The Occupational Safety and Health Administration (OSHA) is now mandating operator training for all lift truck operators.

SAFE and EFFICIENT OPERATION of a lift truck depends to a great extent on the skill and alertness of the operator. To develop the skill, the operator should:

1. Know the working capabilities and limitations of the lift truck.
2. Know the make-up of the lift truck.
3. Read and understand the safe driving and load handling procedures contained in this manual.

And, most important, a qualified person experienced in lift truck operation should guide new operators through several driving and load handling operations before they attempt to operate the lift truck on their own.

It is the responsibility of the employer to make sure the operator can see, hear and has the physical and mental ability to operate the lift truck safely.

This manual contains information necessary for the operation and “do-it-yourself” maintenance of standard lift trucks. Optional equipment is sometimes installed; it can change some operating characteristics described in this manual. Before operating such a lift truck, make sure the necessary instructions are available and understood.

Lift truck operator training is provided through your Cat lift truck dealer. They will be glad to help you and answer any questions you may have about operating your new lift truck. The lift trucks are NOT intended for use on public roads.
HOW TO USE THIS MANUAL

The following safety signs and NOTICE are used in this manual to emphasize important and critical instructions.

⚠ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

![DANGER] Indicates a imminently hazardous situation which, if not avoided, will result in death or serious injury.

![WARNING] Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

![CAUTION] Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or damage to your machine.

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

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the most complete and current information from your Cat dealer before starting any job. Cat dealers have the current information available. Additional manuals are available from your Cat dealer.

Directional terms:
The directions “left,” “right,” “front” and “rear” are given from the viewpoint of the operator facing forward.
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◆ In General

The safety rules and regulations in this section are representative of some, but not all rules and regulations that apply to lift trucks. Rules are paraphrased without representation they have been reproduced verbatim.

Your lift truck was manufactured in accordance with the National Fire Protection Association (NFPA) No. 505 and the American National Standards Institute, Inc./Industrial Truck Standards Development Foundation (ANSI/ITSDF) B56.1, Safety Standard for Low and High Lift Trucks. Operate this lift truck in accordance with local regulations. See www.ITSDF.org web site for more information on the B56.1 Safety Standard for Low and High Lift Trucks.

The most effective way of preventing serious injuries, or even death, to you and others, is for you to know how to operate the truck properly. Drive alertly and avoid maneuvers or conditions that can cause accidents. Be professional.

Do not operate a lift truck if it is in need of maintenance, repair or appears to be unsafe in any way. Report all unsafe conditions immediately to your supervisor and contact your authorized Cat lift truck dealer. Do not attempt any adjustments or repairs unless you are trained and authorized to do so.

Continuing improvement and advancement of product design may have caused changes to your lift truck which are not included in this publication. Whenever a question arises regarding your lift truck, or this publication, please consult your Cat lift truck dealer for the latest available information.

All lift truck users should be familiar with their Local, Regional, and National regulations.

United States users should be familiar with the Occupational Safety and Health Administration (OSHA), and American National Standards Industrial Forklift Trucks.

You should also be familiar with areas of use of different types of lift trucks as specified in the National Fire Protection Association (NFPA).
SAFETY RULES FOR LIFT TRUCK OPERATORS

Warning Decals, Location

There are several specific warning decals on your lift truck. Their exact location and description of the potential hazard are reviewed in this section. Please take the time to familiarize yourself with these decals.

Be sure you can read all warning and instruction decals. If you cannot, clean or replace them. Use a cloth and soap and water to clean them.

You must replace a decal if it is damaged, missing or cannot be read. If a decal is on a part that is replaced, make sure a new decal is placed on the new part. Contact your Cat lift truck dealer for new decals.
SAFETY RULES FOR LIFT TRUCK OPERATORS

- Direction Lever decal
- Decal: Impact Test Rating
- No Riders decal
- Capacity decal
- Requirement Tires Authorized
- Back-up Buzzer decal
- Fasten Seat Belt decal
- Survive in Tipover decal
- Operator Restraint System decal
- Pinch Point decal
- UL Plate
- Operator Warning decal
- With Backrest Extension decal
- No Contamination decal

105364
SAFETY RULES FOR LIFT TRUCK OPERATORS

◆ Decals for LP-Gas Only
SAFETY RULES FOR LIFT TRUCK OPERATORS

◆ Warning Decals, Description
  - Parking Brake

**Warning**

When leaving the machine (lift truck), apply the parking brake! The parking brake is not automatically applied.

Located to the left front of the operator’s seat. Proper operating force: 250 to 290 N (25 to 30 kgf) [55 to 66 lbf].

- Capacity Plate

**Warning**

Improper operation or maintenance could result in injury or death. Do not operate or work on the lift truck unless you are properly trained.

Located to the right front of the operator’s seat.

- No Rider

**Warning**

To avoid serious injury, do not carry passengers. A lift is designed for only one operator and no riders.

Located to the right of the operator’s seat on the engine hood.
SAFETY RULES FOR LIFT TRUCK OPERATORS

FOR SAFETY OBSERVE THE FOLLOWING WARNINGS

1. Do not operate this truck unless you have been trained and authorized to do so. Read all warnings and instructions in the operator’s manual and on this truck. An Operation & Maintenance Manual is supplied with this truck or available from your Cat lift truck dealers.

2. Do not operate this truck until you have checked its condition. Give special attention to Tires, Rims, Horns, Light Battery(s), Controller, Lift and Tilt Systems including forks or attachments, chains, cable and limit switches, brakes, steering mechanism, fuel system, hydraulic hoses and guards.

3. Operate the truck only from the designated operating position. Never place any part of your body into the mast structure, between the mast and the truck, or outside the truck. Do not carry passengers.

4. Do not operate the truck without the overhead guard.

5. Do not handle loads which are higher than the load backrest or load backrest extension unless the load is secured so that no part of it could fall backward.

6. Do not handle unstable or loosely stacked loads. Use special care when handling long, high or wide loads to avoid losing the load, striking bystanders, or tipping the truck.

7. Do not overload the truck. Check capacity plate for load weight and load center information.

8. Start, stop, travel, steer and brake smoothly. Slow down for turns on uneven or slippery surfaces that could cause truck to slide or overturn. Use special care when traveling without a load as the risk of overturning is greater.

9. Elevate forks or other lifting mechanism only to pick up or stack a load. Lift and lower with mast vertical or tilted slightly back—NEVER FORWARD. Watch out for obstructions, especially overhead.

10. Operate tilting mechanism slowly and smoothly. Do not tilt forward when elevated except to pick up or deposit a load. When stacking, use only enough backward tilt to stabilize load.

11. Travel with the load or lifting mechanism as low as possible and tilt back. Always look in the direction of travel. Keep a clear view, and when load interferes with visibility, travel with the load or lifting mechanism trailing (except when climbing ramps).

12. Use special care when operating on ramp, travel slowly, and do not angle or turn. When the truck is loaded, travel with the load uphill. When the truck is empty, travel with the lifting mechanism downhill.

13. Observe applicable traffic regulations. Yield right of way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.

14. When using forks, move them as far apart as the load will permit. Before lifting, be sure the load is centered and the forks are completely under the load.

15. Do not allow anyone to stand or pass under the load or lifting mechanism.

16. Do not lift personnel except on a securely attached, specially designed Work Platform. Use extreme care when lifting personnel. Place the mast in the vertical position, place the truck controls in neutral and apply the brakes. Lift and lower smoothly. Be available to operate controls as long as personnel are on the Work Platform. Never transport personnel on forks or Work Platform.

17. Before getting off the truck, put the direction lever in neutral engaging the lever lock knob, lower the lifting mechanism fully, and set the parking brake. If leaving the truck unattended, shut the power off also.
SAFETY RULES FOR LIFT TRUCK OPERATORS

- Cooling System

**WARNING**

Check the coolant level only after the engine has been stopped and the filler cap is cool enough to touch with your hands. Remove the filler cap slowly to relieve pressure.

Located on the radiator cap.

- Overhead Guard

**WARNING**

Operation without this device in place may be hazardous. This overhead guard conforms to ANSI/ITSDF B56.1. This design also passed a vertical impact test of 24000 foot pounds.

Located inside the top frame member of the overhead guard.

- Back-up Buzzer

**WARNING**

To avoid serious injury, stay clear of the moving fan.

Located on the frame of the cooling fan.

The Back-up Buzzer must sound when operating this vehicle in reverse.

Located inside the front frame member of the overhead guard.
SAFETY RULES FOR LIFT TRUCK OPERATORS

• No One Under/On Forks

![WARNING]

Do not stand or ride on the forks.
Do not stand or ride on a load or pallet on the forks.
Do not stand or walk under the forks.

Located on the mast.

• Load Backrest Extension

![WARNING]

Operation without this device in place may be hazardous.
DO NOT remove the load backrest extension.

Located on the load backrest.

• Pinch Point

![WARNING]

Do not touch, lean on, or reach through the mast or permit others to do so.
Hands off!

Located on the mast.

![WARNING]

Moving Mast-Crush Points.
Keep All Body Parts Clear Of Mast.
SAFETY RULES FOR LIFT TRUCK OPERATORS

- Tipover Warnings

**WARNING**

Tipover can occur if truck is improperly operated. Injury or death could result.

1. Side tipover of an unloaded truck can occur if the combination of speed and a sharp turn which exceeds the stability of the truck.
2. Side tipover can occur if overloaded, or loaded within capacity and:
   - The load is elevated.
   - Turning and/or braking when traveling in reverse.
   - Turning and/or accelerating when traveling forward.

   **These actions may exceed the stability of the truck.**

3. Forward tipover can occur if overloaded or when loaded within capacity and the load is elevated in forward tilt, braking in forward travel, or commencing reverse travel. These actions may exceed the stability or the truck.
4. Serious injury or death can occur if the operator is trapped between the truck and the ground.

**IN CASE OF TIPOVER**

1. The operator should stay with the truck if side or forward tipover occurs. The operator should hold on firmly to the steering wheel, brace feet, lean forward and lean away from the point of impact.
2. If the truck falls off of a loading dock or ramp, you should try to stay within the confines of the operator’s seat area. Should the landing area present a more severe hazard, you may find it prudent to leave the truck.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Safety Rules

- **WARNING**
  Authorized, trained operator only!
  Thoroughly learn how to operate a lift truck and the safe areas and surfaces to travel before you drive one.

- **WARNING**
  DO NOT travel on public roads!

- **WARNING**
  DO NOT wear loose clothing or accessories—flapping cuffs, dangling chains, neck ties, scarves, or rings—that can catch in moving parts.

- **WARNING**
  You may need:
  - Safety goggles.
  - Ear protectors.
  - Hard hat.

- **WARNING**
  Be alert!
  Know how to use a first aid kit and a fire extinguisher—and where to get prompt assistance.

- **WARNING**
  NO smoking while refueling!
  DO NOT fuel while the engine is running. Keep away from flames or spark sources. Turn off all electrical switches on the truck. Fuel in a well ventilated area.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Unauthorized addition or modification is prohibited!
DO NOT add to or modify the lift truck unless authorized in writing by the manufacturer to do so. Any change to the lift truck could cause serious injury or property damage.

Know all signals and traffic rules!
Know who is responsible for signaling. Learn to tell at a glance what the signal means, and what action you should take.

Know your lift truck and attachments!
Know the operating, inspection and maintenance instructions in the OPERATION & MAINTENANCE MANUAL.

Avoid being splashed by scalding hot coolant!
Wait until the engine cools before opening or loosening the radiator cap. If you cannot wait, use a heavy cloth and gloves to protect yourself. Stand to the side, protect your face, and slowly loosen cap.

Shut down engine before servicing!
DO NOT service a lift truck while engine is running unless absolutely necessary to do so.

Exhaust fumes could kill you!
If you operate a lift truck in an enclosed area, make sure there is adequate ventilation.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Inspect your lift truck prior to operation!
At the beginning of each shift, fill out a daily inspection sheet. Check for maintenance problems and have repairs made before you operate the truck.

DO NOT remove the overhead guard!
The overhead guard is intended to protect the lift truck operator from overhead obstructions and falling objects.

Keep the operator’s compartment clean!

DO NOT operate an unsafe lift truck!
Inspect a lift truck before you operate it to be sure it is properly maintained and in good working order.

Always stay healthy on the job!
Be healthy—and NOT under the influence of drugs or alcohol—when operating the truck.

Know your lift truck is safe!
DO NOT operate any lift truck that is not safe to operate.
SAFETY RULES FOR LIFT TRUCK OPERATORS

LP-gas tank replacement!
LP-gases are flammable. Do not attempt to change LP-gas tanks unless you are trained and authorized to do so. Be sure to get a trained and qualified mechanic to change them.

Alarm must sound when operating this truck in reverse!
When operating in reverse, ALARM MUST SOUND.
Failure to maintain a clear view in the direction of travel could result in injury or death.

For handling frequency transducer, ECU and ECM!
1. Do not directly expose these equipment to washing water, rain, oil and every other liquid.
2. Do not apply force, open, modify these equipment nor operate the truck without these equipment.
3. Turn key switch OFF. Disconnect battery cable and then disconnect these equipment before following operations:
   • Removing these equipment from truck
   • Factory approved welding
SAFETY RULES FOR LIFT TRUCK OPERATORS

Operate only in approved areas!
Certain areas such as those containing hazardous flammable gases, liquid or other combustibles, should be avoided.

Start engine safely!
Start the engine only when securely seated in the operator’s compartment.

DO NOT operate a damaged or defective lift truck!
A truck will operate effectively and safely when it is in proper working order.

Be sure the assist grip is properly tightened!
Face the lift truck when mounting and dismounting.
Maintain a three point contact (one foot and two hands) with the floor and handholds.
Never get on or off a moving lift truck.
Never jump on or off the lift truck.
DO NOT use the controls or steering wheel as handholds when entering or leaving the operator’s compartment.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Adjust the seat before operation!
DO NOT adjust the seat while the lift truck is in motion. This could cause serious injury.

Make sure your lift truck is in safe operating condition!
Test the brakes and inching pedal while moving slowly in a safe area. Make sure the mast moves up and down smoothly.

Fasten the seat belt properly!
If you DO NOT, it may not restrain you in an accident.

Always check overhead clearance!
Serious accidents may be caused by the mast and overhead guard hitting pipes, beams or other overhead obstructions. Watch out for power lines.

Use lights in dark, dim areas!
Even with lights on, DO NOT assume people see you and will move out of your way.

Stay within the confines of the truck!
Keep your arms and legs inside the operator’s compartment.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Always be aware of floor capacity!
Make sure the floor will support the weight of the loaded lift truck.

Stay under the overhead guard!
DO NOT hold on to the overhead guard.

Be careful of forks that extend beyond the load!
If the forks extend beyond the load, use extra caution. Make sure the fork tips do not contact other material.

Avoid off-center loading!
Set the forks as far apart as possible for maximum support of the pallet or load. Too small a fork spread can cause instability of the load.

Check fork stoppers for engagement!
If the fork stoppers are not properly engaged, the forks may shift and cause off-centered or unstable loads.

Check work areas for high risk!
When working on docks, ramps, platforms and other high risk areas, use adequate blocks to reduce the risk of the lift truck from falling off.
SAFETY RULES FOR LIFT TRUCK OPERATORS

◆ Operating Precautions

Stay away from slippery surfaces!
- Loose or slippery materials such as sand, gravel, ice, mud, etc., on your operating surfaces could cause a skid or tipover. Avoid these conditions or slow down.
- Keep your operating surfaces clean and dry at all times. Wet spots could cause a skid or tipover.
- You need greater stopping distance on wet surfaces. Apply brakes earlier on slippery surfaces than on dry surfaces.
- Do not drive into a flooded area whenever possible.

Be aware of the stability of an empty lift truck!
An empty lift truck will tip over more easily than a loaded one in a lowered position.

DO NOT allow any riders!
DO NOT allow anyone to ride on the forks or on any other part of the lift truck—at any time.

Position controls correctly for starting!
Make sure the direction lever is in the NEUTRAL position, the lock knob is in the NEUTRAL position and the parking brake lever is set properly.

If you cannot see where you are going, DO NOT MOVE!
Travel slowly around corners. Sound the horn at cross aisles and other areas where you cannot see clearly or where visibility is restricted.
SAFETY RULES FOR LIFT TRUCK OPERATORS

- **WARNING**
  - DO NOT engage in stunt driving or horseplay!
  - DO NOT pass another truck!
  - DO NOT pass another lift truck traveling in the same direction at intersections, blind spots or at other dangerous areas.

- **WARNING**
  - DO NOT allow anyone to hold loads!
  - Always look in the direction of travel!
  - Always be aware of people near your lift truck. DO NOT proceed until they are aware of you.

- **WARNING**
  - DO NOT engage in stunt driving or horseplay!
  - Stunt driving and horseplay is dangerous for both the lift truck operator and the fellow workers.

- **WARNING**
  - Travel in reverse if forward visibility is blocked!
  - For better visibility with large loads, travel in reverse, but always keep a lookout in the direction of travel.

- **WARNING**
  - Obey all traffic rules and warning signs!
  - Drive carefully, observe traffic rules and be in full control of the lift truck at all times.
SAFETY RULES FOR LIFT TRUCK OPERATORS

**WARNING**

Travel safely on grades with a loaded lift truck!
Keep the load upgrade to maintain control when traveling up or down a grade with a heavily loaded truck.

**WARNING**

Be particularly careful when driving up or down a steep slope!
Use extreme care to reduce the risk of the tips of forks or the bottom of pallet from touching the ground.

**WARNING**

Travel safely on grades with an empty lift truck!
Keep the counterweight upgrade when traveling up or down a grade with an empty truck.

**WARNING**

Start lift truck upgrade carefully!
When starting the lift truck upgrade, be sure to use the parking brake.

**WARNING**

DO NOT turn on a ramp or grade!
Turning on a ramp or grade can cause a lift truck, loaded or unloaded, to tip over.

**WARNING**

Move your lift truck safely!
Sound the horn and be sure no people or objects are in your path before moving.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Allow for counterweight swing distance!
When turning in aisles, especially narrow aisles keep as far away as possible from stock and racks. Be cautious near people.

◆ Working Precautions

Danger! Keep out!
DO NOT allow any unauthorized people in the work area.

A helper should NOT be near the lift truck!
People should be clear of the lift truck operating area.

Always be alert for tipovers!
Turning sharply with a raised load, even at a slow speed, may result in a tipover. Realize that the overhead guard is not designed to provide total protection in the event of a tipover.

Be careful of changes in capacity!
Optional attachments which change the capacity are sometimes installed. Know the capacity before operating the truck.
SAFETY RULES FOR LIFT TRUCK OPERATORS

**WARNING**

**Use forks properly!**
Fork misuse could cause accidents, serious injuries and equipment damage.

**WARNING**

**DO NOT speed when approaching loads!**
Bring truck to a full stop in front of a load, then approach carefully.

**WARNING**

**DO NOT move when someone’s next to truck!**
If someone is standing next to your truck, don’t move until they are out of the way.

**WARNING**

**DO NOT allow anyone to walk or stand under raised forks!**

**WARNING**

**DO NOT pick up unsecured loads that extend above the backrest extension height!**

**WARNING**

**Handle only stable loads!**
If a load is unstable, it can easily shift and fall on someone.
SAFETY RULES FOR LIFT TRUCK OPERATORS

**WARNING**

DO NOT abuse your equipment!
DO NOT use the forks to open or close the doors on a railroad car or to move a car.

DO NOT allow any riders!
DO NOT permit riders on the forks or pallet.

**WARNING**

DO NOT abuse your forks!
Fork misuse could cause accidents, serious injuries and equipment damage.

Drive onto a trailer carefully!
Make sure the trailer brakes are applied and the wheels are blocked while loading or unloading.

WARNING

Failure to follow this rules could cause serious injury.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Stay clear of pinch points!
Keep all parts of your body away from moving parts such as the mast, carriage and attachments. Do not put any part of your body between the head guard and the mast. If the mast moves unexpectedly, you could get caught between the mast and overhead guard and a serious accident could occur.

Shift the transmission smoothly!
Avoid sudden shifting while the truck is moving. This could cause damage to the transmission.

Use only specialized equipment designed to safely raise personnel to high work areas!
Do not lift personnel except on a securely attached, specially designed Work Platform. Use extreme care when lifting personnel. Place the mast in the vertical position, place the truck controls in neutral and apply the parking brake. Lift and lower smoothly. Be available to operate controls as long as personnel are on the Work Platform. Never transport personnel on forks or Work Platform.

Always stay within the capacity!
Read the capacity chart to make sure a load is within the capacity of your lift truck before you handle the load.
SAFETY RULES FOR LIFT TRUCK OPERATORS

Park a disabled machine safely!
- If the lift mechanism is disabled and the forks cannot be lowered, park the truck in a non-operating area and attach warning tags to the forks to alert pedestrians and traffic.
- Use barriers to keep anyone from standing or passing under the forks.
- Remove the starter switch key and attach DO NOT OPERATE or similar warning tag to the truck.

Park in authorized areas only!
Park a safe distance from access to fire aisles, stairways and fire equipment.
DO NOT park near a flammable material storage area.

DO NOT park on a grade!

When you leave your truck, or park it:
- Set the parking brake.
- Put the direction lever in NEUTRAL and lock knob in NEUTRAL.
- Lower the forks fully to the floor.
- Tilt the mast forward until the forks are flat.
- Turn the key switch off.
SAFETY RULES FOR LIFT TRUCK OPERATORS

◆ LP-Gas

Only trained, authorized personnel should fill or exchange LP-Gas tanks.
Personnel engaged in filling LP-Gas tanks should wear protective clothing such as a face shield, long sleeves and gauntlet gloves.
Do not refuel or store LP-Gas powered lift trucks near underground entrances, elevator shafts, or other places where LP-Gas could collect in a pocket and cause potential danger for an explosion.
Do not leave the lift truck, for even a short time, near equipment that generates high temperatures. Ovens and furnaces are examples. The heat may raise the pressure of the fuel and open the relief valve.
Close the service valve on the tank when LP-Gas fueled lift trucks are parked overnight or stored for long periods indoors with the fuel tank in place.
Close the valves on empty tanks.
Examine LP-Gas tanks before filling and before reuse. Look for damage to the valve, liquid gauge, fittings and hand wheels.
Check for dents, scrapes or other damage to the pressure vessel and for dirt or debris in the openings.

All defective or damaged LP-Gas tanks must be removed from service.
Inspect the LP-Gas fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.

The careless handling of LP-Gas tanks can result in a serious accident. To reduce the risk of damage to tanks, use extreme care when transporting them.

The storage and handling of liquid fuels in the U.S.A. should be in accordance with the NFPA No. 30, “Flammable and Combustion Code.” Outside the U.S.A., store and handle in accordance with local regulations.
The lift truck should be refueled only at designated safe locations. Safe outdoor locations are preferable to those indoors.
DO NOT completely fill the tank. The fuel expands when it gets warm and it may overflow. This will create a fire hazard.
Only trained, authorized personnel should fill or exchange LP-Gas tanks.
Do not drop, throw, roll or drag LP-gas tanks.
Do not strike LP-Gas tanks or any associated parts of the tanks or fuel systems.
Check the LP-Gas tank for secure mounting. Loose tanks can cause pressure fuel lines to leak resulting in serious injury.
For quick reference, record your lift truck’s serial numbers in the spaces provided.

UL Plate

Manufacturer Name Plate

Lift Truck Serial Number

Capacity Plate

Engine Serial Number

Gasoline and LP-Gas engine models

Diesel engine models
◆ Serial Number and Capacity Plate

For quick reference, record your lift truck’s serial numbers in the spaces provided.

UL Plate

Manufacturer Name Plate

Lift Truck Serial Number

Capacity Plate

Engine Serial Number

Gasoline and LP-Gas engine models

Diesel engine models
KNOW YOUR LIFT TRUCK
◆ Model View
**KNOW YOUR LIFT TRUCK**

◆ Operator’s Compartment

**Direction lever**
This truck is equipped with a neutral switch. Be sure to put the transmission in NEUTRAL when starting the engine.

- The knob locks the direction lever in the NEUTRAL position.

**Parking brake lever**
- Release
- Apply

**Horn switch**
- Push to sound horn

**Turn signal switch** (optional)
- Left turn
- Right turn

**Attachment control levers**
- Unlocked (left)
- Locked (right)

**Inching pedal**
- Clutch disengaged
- Brake applied
- Released

By varying the position of this pedal, the operator can move the truck slowly for inching while maintaining engine speed. Full application of the pedal puts the transmission in neutral and applies the service brakes.

**Brake pedal**
- Release
- Apply

**Accelerator pedal**
- Idling
- Full throttle
**Know Your Lift Truck**

- **Steering Tilt Lever**
  
  Move the lever in arrow direction to unlock the steering wheel. Adjust it to accommodate operators or to make getting on and off the truck easier.
  
  Push down the lever to lock the steering wheel.

- **Lift Control Lever**

  Lifting speed is controlled by the speed of the engine (the position of the accelerator pedal) and the position of the control lever.
  
  Lowering speed is controlled by the position of the control lever regardless of the speed of the engine.
  
  The lever will return to the NEUTRAL position when released.

- **Tilt Control Lever**

  Tilting speed is controlled by the speed of the engine (the position of the accelerator pedal) and the position of the control lever.
  
  The lever will return to the NEUTRAL position when released.
  
  The mast will not tilt forward even if the control lever is moved forward when the engine is stopped.

---

**WARNING**

Always adjust the steering wheel tilt angle while stopped at a safe place, as adjustment while driving could lead to accidents.

---

**WARNING**

The mast descends downward if the lift control lever is moved forward even though the engine is stopped.
KNOW YOUR LIFT TRUCK
◆ Instrument Panel

**Engine coolant temperature gauge**

The gauge needle is normally in the white zone. If the needle moves into the red zone, set the topic. **Engine coolant temperature gauge needle moves into red zone.**

**Hourmeter**

Starts registering the operating hours of the engine when the key switch is turned to the l (ON) position. Periodic maintenance recommendations are based on these engine hours.

**Fuel gauge**

Indicates the amount of fuel in the tank when the key switch is turned to the l (ON) position. To get an accurate gauge reading, be sure the truck is level.

**OK monitor**

When any warning light (except glow plug indicator light) glows during operation, stop the truck and take corrective action.

**Fuse box**

This switch was changed and moved to the overhead guard.
**OK monitor bulb check**

The following warning lights should glow when the key switch is turned to the (ON) position.

The lights will go out when the engine is started; if not, the charging system has a defect.

If the lights fail to glow with the key switch in the (ON) position, the bulbs have burnt out. Consult your Cat lift truck dealer.

---

**Anti-restart starter switch and key**

Has a built-in mechanical lockout that prevents the key switch from being turned to the (START) position while the engine is running. Turn the key switch back to the (OFF) position before re-cranking the engine.

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(OFF)</td>
<td>Removes all power from instrument panel and electrical circuits except for horn and lights.</td>
</tr>
<tr>
<td>(ON)</td>
<td>Applies power to all electrical circuits except for starter circuit. In diesel models, power is applied to heater plugs for 6 seconds and OK monitor indicator glows.</td>
</tr>
<tr>
<td>(START)</td>
<td>Applies power to the starter motor to crank the engine. A switch spring returns the key switch to the (ON) position when the key is released.</td>
</tr>
</tbody>
</table>

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**Light switch**

<table>
<thead>
<tr>
<th>Light</th>
<th>Position 1</th>
<th>Position 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument panel light</td>
<td>☀️</td>
<td>☀️</td>
</tr>
<tr>
<td>Tail lights</td>
<td>☀️</td>
<td>☀️</td>
</tr>
<tr>
<td>Clearance lights</td>
<td>☀️</td>
<td>☀️</td>
</tr>
<tr>
<td>Head lights</td>
<td>☀️</td>
<td>☀️</td>
</tr>
</tbody>
</table>

**NOTICE:** The lights may be turned on by pulling the switch outward regardless of the starter switch position. Turn off the lights when the truck is not being operated to prevent the battery from discharging.
KNOW YOUR LIFT TRUCK
◆ OK Monitor (Warning Lights and Indicators)

**Powershift transmission oil temperature warning light (optional)**
Glows when the oil temperature is high and the danger of overheating is present. If this light glows, see the topic, *Powershift transmission oil temperature warning light glows.*

**Brake fluid level warning light**
Glows when the fluid level is lower than the specified level. Have the brakes checked by your Cat lift truck dealer.

**Engine oil pressure warning light**
If this light glows during operation, stop the engine and check the oil level. Add oil as required.

**Air cleaner warning light (optional)**
Glows when the air cleaner element is clogged. If the light glows, clean or replace the element.

**Alternator not charging warning light**
Glows when the charging system is out of operation. If the light glows, check the alternator drive belt for slippage or breakage.

**Engine coolant level warning light (optional)**
Glows when the coolant level in the radiator is too low. If the light glows, refill the radiator at the reserve tank.

**ECM warning light/Frequency Converter warning light (GASOLINE)**
Glows when ECM (engine control module) or Frequency Converter is abnormal. Consult your Cat lift truck dealer.

**Heater plug indicator (DIESEL)**
Glows when the key switch is turned to I (ON) position and goes out after heating is completed. Turn the key switch to the ♂ (START) position after the indicator has gone out.

**LP-Gas residual pressure alarm light (optional)**
Lights when the residual quantity becomes small.
**KNOW YOUR LIFT TRUCK**

◆ **Driving Interlock System**

In normal operation your lift truck will drive in a creep mode when the direction lever is placed in the forward or reverse position at engine idling (not depressing the accelerator pedal). If the operator then leaves the operator’s seat, the operator presence switch of the seat is activated to shift the forward or reverse position into the neutral position electrically (the lever itself remains in the forward or reverse position), and cut off the engine output to stop the lift truck. In this case, the parking brake does not synchronize with the driving interlock and is not automatically applied the moment the interlock is activated.

Depending on the condition of the road (grade, for example), therefore, the lift truck may be accelerated, instead of being stopped.

- **Operator Presence Switch**

This switch is built in the seat.

1. Prior to operating the lift truck, be sure to check the driving interlock for function.
2. While driving the lift truck, if you lift your hips above the seat for over 2 seconds, the driving interlock system will be activated, the same as in case of engine idling. Always drive the lift truck correctly with safety in mind.
3. To restore the lift truck to its normal driving condition, sit properly in the operator’s seat and depress the brake pedal to hold the lift truck. Then, return the direction lever to the neutral position and then shift it back into the forward or reverse position.
4. When replacing the operator's seat, be sure to use Cat lift truck genuine seat with operator presence switch.
KNOW YOUR LIFT TRUCK

- **Neutral System**

The lift truck is provided with a device that prevents the engine from being started when the direction lever is not in the neutral position.

**CAUTION**

Before starting the engine, sit properly in the operator’s seat and make sure that:
- No one is around the lift truck.
- The parking brake is applied.
- The direction lever is in the neutral position.
KNOW YOUR LIFT TRUCK

◆ Operator’s Seat
  • Adjustment

Adjust the seat before starting the engine. After adjusting, jiggle the seat to make sure it is properly locked. DO NOT adjust the seat while the truck is in motion.

Move the lever to the left, slide the seat to one of the seven positions, and release the lever.

WARNING

This industrial truck is equipped with an operator restraint system. Should it become necessary to replace any of the components including the seat assembly for any reason, it must only be replaced with components approved by the manufacturer.

To open the engine hood on a truck equipped with the LPG system, tip the seat forward first to get clear of the LPG tank.

To tip the seat forward
The release lever is located on the left side of the seat. Pull this lever all the way in the direction of arrow, hold the lever in that position, and tip the seat forward by pushing the backrest.

To reposition the seat
Reposition the seat by pushing the backrest back and then push the lever to lock.
KNOW YOUR LIFT TRUCK
◆ Seat Belt

The seat belt will help to restrain you in accidents such as a tipover or mast and attachments collision. If you are unrestrained in a tipover, you can fall outside of the operator’s compartment and be crushed by the lift truck. If you are unrestrained and the lift truck comes to a sudden stop, you will continue moving forward until you hit a solid object.

Wear your seat belt anytime you operate a lift truck.

If the seat belt is torn, the pulling motion is interrupted during extension of the belt, or the belt cannot be inserted into the buckle properly. Replace the seat belt assembly.

The seat belt shall be examined at the regular service intervals. It is recommended that it be replaced if any of the following conditions are found.

– Cut or frayed strap
– Worn or damaged hardware, including anchor points
– Buckle or retractor malfunction
– Loose stitching

Also, replace the seat belt assembly if it was worn during an accident.

Seat belts can “jack-knife” drivers—the upper body bends tightly at the waist. If you are pregnant or have suffered an abdominal disease or injury, consult a doctor before using the seat belt.
KNOW YOUR LIFT TRUCK

**NOTICE:** It is not necessary to adjust the belt length.
The belt is designed to fit any body size.
Tug on it to confirm a tight fit.

**WARNING**
If you fasten the belt across your abdomen, the belt will dig into your abdomen in an accident and could cause serious internal injuries.

1. Grip the plate (connector) of the belt and pull the belt from the retractor. Then insert the plate into the slot of the buckle until a snap is heard.
2. Make sure the belt is not twisted.
3. Be sure to fasten the belt as low as possible across your hips, not across your abdomen.

To Fasten

To Release

Push the button in the buckle to release the belt. The belt will automatically retract when released. Hold the plate of the belt and allow the belt to slowly retract.
The following maintenance guidelines detail how to inspect seat belt for "cuts, fraying, extreme or unusual wear of the webbing, etc., and damage to the buckle, retractor, hardware, or other factors” which indicate that belt replacement is necessary.

1. Check the web wear at the buckle/latch area. The webbing must be closely examined to determine if there are any cuts, fraying or extreme wear in the webbing. Cuts, fraying, or excessive wear would indicate the need for replacement of the seat belt system.

2. Check buckle and latch for proper operation and to determine if latch plate is worn, deformed, or buckle is damaged or casing broken.

3. The retractor web storage device, is mounted on the seat. The retractor is the heart of the occupant restraint system and can be damaged if abused, even unintentionally. Check retractor web storage device operation to ensure that it locks properly and that it spools out and retracts webbing properly.

4. Hardware for seat belt mounting points should be evaluated for corrosion, all attachment points of system should be checked for tightness of bolts and nuts.

5. Check web in areas exposed to ultraviolet rays from the sun or extreme dust or dirt. If the original color of the web in these areas is extremely faded, the physical strength of this web may have deteriorated. If this condition exists replace the system.
KNOW YOUR LIFT TRUCK

◆ Fuses and Lights

- Always replace fuses with fuses of the correct amperage.
- If fuse burns out immediately and you cannot locate the cause, have your Cat lift truck dealer make a circuit check.
- Use a replacement light bulb of the same wattage.

<table>
<thead>
<tr>
<th>Code</th>
<th>Gasoline models</th>
<th>Diesel models</th>
</tr>
</thead>
<tbody>
<tr>
<td>🍀</td>
<td>10A Direction lever 10A Direction lever</td>
<td></td>
</tr>
<tr>
<td>🍀</td>
<td>15A Instrument panel (for monitor and gauge), backup, stop and turn signal (opt) lights, ECU (for T/M controller, frequency transducer)</td>
<td>10A Instrument panel (for monitor and gauge), turn signal lights (opt)</td>
</tr>
<tr>
<td>🍀</td>
<td>15A Spare power source</td>
<td>10A Spare power source</td>
</tr>
<tr>
<td>🍀</td>
<td>15A Instrument panel (for panel light), tail and working (opt) lights</td>
<td>15A Instrument panel (for panel light), head, tail and working (opt) lights</td>
</tr>
<tr>
<td>🍀</td>
<td>15A Head lights</td>
<td>10A Horn</td>
</tr>
<tr>
<td>🍀</td>
<td>10A ECM for engine</td>
<td>10A Spare fuse</td>
</tr>
<tr>
<td>🍀</td>
<td>10A Horn</td>
<td>10A Stop lights, ECU (for T/M controller)</td>
</tr>
<tr>
<td>🍀</td>
<td>15A Fuel pump</td>
<td>10A Backup lights</td>
</tr>
<tr>
<td>🍀</td>
<td>10A Starter</td>
<td>15A Spare fuse</td>
</tr>
</tbody>
</table>

- **Lights Won’t Come On**

  Check for burned-out or “blown-out” fuses first.

  Check the fuses one by one by operating the light switch and seeing if each light comes on.

  **One light of the circuit fails to light.**

  **All lights of the circuit fail to light.**

  Check to see if fuse has been blown out.

To remove the fuse or insert a replacement fuse, use the puller found in the fuse panel lid.
KNOW YOUR LIFT TRUCK

◆ Fork Stoppers

When adjusting the fork spread, be careful not to pinch your hand between forks and lift bracket.

For load stability, adjust the forks as wide as possible.

To adjust the fork spread, move the levers or twist the knob upward and reposition the forks. Spread the forks to fit the load.

◆ Changing Forks
◆ To Remove

Remove a fork from the carriage to replace it or to access other parts of the truck for maintenance. Slide the forks, one at a time, to the installation/removal notch on the bottom carriage bar. Tilt the carriage forward, then lower it until the hook fork disengages the forks from the carriage. Use a lifting device to move the forks away from the truck.

◆ To Install

Position the forks side-by-side on the floor in a location where they can be approached from the rear by the lift truck. Slowly drive the lift truck, with the carriage fully lowered and fully tilted forward, to a point just to the rear of the forks. Carefully slide the forks, one at a time, onto the carriage so the top hook of the fork is placed above the top carriage bar. Raise the carriage to engage the top hooks allowing the bottom hooks to pass through the installation/removal notch. Then carefully slide each fork on the carriage so both the upper and lower hooks engage the carriage. Lock the forks in place by engaging the fork lock pins.

◆ Safety Equipment

- Overhead guard
- Load backrest extension

Do not try to move a fork without a lifting device. Each fork can weigh in excess of 45 kg (100 lb.).

To reduce the risk from serious injury or death for you and people around you, DO NOT use a lift truck without safety equipment in proper operating order.
KNOW YOUR LIFT TRUCK

• Drawbar Pin

**Drawbar Pin**

**Use the drawbar pin for:**
- Pulling the truck out of a drop-off or ditch.
- Loading the truck on a hauling truck.

1. When hitching a cable to the pin, make sure the pin is inserted safely.
2. Take up slack slowly—DO NOT jerk. Keep the cable taut. If the cable is slack, the sudden impact of the load can snap it, resulting in an accident.
3. A helper should stand at a safe distance and watch the pin. Stop pulling with the truck, relieve tension, and reduce load if the pin starts to come out.

**WARNING**

DO NOT use the drawbar pin for towing loads.

**Precautions for Use of the Drawbar Pin**

**Assist Grip**

**WARNING**

DO NOT grab the steering wheel or lever. DO NOT jump on or off the truck.

Grasp the assist grip with the left hand, the seat backrest with the right hand, and step up with the left foot to get on the truck safely.
KNOW YOUR LIFT TRUCK

◆ Hydraulic Tank Oil Level/Filler Hole

The oil level/filler hole is located on the right side of the truck inside the engine hood. To check the oil level, use the dipstick located in the hole.

◆ Fuel Filler

The fuel filler is located on the left side of the truck. The cap can be removed by turning it counterclockwise.

◆ Fuel Shut-off Valve

The fuel shut-off valve is located near the air cleaner inside the engine hood. In an emergency or when performing maintenance, close this valve.

![Warning](100989)

**WARNING**

Never fill the tank near an open flame or when the engine is running. When filling, keep the funnel or fuel hose nozzle in contact with the tank’s metal. This reduces the risk of an electric spark igniting the fuel.

![Warning](102538)

**WARNING**

After refueling, close the cap tightly and wipe up spillage.

Confirm the engine type before filling the tank with the recommended fuel.
THE ENGINE HOOD

The engine hood swings up to fully expose the engine compartment for daily inspection, servicing and lubrication.

**Inspection Points Inside Engine Compartment**

- Engine oil level
- Engine coolant level
- Hydraulic oil level
- Brake fluid level
- Air cleaner element
- Alternator drive belt
- Battery electrolyte level

**To open**

1. Move the lever in the direction of the arrow while pushing down on the hood.
2. Lift the engine hood and tilt it all the way back.

**To close**

1. Push down on the hood until it is securely latched.

**WARNING**

When closing the engine hood, be careful not to pinch your hand.

**Back-up Buzzer**

- When operating in reverse, ALARM MUST SOUND.
- Failure to maintain a clear view in the direction of travel could result in injury or death.
- The operator is responsible for the safe operation of this truck.
Counterbalanced lift truck design is based on the balance of two weights on opposite sides of a fulcrum (the front axle). The load on the forks must be balanced by the weight of the lift truck. The location of the center of gravity of both the truck and the load is also a factor. This basic principle is used for picking up a load. The ability of the lift truck to handle a load is discussed in terms of center of gravity and both forward and sideways stabilities.

Center of Gravity (CG)

CG is defined as the point of an object where its weight is evenly distributed. If the object is uniform, its geometric center will be the same as its CG. If it is not uniform, the CG could be a point on either side of the normal geometric center. When the lift truck picks up a load, the truck and load have a new, combined CG.

Stability and Center of Gravity

The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the combined CG. The lift truck has moving parts and, therefore, has a CG that moves. The CG moves forward or backward as the mast is tilted forward or backward. The CG moves up or down as the mast moves up or down. The CG and, therefore, the stability of the loaded lift truck, is affected by a number of factors such as:

- The size, weight, shape and position of the load.
- The height of the lifted load.
- The amount of forward or backward tilt.
- Dynamic forces created when the lift truck is accelerated, braked or turned.
- Condition and grade of surfaces on which the lift truck is operated.
- Tire pressure.
HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE

In order for the lift truck to be stable (not tip over forward or to the side), the CG must stay within the area of the lift truck stability base—a triangle drawn between the front wheels and the pivot of the rear axle. If the CG moves forward of the front axle, the lift truck will tip over forward. If the CG moves outside of the line on either side of the stability base, the lift truck will tip over to the side.

These factors must be considered when the lift truck is unloaded as well, because an empty lift truck will tip over to the side more easily than a lift truck carrying a load in the lowered position.

The capacity of the lift truck is shown on the capacity chart. It is determined by the weight and load center. The load center is determined by the location of the CG of the load. The load center shown on the capacity chart is the horizontal distance from the front face of the forks, or the load face of an attachment, to the CG in the load. The location of the CG of the vertical direction is the same as the horizontal dimension.

Keep in mind that, unless otherwise indicated, the capacity shown on the capacity chart is for a standard lift truck with standard backrest, forks and mast, and having no special-purpose attachment. In addition, the capacity presumes the load center is no further from the top of the forks than it is from the face of the backrest. If these conditions do not exist, the operator may have to reduce the safe operating load because the truck stability may be reduced. The lift truck should not be operated if its capacity chart does not indicate capacity.
HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE

Capacity Chart

- For example

The capacity chart shown above is for a 4 ton model standard lift truck whose capacity is 4000 kg (9000 pounds) at 600 mm (24 in.) load center. The chart specifies this lift truck can lift up to 4000 kg (9000 pounds) if the load center is not more than 600 mm (24 in.) forward from the face of the backrest. Before attempting to pick up or lift a load, make sure its weight is within the capacity of the truck at the load center involved.

NOTICE: If the load is not uniform, the heaviest portion should be placed closer to the backrest and centered on the forks.

1. Capacity chart originally affixed to lift trucks sold by MCFA shall not be removed, altered or replaced without MCFA’s approval.
2. MCFA assumes no responsibility for lift trucks placed in service without a valid MCFA capacity chart.
3. If necessary to change your specification, contact your Cat lift truck dealer.
HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE
◆ Do’s and Don'ts to Avoid Tipover

**WARNING**

**DO** handle loads only within the capacity shown on the capacity chart!

**WARNING**

**DO NOT** go over rough terrain!
If unavoidable, slow down.

**WARNING**

**DO** avoid fast starts, turns and sudden stops!
These movements could cause the lift truck to tip over.

**WARNING**

**DO watch “tail swing.”**
Always maintain a safe distance from the edge of docks, ramps and platforms.

**WARNING**

**DO check surface strengths!**
Stay away from soft ground to avoid tipover.

**WARNING**

**DO NOT** turn, or angle, on ramps and grades, with or without a load!
**HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE**

**WARNING**

DO NOT tilt elevated loads forward!
This can cause the lift truck to tip over forward.

**WARNING**

DO NOT elevate tilted loads!
This can also cause the lift truck to tip over.

**WARNING**

DO NOT pick up an off-center load!
Such a load increases the possibility of a tipover to the side.

**WARNING**

DO avoid slippery surfaces!
Sand, gravel, ice or mud can cause a tipover. If unavoidable, slow down.

**WARNING**

DO NOT attempt to pick up or deposit a load unless the lift truck is level!

**WARNING**

DO NOT go over obstacles—curbs, ditches, ridges and railroad tracks!
HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE

**WARNING**

DO NOT travel with forks higher than 15 to 20cm (6 to 8 in.) above the ground!
The CG moves up increasing the possibility of a tipover.

**WARNING**

DO NOT make fast or sharp turns with a loaded or unloaded truck!

**DANGER**

DO fasten your seat belt!
The belt will keep you from being thrown out of the truck in a tipover.

**WARNING**

DO NOT turn too sharply, even with an empty raised mast, to avoid a tipover!

**DANGER**

DO NOT jump off your truck if it starts to tip over!
Stay in your seat to reduce the risk of serious injury or death.

**WARNING**

DO wear a hard hat!
It will help protect your head from serious injury.
HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE

◆ How to Survive in a Tipover

**DANGER**

Remember, your chances for survival with your seat belt fastened in a tipover are better if you stay in your truck. If your truck starts to tipover:

1. **DO NOT** jump off!
2. Firmly hold on to the steering wheel.
3. Brace your feet.
4. Lean away from impact.
5. Lean forward.

![Diagram of a person in a tipover situation with numbered steps indicating actions to take.](image-url)
Gasoline and Diesel Engine Equipped

 WARNING

- Explosive fumes may be present during refueling.
- Do not smoke in refueling areas.
- Lift trucks should be refueled only at designated safe locations. Safe outdoor locations are preferable to those indoors.
- Stop the engine and get off the lift truck during refueling.

NOTICE: DO NOT allow the lift truck to become low on fuel or completely run out of fuel. Sediment or other impurities in the fuel tank could be drawn into the fuel system. This could result in difficult starting or damage to components.

Fill the fuel tank at the end of each day of operation to drive out moisture laden air and to prevent condensation. DO NOT fill the tank to the top. Fuel expands when it gets warm and may overflow.

1. Park the lift truck only at a location designated safe. Place the transmission in NEUTRAL, lower the forks to the ground, engage the parking brake and shut off the engine.

2. Open the filler cap.

3. Fill the fuel tank slowly. Close the filler cap. If spillage occurs, wipe off excess fuel and wash down the area with water.

NOTICE: Drain water and sediment from the fuel tank as required by prevailing conditions. Also, drain water and sediment from the main fuel storage tank before it is filled and as a weekly routine. This will help prevent water or sediment being pumped from the storage tank into the lift truck fuel tank.
REFUELING
◆ LP-Gas Equipment

**WARNING**

Only trained, authorized personnel should fill or exchange LP-Gas tanks. Personnel engaged in filling LP-Gas tanks should wear protective clothing such as face shield, long sleeves and gauntlet gloves.

Do not refuel or store LP-Gas powered lift truck near underground entrances, elevator shafts, or other places where LP-Gas could collect in a pocket and cause potential danger for an explosion.

Examine all LP-Gas tanks before filling, and again before reuse, for damage to the valves, liquid gauge, fittings and hand wheels.

All defective or damaged LP-Gas tanks must be removed from service.

The careless handling of LP-Gas tank can result in a serious accident.

To reduce the risk of damage to tanks, use extreme care when transporting them.

**NOTICE:**

1. MOUNT THE TANK PROPERLY. Use holes in the collar for horizontal mounting and the slot in the foot ring for vertical mounting to insure full usage of the fuel.
2. Open the valve slowly so the hose and tank pressure can equalize or the valve may shut off.
3. For proper operation of LP-Gas system, use HD-5 LPB fuel.

**For Standard LP-Gas Tank**

1. Park the lift truck on level ground with the parking brake applied, the transmission in NEUTRAL, lock knob in lock position, the forks lowered and the engine running at low idle.
2. Close the fuel valve at the LP-Gas tank. Run the engine until it stops, then turn off the starter switch.
3. Disconnect the fuel supply line.
4. Loosen the retaining clamps, remove the pin and tank.
REFUELING

5. Check to be sure the replacement tank is of the correct type.

6. Inspect the replacement tank for damage such as dents, scrapes or gouges and for leakage at valves or threaded connections.

7. Check for debris in the relief valve and for damage to various valves and the liquid level gauge.

8. Inspect the couplings for deterioration, damage or missing flexible seals.

9. Clamp the tank securely.

10. Connect the fuel supply line.

11. Turn the fuel valve on by slowly turning it counterclockwise. If the fuel valve is opened too quickly, a back pressure check valve will shut off the fuel supply. If this happens, close the fuel valve completely, wait five seconds, and then open the fuel valve very slowly.

12. Inspect the LP-Gas fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.
New Lift Truck Break-In

Correct break-in is important for operation and long life of your truck. The first 100 service hours of operation is the break-in period for your truck. Read these precautionary instructions carefully.

1. If the truck cannot be put to work immediately, or the operation is light and slow, break in the truck under a simulated working condition.
2. Also, try NOT to make severe brake applications to allow the brake linings to seat against the brake drums.
3. Operate the truck under a lighter load and lower speeds than normal.
4. Change oils and relubricate at shorter intervals than normal.
5. Carefully check on and around the truck for loose bolts and nuts, retightening them, if needed.

Before Starting Engine

1. After starting the engine, BE SURE to run it at idle speeds with no load for about 5 minutes. During this time, check all the OK Monitor indicator lights. AVOID long periods of idling. This may cause cylinder wall glazing and prevent the piston rings from seating properly. DO NOT pump the accelerator pedal and DO NOT REV up the engine. This may cause cylinder wall scuffing and scoring.
2. If the truck does not have to be put to work immediately, or the operation is light and slow, break in the truck under a simulated working condition.
3. Try NOT to drive the truck continuously at the same speeds as the parts tend to better adjust themselves to other parts if various speeds are used.
4. ALSO, try NOT to make severe brake applications to allow the brake linings to seat against the brake drums.
5. Operate the truck under a lighter load and lower speeds than normal.
6. Change oils and relubricate at shorter intervals than normal.
7. Carefully check on and around the truck for loose bolts and nuts. Retighten them as needed.
OPERATION

- Gasoline/LP-Gas Dual Fuel Type

Fuel selector switch

Open the fuel shutoff valve.

Your truck has an operator presence switch (a switch built in the seat).

The starting mechanism in vehicles with powershift transmission is disabled until the operator is seated.

When the key switch is in I (ON) position, driving interlock indicator light in the switch box on the overhead guard flickers unless an operator sits on the seat properly.

Instruction for changeover of fuel between LP-Gas and gasoline
1. • To change from LP-Gas to gasoline
   Turn the key switch to □ (OFF) position and close the valve on the LP-Gas container. Leave the fuel selector switch in LPG position.
   • To change from gasoline to LP-Gas
   Turn the key switch to □ (OFF) position and place the fuel selector switch to OFF position.

2. Turn the key switch to ◐ (START) position. The engine should not start. If the engine starts, leave it running until it stops by itself.

3. Turn the key switch to □ (OFF) position and then place the fuel selector switch to GAS or LPG position. If you select the LPG position, be sure to open the valve on the LP-Gas container. Now the engine can be started using the selected fuel.

The LP-Gas and the gasoline are flammable. Leakage of these may cause fire. Before changing the fuel from LP-Gas to gasoline, be sure to check the fuel line for deterioration and loose connection in accordance with the instruction shown in this manual.

If this truck will be operated with LP-Gas for a long time, check gasoline fuel line in accordance with STORING THE LIFT TRUCK in this manual and make sure all gasoline fuel lines are empty.

WARNING!

CAUTION!
OPERATION

– Pull the parking brake lever.

– Be sure the lock knob is in the LOCK position and the direction lever is in the NEUTRAL position.

– The engine will not start unless the direction lever is in the NEUTRAL position.

– If the engine stalls, place the direction lever in the NEUTRAL position; turn the key switch to the (OFF) position; and turn it to the (START) position to start the engine.

Be sure to fasten the seat belt before operating the truck.
Remember, the belt will not restrain you in an accident if it is not fastened properly.
OPERATION

◆ Starting Gasoline Engine

- DO NOT leave the key in the 1 (ON) position when the engine is NOT running. This may cause the battery to run down and damage the ignition coil.
- DO NOT crank the engine for more than 10 seconds at any one time. This may cause run down the battery.

Turn the key switch to the ◁ (START) position to crank the engine (no more than 10 seconds at a time).

Release the key when the engine starts.

Let the engine warm up for about 5 minutes.

If the engine won’t start:

Turn the key switch to the ◁ (OFF) position and recrank the engine after 30 seconds.

If the engine won’t start, see the topic, Engine Won’t Start.
OPERATION

◆ Starting Diesel Engine

- DO NOT leave the key in the l (ON) position when the engine is NOT running. This may cause the battery to run down.
- DO NOT crank the engine for more than 10 seconds at any one time. This may cause damage to the starter and run down.

### Engine Cold in Cool Weather

1. Turn the key switch to the l (ON) position and wait until the heater plug indicator goes out.

2. Depress the accelerator pedal all the way and hold in this position.

3. Turn the key switch to the (START) position to crank the engine (no more than 10 seconds at a time).

- Release the key when the engine starts.
- Release the accelerator pedal.

### Engine Warm

1. You do not need to turn the key switch to the l (ON) position and preheat the engine or depress the accelerator.

2. If the engine won’t start:
   - Turn the key switch to the (OFF) position and wait for about 30 seconds before recranking the engine.

If the engine won’t start, see the topic, If Engine Won’t Start.
OPERATION

**Engine Won’t Start**

Consult your Cat lift truck dealer if the engine still does not start after you have attempted several times.

**Gasoline Engine Model**

Turn the key switch to the (START) position and crank the engine several times.

**Diesel Engine Model**

Air may be in the fuel system to cause failure to start. In such a case, prime the fuel system or have your Cat lift truck dealer make a check.

**NOTICE:** The head lights should be OFF for easier starting.

**CAUTION:**

DO NOT start the engine by pushing or towing the truck. This may cause serious injury and damage to the truck.

Consult your Cat lift truck dealer.

The battery is dead.

Refuel.

Consult your Cat lift truck dealer.

Does the starter crank the engine?

No

Yes

The head lights come ON.

The head lights do not come ON or are dimmed.

Is the fuel gauge showing there is fuel in the tank?

No

Yes

Consult your Cat lift truck dealer.

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OPERATION
◆ Starting with Jumper Cables

Batteries give off flammable vapors which may explode.
Keep flames and sparks away from batteries. They could cause vapors to explode. Do not allow jumper cable ends to contact each other or the lift truck.
Do not smoke when checking battery electrolyte levels.
Electrolyte is an acid and can cause injury if it contacts skin or eyes.
Always wear eye protection when starting a lift truck with jumper cables.
Improper jump start procedures can cause an explosion that can result in injuries.
Turn off all lights and accessories on the stalled lift truck.
Always connect battery positive (+) to battery positive (+) and battery negative (–) to battery negative (–).
Jump only with a battery source of the same voltage as the stalled lift truck.

DON’T try to start the engine by pushing the truck.
BE SURE to connect the cable end 4 to the ENGINE BODY. If it is connected to the negative (–) terminal of the battery, sparks could ignite the gases.

Connect the jumper cables away from the moving parts in the engine compartment.

To start a truck with a “run-down” battery, use a booster battery or jumper cables from the battery of another vehicle.
1. Position another vehicle, with its engine running, within jumper cable distance.

NOTICE: Use a 12 volt jumper system to jump start trucks with a 12 volt system. Use a 24 volt jumper system to jump start the trucks with a 24 volt system.
This lift truck has a 12 volt starting system or a 24 volt starting system. Use only equal voltage for jump starting. Use of a welder or higher voltage will damage the electrical system.
Turn on (close) the battery switch prior to the boost connection to prevent damage to electrical components on the stalled lift truck.
Many “dead” batteries can be recharged.
2. Connect the jumper cables in the sequence shown.
   DO NOT short across the positive (+) and negative (–) terminals.
3. After connecting the cables, increase the speed of the other vehicle’s engine and start the engine of the stalled truck with a “run-down” battery.
4. After the engine starts, disconnect the jumper cables in the reverse sequence.

NOTICE: You can buy jumper cables from your Cat lift truck dealer.
OPERATION

◆ Starting LP-Gas Engine

![WARNING]
LP-Gas fuel is flammable and can cause injuries and fires. Inspect LP-Gas fuel lines and fittings for leaks. Inspect tank for secure mounting.

![CAUTION]
– DO NOT leave the key switch in the I (ON) position when the engine is NOT running. This may cause the battery to run down and damage the ignition coil.
– DO NOT crank the engine for more than 10 seconds at any one time. This may damage the starter and run down the battery.

1. Turn the tank fuel valve ON by slowly turning the valve counterclockwise. Observe the LP-Gas gauge (if equipped).
2. Turn the key switch to the (START) position. Release it when the engine starts.
3. If the engine does not start, do not press on the accelerator. Turn the key switch to the (OFF) position, then repeat step 2.

◆ After Starting Engine

Check the OK monitor and gauges frequently during operation to be sure all systems are working properly.

![WARNING]
If a monitor light comes on, correct the problem before operating the lift truck.

1. Run the engine at idle speeds with no load for about 5 minutes.

![CAUTION]
– BE SURE to warm up the engine regardless of the weather.
– Failure to warm up the engine can cause poor lubrication and incomplete fuel combustion resulting in poor engine performance.

2. During warm-up, check to see that systems are operating properly.
   – Are all the OK monitor warning lights OFF?
   – Is the engine coolant gauge needle in the WHITE zone?
   – Are exhaust noise and smoke color normal?
   – No excessive vibration?
OPERATION

◆ Before Moving Lift Truck

1. Turn the 1st speed mode/automatic mode selector switch to the desired position.
   - Selector switch: For 5 ton model as standard and others as optional.

2. Use the lift control lever to raise the forks to a safe traveling height of 15 to 20 cm (6 to 8 in.) from the floor.

3. Use the tilt control lever to tilt the mast back all the way.

Look around and behind the truck and sound the horn before moving.
OPERATION
◆ Lift Truck Operation

1. Depress the inching pedal all the way.

2. Place the lock knob in the UNLOCK position and move the direction lever to the FORWARD or REVERSE travel position.

3. Push the parking brake lever.

4. Gradually depress the accelerator pedal while releasing the inching pedal.

**CAUTION**

DO NOT “ride” the inching pedal during traveling. This produces a partly disengaged condition that will result in premature clutch plate wear.
**OPERATION**

- **Changing Speed**

Use the accelerator pedal to increase travel speed. Use the brake pedal to slow down.

- **Changing Direction**

NEVER move the direction lever to the NEUTRAL position during traveling. This causes the engine to overspeed.

BE SURE to come to a complete stop when changing direction.

BE SURE to watch for people or hazards in the direction of travel.

**WARNING**

Before operating the speed selector, BE SURE to come to a complete stop.

**CAUTION**

Directional changes faster than stated will cause premature damage to the driveline. For greater operator safety and maximum service life of driveline components, it is recommended the operators bring the truck to a complete stop before changing direction.
OPERATION

• Operating Techniques

Turn the steering wheel with both hands. When handling loads, stop the truck and move the tilt and lift control levers with the right hand.

• Steering (Turning)

A lift truck is different from most other vehicles because it is steered by the rear wheels. This causes an exaggerated tail swing.

1. When working in close quarters, drive more slowly when making turns.
2. Start the turn as close to the inside corner as the tail swing will permit.

TURNING WITH THE FORKS ELEVATED

Turning with the forks elevated, with or without a load, can cause a tipover.

TURNING AT HIGH SPEEDS

Turning at high speeds, with or without a load, can also cause a tipover.

Be aware of tail swing distance. Be sure the tail swing area is clear, before turning, to avoid injury to pedestrians.
The purpose of the inching pedal is to provide precise lift truck inching control at very slow travel speed and high engine rpm. You can move your truck slowly while maintaining the engine speed by varying the position of the inching pedal. Use this pedal when approaching the load and when loading and unloading.

1. Stop ahead of the load platform, lock the parking brake lever, set the direction lever to NEUTRAL, place the mast vertically, and raise the fork to the height of the pallet insertion openings.
2. Depress the inching pedal all the way, move the direction lever to FORWARD, and release the parking brake.
3. Gently depress the accelerator pedal.
4. When the left foot is slowly taken off the inching pedal, the fork lift will advance slowly.
5. Insert the fork slowly, taking care it does not hit the pallet.
6. Stop after inserting the fork until the root of the fork comes into light contact with the pallet.

CAUTION

DO NOT “ride” the inching pedal during traveling. This produces a partly disengaged condition that will result in premature clutch plate wear.
OPERATION

◆ Stopping Lift Truck

1. Release the accelerator pedal.
2. Depress the brake pedal.
3. Move the direction lever to the NEUTRAL position, and place the lock knob in the LOCK position.

WARNING

Avoid sudden stops. This can cause the load to fall off the forks or the truck to tip over.
**OPERATION**

◆ **Parking Lift Truck (After Stopping)**

1. Move the direction lever to the NEUTRAL position, and place the lock knob in the LOCK position.

2. Pull the parking brake lever all the way.

3. Tilt the mast forward just a little and lower the forks to the floor until the fork tips touch the floor.

4. Turn the key switch back to the (OFF) position to stop the engine. When leaving the truck, BE SURE to remove the key.

5. Block the wheels securely.

6. Return the key to a key rack if specified.

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**WARNING**

**Park safely**
- Select a hard level surface.
- BE SURE to park in a parking lot if available.
- If the lift mechanism is disabled and the forks cannot be lowered to the floor, attach a warning tag to the tip of the fork and position the forks away from pedestrians.

**Get off safely**
- Get off after the truck has come to a complete stop and the above procedure has been followed.
- NEVER jump off.
Stability of the loads depends upon how well the stack is formed.

- **Stacking Loads Differing in Size**
  Be sure larger containers in a load are at the bottom of the stack and smaller ones at the top; or heavier containers at the bottom and lighter ones at the top.

- **Stacking Small Identical Loads**
  As in brick laying, place layers of containers alternately so each container will stand astride parts of two or more containers in the layer below. This type of stack is more stable and less likely to fall down.

- **Stacking Large Identical Loads**
  This is one of the most common patterns for stacking large identical containers. Better load stability is achieved by reversing the end-to-side direction on each succeeding layer.
OPERATING TECHNIQUES

◆ Handling Loads Safely

Handle ONLY stable loads. A load having unstable items can easily shift and fall on someone. DO NOT handle a load if any part of it is likely to fall, or if the pallet or skid is damaged. Neatly stack and band loose or unstable loads.

Handle ONLY loads within the capacity of your lift truck as shown on the capacity chart. If the combined center of gravity of the truck and load is located forward of the front axle, or if the load exceeds the capacity, the truck can tip over forward.

Set the forks as far apart as possible for maximum support of the load.

Not every load can be handled using only the forks. Some loads will require a special attachment.
OPERATING TECHNIQUES

◆ Inching into and Lifting the Load

1. Move the truck slowly and stop the truck 20 to 30 cm (8 to 12 in.) short of the load. Make sure the truck is square with the load and the forks are at the correct height.

Direction lever—NEUTRAL

2. Tilt the mast forward to the vertical position, and again make sure the forks are at the correct height.

Direction lever—FORWARD

3. Slowly move the truck forward and slide the forks into the pallet until they are fully under the load.

Direction lever—NEUTRAL

4. Carefully lift the load about 10 cm (4 in.) off the other material. Slowly return the lift control lever to the NEUTRAL position.

When you pick up loads that extend above the backrest extension height, band them together to reduce the risk of items from falling.

Center the weight of the load between the forks.

Avoid approaching the load at high speed.
OPERATING TECHNIQUES
◆ Traveling with the Load

1. Make sure the load is centered on the forks. Then tilt the mast all the way back to cradle the load.

Direction lever—REVERSE
2. Look behind you.

Direction lever—NEUTRAL
3. Slowly move the truck 20 to 30 cm (8 to 12 in.) away from the stack, then stop the truck. Lower the load to a position 15 to 20 cm (6 to 8 in.) from the ground.

Direction lever—FORWARD
4. Look around to be sure your drive area is clear and then move the truck into the working zone.

Slack lift chains means there is a rail or lift bracket hang up. Raise the mast before you move. When stacking:
1. Watch your lift chains.
2. If they go slack, stop; raise the load and lower it again.

DON’T pick up an off-center load. Make sure the weight of the load is centered between the forks.

If the load blocks your view, or when you travel down a grade with the load, drive in reverse. Always look in the direction of travel.
OPERATING TECHNIQUES

◆ Unloading

1. Stop the truck 20 to 30 cm (8 to 12 in.) short of the unloading zone.

Direction lever—NEUTRAL

2. Lift the load 10 to 15 cm (4 to 6 in.) higher than the stack.

3. Slowly move the truck forward to position the load just above the stack.

Direction lever—NEUTRAL

4. Tilt the mast forward to the vertical position.
5. Carefully lower the load onto the stack.
6. Lower the forks just enough to disengage them.

Direction lever—REVERSE

7. Look behind you and carefully back the truck away from the load.

Direction lever—NEUTRAL

8. When you disengage the forks, stop the truck.
9. Lower the forks to a position 15 to 20 cm (6 to 8 in.) from the ground.

10. Tilt the mast back (6° or more).
11. Look around to see that it is safe to drive in your work area.
12. Drive up to your next position.

WARNING

– NEVER travel with the mast tilted forward or with the load in the elevated position. This will increase the possibility of the lift truck tipping over.
– NEVER tilt the mast with the load in the elevated position.
– NEVER leave the lift truck with the load in the elevated position.

Be careful not to drag the forks.
OPERATING TECHNIQUES
◆ Working on Grades
   The Engine Stalls on a Grade
◆ Starting on a Grade

1. Apply the parking brake and lower the forks to the ground.
2. Depress the brake pedal. Place the direction lever in the NEUTRAL position and start the engine.
3. Push the direction lever to FORWARD direction travel.
4. Raise the forks or load to the safe travel position.
5. Quickly shift your right foot from the brake pedal to the accelerator pedal. While gradually depressing the accelerator pedal, release the parking brake.

(Safe Travel Position)
- Keep the forks or the load at a safe travel height, which is 15 to 20 cm (6 to 8 in.) from the ground.
- Tilt the mast back more than 6° when the truck is empty. Tilt it all the way back when the truck is loaded.
OPERATING TECHNIQUES

• Traveling on a Grade

Travel forward up a grade and in reverse down a grade when the truck is loaded.

- DO NOT continuously use the brake pedal only. This can result in brake failure and an accident.
- DO NOT use the inching pedal when traveling down a grade. This prevents the engine from acting as a brake.

• Stopping on a Grade

Depress the brake pedal when you have to bring the truck to a stop on a grade. DO NOT hold the truck by depressing the accelerator pedal. This can cause clutch plate wear or torque converter failure.

WARNING

When traveling up or down a steep grade:
1. DO NOT stop the engine.
2. DO NOT make any turns.
3. DO NOT travel across the grade.
OPERATING TECHNIQUES

• Travelling backward with Back-up buzzer

Lift trucks are used in applications with widely varying conditions. Conditions such as the noise level, number of lift trucks in the location, space provided for operation, loads to be handled, presence of pedestrians, lighting conditions, and many others are very different from application to application. Our manufacture of the lift truck does not have control over the environment where the lift truck will be used, or where it may be resold at a later time.

The user has first-hand knowledge of the conditions at the location of use. The user shall determine if operating conditions require the truck to be equipped with additional sound-producing or visual (such as lights, blinkers or back-up buzzer) devices, and be responsible for providing and maintaining such devices.

Factors such as habituation to the alarm, confusion of multiple alarms, increased noise level, dependence of the operator on the alarm, and other may lead to an unsafe condition in the workplace. Pedestrians and other lift truck operations in the workplace may become accustomed to hearing the alarm and no longer pay attention. Then in a situation where the pedestrian or other lift truck operator is in proximity to the lift truck, he may not react to the alarm devices.

The pedestrians and lift truck operators in the workplace must be aware of their surroundings and actively participate in the safety of themselves and others, including not placing themselves in the path of a moving truck. The operator of the truck is responsible to safely operate the lift truck and keep a clear view of the path when travelling backward.

The alarm devices must also be maintained in proper functional condition. Damage from operation or attempts to disconnect or disable the alarm devices must be repaired.
STORING THE LIFT TRUCK

◆ End of Each Shift Storage

Perform a thorough walk-around inspection for any damage. Report all damage or faulty operation immediately. DO NOT operate a lift truck that has a maintenance problem.

1. Park the truck in an authorized area.
2. Block the wheels securely.
3. Check under the truck for oil or coolant leaks.
4. Clean or wash the truck to keep it free of dirt and oil. This will make it easier to spot loose or defective parts.

Do not expose ECU box to rainwater. Take care not to sprinkle water over ECU box when washing your machine.

If brake linings have become wet after cleaning the truck or after driving through a large area of water, stopping distance may be reduced. In such a case, gently apply brakes several times while driving slowly in a safe area until linings have dried out and normal braking action is restored.

◆ Long Term Storage

If your lift truck is to be put in storage for any length of time, take the following precautions for safety and to reduce the risk of deterioration of truck components.

- Fuel System
  - Gasoline engine trucks
    Gasoline evaporates, leaving a sticky gum deposit in the fuel pump and carburetor. Drain the fuel from the tank and run the engine until the fuel in the lines is used up.
  - Diesel engine trucks
    Drain the fuel from the tank and run the engine until the fuel in the lines is used up.
  - LP-Gas engine truck
    These trucks present a storage problem due to fire hazards. Store them in an outdoor shelter or detached garage. If the shelter is attached to another building, the separating walls should have a fire resistance rating of more than one hour. The shelter should have sprinklers and floor-level ventilation.

- Hydraulic System
  After positioning your truck for storage, retract all the hydraulic cylinders to minimize rod exposure. This will reduce the risk of rusting of the sliding contact surfaces of the rods.
  To prevent rusting of the cylinder interior and rods, and deterioration of the seals, periodically operate each cylinder for lift, tilt and the attachment to full stroke.

- Engine Cooling System
  Protect the cooling system from freezing by draining the system or by adding an antifreeze mixture.

- Engine Cylinders
  Over a long storage period, the cylinders may rust from moisture condensation within the cylinders. To reduce the risk of rusting of cylinder walls, remove the spark plugs and squirt a small amount of engine oil into the cylinders. Crank the engine several times with the starter to spread the oil uniformly on the cylinder walls. Replace the spark plugs. Repeat this procedure prior to starting after storage.

- Battery
  Remove the batteries from the truck and recharge them. Store them in a dry, cool place. More precautions may have to be taken according to the place of storage, storage period and season. When you put your truck in storage, consult your Cat lift truck dealer.

- Controller
  Moisture is harmful to the controller. When washing, do not splash water or steam over the ECM inside the right step and the frequency transducer and the ECU inside the dashboard.
**Lift Truck Shipping**

Always block the trailer or rail car wheels before loading the lift truck.
Position the lift truck on the truck bed or rail car.
Place the direction lever in NEUTRAL, the lock knob in lock position and apply the parking brake.
Turn the key switch to the (OFF) position and remove the key.
Block the wheels and secure the lift truck with tiedowns.
Do not steer the truck after it has been secured on the truck or rail car.

**WARNING**
Check travel route for overpass clearances. Make sure there is adequate clearance if the vehicle being transported is equipped with a high mast or cab.
Remove ice, snow or other slippery material from the shipping vehicle and loading dock.

**Machine Lifting and Tiedown Information**

**NOTICE:** Improper lifting or tiedowns may cause a load to shift and cause injury and/or damage.

1. Weight and instructions given herein apply to lift trucks manufactured by Mitsubishi Caterpillar Forklift America Inc.
2. Use proper rated cables and slings for lifting. Position the crane so the lift truck is level when lifted.
3. Spreader bar widths should be sufficient to prevent contact with the lift truck.
4. Use the tiedown locations provided for lift truck tiedown.
Check the state and local laws governing weight, width and length of a load.
Contact your Cat lift truck dealer for shipping instructions for your lift truck.
**SPECIAL SITUATIONS**

- Care in Cold Weather
  - **Battery**
    - Maintain the specific gravity of electrolyte from 1.26 to 1.28 as corrected to 20°C (68°F).
    - When you park your truck overnight, leaving it outside a garage, remove the battery and keep it warm.
    - The electrolyte of a fully charged battery will not freeze to -35°C (-31°F).
  - **Engine Coolant**
    - Antifreeze used in the engine cooling system of a new lift truck shipped from the factory provides sufficient freeze protection to -30°C (-22°F).
    - If ambient temperatures are below -30°C (-22°F), add antifreeze.
    
    **NOTICE:** For type and concentration of antifreeze, consult your Cat lift truck dealer.

- **Fuel Oils and Lube Oils**
  - Cloud point should be 6°C (11°F) below the lowest ambient temperature.
  - Use engine oil and gear oil to fit the ambient temperature.

**NOTICE:** For type and concentration of antifreeze, consult your Cat lift truck dealer.

- **Battery**
  - After distilled water has been added to the battery, run the engine for a while. This mixes the added water with the electrolyte and will reduce the risk of freezing and damaging the battery.
  - DO NOT attempt to restore a battery’s charge by pouring boiling water over it. This can break the battery case, resulting in acid contact with skin or eyes.
SPECIAL SITUATIONS

◆ Care in Hot Weather

• Fuel Oils and Lube Oils

Use fuel oil, engine oil and gear oil to fit the ambient temperatures.

NOTICE: For selection of fuel oil, engine oil and gear oil, consult your Cat lift truck dealer.

• Battery

In hot, dry weather, check the battery cells for proper electrolyte level more often than in cold weather. Add distilled water whenever the level is low.

• Engine Coolant

WARNING

Be careful NOT to have scalding hot coolant or steam blow out of the reserve tank. Remove the radiator cap only after engine cools.

Coolant evaporates rapidly and the engine is likely to get overheated when the truck is operated continuously or on a grade. During such an operation, observe the engine coolant temperature gauge for symptoms of overheating.

CAUTION

If the engine coolant temperature gauge needle moves into the red zone, the engine is suspected of getting overheated.

NOTICE: If the engine coolant temperature gauge needle moves into the red zone, see the topic, Engine Coolant Temperature Gauge Needle Moves Into the Red Zone.

◆ Care in Severe Dust or Lint Conditions

Check and service the air cleaner element more frequently.

Recommended inspection period

Check the radiator core more frequently for clogging or trash build-up. Clean or wash the truck as necessary.
◆ Changing a Tire

**WARNING**

DO NOT attempt to change the tire with the truck loaded. Injury and/or damage could result.

**WARNING**

Stop raising the truck when the tire clears the ground. DO NOT raise the truck more than necessary.

**WARNING**

BE SURE no one is on the truck when raising the front or rear tires.

**WARNING**

DO NOT place any part of your body under the truck. SECURELY SUPPORT the truck with blocks after jacking it up.

**WARNING**

– Make sure the replacement tire is of the same size, type and load range.
– Use the tire recommended by MCFA.

**WARNING**

– Consult your Cat lift truck dealer for proper tire changing procedure.
– Changing of tire and adjustment procedure must be made by a trained mechanic or dealer personnel.
– Perform all maintenance in the factory with proper equipment.
1. Park the truck on level ground with parking brake applied, transmission in neutral, forks lowered and engine stopped.

2. Prepare tools, jack and wheel blocks.

**Jack Capacities**

7 tons (16000 lbf), minimum

3. Block the diagonally opposite wheel.

---

**To Remove Tire**

1. Loosen the wheel nuts about two rotations. **NOTICE:** Only loosen the wheel nuts. DO NOT remove them.
2. Position the jack under the truck at the specified jacking point.
3. Raise the truck by operating the jack until the tire just clears the ground.

---

**To Raise Front Tire**

Position the jack under the frame and raise the truck until the front tire clears the ground. Next, place stands or blocks of wood on both sides under the frame to support it.

---

**Other Method**

Tilt the mast all the way back, place blocks under the mast, and tilt the mast forward.
TROUBLESHOOTING

4. Remove the wheel nuts (loosened in step 1).
5. Firmly grip the wheel with both hands and remove it from the truck.

To Install Tire
1. Install the wheel and tighten the wheel nuts finger tight until their clamping surfaces come into full-face contact with the counterbores in the rim.

NOTICE: Make sure the clamping surfaces of the wheel nuts and counterbores are free of dirt.

2. Lower the truck by operating the jack until the tire just touches the ground. Then tighten the wheel nuts in the sequence shown, in two or three steps, to the specified torque.

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</tr>
<tr>
<td></td>
<td>Rear</td>
<td>377 (38.5) [278]</td>
<td></td>
</tr>
</tbody>
</table>

Unit: N•m (kgf•m) [lbf•ft]
TROUBLESHOOTING

• Dual Tire

1. Remove the outer tire extension valve by turning it counterclockwise.
2. Loosen the outer wheel nuts about two turns.
3. Position the jack under the truck at the specified jacking point.
4. Raise the truck by operating the jack until the tire just clears the ground.
5. Remove the outer wheel nuts by hand.
6. Firmly grip the tire with both hands, and remove it from the truck.

NOTICE: DO NOT remove the wheelnuts. ONLY loosen them.

When removing the outer wheel nuts, grasp each nut properly to prevent the wrench from slipping off the nut.

WARNING

CAUTION

When removing the wheel, be careful not to strip the inner wheel nut threads on the edges of the bolt holes in the rim.
To Remove Inner Tire

1. Lower the truck to the ground.
2. Loosen the inner wheel nuts about two turns.
3. Raise the truck until the tire just clears the ground.
4. Remove the inner tire nuts by hand.
5. Firmly grip the tire with both hands, and remove it from the truck.

To Install Inner Tire

1. Install the inner tire. Tighten the wheel nuts just enough to hold the tire without rattling.
2. Lower the truck until the tire just touches the ground.
3. Tighten the inner wheel nuts, in two or three steps, to the specified torque. Each of the steps must follow the tightening sequence shown above.

Tightening Torque for Inner Wheel Nuts

<table>
<thead>
<tr>
<th>Unit: N•m (kgf•m) [lbf•ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ton models</td>
</tr>
<tr>
<td>4.5 to 5 ton models</td>
</tr>
</tbody>
</table>

**NOTICE:** When replacing an outer tire only, make sure the inner wheel nuts are tightened properly.

**CAUTION:** When removing the tire, be careful not to strip the wheel bolt threads on the edges of the bolt holes in the rim.
To Install Outer Tire

1. Again raise the truck until the tire just clears the ground.
2. Install the outer wheel. Tighten the outer wheel nuts just enough to hold the wheel without rattling, making sure the clamping surface of each nut comes in full-face contact with the counterbore of the wheel disc.
3. Lower the truck until the tire touches the ground.
4. Tighten the outer wheel nuts in the same way as the inner wheel nuts.
5. Install the extension valve.

CAUTION

- Check the tire pressure and adjust it if necessary.
- Drive the truck for a while, and retighten the wheel nuts.
- In case of the dual wheel, it is common experience that only the outer wheel nuts are tightened with the inner wheel nuts left untightened. BE SURE to tighten the inner wheel nuts, too.

NOTICE: Retighten the wheel nuts at regular intervals.

Rear Tire

1. Loosen the wheel nuts about two turns. **NOTICE:** DO NOT remove the wheel nuts. ONLY loosen them.
2. Position the jack under the truck at the specified jacking point.
3. Raise the truck by operating jack until the tire just clears the ground.
TROUBLESHOOTING

4. Remove the wheel nuts by hand.
5. Firmly grip the tire with both hands, and remove it from the truck.

To Install Tire

1. Tighten the wheel nuts just enough to hold the tire without rattling, making sure the clamping surface of each nut comes in full-face contact with the counterbore of the wheel disc.

2. Lower the truck until the tire touches the ground. Tighten the wheel nuts, in two or three steps, to the specified torque. Each of the steps must follow the tightening sequence shown above.

Tightening Torque for Rear Wheel Nuts

Unit: N•m (kgf•m) [lbf•ft]

| All models | 377 (38.5) [278] |

3. Lower the truck, and restore tools and jack.
TROUBLESHOOTING

- How to Determine Tightening Torque

A torque wrench is recommended for tightening the wheel nuts. If a torque wrench is not available, tighten the nuts with a socket wrench for wheel nuts by resting the weight of your body on the handle of the wrench.

Torque is a turning effort. It is expressed as a product of length and force.

If your weight is 60 kg (132 lb), for instance:
- Rest your weight on the wrench handle at a point of 68 cm (26.8 in.) from the wheel nut to tighten the front wheel nuts, as expressed by this formula:
  \[
  \frac{403 \text{ N m} (41.1 \text{ kgf m}) [297 \text{ lbf ft}]}{60 \text{ kg (132 lb)}} = 68 \text{ cm (26.8 in.)}
  \]
- Rest your weight on the wrench handle at a point of 65 cm (25.6 in.) from the wheel nut to tighten the rear wheel nuts, as expressed by this formula:
  \[
  \frac{377 \text{ N m} (38.5 \text{ kgf m}) [278 \text{ lbf ft}]}{60 \text{ kg (132 lb)}} = 65 \text{ cm (25.6 in.)}
  \]

- DO NOT shake yourself when resting your weight on the wrench handle.
- DO NOT overtighten the wheel nuts.
- Overtightening will strain the bolts or deform the clamping surface of wheel disc.

• Inspecting Tire Pressure

Check the tire pressure and adjust it if necessary. For the tire pressure, see Specifications and Refill Capacities.

NOTICE: The tire pressure is indicated on the nameplate attached to the left side of the hood and seat assembly.
Your lift truck uses high pressure tires. When adding air, check the rim for damage that could permit air to leak from the tire. NEVER over-inflate the tire.

When adding air to the tire, or checking tire pressure, BE SURE to keep your body away from the side. The use of an inflation cage, or some other safety device, helps reduce the risk of serious injury.

When adding air to the tire using an air compressor, make sure the compressor valve is correctly set. Failure to follow this precaution can damage the tire. Always maintain correct tire pressure.

If the engine stalls, hydraulic pressure is lost in the power steering system. If this happens, stop your truck in a safe area and restart the engine. Before restarting the engine:
- Make sure the fuel tank is NOT empty.
- Correct the cause of engine stalling such as overloading.
**TROUBLESHOOTING**

◆ **Engine Coolant Temperature Gauge Needle Moves into Red Zone**

1. Park the truck in a safe area.
2. Open the engine hood to ventilate the engine compartment.
3. Allow the engine to idle for a while. DO NOT attempt to stop the engine.
4. Stop the engine after the coolant temperature gauge needle has moved into the WHITE zone.
5. Check for:
   - Lack of coolant.
   - Loose or broken fan belt.
   - Engine oil level.
   - Foreign material build-up in radiator air passages.

   - DO NOT attempt to remove the radiator filler cap if the engine is overheated. This could cause injury from scalding hot coolant or steam blowing out of the radiator.
   - DO NOT add cold water to an overheated engine. This can cause damage to the engine.
   - Immediately stop the engine if the fan belt is broken.

◆ **Powershift Transmission Oil Temperature Warning Light Glows**

1. Park the truck in a non-traffic area.
2. Apply the parking brake. Place and lock the direction lever in the NEUTRAL position. Allow the engine to run at low idle for a while.
3. After the warning light has gone out, operate the truck again.

   If the warning light does not go out, or if it glows often, consult your Cat lift truck dealer.
TROUBLESHOOTING

◆ Driving Interlock Indicator Light Flickers or Flashes, and the Truck Stops Moving

The driving interlock indicator light starts flickering and the truck stops moving.

Are you seated?

Place the direction lever to the neutral position and sit securely.

The driving interlock indicator light is OFF but the truck fails to move.

Stop working and move the truck to a safe area. Shut down the engine and consult your Cat lift truck dealer.
TROUBLESHOOTING
◆ Trouble with the LP-Gas Equipment

If you smell gas or notice something wrong with LP-Gas equipment during operation, immediately stop the truck in a safe area, turn the key switch to the (OFF) position, close the fuel valve of the LP-Gas tank, and try to find the cause. (It is advisable to have a test kit on hand for detecting gas leakage.) If the internal pressure of the LP-Gas tank rises too high and causes the relief valve to open to let out the excess pressure, sprinkle water over the tank. At the same time, extinguish any fire or flame source (such as a pilot light) and eliminate the possibility of creating sparks near the truck. Ventilate the work area.

When gas leakage is evident, close the fuel valve as soon as possible. Extinguish the fire or flame sources nearby to prevent spark conditions.

There is a possibility of fire after a collision or when a truck turns over. If this happens, close the LP-Gas fuel valve of the LP-Gas tank as soon as possible.

Use a dry-chemical (powder) or carbon dioxide type extinguisher. Never use water. When possible, however, have large quantities of water poured over the LP-Gas tank to cool it down while the fire is being extinguished.
Taking proper care of your lift truck is a vital part of the overall planned maintenance program.

Your participation in this program will provide an early warning to help identify potential maintenance problems.

Do-it-yourself maintenance does not include repairs. If your truck requires any repairs, consult your Cat lift truck dealer. The dealer’s lift truck mechanics are well trained and know how to safely make repairs. Service Manuals are also available from your Cat lift truck dealer.

Follow these rules to help save you from injury and to service your truck properly.

**General**

- Make sure the service area is safe.
- Park the truck on a level ground with the forks lowered, parking brake applied, transmission in NEUTRAL, the direction lever in NEUTRAL, the lock knob in NEUTRAL, engine stopped and the wheels blocked.
- Follow the recommended safety procedures.
- Use only the right tools for the job.

The fuel shut off valve is located near the air cleaner inside the engine hood. To avoid an accident, close this valve when performing maintenance.

**Lines, Tubes and Hoses**

- Make sure the service area is safe.
- Park the truck on a level ground with the forks lowered, parking brake applied, transmission in NEUTRAL, the direction lever in NEUTRAL, the lock knob in NEUTRAL, engine stopped and the wheels blocked.
- Follow the recommended safety procedures.
- Use only the right tools for the job.

DO NOT bend or strike high pressure lines. DO NOT install bent or damaged lines, tubes or hoses.

Repair loose or damaged fuel and oil lines, tubes or hoses. Leaks can cause fires. Contact your dealer for repair or replacement.

Check lines, tubes and hoses carefully. DO NOT use your bare hands to check for leaks, use a board or cardboard. Tighten connections to the recommended torque. If any of the following is found on a part, replace the part.

- End fittings damaged or leaking.
- Outer covering chafed or cut and wire reinforcing exposed.
- Outer covering ballooning locally.
- Evidence of kinked or crushed hose.
- Metal embedded in the outer cover.
- End fittings displaced.

Make sure all clamps, guards and heat shields are installed correctly to reduce the risk of vibration, rubbing against other parts, and excessive heat during operation.
MAINTENANCE

◆ Inspection Precautions

If it is necessary to make an inspection while the engine is running, ALWAYS USE TWO WORKERS—one, the operator, at the controls and the other checking within visual contact of the operator.

If your truck requires any repair, attach a “DO NOT OPERATE” or similar warning tag to the steering wheel or other control, remove the key from the starter switch, and contact your Cat lift truck dealer.

**WARNING**

– Avoid mixing lubricants. In some cases different brands of lubricants are not compatible with each other and deteriorate when mixed. It is best to stick with the same brand at successive service intervals.
– Before refilling, clean filler holes. After filling, clean up spills.

**CAUTION**

– Lift truck level
– Mast in vertical position
– Fork tips on ground
– Engine stopped
– Control levers in neutral
– Wheels blocked

A daily (Pre-Start) inspection is the key to safety. At the beginning of each shift, check your lift truck to make sure it is in safe operating condition. Always inspect your truck under the following conditions.
MAINTENANCE

◆ Maintenance Schedule

As the operator, you are responsible for the performance of daily pre-start inspection. You are also responsible for those items listed under Every 50 Service Hours or Weekly, Whichever Comes First to keep your lift truck in proper working condition.

For periodic inspection and periodic change of rubber parts, however, rely on the expert knowledge of the factory-trained servicemen, and the service facilities at your Cat lift truck dealer’s workshop.

Periodic inspection time intervals

- One month after delivery of a new truck
- Every 200 service hours or monthly, whichever comes first
- Every 400 service hours or 2 months, whichever comes first
- Every 600 service hours or 3 months, whichever comes first
- Every 1200 service hours or 6 months, whichever comes first
- Every 2400 service hours or 1 year, whichever comes first

• Every 10 Service Hours or Daily (Pre-Start), Whichever Comes First, continued

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MAINTENANCE

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- **Every 50 Service Hours or Weekly, Whichever Comes First**

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<td>Change</td>
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- **Every 200 Service Hours or Monthly, Whichever Comes First**

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</thead>
<tbody>
<tr>
<td>Wheel nuts</td>
<td>Retighten</td>
<td>117</td>
</tr>
<tr>
<td>Differential</td>
<td>Check oil level</td>
<td>117</td>
</tr>
<tr>
<td>Powershift transmission</td>
<td>Check oil level</td>
<td>118</td>
</tr>
<tr>
<td>Alternator drive belt – Gasoline</td>
<td>Check/adjust</td>
<td>119</td>
</tr>
<tr>
<td>Spark plug</td>
<td>Check</td>
<td>**</td>
</tr>
<tr>
<td>Vaporizer – LP-Gas</td>
<td>Check tar</td>
<td>**</td>
</tr>
<tr>
<td>Piping and piping joints – LP-Gas</td>
<td>Check damage/ gas leakage</td>
<td>119</td>
</tr>
<tr>
<td>Engine crankcase – Gasoline and LP-Gas</td>
<td>Change oil</td>
<td>120</td>
</tr>
<tr>
<td>Engine crankcase – Diesel</td>
<td>Change oil and filter</td>
<td>121</td>
</tr>
</tbody>
</table>

The change intervals for **engine oil and filter** are depend on the percentage of sulfur in the diesel fuel. Check the following:

<table>
<thead>
<tr>
<th>Sulfur percentage</th>
<th>Oil grade spec.</th>
<th>Change interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 0.2 %</td>
<td>CF or higher</td>
<td>500 hrs. or 3 months*</td>
</tr>
<tr>
<td>0.2 to 0.5 %</td>
<td>CF or higher</td>
<td>300 hrs. or 3 months*</td>
</tr>
<tr>
<td>Over 0.5 %</td>
<td>CF or higher</td>
<td>200 hrs. or 3 months*</td>
</tr>
</tbody>
</table>

Whenever the engine oil is changed, the filter must be replaced at the same time with a genuine MCF oil filter.

**NOTICE:** For the description of ** marked items, refer to the TB45 gasoline engine service manual.
MAINTENANCE

- **Every 200 Service Hours or Monthly, Whichever Comes First, continued**

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mast strip roller surfaces</td>
<td>Lubricate</td>
<td>122</td>
</tr>
<tr>
<td>Lift bracket side rollers</td>
<td>Lubricate</td>
<td>122</td>
</tr>
<tr>
<td>Lift chains</td>
<td>Lubricate/ inspect</td>
<td>122</td>
</tr>
<tr>
<td>Tilt socket pins</td>
<td>Lubricate</td>
<td>122</td>
</tr>
<tr>
<td>Brake pedal</td>
<td>Lubricate</td>
<td>122</td>
</tr>
<tr>
<td>Rear axle center pins</td>
<td>Lubricate</td>
<td>123</td>
</tr>
<tr>
<td>Tie rod pins</td>
<td>Lubricate</td>
<td>123</td>
</tr>
<tr>
<td>Universal joint with grease nipple</td>
<td>Lubricate</td>
<td>123</td>
</tr>
</tbody>
</table>

- **Every 400 Service Hours or 2 Months, Whichever Comes First**

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine coolant – Gasoline</td>
<td>Change</td>
<td>124</td>
</tr>
</tbody>
</table>

- **Every 600 Service Hours or 3 Months, Whichever Comes First**

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake/exhaust valve clearance – Gasoline</td>
<td>Adjust</td>
<td>**</td>
</tr>
<tr>
<td>Injection nozzle – Gasoline and LP-Gas</td>
<td>Inspect</td>
<td>**</td>
</tr>
<tr>
<td>PCV valve and hose – Gasoline</td>
<td>Inspect</td>
<td>**</td>
</tr>
<tr>
<td>LP-Gas filter</td>
<td>Clean</td>
<td>**</td>
</tr>
<tr>
<td>Engine crankcase – Gasoline and LP-Gas</td>
<td>Change filter</td>
<td>127</td>
</tr>
</tbody>
</table>

- **Every 1200 Service Hours or 6 Months, Whichever Comes First**

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powershift transmission</td>
<td>Change oil/wash strainer</td>
<td>128</td>
</tr>
<tr>
<td>Hydraulic system</td>
<td>Change return oil filter/wash strainer</td>
<td>129</td>
</tr>
<tr>
<td>Differential</td>
<td>Change oil</td>
<td>130</td>
</tr>
<tr>
<td>Air cleaner element</td>
<td>Change element</td>
<td>130</td>
</tr>
<tr>
<td>Fuel filter – Diesel</td>
<td>Change</td>
<td>131</td>
</tr>
<tr>
<td>Engine coolant – Diesel</td>
<td>Change</td>
<td>133</td>
</tr>
</tbody>
</table>

- **Every 2400 Service Hours or 1 Year, Whichever Comes First**

<table>
<thead>
<tr>
<th>Item</th>
<th>Service</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic oil</td>
<td>Change</td>
<td>136</td>
</tr>
<tr>
<td>Brake fluid</td>
<td>Change</td>
<td>136</td>
</tr>
<tr>
<td>Fuel filter – LP-Gas</td>
<td>Change</td>
<td>**</td>
</tr>
</tbody>
</table>

**NOTICE:** For the description of ** marked items, refer to the TB45 gasoline engine service manual.
MAINTENANCE

◆ Every 10 Service Hours or Daily (Pre-Start), Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedures.

• Damage or Faulty Operation Found the Day Before
  – Have repairs been made properly?
    Check the daily inspection sheet.

.android

Fill out a daily inspection sheet. Remember, the complete performance of a daily inspection is the best protection against injury and property damage.

• Oil, Fuel or Coolant Leaks

Check on the floor for oil, fuel or coolant leaks.

• Lights

  – Are all the lights in safe working condition?
  – Are their lenses clean and not defective?
  – Do the tail and head lights come ON properly when you switch them on.

• Load Backrest Extension

  – Is the backrest extension free of distortion, cracks and other defects? Shake the backrest to check for excessive rattle.
MAINTENANCE

- **Tilt Cylinder Socket Bolts**

  - Are the bolts tightened properly?
  
  Use a wrench.

  NOTICE: After retightening the bolt, put a mark across the bolt and tilt cylinder socket. This permits you to easily notice loosening of the bolt.

  **Tightening Torque for the Bolt**

  \[ 262 \pm 13 \text{ N\cdot m} (27 \pm 1.4 \text{ kgf\cdot m}) \]
  \[ [193 \pm 9.6 \text{ lbf\cdot ft}] \]

- **Overhead Guard**

  1. Check the front and rear overhead guard mounting bolts on each side. Tighten bolts to 14.5 N\cdot m (1.5 kgf\cdot m) [10.7 lbf\cdot ft].
  2. Inspect overhead guard for bent or cracked sections. Contact your Cat lift truck dealer if repairs are needed.

- **Assist Grip**

  Inspect, and if necessary, tighten the screws of the assist grip.

- **Accelerator Pedal**

  - Can you depress the accelerator pedal smoothly without any sign of rubbing?

- **Brake Pedal**

  - Do you have sufficient pedal travel?
  - Is the free-play adjusted properly?

**Correct Free Play:**

<table>
<thead>
<tr>
<th>Unit: mm (in.)</th>
<th>4 ton models</th>
<th>4 to 15 (0.2 to 0.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 to 5 ton models</td>
<td>5 to 18 (0.2 to 0.7)</td>
<td></td>
</tr>
</tbody>
</table>
MAINTENANCE

• Inching Pedal

- Is the free play correct?

Correct Free Play

Unit: mm (in.)

| All models | 5 (0.2) |

• Parking Brake Lever

- Can you pull the lever all the way with reasonable effort?
- Can you hold your truck on a grade by pulling the brake lever?
- Lever operating effort:
  250 to 290 N (25 to 30 kgf) [55 to 66 lbf]

  Turn the knob clockwise to increase the lever’s tension; counterclockwise to decrease it. Adjustment is correct when the lever requires an effort of 250 to 290 N (25 to 30 kgf) [55 to 66 lbf] to snap it over center.

• Seat Belt

- Is the seat belt in safe condition? Replace the belt assembly if the belt is torn, cut, or if the plate and/or buckle is defective.

• Seat Adjustment

- Can you depress the pedals all the way?

NOTICE: See the topic, Adjustment under Operator’s Seat.
MAINTENANCE

• **Horn**
  
  – Does the horn sound properly when you push the switch?

• **Steering Wheel**
  
  – Is the free play 15 to 30 mm (0.6 to 1.2 in.)? Check the play at the rim of the wheel by rotating the wheel in both directions.
  
  – Is wheel installation loose? Check by shaking the wheel up and down.

• **Amount of Fuel (Truck level)**
  
  – Is the amount of fuel in the tank enough for the day’s work?

• **Stop Lights**
  
  – Do all stop lights come ON properly when you depress the brake pedal?

• **OK Monitor**
  
  – Do all the warning lamps glow when the key switch is in the l (ON) position?

**NOTICE:** When a lamp does not light with the key switch in the l (ON) position, the bulb may be burned out. Contact your Cat lift truck dealer if repairs are needed.
MAINTENANCE

Lift Chains

Check and Adjust

- Check the lift chains periodically and determine if they are still in usable condition.
- Check the lift chains for wear, cracks and worn or seized link pins.
- Improper maintenance of the lift chains can cause accidents. If something is wrong with the chains, consult your Cat lift truck dealer for repair or replacement.
- DO NOT put your foot under the fork.

1. Check the lift chains for wear. Use the following chart to determine if it is still in usable condition.

Lift Chain Elongation Limit: (/20 links)

<table>
<thead>
<tr>
<th>Lift Chain Elongation Limit: (/20 links)</th>
<th>4 ton models</th>
<th>518 mm (20.4 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.5 to 5 ton models</td>
<td>648 mm (25.5 in.)</td>
</tr>
</tbody>
</table>

To Adjust

1. Loosen the locknut ① and the nut ②. Then turn the nut ③ to adjust tension.
2. Hold the nut ③ and tighten the nut ② to torque A. Hold the nut ③ and tighten the locknut ① to torque B.

Tightening Torque:

<table>
<thead>
<tr>
<th>Unit: N•m (kgf•m) [lbf•ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ton models</td>
</tr>
<tr>
<td>A 103.0 (10.5) [76 0.0]</td>
</tr>
<tr>
<td>B 147.5 (15) [108 0.0]</td>
</tr>
<tr>
<td>4.5 to 5 ton models</td>
</tr>
<tr>
<td>A 139.0 (14.2) [103 0.0]</td>
</tr>
<tr>
<td>B 176.0 (18) [130 0.0]</td>
</tr>
</tbody>
</table>

WARNING!
MAINTENANCE

• Engine

Exhaust fumes can kill you! If it is necessary to start the engine in an enclosed area, make sure there is adequate ventilation.

Fire hazards! Clean up spillage of fuel, oil, or other flammable materials in the engine compartment. Know the location of all emergency devices (such as fire extinguisher, first aid kit, etc.) and how to use them.

Is exhaust smoke normal?
Listen for abnormal noise or excessive vibration.

• Service Brakes

Do the brakes apply and stop the truck properly—without dragging, chattering or squealing?

• Back-up Lights

When you move the direction lever into REVERSE position:
  – Do all back-up lights come ON?
  – Does the back-up buzzer sound?
MAINTENANCE

• Engine Crankcase
  Check Oil Level

**WARNING**

Hot oil and components could cause serious injury. Do not allow hot oil or components to contact your skin.

Park the lift truck with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked. The engine must be cooled down.
1. Raise the hood.
2. Remove the dipstick and wipe it clean, then insert it all the way.

3. Maintain the correct level range on the dipstick.

<table>
<thead>
<tr>
<th>Correct level range</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
</tr>
<tr>
<td>H</td>
</tr>
</tbody>
</table>

**CAUTION**

- Perform the work on level ground.
- Clean the filler hole to prevent dirt from dropping into the engine.
- DO NOT overfill.
- Clean up spillage.

1. Remove the oil filler cap.

**Adding Engine Oil**

1. Remove the oil filler cap.

<table>
<thead>
<tr>
<th>Gasoline</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Gasoline" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diesel" /></td>
</tr>
</tbody>
</table>
2. Add engine oil as required. For engine oil, see the topic, **Recommended Fuels and Oils**.

3. After adding oil, make sure the level is in the correct range on the dipstick.

4. Close and tighten the filler cap.
MAINTENANCE

- Engine Coolant
  Check Coolant Level

**WARNING**

At operating temperature, the engine coolant is hot and under pressure. Steam could cause injuries. DO NOT let it contact your skin and eyes.
To avoid having scalding coolant or steam blow out of the radiator, do not remove the radiator cap unless the engine is cold. Muffle the cap in a thick cloth and turn it slowly to release all pressure before removing the cap.

The lift truck must be level, the forks lowered, the parking brake applied, the transmission in NEUTRAL, engine stopped and the wheels blocked. The engine must be cooled down.

1. Raise the hood.
2. Maintain the coolant level between the FULL and LOW marks on the reserve tank.
3. Close and secure the hood.

**Adding Coolant**

**WARNING**

Keep fire away from undiluted antifreeze as it is FLAMMABLE.

**CAUTION**

DO NOT add water only. This dilutes the antifreeze/summer coolant protection and adversely affects the engine. Be sure to premix antifreeze/summer coolant with tap water (soft water). See the topic, **Engine Cooling System Capacity** under **Specifications**.
If coolant has to be added frequently, have your Cat lift truck dealer check the cooling system.

- Antifreeze/summer coolant (ASC) contains rust inhibitors. It is not necessary to add other chemicals.
- Recommended concentration range of ASC is 30% to 60% by volume. ASC of less than 30% concentration does not provide sufficient corrosion protection. Concentrations over 60% adversely affect freeze protection and heat transfer rates.
- Avoid mixing different brands of coolant.
- Select an ASC suitable for use in engines using aluminum alloy parts.
- Select an ASC which contains silicate of less than 0.2% by weight.
MAINTENANCE

1. Remove the reserve tank cap and add coolant to the FULL mark.
2. When adding coolant, maintain the same concentration of antifreeze solution.

NOTICE: The engine cooling system is protected to −30°C (22°F) with 50% concentration of antifreeze/summer coolant (ASC) when shipped from the factory.

3. Put the reserve tank cap back on.

WARNING

Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. Have your Cat lift truck dealer discard antifreeze solution drained from the engine.
1. Operate the lift truck for a few minutes to warm the oil.
2. Park the lift truck on a level surface, with the forks lowered, mast tilted back, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
3. Remove the hydraulic tank filler cap by turning it counterclockwise.
4. Add oil needed to raise it to the correct level range on the dipstick.
5. Put the hydraulic tank filler cap back on.
6. Check for oil leaks.
7. Close and secure the hood.

**Adding Hydraulic Oil**

- Perform the work on level ground.
- Clean the filler hole to prevent dirt from dropping into the tank.
- DO NOT overfill.
- Clean up spillage.

1. Remove the hydraulic tank filler cap.
2. Add oil to the hydraulic tank.
   For **Hydraulic Oil**, see the topic, **Recommended Fuel and Oils**.
3. After adding oil, make sure the level is in the correct range on the dipstick.
4. Insert the dipstick into the filler port and install the hydraulic tank filler cap securely.
5. Close and secure the hood.
MAINTENANCE

- Brake Fluid
  Check Level

**WARNING**

If the brake fluid in the reservoir decreases rapidly, the brake system is leaking.
Have your Cat lift truck dealer check the system.

**CAUTION**

Before refilling the reservoirs, clean the ports to reduce the risk of dirt from getting inside the reservoirs.

Park the lift truck with the forks lowered, parking brake applied, transmission in NEUTRAL, the engine stopped and the wheels blocked.

1. Check the brake fluid level at the reservoir.

2. Maintain the brake fluid level between the MAX and MIN marks on the reservoir.

**Adding Brake Fluid**

1. Remove the reservoir cap.
2. Add brake fluid to the reservoir.
3. Put the reservoir cap back on.
**MAINTENANCE**

- **Wheel Nuts**
  Check – Tighten, when required
  - Wheel nuts should be visually inspected everyday. Any loose nuts should be tightened and any missing or damaged nuts should be replaced.

  **Retightening**
  - Always stand behind the tread of the tire, NOT in front of the rim.
  - Tighten the nuts evenly and in a diagonal sequence to the specified torque.

  - Are the wheel nuts tightened properly? Use a torque wrench.

  **Tightening Torque**
  Unit: N·m (kgf·m) [lbf·ft]

<table>
<thead>
<tr>
<th></th>
<th>Front 4 ton models</th>
<th>4.5 to 5 ton models</th>
<th>Rear 4 to 5 ton models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>403 (41.1) [297]</td>
<td>551 (56.2) [406]</td>
<td>377 (38.5) [278]</td>
</tr>
</tbody>
</table>

- **Tires and Rims**
  Check
  - Is the tread area thickness more than service limit?
    If the thickness is less than service limit, the tire must be replaced. Do not replace the tire yourself. Consult your Cat lift truck dealer for tire replacement.
  - Are all the rims free of distortion or cracks?

![Warning Icon]

**WARNING**

Make sure the replacement tire is of the same size, type and load range.
MAINTENANCE

• Mast and Forks

Check

– Does the mast move up and down smoothly when you operate the lift control lever?
– Does the mast tilt forward and back smoothly when you operate the tilt control lever?
– Are there any oil leaks from the cylinders and hydraulic lines?
– Are the stoppers properly engaged?
– Are the forks free of distortion and cracks?
– Are the welds of the hangers free of cracks?

If the truck is being used to carry maximum capacity loads, the forks should be checked daily.

1. Carefully inspect the forks for cracks.
   Special attention should be given to the heel section A, all weld areas and mounting brackets B.
Forks with cracks should be removed from service.

   “Wet Test” magnetic particle inspection is generally preferred due to its sensitivity and the ease of interpreting the results. Portable equipment is usually recommended so it can be moved to the lift truck.
   Contact your Cat lift truck dealer for further information.

2. Check the difference in height of one fork tip to the other when mounted on the fork carrier. A difference in fork tip height can result in uneven support of the load and cause problems when entering loads.
   The maximum allowable difference in fork tip elevation C is 5 mm (0.2 in.) for pallet forks.
   Replace one or both forks when the difference in fork tip height exceeds the maximum allowable difference.
MAINTENANCE

3. Check the fork blade D. The fork should be withdrawn from service if the thickness is reduced to less than the tolerant thickness. Fork blade length may also be reduced by wear, especially on tapered forks and platens. Remove the forks from service when the blade length is no longer adequate for the intended loads.

Unit: mm (in.)

<table>
<thead>
<tr>
<th>Tolerant thickness</th>
<th>Std.</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ton models</td>
<td>50 (2.0)</td>
<td>43 (1.7)</td>
</tr>
<tr>
<td>4.5 ton model</td>
<td>50 (2.0)</td>
<td>46 (1.8)</td>
</tr>
<tr>
<td>5 ton models</td>
<td>60 (2.4)</td>
<td>48 (1.9)</td>
</tr>
</tbody>
</table>

- Battery
  - Check Electrolyte Level

1. If the electrolyte level is low, remove the filler caps and add distilled water to the cells. Before removing the caps, clean the top of the battery.
2. After adding the water, tighten the caps securely.

**WARNING**

If acid gets in your eyes, FLUSH THEM IMMEDIATELY WITH LARGE AMOUNTS OF WATER AND SEE A DOCTOR AT ONCE.

**CAUTION**

If distilled water has to be often added, have your Cat lift truck dealer check the battery.

3. Using a battery hydrometer, check the specific gravity of the battery cells. Take the reading at eye level.

<table>
<thead>
<tr>
<th>Specific gravity corrected to 20°C (68°F)</th>
<th>Battery condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.260 to 1.280</td>
<td>Fully charged</td>
</tr>
<tr>
<td>1.220 to 1.260</td>
<td>Three-fourths charged (to be recharged)</td>
</tr>
<tr>
<td>Below 1.220</td>
<td>Completely discharged (to be recharged and retested)</td>
</tr>
</tbody>
</table>
MAINTENANCE

◆ Every 50 Service Hours or Weekly, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operating or maintenance procedures.

- Air Cleaner Element
  Clean and Inspect

**WARNING**

When using compressed air for cleaning, wear an approved face shield and protective clothing.
Use a maximum air pressure of 2 kgf/cm² (30 psi) for cleaning purposes.

**NOTICE:**
Never service the air cleaner with the engine running.
Do not clean the elements by striking them against another object.
Always inspect the element before and after cleaning. Use a light inside the element.
Do not use elements with damaged pleats, gaskets or seals.
Park the lift truck on a level surface, with the forks lowered, the parking brake applied, the transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Raise the hood.
2. Remove the dust pan by releasing the latches at three places.
3. Unscrew the wing nut, and remove the element by pulling it.
4. Remove the cover from the dust pan, and clean the inside of the pan by removing dust.
5. Clean the inside of the air cleaner housing.
6. Direct air inside the element along the length of the pleats, and lightly tap it.
7. Insert a light inside a clean, dry element and check. Discard the element if tears or rips are found.
8. Put the element back in place.
9. Reinstall the dust cap.
10. Close the hood.
MAINTENANCE

- Alternator Drive Belt – Diesel
  Check and Adjust

  - After stopping the engine, check and adjust the rotating part.
  - After adjusting the belt, tighten the bracket bolt securely.
  - If the belt is too tight, unnecessary stresses are placed on the alternator bearing and belt. Such stresses will shorten the service life of both.
  - Keep the belt free of oil and grease to reduce the risk of slipping.

NOTICE: If it is difficult to adjust or replace the belts, consult your Cat lift truck dealer.

Park the lift truck on a level surface, with the forks lowered, the parking brake applied, the transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Raise the hood.
2. Push the belt downward with about 98 N (10 kgf) [22 lbf] pressure midway between the pulleys as shown.

<table>
<thead>
<tr>
<th>Deflection</th>
<th>11 to 13 mm (0.4 to 0.5 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTIFICATION:</td>
<td>If the deflection is out of the correct range, readjust the belt. Also, check the belt to make sure that it is not worn, frayed, or has separated piles.</td>
</tr>
</tbody>
</table>

3. Loosen the alternator bracket bolts (indicated by the black arrows), and move the alternator out or in.
4. Close and secure the hood.
MAINTENANCE

• Mast Supports

Lubricate 1 fitting on each support for a total of 2 fittings.

◆ One Month After Delivery of a New Truck

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

• Hydraulic Tank Return Oil Filter Change

  – Filter should be changed.

  See Hydraulic System, Change Return Oil Filter in the Every 1200 Service Hours.

• Fuel Filter – Diesel Change

  – Filter should be changed.

  See Fuel Filter – Diesel, Change in the Every 1200 Service Hours.

• Engine Crankcase – Gasoline and LP-Gas Change filter

  – Filter should be changed.

  See Engine Crankcase – Gasoline and LP-Gas, Change Filter in the Every 600 Service Hours.
MAINTENANCE
◆ Every 200 Service Hours or Monthly, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

- **Wheel Nuts Retighten**
  - Nuts should be retightened.

See Wheel Nuts, Check – Tighten, when required.

- **Differential Check Oil Level**
  Park the lift truck on a level surface, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
  1. Raise the lift bracket high enough to gain access to the level/fill plug.
  2. Use blocking under the inner mast to secure the lift bracket in this position.
  3. Remove the level/fill plug. Maintain lubricant level to the bottom of the plug brake operating.
  4. Clean the level/fill plug and put it back in place.
  5. Remove the blocking. Lower the lift bracket.

Adding Oil
See the topic, Differential, Change Oil under Every 1200 Service Hours or 6 Months, Whichever Comes First.
MAINTENANCE

- **Powershift Transmission**
  
  **Check Oil Level**

  ![WARNING]
  
  Hot oil and components could cause injury. Do not allow hot oil or components to contact your skin.

1. Operate the lift truck a few minutes to warm the oil.
2. Park the lift truck on a level surface with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
3. Remove the floor plate.
4. Remove the dipstick. Check the oil level.
5. Maintain the correct level range indicated on the dipstick.

**Adding Oil**

See the topic, **Powershift Transmission, Change the Oil** under **Every 1200 Service Hours or 6 Months, Whichever Comes First.**
• Alternator Drive Belt – Gasoline
Check and Adjust

- After stopping the engine, check and adjust the rotating part.
- After adjusting the belt, tighten the bracket bolt securely.
- If the belt is too tight, unnecessary stresses are placed on the alternator bearing and belt. Such stresses will shorten the service life of both.
- Keep the belt free of oil and grease to reduce the risk of slipping.

NOTICE: If it is difficult to adjust or replace the belts, consult your Cat lift truck dealer.

Park the lift truck on a level surface, with the forks lowered, the parking brake applied, the transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Raise the hood.
2. Push the belt downward with about 98 N (10 kgf) [22 lbf] pressure midway between the pulleys as shown.

| Deflection | 13 to 15 mm (0.5 to 0.6 in.) |

NOTICE: If the deflection is out of the correct range, readjust the belt.
Also, check the belt to make sure that it is not worn, frayed, or has separated piles.

3. Loosen the alternator bracket bolts (indicated by the black arrows), and move the alternator out or in.
4. Close and secure the hood.

• Piping and Piping joints – LP-Gas
Check Damage and Gas Leakage
- Inspect damage to piping and piping joints.
- Inspect gas leakage from them.
• Engine Crankcase – Gasoline and LP-Gas
  Change Oil

  **WARNING**
  
  Hot oil and components could cause serious injury. Do not allow hot oil or components to contact skin.

  1. Operate the lift truck a few minutes to warm the oil.
  2. Park the lift truck on a level surface with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
  3. Raise the hood.
  4. Remove the drain plug at the side of the engine oil pan. Allow the oil to drain. Clean and put the drain plug back in place.

  5. Fill the crankcase. See Refill Capacities and Lubrication Specifications charts.

  6. Start the engine and allow the oil to fill the filter and passages.
  7. Check for oil leaks.
  8. Stop the engine and measure the oil level. Maintain the correct level range on the dipstick.

  9. Close and secure the hood.
MAINTENANCE

- Engine Crankcase – Diesel
  Change Oil and Filter

**WARNING**

Hot oil and components could cause serious injury. Do not allow hot oil or components to contact skin.

1. Operate the lift truck a few minutes to warm the oil.
2. Park the lift truck on a level surface with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
3. Raise the hood.
4. Remove the drain plug at the side of the engine oil pan. Allow the oil to drain. Clean and put the drain plug back in place.

5. Remove and discard the oil filter element.
6. Wipe the sealing surface of the oil filter element mounting base.

Whenever the engine oil is changed, the filter must be replaced at the same time with a genuine MCF oil filter.

7. Apply a small amount of clean engine oil to the oil filter element gasket. Install the new filter element.

8. Fill the crankcase. See Refill Capacities and Lubrication Specifications charts.

9. Start the engine and allow the oil to fill the filter and passages.

10. Check for oil leaks.
11. Stop the engine and measure the oil level. Maintain the correct level range on the dipstick.

12. Close and secure the hood.
MAINTENANCE

- Mast Strip Roller Surfaces
  Lubricate

Lubricate 1 fitting on each side of the inner mast for a total of 2 fittings.

- Lift Bracket Side Rollers
  Lubricate

Lubricate 1 fitting on each side roller for a total of 2 fittings.

- Lift Chains
  Lubricate and Inspect

Lubricate each chain on the left and right of the mast.

1. Brush a film of engine oil onto the chain links, or spray with chain and cable lubricant.
2. Raise and lower the lift bracket a few times to work lubricant into the chain links.
   NOTICE: Lubricate chains more frequently than normal where the atmosphere can cause corrosion of components or when the truck must work in rapid lift cycles.
3. Inspect the chain anchors and individual links for wear, loose pins or cracked leaves.

- Tilt Socket Pins
  Lubricate

Lubricate 1 fitting on each pin for a total of 2 fittings.

- Brake Pedal
  Lubricate

Lubricate 1 fitting.
MAINTENANCE

• Rear Axle Center Pins
  Lubricate

Lubricate 1 fitting on each pin for a total of 2 fittings.

• Tie Rod Pins
  Lubricate

Lubricate 1 fitting on each pin for a total of 4 fittings.

• Universal Joint – with Grease Nipple
  Lubricate

Lubricate 2 fittings.
MAINTENANCE
◆ Every 400 Service Hours or 2 Months, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

- Engine Coolant – Gasoline Change

See the topic, Engine Coolant, Check Level under Every 10 Service Hours or Daily, whichever comes first.

1. Loosen the radiator cover retaining knob.
Lift and remove the radiator cover.

2. Turn the radiator filler cap slowly to relieve the pressure, then remove the cap.

At operating temperature, the engine coolant is hot and under pressure. Steam could cause severe burns. Park the lift truck in an authorized refueling area, with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked. Check the coolant level only after the engine has been stopped and the filler cap is cool enough to touch with your bare hand. Remove the filler cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with your skin and eyes to reduce the risk of burns and other injuries. Allow cooling system components to cool before draining.
Use all cleaning solutions with care.
Antifreeze is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. For disposal of the antifreeze coolant drained from the engine, consult your Cat lift truck dealer.

Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. Have your Cat lift truck dealer discard antifreeze solution drained from the engine.

1. Loosen the radiator cover retaining knob. Lift and remove the radiator cover.

2. Turn the radiator filler cap slowly to relieve the pressure, then remove the cap.

WARNING

Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. Have your Cat lift truck dealer discard antifreeze solution drained from the engine.

WARNING

Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. Have your Cat lift truck dealer discard antifreeze solution drained from the engine.
MAINTENANCE

3. Open radiator drain valve. Allow the coolant to drain.

4. Drain the reserve tank.

5. Close the radiator drain valve.

6. Fill the cooling system with 1 kg (2 lb) sodium bisulfate per 40 liters (10 gallons) of water. Most commercial cooling system cleaners can be used.

7. Start and run the engine for 30 minutes.

8. Stop the engine and drain the cleaning solution.

9. Flush the system with clean water until the draining water is clear.

10. Close the drain valve. Fill the system with neutralizing solution, 250 g (1/2 lb) sodium carbonate per 40 liters (10 gallons) of water.

11. Start and run the engine for 10 minutes.

12. Stop the engine and drain the neutralizing solution.

13. Flush the system with clean water until draining water is clear.

14. Close the drain valve.

15. Mix a coolant solution of water and antifreeze.

16. Fill the cooling system. See Refill Capacities. To avoid air locks, add the coolant slowly.

17. Start and run the engine until the coolant level is stabilized.

18. Stop the engine.

19. Add coolant, if necessary, to maintain the level to below the bottom of the filler tube.

20. Put the radiator filler cap back on.
21. Remove the reserve tank filler cap.
22. Keep the coolant level at the FULL line on the reserve tank.
23. Put the reserve tank filler cap back on.
MAINTENANCE
◆ Every 600 Service Hours or 3 Months, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

- Engine Crankcase – Gasoline and LP-Gas

  Change Filter

  ![Warning]

  Hot oil and components could cause serious injury. Do not allow hot oil or components to contact skin.

1. Operate the lift truck a few minutes to warm the oil.
2. Park the lift truck on a level surface with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.
3. Raise the hood.
4. Remove and discard the oil filter element.
5. Wipe the sealing surface of the oil filter element mounting base.
6. Apply a small amount of clean engine oil to the oil filter element gasket. Install the new filter element.
7. Fill the crankcase if required. See Refill Capacities and Lubrication Specifications charts.
8. Start the engine and allow the oil to fill the filter and passages.
9. Check for oil leaks.
10. Stop the engine and measure the oil level. Maintain the correct level range on the dipstick.

11. Close and secure the hood.
MAINTENANCE
◆ Every 1200 Service Hours or 6 Months, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

- Powershift Transmission
  Change Oil and Wash Strainer

**WARNING**

Hot oil and components could cause serious injury. Do not allow hot oil or components to contact your skin.

Park the lift truck on a level surface with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Remove the drain plug ①. Allow the oil to drain. Remove the cover ②, the O-ring seal and the strainer.

2. Wash the strainer and the plug in clean, nonflammable solvent. Dry the strainer and the plug. Wipe off the O-ring seal, check and replace if necessary. Install the strainer, the O-ring seal, and the cover. Put the drain plug back in place.

3. Remove the floor plate.
4. Remove the filler cap ③. Fill the transmission with oil. See Refill Capacities. Put the filler cap ③ back in place.
5. Start the engine.
6. Run the engine at low idle.
7. Stop the engine.
8. Remove the dipstick ④. Check the oil level.
9. Add oil, if needed, to reach the correct level range on the dipstick ④.
10. Check for oil leaks at the strainer and drain plug.
11. Put the floor plate back in place.
- **Hydraulic System**  
  Change Return Oil Filter and Wash Strainer

  **WARNING**

  Hot oil components can cause personal injury. Do not allow hot oil or components to contact your skin.

  At operating temperature, the hydraulic tank is hot and can be under pressure.

Park the lift truck with the forks lowered on a level surface, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Raise the hood.
2. Remove the battery and tank cover.
3. Remove the hose.
4. Remove the gasket and strainer ①.
5. Remove the gasket and return oil filter ②. Discard the filter element.
6. Clean the filter parts and replace the seal and gasket, if necessary. Install a new filter element.
7. Put the filter body assembly back in place and tighten the retaining bolts.
8. Wash the strainer in clean, nonflammable solvent.
9. Inspect the gasket and replace it, if necessary.
10. Put the strainer, gasket, cover and battery back in place.
11. Remove the filler cap. Check the oil level.
12. Add oil, if needed, to reach the correct level range on the dipstick.
13. Put the dipstick and filler cap back in place.
14. Check for oil leaks.
15. Close and secure the hood.
MAINTENANCE

- Differential Change Oil

Park the lift truck on a level surface, parking brake applied, transmission in NEUTRAL, forks lowered, lubricant warm, engine stopped and the wheels blocked.

1. Raise the lift bracket high enough to gain access to the level/fill plug ➁.
2. Use blocking under inner mast to secure the lift bracket in this position.
3. Remove the drain plug ➀ and the level/fill plug ➁.
4. Allow the oil to drain. Clean and reinstall the drain plug.
5. Fill with oil to the bottom of the level/fill hole.
6. Put the level/fill plug back in place.
7. Remove blocking. Lower the lift bracket.

- Air Cleaner Element Change

Cat Lift Trucks strongly recommends that the air cleaner element be changed if it is dirty. If you attempt to clean the element, handle it carefully.

<table>
<thead>
<tr>
<th>Recommended change intervals</th>
<th>Normal conditions</th>
<th>Severe dust or lint conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every 1200 service hours or 6 months, whichever comes first</td>
<td>Every 200 service hours or monthly, whichever comes first</td>
<td></td>
</tr>
</tbody>
</table>

Care in Severe Dust or Lint Conditions

Check the radiator core frequently for clogging or dirt accumulation. Clean or wash the truck as needed.

See the topic, Air Cleaner Element, Clean and Inspect under Every 50 Hours or Weekly, whichever comes first.
MAINTENANCE

• Fuel Filter – Diesel
  Change

WARNING

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire. Clean up any spillage of fuel. Know the location of all emergency devices (such as fire extinguishers, first aid kits, etc.) and how to use them.

Disconnect the battery when changing fuel filters.

NOTICE: Engine must be stopped and cool. Park the lift truck in an authorized refueling area, with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Raise the hood.
2. The fuel filter is located on the right side of the truck. Remove the filter.

3. Use filter wrench to remove filter element.
5. Apply a light coat of engine oil to the gasket of the new filter element.

6. Install the new filter element by hand until the gasket contacts the filter base.
7. Start the engine and check for fuel leaks.
8. Stop the engine.
9. Close and secure the hood.
How to Prime the Diesel Fuel System

NOTICE: If the engine runs out of fuel, it cannot be started even if the fuel tank is filled. In such a case, prime the fuel system as follows:

1. Loosen the air vent plug ① on the fuel filter about 1.5 turns with a wrench.
2. Unlock priming pump plunger ② by turning it counterclockwise. Operate the priming pump until the fuel flows free of bubbles from the vent.
3. Tighten air vent plug ①.

CAUTION:
- Make sure no fuel leaks from the air vent plug.
- Clean up spillage.
MAINTENANCE

- Engine Coolant – Diesel Change

See the topic, Engine Coolant, Check Level under Every 10 Service Hours or Daily, whichever comes first.

Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. Have your Cat lift truck dealer discard antifreeze solution drained from the engine.

1. Loosen the radiator cover retaining knob.

Lift and remove the radiator cover.

At operating temperature, the engine coolant is hot and under pressure. Steam could cause severe burns. Park the lift truck in an authorized refueling area, with the forks lowered, parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.

Check the coolant level only after the engine has been stopped and the filler cap is cool enough to touch with your bare hand.

Remove the filler cap slowly to relieve pressure.

Cooling system conditioner contains alkali. Avoid contact with your skin and eyes to reduce the risk of burns and other injuries. Allow cooling system components to cool before draining.

Use all cleaning solutions with care.

Antifreeze is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER. For disposal of the antifreeze coolant drained from the engine, consult your Cat lift truck dealer.

2. Turn the radiator filler cap slowly to relieve the pressure, then remove the cap.

For diesel engine model, also remove the engine block drain plug.
3. Open radiator drain valve. Allow the coolant to drain.

4. Drain the reserve tank.

5. Close the radiator drain valve.

6. Fill the cooling system with 1 kg (2 lb) sodium bisulfate per 40 liters (10 gallons) of water. Most commercial cooling system cleaners can be used.

7. Start and run the engine for 30 minutes.

8. Stop the engine and drain the cleaning solution.

9. Flush the system with clean water until the draining water is clear.

10. Close the drain valve. Fill the system with neutralizing solution, 250 g (1/2 lb) sodium carbonate per 40 liters (10 gallons) of water.

11. Start and run the engine for 10 minutes.

12. Stop the engine and drain the neutralizing solution.

13. Flush the system with clean water until draining water is clear.

14. Close the drain valve.

15. Mix a coolant solution of water and antifreeze.

16. Fill the cooling system. See Refill Capacities. To avoid air locks, add the coolant slowly.

17. Start and run the engine until the coolant level is stabilized.

18. Stop the engine.

19. Add coolant, if necessary, to maintain the level to below the bottom of the filler tube.

20. Put the radiator filler cap back on.
21. Remove the reserve tank filler cap.
22. Keep the coolant level at the FULL line on the reserve tank.

23. Put the reserve tank filler cap back on.
MAINTENANCE

◆ Every 2400 Service Hours or 1 Year, Whichever Comes First

You must read and understand the warnings and instructions contained in this manual before performing any operation or maintenance procedure.

- Hydraulic Oil
  Change

WARNING
Hot oil and components could cause serious injury. Do not allow hot oil or components to contact your skin.
The engine has been stopped and the filler cap is cool enough to remove with your bare hand.
Remove the filler cap slowly to relieve pressure.

Park the lift truck with the forks lowered on a level surface parking brake applied, transmission in NEUTRAL, engine stopped and the wheels blocked.

1. Operate the lift truck to warm the oil.
2. Park the lift truck with forks lowered, parking brake applied, transmission in NEUTRAL, and engine stopped.
3. Remove the filler cap.

4. Remove the hydraulic tank drain plug. Allow the oil to drain. Clean and put the plug back in place.

5. Fill the hydraulic tank. See Refill Capacities. Put the filler cap back on.

6. Start the engine and operate the hydraulic controls and the steering system through a few cycles to fill the filters and lines.

7. Retract all hydraulic cylinders and stop the engine.

8. Remove the filler cap and the dipstick. Keep the oil level at the HIGH mark on the dipstick.

9. Put the dipstick and the filler cap back in place.

- Brake Fluid
  Change

NOTICE: When changing fluid consult with your Cat lift truck dealer.
MAINTENANCE

◆ Parts to be Changed Periodically

The following parts should be periodically changed as noted below.
These parts are made of materials which will deteriorate as time goes by. Further, it is difficult to determine visually whether or not they are still in good condition. Changing at proper intervals will reduce the risk of injury to the operator and damage to the truck.

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Parts to be changed</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LP-Gas repair kit (Converter and fuel lock filter)</td>
<td>2400 service hours or 1 year, whichever comes first</td>
</tr>
<tr>
<td>2</td>
<td>Cups and dust seals of the wheel cylinders</td>
<td>2400 service hours or 1 year, whichever comes first</td>
</tr>
<tr>
<td>3</td>
<td>Cup and dust seal of the master cylinder</td>
<td>2400 service hours or 1 year, whichever comes first</td>
</tr>
<tr>
<td>4</td>
<td>Power steering hoses</td>
<td>4800 service hours or 2 years, whichever comes first</td>
</tr>
<tr>
<td>5</td>
<td>Fuel hoses (Include LP-Gas)</td>
<td>4800 to 9600 service hours or 2 to 4 years, whichever comes first</td>
</tr>
<tr>
<td>6</td>
<td>Inner rubber parts of the power steering cylinders</td>
<td>4800 service hours or 2 years, whichever comes first</td>
</tr>
<tr>
<td>7</td>
<td>Lift chains</td>
<td>4800 to 9600 service hours or 2 to 4 years, whichever comes first</td>
</tr>
<tr>
<td>8</td>
<td>Hydraulic hoses on and around mast</td>
<td>2400 to 4800 service hours or 1 to 2 years, whichever comes first</td>
</tr>
</tbody>
</table>

NOTICE: Periodic changes of these parts are not covered by Warranty.
Fuel Information

Use only fuel recommended in this section.

- **Gasoline (Gas) Specification**

Your lift truck must use unleaded gasoline only.

**Oxygenated Gasoline**

Some gasoline sold at service stations contains oxygenates such as ethanol, methanol, and MTBE (Methyl Tertiary Butyl Ether), although it may not be so identified. The use of fuels containing oxygenates is not recommended.

**Ethanol (Gasohol)**

A mixture of 10% ethanol (grain alcohol) and 90% unleaded gasoline may be used in your lift truck provided the octane rating is at least as high as that recommended for unleaded gasoline.

**Methanol**

Do not operate your lift truck on gasoline containing methanol (wood alcohol). The use of this type of alcohol can result in lift truck performance problems and could damage critical fuel system parts.

**MTBE (Methyl Tertiary Butyl Ether)**

A mixture of 15% or less MTBE and unleaded gasoline may be used in your lift truck provided the octane rating is at least as high as that recommended for unleaded gasoline.

**NOTICE:** If you experience driving problems which you suspect are fuel related, try switching to a different fuel.
Fuel Information

Use only fuel recommended in this section.

- **Gasoline (Gas) Specification**

Your lift truck must use unleaded gasoline only.

**Oxygenated Gasoline**

Some gasoline sold at service stations contains oxygenates such as ethanol, methanol, and MTBE (Methyl Tertiary Butyl Ether), although it may not be so identified. The use of fuels containing oxygenates is not recommended.

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A mixture of 10% ethanol (grain alcohol) and 90% unleaded gasoline may be used in your lift truck provided the octane rating is at least as high as that recommended for unleaded gasoline.

**Methanol**

Do not operate your lift truck on gasoline containing methanol (wood alcohol). The use of this type of alcohol can result in lift truck performance problems and could damage critical fuel system parts.

**MTBE (Methyl Tertiary Butyl Ether)**

A mixture of 15% or less MTBE and unleaded gasoline may be used in your lift truck provided the octane rating is at least as high as that recommended for unleaded gasoline.

**NOTICE:** If you experience driving problems which you suspect are fuel related, try switching to a different fuel.
SERVICE DATA

• Diesel Fuel Specifications
  
  – Types of Fuel
  The preferred fuels provide maximum engine service life and performance. They are distillate fuels. They are commonly called diesel fuel, furnace oil, gas oil or kerosene (for cold weather operation).
  Mitsubishi Caterpillar Forklift America Inc. strongly encourages the use of fuels that meet the Preferred Fuels specification.

  – Fuel Sulfur Content
  The percentage of sulfur in the fuel will affect the engine oil recommendations. Fuel sulfur is chemically changed during combustion to form both sulfurous and sulfuric acid. These acids chemically attack metal surfaces and cause corrosive wear.
  Any API classification performance of oil should have sufficient TBN for fuels with less than 0.5% sulfur. For fuels with 0.5% to 1.5% sulfur by weight, engine oil must have a TBN of 20 times the percentage of fuel sulfur as measured by the ASTM (American Society of Testing Materials) D-2896 method. (ASTM D-2896 can normally be found at your local technological society, library or college.)

• Liquefied Petroleum (LP-Gas) Specifications
  Use grade HD5 LPB. LP-Gas is a highly volatile fuel with an octane rating of 100 to 140. Follow local ordinances regarding storage and/or filling of LP-Gas tanks.
SERVICE DATA

Coolant Information

**NOTICE:**

Mitsubishi Caterpillar Forklift America Inc. recommends that the coolant mix contain 50% commercially available automotive antifreeze, and 50% water.

To reduce the risk of damage to your engine, never add coolant to an overheated engine. Allow the engine to cool first.

Dowtherm 209 full-fill coolant will lower the water pump cavitation temperature and cooling boiling point. These lowered temperatures will cause overheating at a lower ambient temperature than an ethylene glycol and water mix. If Dowtherm is used, follow the instructions provided and use only the inhibitor package recommended by the supplier.

If the lift truck is to be stored in, or shipped to, an area with freezing temperatures, the cooling system must be protected to the lowest expected outside (ambient) temperature.

The engine cooling system is protected with a commercially available automotive antifreeze when shipped from the factory.

In cold weather, check the specific gravity of the coolant frequently to ensure adequate protection.

Clean the cooling system if it is contaminated, the engine overheats or foaming is observed in the radiator.

Old coolant should be drained, the system cleaned and new coolant added – as recommended – using a commercially available automotive antifreeze.

Filling at over 20 liters (5 U.S. gallons) per minute can cause air pockets in the cooling system.

After draining and refilling the cooling system, run the engine with the radiator cap off. Run it until the coolant reaches its normal operating temperatures and the coolant level stabilizes. Add coolant as necessary to fill the system to the proper level.

Operate with a thermostat in the cooling system all year-round. Cooling system problems can arise without a thermostat.

**Coolant Water**

Hard water, or water with high levels of calcium and magnesium ions, encourages the formation of insoluble chemical compounds by combining with cooling system additives such as silicates and phosphates.

The tendency of silicates and phosphates to precipitate out-of-solution increases with increasing water hardness. Hard water, or water with high levels of calcium and magnesium ions, encourages the formation of insoluble chemicals, especially after a number of heating and cooling cycles.

Mitsubishi Caterpillar Forklift America Inc. prefers the use of distilled water or deionized water to reduce the potential and severity of chemical insolubility.

<table>
<thead>
<tr>
<th>Acceptable Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water content</td>
</tr>
<tr>
<td>Chlorides (Cl)</td>
</tr>
<tr>
<td>Sulfates (SO₄)</td>
</tr>
<tr>
<td>Total hardness</td>
</tr>
<tr>
<td>Total solids</td>
</tr>
<tr>
<td>pH</td>
</tr>
</tbody>
</table>

ppm = parts per million

Using water that meets the minimum acceptable water requirement may not prevent dropout of these chemical compounds completely but should control the dropout rate at acceptable levels.
SERVICE DATA

- Antifreeze

NOTICE:
Mitsubishi Caterpillar Forklift America Inc. recommends that the coolant mix contain 50% commercially available automotive antifreeze, or equivalent, and acceptable water to maintain an adequate water pump cavitation temperature for efficient water pump performance.

Premix the coolant solution to provide protection to the lowest expected outside (ambient) temperature. Pure undiluted antifreeze will freeze at -23°C (-10°F).

Use a greater concentration (above 50%) of commercially available automotive antifreeze only as needed for anticipated outside (ambient) temperatures. Do not exceed the coolant-to-water mix ratio recommendations provided with the commercially available automotive antifreezes.

Most commercial antifreezes are formulated for gasoline engine applications and will, therefore, have high silicate content.

Make Proper Antifreeze Additions.
Do not add pure (100%) antifreeze to the cooling system. Add antifreeze mixed with water using the same freeze protection ratio that is in your cooling system.
### SERVICE DATA

#### Recommended Fuels and Oils

<table>
<thead>
<tr>
<th>Fuel or oil</th>
<th>Recommendation</th>
<th>Recommendation for ambient temperatures °C (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>Consult your local Cat lift truck dealer</td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gasoline models</td>
<td>API service classification SJ, min.</td>
<td>SAE10W-30</td>
</tr>
<tr>
<td>Diesel models</td>
<td>API service classification CD, min.</td>
<td>SAE10W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAE30</td>
</tr>
<tr>
<td>Gear oil</td>
<td>API service classification multipurpose type GL-4 or GL-5</td>
<td>SAE80W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAE90</td>
</tr>
<tr>
<td>Transmission oil</td>
<td>Dexron II</td>
<td>Consult your local Cat lift truck dealer</td>
</tr>
<tr>
<td>Hydraulic oil</td>
<td>ISO VG32</td>
<td></td>
</tr>
<tr>
<td>Brake fluid</td>
<td>F.M.V.S.S. No. 116–DOT3 or DOT4 (SAE J1703)</td>
<td></td>
</tr>
<tr>
<td>Grease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel bearings</td>
<td>NLGI No. 2 grade multipurpose type (lithium base), consistency: 265 - 295</td>
<td></td>
</tr>
<tr>
<td>Chassis</td>
<td>NLGI No. 1 grade multipurpose type (lithium base), consistency: 310 - 340</td>
<td></td>
</tr>
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</table>

#### Antifreeze solution

<table>
<thead>
<tr>
<th>Ambient temperature, °C (°F)</th>
<th>-45 (-49)</th>
<th>-39 (-38)</th>
<th>-30 (-22)</th>
<th>-25 (-13)</th>
<th>-20 (-4)</th>
<th>-15 (5)</th>
<th>-10 (14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration (%)</td>
<td>60</td>
<td>55</td>
<td>50</td>
<td>45</td>
<td>40</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

**NOTICE:** Avoid mixing lubricants. In some cases, different brands of lubricants are not compatible with each other and deteriorate when mixed. It is best to stick with the same brand at successive service intervals. For refill capacities and measurements, see **Specifications** in this section.
## SERVICE DATA

Below oils are reference only.

### Engine Oils (Gasoline)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Viscosity</th>
<th>API service classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobil</td>
<td>Mobil 1 10W-30</td>
<td>SAE10W-30</td>
</tr>
<tr>
<td>Shell</td>
<td>Shell Fleet 10W-30</td>
<td>—</td>
</tr>
<tr>
<td>Exxon</td>
<td>XD-3 10W-30</td>
<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>Castrol GTX 10W-30</td>
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### Engine Oils (Diesel)

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<thead>
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<tbody>
<tr>
<td>Mobil</td>
<td>Mobil Delvac 1210</td>
<td>SAE10W</td>
</tr>
<tr>
<td>Shell</td>
<td>Shell Rotella T 10W</td>
<td>SAE10W</td>
</tr>
<tr>
<td>Exxon</td>
<td>XD-3 10W</td>
<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>Castrol Syntec 10W-30</td>
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### Transmission Oils

<table>
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<th>API service classification</th>
</tr>
</thead>
<tbody>
<tr>
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<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Shell</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Exxon</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>—</td>
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### Transmission Oils

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<th>API service classification</th>
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</thead>
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<tr>
<td>Shell</td>
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<td>—</td>
</tr>
<tr>
<td>Exxon</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>—</td>
<td>—</td>
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</tbody>
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### Brake Fluids/Clutch Oil

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<tr>
<td>Mobil</td>
<td>Mobil Delvac 1230</td>
<td>SAE30</td>
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<tr>
<td>Shell</td>
<td>Shell Rotella T 30</td>
<td>SAE30</td>
</tr>
<tr>
<td>Exxon</td>
<td>XD-3 30</td>
<td>—</td>
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<tr>
<td>Castrol</td>
<td>—</td>
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### Engine Oils (Gasoline)

<table>
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<tbody>
<tr>
<td>Mobil</td>
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<td>—</td>
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<tr>
<td>Shell</td>
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<td>—</td>
</tr>
<tr>
<td>Exxon</td>
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<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>—</td>
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### Gear Oils

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<th>API service classification</th>
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</thead>
<tbody>
<tr>
<td>Mobil</td>
<td>Mobilube HD 80W-90</td>
<td>SAE80W</td>
</tr>
<tr>
<td>Shell</td>
<td>Shell Spirax HD 80W-90</td>
<td>SAE90</td>
</tr>
<tr>
<td>Exxon</td>
<td>Gear Oil GX80W-90</td>
<td>—</td>
</tr>
<tr>
<td>Castrol</td>
<td>Castrol Hypoy 80W-90</td>
<td>—</td>
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### Greases

<table>
<thead>
<tr>
<th>NLGI No. 1</th>
<th>NLGI No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency 310 - 340</td>
<td>Consistency 265 - 295</td>
</tr>
<tr>
<td>Mobilux EP 1</td>
<td>Mobilux EP 2</td>
</tr>
<tr>
<td>Retinax HD NLGI 1</td>
<td>Retinax HD NLGI 2</td>
</tr>
<tr>
<td>Ronex Extra Duty 1</td>
<td>Ronex Extra Duty 2</td>
</tr>
<tr>
<td>Castrol EPL1</td>
<td>Castrol EPL2</td>
</tr>
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</table>

### Antifreeze/Summer Coolant

- Full Force
- USI Chemical
- Marcus
- Peak
**SERVICE DATA**

- **Hydraulic oils**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobil</td>
<td>Mobiltrans HD 10W</td>
</tr>
<tr>
<td>Shell</td>
<td>Tellus T-32</td>
</tr>
<tr>
<td>Exxon</td>
<td>Nuto H32</td>
</tr>
<tr>
<td>Castrol</td>
<td>Castrol Hyspin AWH-M32</td>
</tr>
</tbody>
</table>

**NOTICE:**
Brands of oil are subject to change without notice. When you buy oil, check specification. (For example: API service classification CD, SAE10W)
### SERVICE DATA

**Specifications and Refill Capacities (Standard Models)**

<table>
<thead>
<tr>
<th>Item</th>
<th>GP40K</th>
<th>GP40KL</th>
<th>GP45K</th>
<th>GP50K</th>
<th>DP40K</th>
<th>DP40KL</th>
<th>DP45K</th>
<th>DP50K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternator drive belt deflection - when pushed with 98 N (10 kgf) [22 lbf] pressure, mm (in.)</td>
<td>13 to 15 (0.5 to 0.6)</td>
<td>11 to 13 (0.4 to 0.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spark plugs</td>
<td>1.24 (0.049)</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type – NGK</td>
<td>BPR4ES</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine idling speed, rpm</td>
<td>650 to 700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steering wheel free-play - when measured at rim with engine idling, mm (in.)</td>
<td>15 to 30 (0.6 to 1.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inching pedal free play, mm (in.)</td>
<td>5 (0.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake pedal free-play, mm (in.)</td>
<td>4 to 15 (0.2 to 0.6)</td>
<td>5 to 18 (0.2 to 0.7)</td>
<td>4 to 15 (0.2 to 0.6)</td>
<td>5 to 18 (0.2 to 0.7)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Parking brake lever effort, N (kgf) [lbf]</td>
<td>250 to 290 (25 to 30) [55 to 66]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tire size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear Single</td>
<td>7.50 - 16 - 12 PR(I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual</td>
<td>7.00 - 12 - 12 PR(I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front single</td>
<td>800 (8.0) [14]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front dual</td>
<td>700 (7.0) [100]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear</td>
<td>700 (7.0) [100]</td>
<td>850 (8.5) [120]</td>
<td>700 (7.0) [100]</td>
<td>850 (8.5) [120]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening torque for wheel nuts, N-m (kgf-m) [lbf-ft]</td>
<td>Front</td>
<td>403 (41.1) [297]</td>
<td>551 (56.2) [406]</td>
<td>403 (41.1) [297]</td>
<td>551 (56.2) [406]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear</td>
<td>377 (38.5) [278]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lift chain elongation limit, mm (in.)/20 links</td>
<td>518 (20.4)</td>
<td>648 (25.5)</td>
<td>518 (20.4)</td>
<td>648 (25.5)</td>
<td></td>
<td></td>
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</table>
### SERVICE DATA

<table>
<thead>
<tr>
<th>Item</th>
<th>Truck model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP40K</td>
</tr>
<tr>
<td>Fuel tank</td>
<td></td>
</tr>
<tr>
<td>115 (30)</td>
<td></td>
</tr>
<tr>
<td>Engine cooling system —</td>
<td></td>
</tr>
<tr>
<td>0.65 litre (1.4 pt) reserve tank included</td>
<td></td>
</tr>
<tr>
<td>11.2 (3.0)</td>
<td></td>
</tr>
<tr>
<td>14.7 (3.9)</td>
<td></td>
</tr>
<tr>
<td>Crankcase</td>
<td></td>
</tr>
<tr>
<td>7.3 (1.9)</td>
<td></td>
</tr>
<tr>
<td>11 (2.9)</td>
<td></td>
</tr>
<tr>
<td>Engine oil</td>
<td></td>
</tr>
<tr>
<td>Oil filter</td>
<td></td>
</tr>
<tr>
<td>0.3 (0.08)</td>
<td></td>
</tr>
<tr>
<td>1 (0.3)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>7.6 (2.0)</td>
<td></td>
</tr>
<tr>
<td>12 (3.2)</td>
<td></td>
</tr>
<tr>
<td>Transmission</td>
<td></td>
</tr>
<tr>
<td>14 (3.7)</td>
<td></td>
</tr>
<tr>
<td>15 (4.0)</td>
<td></td>
</tr>
<tr>
<td>14 (3.7)</td>
<td></td>
</tr>
<tr>
<td>15 (4.0)</td>
<td></td>
</tr>
<tr>
<td>Differential (P/T)</td>
<td></td>
</tr>
<tr>
<td>9.1 (2.4)</td>
<td></td>
</tr>
<tr>
<td>Hydraulic tank</td>
<td></td>
</tr>
<tr>
<td>64.5 (17.0)</td>
<td></td>
</tr>
<tr>
<td>Brake fluid reservoir, cc (cu in.)</td>
<td></td>
</tr>
<tr>
<td>150 (9.2)</td>
<td></td>
</tr>
<tr>
<td>Battery electrolyte specific gravity corrected to 20° C (68° F)</td>
<td></td>
</tr>
<tr>
<td>1.28</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Refill capacities (approximate), litre (U.S. gal.)

### Capacity and Truck Weight (Standard Models)

<table>
<thead>
<tr>
<th>Item</th>
<th>Truck model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP40K</td>
</tr>
<tr>
<td>Capacity, kg (lb)</td>
<td></td>
</tr>
<tr>
<td>600 mm (24 in.)</td>
<td>—</td>
</tr>
<tr>
<td>500 mm (24 in.)</td>
<td>4000 (8000)</td>
</tr>
<tr>
<td>Truck weight, unloaded kg (lb)</td>
<td></td>
</tr>
<tr>
<td>Single drive tires</td>
<td>5570 (12300)</td>
</tr>
<tr>
<td>Dual drive tires</td>
<td>5700 (12550)</td>
</tr>
</tbody>
</table>
◆ The Importance of Genuine Parts

The dealers and the owners are urged to use ONLY Genuine Parts to maintain lift trucks in a safe and efficient operating condition.

Safe and efficient operation of your lift truck could be endangered by the use of inferior parts. In most cases, imitations sold as cheap parts invariably could mean short life and high cost.

The use of other than genuine parts could cause damage not covered by your Cat lift trucks warranty.

Genuine parts give safe and reliable performance.
TO THE CAT LIFT TRUCK OWNER

◆ Instructions for Ordering Parts

When ordering parts, or when asking your lift truck dealer to have your truck repaired, be sure to provide the TRUCK SERIAL NUMBER and the ENGINE SERIAL NUMBER.

Manufacturer’s Name Plate

Each lift truck has a name plate. It tells you the:
Truck serial number.
Truck model designation.
TO THE CAT LIFT TRUCK OWNER

SERVICE REGISTRATION

<table>
<thead>
<tr>
<th>Truck model, Serial No.</th>
<th>Engine model, Serial No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mast model, Serial No.</td>
<td>Attachment model, Serial No.</td>
</tr>
<tr>
<td>Delivering dealer</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Address</td>
</tr>
<tr>
<td></td>
<td>Delivery date</td>
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</tbody>
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Fill out this sheet for your ready reference.
## Transfer of Ownership Report for Mitsubishi Caterpillar Forklift America Inc. Customers Only

### TRANSFER REPORT

<table>
<thead>
<tr>
<th>DISTRIBUTED BY:</th>
<th>MODEL</th>
<th>SERIAL NUMBER</th>
<th>HOUR METER</th>
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</thead>
<tbody>
<tr>
<td>Mitsubishi Caterpillar Forklift America Inc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2121 W. Sam Houston Parkway N.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houston, TX 77043-2305</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax: (713) 365-1414</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attn: Marketing Services</td>
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### TRANSFERRED FROM

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<table>
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<th>COUNTY</th>
<th>STATE</th>
<th>ZIP</th>
<th>COUNTRY</th>
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<th>COUNTY</th>
<th>STATE</th>
<th>ZIP</th>
<th>COUNTRY</th>
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<table>
<thead>
<tr>
<th>CUSTOMER'S PRINCIPAL BUSINESS</th>
<th>CUSTOMER CONTACT</th>
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<table>
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<th>(AREA CODE) TELEFAX NUMBER</th>
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</thead>
<tbody>
<tr>
<td>(                   )</td>
<td>(                   )</td>
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</tbody>
</table>

CUSTOMER’S SIGNATURE: ___________________________  DATE: ____________

Copies distributed to:
- Dealer Sales Department
- Dealer Service Department/Warranty
- MCFA Marketing Services [FAX (713) 365-1414]
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Accelerator Pedal</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Accelerator Pedal, Check (Every 10 Service Hrs.)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Adding Engine Coolant</td>
<td>107–108</td>
</tr>
<tr>
<td></td>
<td>Adding Engine Oil</td>
<td>105–106</td>
</tr>
<tr>
<td></td>
<td>Adding Hydraulic Oil</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>After Starting Engine</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Air Cleaner Warning Light</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Air Cleaner, Care in Severe Dust and Lint Conditions</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>Air Cleaner, Change Element (Every 1200 Service Hrs.)</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>Air Cleaner, Clean/Inspect (Every 50 Service Hrs.)</td>
<td>114</td>
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<tr>
<td></td>
<td>Alternator Not Charging Warning Light</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Alternator, Drive Belt – Diesel, Check-Adjust (Every 50 Service Hrs.)</td>
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