been trained and holds the driving license.
2. Before operation, check all the control and alarm devices. In case of any damage or defect observed, it is necessary to repair before operation;
3. In handling, the load shall not exceed the specified value. The forks shall be completely inserted below the goods that should be placed evenly on the forks. It is not allowed to lift the goods with a single fork tip;
4. Start, turn, travel, brake and stop steadily. On any wet or slippery pavement, slow down before turning;
5. To travel with a load, lower the goods and keep the mast in a back incline;
6. Travel carefully on a ramp-way. On a ramp-way of greater than one tenth, travel forward upslope and travel backward down-slope. Avoid turning on the slope. With the forklift traveling, do not operate the handling;
7. Travel with caution to the pedestrians, obstacles and hollows and make sure the adequate clearance above the forklift;
8. No one shall stand on the fork. No passengers shall be carried;
9. No one shall stand or walk below the fork;
10. It is prohibited to operate the vehicle and attachments in a position other than the driver's seat;
11. Do not handle any goods that have not been fixed or are in piles. Be careful in handling the larger-size goods;
12. For a high-lift forklift with a lifting height of above 3m, make sure the goods will not fall down from above. If necessary, protection measures shall be taken;
13. To lift high with a forklift, try to keep the mast in a back incline. For loading and unloading, it is necessary to tilt forward and backward within a minimum range;
14. Travel on the dock or temporary bed planks with double care and at a low speed;
15. To refuel, the driver should leave the vehicle and stop the engine. Keep the engine off when checking the battery or oil tank level;
16. Unloaded operation of the forklift with attachments shall be deemed as loaded forklift for operation;
17. To leave the vehicle, land the fork on the ground and keep the gear handler in the neutral position. Pull the parking brake to the proper position, stop the engine and switch off the power. To park on a ramp-way, pull the parking brake to the proper position. In case of parking for a longer period, the wheels should be stopped with the pads.

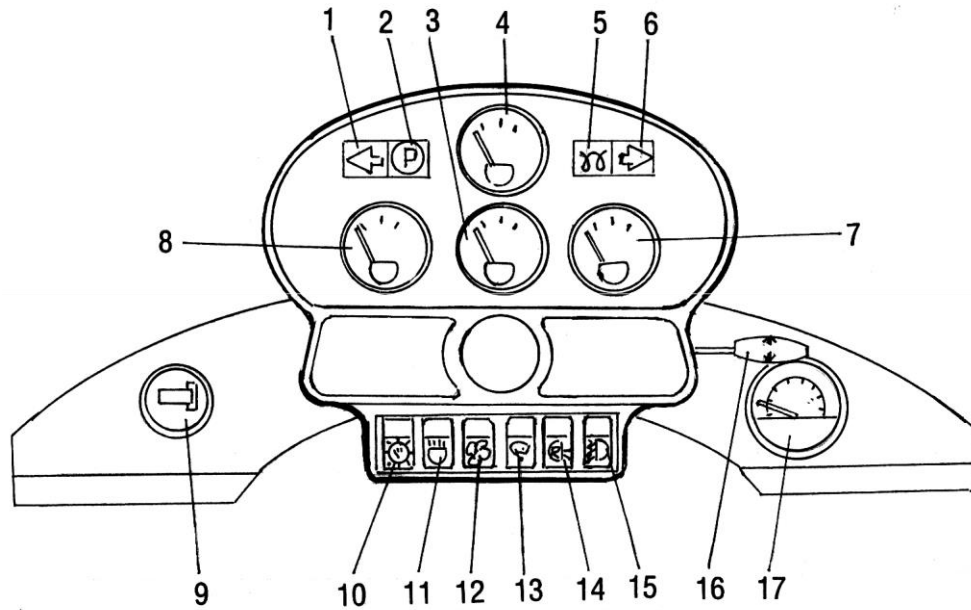
18. In case of any failure while lifting on a slope and any leakage of battery electrolyte, hydraulic oil or braking fluid, it is necessary to arrange for the rush repair to keep the vehicle in a safe status. Contact the professional maintenance people or the seller.

II. Components of Forklift

1. Apparatus



1. Mast 2. Hoisting Cylinder 3. Backrest 4. Fork 5. Overhead Guard 6. Steering Wheel 7. Seat 8. Balancing
Weight 9. Hood 10. Rear Wheel 11. Tilting Oil Cylinder 12. Front Wheel;



1. Left Turn Indicator; 2. Braking Indicator; 3. Current Meter; 4. Engine Oil Thermometer; 5. Warm-Up Indicator; 6. Right Turn Indicator; 7. Engine Oil Pressure Meter; 8. Water Thermometer; 9. Hour Meter; 10. Apparatus Switch; 11. Headlight and Dim Light Switch; 12. Air-heating Switch; 13. Washer/Windshield Wiper Switch; 14. Rear Headlight Switch; 15. Fog Lamp Switch; 16. Steering Indicator Switch; 17. Torque Converter Oil Pressure Gauge

Hour meter [9]

With the key switch in | (ON) position, the hour meter starts to work. Working for each hour, the hour meter revolution will increase one number.

Hour meter reading displays the aggregate actual working hours of the forklift.

Water thermometer [8]

With the key switch in | (ON) position, the water thermometer starts to work. The pointer displays the cooling-water temperature of the engine. In a normal condition, the pointer is within the range of 60 °C~115°C.

Caution:

With the pointer reaching the red area, immediately stop the operation and slow down the engine speed to cool the engine. Then stop the engine, check if the coolant volume is adequate and the fan belt tightness is proper.

Charge indicator (A)

The lamp indicates the charging status of the battery. With the starting switch in the I (ON) position, the lamp is on. With the engine started, the lamp is off.

Caution:

In operation, if the lamp is on or flickers, it indicates that the charging is abnormal and immediate check-up is required.


Braking Indicator

The indicator displays the pressure status of the brake pump. With the indicator on, it means the braking status is abnormal and immediate check-up is required. After the overhaul, the indicator should be off.

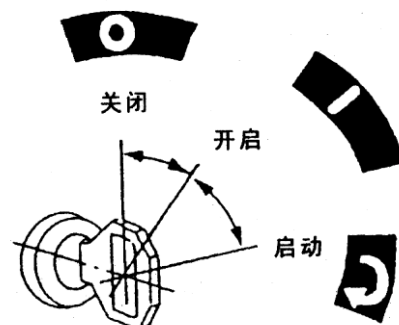
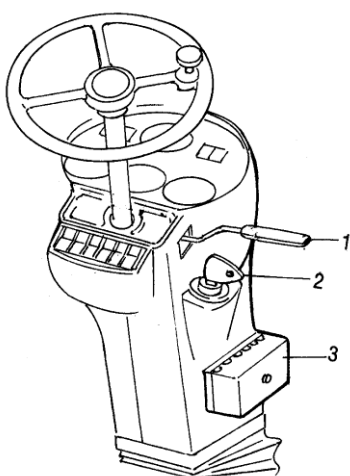
Caution:

In operation, if the lamp is on or flickers, it indicates that the braking force is inadequate and it is necessary to carry out the immediate check-up and replenish the brake fluid.

Warm-up indicator [Diesel-engine forklift]

With the switch in the position of I (ON), the lamp is on. With the lamp off, turn the key to the position of  (START) for a start.

2. Switches



Key switch [2]

○ (OFF)

This is the position to put in and pull out the key.

The gasoline engine and diesel engine will stop when the key in this position.

┤ (ON)

With the start key in the position of “┤”, the electric circuit is connected. With the engine started, the key will remain in the position.

↻ (START)

With the key in the position of “↻”, the engine starts. --With the engine started, upon releasing, the key will automatically turn back to the position of “┤”.

Diesel Engine

Caution:

1. With the engine stopped, don't keep the key in the position of “┤” to avoid the battery from discharging.
2. With the engine in operation, don't turn the key to the position of “↻” to avoid any damage to the starting motor.
3. To start, don't keep the motor running for more than 5 second. The interval between two starts should be 120 seconds.

Steering lamp switch [16]

The steering lamp switch is on the right of the steering column. For turning, set by hand the switch. R = right turn lamp; N = neutral; L = left turn lamp.

The steering lamp switch cannot auto return to the neutral position automatically and shall be reset manually.

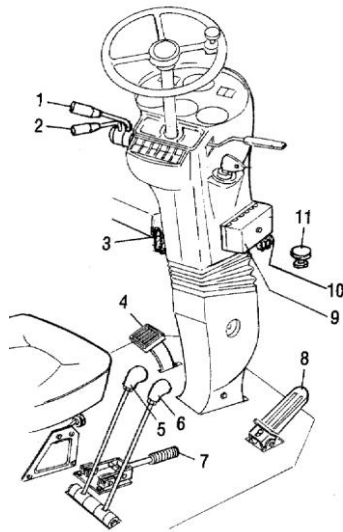
Headlight and dim-light switch [11]

The headlight and dim-light switch is a rocker switch: backward Step I is for the headlight; forward Step II is for the dim-light;

Horn button

To give a horn, press the horn button in the center of the steering wheel.

3. Control



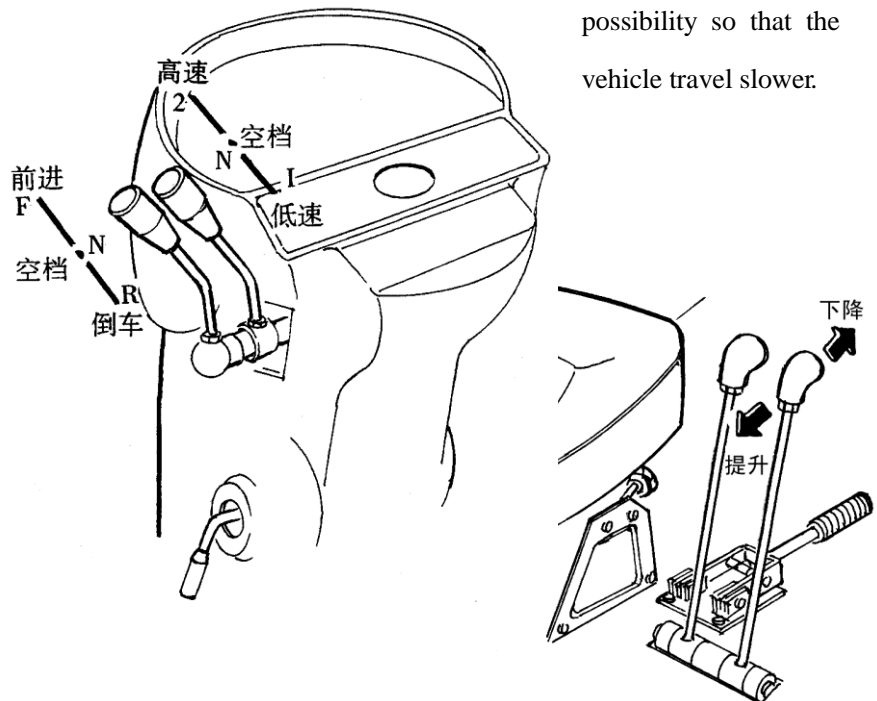
1. Shift Lever; 2. Direction Lever; 3. Regulation Lock-up; 4. Brake Pedal; 5. Tilting Lever; 6. Lift Lever; 7. Hand Brake; 8. Accelerator Pedal; 9. Cutout Case; 10. Flasher; 11. Emergency Stop Button

Accelerator pedal [8]

Step on the accelerator pedal so that the engine speed increases and the vehicle travels faster; release the accelerator pedal as per need and engine speed drops and the possibility so that the vehicle travel slower.

Speed lever [1]

Shift lever [2]



Mechanical Transmission

F—forward N—neutral R—reverse

I—low speed N—neutral 2—high speed

Mechanical gearbox has two gears respectively for forward and reverse. While retreating, the reverse lamp will be lit.

Lifting Lever [6]

Used to raise or lower the fork.

Push forward——descend Pull backward——ascend

The ascending speed is controlled with the back-tilting angle of the handle and the accelerator pedal. The descending speed is controlled only with the handle's forward-tilt angle.

Tilting lever [5]

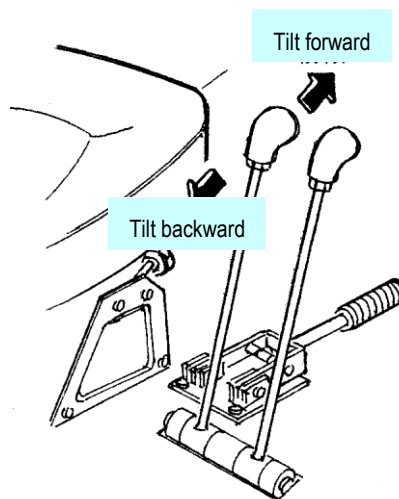
Used for the forward tilting and backward tilting of the mast

Push forward——tilt forward pull backward——tilt backward

The tilting speed is controlled with the handle's tilting angle and the accelerator.

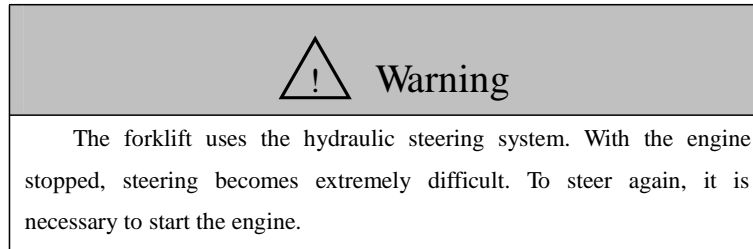
Caution:

The multi-way valve has an auto lock valve for forward tilting. When the engine is stopped, the mast cannot be tilted forward even by pushing forward the tilting handle.

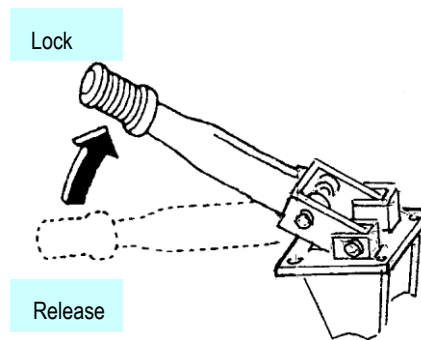


Steering wheel

With the steering wheel rotated rightward, the forklift will turn to the right; with the steering wheel rotated leftward, the forklift will turn to the left. The rear part of the forklift can swing award.



Hand Brake Handle [7]



Pull the handle backward to lock and push the handle forward to release. Before leaving the forklift, the operator must lock the handle.

Emergency Stop Button [11]

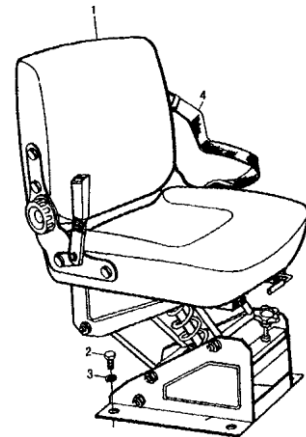
Push down the emergency stop button to stop the engine. Turn clockwise the emergency stop button to return to the status of standby for starting.

4. Miscellaneous

Backrest

The backrest is used to balance the load. It is prohibited to use any forklift with a backrest.

Seat



Seat adjusting bar

The seat adjusting bar is located on the left front of the seat.

To adjust the seat position, push forward and hold the adjusting bar to slide the seat forward or backward to the required position.

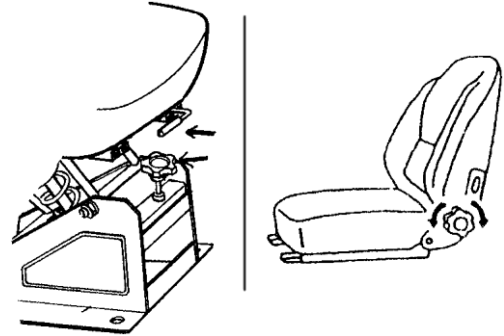
Then release the adjusting bar to lock the seat position.

Before using the forklift, make sure to lock safely the seat.



Warning

- a. Before adjusting the seat, make sure to shut off the key switch.
- b. Make sure to stop the forklift before adjusting the seat position.



Cab

The cab protects the operator from being injured by the falling object from above. It must have adequate shock strength. It is prohibited to use any forklift without the protective overhead guard.

Lock component

To prevent the IC engine hood from being arbitrarily opened, the vehicle is installed with the lock element. To open the IC engine hood, it is necessary to pull out, first of all, the handle of the component. By doing so, IC engine hood will be released.

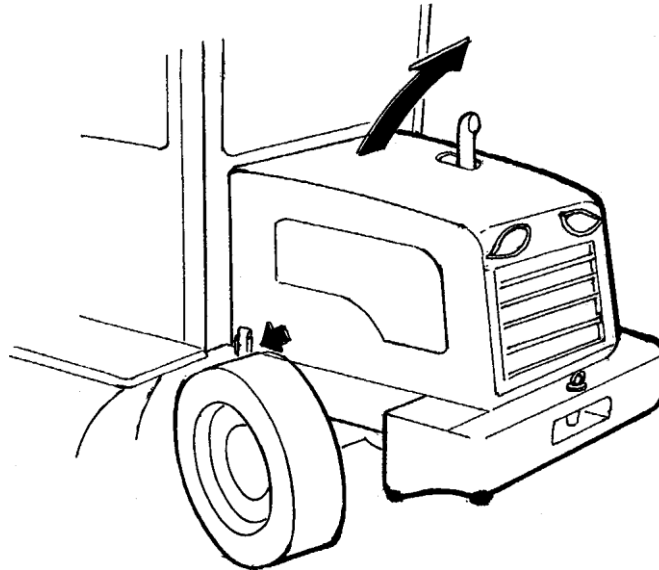
IC engine hood

The wide-open IC engine hood is built-in with the stopper to prevent the engine hood from being closed during maintenance for the convenience of maintenance and service. To close it, press the head part of IC engine hood downward.

Caution:

To open the IC engine hood, make sure to pull out the lock component from outside first.

To close the IC engine hood, avoid your fingers from being clamped by the falling IC engine hood.



Radiator cap and auxiliary water tank

The auxiliary water is placed inside the IC engine hood.

The radiator cap is located beneath the rear cover of the IC engine hood.

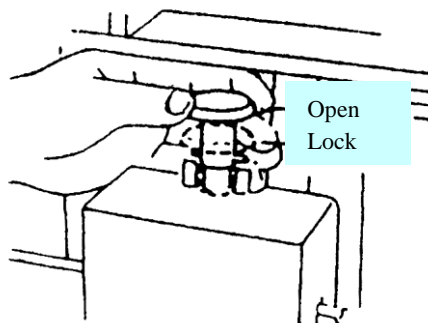


Warning

- When the engine water temperature is higher than 70 °C, do not open the radiator cap. Press down the cap and turn to the left slight to reduce the pressure in the radiator.
- Do not open the radiator cap with the gloves on.
- The antifreeze fluid is corrosive and toxic. The body should be washed clean once the skin is in contact with the fluid. Keep children away from the antifreeze fluid

Fork Positioning Pin

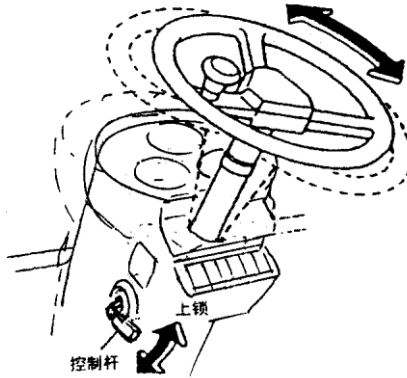
Used to adjust the space of the fork; pull up the fork positioning pin, turn 90° and adjust the fork to the required position according to the goods to be handled.





Warning

- The space of fork should be adjusted according to the central line of the forklift for a bilateral symmetry. After such adjustment, the fork positioning pin must be locked tight.
- The lower beam of the fork frame has one open mouth, which is used to install and remove the fork.
- The fork shall not be used at the open mouth to avoid the fork from falling off from there. Check frequently the bolts in center of the fork frame, which is used to prevent using the fork at the open mouth.



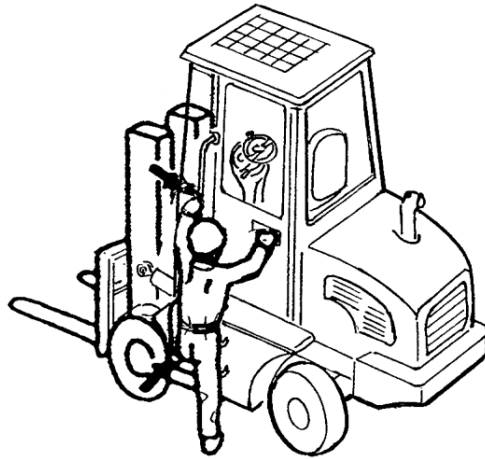
The position of the steering wheel can be adjusted by pushing down the controller fixed on the left side of the steering hub column, shifting the steering wheel to the expected position and pulling up the controller to lock up.

Caution:

- a. After parking the forklift and pulling up the hand brake lever, adjust the angle of the steering wheel.
- b. After adjustment, move the steering wheel hard up and down to ensure it is well locked.

Footstep and handrail

Both sides of the vehicle are installed with the footsteps for getting on and off the vehicle. The left support of the overhead guard is fixed a handrail, which is meant for safety when getting on and off the vehicle.

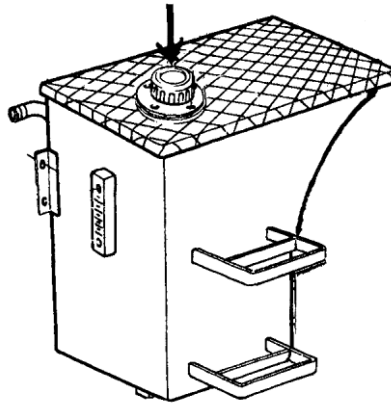


Brake oil cup

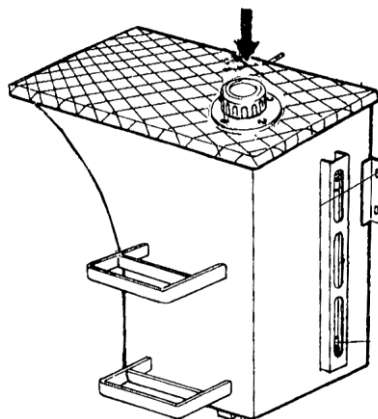
The brake oil cup is the left below the central floor.

Hydraulic oil tank cap

The hydraulic oil tank cap is located on the right frame. To charge the oil, open the oil inlet cap. Through the oil inlet, charge the clean hydraulic oil. After charging, turn the cap tight.



Fuel tank cap



The fuel tank cap is on the left side of the vehicle. The fuel tank cap has an air hole inside, which should be checked if it is unblocked each time for refueling.

Caution:**Refuel**

1. Make sure to stop the forklift, switch off the engine and pull up the hand brake lever before refueling. Make sure there is no open flame and the driver is off the vehicle.
2. After refueling, make sure to close the cap tight; the fuel may leak out, causing a fire.
3. Clean away the fuel spilt out before starting the engine.
4. While checking the fuel level, no open flames shall be allowed.

Mirror

The mirror is fixed on the right upper part of the driver's cab, which is used to observe the conditions behind the vehicle or reversing.

III.Safety Rules

1. Only the trained and certified operators will be allowed to operate the forklift.

2. Regularly check the oil and water for any leakage, deformation, loosening, etc. Due to the ignorance to checking, the service life of the vehicle will be shortened. The adverse circumstance will cause an accident.

Make sure to change the "key safety parts" during the regular inspection.

Wipe out the oil, grease or water from the floor, footstep and controller.

To check the engine and associate parts, switch off the engine and pay special attention to the fan.

While checking the radiator or muffler, make sure not to be scalded.

3. In case of observing any abnormal operation of the vehicle at any time, immediately stop and report to the managerial staff.

For the service at a high position (such as the mast, front and rear lights, etc), ensure the safety and avoid being clamped or backfalling.

If the alarm indicator is on or other failure occurs, drive the vehicle to a safe place for checking and eliminating the failure.

During service and maintenance, mind your head, hands and body that may be in contact with the sharp edges and corners and avoid any wound.

The faulty vehicle should be hanged with the signboard of "fault".

4. No open flames shall be used to check the fuel level, electric contact liquid or cooling water and leakage.

While checking the battery, refueling or checking the fuel system, no smoking will be allowed to avoid any explosion.

The working area shall be equipped with fire extinguishers.

Don't refuel with the engine in operation.

5. Before operation, warm up the forklift with the water temperature to 70°C; after operation, the cooling water temperature drops to 70°C.

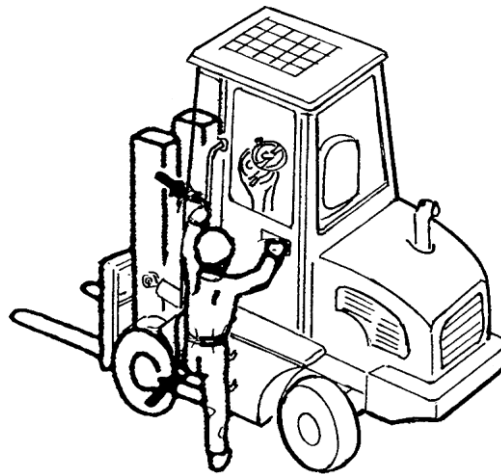
When the water temperature is higher than 70°C, don't open the radiator cap.

6. Gas is harmful to the human body. When operating the forklift in the enclosed space, make sure to have adequate ventilation. If necessary, install the ventilator.



It is prohibited to operate the forklift in an inflammable and explosive environment.

7. Don't get on and off the forklift in operation. To get on and off the forklift, use the safety footstep and safety handrail of the forklift.



8. Sit properly before operating the forklift

Before starting, adjust the seat position for convenience to operate with hand and foot.

9. Before a start, check:

① no one is around the forklift; ② the forward and reverse controllers are in neutral position.

10. Park on the flat ground and pull up the hand brake. In case of parking on a rampway as required, make sure to stop the wheels with shim blocks.

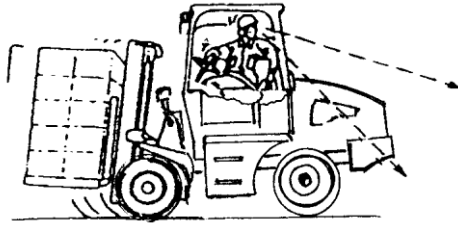
The forks should be landed on the ground and tilted slightly forward. Turn off the engine and take out the key.

11. In operation, keep balanced and accurate. Avoid sudden stop, start or turn.

12. Control the speed and follow the traffic signals.

To travel on the highway or street, abide the traffic rules.

13. Take care of the traveling direction and maintain a good vision.



14. Don't allow any person to sit on the forks, pallet or forklift.



15. To travel on the ship board or bridge deck, make sure it is properly fixed and has adequate strength to bear the weight of the forklift. Check in advance the ground conditions of the work place.

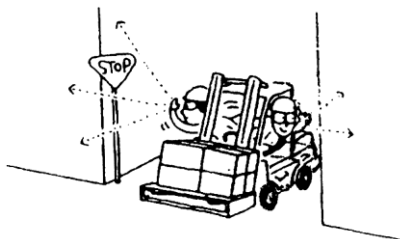


16. Concentrate in work.

17. Keep the head, arms, legs and feet inside the cabinet and don't extend out for whatever reasons.

18. To handle any extra-large load blocking the vision, travel in reverse or be guided by a guide.

19. To pass through any cross pass or other section with poor vision, slow down and give a horn. The traveling speed shall be controlled within 1/3 of the maximum speed of the vehicle.



20. The forklift should be operated away from LPG storage tank, timber, paper and chemical substance. The waste gas exhausted from the muffler may cause any flammable or explosive hazards.


21. To operate at night, use the front headlight and size indicators and control the travel speed.


22. The pavement for the forklift to work on should be solid and level cement pavement, bitumen pavement or concrete pavement.

The forklift is designed with consideration to the following climatic conditions: air temperature of -20°C ~ 50°C , wind speed of less than 5m/s and air humidity of less than 90% (20°C).

Check the pavement to travel on and check the cave entrance, steep slope, obstacles, sharp point and such road condition as may cause any lost control, bumping, etc.

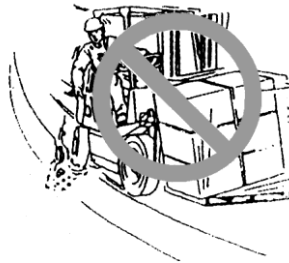
Clear away the refuses, scraps and foreign stuffs that may puncture the tire and cause any unbalance of the load.

 Travel slowly on a wet and slippery road. Do not travel on the edge of road and be extremely careful if not avoidable. In the condition for the maximum unloaded travel speed, the human comprehensive vibration acceleration is $0.95\text{m} / \text{s}^2$. In the condition for the maximum loaded lifting speed, the human comprehensive vibration acceleration is 0.68m/s^2 . The uneven ground will cause the vehicle to vibrate and produce noise. The excessively high air pressure of the tires will also cause the vehicle to vibrate and produce noise.

 Do not operate the forklift in the field in the adverse climatic conditions such as wind sand, snowing, thunder and lightning, storm, strong wind, etc.

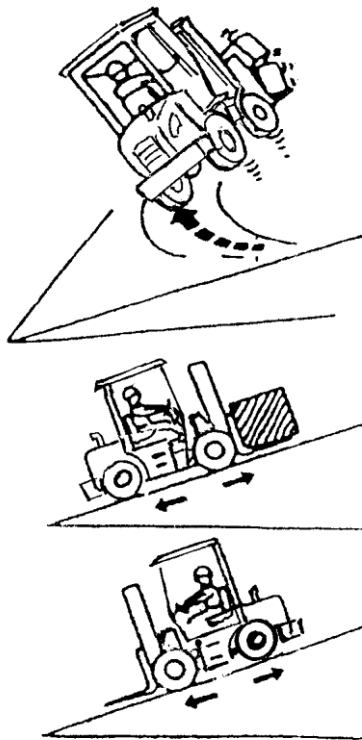
The noise of the forklift is less than 75dB (A). The acoustic power is adopted 7m away from the outer side of the vehicle.

The noise around the ears of the driver is $< 95\text{dB}$ (). Acoustic pressure level is adopted.



23. If loaded, reverse downslope and advance upslope if unloaded. If unloaded, it will be otherwise.

Don't make a turn on straight-line to avoid any tipping accident.

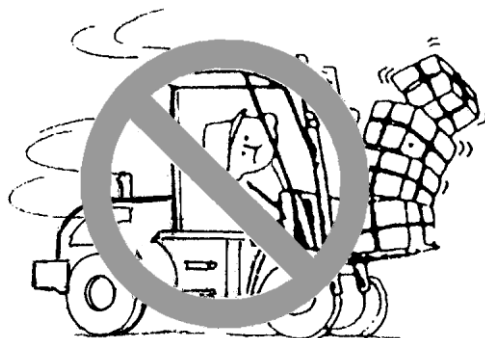


24. To travel downslope, use the engine idle speed as well as apply the brake pedal at intervals.

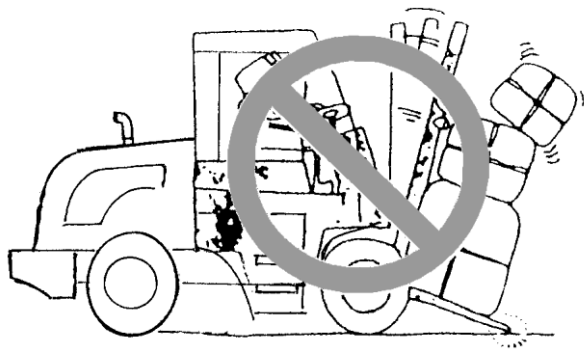
25. With or without load, it will be dangerous to travel with forks lifted high. A standard operation status (with the forks 15~30cm above the ground) should be maintained in traveling.

As for the forklift with the side shifter, do not operate the side shifting with the load lifted high to avoid losing the balance of the forklift.

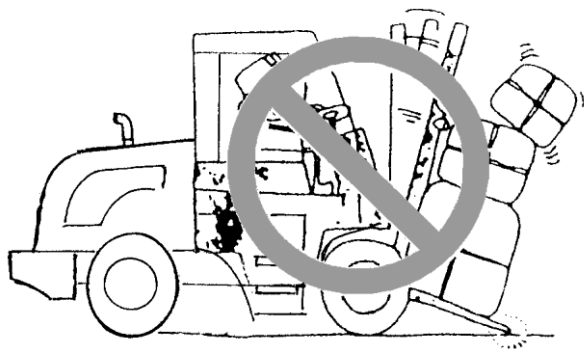
The forklift with attachments should be deemed as the loaded vehicle.



26. To operate with load, tilt the mast backward and try to reduce the height of the load.



27. Don't slam the brakes on or speed up downhill to avoid the load from falling off or turnover. It is dangerous to brake suddenly.



28. Stop the forklift complete before making a reverse; or vice versa.



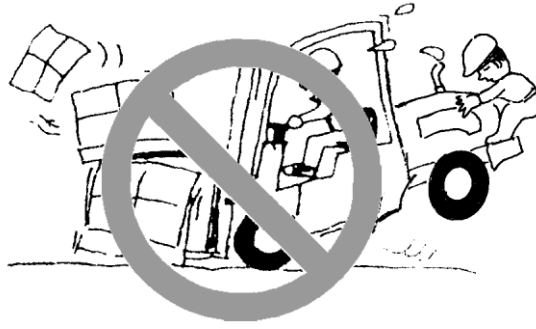
29. According to the shape and material of the load, select the proper attachment and tool.

Do not lift any load by hanging rope on the forks or attachment. The rope may drop off. If necessary, have the qualified person for hoisting to do the job with the hock or lifting arm.



Make sure that the forks will touch the pavement to avoid any damage to the fork tip and the pavement.

30. Familiarize yourself with the load curve of the forklift and attachment. Overloading is strictly prohibited.





It is prohibited to use man as the counterweight, as will be extremely dangerous.

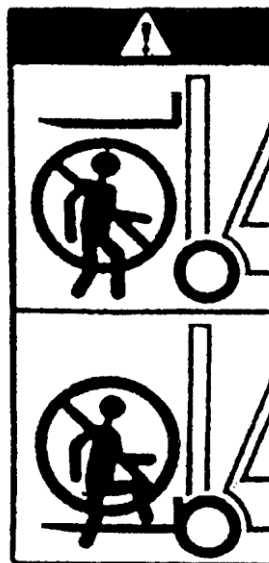
31. The customers are provided with various attachments, such as rotating clamp, level grabber, side shifter, hoisting arm, etc, which are meant for the special purpose.


In case of any need, the modification of any such attachment must be permitted by the manufacturer. It is strictly prohibited to modify the attachments with such permission.

33. Never allow anyone to walk or stand under the elevated forks or attachments.

 **Never allow anyone to stand on the forks.**

 **Keep the load stable. It is not allowed to use any forklift without the overhead guard and backrest.**

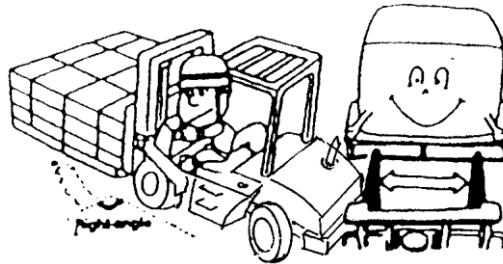


34.  **Keeping the body between the mast and overhead guard is strictly prohibited. Once being clamped, life will be at a danger.**

 **Holding hands between the inner and outer mast is strictly prohibited.**



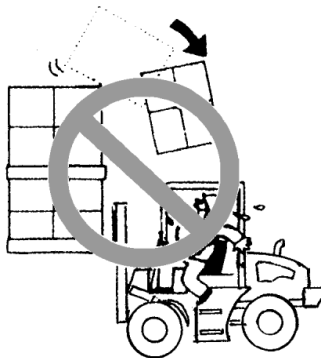
35. To pick a load from the stack, enter the area from front and insert the forks carefully into the pallets.



36.  Loading at a high speed is strictly prohibited. Make sure the load is stable and safely arranged

on the forks

Before lifting the load, stop for a while to check if any obstacle is around.

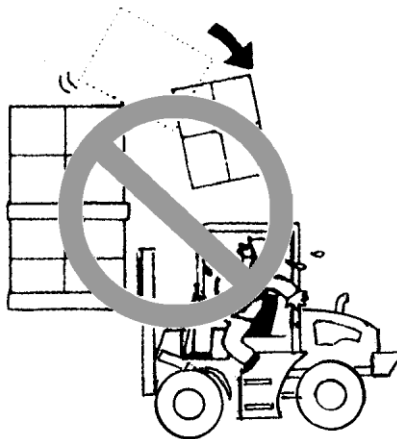


37. Make sure the load is properly packed and deposited evenly on the two forks. Lifting any load with a single fork is prohibited.

As for the forklift with the attachment such as the horizontal gripper, make sure the load is firmly wrapped and gripped before pulling the multi-way controller to the right position.

38. With the forklift on an inclined ground, do not elevate the load to avoid load handling on the rampway.

39. The height of load shall not exceed the backrest. If it is unavoidable, the load should be fixed firmly. Handling the large-size load may hinder the vision. In this, travel in reverse or be guided by a guide.



40. To unload at the stack, try to reduce the forward tilting angle. With the load being slightly higher the stack layer or in a low position, tilt forward.

To stack high, at a clearance of 15~20cm from the ground, keep the mast straight before lifting. Make sure not to tilt the mast when the load is elevated. To pick up a load high, insert the forks into pallet, lift slowly, reverse and then lower down before tilting the mast. With the goods being in a high position, never tilt the mast.

To tow the vehicle on the highway, follow the instruction of traffic police.


42. According to the working environment, wear and put on the work uniform and other personal safety protection devices while working, such as earmuffs, safety helmet, protective spectacles, dustproof mask, safety boots, antistatic clothes, etc. For the safety sake, do not wear the tie or ornament.

43. The vehicle has the labels of warning and operation methods. In operation, follow the requirements of the Manual and the labels on the vehicle.

Check the labels, signs and marks and replace the damaged labels, signs and marks.

IV. Routine Service

1. Leakage Checking: electrolyte, hydraulic oil, brake fluid

 Warning
<p>In case of observing any fuel leakage before operation, do not operate the vehicle and eliminate the leakage before starting the engine.</p>

Check the engine, hydraulic pipe joint, radiator and driving system for any oil or water leakage, by hand touching and visual inspection. Open flames are strictly prohibited.

2. Engine Coolant Volume

With the engine in a cool condition, observe the coolant level of the auxiliary water tank. If it is lower than

the level of “MIN”, replenish up to the level of “MAX”. If the auxiliary water tank has no coolant, check the coolant level of the radiator. If the radiator has inadequate coolant, replenish the coolant up to the radiator cap as well as replenish the coolant in the auxiliary water tank up to the level of “MAX”.



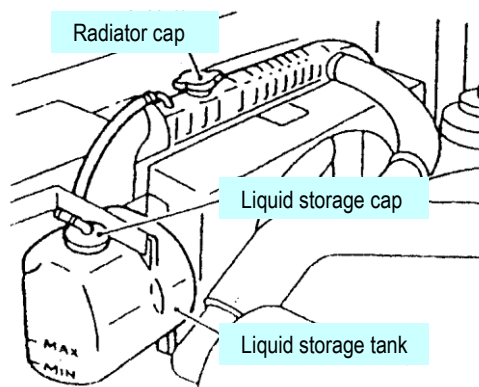
Warning

When the engine water temperature is higher than 70 °C, do not open the radiator cap. Press the cap down and turn left slowly to let out the steam. With a piece of thick cloth, twist it off.

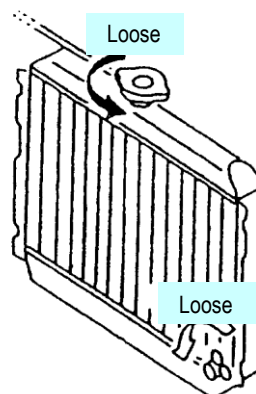
Do not twist the radiator cap with the gloves on.

Caution:

Add the radiator with the clean running water. In case of using the antifreeze fluid, the same antifreeze fluid should be used.



3 Change the engine coolant



- ① Open the radiator cap and discharge cock to drain out the coolant and then wash the cooling system.
- ② Screw up the discharge cock.

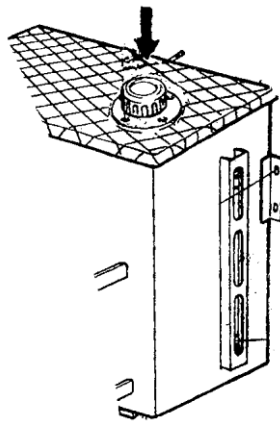


Warning

To avoid the danger of scald, never change the coolant when the engine coolant temperature is higher than 70 °C.

- ③ Add the coolant into the radiator up to the level of the filling point.
- ④ Keep the engine in adequate operation.
- ⑤ Stop the engine. Upon cooling down, replenish the radiator with the coolant up to the level of filling point and replenish the liquid storage tank (i.e., the auxiliary water tank) with the coolant up to the level of “MAX”.
- ⑥ Check if the discharge cock has any leakage.

4. Check the fuel level



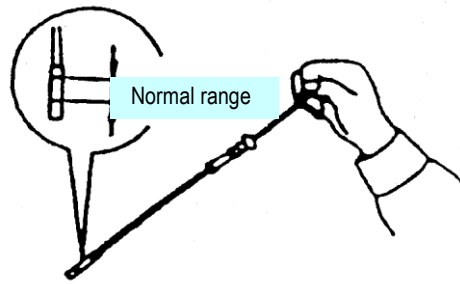
The fuel meter is installed on the panel. Every day, before work, check the fuel level. After work every day, refill the fuel tank. The fuel filling point is at the left support leg of the overhead guard.

5. Check the oil level of the engine

Caution:

- Park the forklift on the flat ground for engine oil checking.
- In cooling operation, the oil level can be accurately checked.

Pull out the oil staff and clean the end before re-inserting and pulling to check if the oil level is between the two indicating lines.



6 Check the brake fluid level

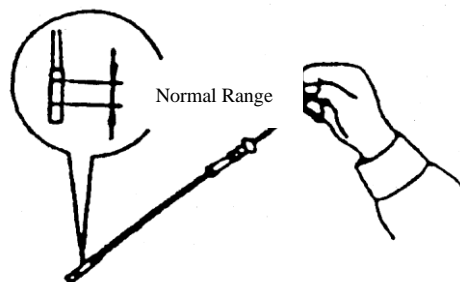
Check the brake fluid cup. Check if the brake fluid level is within the indicating line. If it is inadequate, replenish and check if the braking pipe is air blocked.

Caution:

- To add the brake fluid, prevent the dust and water from being mixed with the fluid.
- The brake fluid is toxic and corrosive. Once being in contact, wash clean.

7 Check the electrolyte level

The battery case has the upper and lower indicating lines. If the electrolyte level is not within the correct range, it is necessary to add distilled water to the top level.



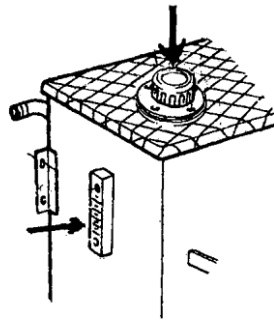
8. Oil level of the hydraulic transmission box

Open the inspection cover and pull out the oil staff to check if the oil level between the scales.

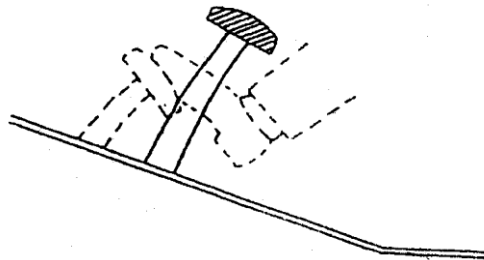
9.Oil level of the hydraulic oil tank

Check the oil level of the hydraulic oil tank.

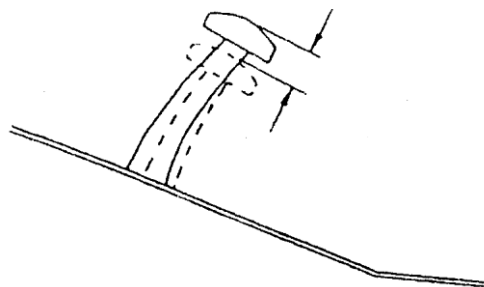
The hydraulic oil level should be between the upper and lower limits.



10. Check the brake pedal, micro-motion pedal, clutch pedal



With the engine in operation, push the brake pedal downward with a distance of more than 60cm to the front floor. In the same way, check the height of the micro-motion pedal and the clutch pedal.



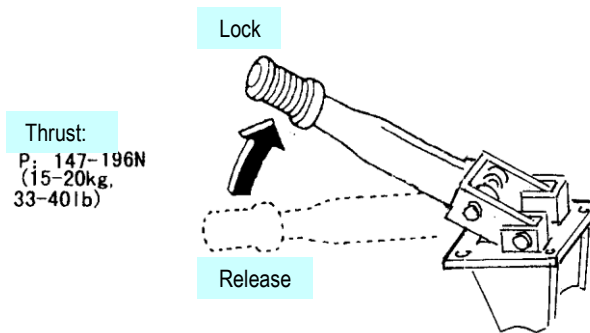
Height and free clearance: mm

	Height	Push-down Height	Free Clearance
Brake pedal	120-130	≥ 60	1 -

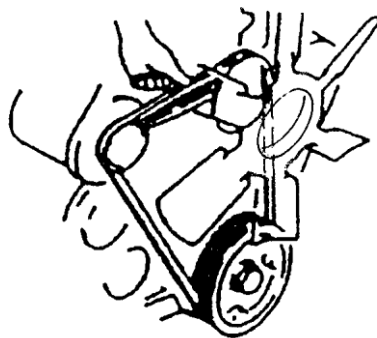
11. Hand brake

Make sure to pull tight the hand brake lever and release. Upon returning the original position, the effect should be fine.

Upon pulling tight, the thrust is required to be: 147-196N



12. Fan belt



Turn off the engine

With the fingers, apply the force of 10Kg downward between the two pulleys to check if the ptotic amount complies with the rate value.

Engi ne	Ptotic amount (mm)
A498B T1	10- 15

Caution:

If the belt has been extended, without any margin for adjustment or with cutting or crack, it should be replaced.

If the engine has not been stopped for operation, do not check the ptotic amount of the belt so as to avoid the fingers from being clamped or the sleeve from being caught in.

13. Horn

Press down the horn button to check if the sound is correct.

14. Seat adjustment

Throw backward the seat adjusting lever to adjust the seat to a comfortable position for hands and feet, release the seat and lock tight the adjusting lever.

15. Shifting handle

Check if the shifting handle is loose and stable upon changing the gear.

16. Lifting handle, tilting handle and attachment handle

Check if the lifting handle and tilting handle are loss and can return properly.

Increase the engine speed and operate separately the lifting handle, tilting handle and attachment handle to ensure that the forks can be completely elevated and dropped and the mast and forks can be completely tilted forward and backward.

17. Lighting check-up

Make sure the lights are on when the key switch is in the position of ON.

18. Steering lamps

Toggle the steering lamp handle to check if the steering lamps are correct.

19. Apparatus and sensors

Check if the hour meter, water thermometer, oil temperature indicator, gearbox oil temperature sensor, fuel sensor and engine water temperature sensor, engine oil pressure sensor work properly.

20. Mast and forks

Check the mast and forks to ensure:

- ① Forks have no cracks and bends and the forks are firmly and correctly installed on the fork holder;
- ② Check if the oil cylinder and pipes have any oil leakage;
- ③ Check the rotation of the rollers;
- ④ Check if the mast has any crack and deformation;

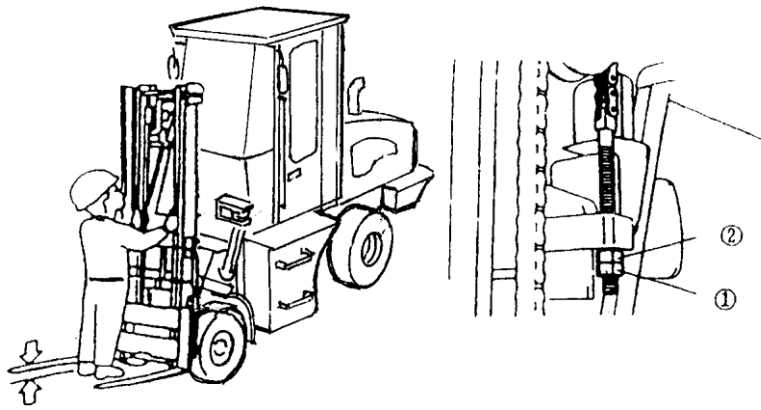
⑤ Operate the lifting, tilting and attachment handles and check if the mast works correctly and has any abnormal sound.

21 Check the tension of the chain

① With the forks elevated 10~15cm, the mast is straight.

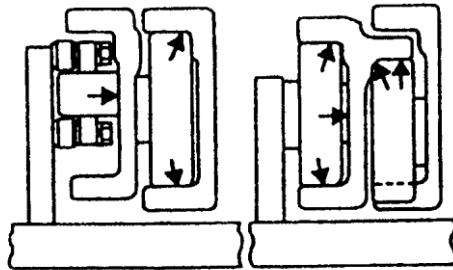
② With the thumb, press the center part of the chain to check if the left and right chains have the same tension.

③ Adjustment of tension: loose the locking nut 1 and screw the nut 2 to adjust the chains so that the two chains have the same tension. Then, screw tight the locking nut 1.



22. Mast Lubrication

According to the requirements of the charts for regular service and lubrication items, lubricate regularly the following parts.



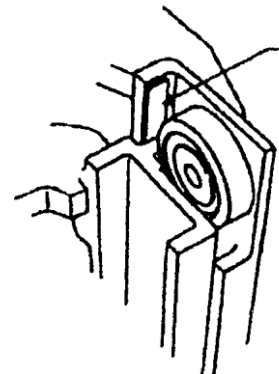
Mast

Coat one layer of grease on the bracing guide rail.

Caution:

a) The intervals of lubrication should be changed according to the operating conditions. During busy months of operation, increase the lubrication frequency.

b) According to the operation of the forklift, coat one layer of grease on the contact surface of the lifting pulleys and inner and outer masts.



23 Steering

① Drive the vehicle at a low speed.


② Turn the steering wheel three rounds respectively left and right

Observe if the left and right steering forces are basically the same.

24 Exhaust Inspection

Colorless	Complete combustion--normal
Black	Incomplete combustion-- abnormal

Blue	Lube oil burning-- abnormal
White	Water in combustor--abnormal

 Warning
<p>Do not run the engine in a place with poor ventilation. The exhaust contains CO which may cause poisoning to the human beings.</p>

25 Braking

Drive the vehicle slowly and step on the brake pedal. With the brake pedal stepped down, the brake light is on.

26 Hand brake checking

- ① Drive the vehicle at a low speed.
- ② Pull up the hand brake lever and the vehicle is stopped. The vehicle shall not have any deviation.

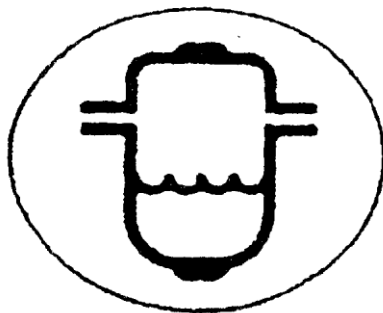
27 Checking of backing light and buzzer

With the change lever in the position of R, the backing lights are on and the backing buzzer sounds.

28 Drain out water from oil-water separator (W9, W13. W15A and other diesel vehicles)

With the engine running, if the alarm lamp of the fuel filter is on, drain out the accumulated water.

- ① Place one container below the fuel filter;
- ② Screw the drainage outlet bearing bolt (W 15A), turn the outlet tap 4~5 rounds and drain out the water.
- ③ With the water completely drained out, screw tight the drainage outlet bearing bolt (W 15A) and outlet tap.



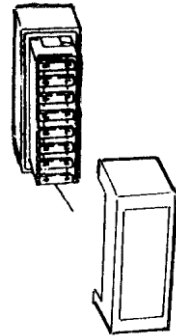
29 Exhaust of fuel system (diesel vehicle)

After refueling or in draining out the accumulated water from the oil-water separator, also let out the air in the fuel;

- ① Loose the air outlet bolt;
- ② Push the hand pump up and down till no air comes out from the air outlet;
- ③ Screw tight the air outlet bolt.

30 Fuses

The fuse box is installed on the left of the steering wheel in the center of the panel. Before changing any defective fuse, find out the reason and change the defective fuse with the specified fuse.



31 Tire pressure

Screw off the cap anticlockwise and measure the tire pressure with a barometer. If the pressure is inadequate, charge up to the specified pressure. Upon ensuring no air leakage, screw on the cap and check if the tire surface has any damage and if the rim is deformed.



Warning

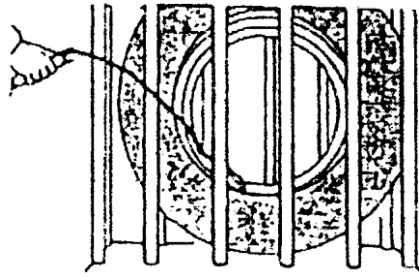
The forklift tires need extremely high pressure for bearing. Any minor deformation of the rim or damage on the tire contact may cause an accident.



Warning

- To use the air compressor, first adjust the air pressure for the maximum output pressure of an air compressor is much higher than the rated pressure of tires; otherwise it may cause a major accident.

- To ensure the safety, keep the tire in a protection frame for inflation.



Rated pressure of tire

Driving wheel (front)	Steering wheel (rear)
$(6.5 \pm 0.2) \times 105 \text{Pa}$	$(5.5 \pm 0.2) \times 105 \text{Pa}$



Warning

With the tire and wheel hub assembled, all the bolts and nuts should be screwed tight to the rated torque value before the tires can be inflated. The inflated tires are of expansion. The tire pressure shall not exceed the specified value.

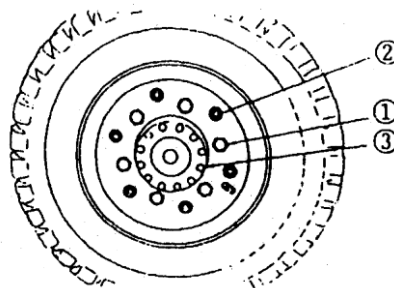
32 Checking on the tightening torque of fire nuts

Check if the tightening torque complies with the requirement.

- ① Hub nuts;
- ② The split rim bolts (which are not available for some forklifts);
- ③ Driving axle bolt half shaft
- ④ Rear wheel hub nuts;
- ⑤ Split rear wheel rim bolts.

Driving wheel (front wheel) (rear wheel)

For the tightening torque value, see List of Bolt Tightening Torques.



33 Tire Changing

Front wheel tire

- 1) Park the forklift on the even and solid ground;
- 2) Start the engine and elevate the mast up to about 100mm ;
- 3) Place the wood pads behind the rear wheel to prevent the forklift from moving;
- 4) Screw each nut on the wheel 1 to 2 rounds anticlockwise;
- 5) Tilt the mast backward and place the woods on both sides of the outer mast;
- 6) Tilt the mast forward till the front wheels are off the ground;

Caution:
Before the front wheels are off the ground, do not loose the nuts.

7) On both front sides of the forklift, place separately the wood blocks to support the forklift before turning off the engine.

- 8) Take the wheel nuts and change the front wheel.

Caution:
a. To take off the tire from the hub, deflate before taking off the rim nuts and bolts;
b. The wood blocks should be full and adequately solid.
c. With only the wood blocks used to support the forklift, no one shall be allowed to enter below the forklift.

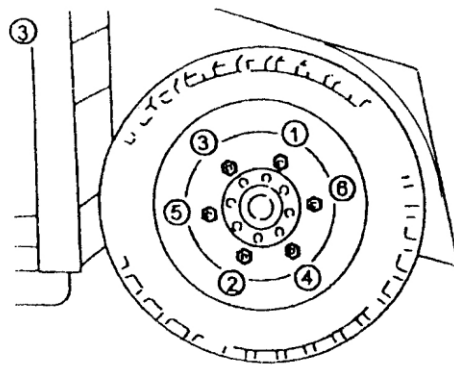
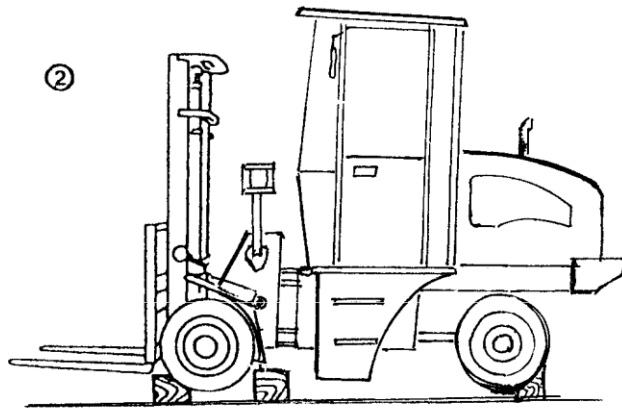
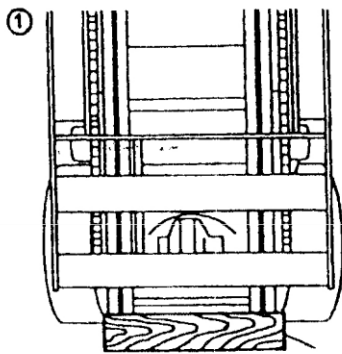
- 9) As per diagram, install the nuts and lock the nuts temporarily.

- 10) Start the engine and take out the wood blocks from below the frame.

- 11) Tilt the mast backward so as to lower the forklift slowly and then take out the wood pads at the rear wheels below the mast.

- 12) Screw tight the tire bolts one by one as per symmetrical cross.

- 13) Adjust the tire pressure up to the specified value.



Rear wheel tire

- 1) Park the forklift on the even and solid ground.
- 2) Pull the hand brake and place the wood pads behind the front wheels to prevent the forklift from moving.
- 3) As illustrated in the diagram, place the jack at the section of the counterbalance bottom.

Caution:

Make sure the minimum bearing capacity of the jack is $\frac{2}{3}$ of the forklift's gross weight.

- 4) Anticlockwise, loose the wheel nuts 1~2 rounds.



Warning

Before the rear wheels are off the ground, do not take out the nuts.

5) With the jack, elevate the forklift slowly till the rear wheels are completely off the ground. As shown in the diagram, place the wood pads respectively at the rear supports on both sides of the forklift to support forklift.

- 6) Take out the wheel nuts and the rear wheel.



Warning

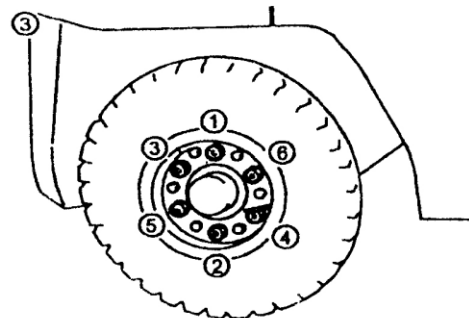
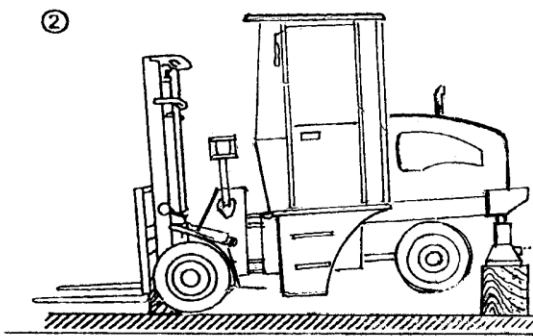
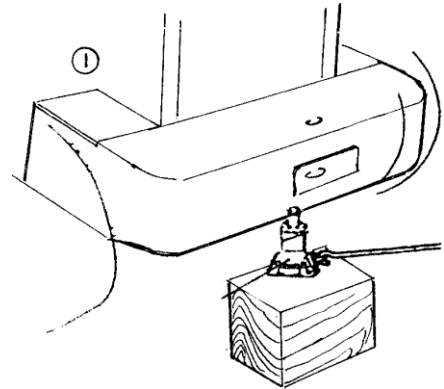
- a. To take off the tire from the hub, deflate before taking off the rim nuts and bolts;
- b. Make sure the wood pads used to support the forklift are full and adequately solid.
- c. With only the wood blocks used to support the forklift, no one shall be allowed to enter below the forklift.

7) As per diagram, install the nuts and lock the nuts temporarily.

8) Remove the wood pads from below the frame, lower the forklift slowly to the ground and take away the wood pads behind the front wheels and the jack.

9) Tighten the nuts to the specified torque in a symmetrical cross way. Please refer to the sheet "Tightening Torque".

10) Adjust the tire pressure up to the specified value.



V. Forklift Structure and Stability

Defining the forklift structure and stability is very important for the safe operation of the forklift.



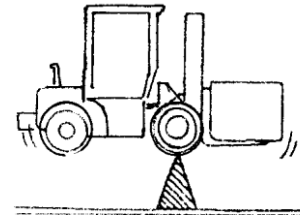
Caution

Forklift structure

The basic members of a forklift are the lifting devices (forks and mast) and the forklift body at the back (with tires).

As a supporting point, the front wheels of the forklift maintain the balance for the gravity of the forklift and gravity of the load.

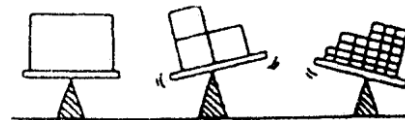
The relation between the forklift gravity center and load gravity center is extremely important for the continual operation of the forklift.



Caution

Load gravity center

The loads handled by a forklift have different shapes, ranging from wooden boxes to the wood boards and long substances. In to assess the forklift and stability, it is extremely important to identify the location of the gravity center for different-shape loads.



Warning

Don't jump off the vehicle in case of turning over

If the forklift is about to turn over, don't jump. The speed for the forklift to turn over is much faster than you jump. Spread your fee and grasp tight the steering wheel with your hands to keep yourself inside the cab.



Caution

Gravity center and stability

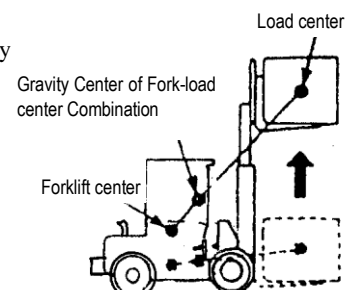
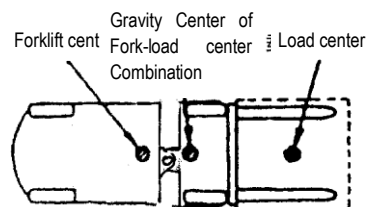
The stability of a forklift depends on the gravity center of the forklift-load combination.

With the forklift unloaded, the gravity center remains unchanged. With the forklift loaded, the gravity center is composed of the forklift and load centers.

The load gravity center depends on the forward or backward tilting of the mast, ascending and descending of the mast. Therefore, the combined gravity center changes accordingly.

The center of gravity of the forklift-load combination will be determined by the following factors:

- Size, weight and shape of the load;
- Elevation height;
- Tilting angle of the mast;
- Tire pressure;
- Acceleration, deceleration and turn radius;
- Pavement condition and dip;



- Types of attachment.

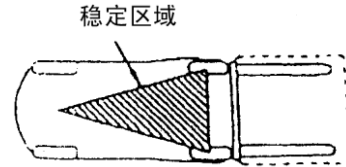


Stability Triangle of Gravity Center

To stabilize the forklift, the gravity center of forklift-load combination must be located within the triangle formed by the center of each front wheel and the center of the rear axle.

With the forklift-load gravity center at the front axle, the front tires will form a fulcrum and the forklift will turn over forward. With the forklift-load gravity center moving out of the stability triangle, the forklift will turn over in the direction in which the forklift-load gravity center moves out of the stability

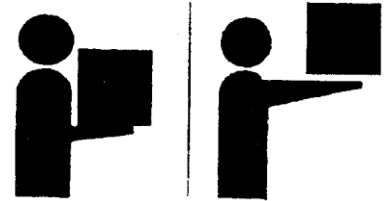
Stability Triangle



Caution

Maximum Load (weight and load center distance)

The horizontal distance between the gravity center of the load on the forks and the fork backrest or forks' front surface (the smaller one) is called as the load center distance. The maximum load means the maximum load that is bearable with the standard load center. The relation between maximum load and the load center distance is specified on the bearing-capacity diagram of the forklift. If the load center distance moves ahead of the forks, the overall gravity center will move forward. Therefore, the load must be reduced.



Caution

Bearing Capacity Diagram

This diagram indicates the relation between the location of load center distance and the maximum load. Before loading, check if the load and the load center distance are within the range specified in the bearing-capacity diagram. If the load to be carried has a complicated shape, the heaviest load should be placed at the fork center and adjacent to the backrest.



Caution

Speed and Acceleration

Without an external force, a static object will remain static. Similarly, with an external force, a moving object will move at the same speed, as is inertia.

Due to the inertia, when the forklift starts to move, a force functions backward. When the forklift is parking, a force functions forward. Braking suddenly is dangerous for the forklift will turn over or the load will fall off with a big force functioning forward.

When the forklift makes a turn, a centrifugal force will be imposed outward for the turning center, which pushes the forklift outward and makes it turn over. The stable area left and right is rather limited. Therefore, to make a turn, it is necessary to slow down to avoid the forklift from turning over. If the forklift handles a load high, the overall gravity center is relatively high and thus it is most likely for the forklift to turn over towards the front, the left and the right.

VI. Operation



Warning

If the forklift has any damage or is out of control, starting the forklift is prohibited before being repaired to the normal condition.

1. Starting

Diesel-engine forklift

- ① Keep the shifting handle in a neutral position
- ② Turn the start switch to the position of “START” for starting up. After starting, return the key to the opposition of “ON”.

Caution:

- Failing to start within 5 seconds, return to the position of “OFF” and wait for 2 minutes before trying again.
- In case of failing to start successively for three times, it is necessary to find the reason.

Caution:

- With the ambient temperature being lower than -5 °C, turn the key right to the end for warming up. With the warm-up indicator off, start the engine.

After the engine is started.

- ① Warm up the engine for about 5 minutes.
- ② Check the operation status of the engine.

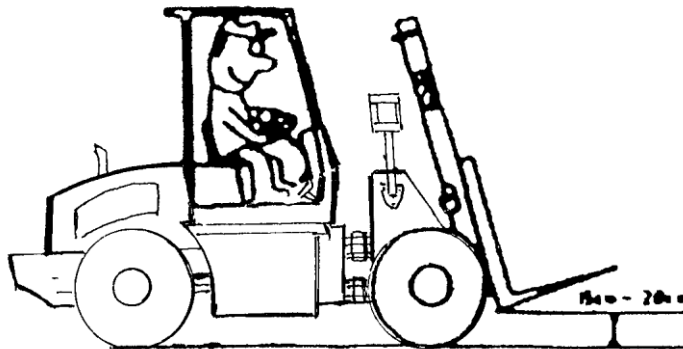
Caution:

With the diesel engine started, accelerate to keep it running at a medium speed (1800~2000r/min) for warming up without load.

- Check the sound interval of compression (or failure to start).
- Check the venting condition.
- Make sure all the indicators are off.
- With the engine completely warmed up, apply in full the multi-way valve handle two or three times and check the working condition of the mast.

2. Operating

- ① Hold the steering wheel handle with the left hand and put the right hand gently on the steering wheel for load handling.
- ② The fork bottom is off the ground by 15-20cm the mast is tilted backward to the right position.



- ③ Observe around the forklift, ensure no pedestrians around and give a horn.

Hydraulic transmission forklift

- Step on the brake pedal and operate the forward-reverse gear lever.
- Release hand brake
- Release the brake pedal, step on the accelerator pedal and move the vehicle.

Gear Changing

- Stop the vehicle before changing the gear.
- Move the gear lever.

Slow down

Slightly release accelerator pedal and step on the brake pedal if required.

Steering

The off-road forklift differs from the common vehicles in steering. With the connecting pins of the front frame and rear frame, it makes the articulated movement for steering.

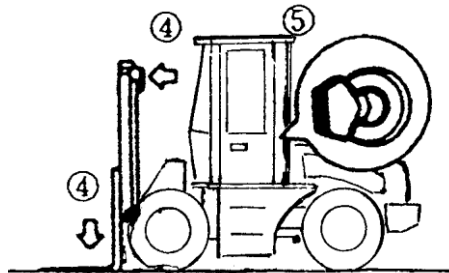
Parking

- ① Slow down and step down the brake pedal to stop the vehicle
- ② Keep the shifting handle in the neutral position.
- ③ Pull the hand brake.
- ④ Land the forks and tilt the mast forward to the maximum.

⑤ Turn the key switch to the “OFF” position and turn off the engine. For the diesel-engine forklift, pull out the emergency stop button and take out and keep the key in a proper place.

Caution:

- Step off carefully, but do not jump off.
- The vehicle shall not be parked on the traveling route.

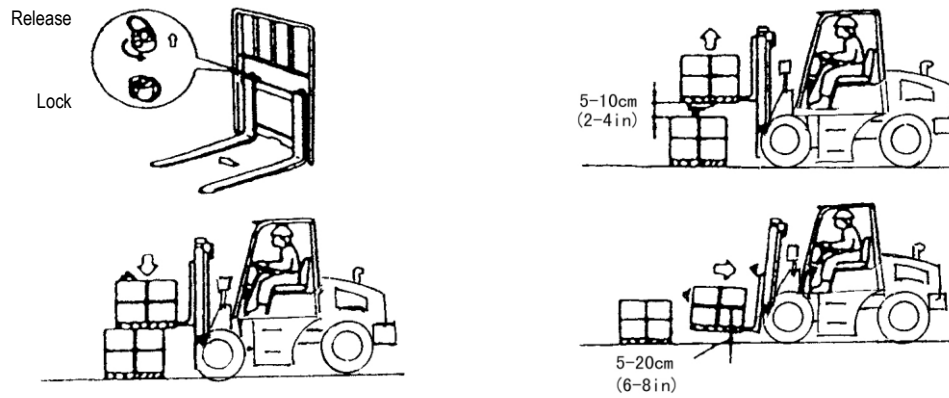


3. Loading

- Adjust the fork space to balance the load.
- The pallet should be symmetrically placed on the two forks.
- Elevate the goods
- The vehicle should face the goods for loading.
- The forks should be inserted inside the pallet as much as possible.

- ① First lift the forks 5~10cm above the ground and ensure if the load is firmly arranged.
- ② Tilt the mast back to the right position, lift the load 5~10cm above the ground and then travel.

● The large-size load may hinder the vision and thus it is necessary to travel in reverse except on an incline.



4. Stacking

- Slow down when approaching the arena for stacking.
- Park the vehicle right ahead of the stacking arena.
- Check the conditions of the stacking arena.
- Tilt the mast forward to the level of the forks and elevate the forks slightly higher than the stacking position.
- Advance, place the load above the unloading place and stop.
- Make sure the load is right above the unloading place, lower the forks slowly and check the load in a safe position.
- Undertake the necessary operation of lifting and tilting and reverse to take out the forks from the goods.
- Check the tip of the forks are off the goods and then lower the forks to 15~20cm above the group.
- Tilt the mast back into the right position.



Warning

- With the load elevated more than 2 m, do not tilt the mast.
- With the load in a high position, do not get off the vehicle or leave the vehicle unattended.

5. Unstacking

- Slow down when the forklift approaches the pick-up arena

- Stop the forklift 30cm away from the goods.
- Check the conditions of the goods.
- Tilt the mast forward to the level of the goods and elevate the forks to the position of the pallet or the sleeper.
- Make sure to direct the forks to the pallet, advance slowly and stop when the forks are inserted into the pallet properly.

Caution:

- If it is hard to insert the forks completely in, advance the vehicle so that the forks can be inserted 3/4. Elevate the forks 5 ~ 10cm , back 10 ~ 20cm and then lower the pallet or sleeper before advancing to insert completely.

- Elevate the forks 5~10 cm above the stack.
- Observe around the vehicle and make sure no traffic obstacles before backing slowly.
- Lower the forks 15~20cm above the ground, tilt the mast back ward to the right position and then move the load the designation.

6. Measures for Coping with Cold and Hot Conditions

Oil

According to the ambient temperature, select the oil of proper viscosity.

Battery

- Cold seasons

To prevent the power source fluid from being solidified, it is necessary to recharge the battery to 75 % of the total capacity in an excellent recharging condition and maintain the ratio of 1.260 which shall not be exceeded.

- Hot seasons

The water content in the electrolyte may evaporate easily. The distilled water must be replenished. At a comparatively temperature, reduce the ratio of the electrolyte 1.220 ± 0.01 .

Radiator coolant



Warning

- The antifreeze fluid contains hazardous substance to the human bodies. In case of swallowing by accident, immediately vomit it out and go to the hospital.
- Keep children away from the antifreeze fluid

As per need, add 50 % of antifreeze fluid into the radiator, which has a freezing point of -36.5°C . If the coolant is inadequate, add the blended Caltex E.L.C. 6280 antifreeze fluid of the same ratio up to the specified value. During the hot season, special attention should be given the radiator and cooling system.

Clean the cooling fins of radiator



Warning

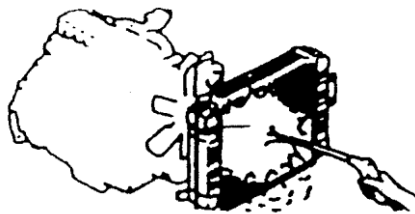
- The flying dust may be caught in your eyes. Therefore, wear the protective spectacles or dustproof glasses

The choked cooling fins may lead to the overheating. Therefore, clean the cooling fins with the compressed air, steam or water.



Warning

- To clean the cooling fins with compressed air or steam, direct the spray nozzle toward the radiator in a right angle.



Check the fan belt tension

If the fan belt is loose, adjust the belt to the specified tension

Operation for the overheating of engine

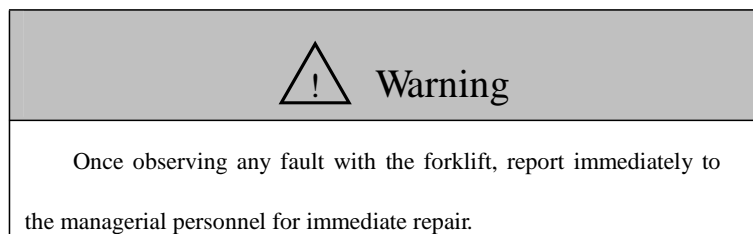
If the engine is overheating, do not stop the engine immediately, but do the following:

- ① Keep the engine running at a low speed;
- ② Open the engine hood for better ventilation
- ③ Stop the engine when the water temperature comes down;
- ④ Check the coolant and add water if necessary.

VII. Parking

Daily Parking

- ① Park the forklift at the designated place and stop the wheels with the wedge blocks.
- ② Keep the shifting handle in the neutral position
- ③ Pull up the hand brake handle.
- ④ Turn off the engine, operate the multi-way valve lever several times to release the surplus pressure from the oil cylinder and pipeline.
- ⑤ Take out and keep the key in a safe place.



Also, do the following services:

- ① Clean the oil and grease away from the body with cloth and water.
- ② Check the vehicle thoroughly and check especially if the tires are damaged and impacted with any foreign stuff.
- ③ Fill up the fuel tank with the specified fuel.
- ④ Check if there is any leakage of hydraulic oil, engine oil, fuel and coolant.
- ⑤ Inject the lubricant oil.
- ⑥ Check if the hub nuts and the contact of oil-cylinder piston poles are loose and if the piston pole surface has any scratch.
- ⑦ Check if the mast rollers rotate smoothly.
- ⑧ Elevate the hoisting cylinder to the top so that the cylinder is full of oil.
- ⑨ In winter or cold environment, the long-lasting antifreeze fluid should not be drained, but the cooling water should be drained out.

Long-term Parking

Based on the services for “Daily Parking”, undertake also the following services and checking:

- ① Remove the battery from the forklift, place it in a dry, cool and shadowy place and recharge once

every month.

② Coat the anti-rust oil on the exposed parts such as the cylinder rods and axles that may get rusty.

③ Such parts as vent, air filter, etc should be covered for the dampproof purpose..

④ Start the engine once every week. If the cooling water has been drained out, add the cooling water, install the battery, remove anti-rust oil from the cylinder rods and axles, start the engine for adequate warm-up, travel forward and backward, operate the mast upward, downward, forward and backward for several times.

⑤ In summer, do not park the forklift on the bitumen pavement.

Operation of forklift after parking for a long period of time

① Remove the anti-rust oil from the exposed parts.

② Drain out the engine from the crankcase of the engine, drain out the gear oil or hydraulic oil from the mechanical gearbox (mechanical forklift), drive axle housing and hydraulic gearbox (hydraulic transmission forklift) and clean inside thoroughly before filling with the new oil.

③ Clear away the foreign stuff and water in the hydraulic oil tank and fuel tank.

④ Remove the engine cylinder head, valve and rockshaft and check if all the valves have adequate gap.

⑤ Add the coolant up to the specified level.

⑥ Recharge the battery, install it on the forklift and make the electric connection.

⑦ Carry out the pre-starting checking carefully and check the functions of the forklift such as starting, advancing, reversing, steering, lifting, descending, and tilting forward and backward, etc.

⑧ Warm up the forklift.

VIII. Service Schedule

1. Leakage checking: electrolyte, hydraulic oil, brake fluid

Caution:

① Operating in quarries with comparatively more dust or in the other polluted environments, it is necessary to increase the service frequency.

② In case of any such circumstance observed before the service is required as declining engine power, black smoke or big noise from the engine, it is necessary to check. If required, adjust the start-up pressure of

the fuel injection nozzles and the atomization of fuel.

Caution:

- ① Carry out the regular checking and service for the forklift for an excellent performance.
- ② Checking and service is often neglected. Find out the problems as early as possible and resolve such problems promptly.
- ③ Use the genuine parts of SWLTD.
- ④ To change or add oil, do not use any oil of different model.
- ⑤ The waste and old oil and batteries to be replaced should be recycled as per requirements of the local laws and regulations on the environment protection, which shall not be dumped or discarded arbitrarily to pollute the environment.
- ⑥ Formulate the considerable service and maintenance plans.
- ⑦ Keep a complete record for each service and maintenance.
- ⑧ Without being trained, no one will be allowed to repair the forklift.

2. Regular Service and Lubrication Schedule

(O=Check, correct and adjust; X = change)

Service Items	Description	Tools	Monthly (200 hours)	3 months (600 hours)	6 months (1200 hours)	1 year (2400 hours)
Engine	1. Adjust the gap of intake and exhaust valves	Feeler	○	○	○	○
	2. Adjust belt tension		○	○	○	○
	3. Tight the cylinder head bolts		○	○	○	○
	4. Clean outside of radiator (I)		○	○	○	○
	5. Change engine oil (I)		x	x	x	x
	6. Change engine oil (diesel engine) filter (I)		x	x	x	x
	7. Change engine coolant					
	8. Change the fuel filter (diesel engine) Clean the fuel filter (gasoline engine)			x		
			○	○	○	○

	9. Drain out water from the oil-water separator (diesel engine)		○	○	○	○
	10. Clean or change air filter		○	○	×	×
	11. Engine idling	Speed indicator	○	○	○	○
	12 Ignition timing (gasoline engine)		○	○	○	○
	13. Spark plugs (gasoline engine)		○	○	○	○
	14. Check the distributor's contact point, cover and rotator (gasoline)		○	○	○	○
	15. Inner layer of distributor (IC ignition system) (1)					○
	16. Check the nuzzles and adjust the pressure (diesel engine) (2)			○	○	
	17. Choking or damage of P.C.V valve and pipe				○	○
	18. Ratio of electrolyte				○	○

3. Service of Chassis and Body

(O=Check, correct and adjust; X = change)

Service Items	Description	Tools	Monthly (2)	3 months (600 hours)	6 months (1200 hours)	1 year (2400 hours)
Hydraulic Gearbo	Clean intake oil filter					
	Change oil and fluid (1)		Primary			
Driving axle	Check and change (if necessary) differential gear oil		○	○	○	○
	Check connection and fastening status		○	○	○	○
Braking & micromotion system	Check and adjust the height and free gap of brake pedal		○	○	○	○
	Change brake fluid					×
	Check if the hand brake works reliably		○	○	○	○
	Check and adjust the height and free gap of micro-motion pedal		○	○	○	○
					×	×

Hydraulic System	Change hydraulic oil (l)				x	x
	Clean oil-return filter (l)		○	○	○	○
	Operation of hydraulic oil pump		○	○	○	○
	Operation status of multi-way valve		○	○	○	○
	Check if the pipeline and joints have any crack, deformation or					
Lifting System	Check the chain tension		○	○	○	○
	Chain lubrication		○	○	○	○
	Check if the chain and bearings have any deformation or damage		○	○	○	○
	Check the operation and connection of hoisting cylinder		○	○	○	○
	Check the operation and connection of tilting oil cylinder		○	○	○	○
	Check if the forks and positioning pins have any damage, deformation or wears		○	○	○	○
	Check if the fork root welding has any crack or wears		○	○	○	○
	If the mast, fork frame rollers are loose			○	○	○

4. List of Bolt Tightening Torque Parameters

Diameter of Bolt	Class			
	4.6	5.6	6.6	8.8
6	4~5	5~7	6~8	9~12
8	10~12	12~15	14~18	22~29
10	20~25	25~31	29~39	44~58
12	35~44	44~54	49~64	76~107
16	54~69	69~88	83~98	121~162
20	88~108	108~137	127~157	189~252
24	118~147	147~186	176~216	260~347
30	167~206	206~265	245~314	369~492
36	225~284	284~343	343~431	502~669
42	294~370	370~441	441~539	638~850
48	441~519	539~686	637~784	933~1244

Notes: ● Class 8.8 bolts are used at all the joints of weight

●The class of bolts can be found at the head; otherwise it will be Class 8.8

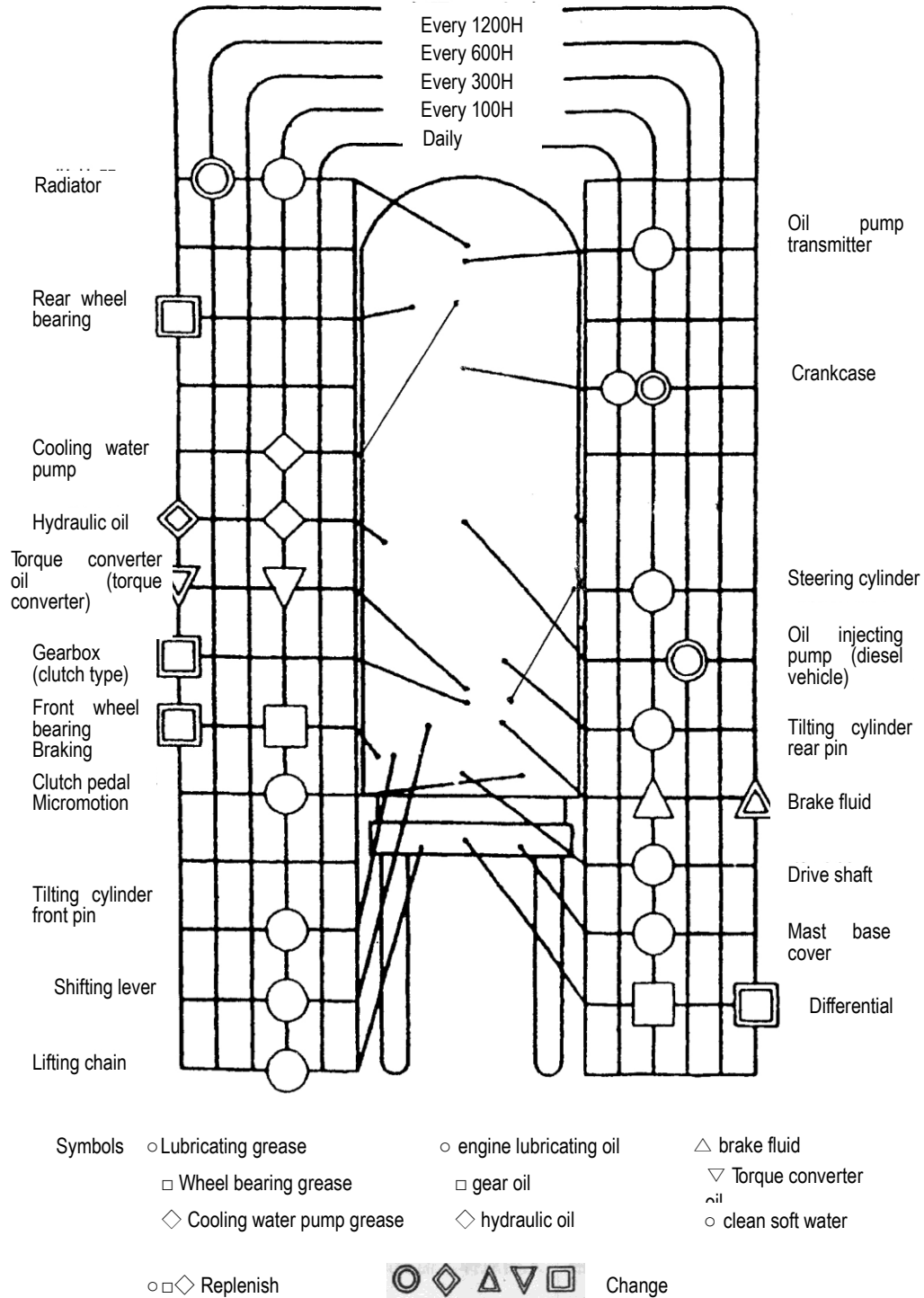
5. List of Forklift Oil

Names	Brand and Code	Capacity (L)	Remarks
Diesel	0# (summer)	45	1~1.8t
	-10#-35# (winter)	60	2~3.5t
Diesel engine	Class CD and above 10W/30 or as per Engine Maintenance Manual (High & Cold Environment 5W/30CD or as per Engine Maintenance Manual	5	1~1.8t
		6.5~7.5	2~3.5t
Hydraulic oil	L-HM32 (high and cold environment: L-HV32)	35~40	1~1.8t
		45~50	2~3.5t
Hydraulic transmission oil	#6 Hydraulic transmission oil	6	1~1.8t
	DEXRON-III (Caltex)	8	2~3.5t
		7	Special
Gear oil	GL-5 85W/90 (Caltex)	5.5	1~1.8t
		8	2~3.5t
	API GL-5 80W/90 (Caltex)	6.5	Special
Brake fluid	Caltex DOT3	1.5	
Anti-rust & antifreeze fluid	Caltex	10~11	
Industrial Vaseline	2#		Electro polar of battery
General automotive lithium-based grease	General automotive lithium-based grease		

- Note:
- 1-3.5t Vehicle has been filled with the anti-rust and anti-freezing fluid which shall not be let out. If required, fill up as per original requirement. Change every 2 or 4 years.
 - If not filled with the anti-rust and antifreeze fluid, the User may add as per need in accordance with the requirement. The anti-freezing fluid must be used in winter.

6 Lubrication System Chart


Lubrication System



IX. Hoisting, Shipping and Towing of Forklift

Hoisting forklift

Tighten the steel rope to the hoisting hole and hook on the two ends of the beam of the outer mast and hoist the forklift with a lifting device.

 Warning
<ul style="list-style-type: none"> •To hoist a forklift, make sure not to wind the steel rope with the overhead guard. •The steel rope and lifting device should be absolutely solid enough to support safely the forklift as the forklift is extremely heavy. •Don't hoist the forklift with the cab frame (overhead guard). •To hoist the forklift, don't enter below the forklift.


Shipment

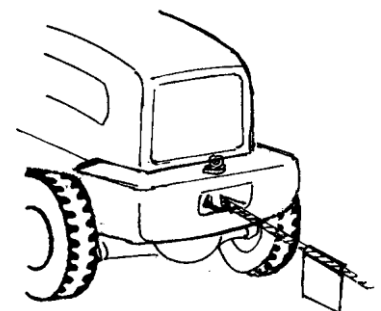
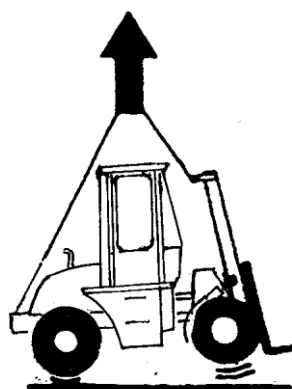
A forklift is generally used for load handling and short-distance transport and is not suitable as a long-distance transport vehicle. In case of any need for long-distance shipment of the forklift, it should be transported by ship, train or truck of 5t and above. Stop the wheels with pads and tighten the body firmly to avoid any drift of the vehicle during transportation.

Towing

The towing pin beneath the counterbalance is meant for towing the forklift. For towing, first take out the pin, fit in the steel rope and then put back the pin.

Caution: release the hand brake lever.

 Warning
<p>Do not fasten the steel rope on the position not designated.</p> <p>No sudden load shall be applied on the steel rope.</p>



X. Performance Parameters

Model		MR30Y
Rated load (kg)		3000
Max. Lifting height (m)		3.7
Load center distance (mm)		500
Free lifting height (mm)		145
Max. lifting speed (m/s)		430
Tilt angle(forward/backward)		6°/12°
Max. travel speed (unloaded) (Km/h)		19
Min. under clearance (mm)		195
Min. outside turning radius (mm)		4500
Gradeability (laden) %		50
Wheel base (mm)		2005
Tread (front/rear) mm		1345
Dead weight (Kg)		3700
Overall dimension (LWH) (inclusive of forks)		4585×1700×2720
Tire (front/rear)		12-16.5
Engine	Model	4L68
	Rated power/speed (KW/PS)	37
	Max. torque/speed (N.m)	1680r/min-2240r/min
	Net quality (Km)	215

XI. Running-in of New Vehicles

To prolong the service lifetime of a forklift, before being used, a new vehicle requires for a running-in test so that all the frictional parts will receive adequate running-in. The Regulations will be also applicable to the overhauled loaders.

For a new vehicle, the running-in period shall be at least 32 hours. During the running-in period, the traveling speed should increase gradually from low to high, while the load (or traction volume) shall exceed 70% of the common load.. Ideally, it should be used to shovel and load the loose materials. The running-in operation will be carried out in two steps: unloaded running and operation running.

1. The unloaded running should be for about 8 hours, in the following steps:

(1) After starting the diesel engine as per specification, keep the engine running in neutral gear at a low speed and then accelerate gradually to the maximum speed for running 10 minutes;

(2) Operate the lift lever and forward-tilting lever of working devices for ascending, descending and tilting over for about 10 minutes;

(3) Travel unloaded from a low speed to a high speed in the advance and reverse gears respectively.

2. After the unloaded running, check the following items:

(1) Check thoroughly the fixture status of all the bolts and nuts, especially the cylinder head bolts, exhaust bolts and fixing bolts of front and rear driving axles, rim bolts, connecting bolts of transmission shaft;

(2) If the fan belt is properly tight;

(3) If the engine, torque converter, gear box, driving axles and other parts produce any abnormal sound;

(4) If any oil or water leakage with the hydraulic system of working devices, transmission hydraulic system, lubrication cooling system of the engine, braking system, water cooling system of the engine;

(5) If the steering is flexible and the brake is flexible and reliable;

(6) If the reading of all meters is normal;

(7) If all the levers and accelerator pull-rod are properly connected or loose;

(8) If the working devices are jammed in operation;

(9) If all the parts of the electric system are connected and the meters, lights, signals and generator charging are normal.

3. After the above checking and service, the operation running will be carried out. To operate, the load should be gradually increased. The operation should not be excessively fierce or sudden, with attention given to the operation capacity. During the operation running, the checking items specified for the unloaded running should be also checked.

4. After the running-in, the following work will be undertaken:

(1) Change the engine lubricating oil and clean the oil filter with diesel;

(2) Change the oil for the torque converter, gear box and their respective oil circuits and clean their filters;

(3) Change the oil in the working hydraulic system and clean the filters;

(4) Clean the main reducer and wheel-side reducer of the front and rear axles and change with the new oil;

(5) Eliminate all the faults observed in the running-in period.

Driving and Operating

Before driving the loader for operation, it is necessary to read the User's Book and the user's book for the engine so as to be acquainted with the loader's performance structure and operating method, technical service and maintenance as well as the position and function of all the levers and meters for a safe travel and operation.

1. Before dispatching, check and prepare:

(1) Add up the water tank with cooling water;

(2) Check if the engine lubricant is adequate;

- (3) Check if the transmission and working hydraulic system has adequate oil;
- (4) Add up the engine fuel oil;
- (5) Check if the tire pressure is adequate and the rim bolts are loose;
- (6) Add all the lubricated parts with the adequate lubricating oil or grease.

2. Instructions for Operation:

- (1) The diesel to be used must be clean, while its brand should comply with the specified quality specified;
- (2) The hydraulic transmission oil for gear box and hydraulic torque converter and hydraulic oil for the hydraulic system of working devices must be clean and comply with the brand and model requirement;
- (3) Carry out the regular service and lubrication as per specification;
- (4) With the engine started, keep the engine running unloaded till the water temperature reaches to 55°C before starting to travel;
- (5) Only when the diesel-engine outlet water temperature reaches 55°C and the engine oil reaches 45°C can the loader be operated with full load. In operation, the engine water temperature shall not exceed 90°C, the engine oil temperature shall not exceed 95°C and the oil temperature of torque convert shall not exceed 120°C;
- (6) It is not allowed to lift the spading teeth to the maximum height for moving the materials. To shift a load, it is necessary to keep a lower position for a stable travel.

3. Start

- (1) Switch on the power;
- (2) Keep the gear lever and working device lever in the neutral position and the hand-brake handle in the position of braking;
- (3) Insert the electric switch key into the switch and turn it clockwise to the connection position;
- (4) Step the accelerator pedal half way and turn the start switch to the position of "START" for starting. Each starting shall not last more than 15 seconds. If the engine fails to start within 15 seconds, wait for 2 minutes before making the second try. In case of failing to start for four or five times, it is necessary to find out the reason and eliminate the problem before continuing with the start;
- (5) Upon starting, accelerate gradually so that the engine will be warmed up at a speed of 1200~1400R/M. Make sure also that all the indicators are in a normal range;
- (6) In case of being difficult to start in winter, it is necessary to drain out the cold water and add the hot water or boiled water before making a start. If necessary, add the lubricating system of the engine with winter lubricant of 70-80°C before making the start again. To start, make sure to observe the engine oil pressure and control properly the accelerator to avoid any burning tile.

4. Travel and Operation

After warming up for five minutes with the engine started, when the water temperature and oil temperature reaches 45°C and above, all indicators are in a normal state and the sound and exhaust of the engine is normal

before releasing the hand-brake handle and clutching in for traveling.

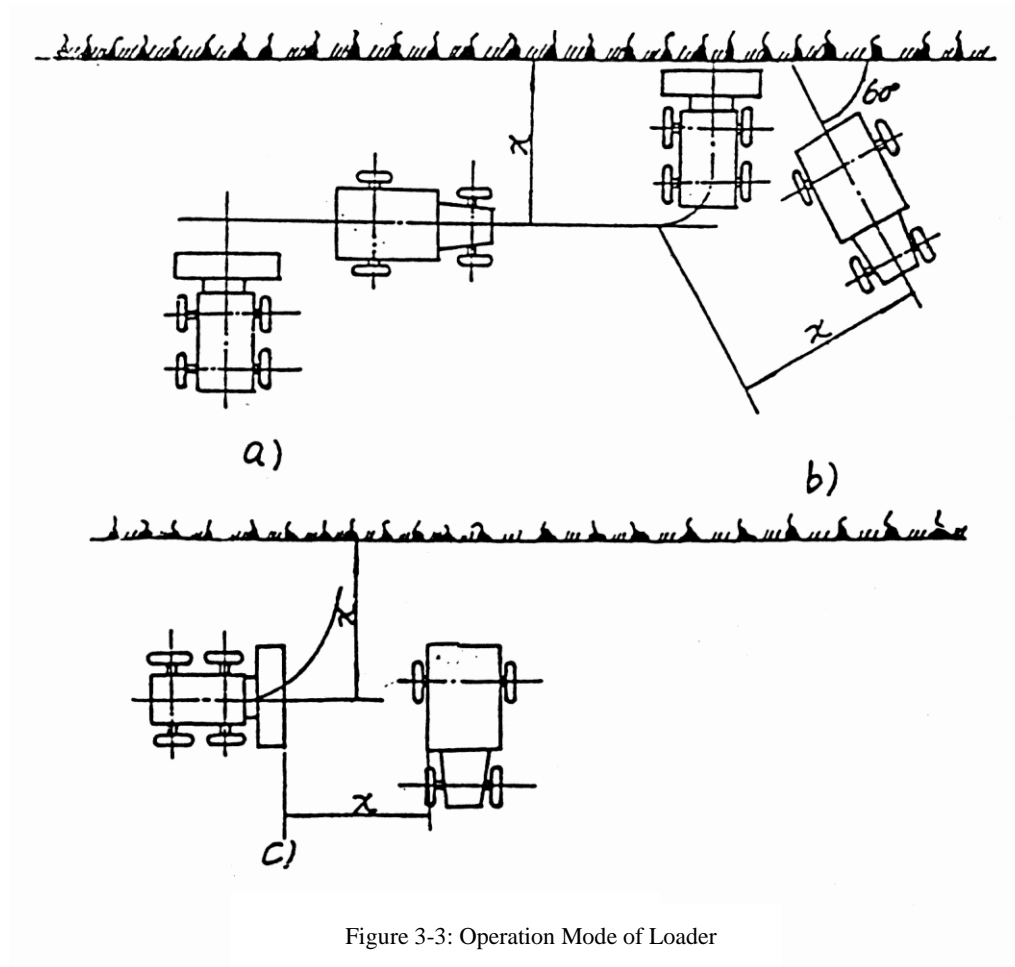


Figure 3-3: Operation Mode of Loader

5. Stop and Cutoff

- (1) Bring down the speed of the engine and step down the brake pedal to stop;
- (2) Keep the gear handle in the neutral position;
- (3) Release the brake pedal and pull tight the hand-brake lever;
- (4) Keep the engine idling for 3-5 minutes for cooling off all the parts;
- (5) Land the working device on the ground and keep all the handles in the neutral position;
- (6) Lift up the flameout plug. When the engine stops, push the flameout plug to the original position;
- (7) Pull out the electric switch key, turn off the main power switch and lock the door;
- (8) After parking in winter, it is necessary to promptly turn off water valves to drain out all the water from the cooling system. If the anti-freezing fluid is used, it shall not be drained out;
- (9) With the temperature down to $-20^{\circ}\text{C} \sim -30^{\circ}\text{C}$, remove the battery and keep it in a warm room to avoid

any frost crack.

1. The driver must have the official driving license and must be acquainted with the User's Book and the user's book for the engine and shall use, maintain and service as per specifications thereof;

2. No one shall stand beneath the forkteeth of the forklift;

3. Slow down while turning. It is prohibited to make any sharp turn or sudden brake. In a rainy or snowing day, it is not allowed to travel at a high speed. Also make sure not to turn on a slope;

4. It is strictly prohibited to travel downslope or steer with the engine off to avoid accident because the hydraulic steering is out of control;

5. It is not allowed to travel with the load lifted high;

6. To load, it is not allowed to polarize the load center;

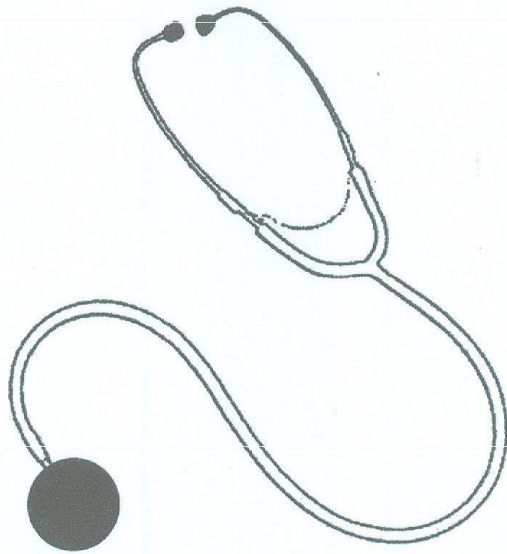
7. It is not allowed to travel overloaded;

8. To park on a ramp, it is necessary to stop the wheels with triangle wood pads in addition to applying the hand brake;

9. Parking near fire is not allowed;

10. Make sure from time to time the reading of meters is normal.

Failure Causes and Repair



Review common machine symptoms and related troubleshooting techniques for use by customers and servicemen.

Engine system

Refer to the WD615.220 engine manual for specific troubleshooting details.

Transmission

Transmission oil pressure is too low in every gear

Proble	Soluti
1. Transmission oil level is too low	1. Fill transmission oil level to the proper level
2. Oil leakage in main pipe lines	2. Check and repair
3. Transmission oil suction filter screen is blocked	3. Clean or replace the filter screen
4. Transmission oil pump is damaged	4. Repair or replace the pump
5. Improper pressure valve adjustment	5. Readjust the valve setting

Transmission oil pressure is too low in some gears

1. Damaged to piston sealing	1. Replace the seal rings
2. Damaged seal rings in the transmission lines	2. Replace the seal rings
3. Oil leakage in the transmission lines	3. Check and repair

Torque converter oil temperature is too high

1. Transmission oil level is too low	1. Fill the oil to the proper level
2. Transmission oil level is too high	2. Drain the oil to the proper level
3. Oil coolant is blocked	3. Clean or replace coolant
4. Clutch is slipping	4. Check and adjust the transmission oil
5. Excessive time running the machine at high loads	5. Idle or turn the machine to cool it down

Loader cannot move after the engine has been started

1. A Gear not selected	1. Shift to desired gear or adjust the transmission control lever to the desired position
2. The transmission valve cannot re-cut-off	2. Overhaul the valve for inspection to identify potential solutions
3. Low torque converter oil pressure	3. Adjust the torque converter overflow valve
4. Low transmission oil pressure	4. See (Transmission oil pressure is too low in every gear) and (Transmission oil pressure is too low in some gears)

Insufficient machine power to drive the machine

- | | |
|---|--|
| 1. Low transmission oil pressure | 1. See (Transmission oil pressure is 100 low in every gear) and (Transmission oil pressure is too low in some gears) |
| 2. Torque converter oil temperature is 100 high | 2. See (Torque converter oil temperature is too high) |
| 3. Damaged torque converter impeller blades | 3. Disassemble and check the torque converter - replace the damaged blades |
| 4. Insufficient output power from the engine | 4. Check and repair the engine |
| 5. Service or parking brake is engaged | 5. Check and repair the brake system and/or disengage the service and/or parking brake |

Brake System

Insufficient service brake force

- | | |
|--|---|
| 1. Brake system oil leakage | 1. Replace the sealing parts |
| 2. Air present in the brake system hydraulic brake lines | 2. Bleed the air out of the brake system hydraulic brake lines |
| 3. Insufficient pressure in the air lines | 3. Check the sealing performance in the air compressor storage tank and lines |
| 4. Worn booster cup | 4. Change the cup |
| 5. Oil on friction disc | 5. Investigate root cause and determine corrective action |
| 6. High abrasion of the friction disc | 6. Replace with a new friction disc |

Transmission cannot be shifted after braking

- | | |
|--|----------------------------------|
| 1. Brake valve cannot reset | 1. Disassemble, clean and repair |
| 2. Transmission air valve is blocked | 2. Disassemble, clean and repair |
| 3. Insufficient pressure in the rear chamber of transmission cut-off valve rod | 3. Check the brake lines |

Brakes do not release normally

- | | |
|--|--|
| 1. Push-rod of brake valve is not aligned to the correct position or the piston rod is blocked and the reset spring is incorrectly set | 1. Check, adjust or replace the damaged parts |
| 2. Inexible reset of booster piston | 2. Check, clean and identify potential solutions |
| 3. Brake piston cannot reset | 3. Clean or replace the rectangular seal ring |

Rapid air storage tank pressure loss after the machine is parked

- | | |
|---|---|
| 1. Brake inlet valve is blocked or damaged | 1. Brake continuously several times to remove or replace with a new valve |
| 2. Pipe connectors are loose or lines are damaged | 2. Tighten the connectors or replace the lines |
| 3. Relief valve is not sealed | 3. Investigate and replace the valve if necessary |

Slow pressure rise after the engine is started

- | | |
|---|--|
| 1. Abnormal working condition of the air compressor | 1. Inspect the operating condition of the air compressor |
| 2. Loose connectors | 2. Tighten the connectors |
| 3. Unsealed brake or relief valve | 3. Repair or replace |

Machine turns when brakes are applied

- | | |
|---|---|
| 1. The brake force for the right and left tires are different | 1. Check and repair the brake pliers and pipe lines |
| 2. Air pressure in the right and left tires are different | 2. Ensure all tires are filled to the correct pressures |

Insufficient parking brake force

- | | |
|---|--|
| 1. Excessive clearance between the brake hubs and brake discs | 1. Re-adjust to meet the recommended clearance |
| 2. Oil on brake discs | 2. Clean the oil off |

Work Tool and Hydraulic System

Boom raise and bucket tilt functions are slow or dysfunctional

- | | |
|---|---|
| 1. Damaged cylinder oil seals | 1. Replace with new seals |
| 2. Oil leakage in hydraulic lines | 2. Check and repair |
| 3. Severe inner leakage of the pump | 3. Repair or replace the pump |
| 4. Improper adjustment of the safety valve resulting in low system pressure | 4. Adjust the system pressure to the required specification |
| 5. Air enters into the oil suction lines of the hydraulic pump or the oil filter is blocked | 5. Clean the filter and/or replace the oil suction pipe |
| 6. Excessive hydraulic valve fitting clearance | 6. Repair or replace the valve |

Voiding of hydraulic oil in suction line or foaming of hydraulic oil

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| 1. Hydraulic oil level is too low | 1. Fill oil to the required level |
| 2. Filter is blocked | 2. Clean the filter |
| 3. Damaged oil pump | 3. Repair or replace the pump |
| 4. Air leakage in oil suction lines or damaged pump seals | 4. Repair or replace the damaged pump seals |
| 5. Contaminated and/or deteriorated hydraulic oil | 5. Replace with recommended new hydraulic oil |

Hydraulic oil temperature is too high

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| 1. Excessive time running the machine at high loads | 1. Stop the machine to cool it down |
| 2. Hydraulic system pressure is too low | 2. Adjust to the required pressure |
| 3. Hydraulic oil level is too low | 3. Fill oil to the required level |
| 4. Damaged oil pumps | 4. Repair or replace the pump |
| 5. Blocked hydraulic lines and/or filter screen | 5. Repair, clean or replace the hydraulic lines and/or filter screen |
| 6. Insufficient engine fan cooling | 6. Adjust the engine fan belt to meet the engineering requirement |

Failure in resetting

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| 1. Deformation of the multi-way valve reset spring | 1. Replace |
| 2. Dirt between multi-way valve rods | 2. Clean the parts |

Steering System

Heavy Steering

Normal steering when the steering is slow heavy steering when the steering is fast

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| 1. Insufficient oil supply from the pump | 1. Repair and replace oil pump |
| 2. Inflexible operation of the priority valve spool | 2. Identify potential solutions and/or replace the priority valve |
| 3. Priority valve control pressure is too low | 3. Adjust the control pressure |
| 4. Air present in the oil lines between the priority valve and steering gear | 4. Turn the steering wheel until the tires are at its maximum steering position then continue to turn the steering wheel forcing the safety valve open thereby venting the air out of the steering system |

Foam in the oil abnormal sound coming from the oil oil cylinders sometimes move and stop while the steering wheel is being turned

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| 1. Air in the system | 1. Check oil level and add oil to the required level. Check whether there is air leakage in the suction oil and resolve venting the air out of the system |
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Easy steering without load heavy steering with load

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| 1. Setting of the steering safety valve pressure lower than the operation pressure | 1. Re-adjust the steering safety valve pressure setting |
| 2. Steering safety valve is blocked | 2. Clear the dirt |
| 3. High oil viscosity | 3. Replace with the recommended oil |

Heavy steering when the throttle is low normal steering when the throttle is high

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| 1. Low pump volume efficiency | 1. Replace oil pump |
| 2. Large clearance between the priority valve spool and body | 2. Replace the priority valve |

No tactile operator feedback

Operation of the steering wheel is still light when the tires are at their limited steering position

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| 1. Pressure setting of the bidirectional cushion valve on the oil pump of the steering gear is lower than that of the steering safety valve | 1. Re-adjust the bidirectional cushion valve starting pressure which should not less than 1.25 times of the steering safety valve set pressure |
| 2. Severe wear and excessive clearance between the valve body sleeve and spool or between the stator and rotor pair of steering gear | 2. Replace the worn pair of the steering gear |

Steering failure

Steering wheel cannot return to the neutral position. The pressure drop increases in the neutral position

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| 1. Spring plates are broken | 1. Replace the broken spring plates |
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Pressure run-out increases significantly and even cannot rotate

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| 1. Pin puller or drive shaft opening is broken or deformed | 1. Replace pin puller or drive shaft |
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Electric System

Generator does not generate electricity or the voltage is low

1. Drive belt is slipping	1. Adjust the belt
2. Connector contains oily dirt or is worn	2. Clean the oily dirt off using a clean cloth moistened with gasoline or grind it using fine abrasive paper
3. Bad contact between electric brush and connector	3. Check and repair
4. Excitation coil is open circuit	4. Inspect the outer magnetic field and check the excitation loop with a light bulb
5. Residual magnetism disappears	5. Magnetically charge or replace with a new generator

Battery does not charge or the charging current is weak

1. Damaged voltage regulator	1. Repair or replace
2. Bad wire contacts or open circuit	2. Check connecting wires between the generator and battery

Large spark between the generator brush and connector

1. Severe connector wear	1. Clean connector or clear the dirt out from the connector lugs
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Generator is overheating

1. High voltage regulator voltage	1. Adjust regulator voltage
2. Worn bearings or less lubrication	2. Replace bearings or add lubrication oil
3. Short circuit in connector or armature coil	3. Disassemble or repair or replace

Engine start difficulty

1. Low voltage or damaged battery	1. Charge or replace with a new battery
2. Damaged start switch	2. Repair or replace
3. Bad wire contacts or open circuit	3. Check and repair
4. Air present in engine fuel inlet lines	4. Venting the air out of the lines

Air Conditioning System

Cooling air not emitted from the air conditioning vents

1. Drive belt is too loose or is broken	1. Tighten belt or replace with a new belt
2. Fuse is blown wire is disconnected cooling air switch is damaged or blower motor stops working	2. Replace with new fuse repair wire switch and/or blower motor

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| 3. Compressor does not rotate is shg on the pulley | 13. Remove the mpressor |
| 4. Compressor does not work. When the engine speed varies. only slight changes are observed between low and high pressure readings | 14. Repair or replace with the mpressor valve plate |
| 5. Cooling system lines are broken or refrigerant is leakingLow and high ssure readings are zero | 15. Repair cooling system lines inspect system for ate linesand with Freon |
| 6. Dryer of rece ex sion valve is blocked | 16. Osas mp |
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Insufficient cooling air volume

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| 1. Insufficient volume of air in the vent duct air leakage in the vent duct | 11. Clean or replace the air filter screenclear obstructions in the vent ductreconnect the vent duct |
| 2. Blower motor does not function properly | 12. Repair or replace the blower motor |
| 3. Compressor electromagnetic clutch slips | 13. Repair or replace the electromagnetic clutch |
| 4. Compressor efficiency decreases | 14. Repair or replace the compressor |
| 5. Air exists in the cooling systemexcessively high pressure shown in the high pressure gauge | 15. Bleed airevacuate the linesand fill with Freon |
| 6. Insufficient refrigerant bubbles n be seen in the sight glass excessively high pressure shown in the high pressure gauge | 16. Add refrigerant until the bubbles disappear |
| 7. Insufficient air circulation around the radiatorexcessively high pressure shown in the high pressure gauge | 17. Clean the radiator and engine water tank or install a condensation fan |
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Cooling system working intermittingly

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| 1. Controllers for idle ing and temperature are out of control | 11. Rljus t or re |
| 2. Compressor electromagnetic clutch slips | 12. Disasswmb le the bracket or replace |
| 3. Electromagnetic clutch coil is loose or not grounded well | 13. Disasswmb le repair or replace |
| 4. Water in the cooling system uses an intermitent blocking of the expansion valve | 14. Replace the dryer of the receiver |
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Increasing noise

1. Drive belt is loose or worn	1. Tighten belt or replace with a new belt
2. Compressor is loose on its mounting bracket	2. Tighten bracket mounting screws
3. Blower motor is loose or worn	3. Repair or replace the motor
4. Slip of the electromagnetic clutch is resulting in noise	4. Disassemble, repair or replace
5. Inner parts of the compressor are worn	5. Repair or replace the compressor