CAT Lift Trucks

Operation & Maintenance Manual

MC

GP15N	CT25C-55001-59999
GP15ZN	CT34-52001-59999
GP18N	CT25C-75001-79999
GP18ZN	CT34-72001-79999
GP20CN	CT34-22001-29999
GP20N	CT17D-10001-19999
GP20ZN	CT35-10001-19999
GP25N	CT17D-60001-69999
GP25ZN	CT35-60001-69999
GP30N	CT13F-40001-49999
GP35N	CT13F-60001-69999
GPE15N	CT34-00001-09999
GPE18N	CT34-40001-49999
GPE20CN	CT34-30001-39999
GPE20N	CT17D-20001-29999
GPE20ZN	CT35-20001-29999
GPE25N	CT17D-70001-79999
GPE25ZN	CT35-70001-79999
GPE30N	CT13F-10001-19999
GPE35N	CT13F-80001-89999
DP15N	CT16D-54001-59999
DP18N	CT16D-74001-79999
DP20CN	CT16D-24001-29999
DP20N	CT18C-20001-29999
DP25N	CT18C-70001-79999
DP30N	CT14E-10001-19999
DP35N	CT14E-80001-89999

Keep this manual in your lift truck as a ready reference

99710-3E130

FOREWORD

The Occupational Safety and Health Administration (OSHA) prohibits employees under the age of 18 years old from operating lift trucks, and 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 read this manual to understand the following points:

(1) Working capabilities and limitations of the lift truck
(2) Make-up of the lift truck
(3) Safe driving and load handling procedures

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

It is also important that 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.

Note:

- This manual contains information necessary for the operation and 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 authorized Cat lift truck dealer.
  They will be glad to help you and answer any questions you may have about operating your new lift truck. Lift trucks are NOT intended for use on public roads.
- If you resell a lift truck, be sure to attach the original Operation & Maintenance Manual to the lift truck. In some countries, strict regulations DO NOT allow imported lift trucks for resale. For resale information, contact your authorized Cat lift truck dealer.
- If a lift truck is resold from another country, an Operation & Maintenance Manual attached to the lift truck may not meet your country's rules and regulations. For manual information, contact your authorized Cat lift truck dealer.

◆How to Use This Manual

The following safety signs and NOTE 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.

Be sure to read these precautionary instructions and all safety related decals installed on your lift truck before you operate it.

⚠ DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
Note:	This indicates important matters and useful information on operation and maintenance.

Mitsubishi Logisnext Asia Pacific Pte. Ltd. (MLAP) 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 MLAP is used, you must satisfy yourself that it does not pose a safety hazard to yourself 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.

All information, specifications, and illustrations in this manual are based on the latest data available at the time of publication. 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 authorized Cat lift truck dealer before starting any job. Additional manuals are available from your authorized Cat lift truck dealer.

DIRECTIONAL TERMS:

The directions "Left", "Right", "Front", and "Rear" are given from the viewpoint of the operator facing forward.

▶ Truck Models Covered in This Manual

Truck Model	Serial Number	Engine
GP15N	CT25C-55001-59999	GK15
GP15ZN	CT34-52001-59999	GK21
GP18N	CT25C-75001-79999	GK15
GP18ZN	CT34-72001-79999	GK21
GP20CN	CT34-22001-29999	GK21
GP20N	CT17D-10001-19999	GK21
GP20ZN	CT35-10001-19999	GK25
GP25N	CT17D-60001-69999	GK21
GP25ZN	CT35-60001-69999	GK25
GP30N	CT13F-40001-49999	GK25
GP35N	CT13F-60001-69999	GK25
GPE15N	CT34-00001-09999	GK21E
GPE18N	CT34-40001-49999	GK21E
GPE20CN	CT34-30001-39999	GK21E
GPE20N	CT17D-20001-29999	GK21E
GPE20ZN	CT17D-70001-79999	GK25E
GPE25N	CT35-20001-29999	GK21E
GPE25ZN	CT35-70001-79999	GK25E
GPE30N	CT13F-10001-19999	GK25E
GPE35N	CT13F-80001-89999	GK25E

Truck Model	Serial Number	Engine
DP15N	CT16D-54001-59999	S4Q2
DP18N	CT16D-74001-79999	S4Q2
DP20CN	CT16D-24001-29999	S4Q2
DP20N	CT18C-20001-29999	S4S
DP25N	CT18C-70001-79999	S4S
DP30N	CT14E-10001-19999	S4S
DP35N	CT14E-80001-89999	S4S

Abbreviation

- MC is short for mechanical control levers.

◆LOCKOUT/TAGOUT

LOCKOUT is not only used to disconnect a power supply, but also to physically isolate power sources from supplying power to the lift truck, with a lockout device, disabling the lift truck.

TAGOUT also reduces the risk of operating the machine during LOCKOUT with the use of a "DO NOT OPERATE" or similar warning tag. Warning tags are ideally placed on the lockout device to indicate the lift truck must not be operated until the tag is removed. Combined use of LOCKOUT/TAGOUT reduces the risk of accidental or inadvertent operation.

A lift truck that has been LOCKED OUT and TAGGED OUT must not be operated until the required service has been completed and the lift truck is no longer LOCKED OUT and TAGGED OUT.

⚠ WARNING

- Personnel could be exposed to death or serious injury if LOCKOUT/TAGOUT procedure is not performed prior to servicing the lift truck.
- Only the trained technician who performs the LOCKOUT/TAGOUT procedure must release the lift truck back into service.
- Only proper LOCKOUT/TAGOUT devices must be used.

⚠ WARNING

Basic requirements before servicing equipment:

- Wear appropriate personal protective equipment.
- Move equipment to secure maintenance area.
- Park the lift truck on hard and level surface with the forks lowered until the forktips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.
- Turn the key switch to the OFF position.
- Remove the key from the key switch.

Typical LOCKOUT/TAGOUT procedures are shown below:

Engine lift truck

(1) Remove the key to the lift truck from the key switch and access the battery compartment.
(2) Remove the negative (-) battery cable from the battery terminal and place in the proper lockout device.
(3) Lock the lockout device with the negative (-) battery cable locked inside.
(4) TAGOUT the lift truck by placing a "DO NOT OPERATE" or similar warning tag where it can be visibly seen.
(5) After the work is finished, the technician with the key to the lift truck must unlock the lockout device and remove the tag.

Battery lift truck

(1) Remove the key to the lift truck from the key switch and access the battery compartment.
(2) Disconnect the battery plug/connector and their connections from the lift truck and place in the proper lockout device.
(3) Lock the lockout device.
(4) TAGOUT the lift truck by placing a "DO NOT OPERATE" or similar warning tag where it can be visibly seen.
(5) After the work is finished, the technician with the key to the lift truck must unlock the lockout device and remove the tag.

■ SAFETY RULES FOR LIFT TRUCK OPERATORS

◆ 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 that they have been reproduced verbatim.

All lift truck users should be familiar with their Local, Regional, and National regulations. Operate this lift truck in accordance with local regulations.

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

Be professional.

Do not operate your 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, then contact your authorized Cat lift truck dealer.

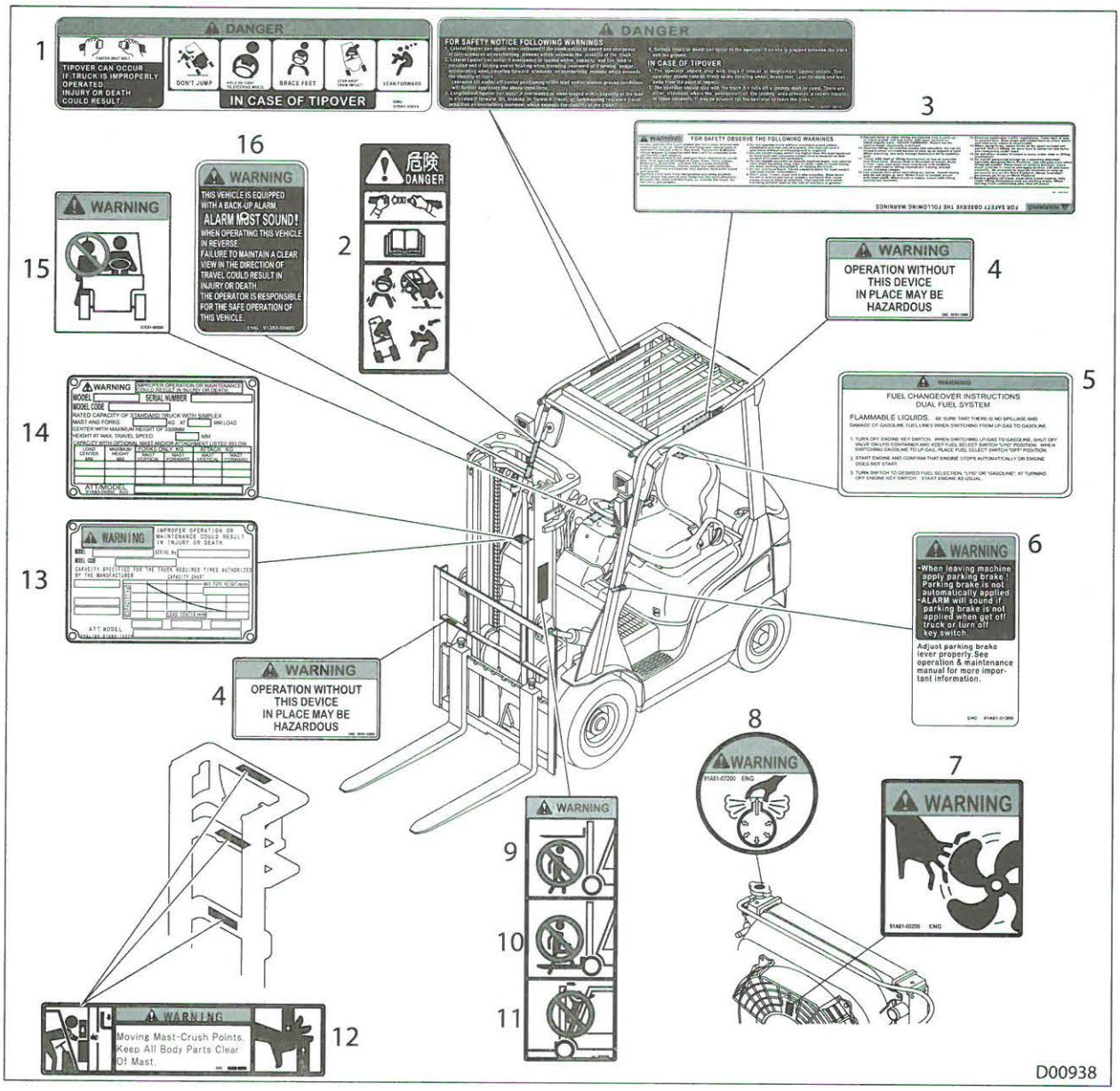
Do not attempt any adjustments or repairs unless you are trained and authorized to do so.

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 contact your authorized Cat lift truck dealer for the latest available information.

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

◆ Warning Decals, Location

- There are several specific decals on your lift truck. Their exact location and description of the potential hazard are reviewed in this manual. Please take the time to familiarize yourself with these decals.
- Make sure you can read all 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 authorized Cat lift truck dealer for new decals.

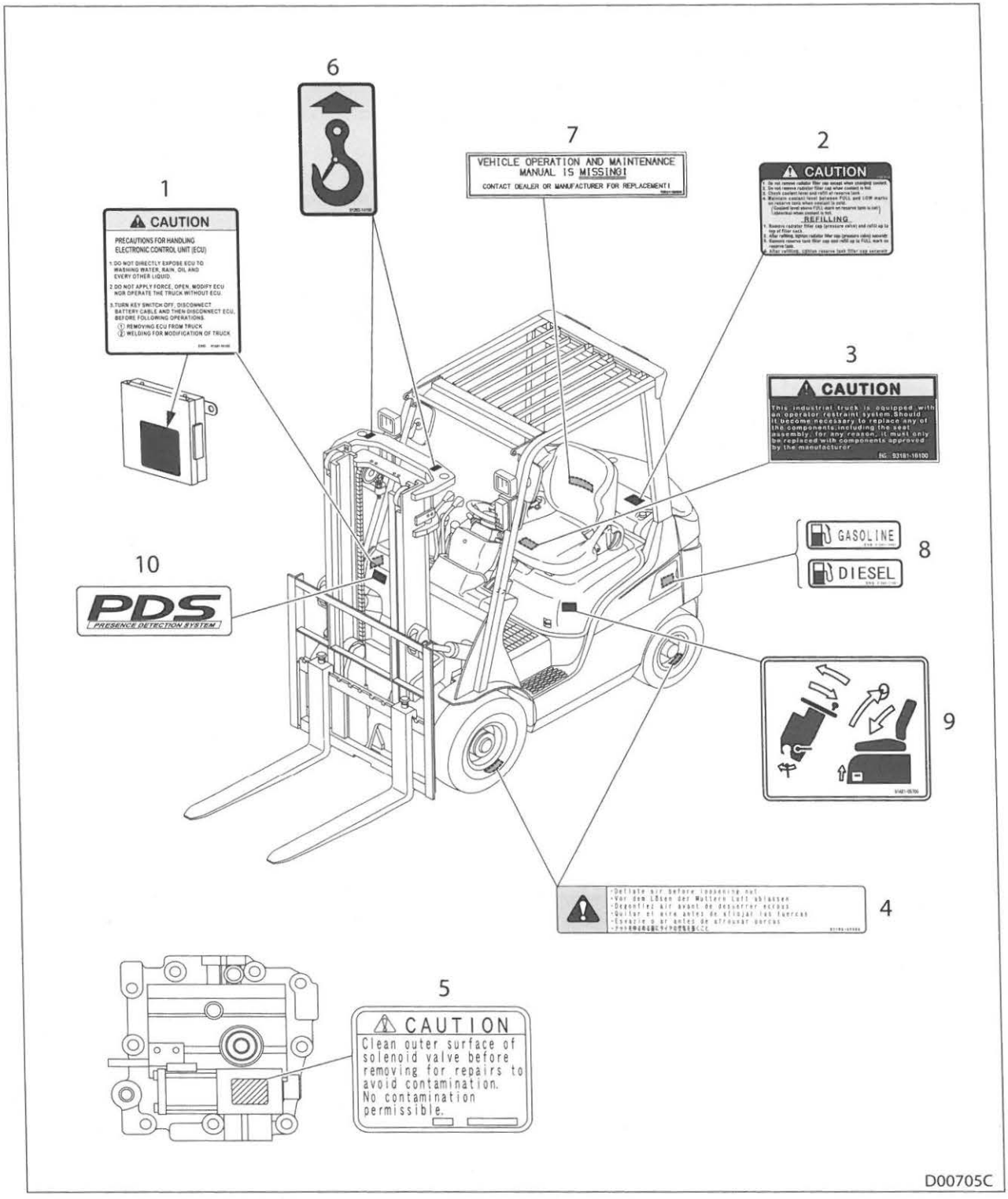


DANGER

(1) Survive in a Tipover Decal
(2) Fasten Seat Belt Decal

WARNING

(3) Operation Warning Decal
(4) With Overhead Guard Decal/ With Load Backrest Extension Decal
(5) Dual Fuel Instruction Decal
(6) Parking Brake Adjustment Decal
(7) Stay Clear of Moving Fan Decal
(8) Radiator Cap Warning Decal
(9) No One under Forks Decal
(10) No One on Forks Decal
(11) No One Between Mast and Body Decal
(12) Operation Warning Decal
(13) Capacity Plate
(14) Capacity Plate (for Australia)
(15) No Riders Warning Decal
(16) Backup Alarm Decal



CAUTION

(1) Precautions for Handling E.C.U. Decal
(2) Engine Coolant Decal
(3) Operator Restraint System Decal
(4) Deflate Air Before Loosening Nut Decal
(5) No Contamination Permissible Decal

OTHERS

(6) Hoist Point Decal
(7) Operate with OMM Decal
(8) Fuel Decal
(9) How to Open Engine Hood
(10) Presence Detection System Decal

◆ Warning Decals, Description

▶ Survive in a Tipover Decal

⚠ DANGER

TIPOVER CAN OCCUR IF TRUCK IS IMPROPERLY OPERATED.
INJURY OR DEATH COULD RESULT.

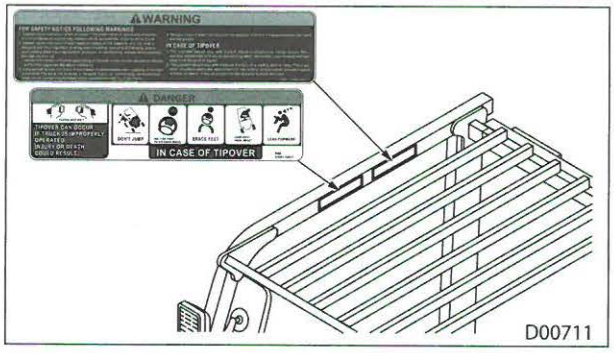
⚠ WARNING

FOR SAFETY NOTICE FOLLOWING WARNINGS

(1) Lateral tipover can occur when unloaded if the combination of speed and sharpness of turn produces an overturning moment which exceeds the stability of the lift truck.

(2) Lateral tipover can occur if overloaded or loaded within capacity and the load is elevated and if turning and/or braking when traveling rearward or if turning and/or accelerating when traveling forward produces an overturning moment which exceeds the stability of the lift truck.

- Rearward tilt and/or off-center positioning of the load and/or uneven ground conditions will further aggravate the above conditions.



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(3) Longitudinal tipover can occur if overloaded or when loaded within capacity of the load is elevated if forward tilt, braking in forward travel, or commencing rearward travel produces an overturning moment which exceeds the stability of the lift truck.

(4) Serious injury or death can occur to the operator if he/she is trapped between the lift truck and the ground.

IN CASE OF TIPOVER

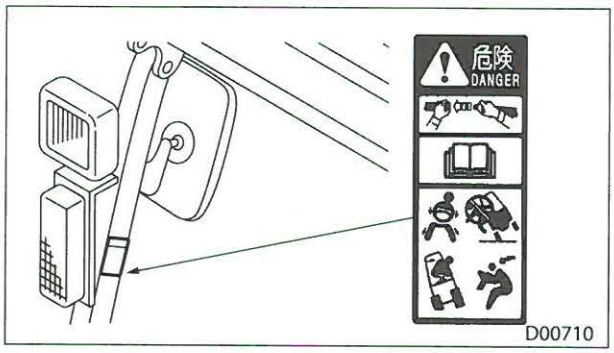
(1) The operator should stay with truck if lateral or longitudinal tipover occurs. The operator should hold on firmly to the steering wheel, brace feet, lean forward, and lean away from the point of impact.

(2) The operator should stay with the lift truck if it falls off a loading dock or ramp. There are other situations where the environment of landing area presents a severe hazard. In those incidents, it may be prudent for the operator to leave the lift truck.

▶ Tipover Warnings

⚠ DANGER

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



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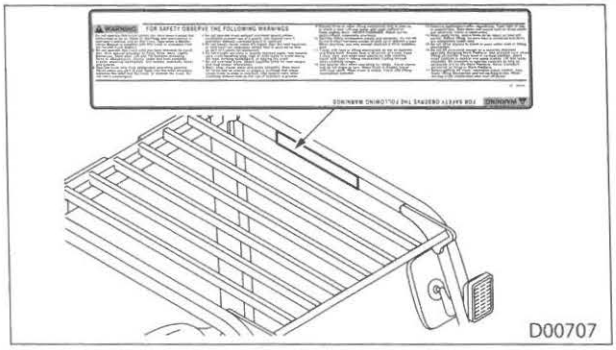
▶ Operation Warning Decal

⚠ WARNING

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 operator manual and on this truck. Operation & Maintenance Manual is supplied with this truck or available from our Cat lift truck dealers.

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

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

(4) Do not operate the lift truck without the overhead guard, unless conditions prevent use of a guard. Use special care if operation without overhead guard is required.

(5) Do not handle loads which are higher than the load backrest or load backrest extension unless 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 lift truck.

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

(8) Start, stop, travel, steer, and brake smoothly. Slow down for turns and on uneven or slippery surfaces that could cause truck to slide or overturn. Use special care when traveling without 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 load or lifting mechanism as low as possible and tilted back. Always look in direction of travel. Keep a clear view, and when load interferes with visibility, travel with load or lifting mechanism trailing (except when climbing ramps).

(12) Use special care when operating on ramps--- travel slowly, and DO NOT angle or turn. When truck is loaded, travel with load uphill. When truck is empty, travel with 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, space forks as far apart as load will permit. Before lifting, be sure load is centered and forks are completely under load.

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

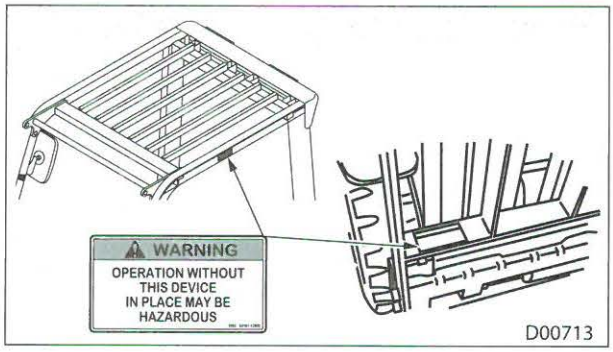
(16) Do not lift personnel except on a securely attached specially designed Work Platform. Use extreme care when lifting personnel. Place mast in vertical position, place truck controls in neutral and apply brakes. Lift and lower smoothly. Be available to operate controls as long as personnel are on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

(17) Before getting off truck, neutralize travel control, fully lower lifting mechanism and set parking brake. When leaving truck unattended, also shut off power.

▶ With Overhead Guard Decal / Load Backrest Extension

⚠ WARNING

OPERATION WITHOUT THIS DEVICE IN PLACE MAY BE HAZARDOUS



▶ Duel Fuel Instruction Decal

⚠ WARNING

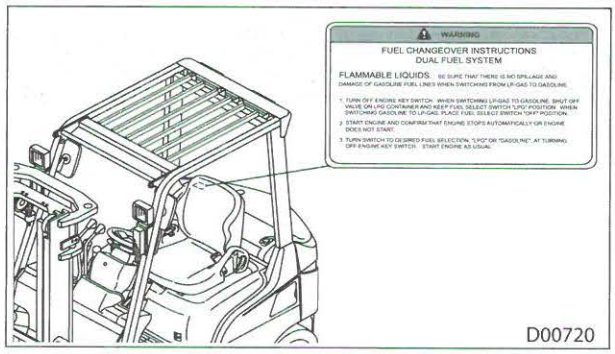
FUEL CHANGEOVER INSTRUCTIONS
DUAL FUEL SYSTEM

FLAMMABLE LIQUIDS. BE SURE THAT THERE IS NO SPILLAGE AND DAMAGE OF GASOLINE FUEL LINES WHEN SWITCHING FROM LPG TO GASOLINE.

(1) TURN OFF ENGINE KEY SWITCH. WHEN SWITCHING LPG TO GASOLINE, SHUT OFF VALVE ON LPG CONTAINER AND KEEP FUEL SELECT SWITCH "LPG" POSITION. WHEN SWITCHING GASOLINE TO LPG, PLACE FUEL SELECT SWITCH "OFF" POSITION.

(2) START ENGINE AND CONFIRM THAT ENGINE STOPS AUTOMATICALLY OR ENGINE DOES NOT START.

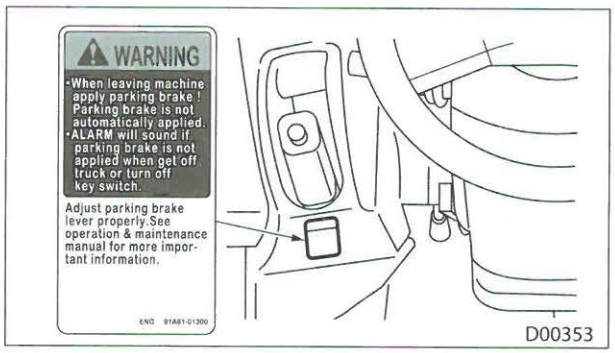
(3) TURN SWITCH TO DESIRED FUEL SELECTION, "LPG" or "GASOLINE", AT TURNING OFF ENGINE KEY SWITCH. START ENGINE AS USUAL.



▶ Parking Brake Adjustment Decal

⚠ WARNING

- When leaving machine, apply parking brake! Parking brake is not automatically applied.
- ALARM will sound if parking brake is not applied when get off the lift truck or turn off the key switch.
- Adjust parking brake lever properly. See operation & maintenance manual for more important information.

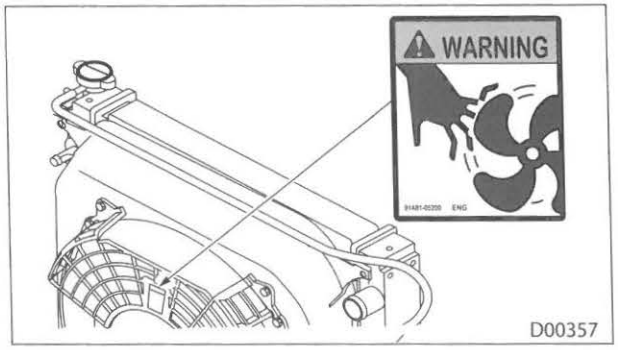


Model	Operating Force
1 ton model	150 to 200 N (15 to 20 kgf) [33 to 44 lbf]
2 ton model	200 to 250 N (20 to 25 kgf) [44 to 55 lbf]
3 ton model	230 to 250 N (23 to 25 kgf) [50 to 55 lbf]

▶ Cooling Fan

⚠ WARNING

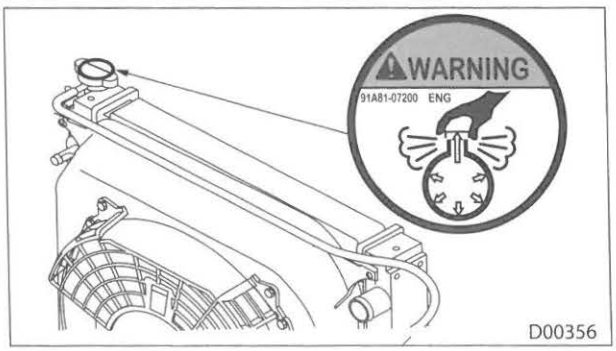
To avoid serious injury, stay clear of the moving fan.



▶ Radiator Cap

⚠ WARNING

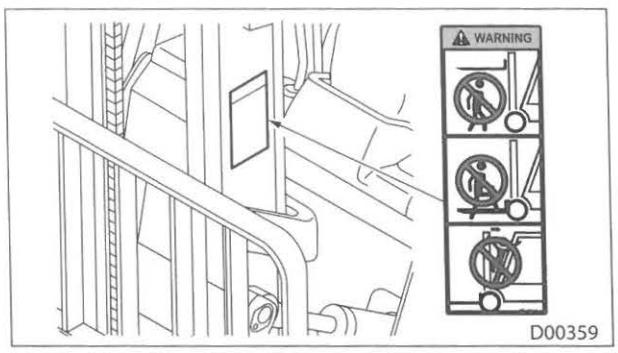
Check the coolant level only after the engine has been stopped and the filler cap is cool enough to touch with your hands. Remove the filler cap slowly to relieve pressure.



▶ 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.
- DO NOT place any part of your body between the mast and the lift truck chassis.

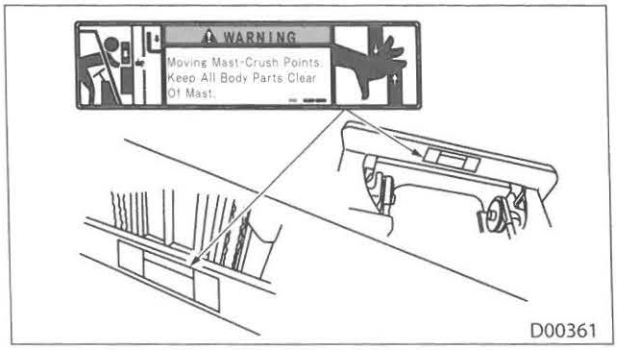


▶ Crush and Pinch Points

⚠ WARNING

Moving Mast-Crush Points.

Keep All Body Parts Clear Of Mast.

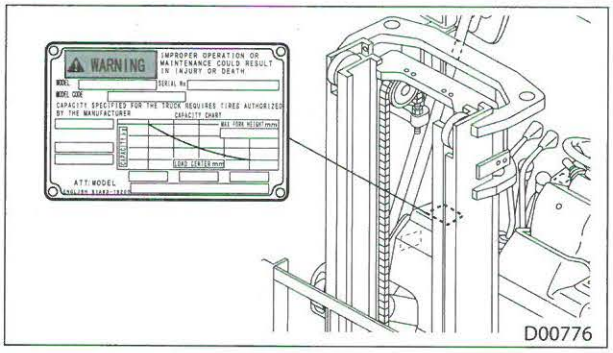


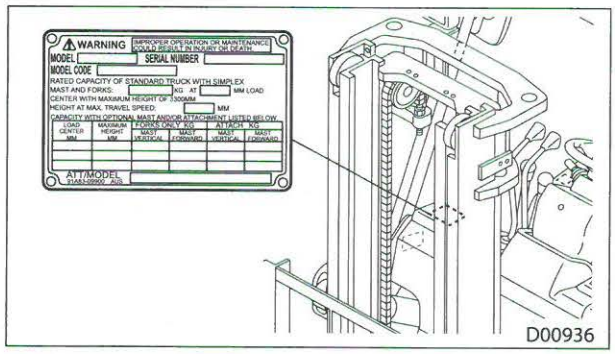
▶ Capacity Plate

⚠ WARNING

IMPROPER OPERATION OR MAINTENANCE COULD RESULT IN INJURY OR DEATH

CAPACITY SPECIFIED FOR THE TRUCK REQUIRES TIRES AUTHORIZED BY THE MANUFACTURER.



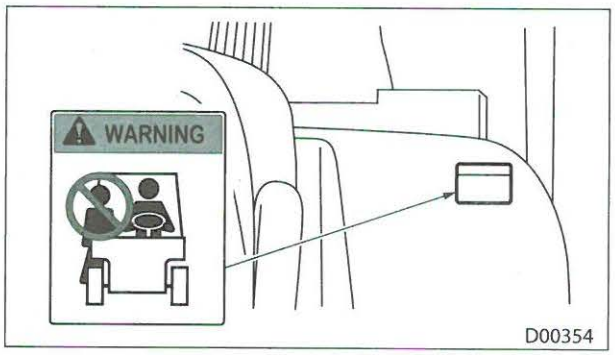


For Australia

▶ No Riders Warning Decal

⚠ WARNING

To avoid serious injury, DO NOT carry passengers. This lift truck is designed for only one operator and no riders.



▶ Backup Alarm Decal

⚠ WARNING

THIS VEHICLE IS EQUIPPED WITH A BACKUP ALARM.

ALARM MUST SOUND!

WHEN OPERATING THIS VEHICLE IN REVERSE.
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 VEHICLE.

▶ Precautions for Handling E.C.U Decal

⚠ CAUTION

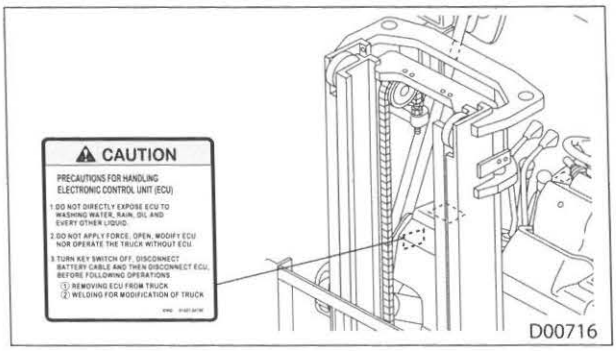
PRECAUTIONS FOR HANDLING ELECTRONIC CONTROL UNIT (ECU)

(1) DO NOT DIRECTLY EXPOSE ECU TO WASHING WATER, RAIN, OIL AND EVERY OTHER LIQUID.

(2) DO NOT APPLY FORCE, OPEN, MODIFY ECU NOR OPERATE THE TRUCK WITHOUT ECU.

(3) TURN KEY SWITCH OFF, DISCONNECT BATTERY CABLE AND THEN DISCONNECT ECU, BEFORE FOLLOWING OPERATIONS.

- REMOVING ECU FROM TRUCK
- WELDING FOR MODIFICATION OF TRUCK



▶ Engine Coolant Decal

⚠ CAUTION

(1) Do not remove radiator filler cap except when replacing coolant.

(2) Do not remove radiator filler cap when coolant is hot.

(3) Check coolant level and refill at reserve tank.

(4) Maintain coolant level between FULL and LOW marks on reserve tank when coolant is cold. (Coolant level above FULL mark on reserve tank is not abnormal when coolant is hot.)

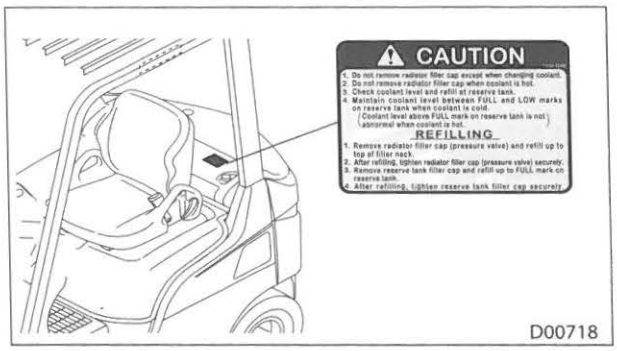
REFILLING

(1) Remove radiator filler cap (pressure valve) and refill up to top of filler neck.

(2) After refilling, tighten radiator filler cap (pressure valve) securely.

(3) Remove reserve tank filler cap and refill up to FULL mark on reserve tank.

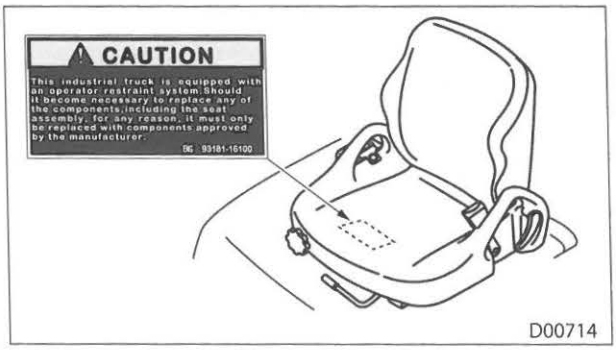
(4) After refilling, tighten reserve tank filler cap securely.



▶ Operator Restraint System Decal

⚠ CAUTION

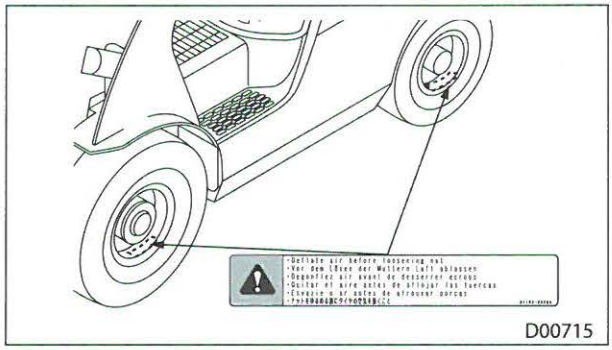
This industrial truck is equipped with an operator restraint system. Should it become necessary to replace any of the components, including the seat assembly, for any reason, it must only be replaced with components approved by the manufacturer.



▶ Deflate Air Before Loosening Nut Decal

⚠ CAUTION

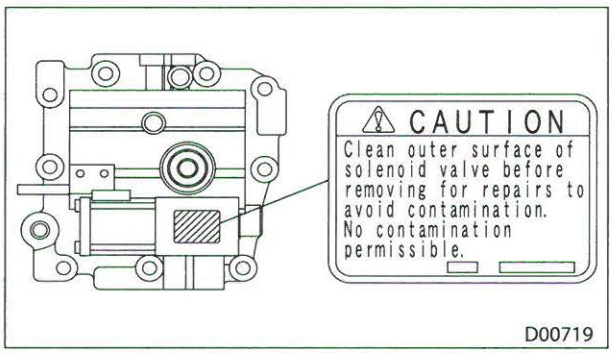
- Deflate air before loosening nut



▶ No Contamination Permissible Decal

⚠ CAUTION

Clean outer surface of solenoid valve before removing for repairs to avoid contamination. No contamination permissible.

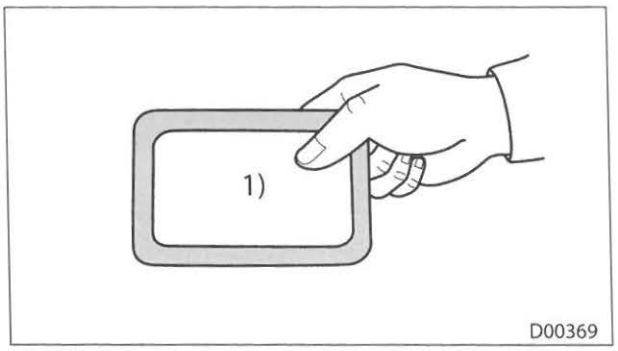


◆ Safety Rules

⚠ WARNING

Authorized and trained operators only!

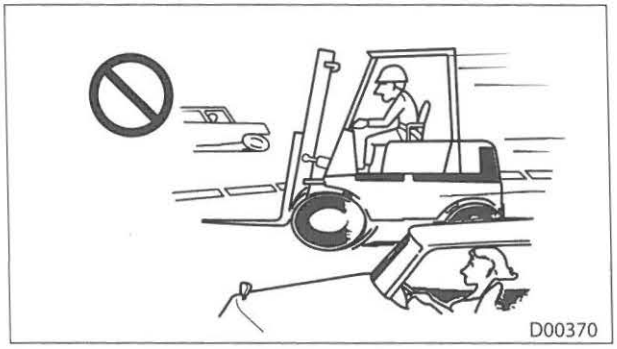
DO NOT operate this lift truck unless you have a certificate for operating this type of lift truck and have the ability to operate the lift truck safely.



1) CERTIFICATE

⚠ WARNING

Lift trucks are NOT intended for use on public roads.



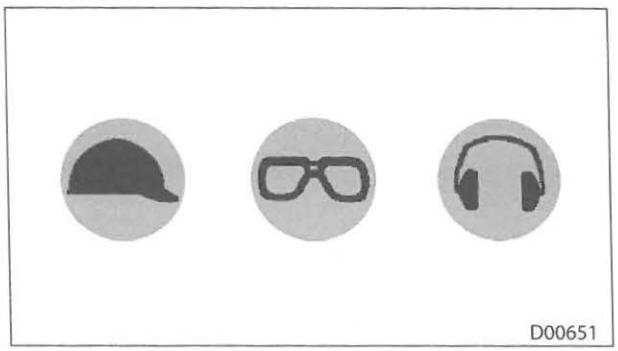
⚠ WARNING

Dress properly for the job!

Follow your employer guidelines for protective equipment.

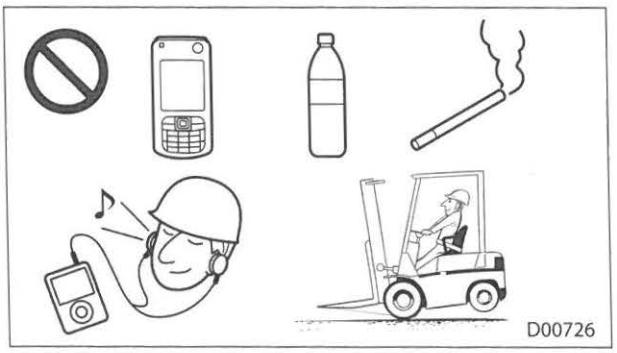
DO NOT wear loose clothing or accessories (flapping cuffs, dangling chains, necktie, scarves, or rings) that could catch in moving parts.

Wear personal protective equipment appropriate for the conditions of your work places.



⚠ WARNING

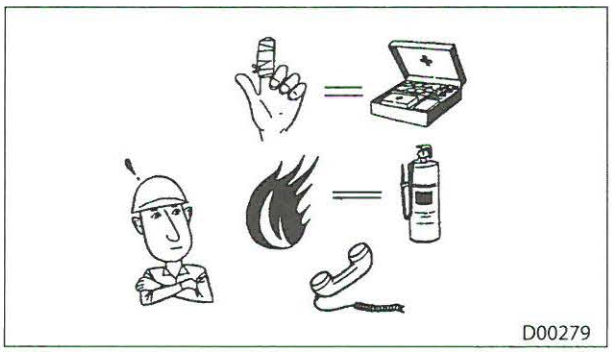
Operate the lift truck safely within the rules and regulations of your employer!



⚠ WARNING

Always be alert!

Know your employer guidelines and how to get prompt assistance if involved in an accident.



D00279

⚠ WARNING

No smoking while refueling!

DO NOT fill the fuel tank while the engine is running or the operator is on the lift truck. Keep away from flames or spark sources. Turn off all electrical switches on the lift truck. Pump fuel in a well-ventilated area.

D00680

⚠ WARNING

Know your truck is safe!

DO NOT operate any lift truck that is not safe to operate.

D00288

⚠ WARNING

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 must take.

D00280

⚠ WARNING

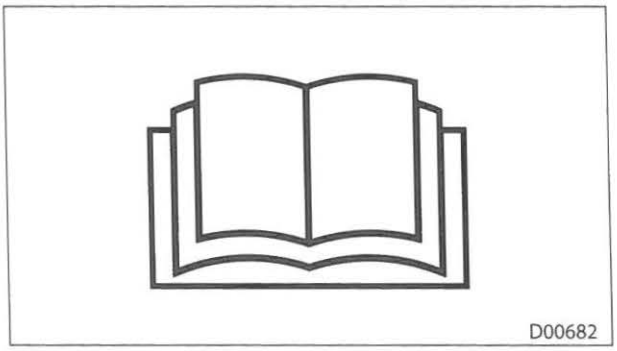
Unauthorized addition or modification is prohibited!

DO NOT add to or modify the lift truck unless authorized in writing by the manufacturer to do so. Any changes approved by the manufacturer requires a new capacity plate and decals after modification.

⚠ WARNING

Know the lift truck and attachments!

Read and understand the operating, inspection, and maintenance instructions in the Operation & Maintenance Manual and the decal on the lift truck.



⚠ WARNING

Avoid being splashed by scalding hot coolant!

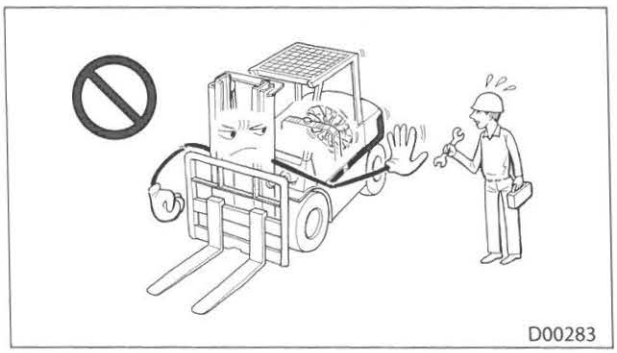
Wait until the engine cools before opening or loosening the radiator cap. Stand to the side, protect your face, and slowly loosen cap.

⚠ WARNING

Turn OFF the key switch before servicing!

DO NOT service this lift truck while engine is running unless absolutely necessary.

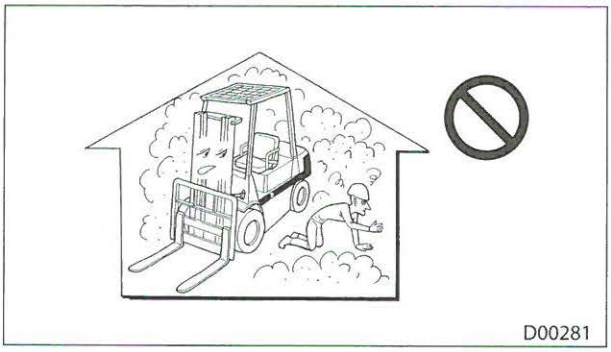
Contact your authorized Cat lift truck dealer if needed.



⚠ WARNING

Exhaust fumes could kill you!

Some of the symptoms from carbon monoxide poisoning are headaches, flu like symptoms, food poisoning like symptoms, fatigue, or weakness. If you feel any of these symptoms, leave the area and seek medical attention.

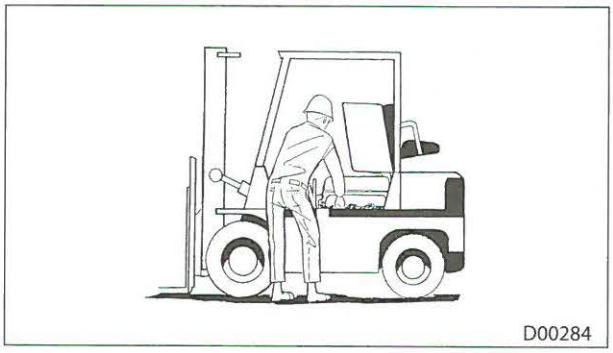


D00281

⚠ WARNING

Inspect the lift truck prior to operation!

At the beginning of each shift, fill out a daily inspection sheet. Defects when found must be immediately reported and corrected before operating the lift truck, or the lift truck must be taken out of service.

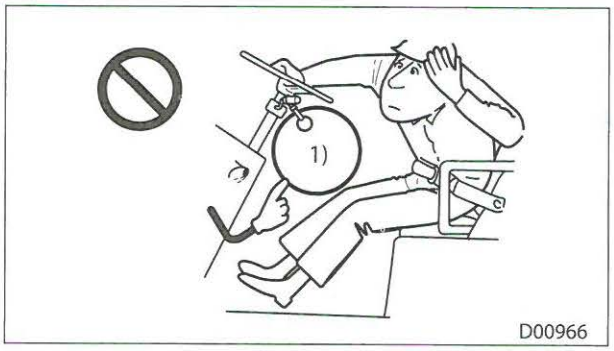


D00284

⚠ WARNING

DO NOT operate an unsafe lift truck!

If the lift truck has a "OUT OF SERVICE" or similar warning tag, the lift truck must not be operated until it has been restored to a safe operating condition. Inspect the lift truck before you operate it.



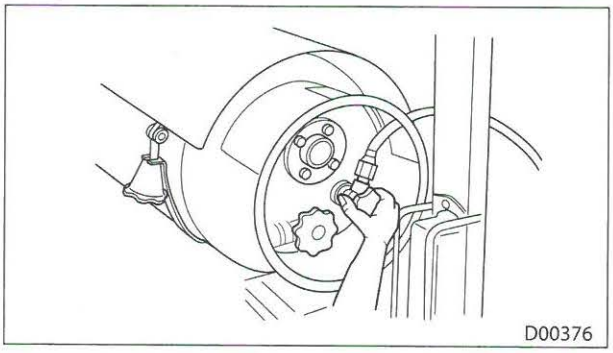
D00966

1) OUT OF SERVICE

⚠ WARNING

LP-Gases are flammable.

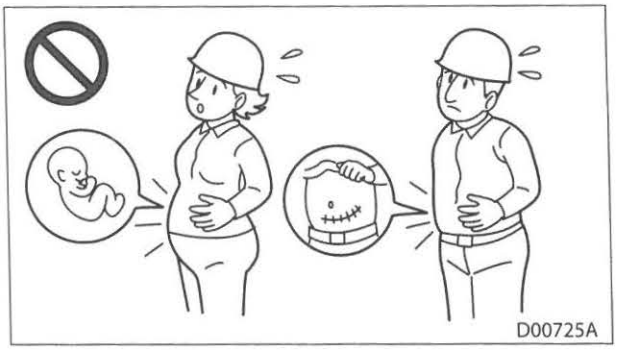
DO NOT attempt to exchange or refill a LPG tank unless you are trained and authorized to do so.



D00376

⚠ CAUTION

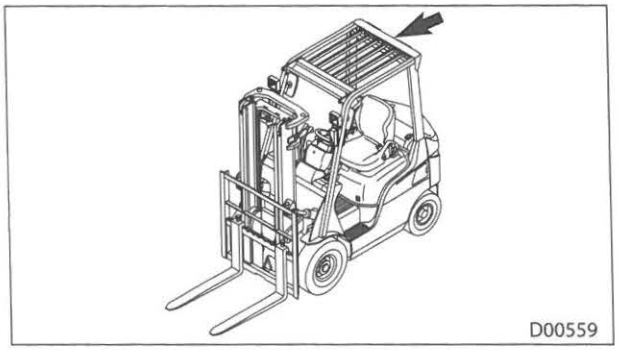
Operate the lift truck in accordance with your employer's guidance if you are pregnant or have suffered an abdominal disease or injury.


D00725A

⚠ WARNING

DO NOT remove the overhead guard!

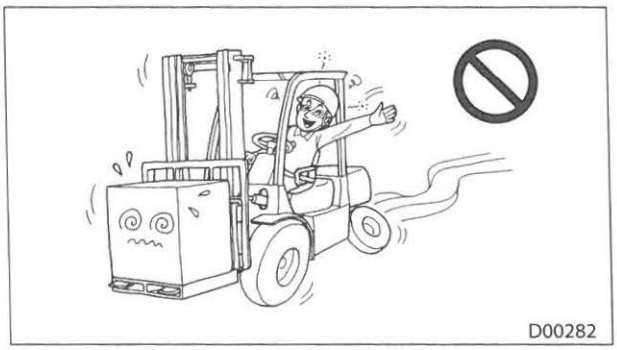
The overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.


D00559

⚠ WARNING

DO NOT operate the lift truck under the influence of drugs or alcohol!

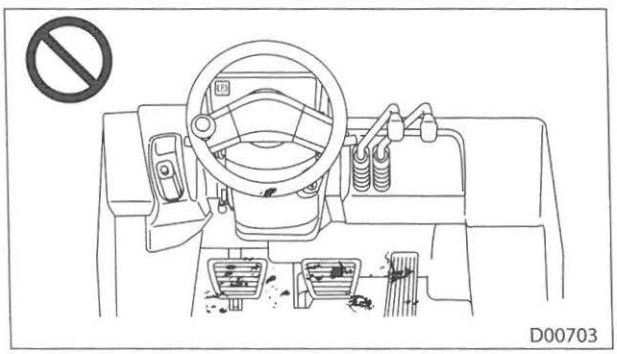
Always stay healthy on the job. Operators of lift trucks must be qualified as to visual, auditory, physical, and mental ability to operate the lift truck safely.


D00282

⚠ WARNING

Keep the operator compartment clean!

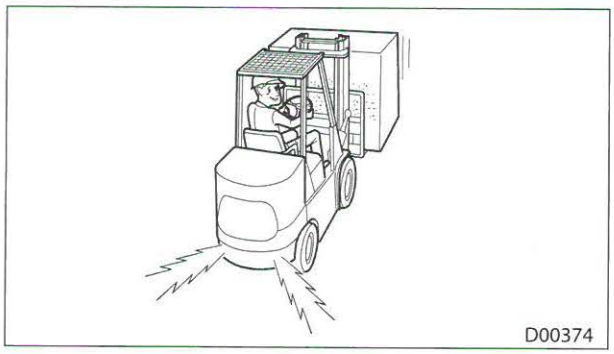
Keep your hands and shoes, as well as the floor and controls (steering wheel, levers and pedals) clean and free of grease, mud, and other materials. A slip could cause an accident.


D00703

⚠ WARNING

The backup alarm must activate when traveling in REVERSE!

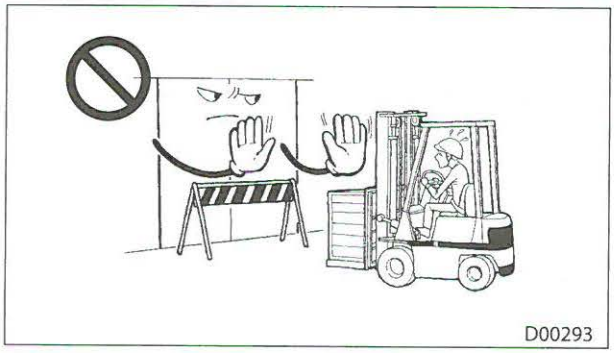
Make sure the backup alarm is in working order. The horn can also be used to alert other lift trucks or pedestrians when traveling in REVERSE. Always look in the direction of travel.


D00374

⚠ WARNING

Operate only in approved areas!

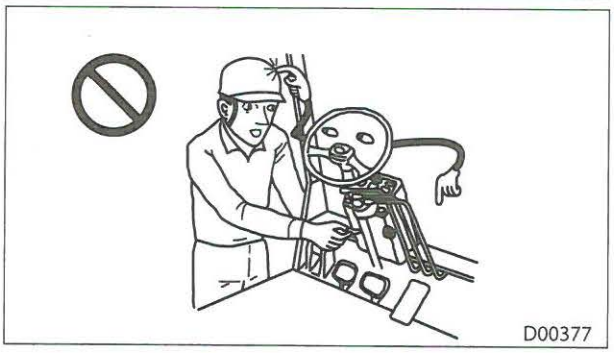
Certain areas such as those containing hazardous flammable gases, liquid, or other combustibles require a Safety Rated lift truck. If your lift truck is not Safety Rated, the area must be avoided.


D00293

⚠ WARNING

Sit in the operator seat when starting the engine!

Start the engine only when seated in the normal operating position.

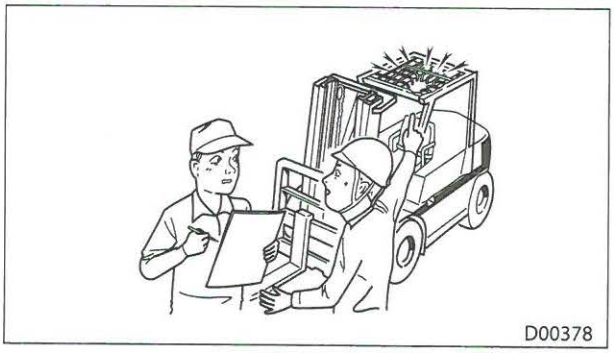

D00377

⚠ WARNING

DO NOT operate a damaged or defective lift truck!

If the lift truck is damaged, take it out of service until it has been restored to a safe operating condition. Park it in a non-operating area and remove the key. Attach an "OUT OF SERVICE" or similar warning tag on the lift truck.

Contact your authorized Cat lift truck dealer for repairs.

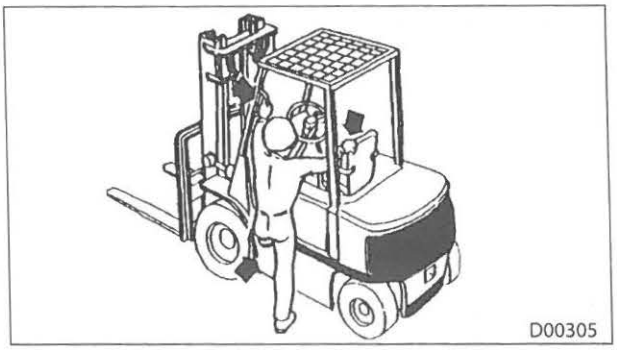

D00378

⚠ WARNING

Face the lift truck when getting on and off!

Maintain a three point contact (one foot and two hands) with the foot step, the assist grip, and the seat backrest.

- DO NOT get on or off the moving lift truck.
- DO NOT jump on or off the lift truck.
- DO NOT use the operating control levers or steering wheel as assist grips when entering or leaving the operator compartment.
- DO NOT get on or off the right side of the lift truck.


D00305

⚠ WARNING

Adjust the operator seat before operating the lift truck!

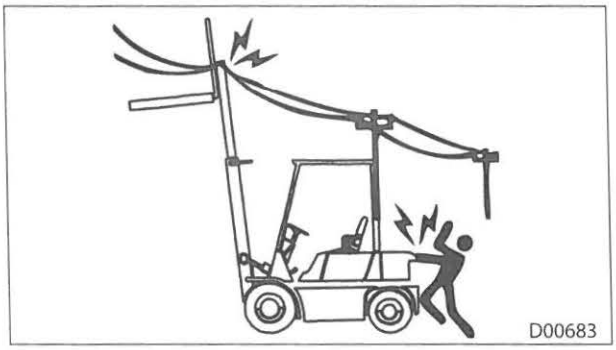
DO NOT adjust the operator seat while the lift truck is in motion.


D00436

⚠ WARNING

Always check overhead clearance!

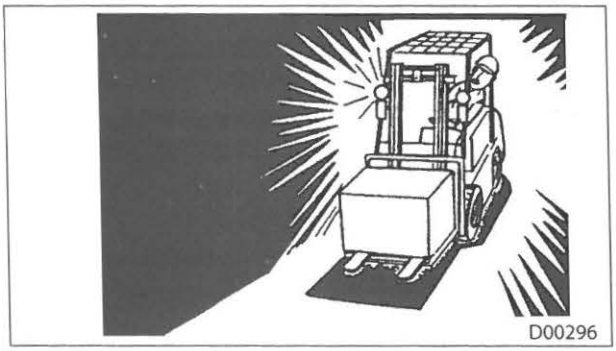
Serious accidents and damages could be caused by the mast and overhead guard hitting pipes, beams, or other overhead obstructions. Watch out for power lines.


D00683

⚠ WARNING

Use lights in dark, dim areas!

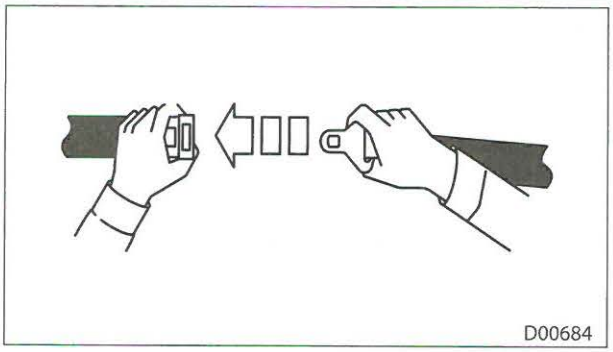
Even with lights ON, DO NOT assume people see you and will move out of your way.


D00296

⚠ WARNING

When operating the lift truck, BE SURE to fasten the seat belt!

If not, the operator could be thrown out of the lift truck or crushed under the lift truck.

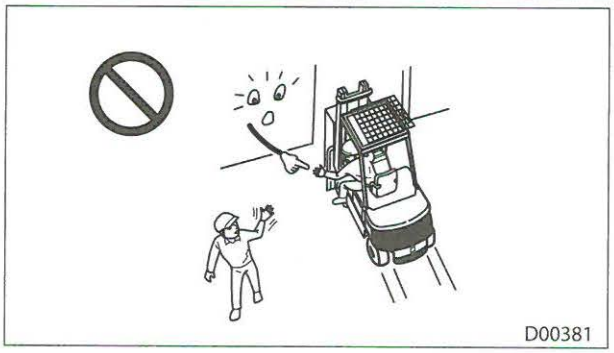


D00684

⚠ WARNING

Stay within the confines of the lift truck!

- Make sure there is enough space to pass through.
- Keep your hands and feet inside the operator compartment. DO NOT put any part of the body outside the operator compartment of the lift truck.
- In a confined area, place a guide and observing the instructions of the guide, always work under the overhead guard.

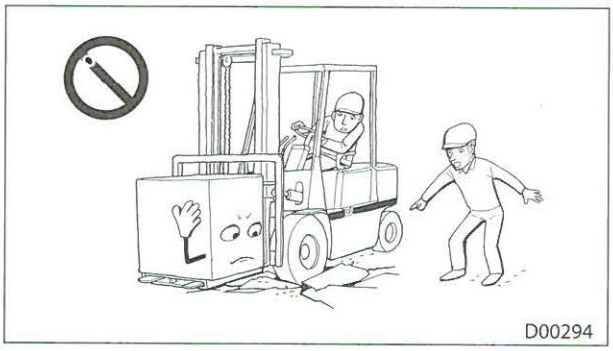


D00381

⚠ WARNING

Always be aware of floor capacity!

Make sure the floor will support the weight of the loaded lift truck.

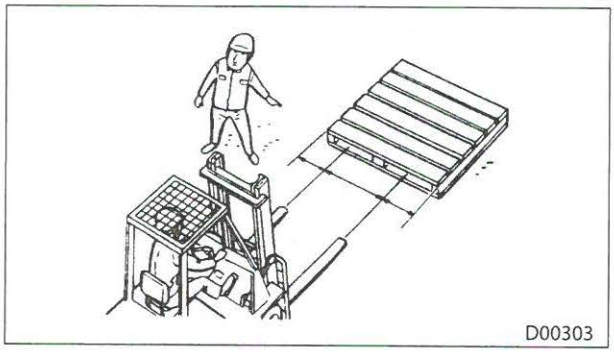


D00294

⚠ WARNING

Avoid off-center loading!

Set the forks as far apart as possible for maximum support of the pallet or load. Too small of a fork spread could cause instability of the load. DO NOT pick up an off-center load.

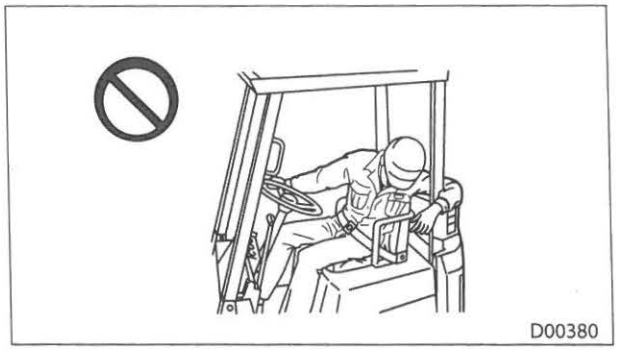


D00303

⚠ WARNING

Stay under the overhead guard!

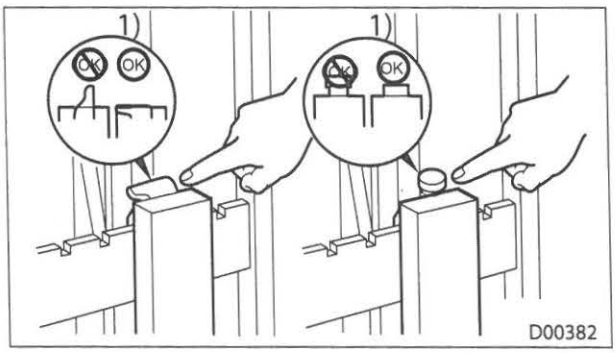
DO NOT hold on to the overhead guard.



⚠ WARNING

Check fork locking pins for engagement!

If the fork locking pins are not properly engaged, or in poor repair, the forks could shift and cause off-center or unstable loads.

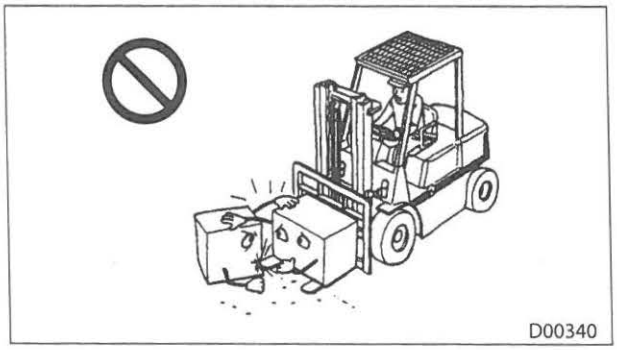


1) OK

⚠ WARNING

Be careful of forks that extend beyond the load!

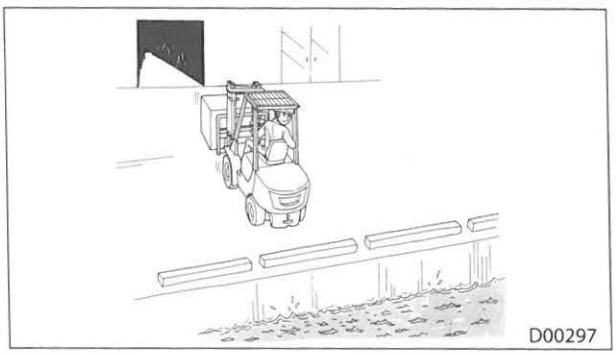
If the forks extend beyond the load, use extra caution. Make sure the fork tips do not contact other material.



⚠ WARNING

Check work places for high risk!

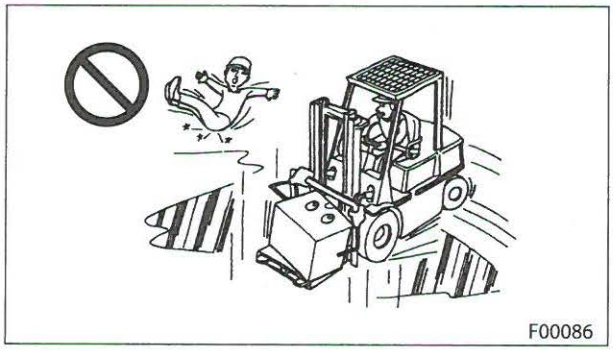
When working on docks, ramps, platforms, and other high risk areas, use adequate blocks to reduce the risk of the lift truck from falling off.



⚠ WARNING

Slow down for wet and slippery surfaces!

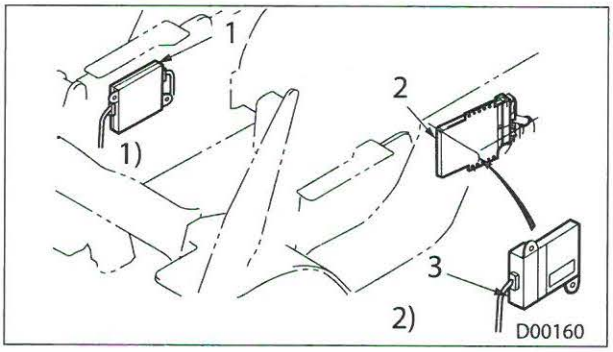
- Loose or slippery materials such as sand, gravel, ice, mud, etc. on your operating surfaces could cause a skid or tipover.
- Avoid these conditions or slow down.
- Keep your operating surfaces clean and dry at all times.
- Wet spots could cause a skid or tipover. You need a greater stopping distance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



⚠ CAUTION

Precautions when handling controllers and sensors!

- DO NOT allow wash water, rain, oil, or any other liquid on controllers and their related sensors.
- DO NOT apply force, open, modify controllers, or operate the lift truck without controllers.
- Turn the key switch to the OFF position. Disconnect battery cables and controller connections before conducting the following operations:
  - Removing controllers from the lift truck
  - Manufacturer-approved welding



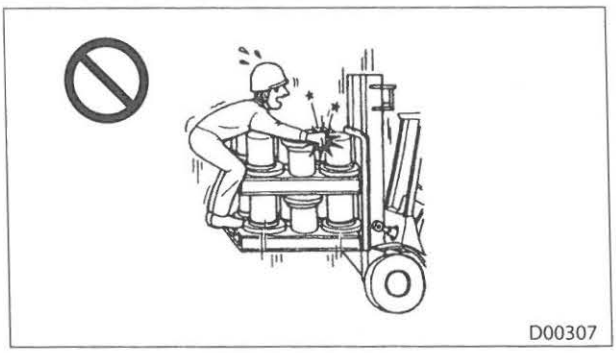
1. VCM (Vehicle control module)
2. ECM (Engine control module)
3. DCM (Diesel engine control module)

1) Inside the right step
2) Under the battery

◆ Operating Precautions

⚠ WARNING

DO NOT allow anyone to hold loads.



⚠ WARNING

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.

⚠ WARNING

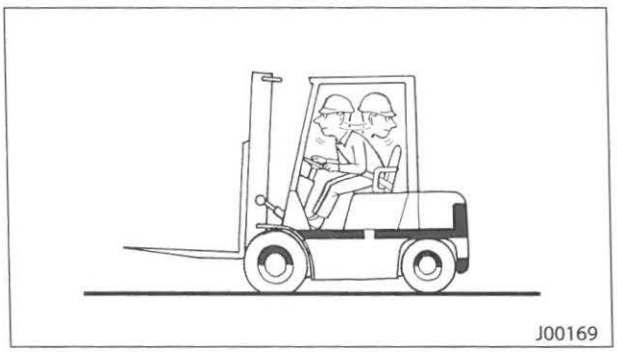
Position lever correctly before turning the key switch ON!

Make sure the direction lever is in the NEUTRAL position and the parking brake lever is set properly.

⚠ WARNING

Make sure that no one is around the lift truck before starting!

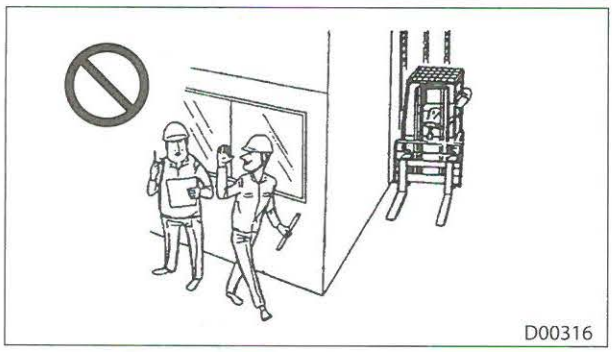
Sound the horn and make sure that no one is around the lift truck.



⚠ WARNING

Slow down where vision is obstructed!

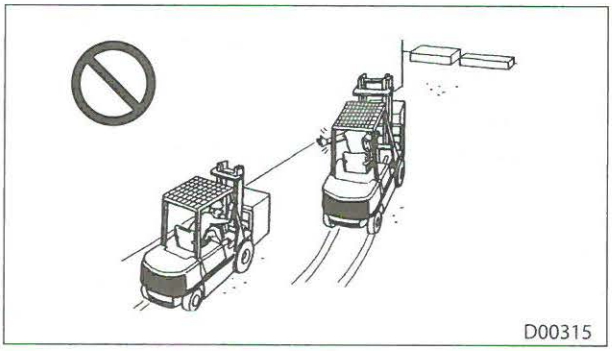
- If you sound the horn, people may not even notice. Pay attention to movements of people around you.
- The operator is required to slow down and activate the horn at cross aisles and other locations where vision is obstructed.


D00316

⚠ WARNING

DO NOT pass another lift truck!

DO NOT pass another lift truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.


D00315

⚠ WARNING

DO NOT engage in stunt driving or horseplay!

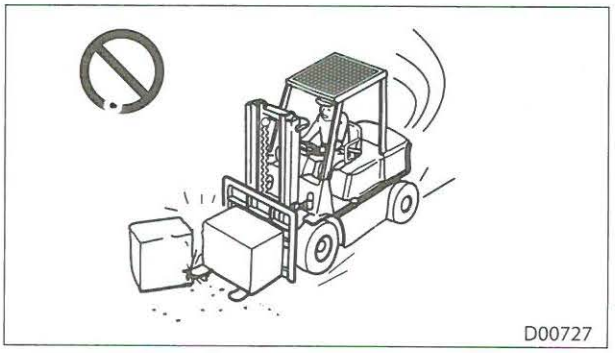
Stunt driving and horseplay is hazardous for both the lift truck operator and fellow workers.


D00309

⚠ WARNING

Be careful when turning with a load!

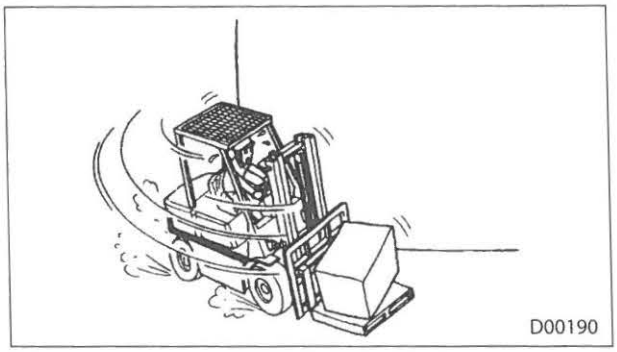
- When operating with a load, the load or tip of the forks are hard to see.
- If operated carelessly, the load or forks could collide with nearby objects.
- When taking a turn while operating in reverse with a load, always pay attention to the position of the load. If not, the load could collide with nearby objects.


D00727

⚠ WARNING

DO NOT speed when making turns!

Drive slowly when making turns to avoid a tipover.



⚠ WARNING

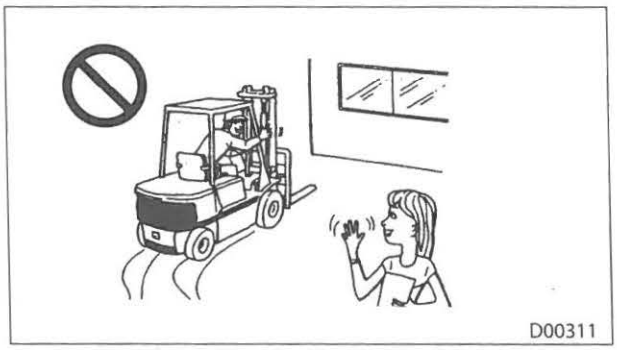
Obey all traffic regulations and warning signs, including authorized facility speed limits!

A safe distance of approximately three lift truck lengths must be maintained from the lift truck ahead, and the lift truck must be kept under control at all times. Use special care when traveling without a load as the risk of tipover is greater.

⚠ WARNING

Always look in the direction of travel!

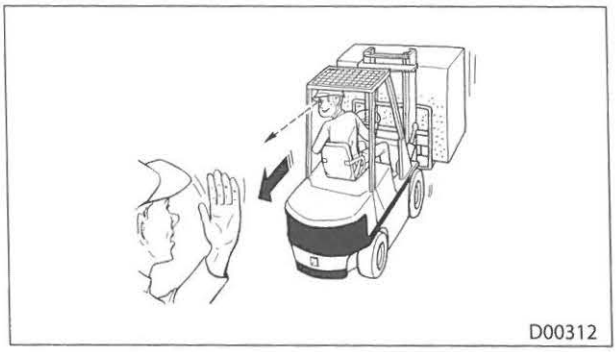
Always be aware of people near your lift truck. DO NOT move until they are at a safe distance and are aware of you.



⚠ WARNING

Travel in REVERSE if forward visibility is blocked!

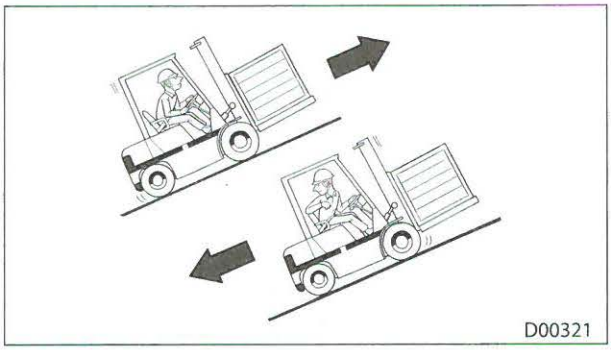
For better visibility with large loads, travel in REVERSE, but always keep a lookout in the direction of travel.



⚠ WARNING

Travel safely on grades with a loaded lift truck!

When ascending or descending grades loaded lift trucks must be driven with the load upgrade.

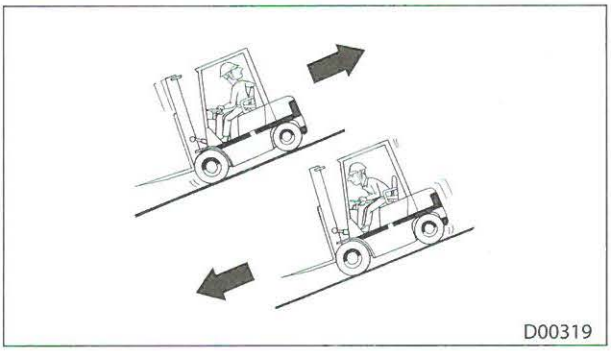


⚠ WARNING

Travel safely on grades with an empty lift truck!

Unloaded lift trucks must be operated on all grades with the forks downgrade.

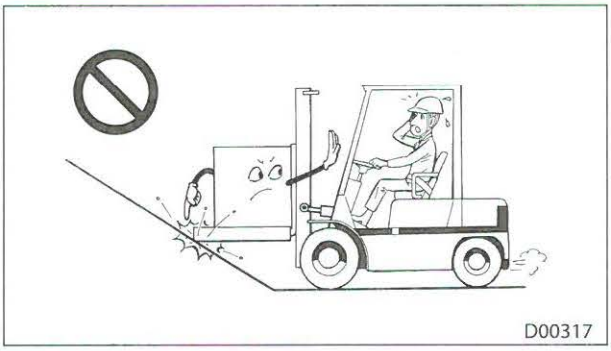
When descending grades, use service brake and engine brake.



⚠ WARNING

Be particularly careful when driving up or down a steep slope!

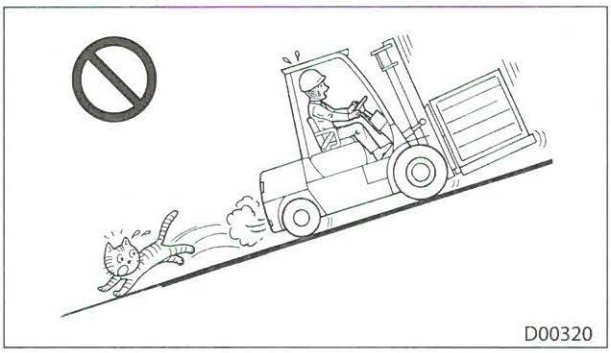
Use extreme care to reduce the risk of fork tips or the bottom of the pallet from touching the ground.



⚠ WARNING

Starting the lift truck on an upgrade carefully!

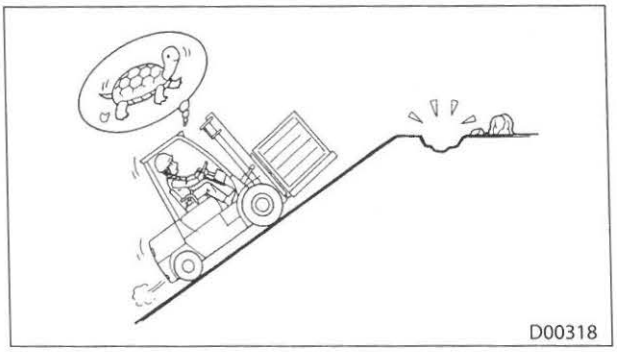
When starting the lift truck on an upgrade, BE SURE to use the parking brake.



⚠ WARNING

Slow down at the top of upgrades!

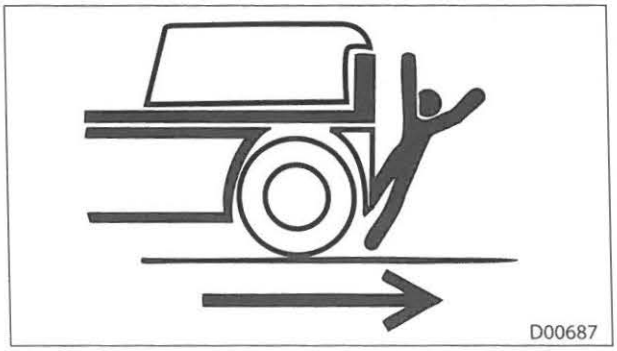
Travel slowly near the top of upgrades as the visibility is limited.



⚠ WARNING

Be careful of tail swing when turning while operating with load end leading!

Make sure that personnel stand clear of the rear swing area before making turns.



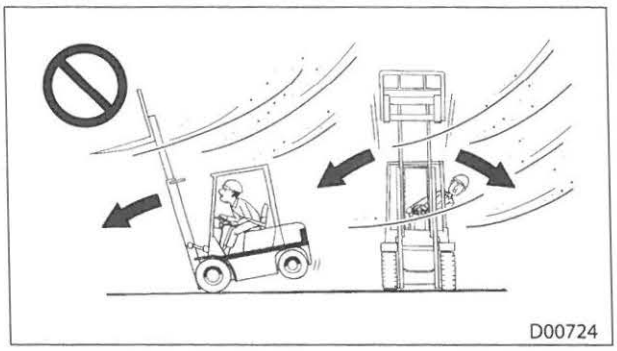
⚠ WARNING

DO NOT operate the lift truck under windy conditions!

Lift truck operation under windy conditions could cause the following situations:

- Falling of a load from the forks
- Tipover of the lift truck

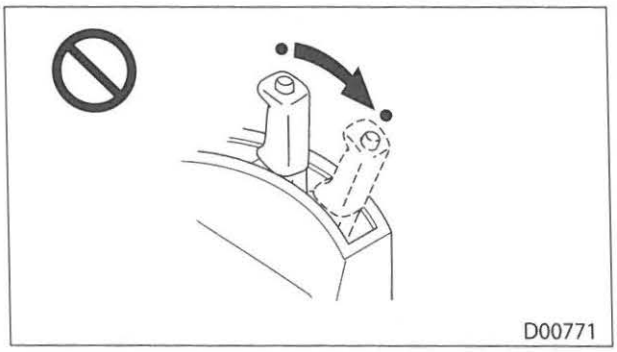
BE SURE to operate the lift truck after the wind clams down.



⚠ WARNING

DO NOT operate the parking brake lever during travel!

- Damage to the brake system could occur If you apply the parking brake lever during travel.

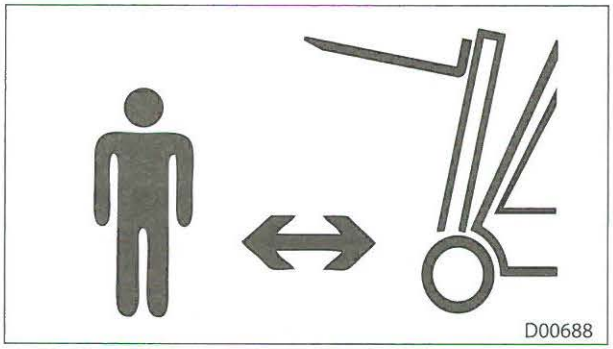


◆ Working Precautions

⚠ WARNING

Keep out!

- DO NOT allow any unauthorized persons in the work area where the lift truck is operated.
- Personnel must be clear of the lift truck operating area.


D00688

⚠ WARNING

Be careful of changes in capacity!

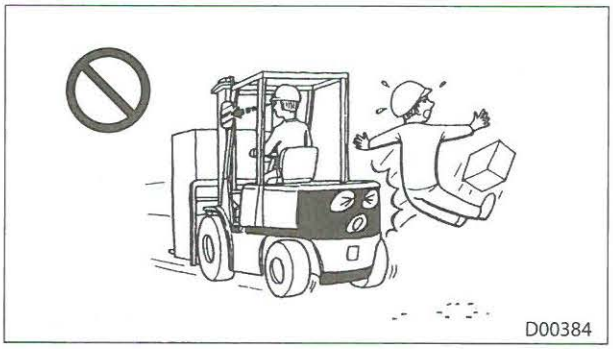
- Know the capacity when attachments are used. Extra care must be taken in securing, manipulating, positioning, and transporting the load. Operate lift trucks equipped with attachments as partially loaded lift truck when not handling loads.
- When using an attachment, BE SURE to read the attachment instructions manual and attachment warning labels carefully and understand its function fully before using it.


D00334

⚠ WARNING

Watch out for pedestrians at all times!

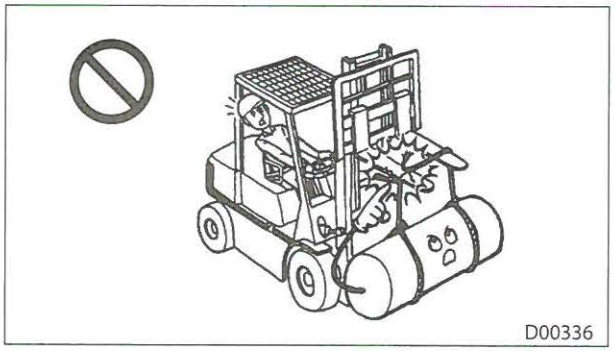
Yield the right-of-way to pedestrians at all times.


D00384

⚠ WARNING

Use the proper attachment!

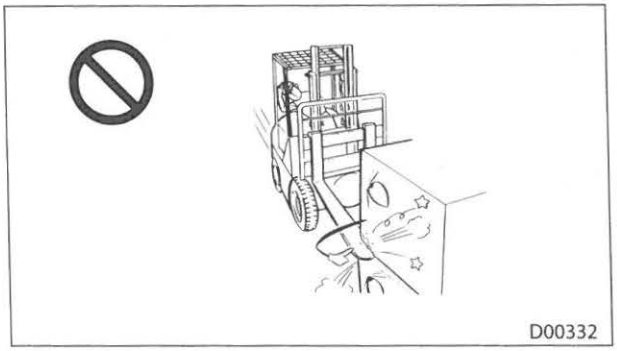
When lifting a load, use the proper attachment designed for the load. DO NOT operate at high speeds.


D00336

⚠ WARNING

DO NOT speed when approaching loads!

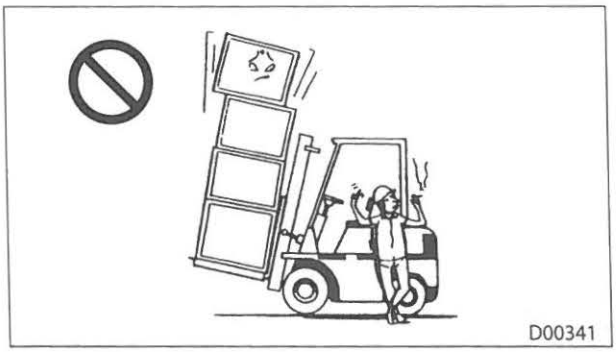
Approaching loads at high speed is dangerous. This could also damage the load(s).
Approach the load carefully at slow speeds.



⚠ WARNING

Ensure the load is not too high!

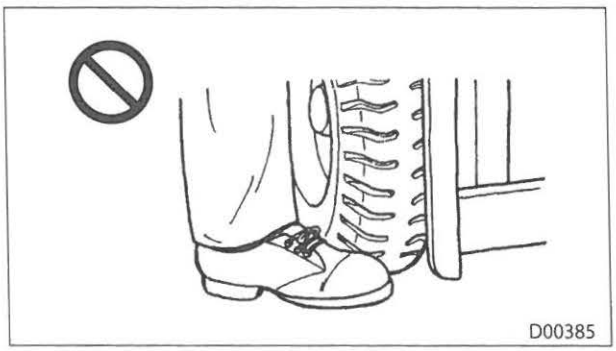
DO NOT pick up unsecured loads that extend above the load backrest extension height.



⚠ WARNING

DO NOT move when someone's next to the lift truck!

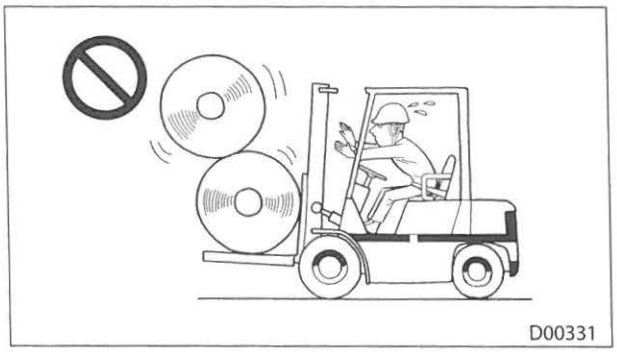
If someone is standing next to the lift truck, DO NOT proceed until they are a safe distance away. DO NOT assume that people are aware of you and will move out of your way.



⚠ WARNING

Handle only stable and safely arranged loads!

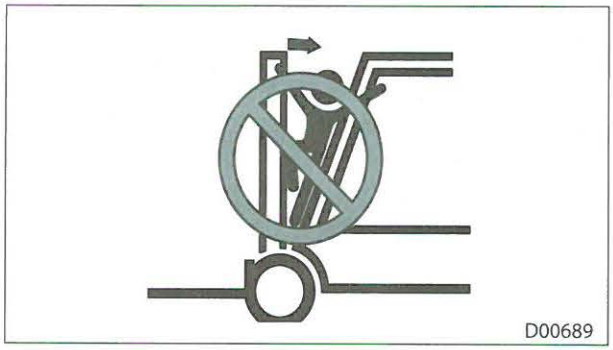
If a load is unstable, it could easily shift and fall on someone.



⚠ WARNING

Stay clear of pinch points!

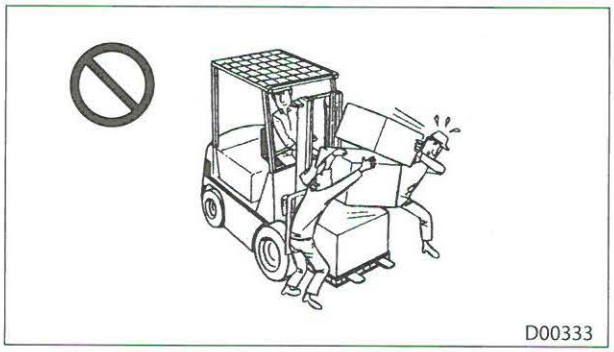
Keep all parts of your body away from moving parts such as the mast, carriage, and attachments. DO NOT place any part of your body between the overhead guard and the mast. If the mast moves unexpectedly-You could get caught between the mast and overhead guard and a serious accident could occur.



⚠ WARNING

DO NOT allow unloading from raised loads!

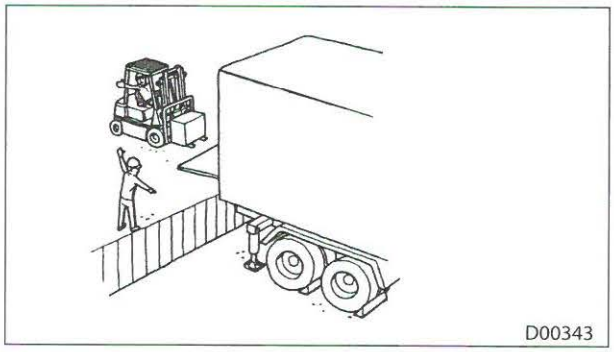
Failure to follow these rules could cause serious injury.



⚠ WARNING

Inspect a trailer before entering!

- The brakes on the highway trucks or trailers must be applied, and wheel chocks or other positive mechanical means must be used to prevent unintentional movement of highway trucks and trailers.
- DO NOT travel along the edge of the dock. The lift truck could fall off the dock.
- Before starting work, check the allowable load of dock plate, and if it does not have enough strength to withstand the weight of the lift truck carrying a load, do not use it.
- When entering a trailer, use outriggers so that trailer will not sink.
- Travel slowly on dock plate when getting in or out of trailers or railroad.
- Ask the driver of the trailer not to move the trailer until the work is completed.
- Use any anchoring equipment available in the dock to secure the trailer or railroad, and also secure the dock plate to prevent it from falling off.
- Obey the instructions of the supervisor when working as a team.



⚠ WARNING

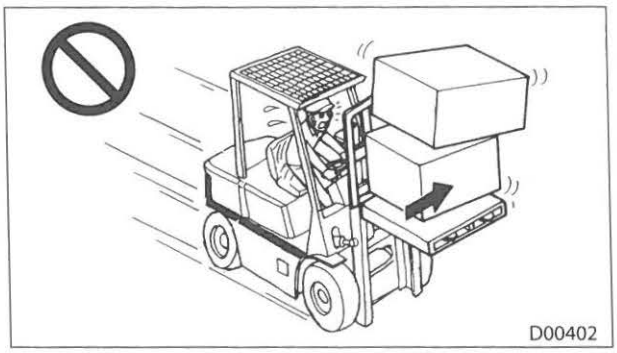
Fork positioner operation!

- DO NOT operate the fork positioner while carrying loads.
- DO NOT handle off-center loads.

⚠ WARNING

Side shifter operation!

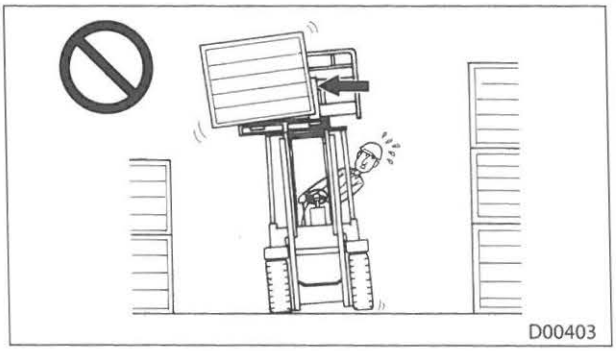
When sideshifting to pick up loads, BE SURE that forks are centered under the load. DO NOT side shift while traveling with loads.



⚠ WARNING

DO NOT raise or lower a load while side shifted, as it is dangerous!

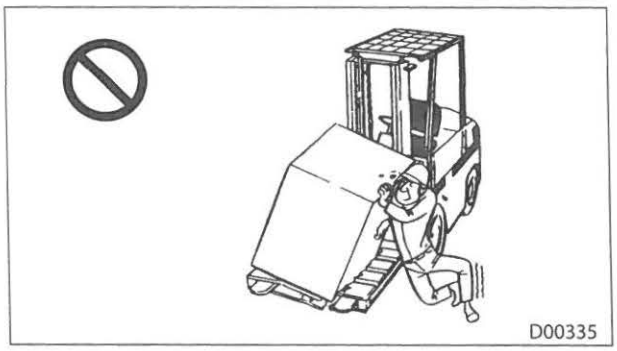
DO NOT side shift the forks with the load raised higher than 150 cm (59 in.) unless safety is assured by the load stack or carrier deck just below the forks.



⚠ WARNING

DO NOT use damaged pallets!

Make sure pallets and skids are sturdy and in safe operating condition.



⚠ WARNING

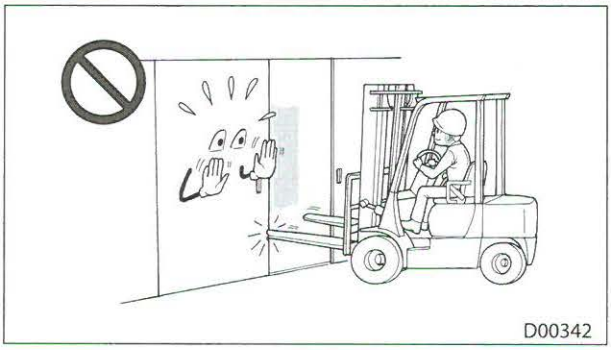
DO NOT abuse forks!

Fork misuse could cause accidents, serious injuries, damage to the lift truck, and load.

⚠ WARNING

DO NOT use lift truck improperly!

DO NOT use the lift truck for opening or closing railroad car doors, unless the lift truck utilizes an attachment specifically designed for opening and closing railroad car doors.

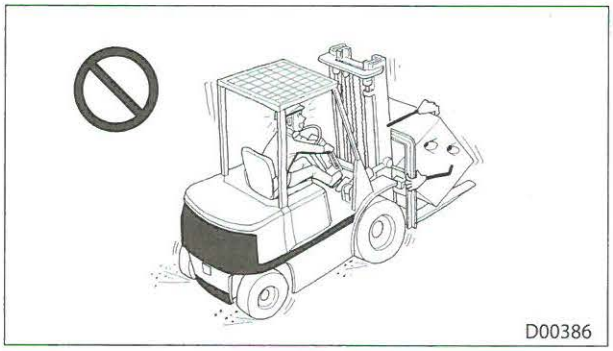


D00342

⚠ CAUTION

Operate the direction lever smoothly!

Avoid sudden changing of traveling direction. This may cause damage to the transmission.

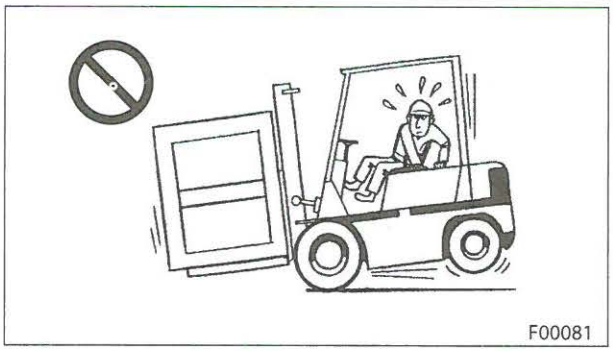


D00386

⚠ WARNING

Always stay within the capacity!

Read the capacity plate to make sure a load is within the capacity of the lift truck before you handle the load.

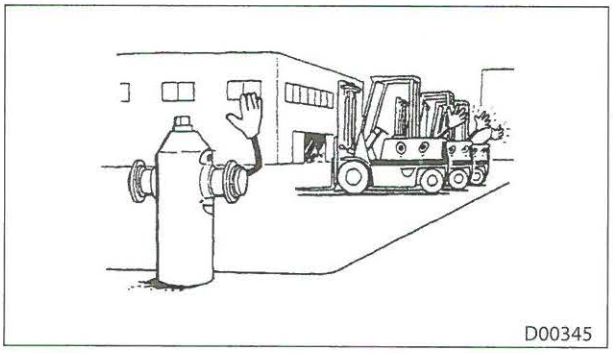


F00081

⚠ WARNING

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.



D00345

⚠ WARNING

Watch out for personnel!

DO NOT allow anyone to walk or stand under raised forks.

D00690

⚠ WARNING

DO NOT lift personnel except on a securely attached, specially designed work platform!

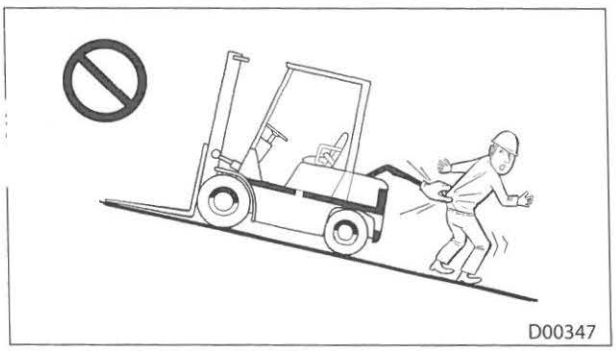
Use extreme care when lifting personnel. Place the mast in the vertical position, place the control levers in the NEUTRAL position, and apply the parking brake. Lift and lower smoothly. Have a trained operator in position to control the lift truck as long as personnel are on the work platform. DO NOT transport personnel on forks or work platform.

D00691

⚠ WARNING

Park disabled lift truck safely!

DO NOT park on a grade.

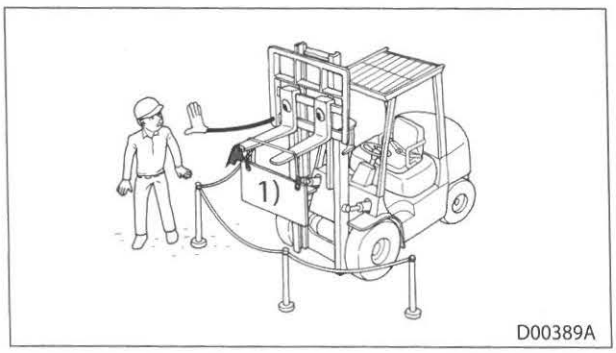


D00347

⚠ WARNING

Park the disabled lift truck safely!

- If the lift mechanism is disabled and the forks cannot be lowered, park the lift truck in a non-operating area.
- Use barriers to keep anyone from standing or passing under the forks.
- Remove the key and attach an "OUT OF SERVICE" or similar warning tag to the lift truck.
- Contact your authorized Cat lift truck dealer.



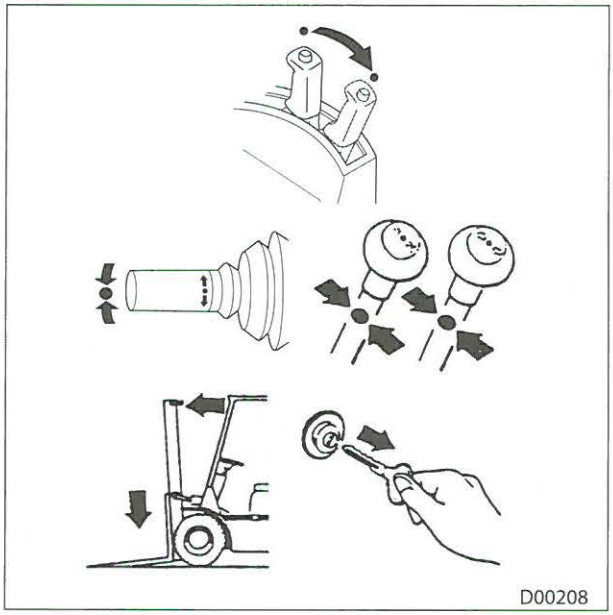
D00389A

1) OUT OF SERVICE

⚠ WARNING

When you leave or park the lift truck:

- Park the lift truck on a hard and level surface.
- Apply the parking brake.
- Place the direction lever or gearshift lever in the NEUTRAL position.
- Lower the forks fully to the floor or ground.
- Tilt the mast forward until the fork tips touch the floor or ground.
- Turn the key switch to the OFF position.
- Remove the key from the key switch.
- Block the wheels. (if required by supervisor).
- Return the key to a key rack (if required by supervisor).

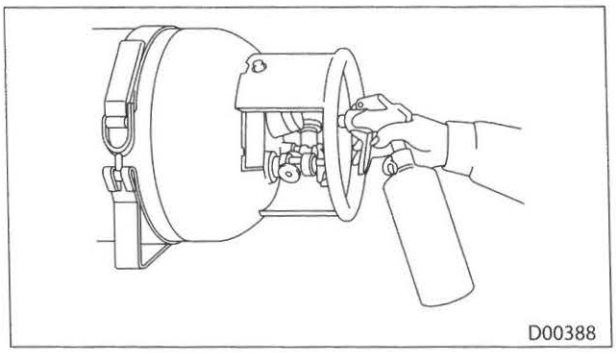


◆LPG

Only trained and authorized personnel must fill or replace LPG tanks. Personnel engaged in filling LPG tanks must wear protective equipment such as a face shield, long sleeves, and gauntlet gloves.

Do not refuel or store LPG 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 LPG fueled lift trucks are parked overnight or stored for long periods indoors with the fuel tank in place. Close the valves on empty tanks.

Inspect LPG 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.

Defective or damaged LPG tanks must be removed from service. Check the LPG fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.

Do not drop, throw, roll, or drag LPG tanks. Do not strike LPG tanks or any associated parts of the tanks or fuel systems. The careless handling of LPG tanks could result in a serious accident. To reduce the risk of damage to tanks, use extreme care when transporting them.

Only trained and authorized personnel must fill or replace LPG tanks. The lift truck must 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.

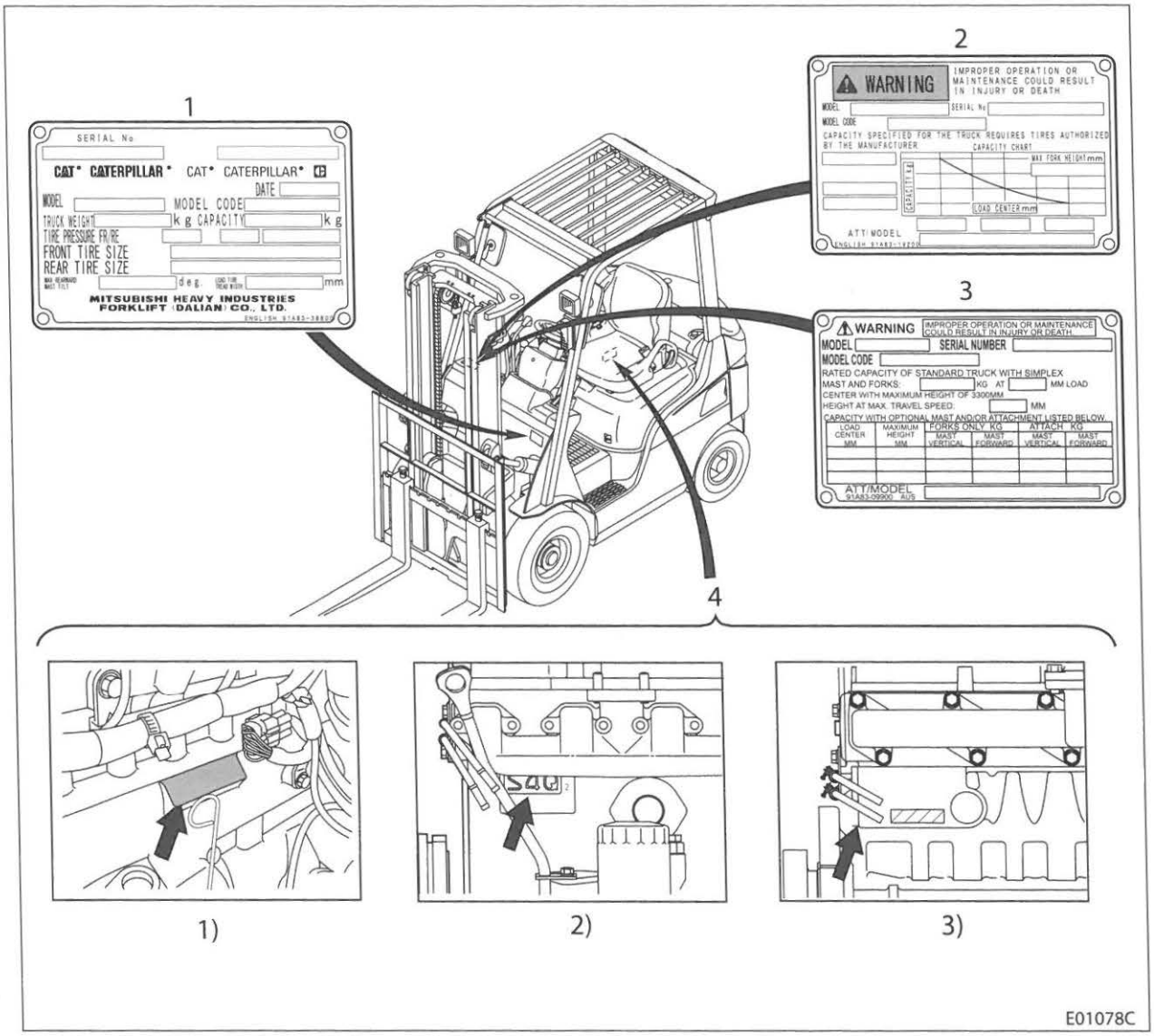
Check the LPG tank for secure mounting. Loose tanks could cause pressure fuel lines to leak resulting in serious injury.

The storage and handling of liquid fuels in the U.S.A. must 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.

■ KNOW YOUR LIFT TRUCK

◆ Serial Number and Capacity Plate

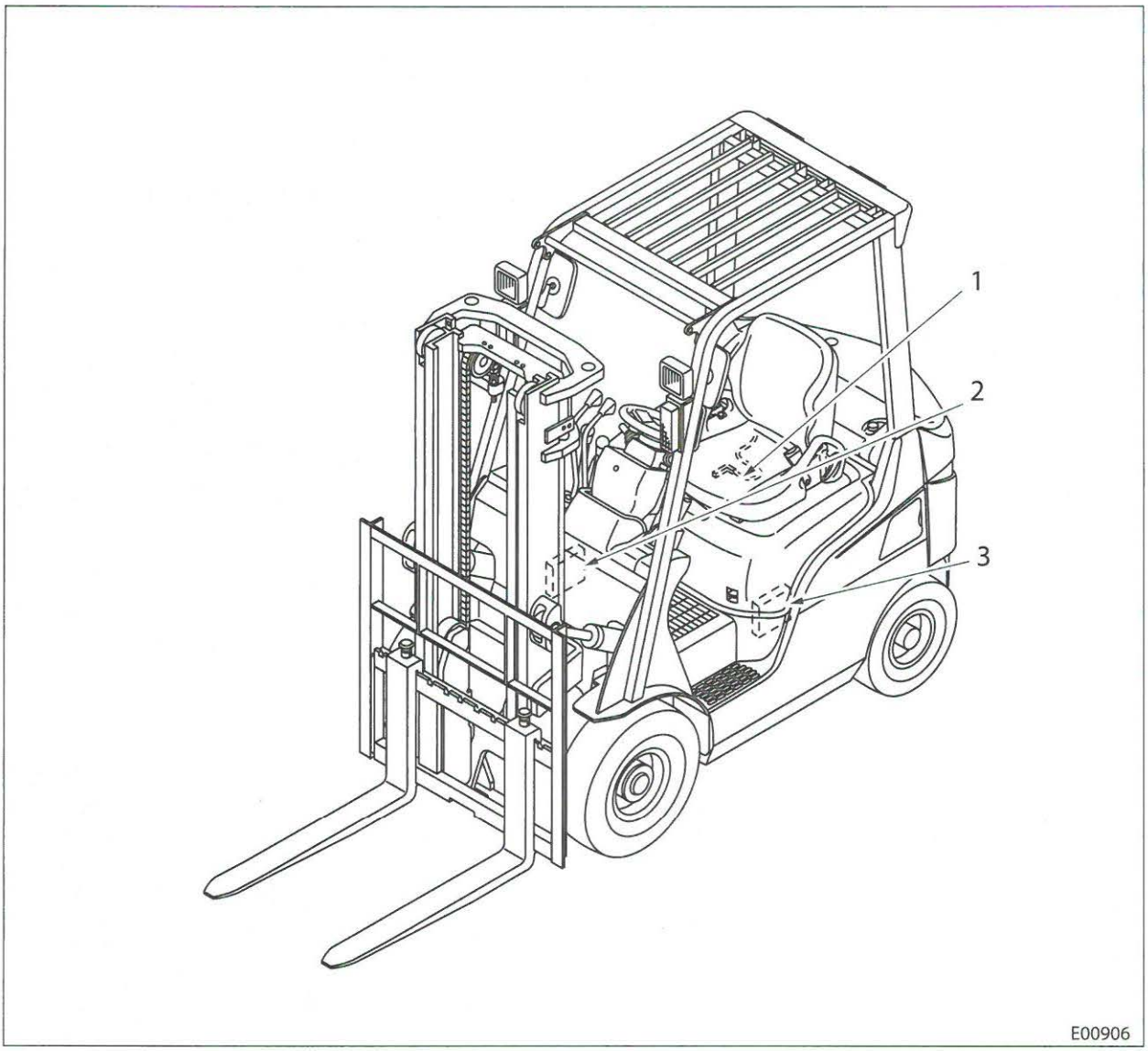
For quick reference, record your lift truck's serial numbers in the spaces provided on 13-4 "Service Registration".



1. Manufacturer name plate
2. Capacity plate
3. Capacity Plate (for Australia)
4. Engine serial number

1) Gasoline model (left side of engine)
2) Diesel model1 ton class (left side of engine)
3) Diesel model 2 to 3 ton class (left side of engine)

◆ Electrical Components

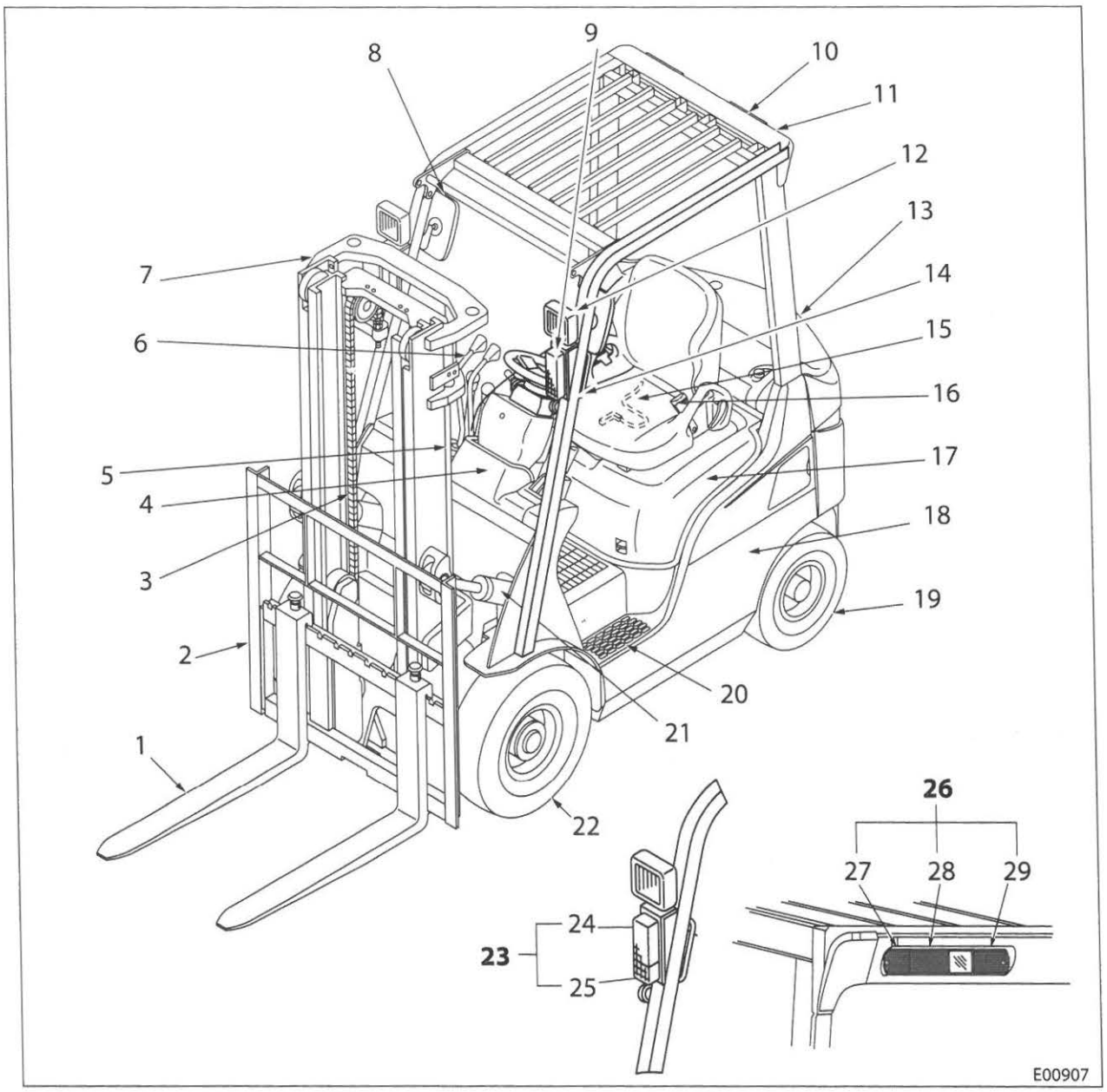


1. Operator presence switch
2. VCM (Vehicle control module)
3. ECM (Engine control module)

⚠ CAUTION

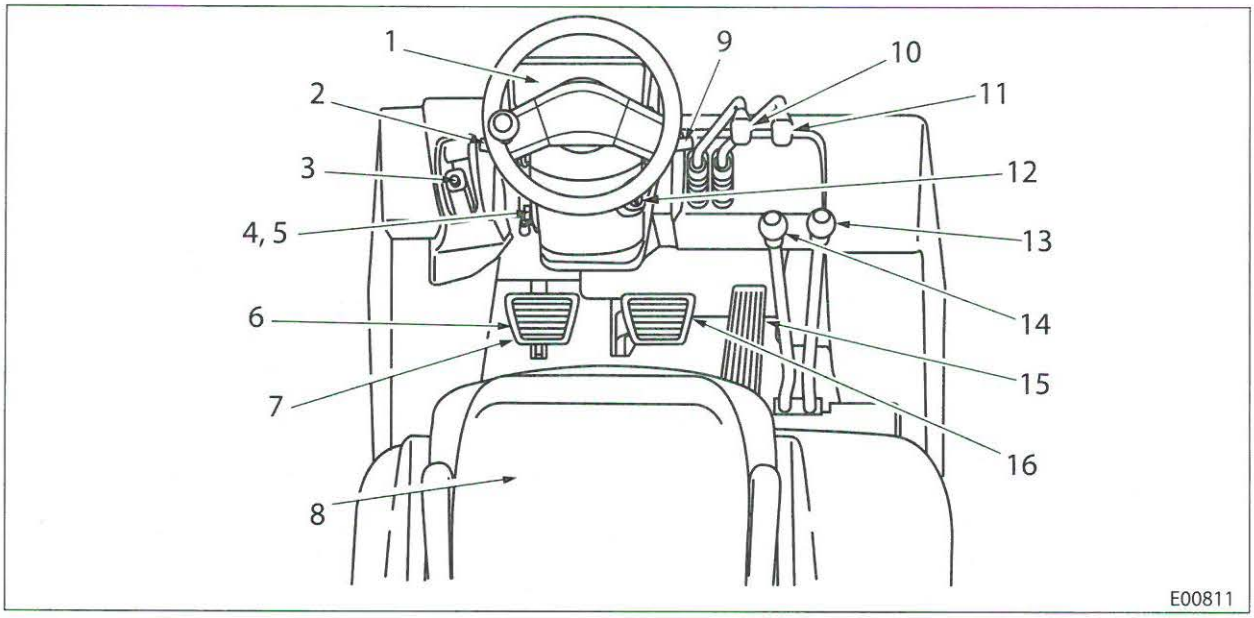
- This system consists of precise components. DO NOT attempt to make adjustments or repair by yourself. Contact your authorized Cat lift truck dealer.
- Moisture is harmful to controllers and their related sensors. When washing, DO NOT splash water or steam clean the VCM inside the right step, the ECM inside the engine compartment, and their related sensors.
- The operator is unable to move the mast unless properly seated. When replacing the operator seat, BE SURE to order a genuine Cat lift truck seat with an operator presence switch.

◆ Model View



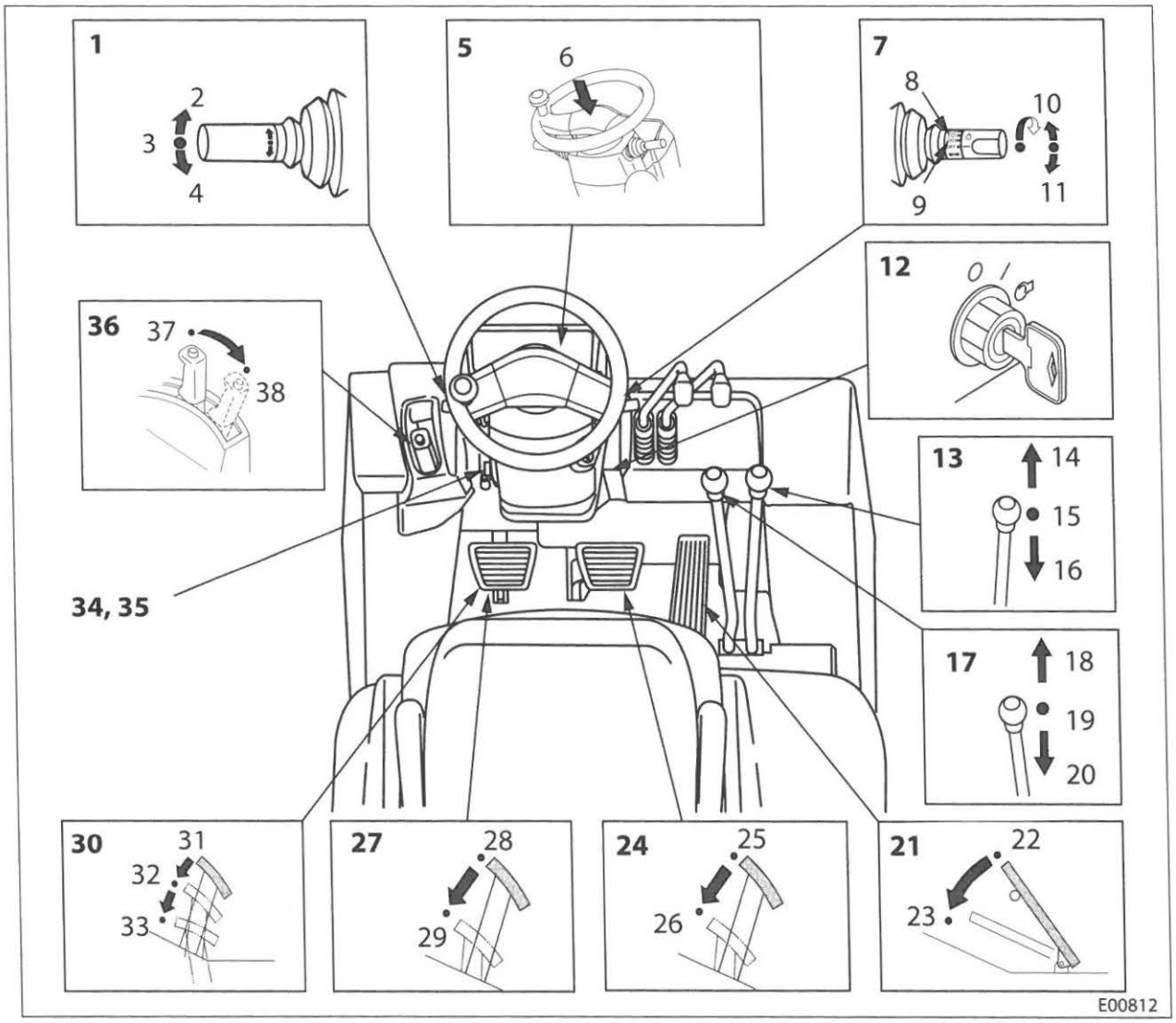
1. Fork
2. Load backrest extension
3. Lift chain
4. Meter panel
5. Lift cylinder
6. Control lever (MC model)
7. Mast
8. Rear view mirror
9. Front combination light
10. Rear combination light
11. Overhead guard
12. Head light
13. Counterweight
14. Assist grip
15. Operators seat
16. Operators seat belt
17. Engine hood
18. Fuel tank (left) / Hydraulic tank (right)
19. Rear wheel
20. Foot step
21. Tilt cylinder
22. Front wheel
23. **Front combination light**
24. Turn signal light
25. Clearance light
26. **Rear combination light**
27. Turn signal light
28. Backup light
29. Tail / Stop light

▶ MC Model



1. Meter panel
2. Direction lever (Powershift model)
3. Parking brake lever
4. Steering column tilt lever
5. Steering column release lever
6. Inching pedal (Powershift model)
7. Clutch pedal (Manual)
8. Operator seat
9. Turn signal / Light switch
10. Lift lever
11. Tilt lever
12. Key switch
13. Direction lever (Manual model)
14. Gearshift lever (Manual model)
15. Accelerator pedal
16. Brake pedal

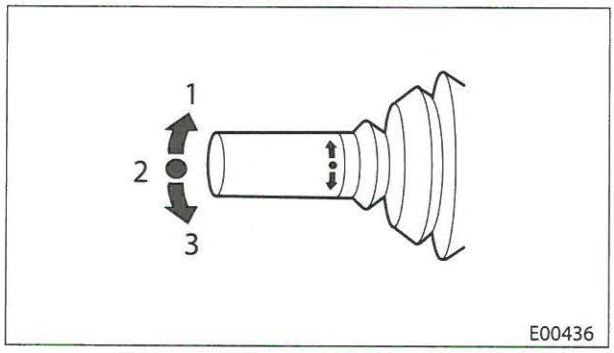
◆ Driving Switches and Controls



1. **Direction lever (Powershift model)**
2. Forward (F)
3. Neutral (N)
4. Reverse (R)
5. **Horn switch**
6. Push to activate
7. **Turn signal / Light switch**
8. Head light (position 2)
9. Clearance light (position 1)
10. Left turn
11. Right turn
12. **Key switch**
13. **Direction lever (Manual model)**
14. Forward (F)
15. Neutral (N)
16. Reverse (R)
17. **Gearshift lever (Manual model)**
18. 1st speed
19. Neutral
20. 2nd speed
21. **Accelerator pedal**
22. Idling
23. Full throttle
24. **Brake pedal**
25. Release
26. Apply
27. **Clutch pedal (Manual model)**
28. Engage
29. Disengage
30. **Inching pedal (Powershift model)**
31. Released
32. Clutch disengaged
33. Brake applied
34. **Steering column tilt Lever**
35. **Steering column release lever**
36. **Parking brake lever**
37. Release
38. Apply

▶ Direction Lever (Powershift Model)

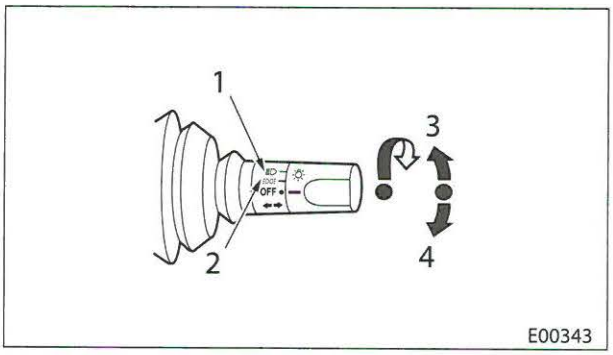
This lift truck is equipped with a NEUTRAL switch. BE SURE to put the direction lever in NEUTRAL position before starting the engine.



1. Forward (F)
2. Neutral (N)
3. Reverse (R)

▶ Turn Signal / Light Switch

- When turning to the right or to the left, operate the turn signal switch in the direction of the arrow as shown on the right. The turn signal switch automatically returns when the steering wheel is turned, but it can also be returned manually.
- When the light switch is placed to the ≡D◯≡ position, the meter panel light, tail lights, and clearance lights illuminate. When it is placed to the ≡D position, head lights also illuminate in addition to the above lights.



1. Head Light (Position 2)
2. Clearance Light (Position 1)
3. Left turn
4. Right turn

Light	Position	
	1	2
Meter panel light	◯	◯
Tail lights	◯	◯
Clearance lights	◯	◯
Head lights		◯

Note: The lights may be turned on by placing the light switch in position 1 or 2 regardless of the key switch position. Turn OFF the lights when the lift truck is not being operated to prevent the battery from discharging.

▶ Key Switch

The key switch has as 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.

⚠ CAUTION

DO NOT crank the engine for more than 10 seconds at any one time. This may cause damage to the starter and run down the battery.

Position	Definition
○	**OFF** The key switch in the OFF position removes power from meter panel and electrical circuits except for horn, parking brake warning buzzer and lights.
I	**ON** The key switch in the ON position applies power to all electrical circuits except for starter circuit. Note: In diesel models, power is applied to glow plugs for 1.5 to 10 seconds depending on the cooling engine coolant temperature and glow plug pilot light glows.
⊙	**START** The key switch in the START position 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.

▶ Steering Column Tilt Lever

The steering column position can be adjusted with the steering column tilt lever to an operator's desired driving position.

Adjustment of steering column position

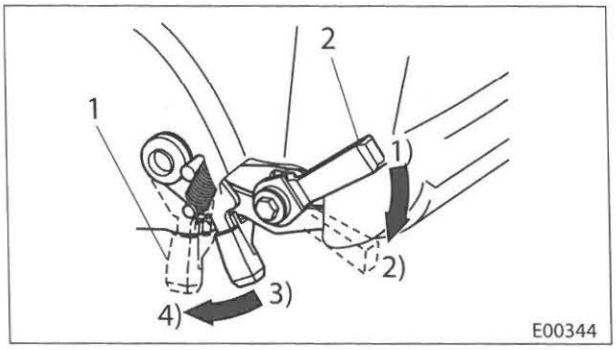
(1) Unlock the steering column tilt lever.
(2) Hold the steering column and adjust it to an appropriate position.
(3) After adjustment, lock the steering column tilt lever.

Steering column release lever

For easy getting on and off, unlock the steering column release lever and tilt the steering column toward the front of the lift truck.

After returning to the operator seat, tilt the steering column toward the operator seat and make sure that it is automatically locked. It will return to the same position it was set at prior to getting off the lift truck.

This lever is also used when opening and closing the engine hood.



1. Steering column release lever
2. Steering column tilt lever

1) Lock
2) Unlock
3) Lock
4) Unlock

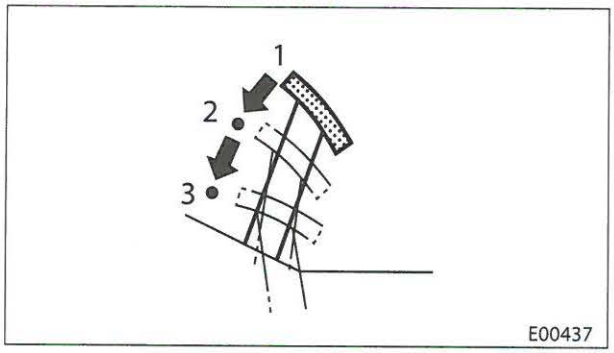
⚠ WARNING

- Always adjust the steering column tilt angle while stopped at a safe place, as adjustment while driving could lead to accidents.
- Make sure that the steering column is firmly secured.

▶ Inching Pedal

An operator can move the lift truck slowly by pressing the inching pedal to lower the traveling speed while maintaining engine speed.

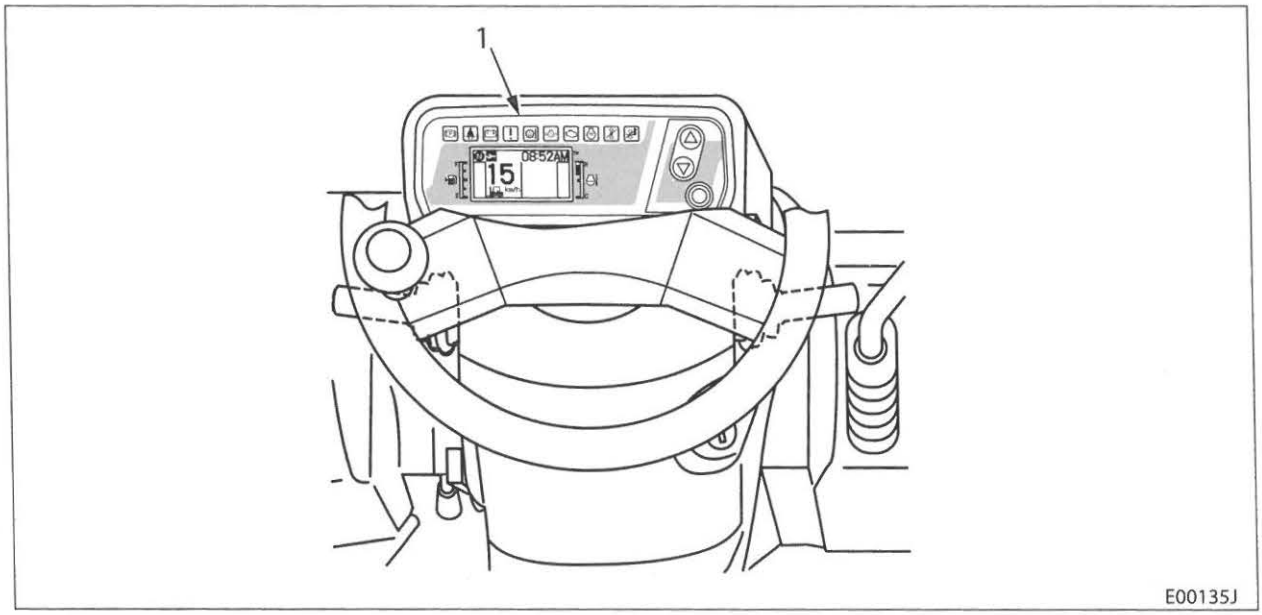
Full application of the pedal puts the transmission in NEUTRAL and applies the service brake.



1. Released
2. Clutch disengaged
3. Brake applied

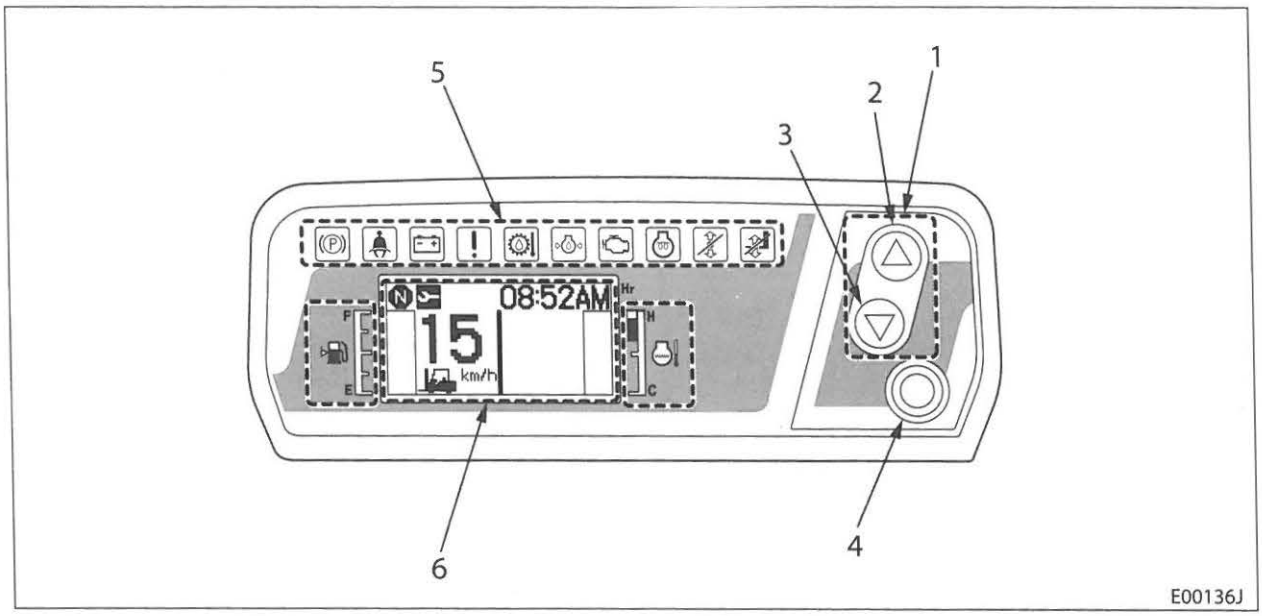
◆Meter Panel

When any warning light in the meter panel glows or blinks, stop the lift truck and take corrective action. (Except for the glow plug pilot indicator icon.)



1. Meter panel

Meter panel consists of warning lights, LCD (Liquid Crystal Display) screen, cursor buttons (△ UP button and ▽ DOWN button) and entry/display switch button (◎ ENTER/DISPLAY SWITCH button).

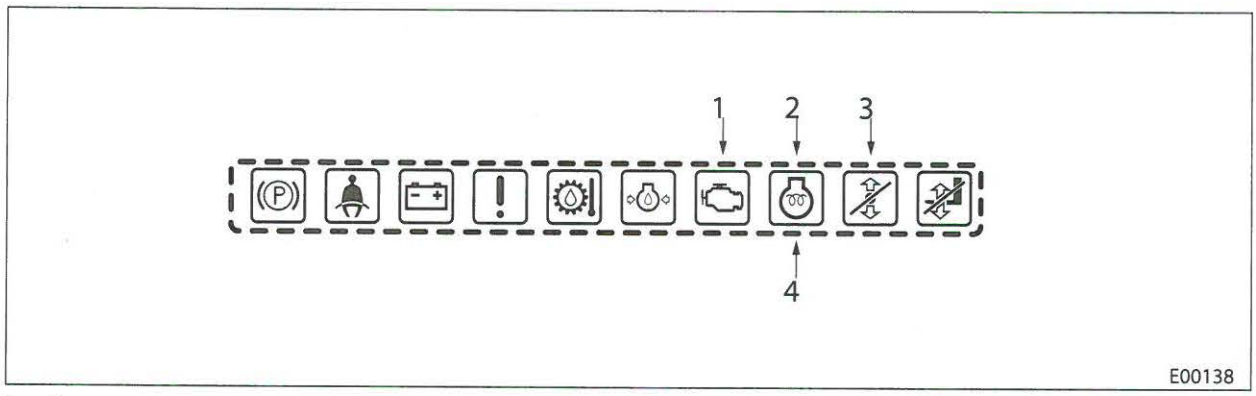


1. Cursor buttons
2. △ UP button
3. ▽ DOWN button
4. ◎ ENTER/DISPLAY SWITCH button
5. Warning lights
6. LCD screen

▶ Warning and Indicator Icons

When the key switch is turned to the ON position, warning lights and indicator icons will glow. (Except the lights marked G, D; G for Gasoline and LPG models and D for Diesel models.)

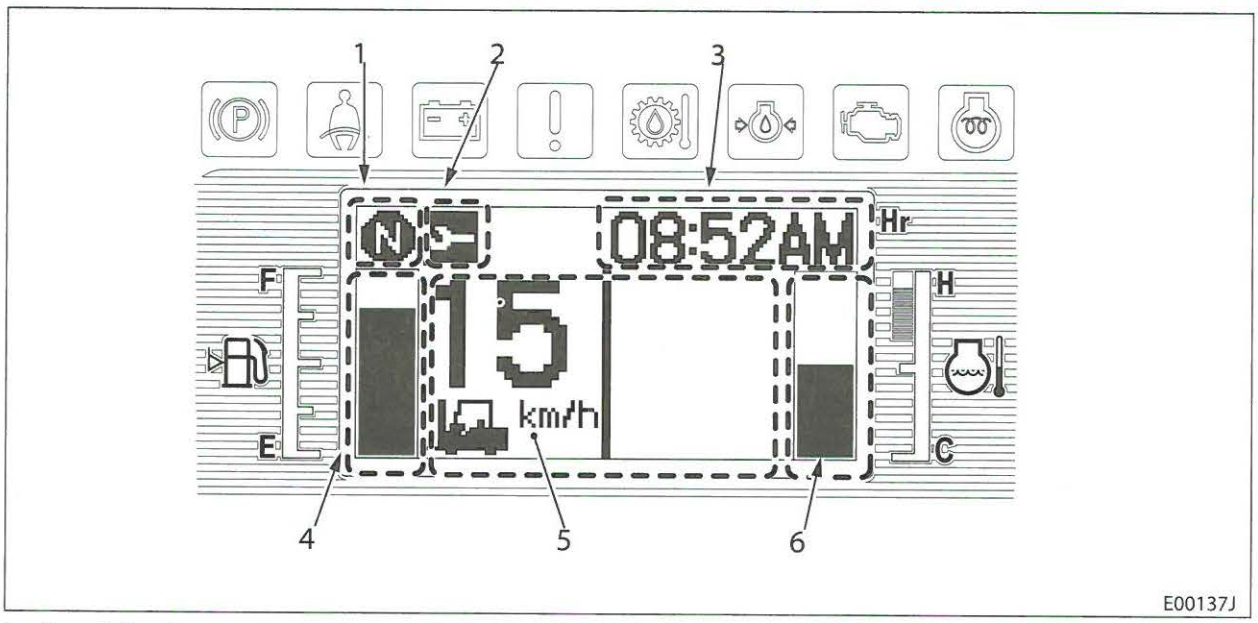
On Diesel models, the warning light marked ✻ will keep glowing until glow plug heating is completed. If not, the LED (Light-Emitting Diode) may have a defect. If the LED fails to glow with the key in the ON position, contact your authorized Cat lift truck dealer.



1. G
2. D
3. G, D
4. ✻

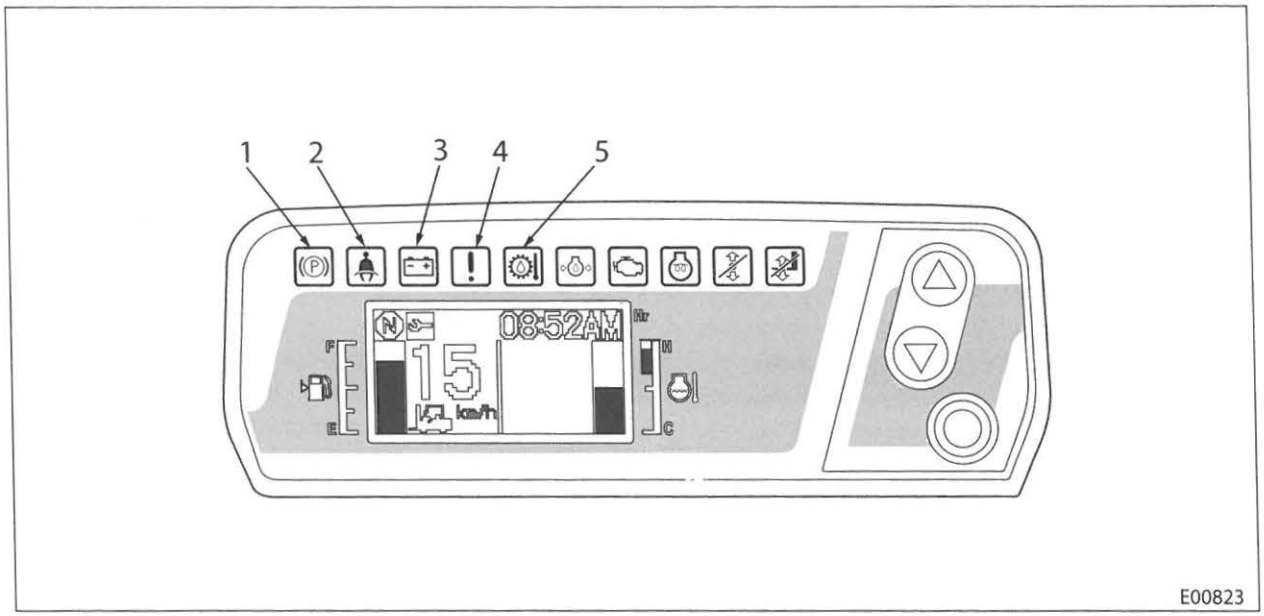
▶ LCD Screen

The LCD screen consists of main display, fuel gauge, travel direction, symbol mark, time/hour meter and engine coolant temperature gauge. The main display is divided into two parts; right and left.



1. Travel direction
2. Symbol mark (Optional feature)
3. Time/hour meter display
4. Fuel gauge
5. Main display
6. Water temperature gauge

▶ Warning and Indicator Icons



1. Parking brake warning light
2. Seat belt warning light
3. Battery charge warning light
4. Multi-purpose warning light
5. Torque converter fluid temperature warning light (Powershift model)

1. Parking brake warning light

- This warning light glows when the parking brake is applied, and it goes out when released.
- Parking brake warning buzzer will be activated when the operator leaves the operator seat for 3 seconds without applying the parking brake.

2. Seat belt warning light

- This warning light glows when the seat belt is not worn or when the seat belt is not properly buckled.

3. Battery charge warning light

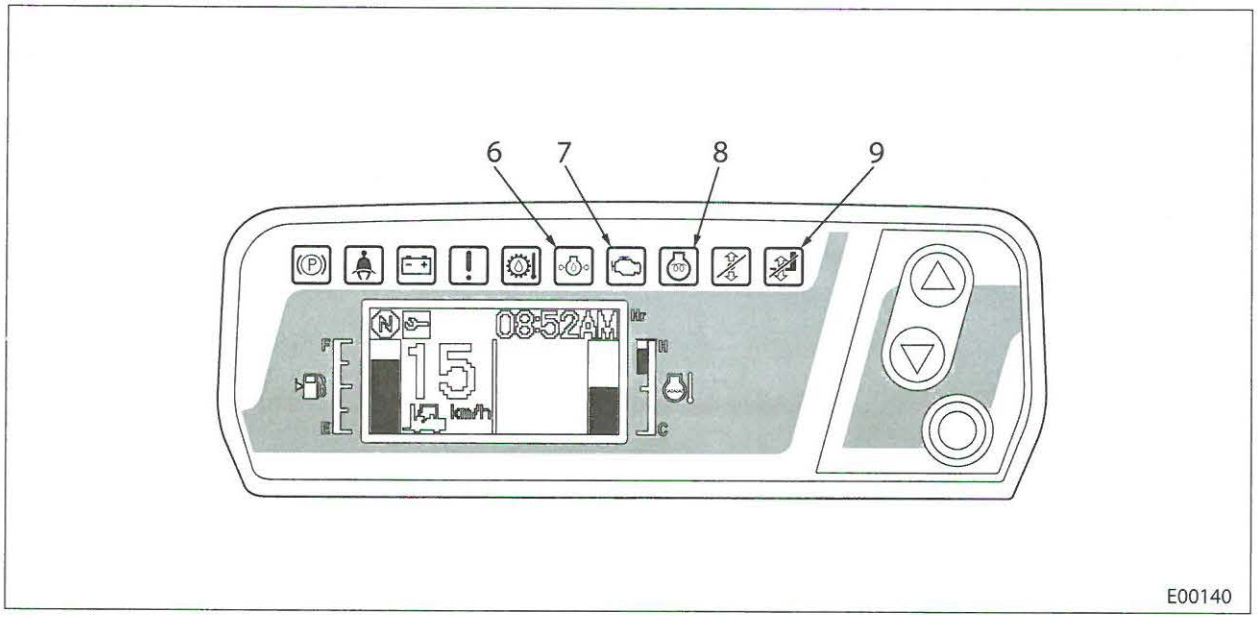
- This warning light glows when the charging system is not functioning properly.
- First, check the battery voltage. If the battery is fine, check the alternator drive belt for slippage or breakage.

4. Multi-purpose warning light

- This warning light glows when a minor warning occurs. The diagnostic codes and symbols are also displayed.

5. Torque converter oil temperature warning light (Powershift model)

- This warning light glows when the oil temperature is high and the danger of overheating is present. See 10-9 "If Torque Converter Oil Temperature Warning Light Glows (Powershift Model)".



6. Engine oil pressure warning light
7. Engine warning light (Electronic gasoline model)
8. Glow pilot light (Diesel model)
9. Mast interlock indicator icon

6. Engine oil pressure warning light

- If this light glows during operation, stop the engine and check the oil level. Add oil as required.

⚠ CAUTION

- If the lift truck is operated with low engine oil level or with this warning light glowing, overheating may result.
- If this warning light glows even when the engine oil level is correct, have the engine checked by your authorized Cat lift truck dealer.

7. Engine warning light (Electric LPG model)

- This warning light glows when the engine experiences an issue. When this light glows, contact your authorized Cat lift truck dealer.

8. Glow plug pilot light (Diesel model)

- This warning light glows when the key switch is turned to the ON position and goes OUT after heating is completed. Turn the key switch to the START position.

9. Mast interlock indicator icon

- This warning light blinks when the operator is not sitting properly in the operator seat for 3 seconds. The mast will not move even if the lift and/or tilt lever is operated. This warning light goes OUT if the lift and/or tilt lever is placed to the NEUTRAL position and the operator sits in the operator seat properly.

▶ Basic Screen Display

LCD screen when the key switch is turned ON

When the key switch is turned to the ON position, the LCD screen changes in the following order; brand logo screen, password input screen (optional) and standard screen. Pressing a button can also show the error warning display on the screen.

Brand logo screen

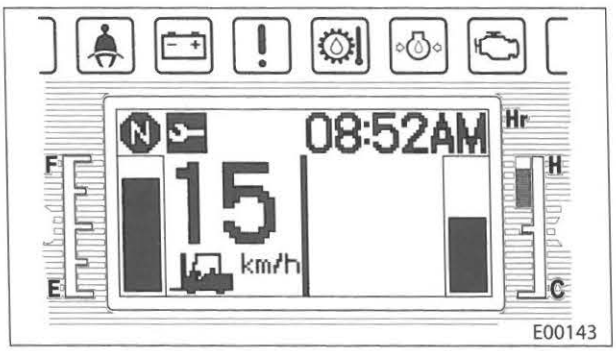
When the key switch is turned to the ON position, the brand logo screen will be displayed for approximately 3 seconds while the lights are being checked.

Password input screen (optional)

The lift truck can be operated after inputting the registered password. (Available when password option is selected.)

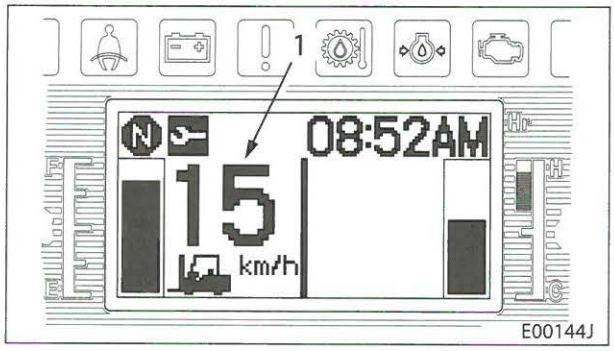
Standard screen

The screen changes to the standard display.



Speedometer display

Speedometer reads the current speed.



1. Speedometer display

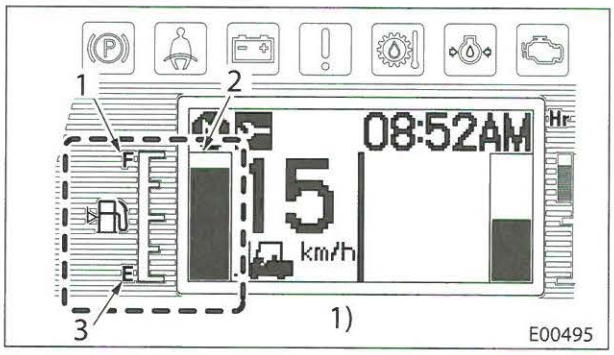
Actual speed	Display
0.1 to 1.0 km/h (0.06 to 0.6 mph)	1 km/h (0.6 mph)
1.1 to 2.0 km/h (0.6 to 1.2 mph)	2 km/h (1.2 mph)
.	.
.	.
.	.
24.1 to 25.0 km/h (14.9 to 15.5 mph)	25 km/h (15.5 mph)

Fuel gauge display

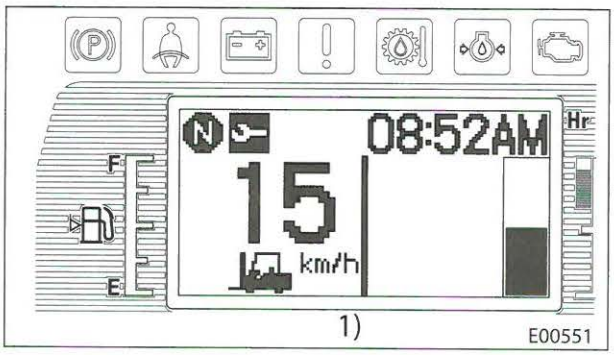
When the key switch is turned to the ON position, the fuel gauge will indicate the remaining fuel amount in the tank. If the ground is not level, the correct fuel amount will not be shown.

When the fuel gauge shows E (Empty), the low fuel level warning light will be displayed on the LCD screen.

- LPG model does not show the fuel gauge.



1) With fuel gauge
1. Full
2. Fuel gauge
3. Empty



1) Without fuel gauge

Amount of fuel remaining when fuel gauge shows E (Empty)

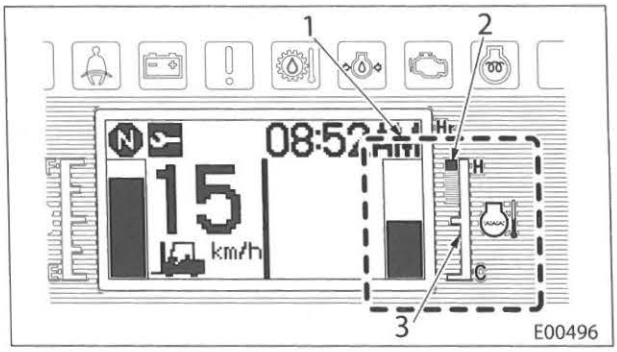
Model	Remaining amount
1.0 to 2.0C	Less than 5 L
2.0 to 3.5A	Less than 7.5 L

Engine coolant temperature gauge display

This gauge indicates the engine coolant temperature.

When the gauge shows the red zone, the engine may be overheated.

See 10-8 "If the Engine Coolant Temperature Gauge Shows Red Zone".



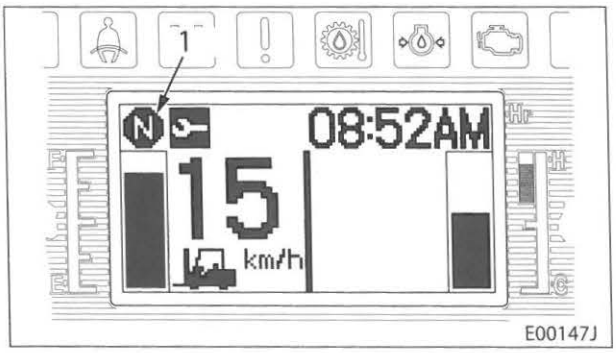
1. Engine coolant temperature gauge
2. Overheat
3. Suitable temperature

Travel direction display

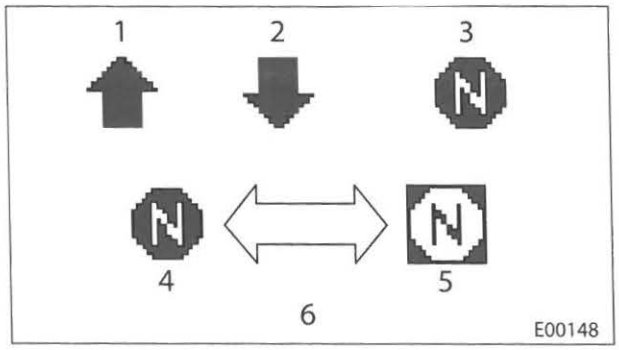
The lift truck travel direction is displayed. If the direction lever is not in the NEUTRAL position when starting the engine, the engine will not start with "N" blinking on the screen. If the operator leaves the operator seat for 3 seconds while the engine is running and the direction lever is not in the NEUTRAL position, "N" on the screen will blink, and the transmission will electrically shift into NEUTRAL.

Note:

- On the Powershift model, "N" glows when the direction lever is in the NEUTRAL position.
- Travel direction display changes to the signals from the direction lever.



1. Travel direction



1. Forward
2. Reverse
3. Neutral
4. 0.5 sec
5. 0.5 sec
6. Travel interlock indication (Powershift model)

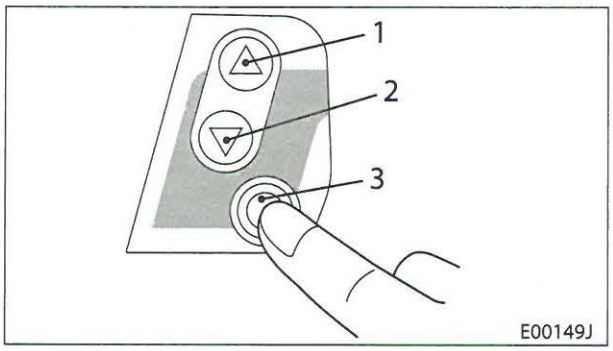
▶ Basic Operation

Operation buttons

The operation buttons are located on the right side of the meter panel. There are three types of buttons; UP button, DOWN button, and ENTER/DISPLAY SWITCH button. The function/operation of these three buttons varies with each display screen.

Button operation is available only when the key switch is in the ON position.

Some changes to the display are not available when the engine is running.



1. UP button
2. DOWN button
3. ◎ button

Note: Adjustment of screen contrast and selection between hour meter display and time display will operate with the engine running.

Short press of button:

Press button for less than two seconds.

Long press of button:

Press button for more than two seconds.

Multiple button presses:

All buttons pressed at the same time for more than two seconds.

How to adjust screen contrast

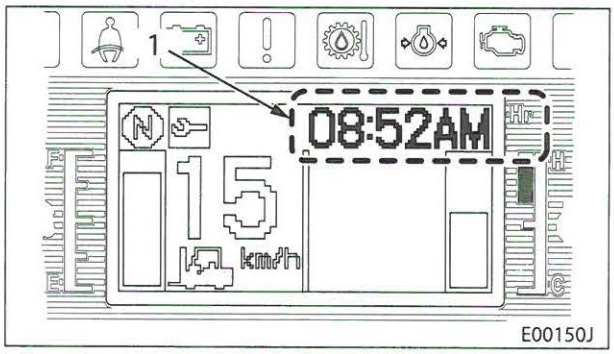
Turn the key switch to the ON position. Adjustment of screen contrast is available while the engine is running.

Button	Press	Screen contrast
△	Short press	Light to Dark
▽		Dark to Light

The screen contrast varies with the number of times a button is pressed.

How to display clock time

Turn the key switch to the ON position. Screen display selection is available while the engine is running. With a short press of the ENTER/DISPLAY SWITCH button, the display changes between the clock time and the hour meter.

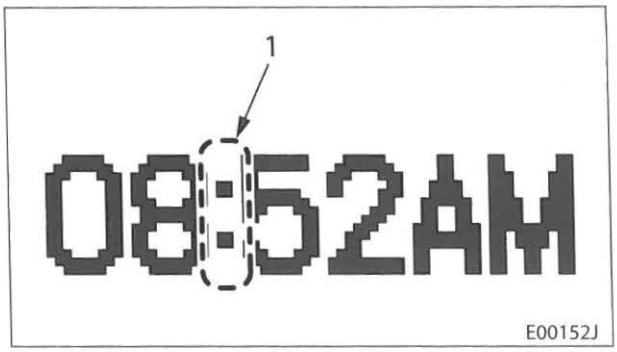


1. Clock time / Hour meter

Button	Press	Screen contrast
◎	Short	Hour meter ↔ Clock time

How to adjust clock time

Turn the key switch to the ON position. Do not start engine.



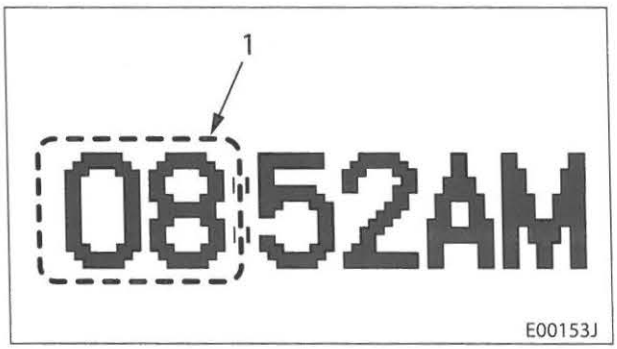
1. Blinking

Select clock time display

Button	Press	Display
◎	Short	Clock time (: Blinks)

Time adjust mode

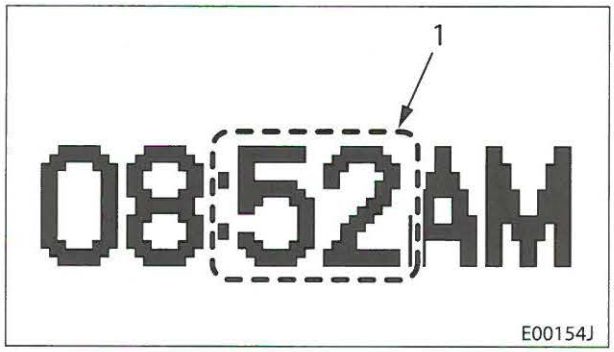
Button	Press	Display
◎	Long	Time setting mode of hours



1. Digits to be adjusted is blinking

Time setting of hours

Button	Press	Display
△	Short	01 to 12 / 01 to 24 (1 hour at each press)
	Long	01 to 12 / 01 to 24 (continuous)
▽	Short	12 to 01 / 24 to 01 (1 hour at each press)
	Long	12 to 01 / 24 to 01 (continuous)
◎	Short	Move to the time setting of minutes



1. Digits to be adjusted is blinking

Time setting of minutes

Button	Press	Display
△	Short	00 to 59 (1 min. at each press)
	Long	00 to 59 (continuous)
▽	Short	59 to 00 (1 min. at each press)
	Long	59 to 00 (continuous)
◎	Short	Move to the standard screen

Time accuracy

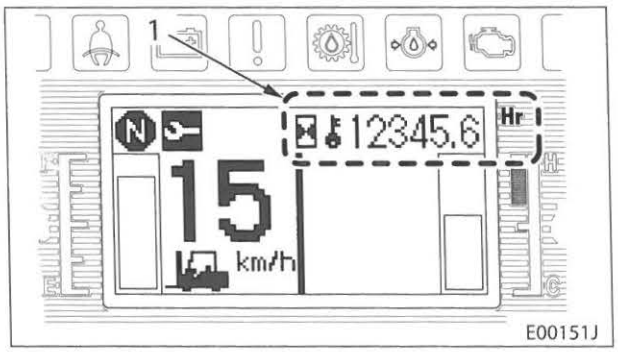
Precision errors will be a minute or less per month.

How to display hour meter

Turn the key switch to the ON position.

Screen display selection is available while the engine is running.

With a short press of the ENTER/DISPLAY SWITCH button, the display changes between the clock time and the hour meter.



1. Hour meter

Button	Press	Screen contrast
◎	Short	Clock time ↔ Hour meter

How to change hour meters

Turn the key switch to the ON position and select the hour meter. There are three hour meter counters; key-on time, engine-on time and seat switch-on time. With a long press of the UP button, the display changes.

1. Key-on time display
2. Engine-on time display
3. Seat switch-on time display

Button	Press	Screen contrast
△	Long	key-on time ↓ Engine-on time ↓ Seat switch-on time

Key-on time:

Total hours of engine key switch ON time

Engine-on time:

Total hours of engine operation time

Seat switch-on time:

Total hours the seat switch has been activated.

Note:

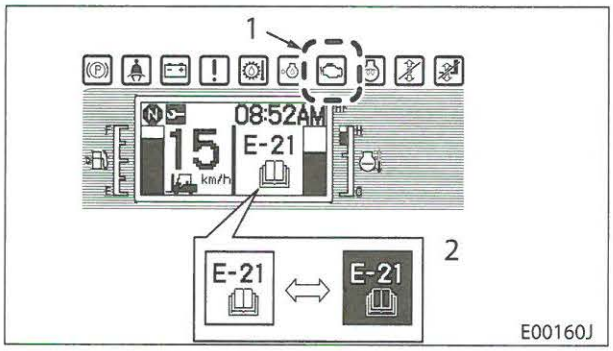
- 0.1 hour is added every six minutes that pass.
- At the manufacturing facility, key-on time is set to display on the screen.
- When the key switch is turned to the OFF position, the last selected screen is placed in memory to display the next time.

▶ When Diagnostic Code is Shown on Display

When the lift truck's condition changed, the screen will display the corresponding diagnostic code. The diagnostic code remains displayed on the screen until the automatic reset is successfully completed.) he order of display is; engine warning, serious warning and minor warning.

When an engine warning occurs

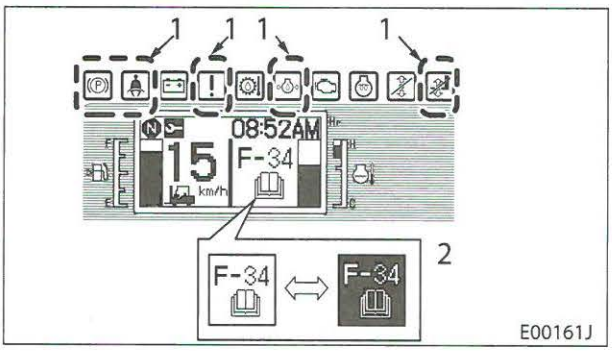
The corresponding diagnostic code will be shown on the main display, and the diagnostic code display will change between black and white alternately. Also engine check light will glow.



1. Illumination of engine warning light
2. When a serious warning occurs, the diagnostic code alternately changes from black characters on a white background to white characters on a black background.

When a serious warning occurs

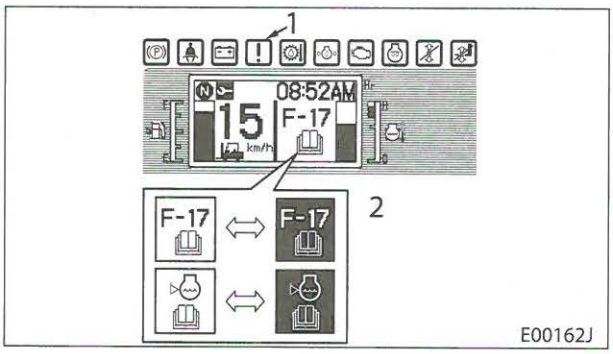
The corresponding diagnostic code will be shown on the main display, and the diagnostic code display will change between black and white alternately. Also, all of the corresponding warning lights will glow.



1. Flash of warning lights shown within the dotted line box
2. When a serious warning occurs, the diagnostic code alternately changes from black characters on a white background to white characters on a black background.

When a minor warning occurs

The corresponding diagnostic codes and symbols will be shown on the main display, and the diagnostic code and symbol display will change between black and white alternately. Also, the multi-purpose warning light will glow.



1. Illumination of multi-purpose warning light
2. The diagnostic code and symbol alternately change from black characters/lines on a white background to white characters/lines on a black background.

Symbols

The symbols shown on the main display are listed below:

Symbol	Name	Condition
	Blake Fluid Level Warning Light	When brake fluid level is low (Option)
	Fuel Filter Drain Warning Light	When fuel filter needs to be drained (Diesel model)
	Coolant Level Warning Light	When coolant level is low (Option)
	Clogged Air Cleaner Element Warning Light	When air cleaner element is clogged (Option)
	Low Fuel Level Warning Light	When fuel level is low (On LPG/Gasoline dual models, when gasoline level is low.)
	LPG Level Warning Light	When LPG level is low (LPG model) (Option)

▶ Optional Functions

The following optional functions are available.

- password authentication
- service interval display
- over speed warning
- load meter display
- over load warning
- exterior alarm
- speed restrictions

Note: Installation of special devices is required on the lift truck for the load meter display, the over load warning and the exterior alarm.
To use these options, function settings are required. Contact your authorized Cat lift truck dealer for details.

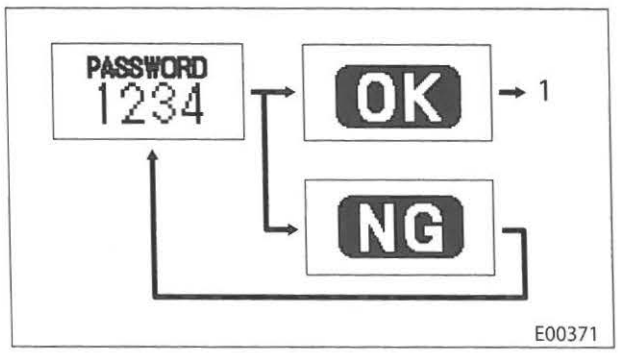
Password authentication

This function prevents an unauthorized person from operating the lift truck. To operate the lift truck, you need to enter the registered four-digit password.

Inputting a password

Turn the key switch to the ON position.

When the password input screen is displayed after brand logo screen, enter the registered four-digit password.



1. To standard screen

Password input procedure

Button	Press	Display
△	Short	0 to 9, ← (one at each press)
	Long	0 to 9, ← (continuous)
▽	Short	←, 9 to 0 (one at each press)
	Long	←, 9 to 0 (continuous)
◎	Short	Enter to move to the next digit

- Press ENTER/DISPLAY SWITCH button at ← to return to the previous digit.
- Press ENTER/DISPLAY SWITCH button to move to the next digit.
- Press ENTER/DISPLAY SWITCH button at the fourth digit to enter.

Note: When the password is correct, the "OK" message will be displayed. When the password is wrong, the "NG" message will be displayed.
With the "NG" message, the engine can be started, but the lift truck will neither travel nor operate.

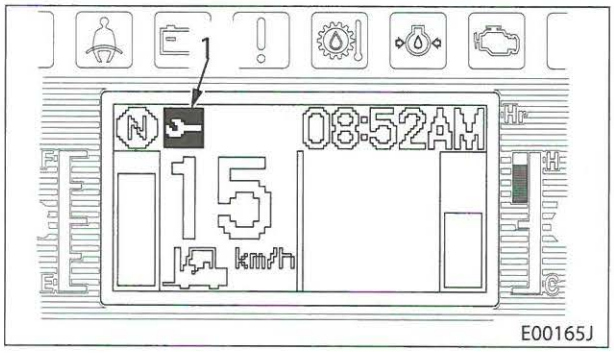
- In case of an emergency or when the registered password is forgotten, enter "1111" as shown for the minimized use of travel and operation.
- Password input is necessary when starting the operation, but if it is within 3 minutes after the operator leaves the operator seat or after the key switch is turned to the OFF position, you need not enter the password again. (Password will time out after 3 minutes.)
- Password registration, change and cancellation should be set up by your authorized Cat lift truck dealer.
- Password registration of "0000" and "1111" are not available. Register a different four-digit password.

Service interval display

When the hour counter reaches the pre-set number of hours, the service interval symbol mark will be displayed to notify the lift truck operator of the periodic inspection and maintenance time.

Note: Service interval symbol will not be displayed if this setup is not installed.

- The service interval setting, should be set up by your authorized Cat lift truck dealer.

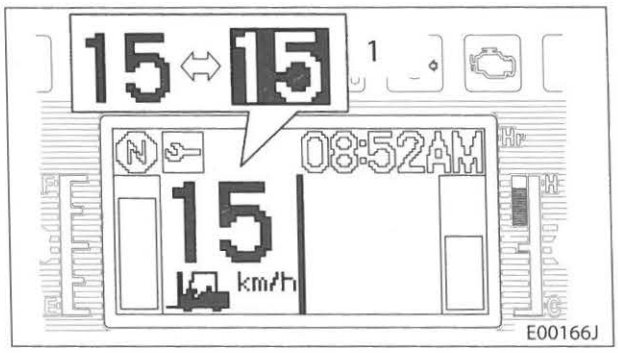


1. Service interval display

Over speed warning display

When the pre-set speed limit is exceeded, the speedometer display on the LCD screen will change between black and white alternately. Also the warning buzzer will be activated.

- The over speed setting, should be set up by your authorized Cat lift truck dealer.
- Travel speed of lift truck is limited within the range of pre-set speed.

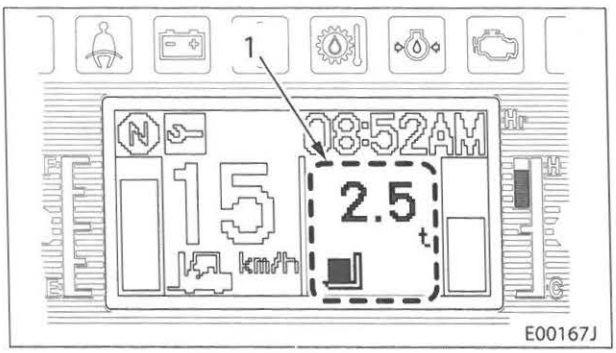


1. Over speed warning display

Load meter display

Load meter display is a function to display load weight.

- The load meter setting, should be set up by your authorized Cat lift truck dealer.



1. Load meter display

Note:

- If equipped with the optional; load weight indicator / display, the weight on the forks will be displayed on the load meter display when the load is lifted. The weight shown can be set to indicate either tons (t) or pounds (lbs). The readout is an estimation of the actual load on the forks.
- The estimation is for reference purposes only and CANNOT be used for legal trade.
- The capacity plate on the lift truck specifies the maximum lifting capacity. Wide loads or extended load centers can change the lift capacity of the lift truck.

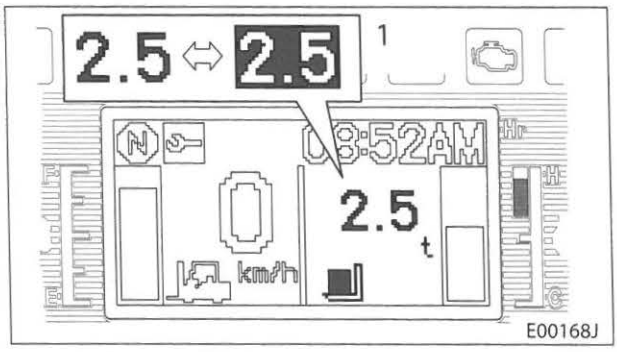
Overload warning display

When the pre-set load limit is exceeded, the load meter display on the LCD screen will change between black and white alternately.

Switching the weight unit (t ↔ lb) is available only after the key switch is turned from the OFF position to the ON position.

In order to change the unit, long press the ▽ button (for two seconds). This function is not available when the engine is running.

- The overload warning setting, should be set up by your authorized Cat lift truck dealer.

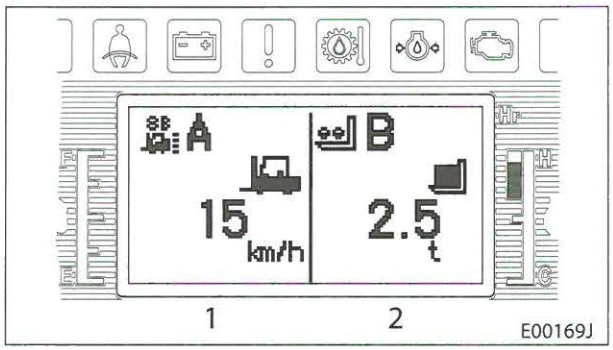


1. Overload warning display

Exterior alarms

When the pre-set speed limit or overload limit is exceeded, the exterior lights (display A--yellow; display B--red) installed on the lift truck will glow and/or alarm will be activated at full blast.

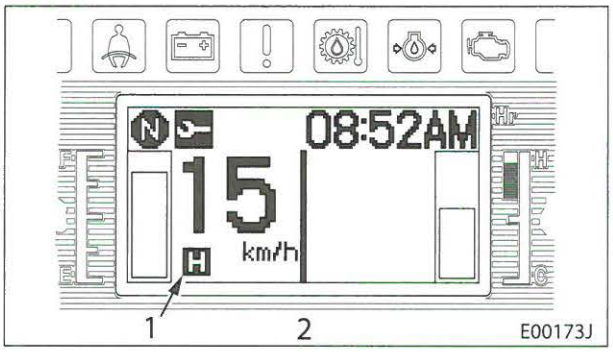
- The exterior alarm setting, should be set up by your authorized Cat lift truck dealer.



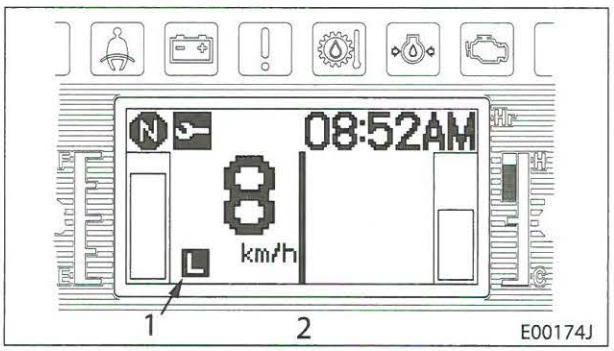
1. Screen A 2. Screen B

Speed restriction

Speed restriction controls the maximum speed of both high (H) and low (L) speeds to the pre-set values.



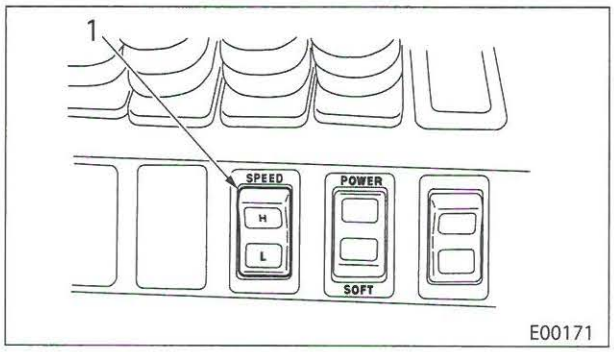
1. High speed symbol 2. High speed limit display



1. Low speed symbol 2. Low speed limit display

H/L selector switch is used to change between high and low speeds.

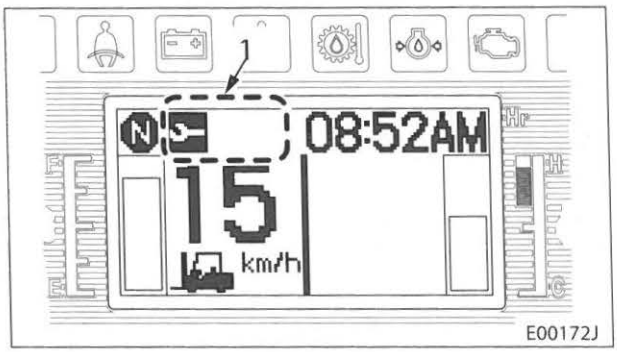
The speed restriction setting, should be set up by your authorized Cat lift truck dealer.



1. H/L selector switch

Symbol display

Symbol shows functions available on the lift truck. Display is divided into 3 zones.

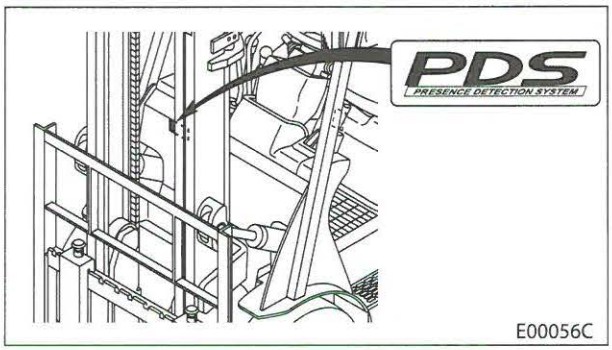


1. Symbol display

◆Presence Detection System

Lift trucks with this label are equipped with an "Presence Detection System" (PDS). This system features an enhanced, integral computer-based, feed back system which provides "certain product intelligence" to the operator.

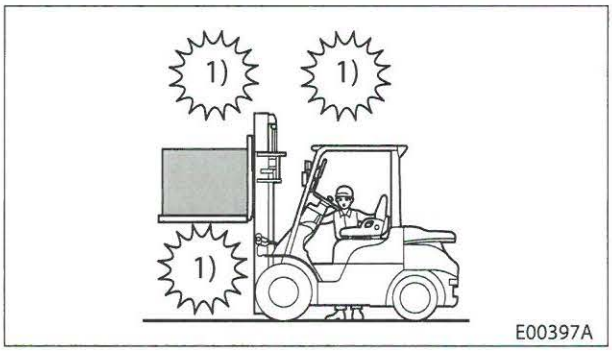
BE SURE to operate the lift truck and system correctly. Also BE SURE to properly maintain as well as operate the system at all times.



▶ Mast Interlock System

If the operator leaves the operator seat for approximately 3 seconds, a switch in the operator seat activates the mast interlock system. This action causes the system to deactivate the lift and tilt control levers.

Note: The start-up time of mast interlock operation may have some differences depending on the conditions of lift and tilt (lift, tilt, and attachment) control levers, and the specification of mast and attachment. For details on the mast interlock system for attachment, see the manuals of the attachment manufacturer.



1) STOP

Mast Interlock System Functions

Key Switch	Engine	Operator Seat	Mast Interlock Indicator Icon	Operating Control Lever (MC)	
				Lift Lever	Tilt Lever
OFF	Stop	Seated	OFF	Not Active	Not Active
		Not Seated	OFF	Not Active	Not Active
ON	Stop	Seated	OFF	Lowering only	Not Active
		Not Seated	Glow	Not Active	Not Active
START	Running	Seated	OFF	Active	Active
		Not Seated	Glow	Not Active	Not Active

⚠ WARNING

- Check the function of the mast interlock system at the daily pre-start inspection.
- Even when the engine is not running, while the operator is sitting correctly in the operator seat and with the key switch in the | ON position, it is possible for the mast to descend. Please be very careful. (See the table above.)
- The parking brake is not automatically applied when the interlock is activated.
- When replacing the operator seat, BE SURE to select a genuine Cat lift truck seat with an operator presence switch and an operator restraint system.

Note: MC Model

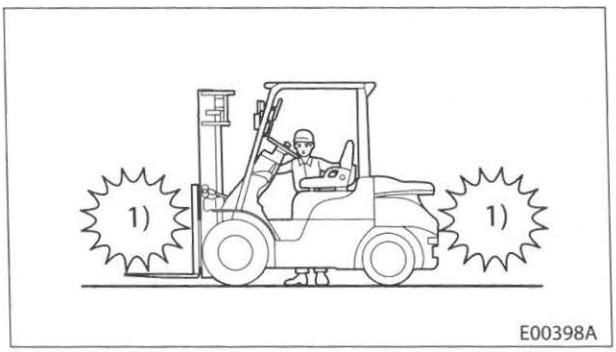
The mast interlock will work only for the lift and tilt levers. Attachments can be moved regardless of whether the mast interlock function is operating or not. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight. When the key switch is in the ON position, the lift lever will lower.

▶ Driving Interlock System (Powershift Models Only)

⚠ WARNING

- Check the function of driving interlock system at the daily pre-start inspection.
- The parking brake is not automatically applied when the interlock is activated.
- When replacing the operator seat, BE SURE to order a genuine Cat lift truck seat with an operator presence switch and an operator restraint 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 pressing the accelerator pedal).
- The driving interlock system will not allow the lift truck's transmission to stay in the FORWARD or REVERSE position when you are out of the operator seat.
- If the operator leaves the operator seat for approximately 3 seconds, a switch in the operator seat activates the driving interlock system. This action causes the system to cut power and to electrically shift the transmission to NEUTRAL. The transmission will disengage but the direction lever will not physically move to the NEUTRAL position.
- To reactivate the transmission, sit in the operator seat and place the direction lever to the NEUTRAL position and back to the direction of travel.
- The parking brake does not synchronize with the driving interlock and is not automatically applied when the interlock is activated. The lift truck will start to move in the direction of the downgrade if on an incline.
- Even if the driving interlock system is activated, the lift truck may move in the direction of the downgrade when the lift truck is on a grade. In this case, apply the brakes and sit properly in the operator seat.



1. No Power Travel

▶ Driving Interlock System Functions (Powershift Models Only)

Conditions				Function	Driving Interlock Indicator Icon
Key Switch	Engine	Operator Seat	Direction Lever		
ON	ON	Not Seated	F / R	Driving inoperative	BLINK
		Seated	F / R	Driving operative	OFF
		Seated to Not Seated	F / R	For approximately 3 seconds Driving operative	BLINK within approximately 3 seconds
		Seated to Not Seated to Seated	F / R	Within approximately 3 seconds Driving operative	OFF within approximately 3 seconds
		Not Seated to Seated	F / R	Driving inoperative	BLINK
		Not Seated to Seated	F / R to N to F / R	Driving inoperative, then operative after Neutral	BLINK then OFF after Neutral

▶ Driving Interlock System With Operator Restraint Function (For Powershift Models With Australia Specification Only)

This system features a combinational interlock system to prevent the lift truck from traveling unless the operator is properly seated and seat belt is properly buckled.

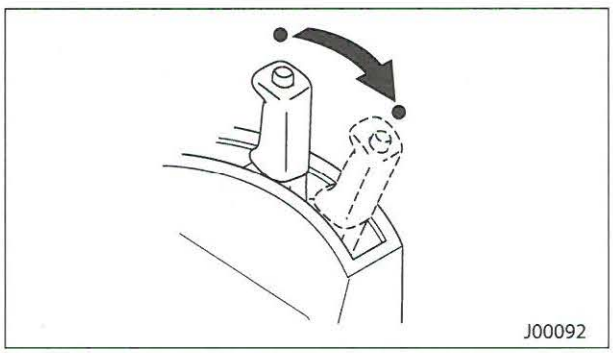
Note:

- Learn the correct starting procedure shown below before starting the engine.
- Be sure to apply the parking brake and place the direction lever in the NEUTRAL position before starting the engine.

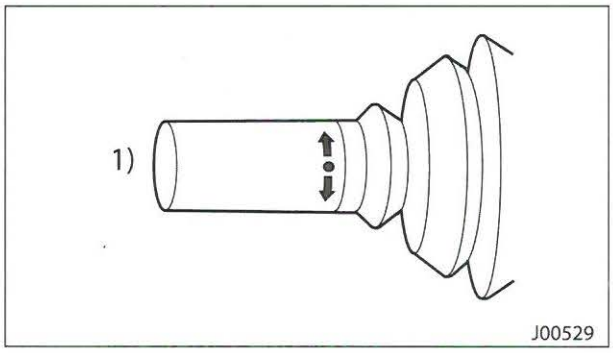
Correct starting procedure

(1) Sit on the operator seat.

(2) Apply the parking brake.

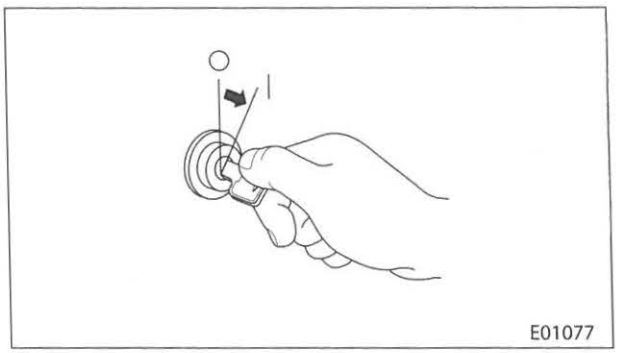


(3) Place the direction lever in the NEUTRAL position.

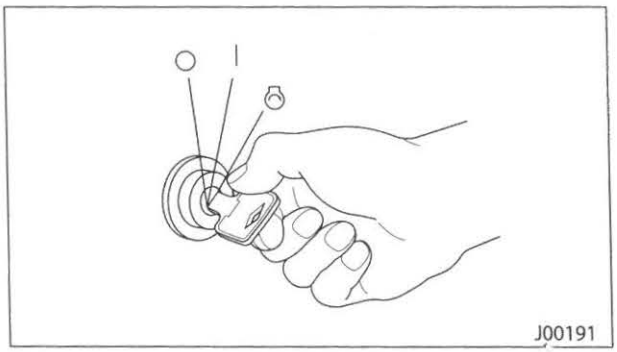


1) NEUTRAL position

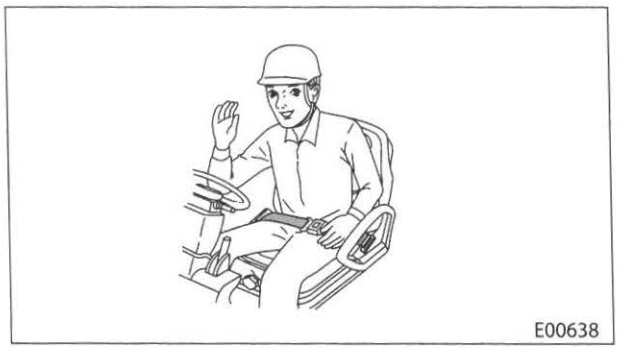
(4) Turn the key switch to the ON position.



(5) Turn the key switch to the START position to crank the engine.



(6) Fasten the seat belt.

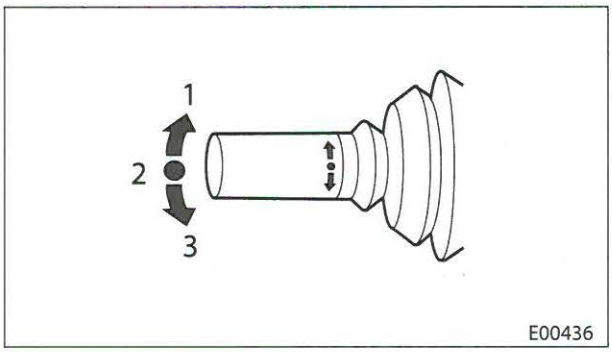


▶ Driving Interlock System Functions (For Powershift Models With Australia Specification Only)

Conditions				Function	Driving Interlock Indicator Icon
Key Switch	Engine	Operator Seat	Direction Lever		
ON	ON	Not Seated	F/R	Driving inoperative	BLINK
		Seated without seat belt buckled	F/R	Driving inoperative	BLINK
		Seated with seat belt buckled	F/R	Driving operative	OFF
		Seated with seat belt buckled to unbuckle seat belt	F/R	Driving inoperative	BLINK
		Seated to Not Seated to Seated with seat belt buckled	F/R	Driving operative	OFF
		Not Seated to Seated with seat belt buckled	F/N/R	Condition will not change	Indication will not change

▶ Neutral System

The lift truck is equipped with a device that prevents the engine from being started if the direction lever is not in the NEUTRAL position.



1. Forward (F)
2. Neutral (N)
3. Reverse (R)

⚠ CAUTION

Check the following when the starting engine.

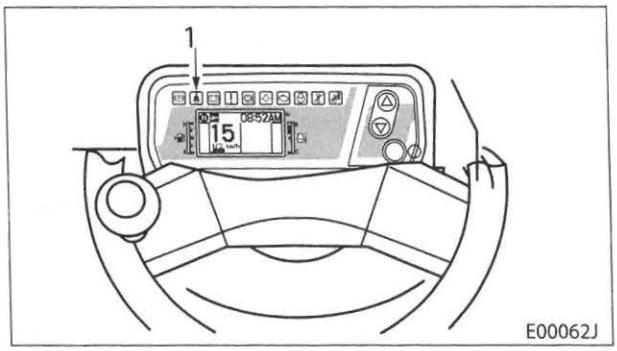
- No one is around the lift truck.
- The parking lever is locked.
- The direction lever is in the NEUTRAL (N) position.
- Seated in the operator seat properly.

▶ Neutral System Functions

Conditions			Safety Function
Key Switch	Operator Seat	Direction Lever	
OFF or ON	Seated or Not Seated	NEUTRAL	Engine starts only when the direction lever is in the NEUTRAL position

▶ Seat Belt Warning Light

The seat belt has a switch that activates a warning light. The warning light in the meter panel stays on until the seat belt is buckled. The seat belt warning is one of the PDS functions installed on this lift truck.



1. Seat belt warning light

⚠ WARNING

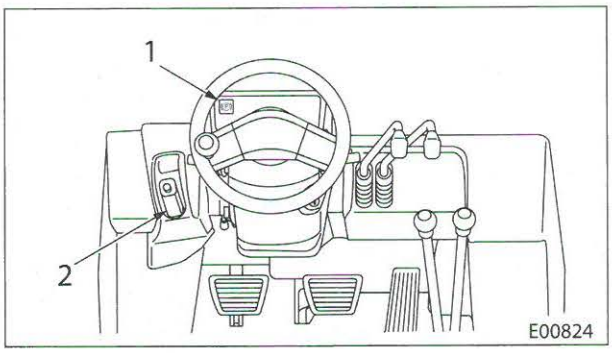
- Prior to operating the lift truck, BE SURE that the seat belt warning light is functioning.
- This warning light reminds the operator to fasten the seat belt. Maintain it so that it is always functional.

▶ Seat Belt Warning Functions

Conditions				Safety Warning
Key Switch	Engine	Operator Seat	Seat Belt	
ON	ON or OFF	Not seated	Not buckled	Seat belt warning light [ON]
			Buckled	Seat belt warning light [OFF]
		Seated	Not buckled	Seat belt warning light [ON]
			Buckled	Seat belt warning light [OFF]

▶ Parking Brake Warning Buzzer and Icon

The parking brake is a double action type designed to be released while pressing the top button and pushing the lever forward. Pull the parking brake lever until it locks into place. When leaving the lift truck, always apply the parking brake.



1. Parking brake warning light 2. Parking brake lever

⚠ WARNING

- Prior to operating the lift truck, BE SURE to check that the parking brake warning buzzer and light are functioning correctly.
- The warning buzzer and light remind the operator to apply the parking brake when leaving the lift truck. Maintain them so that they are always functional.
- Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked.
- When replacing the operator seat, BE SURE to order a genuine Cat lift truck seat with an operator presence switch and an operator restraint system.

▶ Parking Brake Warning Functions

Conditions				Safety Warning	
Key Switch	Engine	Operator Seat	Parking Brake		
OFF	OFF	Seated or not seated	Not applied	Parking brake warning light [OFF]	Warning buzzer [ON]
			Applied	Parking brake warning light [OFF]	Warning buzzer [OFF]
ON	ON or OFF	Not seated	Not applied	Parking brake warning light [OFF]	Warning buzzer [ON]
			Applied	Parking brake warning light [ON]	Warning buzzer [OFF]
		Seated	Not applied	Parking brake warning light [OFF]	Warning buzzer [OFF]
			Applied	Parking brake warning light [ON]	Warning buzzer [OFF]
		Seated to not seated	Not applied	Parking brake warning light [OFF]	After approximately 3 seconds, warning buzzer will turn [ON]

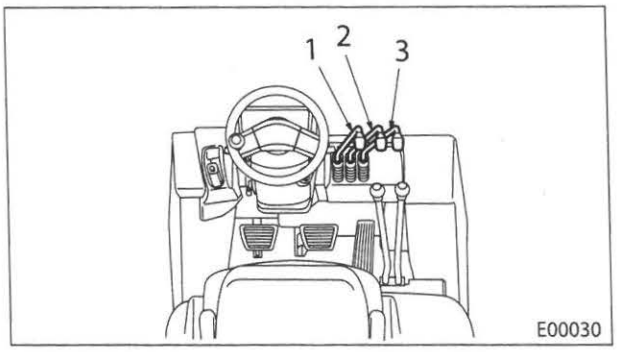
◆Operating Switches and Controls (MC Model)

Equipped with mast interlock system

The mast interlock system is one of the functions of the Presence Detection System on this lift truck.

If you are not properly seated in the operator seat, you cannot operate the mast operate until you are properly seated. In the following case, the mast interlock system disconnects power to the hydraulic control valve and the mast will not lift, lower or tilt even if the control levers are operated:

- The operator leaves the operator seat for approximately 3 seconds with the key switch in the ON position regardless of whether the engine is running or not.

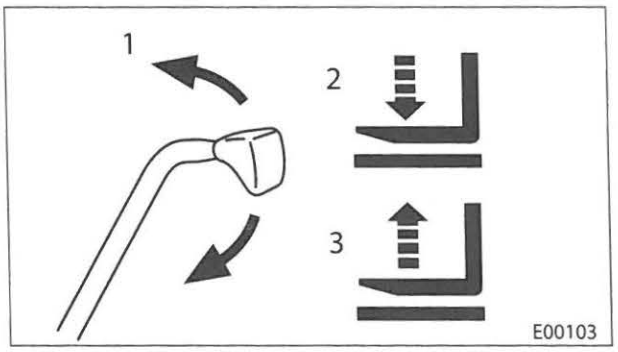


1. Lift lever
2. Tilt control lever/Mast vertical switch (optional)
3. Attachment control lever

▶ Lift Lever

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

To deactivate the mast interlock system, the operator sits on the operator seat while the key switch is in the ON position with the engine running, and then operate the lift lever.

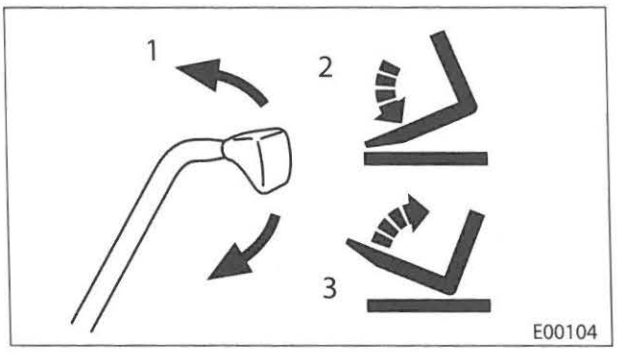


1. Lift lever
2. Lower
3. Raise

▶ Tilt Lever

Tilt speed is controlled by the speed of the engine (the position of the accelerator pedal) and the position of the tilt lever. The lever will return to the NEUTRAL position when released.

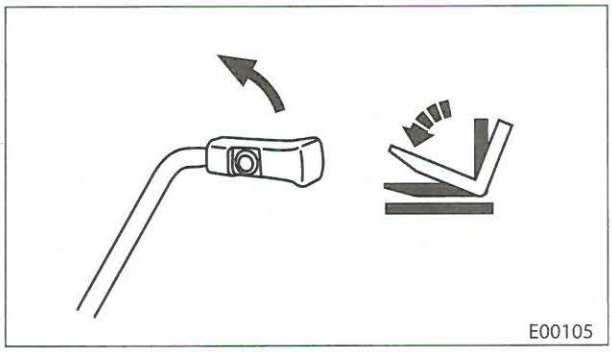
To deactivate the mast interlock system, the operator sits on the operator seat while the key switch is in the ON position with the engine running and then operate the tilt lever.



1. Tilt lever
2. Forward
3. Backward

▶ Mast Vertical Switch (Optional)

When the mast is placed at a tilt-back position without load, push the tilt lever forward while pressing the switch. The mast stops at a vertical position.



▶ Attachment Lever (Optional)

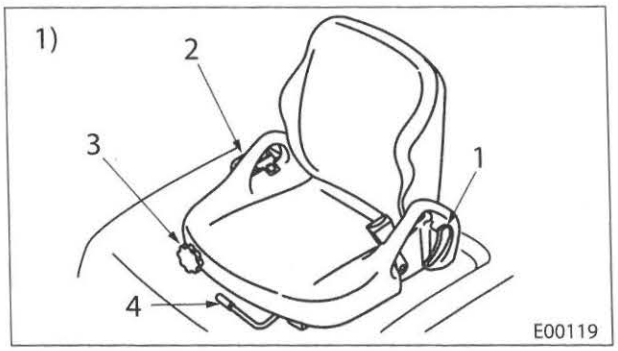
The mast interlock will not work for the attachment levers. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight.

◆Operator Seat

▶ Seat Adjustment

⚠ WARNING

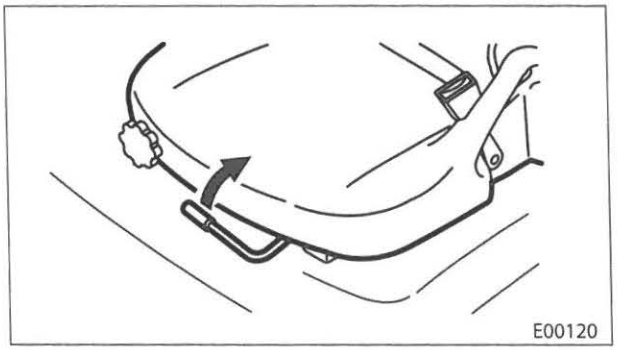
Adjust the operator seat slide forward and back position before starting the engine. After adjusting, jiggle the seat to make sure it is properly locked. DO NOT adjust the operator seat while the lift truck is in motion.



1) MC model
1. Reclining lever
2. Seat belt
3. Adjusting knob
4. Side lever

▶ Forward and Back Adjustment

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



⚠ WARNING

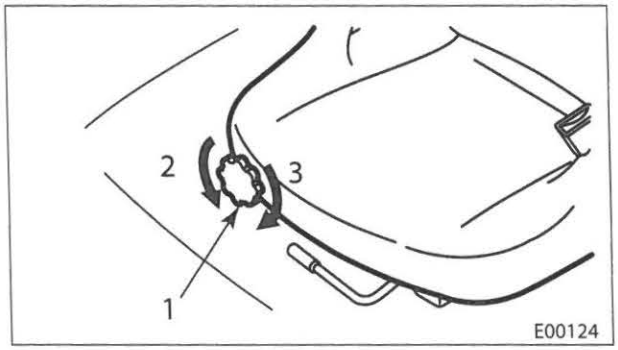
Your lift truck comes equipped with a genuine Cat lift truck operator restraint system and an operator presence switch. Should it become necessary to replace the seat for any reason, it must only be replaced with a genuine Cat lift truck operator restraint system equipped with an operator presence switch.

▶ Adjustment of Suspension

Adjust the suspension before sitting on the seat.

Turn the knob until the gauge indicates the weight of the operator. Turning the knob clockwise, increases the gauge indication, and turning it counterclockwise decreases the gauge indication.

Weight adjustment range: 40 to 120 kg

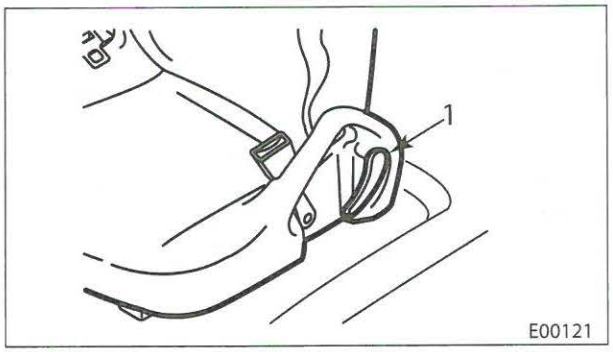


1. Adjusting knob

1) Decrease
2) Increase

▶ Reclining Angle Adjustment

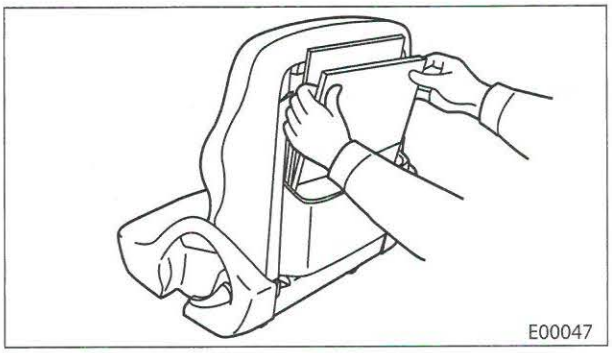
Push the lever and set the angle to the desired position.
And release the lever.



1. Reclining lever

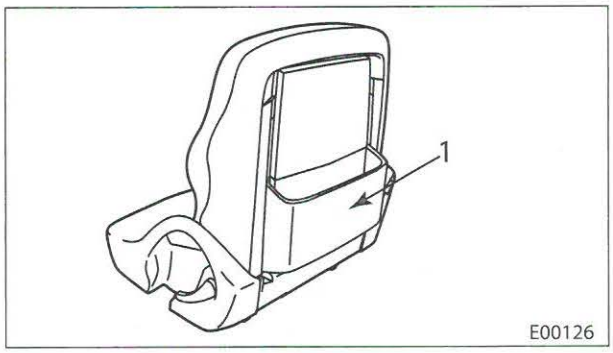
▶ Pocket for the Manual

Place the operation and maintenance manual in this pocket.
Use both hands to open or close the pocket.



▶ Magazine Box

A magazine box that can hold small items such as sketch boards, magazines, and gloves is equipped together with the pocket.



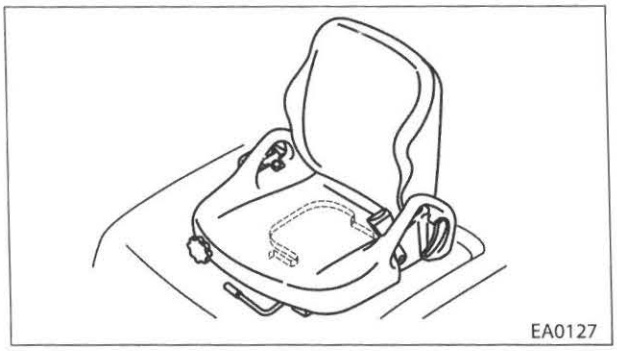
1. Magazine box

▶ Operator Presence Switch and Buzzer

The lift truck has an operator presence switch. The mast and attachments cannot be moved unless the operator is seated in the operator seat. For details, see 2-26 "Mast Interlock System"

If you leave or rise from the operator seat for approximately 3 seconds with the key switch in the ON position:

- With the mast indicator icon blinking in the meter panel, electrical power is interrupted to the mast hydraulics until the operator is seated.
- Electrical power is interrupted to the transmission control valve. The "N" will blink in the meter panel only when the directional lever is in the FORWARD or REVERSE position.
- The parking brake warning buzzer will be activated if the parking brake is not applied while the key switch is in the OFF position or if the operator leaves the operator seat for approximately 3 seconds.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⚠ WARNING

When replacing the operator seat, BE SURE to order a genuine Cat lift truck seat with an operator presence switch and an operator restraint system.

◆Seat Belt

⚠ WARNING

- The seat belt will help to restrain the operator in accidents such as a tipover or mast and attachment collisions.
- An unrestrained operator in a tipover could fall outside of the operator compartment and be crushed by the lift truck.
- An unrestrained operator could continue to move forward if a sudden stop occurs.
- Always fasten the seat belt when operating the lift truck.

⚠ WARNING

- Seat belts could "jack-knife" the operator, i.e., the upper body bends tightly at the waist.
- If the seat belt is fastened across the operator's abdomen during an accident, it could cause serious internal injuries.

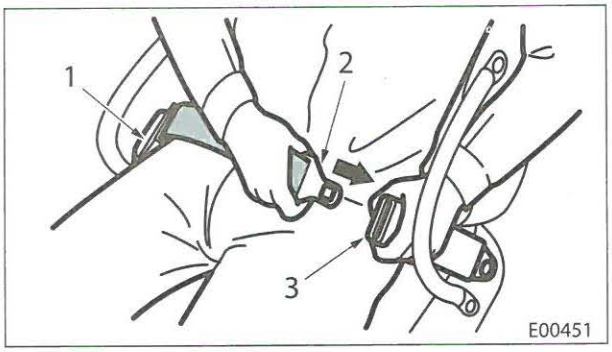

D00379

How to fasten the seat belt

(1) Hold the latch plate of the belt and pull the belt from the retractor.

(2) Insert the latch plate into the slot of the buckle until a snap is heard.

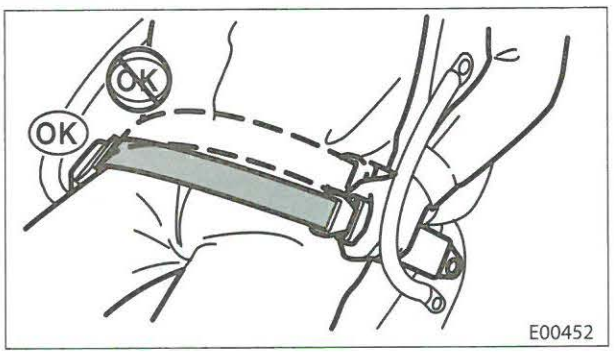
Note: Make sure the belt is not twisted.



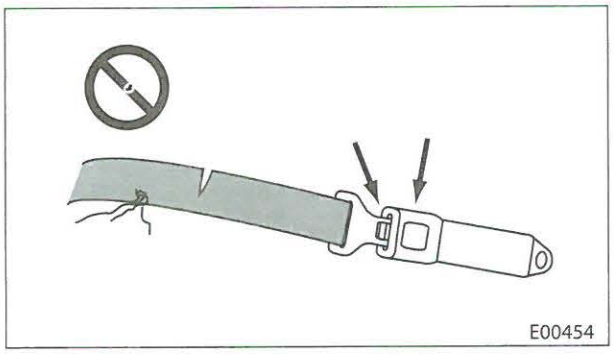
1. Retractor
2. Latch Plate
3. Buckle

(3) Be sure to fasten the belt as low as possible across your hips, not across your abdomen.

Note: It is not necessary to adjust the belt length. Tug on it to check for a tight fit.



If the seat belt is torn, the pulling motion of the belt is interrupted during extension, or the belt cannot be inserted into the buckle properly, replace the seat belt assembly. The seat belt must be checked at designated maintenance intervals.



Note: 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 change is necessary:

- Cuts, fraying, or excessive wear on the webbing would indicate the need for change of the seat belt system.
- Check buckle and latch for proper operation and to determine if latch plate is worn, deformed, or buckle is damaged or the casing is broken.
- Check the retractor web storage device operation to make sure that it locks properly and that it spools out and retracts the webbing properly.

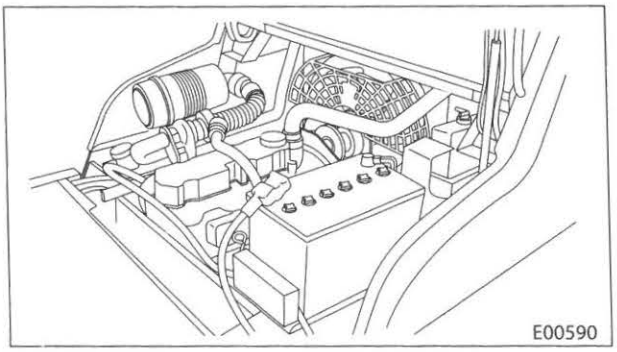
⚠ WARNING

When replacing seat belt components, replace them with genuine Cat lift truck parts.

◆Engine Hood

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

- Engine Oil Level
- Engine Coolant Level
- Hydraulic Tank
- Battery Electrolyte Level
- Air Cleaner Element
- Alternator Drive Belt



⚠ CAUTION

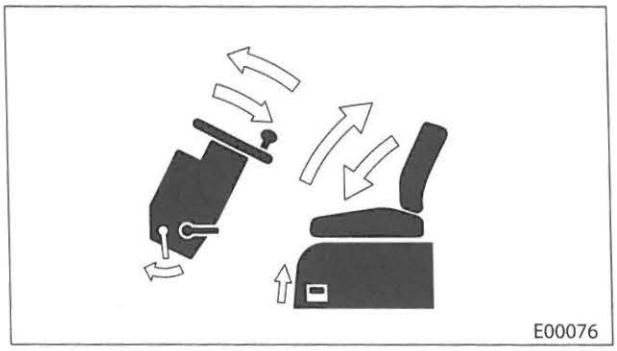
When closing the engine hood, be careful not to pinch your hand.

▶ Hood Latch

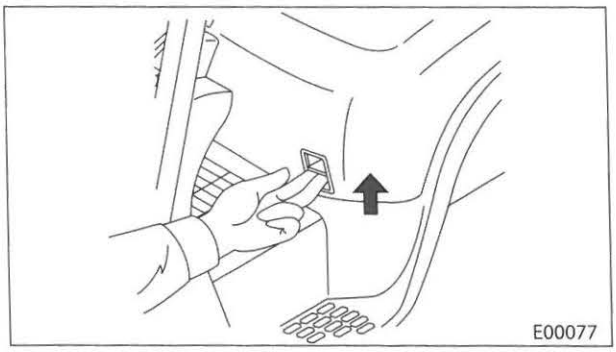
How to open

Lower seat back cushion and slide seat assembly forward before opening the engine hood.

(1) Unlock the steering column release lever and tilt the steering wheel toward the front of the lift truck.
(2) Slide seat assembly forward.
(3) Lower seat back cushion.
(4) Pull the engine hood lever in the direction of the arrow.



(5) Raise the engine hood.



How to close

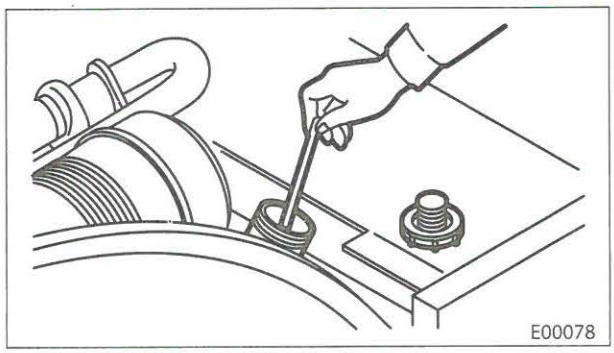
(1) Push the engine hood down until it is locked.
(2) Raise seat back cushion to the upright locked position.
(3) Slide seat assembly back to desired position.
(4) Tilt the steering wheel toward the operator seat and make sure that it is automatically locked.

⚠ CAUTION

Be careful not to pinch your fingers when closing the engine hood.

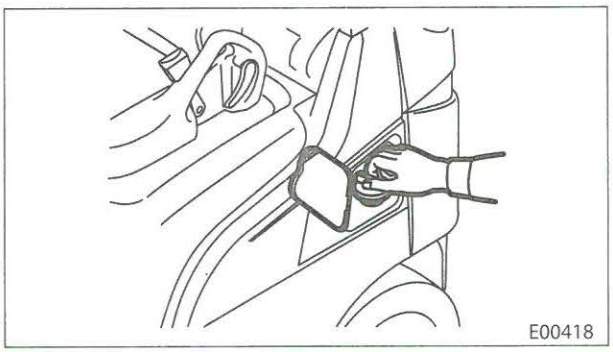
◆Hydraulic Tank Oil Level / Filler Hole

The oil level / filler hole is located on the right side in the engine compartment. To check the oil level, use the dip stick located in the hole.



◆Fuel Filler

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

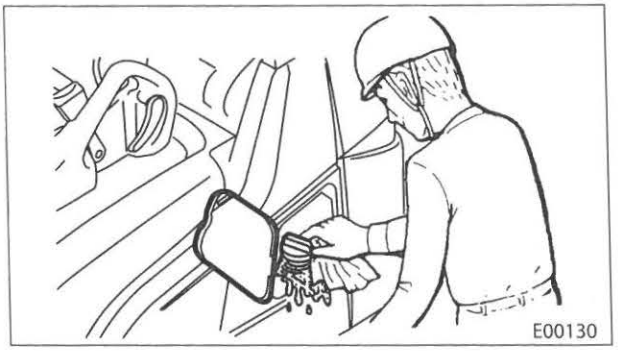


⚠ CAUTION

When filling oil, stop the engine.
Open flames and smoking are strictly prohibited.

⚠ CAUTION

Tighten the cap securely after refilling.
Clean up any spillage of fuel.

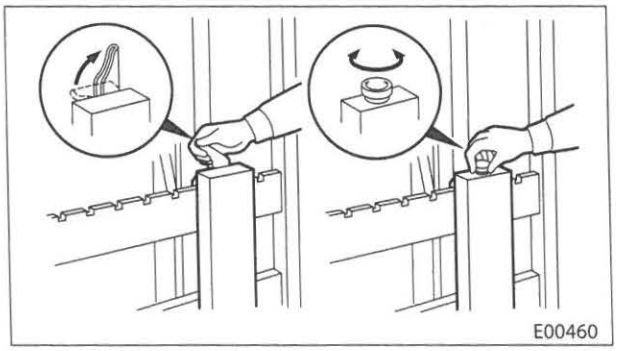


◆Fork Locking Pins

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

How to adjust fork spread

(1) Pull up and turn the locking pins 90 degrees of angle.
(2) Spread the forks to fit the load.



⚠ WARNING

When adjusting the fork spread, DO NOT place your hands between the fork and load backrest extension or lift bracket, to avoid pinching your hands.

⚠ CAUTION

- After adjusting the fork spread, restore the fork locking pins or levers to the original position to lock the forks.
- Position each fork the same distance from the center of the load backrest extension or lift bracket.

◆Replacing Forks

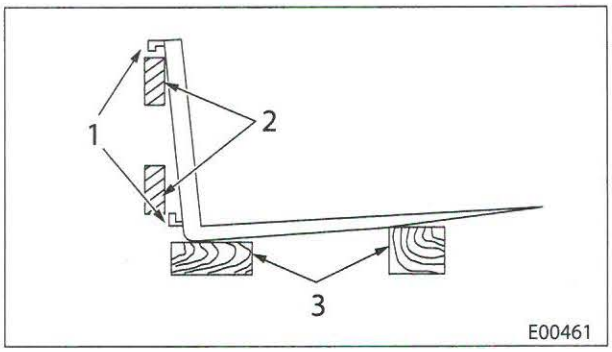
Remove a fork from the lift bracket to change it or to access other parts of the lift truck for maintenance.

⚠ WARNING

DO NOT try to install or remove a fork without a lifting device. Each fork could weigh in excess of 45 kg (100 lb.).

How to remove forks

(1) Slide the forks, one at a time, to the installation/removal recess on the bottom carriage bar.
(2) Tilt the lift bracket forward, then lower it until the fork hook disengages the forks from the lift bracket.
(3) Use a lifting device to move the forks away from the lift truck.



1. Fork Hook
2. Carriage Bars
3. Wood Blocks

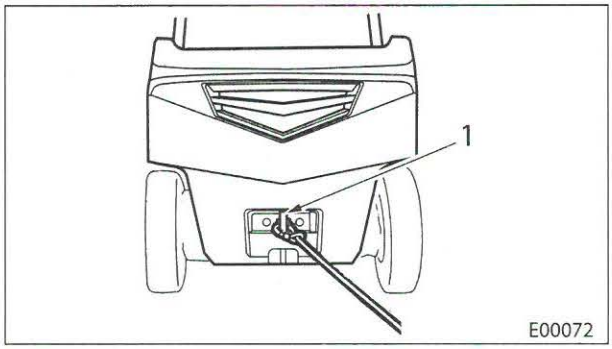
How to install forks

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

◆Drawbar Pin

Use the drawbar pin for the following situations:

- Pulling the lift truck out of a drop-off or ditch.
- Loading and unloading the lift truck on a transport truck.
- When loading the lift truck on a hauling truck by using the drawbar pin, start the engine, and release the parking brake lever.



1. Drawbar pin

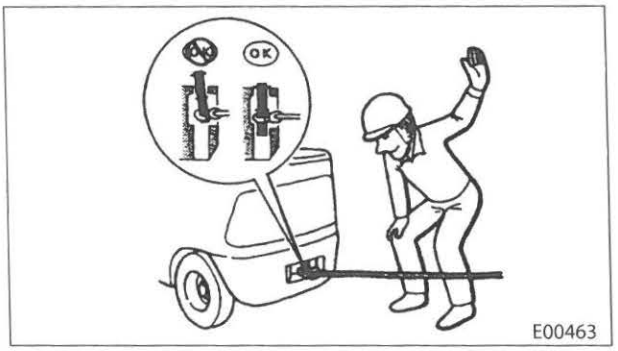
⚠ WARNING

DO NOT use the drawbar pin for towing loads.

⚠ WARNING

Precautions for the use of the drawbar pin

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



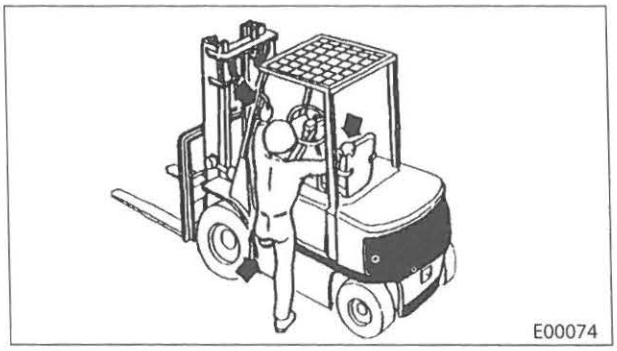
E00463

◆Assist Grip

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 lift truck safely.

⚠ WARNING

- DO NOT hold the steering wheel or the control lever.
- DO NOT jump on or off the lift truck.


E00074

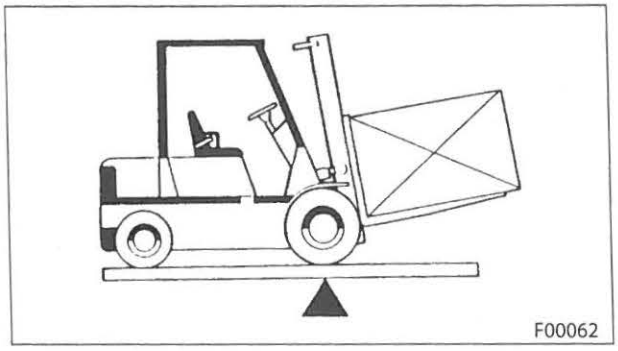
■ HOW TO AVOID A TIPOVER; HOW TO SURVIVE ONE

◆Know What Lift Truck Stability Is

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 lift 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.

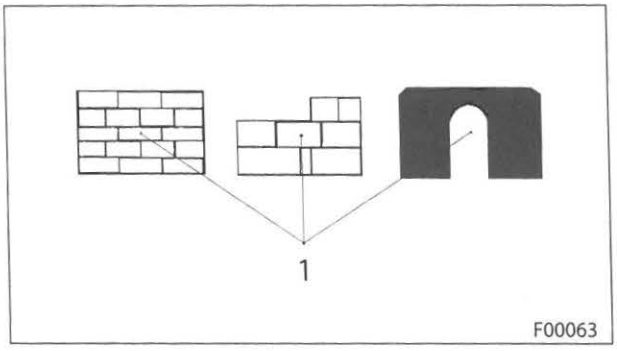


◆ Center of Gravity (CG)

Center of Gravity (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 lift truck and load have a new combined CG.

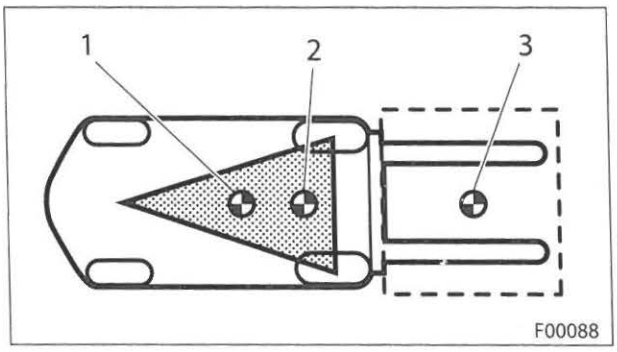


1. CG

◆ Stability and Center of Gravity

The stability of the lift truck is determined by the location of its CG, or if the lift 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.

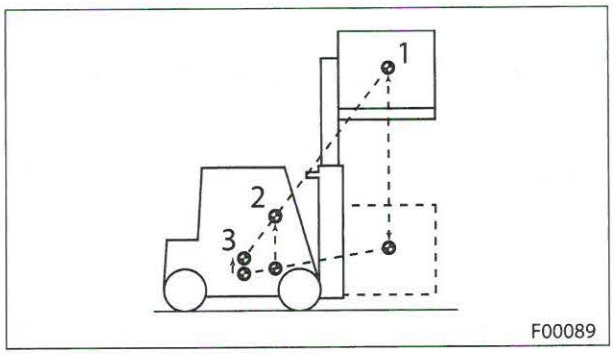


1. CG truck
2. Combined CG
3. CG load

The CG and the stability of the loaded lift truck are affected by a number of factors such as:

- The size, weight, shape, and position of the load.
- The height of the lifted load.
- The angle of forward or backward tilt.
- Dynamic forces created when the lift truck accelerates, brakes, or turns.
- Condition and grade of surfaces on which the lift truck is operated.

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.



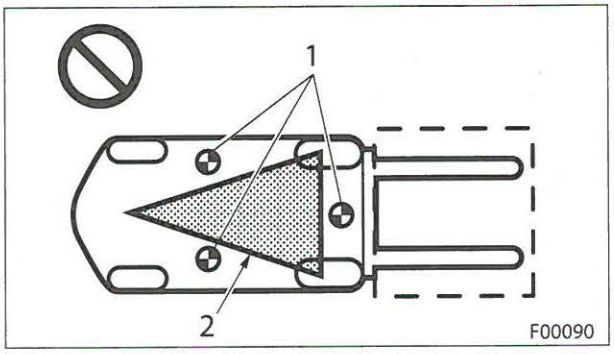
1. CG load
2. Combined CG
3. CG truck

◆Lift Truck Stability Base

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.

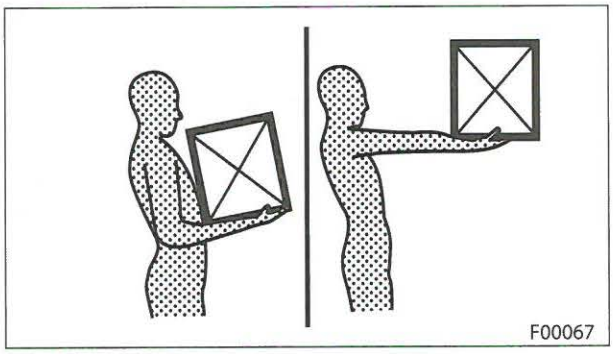


1. CG truck
2. Stability base

◆ Capacity (Weight and Load Center)

The capacity of the lift truck is shown on the capacity plate. 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 plate 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 plate is for a standard lift truck with standard backrest, forks, 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 lift truck stability may be reduced. The lift truck should not be operated if its capacity plate does not indicate capacity.

◆ Capacity Plate

⚠ WARNING

Capacity plate originally affixed to lift trucks must not be removed, altered or changed without the manufacturer's approval.

- If the lift truck is equipped with a high mast, the lift truck's capacity will be reduced. Be sure to check the capacity plate before handling loads.
- If the lift truck is equipped with attachment, the lift truck's capacity will vary with the weight of attachment and the front overhang (distance from the front axle center to the vertical surface of the forks).
  Be sure to check the capacity plate before handling loads.

▶ For Example

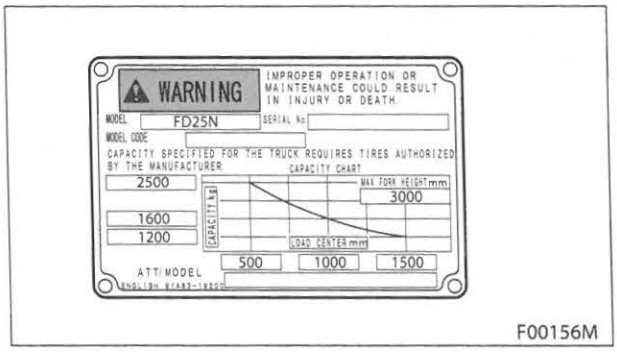
⚠ WARNING

The capacity plate shown is for a 2.5 ton model standard lift truck whose capacity is 2500 kg (5513 lb) at 500 mm (20 in.) load center.

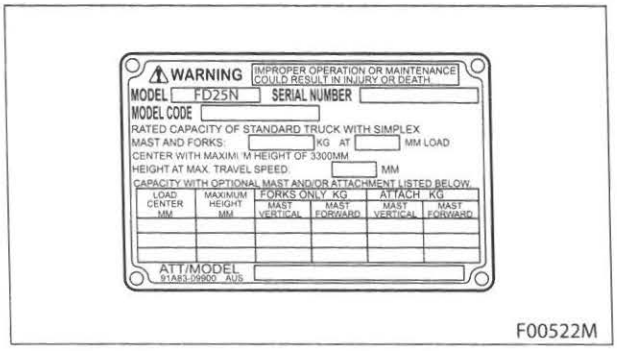
The capacity plate specifies this lift truck can lift up to 2500 kg (5513 lb) if the load center is not more than 500 mm (20 in.) forward from the face of the backrest.

Before attempting to pick up or lift a load, make sure its weight is within the capacity of the lift truck at the load center involved.

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



F00156M



F00522M

For Australia

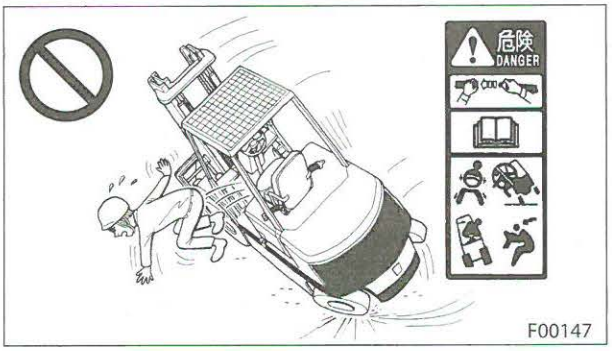
◆ Do's and Don'ts to Avoid Tipover

⚠ DANGER

Fasten the seat belt!

The seat belt will help to restrain you in accidents such as tipover.

The seat belt is used to protect your head and torso from being trapped between the lift truck and the ground; however, it may not protect the operator against all possible injury.

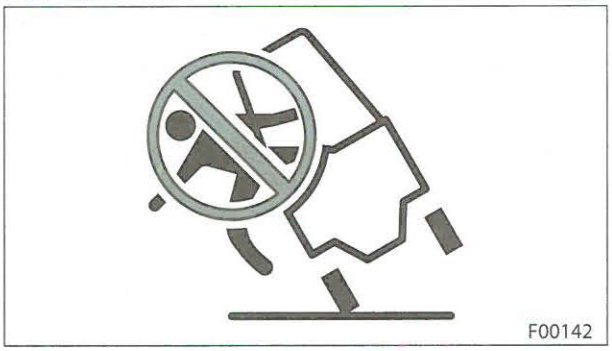


F00147

⚠ DANGER

DO NOT jump off your lift truck if it starts to tip over!

- The operator must stay with the lift truck if lateral or longitudinal tipover occurs. The operator should hold on firmly to the steering wheel, brace feet, lean forward, and lean away from the point of impact.
- The operator should stay with the lift truck if it falls off a loading dock or ramp. There are other situations where the environment of the landing area presents a severe hazard. In those incidents, it may be prudent for the operator to leave the lift truck.


F00142

⚠ WARNING

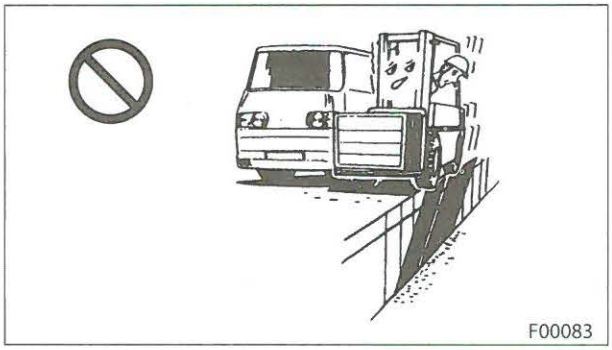
DO handle loads only within the capacity shown on the capacity plate.


F00081

⚠ WARNING

DO watch "Tail swing!"

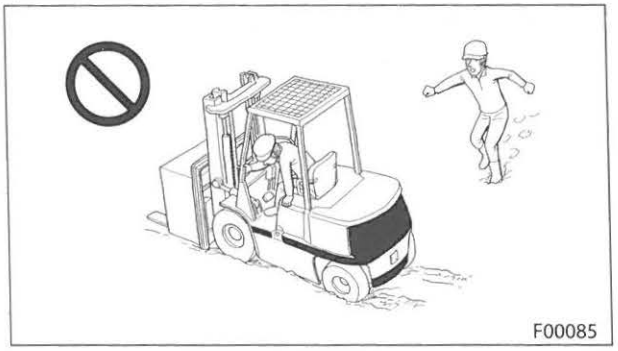
The lift truck may drop off the edge of the dock if you get too close.
Always maintain a safe distance from the edge of docks, ramps and platforms.


F00083

⚠ WARNING

DO check surface strengths!

Stay away from soft ground to avoid tipover.

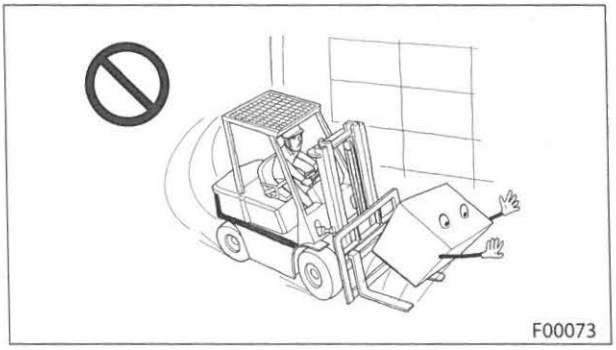


F00085

⚠ WARNING

DO avoid fast starts, turns and sudden stops!

These movements could cause the lift truck to tip over.

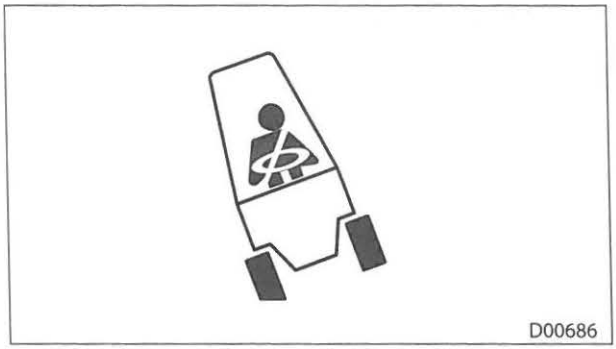


F00073

⚠ WARNING

DO NOT drive across a slope or grade and DO NOT turn on grades!

Use extreme caution on grades, ramps, or inclines.
Avoid turning, if possible, and use extreme caution on grades, ramps, or inclines.

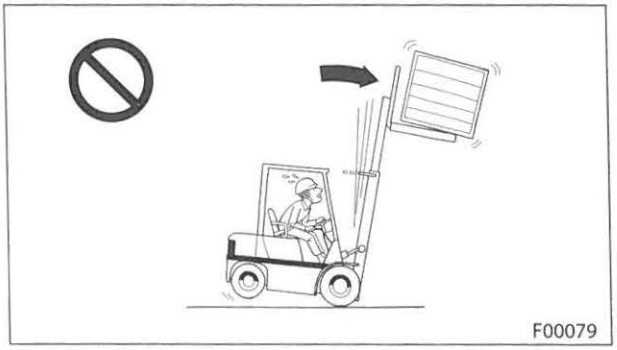


D00686

⚠ WARNING

DO NOT tilt elevated loads forward!

DO NOT tilt elevated loads forward except when the load is in a deposit position over a rack or stack.

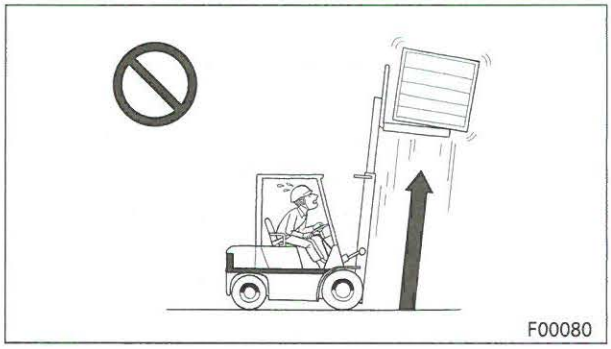


F00079

⚠ WARNING

DO NOT elevate forward tilted loads!

This could also cause the lift truck to tip over.

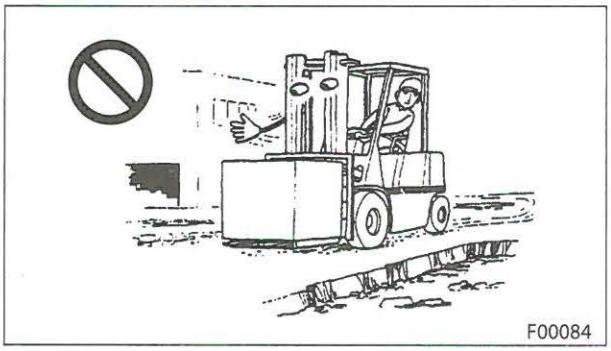


⚠ WARNING

Travel at a reduced speed on rough surfaces!

If you do not, the following accidents could result:

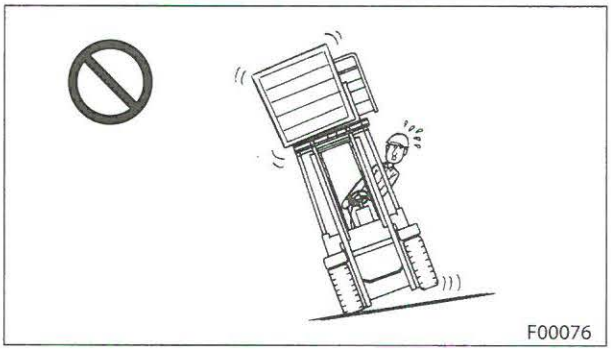
- The lift truck tips over.
- Hard to turn the steering wheel appropriately, leading to improper operation.
- Personnel is hit by the lift truck.



⚠ WARNING

DO NOT pick up or deposit a load on grades!

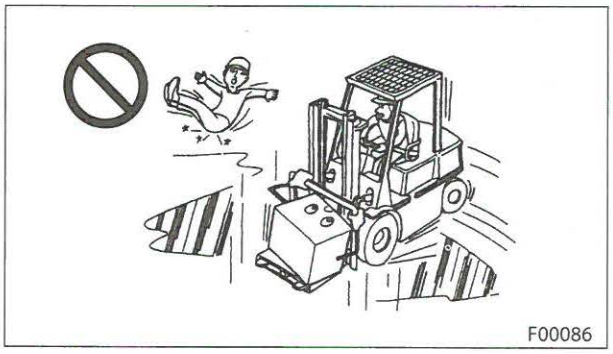
DO NOT attempt to pick up or deposit a load on ramps and other sloped surfaces that could affect the lift truck's stability.



⚠ WARNING

DO avoid slippery surfaces!

Slow down for wet and slippery surfaces.
Sand, gravel, ice, or mud could cause a tipover. If unavoidable, slow down.

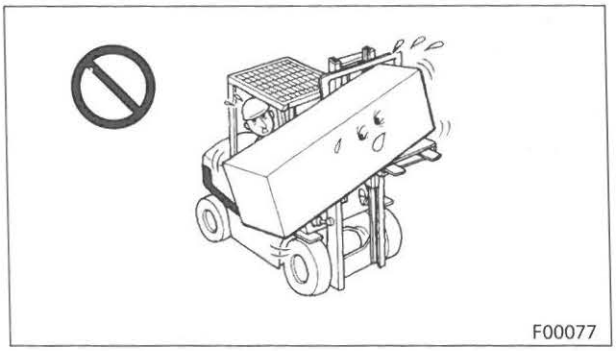


⚠ WARNING

Avoid off-center loading!

Only stable and secured loads must be handled!

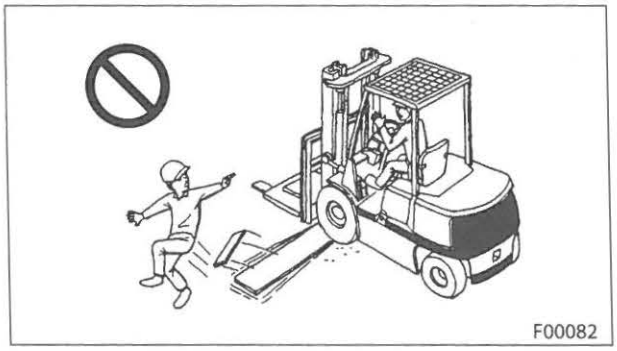
- Keep the center of gravity low and avoid off-center loading. Off-center loads may cause tipover or falling loads.
- Slowly operate the lift truck when picking up or depositing a long or wide load, or when turning with such load.


F00077

⚠ WARNING

DO NOT run over objects!

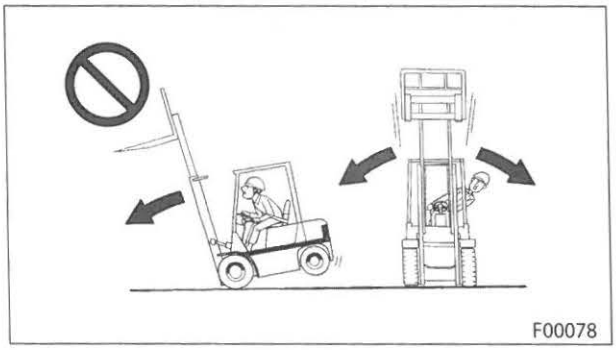
DO NOT run over loose objects on the roadway surface.


F00082

⚠ WARNING

DO NOT travel with forks higher than 15 to 20 cm (6 to 8 in.) above the ground!

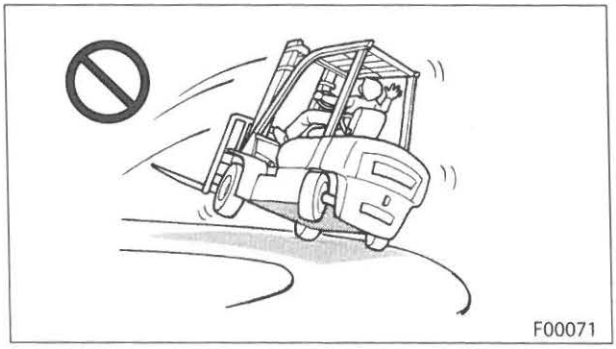
The CG moves up increasing the possibility of a tipover.


F00078

⚠ WARNING

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

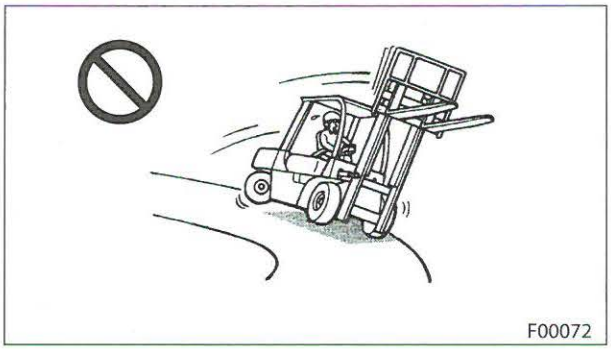
When negotiating turns, reduce speed to a safe level consistent with the operating environment.


F00071

⚠ WARNING

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

A lift truck with a raised mast will tip over more easily than a lift truck with a lowered mast because the stability of the lift truck worsens.

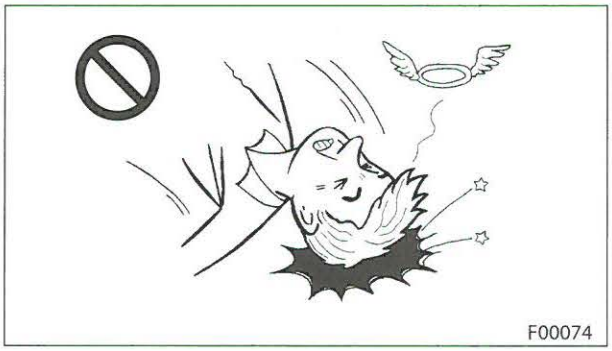


F00072

⚠ WARNING

DO wear a hard hat!

It will help protect your head from serious injury.

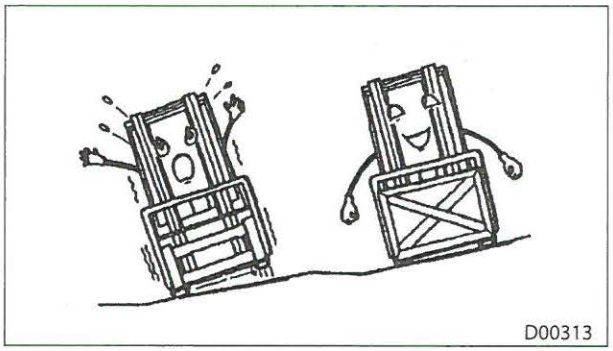


F00074

⚠ WARNING

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.



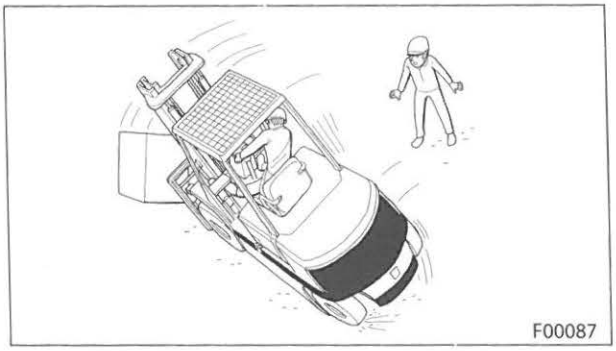
D00313

◆ How to Survive in a Tipover

⚠ DANGER

DO fasten your seat belt!

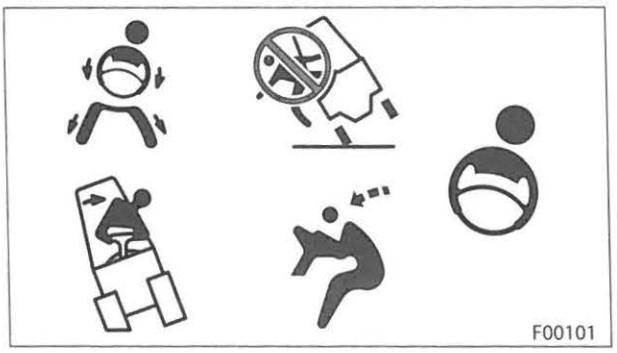
Remember, your chances for survival during a tipover are better with the seat belt fastened.



⚠ DANGER

If your lift truck starts to tipover:

- Brace your feet.
- DO NOT jump off!
- Firmly hold onto the steering wheel.
- Lean forward.
- Lean away from impact.



■ REFUELING

◆Gasoline and Diesel Engine Equipped

⚠ WARNING

- BE SURE to use the proper fuels specified in the SERVICE DATA. If not, the engine could fail.
- Lift trucks must 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.

⚠ WARNING

- Explosive fumes could be present during refueling.
- DO NOT smoke in refueling areas.

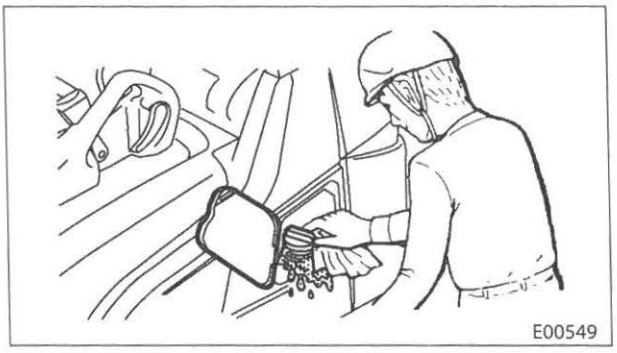
⚠ WARNING

Fire caused by static electricity!

- In dry seasons, there is a lot of static electricity. The fuel could catch fire due to the static electrical spark.
- When refueling, touch grounded metals with bare hand to discharge the static electricity before opening the filler cap.

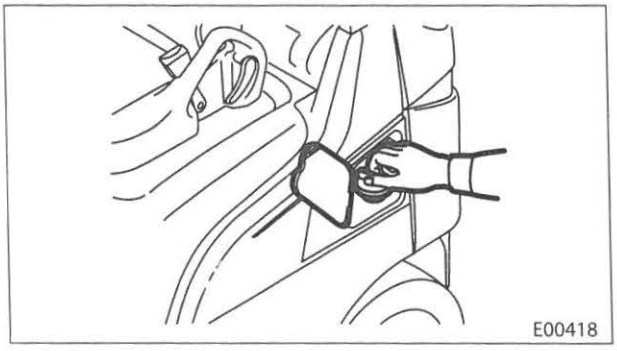
⚠ CAUTION

- 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 moist air and to prevent condensation.
- Do not fill the tank to the top. Fuel expands when it gets warm and may overflow.


E00549

Refueling steps

(1) Park the lift truck only at a safe location.
(2) Lower the forks until the fork tips touch the floor or ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Stop the engine.
(6) Block the wheels.
(7) Open the filler cap.
(8) Fill the fuel tank slowly.
(9) Close and tighten the filler cap.
(10) If spillage occurs, wipe off excess fuel.


E00418

Note: Drain water and sediment from the fuel tank as needed. 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 from being pumped from the storage tank into the lift truck fuel tank.

◆LPG Equipped

⚠ WARNING

BE SURE to use the proper fuels specified in Chapter "SERVICE DATA". If not, the engine could fail.

⚠ WARNING

- Only trained and authorized personnel must fill or exchange LPG tanks.
- Personnel engaged in filling LPG tanks must wear protective equipment such as a face shield, long sleeves, and gauntlet gloves.
- DO NOT refuel or store LPG powered lift trucks near underground entrances, elevator shafts, or other places where LP-Gas could collect in a pocket and cause an explosion.
- Inspect all LPG tanks before filling, and again before reuse for damage to the valves, liquid gauge, fittings, and hand wheels.
- All defective or damaged LPG tanks must be removed from service.
- The careless handling of LPG tanks could result in a serious accident.
- To reduce the risk of damage to tanks, use extreme care when transporting them.

⚠ WARNING

The LPG tank must not extend past the counterweight and must be inside the confines of the lift truck.

⚠ WARNING

Reduce the risks of fire caused by static electricity!

Touch grounded metals with bare hand to discharge the static electricity before replacing compressed LPG tanks. If not, the fuel could catch fire due to the static electrical spark.

⚠ CAUTION

LPG tanks can be heavy. Follow the instructions below:

- DO NOT insert fingers into the straps or brackets. If this warning is not adhered to, fingers may be pinched.
- DO NOT lift LPG tank with your body in an improper position. You may injure your back.
- Take care not to drop an LPG tank. It may fall on your body and lead to serious injury including bone fractures.
- Wear appropriate personal protective equipment.

⚠ CAUTION

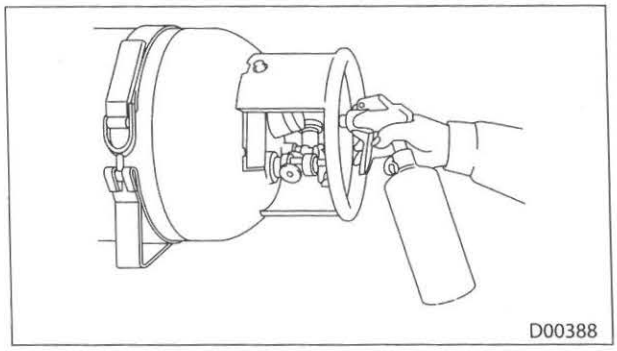
Be careful not to pinch fingers in the bands when installing a LPG tank.

Note:

- MOUNT THE TANK PROPERLY. To insure full usage of fuel, use the mounting holes located on the collar for horizontal mounting and the slot in the foot ring for vertical mounting.
- Open the valve slowly so that hose and tank pressure can equalize. Or the valve may shut off.
- For proper operation of LPG system, use HD-5 LPG fuel.

▶ For Standard LPG Tank

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Run the engine at low idle.
(6) Discharge the static electricity.
(7) Close the fuel valve on the LPG tank. Run the engine until it stops, then turn the key switch to the OFF position.
(8) Disconnect the fuel supply line.
(9) Loosen the retaining clamps, and remove the tank.
(10) Make sure the replacement tank is the correct type.



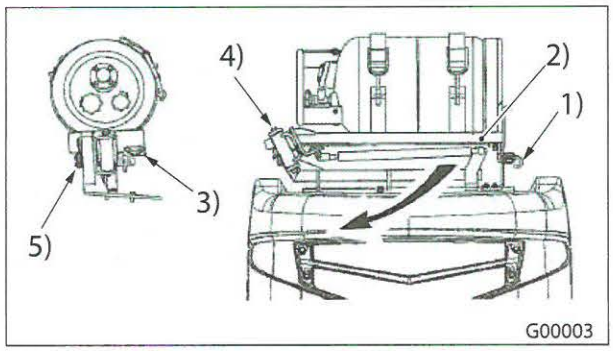
(11) Inspect the replacement tank for damage such as dents, scrapes, or gouges and for leakage at valves or threaded connections.
(12) Check for debris in the relief valve and for damage to various valves and the liquid level gauge.
(13) Inspect the couplings for deterioration, damage, or missing flexible seals.
(14) When lifting the tank for mounting, hold with both hands to prevent injury, and check the tank clamp lock.
(15) Clamp the tank securely.
(16) Connect the fuel supply line.
(17) Open the fuel valve by turning it slowly 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.
(18) Check the LPG fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.

▶ For Optional LPG Tank

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Run the engine at low idle.
(6) Discharge the static electricity.
(7) Close the fuel valve on the LPG tank. Run the engine until it stops, then turn the key switch to the OFF position.
(8) Disconnect the fuel supply line.

(9) While pulling the lock pin 1, pull the LPG tank.
(10) Release your hand from lock pin 1, then down the LPG tank to the lower left.
(11) When move the LPG tank approximately 180°, lock the striker 3 of cradle 2 to the snatch lock 5 of rotating shaft 4.
(12) Check that the cradle 2 is locked, then release your hand.

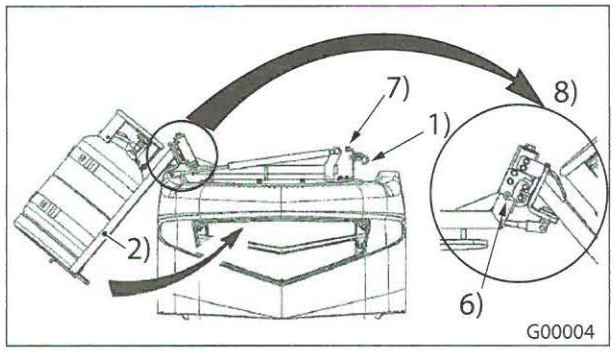
Note: If unlocked, the LPG tank will move up.



1. Lock pin
2. Cradle
3. Striker
4. Rotating shaft
5. Snatch lock

(13) Loosen the retaining clamps, and remove the tank.
(14) Make sure the replacement tank is the correct type.
(15) Inspect the replacement tank for damage such as dents, scrapes or gouges and for leakage at valves or threaded connections.
(16) Check for debris in the relief valve and for damage to various valves and the liquid level gauge.
(17) Inspect the couplings for deterioration, damage or missing flexible seals.

(18) Press the LPG tank with your hand, and move up the snatch lock lever 6, then release the lock.
(19) Move up the cradle 2 to the upper right slowly.
(20) Mount the cradle 2 to the bracket 7, and press the right side of LPG tank to lock with the lock pin 1.
(21) Check that the cradle 2 is locked, then release your hand.



6. Snatch lock lever
7. Bracket
8. Rear side

⚠ CAUTION

- DO NOT move the lift truck if unlocked.
- The lock pin 1 is not fixed with open position.

(22) Connect the fuel supply line.
(23) Open the fuel valve by turning it slowly 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.
(24) Check the LPG fuel lines and fittings with a soap solution after filling the tank or when looking for leaks.

■ OPERATION

◆ New Lift Truck Break-In

Correct "break-in" is important for operation and the long life of your lift truck. The first 100 service hours of operation are the "break-in period." Carefully read these precautionary instruction:

⚠ CAUTION

- 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 meter panel indicator icons.
- DO 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.
- If the lift truck does not have to be put to work immediately, or the operation is light and slow, break in the lift truck under a simulated working condition.
- Try NOT to drive the lift truck continuously at the same speeds as the parts tend to better adjust themselves to other parts if various speeds are used. Also, try NOT to make severe brake applications to allow the brake linings to seat against the brake drums.
- Operate the lift truck under a lighter load and lower speeds than normal.
- It is recommended to replace and re-lubricate at shorter intervals than normal periods.
- Carefully check on and around the lift truck for loose bolts and nuts. Retighten them as needed.

◆ Before Starting Engine

⚠ WARNING

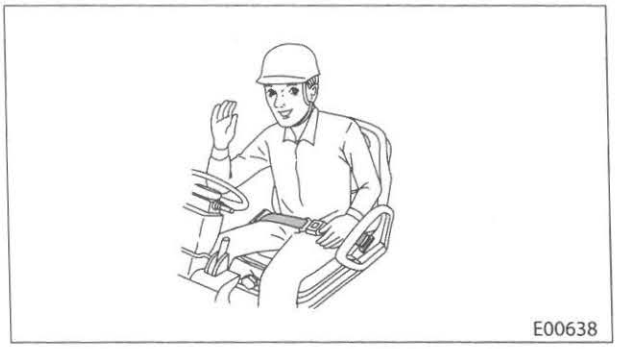
- BE SURE to read the SAFETY RULES FOR LIFT TRUCK OPERATORS for your safety and the safety of fellow workers.
- BE SURE to perform the DAILY (PRE-START) INSPECTION.
- Where lift trucks are used on a round-the-clock basis, they must be inspected prior to each shift.

⚠ WARNING

If at any time a lift truck is found to be in need of repair, defective, or in any way unsafe, the lift truck must be taken out of service until it has been restored to safe operating condition. Report it immediately to the designated authority.

⚠ WARNING

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



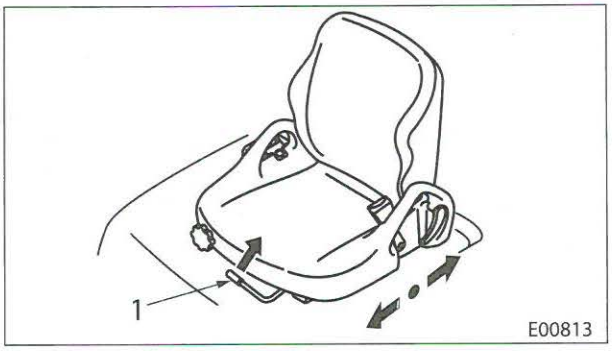
E00638

⚠ WARNING

Before starting, always adjust the rear view mirror (if installed) at a safe location, as adjustment while driving could lead to accidents.

⚠ WARNING

Before starting, always adjust the operator seat at a proper place so that you can press all the pedals fully down. Seat adjustment while driving could lead to accidents.



1. Lever

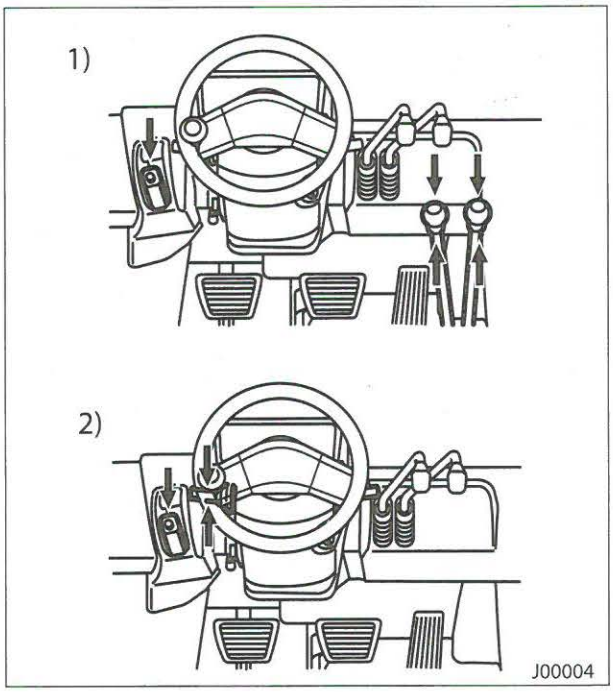
Your lift truck has an operator presence switch installed in the operator seat.

▶ Starting Engine

(1) Press the brake pedal.
(2) Apply the parking brake lever.
(3) Make sure the direction lever is in the NEUTRAL position.
(4) The engine will not start unless the direction lever is in the NEUTRAL position.

Note: Engine will not start unless operator is properly seated and seat belt is fastened. (For powershift models with Australia specification only).

(5) 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.



1. Manual model 2. Powershift model

MC model

The mast interlock will work only for the lift and tilt levers.
Attachments can be moved regardless of whether the mast interlock function is operating or not. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight.
The starting mechanism in lift trucks with powershift transmission is disabled until the operator is seated. When the key switch is in the ON position, the mast interlock indicator icon and driving interlock indicator icon in the meter panel flash unless an operator sits on the operator seat properly. In addition, the seat belt warning light glows when the seat belt is not worn or when it is not inserted into the seat belt buckle properly.

▶ Gasoline / LPG Dual Fuel Type

⚠ WARNING

- LP-Gas and Gasoline are flammable. Leakage of these could cause a fire and explosion.
- Before changing the fuel from LPG to gasoline, BE SURE to check that the fuel line for deterioration and loose connection in accordance with the maintenance section shown in this manual.

⚠ CAUTION

If the lift truck will be operated with LPG for a long time, check gasoline fuel lines to make sure all the fuel lines are empty. If they are not empty, drain the fuel from the tank and run the engine until the fuel in the lines is used up.

▶ Instruction for Changeover of Fuel Between LPG and Gasoline

To Change from LPG to Gasoline

(6) Turn the key switch to the OFF position and close the valve on the LPG tank. Leave the fuel selector switch in the (LPG) position.

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

(8) Turn the key switch to the OFF position and then place the fuel selector switch to the (GAS) position. Now the engine can be started using gasoline.

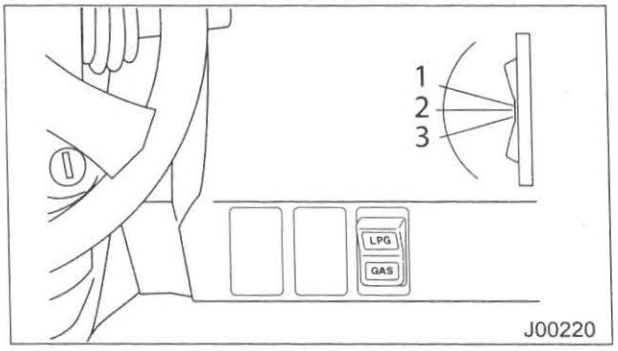
To Change from Gasoline to LPG

(1) Turn the key switch to the OFF position and place the fuel selector switch to the OFF position.

(2) Turn the key switch to the 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 the OFF position and then place the fuel selector switch to the (LPG) position. Open the valve on the LPG tank. Now the engine can be started using LPG.

Note: If operating on gasoline and with no LP tank installed, hook the LP hose to the bracket by screwing the coupling into place. It will secure the hose.



1. LPG
2. OFF
3. GAS

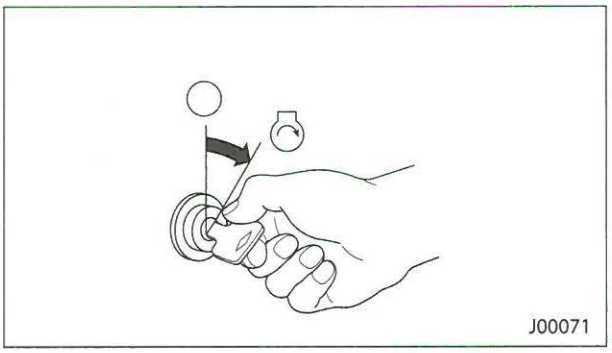
◆ Starting Engine

▶ Gasoline Model

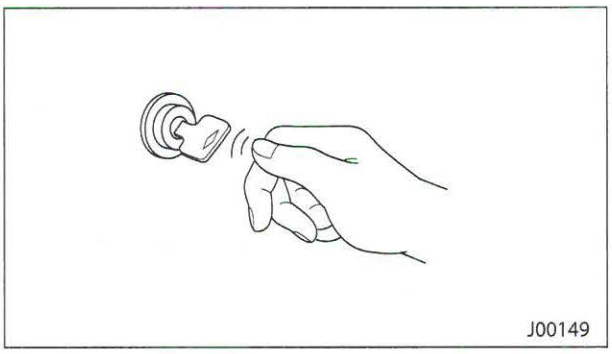
⚠ CAUTION

- DO NOT leave the key switch in the ON position when the engine is NOT running. This may run down the battery and damage the ignition coil.
- DO NOT turn the key to the START position for more than 10 seconds at any one time. This may cause the battery to run down.
- Operator seat MUST be seated before starting the engine, and seat belt MUST be fastened after starting the engine. (For powershift models with Australia specification only).

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



(2) Release the key when the engine starts.

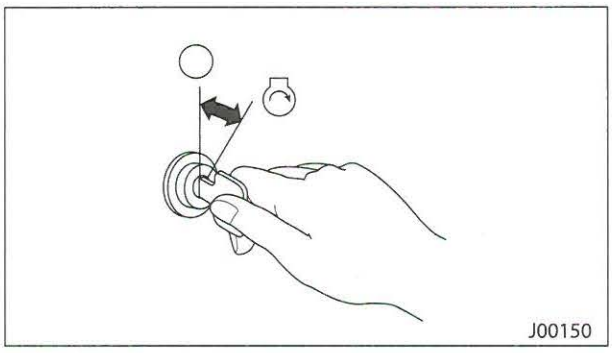


(3) Let the engine warm up for about 5 minutes.

If the engine won't start:

Turn the key switch to the OFF position and wait for approximately 30 seconds before re-cranking the engine.

If the engine won't start, see 5-7 "Engine Won't Start".



▶ LPG Model

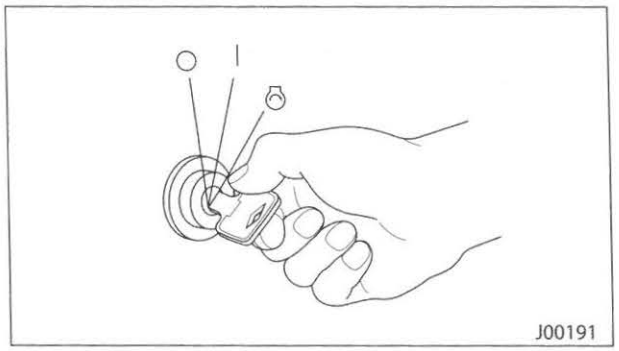
⚠ WARNING

LP-Gas is flammable and could cause injuries and fires. Inspect LPG fuel lines and fittings for leaks.

⚠ CAUTION

- DO NOT leave the key in the ON position when the engine is NOT running. This may cause the battery to run down.
- Operator seat MUST be seated before starting the engine, and seat belt MUST be fastened after starting the engine. (For powershift models with Australia specification only).

(1) Open the fuel valve by turning it slowly counterclockwise. Observe the LPG gauge. (If equipped)
(2) Turn the key switch to the START position. Release the key when the engine starts.
(3) If the engine does not start, DO NOT press the accelerator pedal. Turn the key switch to the OFF position, then repeat Step 2.

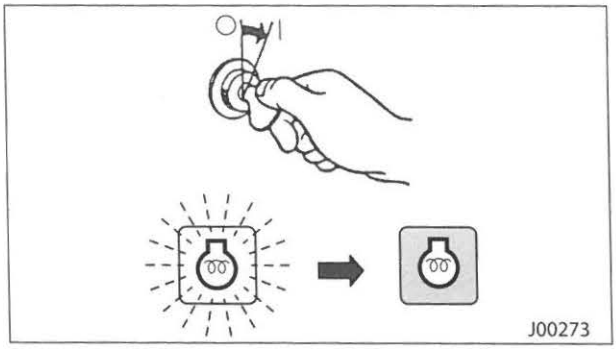

J00191

▶ Diesel Model

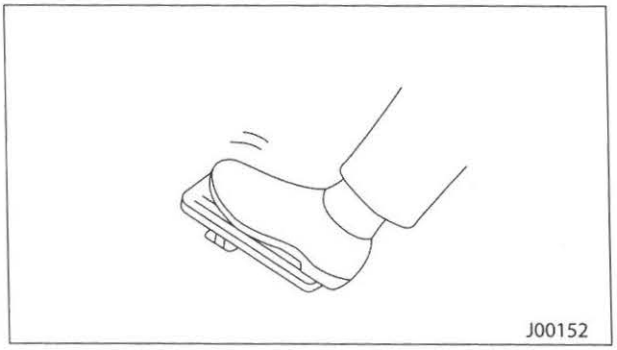
⚠ CAUTION

- DO NOT leave the key in the ON position when the engine is NOT running. This may cause the battery to run down.
- DO NOT turn the key switch to the ON position for more than 10 seconds at any one time. This may cause the battery to run down.
- Operator seat MUST be seated before starting the engine, and seat belt MUST be fastened after starting the engine. (For powershift models with Australia specification only).

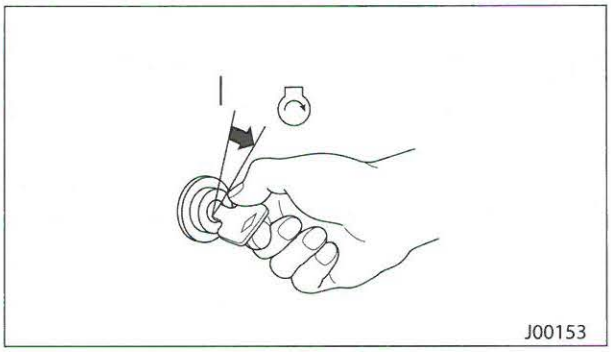
(1) Turn the key switch to the ON position and wait until the glow plug pilot light goes out.


J00273

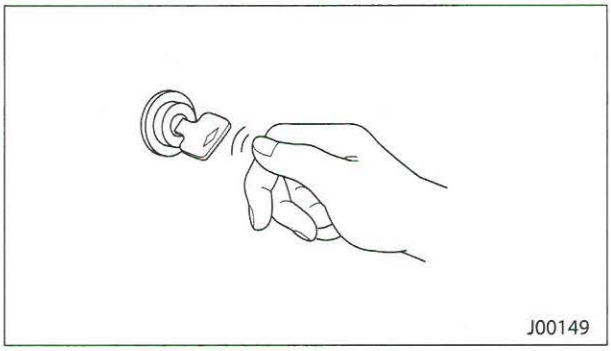
(2) Press the accelerator pedal fully and hold in this position.


J00152

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



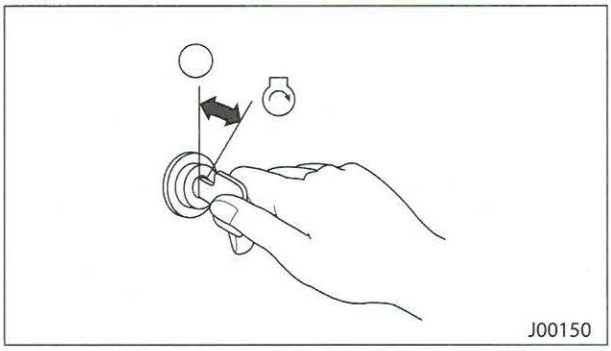
(4) Release the key when the engine starts.
Release the accelerator pedal.



If the engine won't start:

Turn the key switch back to the OFF position and wait approximately 30 seconds before cranking again.

If the engine won't start, see 5-7 "Engine Won't Start".



◆Engine Won't Start

Contact your authorized Cat lift truck dealer if the engine still does not start after you have attempted the following:

Does the starter crank the engine?

YES

Check the fuel gauge to see if there is fuel in the tank. If not, refuel it.

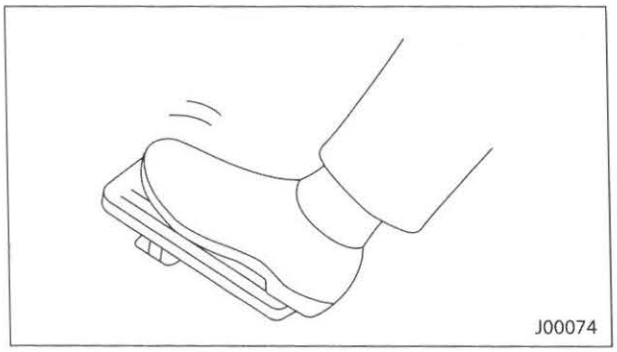
NO

The battery is dead if the head lights don't turn ON or dimly light.

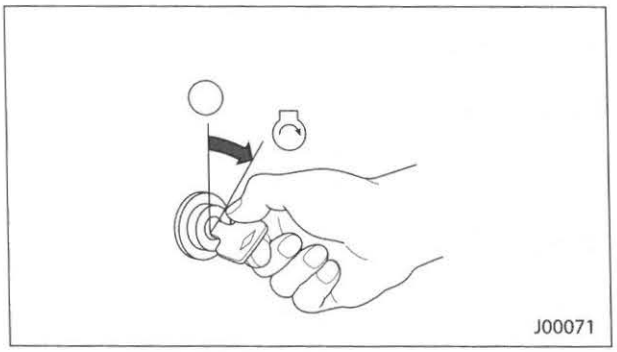
▶ When Engine Is "Flooded"

Gasoline model

(1) Press the accelerator pedal all the way down and hold in this position.



(2) Turn the key switch to the START position.



Note: The head lights should be turned OFF for easier starting.

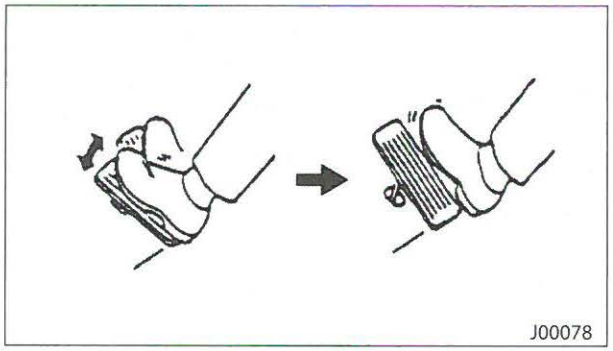
⚠ CAUTION

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

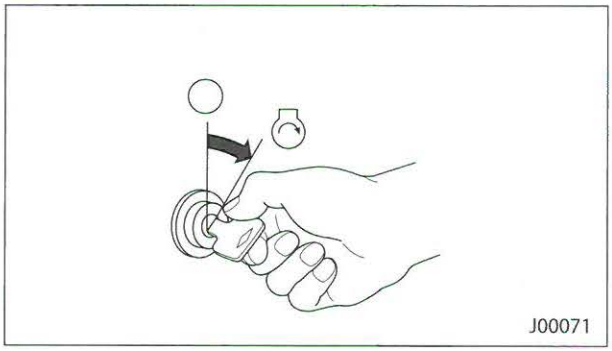
▶ When Engine Is Started after Long Idle Period

Gasoline model

(1) Press the accelerator pedal several times and release the pedal fully.



(2) Turn the key switch to the START position.



Note: The head lights should be turned OFF for easier starting.

Diesel model

Air in the fuel system may cause starting failure. In this case, have your authorized Cat lift truck dealer prime the fuel system or check the fuel system for possible problems.

◆ After Starting Engine

⚠ WARNING

If the warning light comes on, correct the problem before operating the lift truck. Contact your authorized Cat lift truck dealer for repairs.

⚠ CAUTION

- BE SURE to warm up the engine regardless of the weather.
- If the engine is not warmed up, it may cause poor lubrication and incomplete fuel combustion resulting in poor engine performance.

Check the warning lights and gauges frequently during operation to make sure all systems are working properly.

(1) Run the engine at idle speeds, without a load for about 5 minutes.
(2) During warm-up, check to see that systems are operating properly.

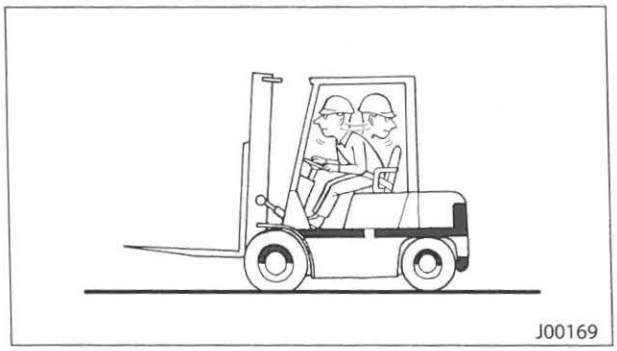
- Are all the warning lights OFF?
- Are exhaust noise and smoke color normal?
- No excessive vibration?

◆ Before Moving Lift Truck

⚠ WARNING

DO NOT allow other personnel to enter the area around the mast!

It could cause other personnel to get caught between the mast and lift truck when operating the mast, leading to serious injury or death.

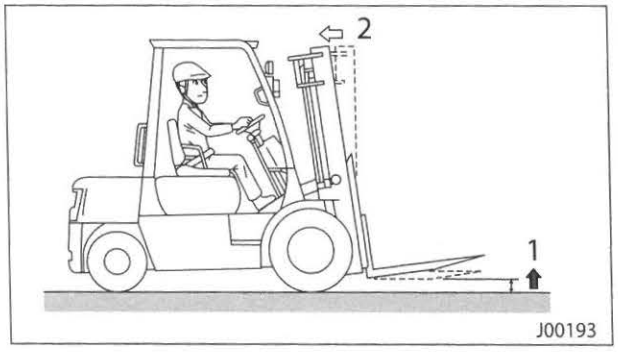


⚠ CAUTION

Before starting the engine, sit properly in the operator seat and make sure that:

- Sound the horn and make sure no one is around the lift truck.
- The parking brake is applied.
- The direction lever is in the NEUTRAL position.

(1) Pull the lift lever to raise the forks to a safe traveling height of 15 to 20 cm (6 to 8 in.) from the floor.
(2) Pull the tilt lever to tilt the mast fully back.



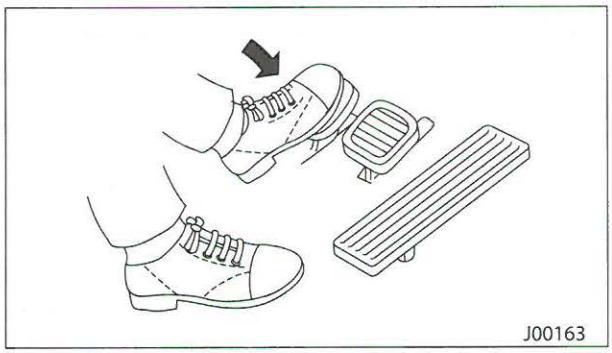
1. 15 to 20 cm (6 to 8 in.) 2. Tilt back

◆ Lift Truck Operation

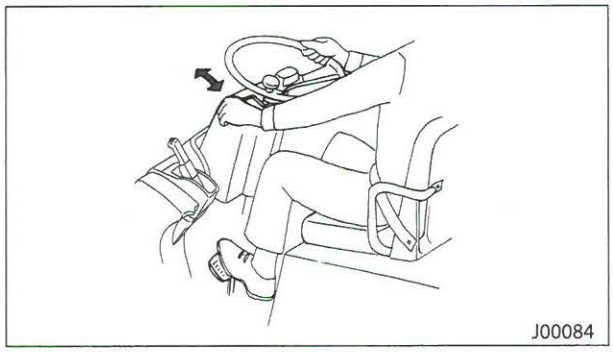
⚠ CAUTION

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

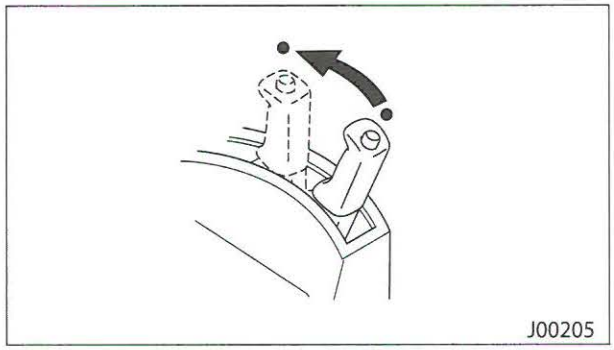
(1) Press the inching pedal fully.



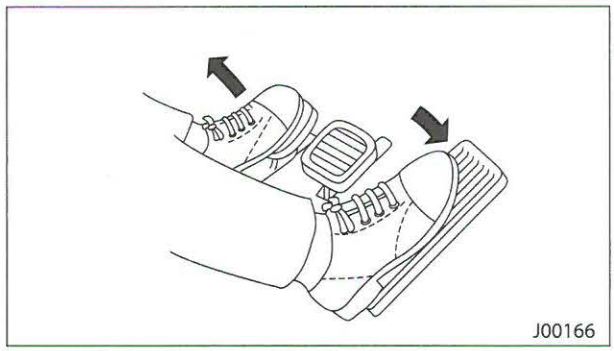
(2) Move the direction lever to the FORWARD (F) or REVERSE (R) position.



(3) Press the top button and push the parking brake lever forward to release.



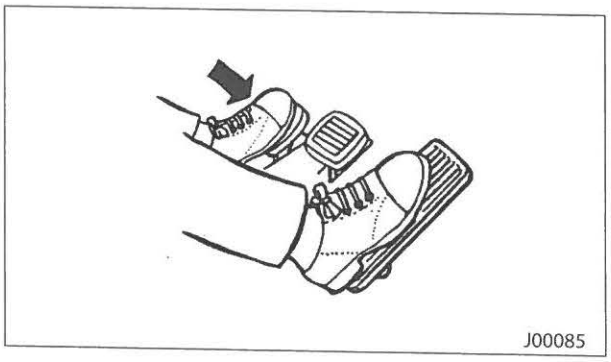
(4) Gradually press the accelerator pedal while releasing the inching pedal.



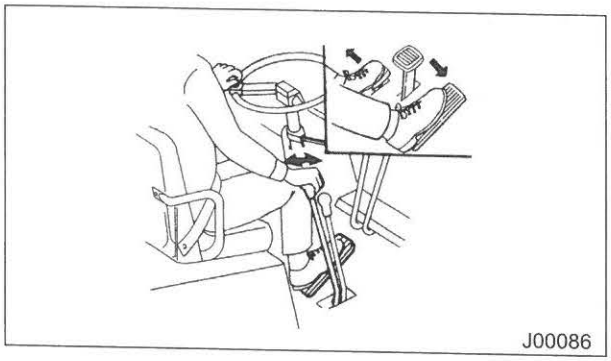
▶ Changing Speed

Manual model

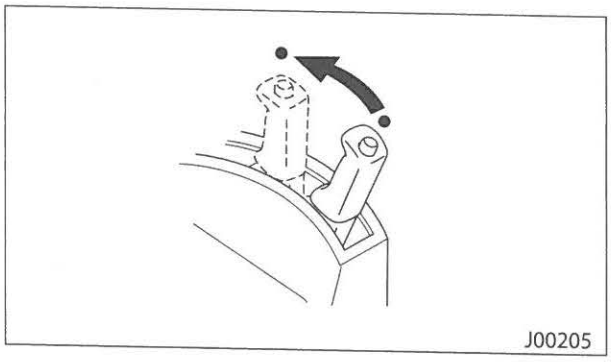
(1) Release the accelerator pedal and, at the same time, press the clutch pedal.


J00085

(2) Move the gearshift lever to 1st speed position.

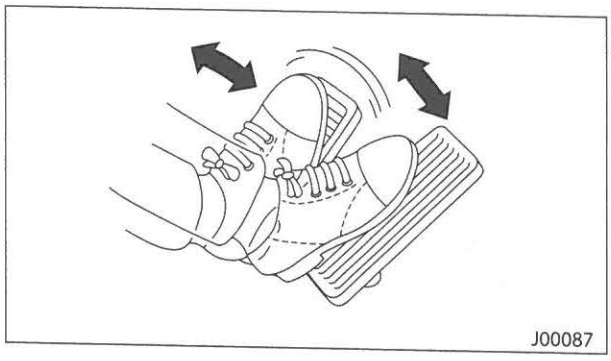

J00086

(3) Press the top button and push the parking brake lever forward.


J00205

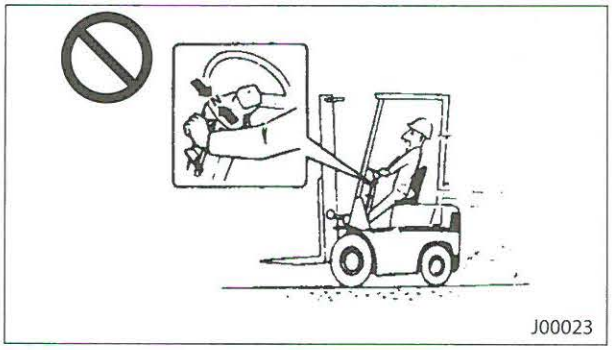
Powershift model

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


J00087

⚠ WARNING

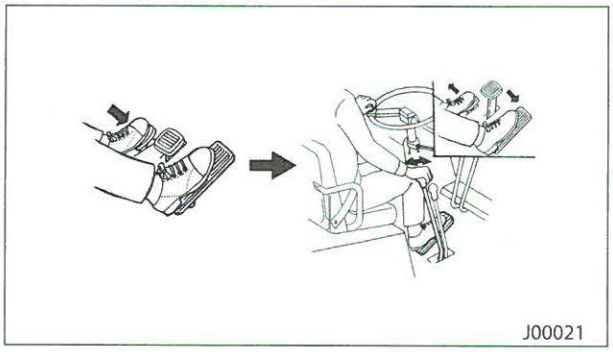
DO NOT move the direction lever to the NEUTRAL position during traveling. This could cause the engine to race.



▶ Changing Direction

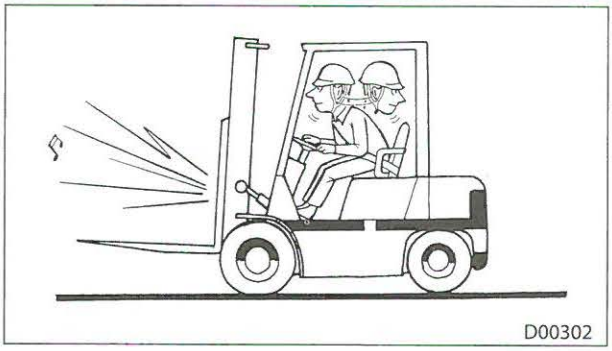
Manual model

Be sure to come to a complete stop before changing directions.



⚠ WARNING

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

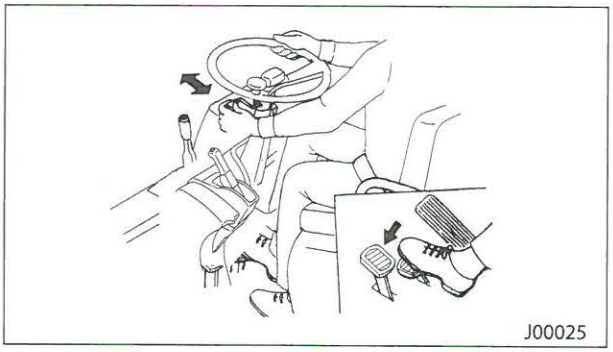


⚠ CAUTION

- Directional changes without coming to a complete stop may cause premature damage to the driveline.
- For a smoother ride and maximum service life of driveline components, bring the lift truck to a complete stop before changing direction.

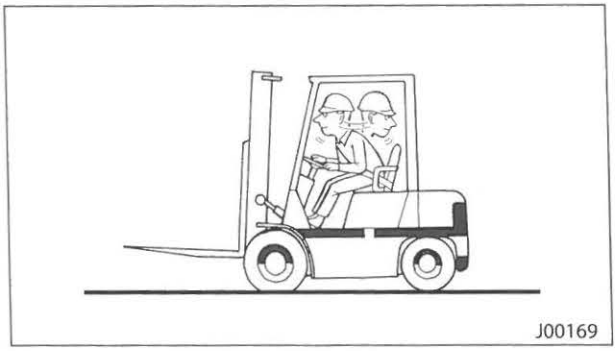
Powershift model

Be sure to come to a complete stop before changing directions.



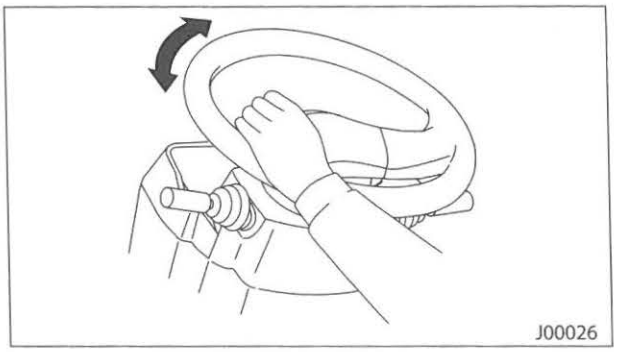
⚠ WARNING

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



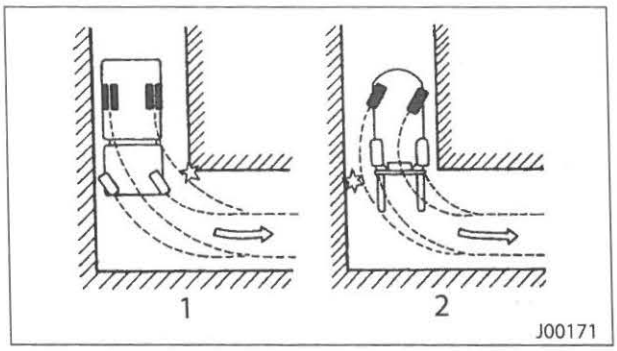
▶ Operating Techniques

Turn the steering wheel knob with LEFT HAND. When handling loads, stop the lift truck to operate the tilt, lift, and attachment levers with the RIGHT HAND.



▶ Steering (Turning)

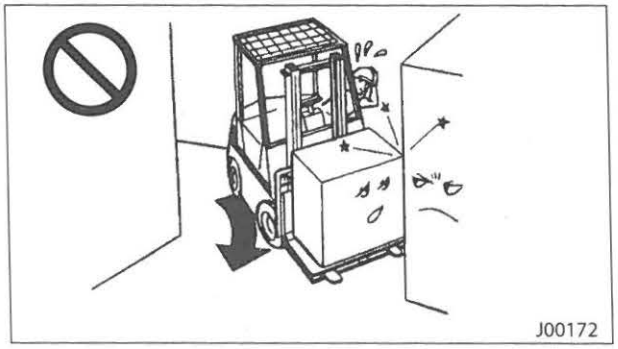
A lift truck is different from most other vehicles because it is steered by the rear wheels. This causes an exaggerated tail swing.



3. Car 4. Lift Truck

⚠ WARNING

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

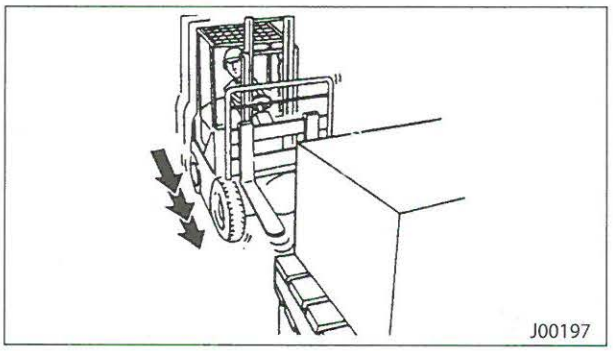


▶ Inching

The purpose of the inching pedal is to provide precise lift truck inching control at very slow travel speed and high engine revolutions.

You can move your lift truck slowly while maintaining the engine speed by varying the position of the inching pedal.

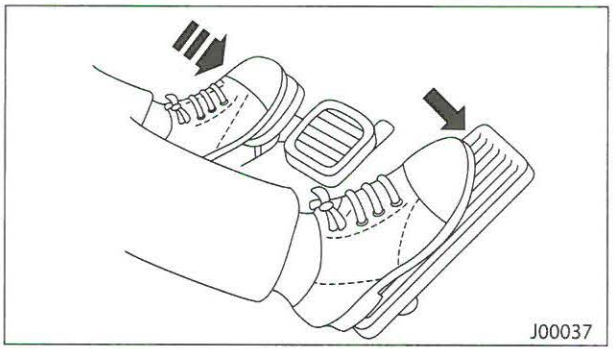
Use this pedal when approaching the load for loading and unloading.


J00197

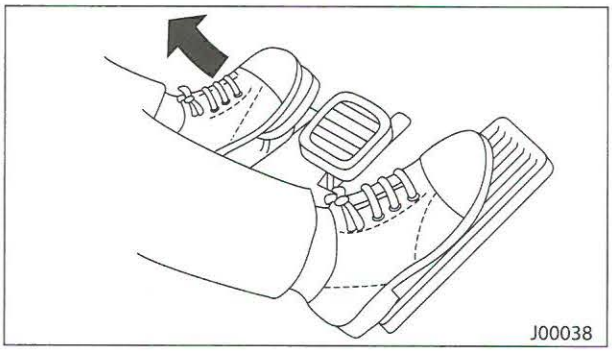
⚠ CAUTION

DO NOT ride the inching pedal. This produces a partly disengaged condition that may result in premature clutch plate wear.
DO NOT press inching pedal when inching is not necessary.

(1) Stop ahead of the load platform.
(2) Apply the parking brake, set the direction lever to the NEUTRAL position, place the mast vertically, and raise the forks to the height of the pallet insertion openings.
(3) Press the inching pedal fully down, place the direction lever to the FORWARD position, and release the parking brake.
(4) Gently press the accelerator pedal.


J00037

(5) When the left foot is slowly taken off the inching pedal, the lift truck will advance slowly.
(6) Insert the forks slowly, taking care they do not hit the pallet.
(7) Stop inserting the forks after the heels of the forks come into light contact with the pallet.


J00038

◆ Stopping Lift Truck

⚠ WARNING

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

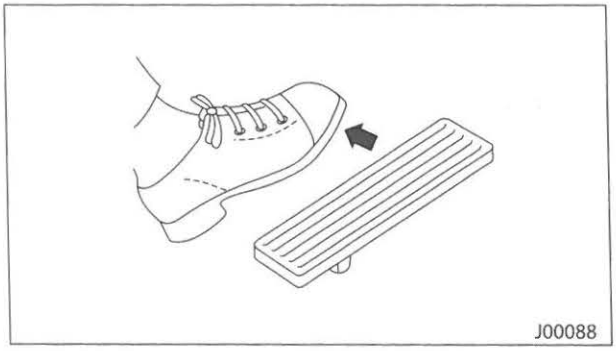
⚠ WARNING

Avoid sudden stops. This could cause the load to fall off the forks or the lift truck to tip over.

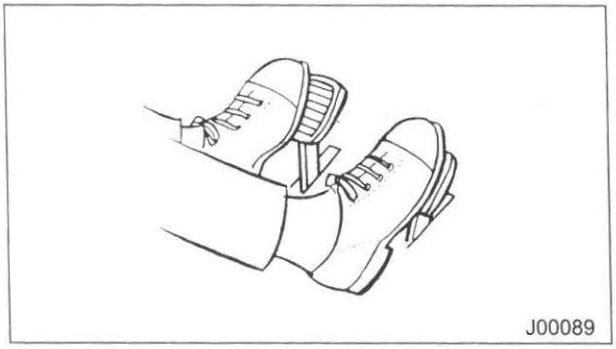

J00040

Manual model

(1) Release the accelerator pedal.

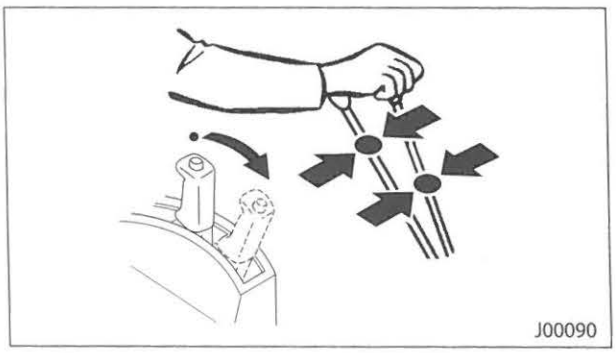

J00088

(2) Pressed the brake pedal and, just before the lift truck stops, press the clutch pedal.


J00089

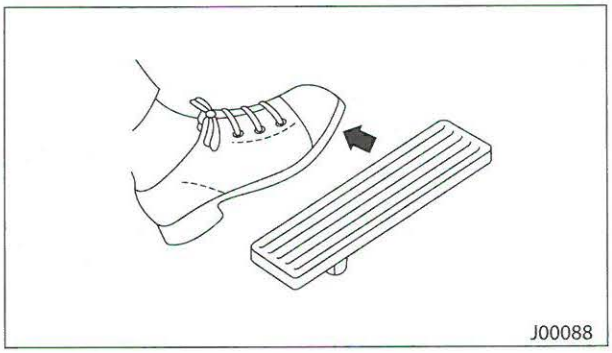
(3) After the lift truck has been stopped, pull the parking brake lever all the way back.

(4) Place the direction lever and gearshift lever in NEUTRAL position.

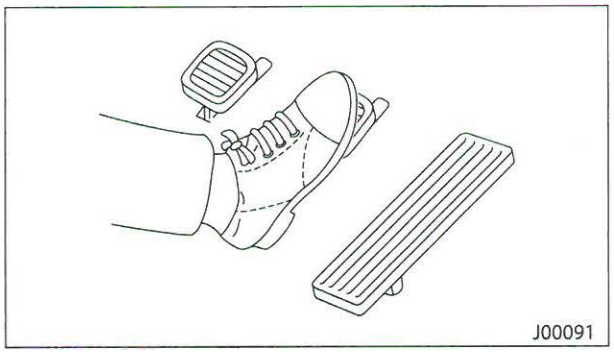

J00090

Powershift model

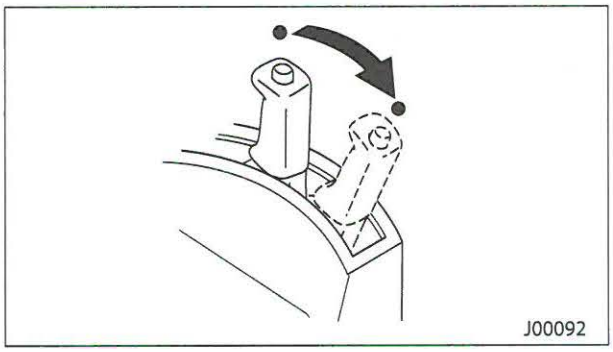
(1) Release the accelerator pedal.



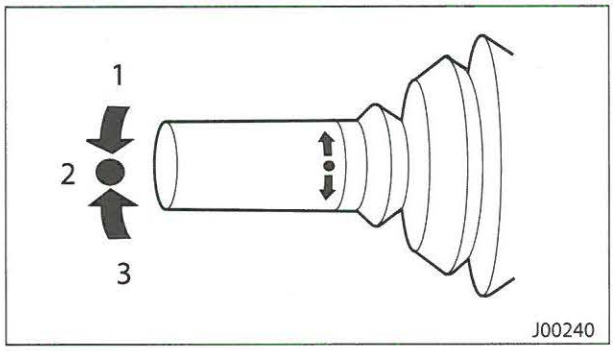
(2) Press the brake pedal and come to a complete stop.



(3) Pull the parking brake lever all the way back.



(4) Place the direction lever to the NEUTRAL position.



1. Forward (F)
2. Neutral (N)
3. Reverse (R)

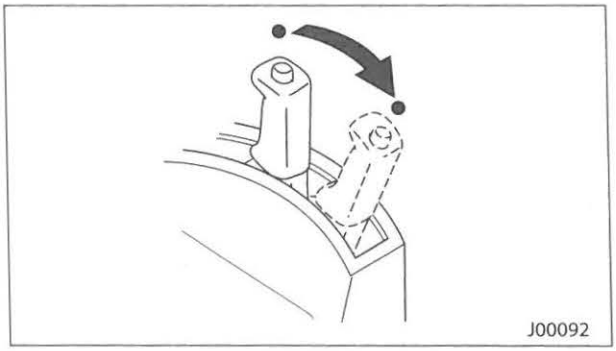
◆ Parking Lift Truck (After Stopping)

⚠ WARNING

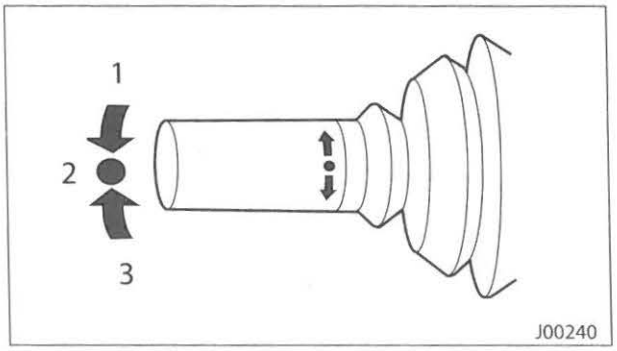
Park safely

- Select a hard level surface.
- BE SURE to park in the designated parking area.

(1) Pull the parking brake lever.

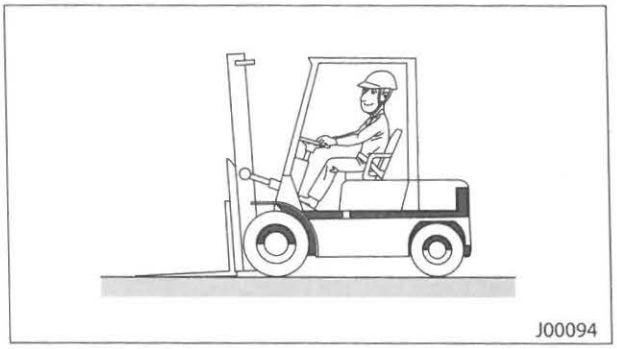


(2) Place the direction lever in the NEUTRAL position.

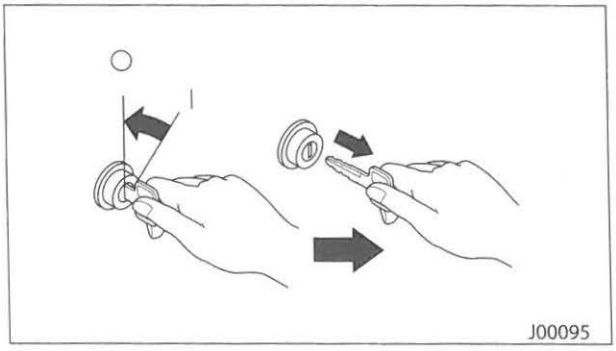


1. Forward (F)
2. Neutral (N)
3. Reverse (R)

(3) Slightly, tilt the mast forward and lower the forks to the floor or ground until the fork tips touch the floor or ground.



(4) Turn the key back to the OFF position to stop the engine. When leaving the lift truck, be sure to remove the key.
(5) Block the wheels securely.
(6) Return the key to a key rack if specified.



⚠ WARNING

Get off safely

- Get off after the lift truck has come to a complete stop and 5-17 "Parking Lift Truck (After Stopping)" has been followed.
- DO NOT jump off.

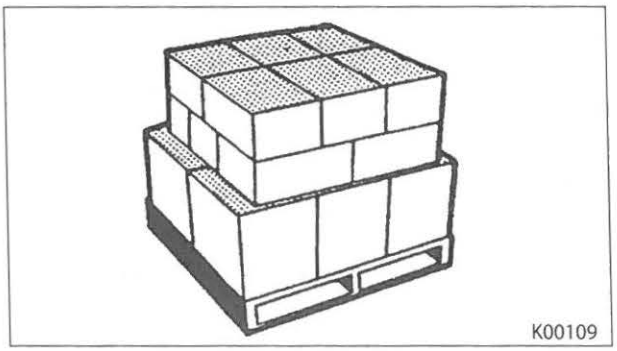
■ OPERATING TECHNIQUES

◆Stacking Methods

Stability of the loads depends upon how well the stack is formed.

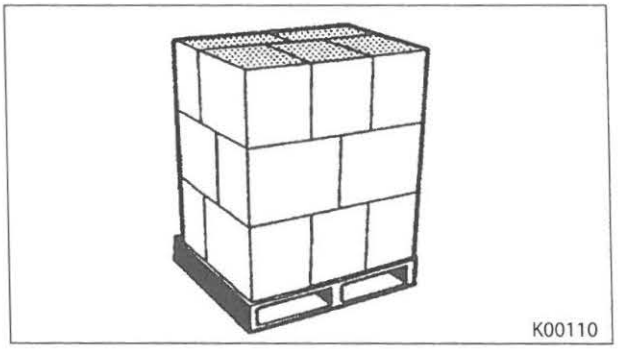
▶ Stacking Different Loads in Size

Make 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.



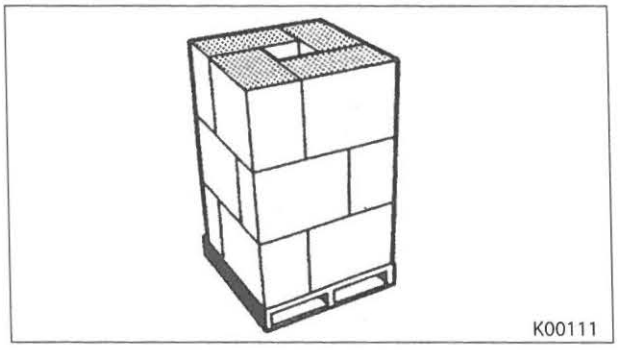
▶ Stacking Small Identical Loads

As in bricklaying, place layers of containers alternately so each container will sit across 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.

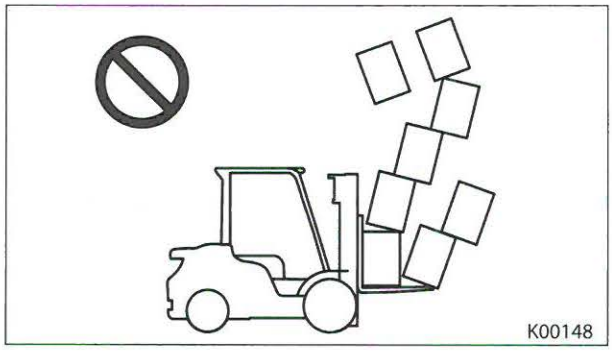


◆Handling Loads Safely

⚠ WARNING

Handle ONLY stable loads to prevent the load from falling!

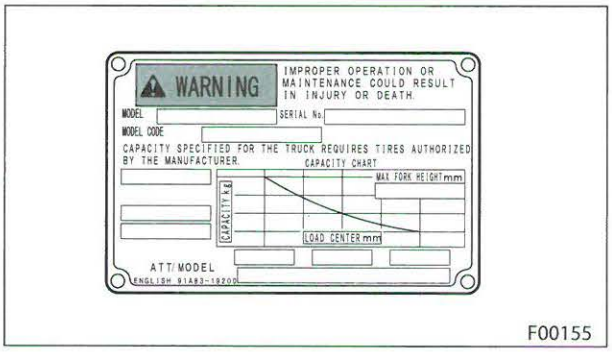
- Handle balanced loads only.
- Visually make sure that boxes or containers have not collapsed or are potentially dangerous.
- If the loads are not balanced or there is a danger of collapse, take appropriate measures such as binding with a band or loading the material into another container.
- DO NOT use broken pallets. It could cause the load to collapse.



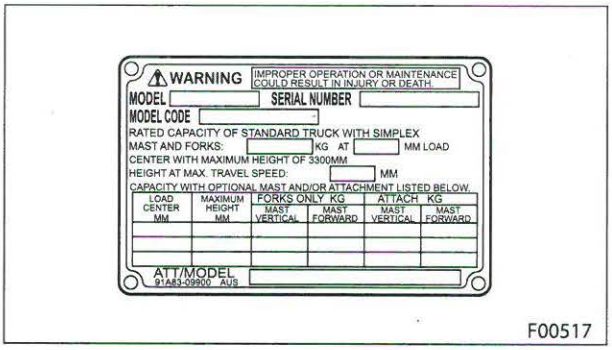
K00148

⚠ WARNING

Handle ONLY loads within the capacity of the lift truck as shown on the capacity plate.
DO NOT place loads at the end of the forks even if they are within the capacity and DO NOT pick up loads that exceed the capacity. Otherwise, it can create very dangerous situation, disabling the operation of steering wheel as the rear wheels are lifted off the ground.



F00155



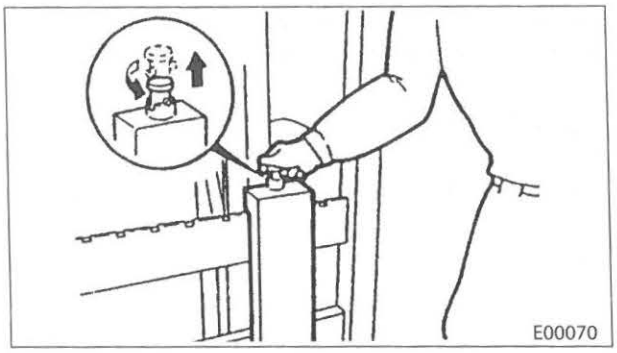
F00517

For Australia

▶ Fork Spread Adjustment

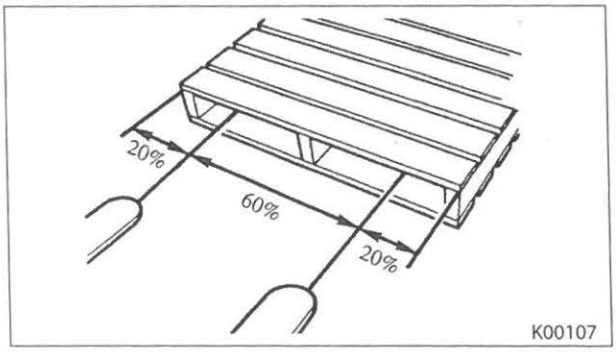
(1) Pull up the stopper and turn it 90 degrees to unlock. Adjust the fork spread to suit the width of the load or pallet.

(2) Turn the stopper back to the original position and drop it into the groove. Make sure the forks are firmly fixed and locked in position.

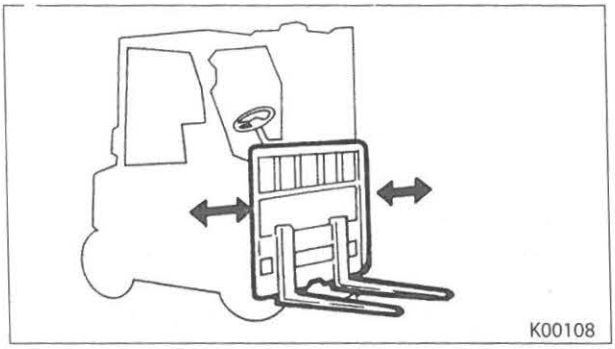


⚠ WARNING

Spread the forks out as wide as possible for even distribution. However, it depends on type of load or pallet. Set the forks wide apart, so that the load becomes balanced while on the forks. In general, it is best around 60% of the width of the pallet.



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

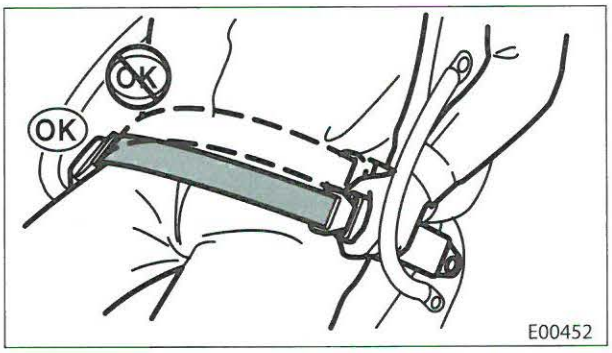


◆Before Operating the Lift Truck

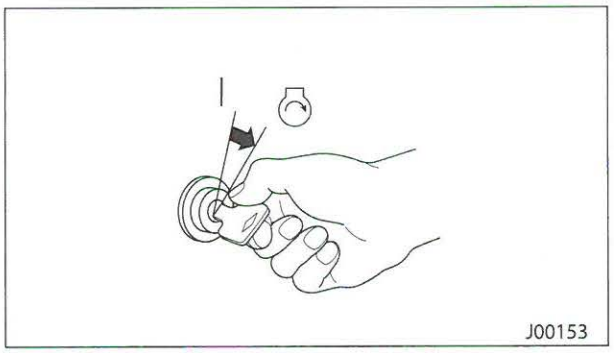
Follow the correct operating steps, (1) through (4), before you operate the lift truck.
Make sure the mast interlock indicator icon is OUT.

Operating steps

(1) Sit properly and buckle the seat belt securely.



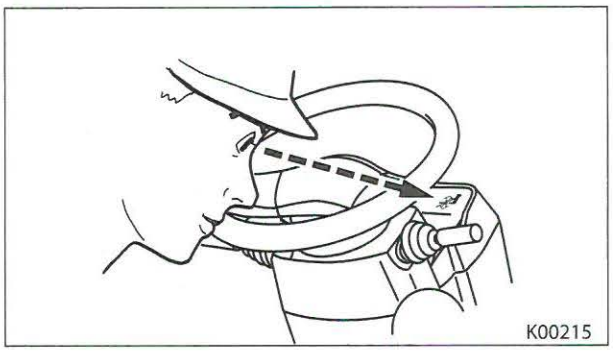
(2) Start the engine.



(3) Make sure the mast interlock indicator icon is OUT.

Note:

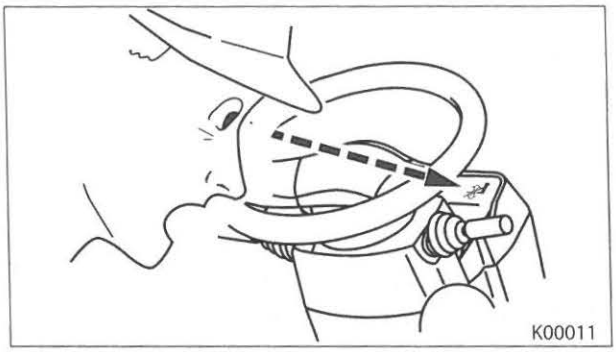
- See 6-7 "Inching Into and Lifting the Load", 6-9 "Traveling with the Load" and "6-11 "Unloading".
- If the mast interlock indicator icon blinks, see 6-5 "Blinking of the Mast Interlock Indicator Icon".



◆Blinking of the Mast Interlock Indicator Icon

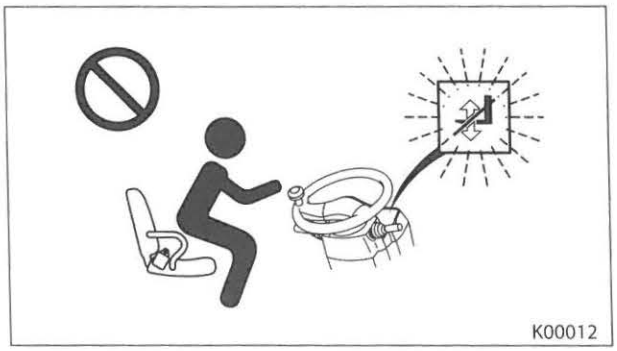
In the following three examples, the mast interlock indicator icon flickers blinks and the mast would not move even though the operating levers are in the operating position. This is not a fault but the function of the interlock system. In this case, follow each instruction in "Remedy."

The mast interlock will work only for the lift and tilt levers. Attachments can be moved regardless of whether the mast interlock function is operating or not. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight.
See the table of 2-27 "Mast Interlock System"


K00011

Example 1

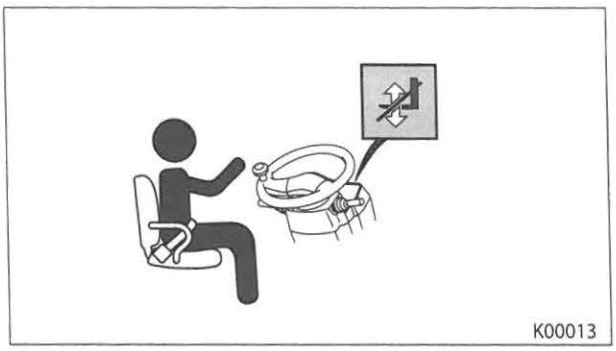
The mast interlock indicator icon flickers when the key switch is in the ON position and you are not properly sitting in the operator seat.


K00012

Remedy

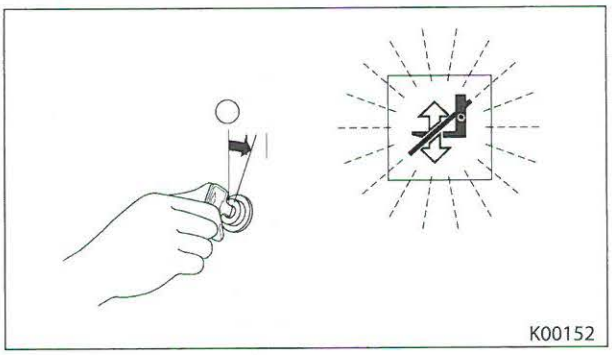
Sit securely. This causes the mast interlock indicator icon to go OUT and you can operate the lift or tilt lever.

Note: The mast interlock indicator icon flickers when you sit on the operator seat while the lift or tilt lever is placed to the operating position. To clear this function, move the lift or tilt lever to the NEUTRAL position.


K00013

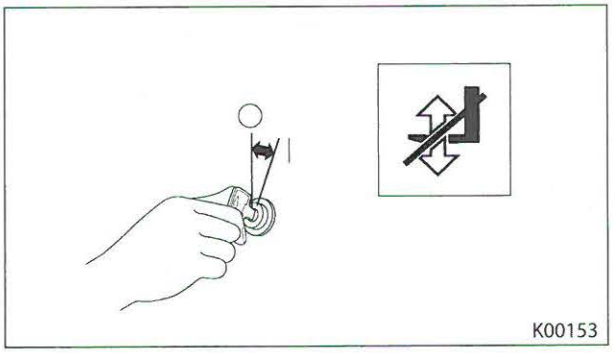
Example 2

The mast interlock indicator icon flickers when you turn the key switch to the ON position or start the engine while the lift or tilt lever is placed to the operating position.



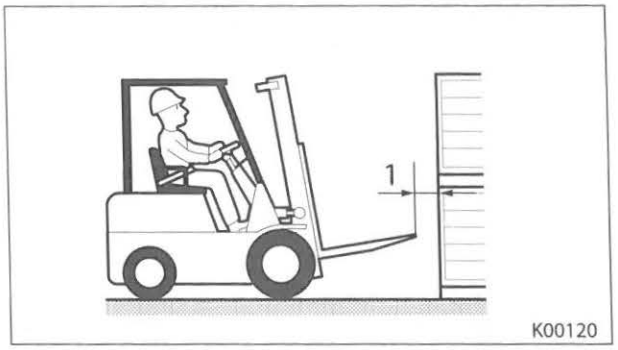
Remedy

(1) Place the lift or tilt lever to the NEUTRAL position and turn the key switch to the OFF position once.
(2) Turn the key switch to the ON position.
(3) Make sure the mast interlock indicator icon is OUT and start the engine.



◆Inching Into and Lifting the Load

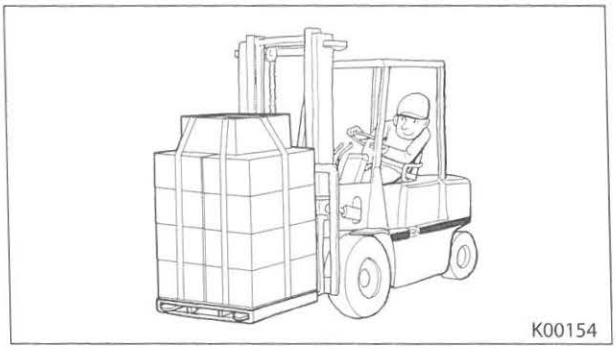
(1) Place the direction lever in the FORWARD position.
(2) Inch into the load and stop the lift truck 20 to 30 cm (8 to 12 in.) short of the load.
(3) Make sure the lift truck is square with the load and the forks aire at the correct height.



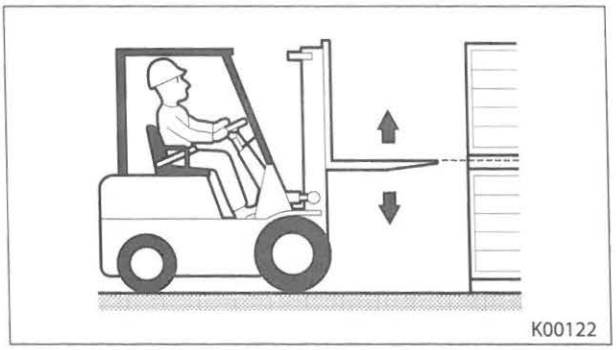
1. 20 to 30 cm (8 to 12 in.)

⚠ WARNING

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

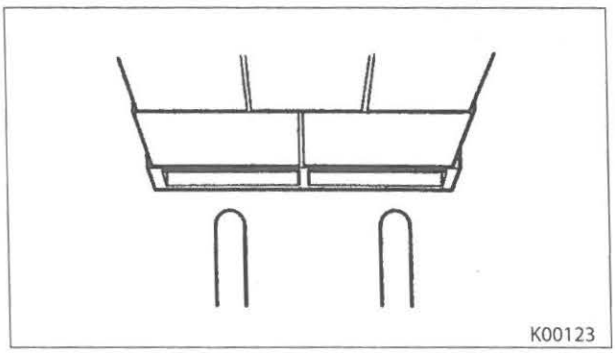


(4) Place the direction lever in the NEUTRAL position.
(5) Tilt the mast forward to the vertical position, and again make sure the forks are at the correct height.

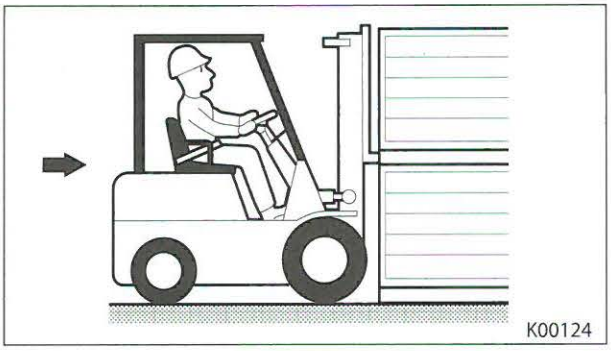


⚠ WARNING

Only stable or safely arranged loads must be handled. DO NOT pick up an off-center load. Make sure the weight of the load is centered between the forks.

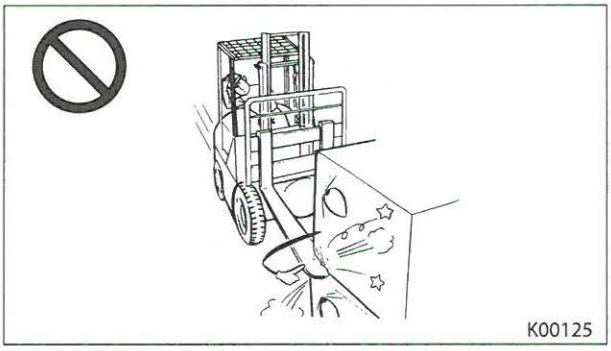


(6) Place the direction lever in the FORWARD position and slowly move the lift truck forward.
(7) Slide the forks into the pallet until they are fully under the load.

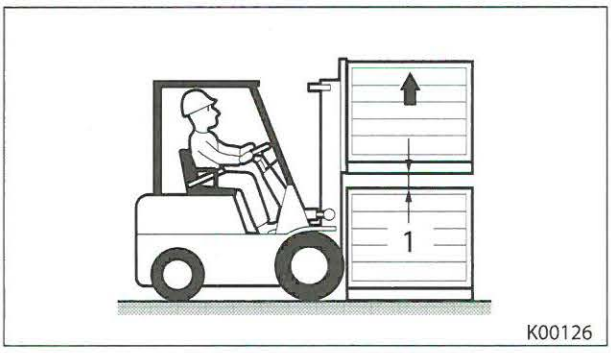

K00124

⚠ WARNING

Avoid approaching the load at high speeds. Under all travel conditions, operate the lift truck at a speed that will permit it to be brought to a stop in a safe manner.


K00125

(8) Place the direction lever into the NEUTRAL position.
(9) Carefully lift the load about 10 cm (4 in.) off the stack. Slowly return the lift lever to the NEUTRAL position.



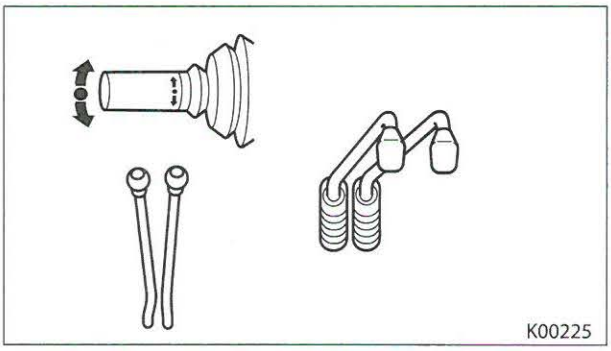
K00126

1. 10 cm (4 in.)

⚠ WARNING

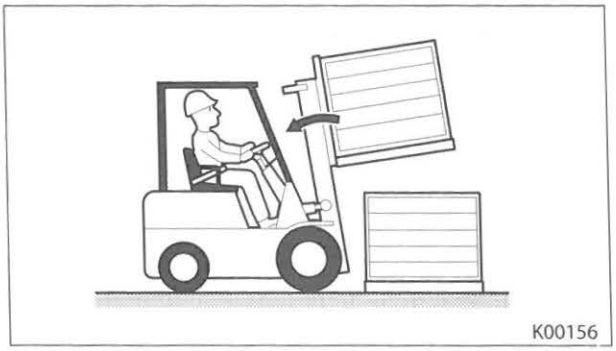
DO NOT mistake the direction and control levers!

If you operate the wrong lever, collision of the lift truck with persons or objects could occur, or you could drop the load.

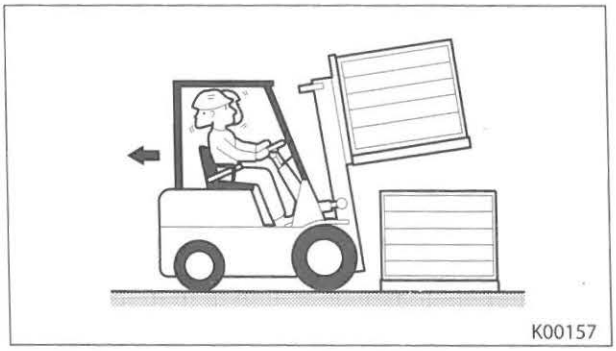

K00225

◆Traveling with the Load

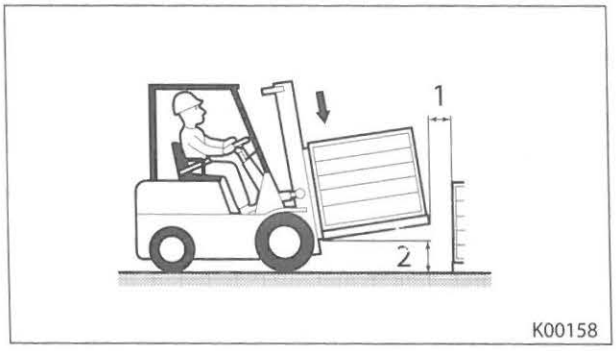
(1) Place the direction lever in the NEUTRAL position.
(2) Make sure the load is centered on the forks.


K00156

(3) Look behind you.
(4) Place the direction lever into the REVERSE position.


K00157

(5) Slowly move the lift truck 20 to 30 cm (8 to 12 in.) away from the stack, and then stop the lift truck.
(6) Place the direction lever in the NEUTRAL position.
(7) Lower the forks to a position 15 to 20 cm (6 to 8 in.) from the ground.



K00158

1. 20 to 30 cm (8 to 12 in.) 2. 15 to 20 cm (6 to 8 in.)

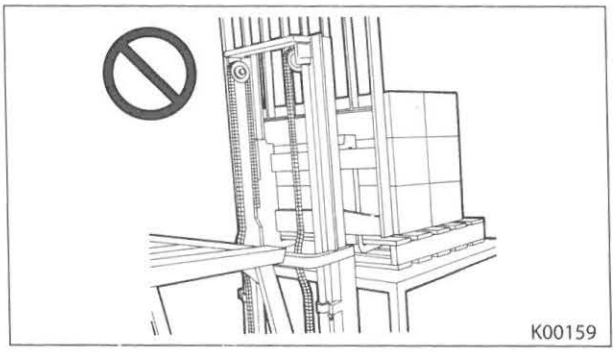
(8) Tilt the mast backward fully to cradle the load.

⚠ WARNING

Slack lift chains means there is a rail or lift bracket hang up. Raise the mast before you move.

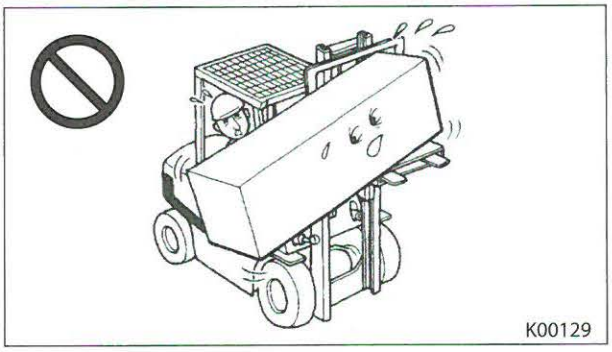
When stacking a load:

- Watch your lift chains.
- If they go slack, stop lowering. Then raise the load and lower it again.

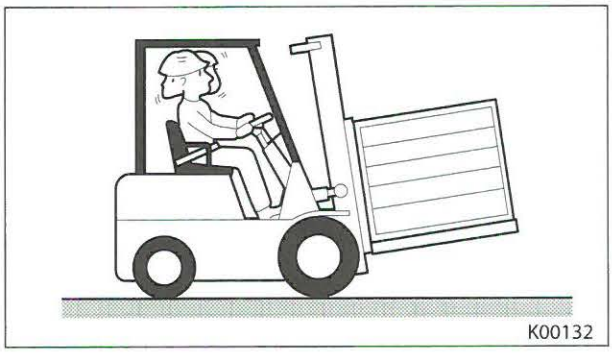

K00159

⚠ WARNING

DO NOT pick up an off-center load. Make sure the weight of the load is centered between the forks.

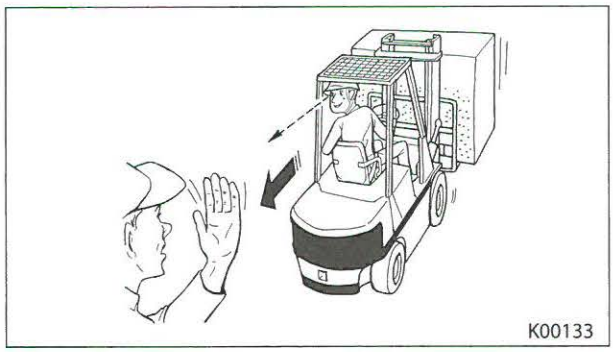

K00129

(9) Look around to make sure your drive area is clear.
(10) Honk horn.
(11) Place the direction lever in the REVERSE position and change the direction to the work place.
(12) Place the direction lever in the FORWARD position and move the lift truck into the work place.


K00132

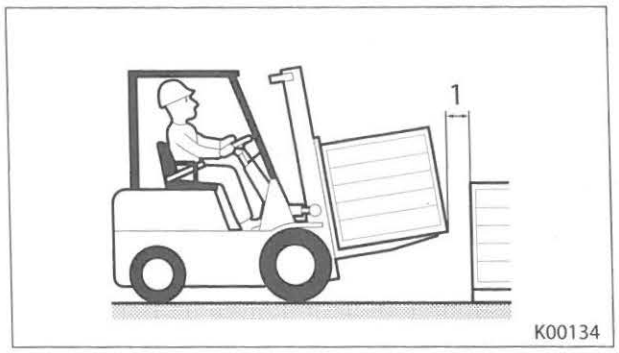
⚠ WARNING

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.


K00133

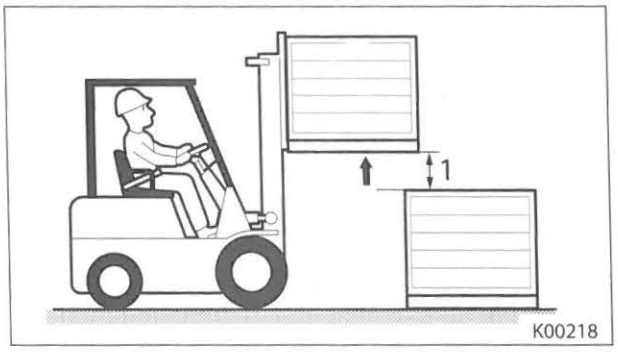
◆Unloading

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



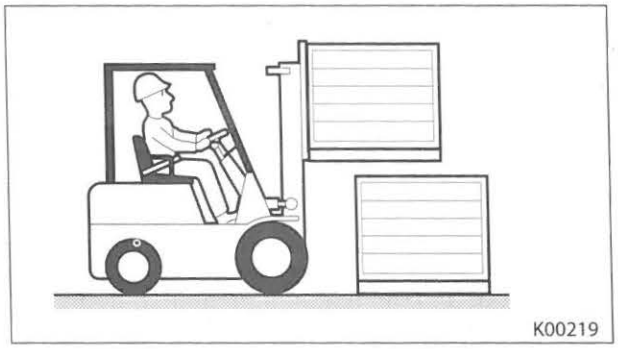
1. 20 to 30 cm (8 to 12 in.)

(2) Place the direction lever in the NEUTRAL position.
(3) Tilt the mast forward to the vertical position.
(4) Lift the load 10 to 15 cm (4 to 6 in.) higher than the stack.

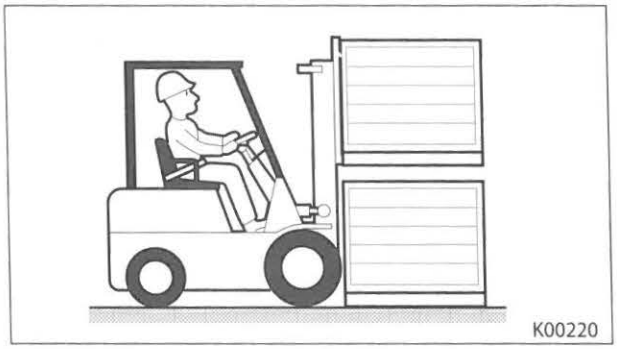


1. 10 to 15 cm (4 to 6 in.)

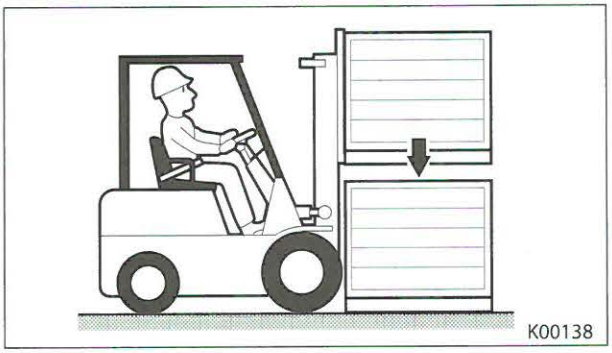
(5) Place the direction lever in the FORWARD position.
(6) Slowly move the lift truck forward to position the load just above the stack.



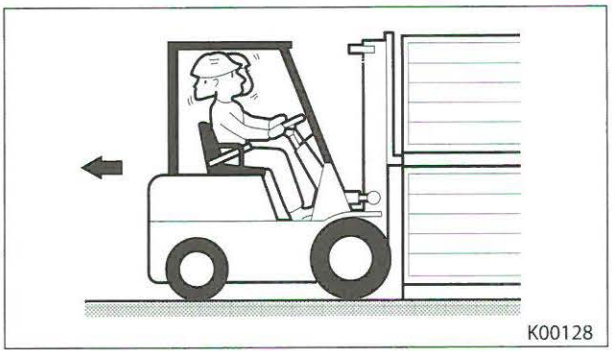
(7) Place the direction lever in the NEUTRAL position.



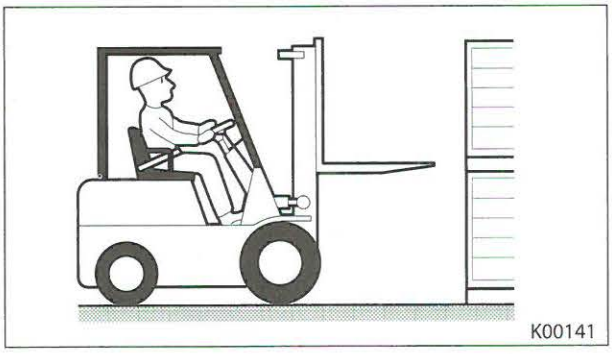
(8) Carefully lower the load onto the stack.
(9) Lower the forks just enough to disengage them.



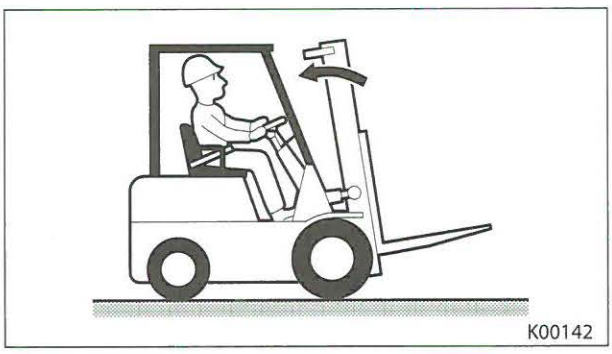
(10) Look behind you.
(11) Place the direction lever in the REVERSE position and carefully back the lift truck away from the load.



(12) When you disengage the forks, stop the lift truck.
(13) Place the direction lever in the NEUTRAL position.
(14) Lower the forks to a position 15 to 20 cm (6 to 8 in.) from the ground.



(15) Tilt the mast back 6° or more.
(16) Look around to see that it is safe to drive in your work location.
(17) Place the direction lever into the REVERSE position.
(18) Honk horn.
(19) Move up to your next position.



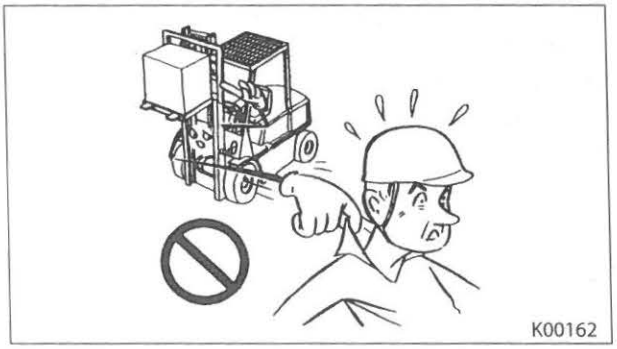
⚠ WARNING

Be careful not to drag the forks.


K00140

⚠ WARNING

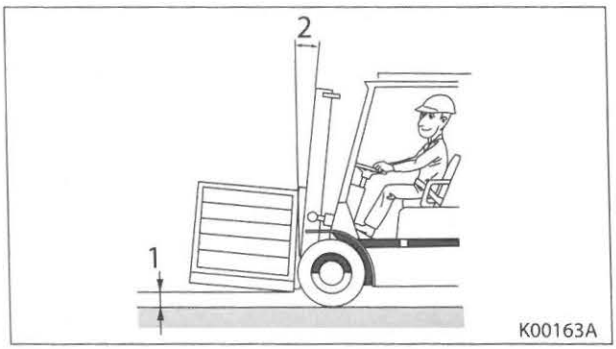
- DO NOT travel with the mast tilted forward or with the load in the elevated position. This will increase the possibility of the lift truck tipping over.
- DO NOT tilt the mast with the load in the elevated position.
- DO NOT leave the lift truck with the load in the elevated position.


K00162

◆Working on Grades

▶ Normal 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 lift truck is empty. Tilt the mast fully backward when the lift truck is loaded.



K00163A

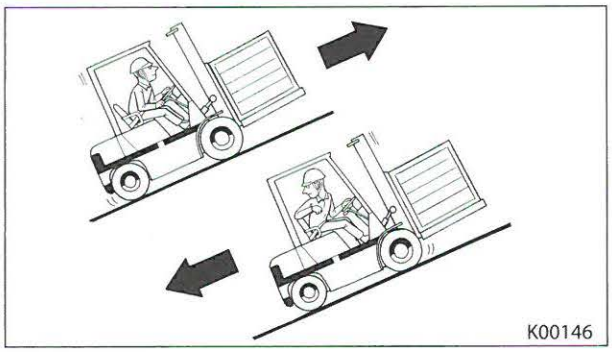
1. 15 to 20 cm (6 to 8 in.) 2. 6° Tilt back

▶ Traveling on a Grade

⚠ WARNING

- DO NOT continuously use the brake pedal alone. This could 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.
- DO NOT place the direction lever in the NEUTRAL position when traveling down a grade.

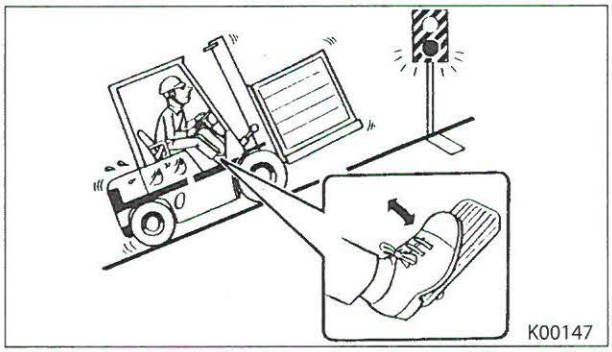
Travel up a grade in FORWARD and down a grade in REVERSE when the lift truck is loaded.


K00146

▶ Stopping on a Grade

⚠ CAUTION

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


K00147

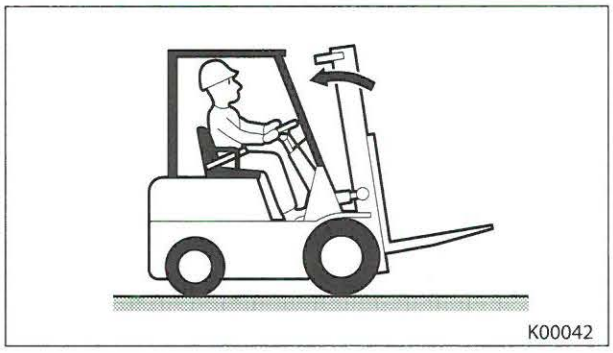
When traveling up or down a steep grade:

(1) Do not stop the engine.
(2) Do not make any turns.
(3) Do not travel across the grade.

▶ Starting on a Grade (Engine Stalls on a Grade)

Manual model

(1) Press the clutch pedal, move the gearshift lever to NEUTRAL position and start the engine.
(2) Pull the parking brake lever all the way back to hold the lift truck and lower the forks to the ground.
(3) Move the gearshift lever to 1st speed position.
(4) Raise the forks or load to the normal travel position.
(5) Press the accelerator pedal while gradually releasing the clutch pedal. As soon as the clutch is engaged, gradually release the parking brake lever.


K00042

Powershift model

(1) Apply the parking brake.
(2) Lower the forks to the ground.
(3) Press the brake pedal.
(4) Place the direction lever in the NEUTRAL position.
(5) Start the engine.
(6) Place the direction lever in the FORWARD position.
(7) Raise the forks or load to the normal travel position.
(8) Quickly shift your right foot from the brake pedal to the accelerator pedal.
(9) Release the parking brake while gradually pressing the accelerator pedal.

■ STORING THE LIFT TRUCK

◆ End of Each Shift Storage

To ensure a long life of your lift truck, be sure to take the following steps at the end of each shift:

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

⚠ WARNING

BE SURE to pull the parking brake lever before blocking the wheel!

- Before blocking or releasing the wheel, make sure that the parking brake is applied. If not, the lift truck could start moving by itself, resulting in accidents.
- Perform a thorough walk-around inspection for any damage. Report all damage or faulty operation immediately. DO NOT operate the lift truck that has a maintenance problem.
- DO NOT put your hand between the tire and wheel chock when using a wheel chock to block wheels. The lift truck may move, causing your hand to be pinched.
- DO NOT expose the ECU/VCM boxes to rainwater. Take care not to sprinkle water over ECU/VCM boxes when washing the lift truck.

◆ Long Term Storage

If your lift truck is stored for any length of time, take the following safety precautions to reduce the risk of deterioration of the lift truck components.
If it is necessary to store the lift truck outdoors, park it on hard and level surface, secure with wooden blocks, and cover it with a water-proof plastic sheet to protect it from humidity or dust.

▶ Storage within 3 Months

Operate the lift truck for thirty minutes at least once a month. Run the engine at normal idle speed as well as high idle speed to warm up the engine fully.
Also, move the lift, tilt, and attachment cylinders through their entire stroke.

Fuel system

- Gasoline model or Diesel model:

There is no need to drain fuel from the tank.

- LPG model:

Remove the fuel tank from the lift truck and take necessary safety precautions.

Hydraulic system

After positioning your lift 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.

▶ Storage Exceeding 3 Months

Contact your authorized Cat lift truck dealer and ask for proper storage procedures.

After prolonged storage, have your authorized Cat lift truck dealer inspect the lift truck before operation.

Fuel system

- Gasoline model:

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 model:

Drain the fuel from the tank and run the engine until the fuel in the lines is used up.

- LPG model:

Remove the fuel tank from the lift truck and take necessary safety precautions.

Hydraulic system

After positioning your lift 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.

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 (injection nozzles) and squirt a small amount of engine oil into the cylinders. Crank the engine several times with the starter in order to spread oil uniformly onto the cylinder walls, and then install the plugs (injection nozzles).
Perform this procedure when starting the engine after storage.

Battery

Remove the batteries from the lift truck and recharge them. Store them in a dry, cool place. Check the battery fluid periodically and add distilled water if the level is low. Also check the specific gravity of electrolyte, and recharge if it is below the 1.28 (20). Clean the battery and apply an antirust agent to the terminals.

Controller

Moisture is harmful to the controller.
DO NOT splash water or steam over the controllers when washing the lift truck.

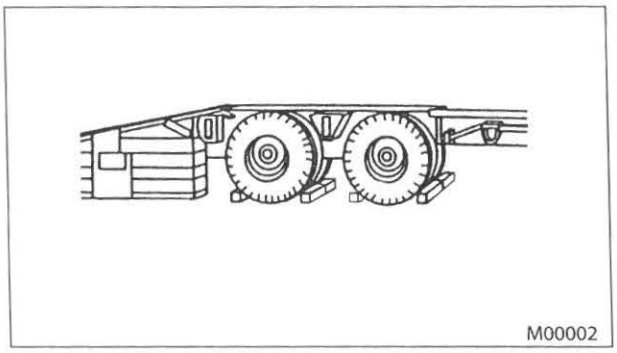
- VCM
- ECM
- DCM
- Other controllers

■ TRANSPORTATION HINTS

◆Lift Truck Loading and Shipping

Be sure to take the following safety precautions before loading and shipping lift trucks:

- Always block the trailer or rail car wheels before loading the lift truck.
- Position the lift truck on the lift truck bed or rail car.
- Apply the service brake and then apply the parking brake. Place the direction lever in the NEUTRAL position.
- Turn the key switch to the OFF position and remove the key.
- Block the wheels and secure the lift truck with tiedowns.
- Do not turn the steering wheel after the lift truck has been secured. It may loosen the tiedowns.


M00002

⚠ WARNING

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

◆Lift Truck Lifting and Tiedown Information

Take the following safety precautions when lifting or tying down lift trucks:

- Weight and instructions given here apply to lift trucks manufactured by Cat Lift Trucks.
- Use proper rated cables and slings for lifting. Position the crane so the lift truck is level when lifted.
- Spreader bar widths should be sufficient to prevent contact with the lift truck.
- Use the tiedown locations provided for lift truck tiedown.

⚠ CAUTION

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

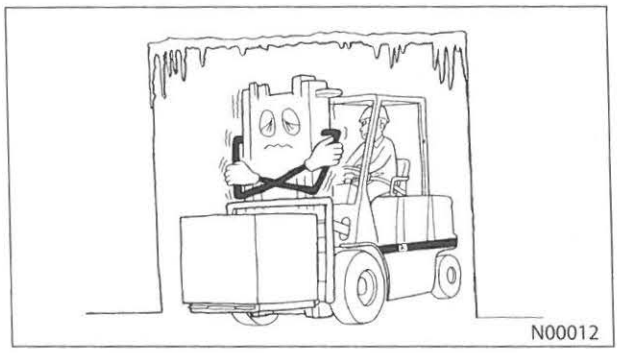
Note: Check the state and local laws governing weight, width and length of a load. Contact your authorized Cat lift truck dealer for shipping instructions for your lift truck.

■ SPECIAL SITUATIONS

◆Care in Cold Weather

▶ Fuel Oils and Lubrication Oils

Use diesel fuel to fit the ambient temperatures. The cetane number should be 40 minimum. If you operate the lift truck where ambient temperatures are normally low, you may need fuel with a high cetane number.

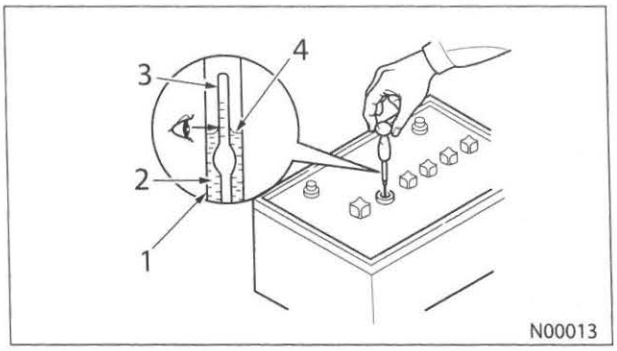


⚠ CAUTION

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

▶ Battery

- Maintain the specific gravity of electrolyte from 1.26 to 1.28 as corrected to 20°C (68°F).
- When you park your lift truck overnight, leaving it outside in the elements, remove the battery and keep it warm.



1. Glass tube
2. Electrolyte
3. Float
4. Electrolyte level

Note: The electrolyte of a fully charged battery will not freeze until -35°C (-31°F).

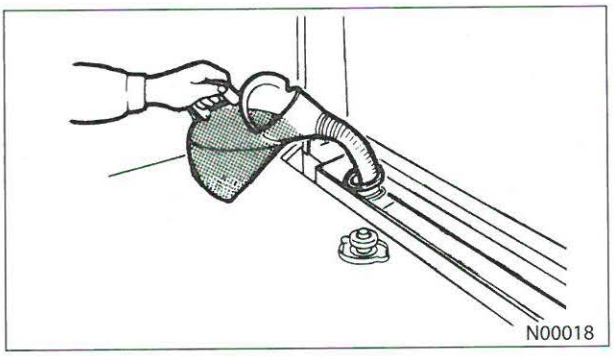
⚠ CAUTION

- 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 may break the battery case, resulting in acid contact with skin or eyes.

▶ Engine Coolant

- Antifreeze used in the engine cooling system of a new lift truck shipped from the manufacturer provides sufficient freeze protection to -30°C (-22°F).
- If ambient temperatures are below -30°C (-22°F), add antifreeze.

Note: For type and concentration of antifreeze, contact your authorized Cat lift truck dealer.

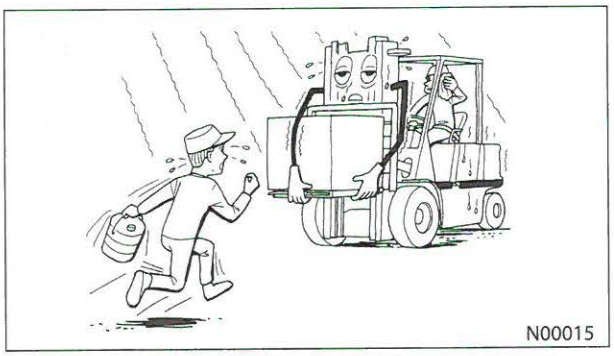


◆Care in Hot Weather

▶ Fuel Oils and Lubrication Oils

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

Note: For selection of fuel oil, engine oil and gear oil, contact your authorized Cat lift truck dealer.



▶ Battery

In hot and/or 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.

Note: Coolant evaporates rapidly and the engine is likely to get overheated when the lift 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 shows the red zone, the engine may be overheated.

Note: If the engine coolant temperature gauge shows the red zone, see 10-8 "If the Engine Coolant Temperature Gauge Shows Red Zone".

◆Severe Dust or Lint Conditions

Check and service the filters and oils more frequently.
For details, contact your authorized Cat lift truck dealer.

▶ Air Cleaner Element

The air cleaner elements can be cleaned up to five times. Replace the filter after the element has been cleaned five times.

For reference

Standard inspection intervals	Every 50 service hours or weekly
Standard change intervals	Every 6 months or every 1000 hours

▶ Engine Oil and Engine Oil Filter

For reference

Standard change intervals	One month or 200 hours after purchase of a new truck. Every 3 months or every 500 hours

▶ Hydraulic Oil

For reference

Standard change intervals	Every 12 months or every 2400 hours

▶ Hydraulic Tank Return Filter

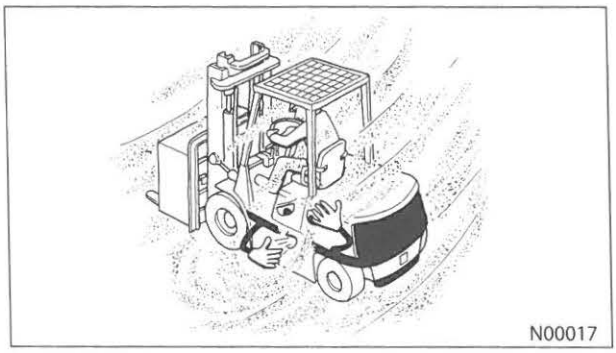
For reference

Standard change intervals	One month or 200 hours after purchase of a new truck. Every 3 months or every 500 hours

- For the use in severe dust conditions, a dust-proof type is available.

Contact your Cat lift truck authorized dealer if one is necessary.

- Check the radiator core more frequently for clogging or trash build-up. Clean or wash the lift truck as needed.


N00017

■ TROUBLESHOOTING

◆If a Tire Blows Out

▶ If a Tire Blows out During Traveling or Operation

⚠ CAUTION

A flat tire tilts the lift truck, which makes it difficult to turn the steering wheel properly. Operating the lift truck with a flat tire may cause an accident.

Remedy

(1) Stay calm and firmly hold on to the steering wheel.
(2) Gently release the accelerator pedal to slow down.
(3) Park the lift truck in a safe area.
(4) Replace the punctured tire with a new one.

Note: Contact your authorized Cat lift truck dealer when requesting to replace tires.

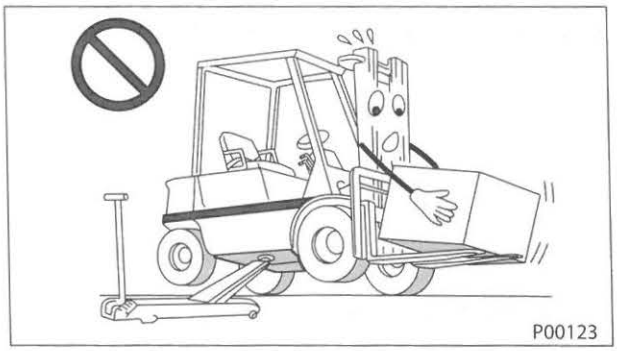
◆Replacing Tires

⚠ WARNING

- When replacing tires, replace them in sets, even if only one of the tires is damaged. If both new and used tires are used on the same axle, tilting of the mast and rapid tire wear will result.
- Make sure the replacement tire is of the same size, type, and load range as indicated on the Manufacturer Name Plate.
- Use only tires recommended by the manufacturer. See manufacturer name plate for correct tire size.
- Contact your authorized Cat lift truck dealer for proper tire replacing procedure.
- Replacing a tire and adjustment procedures must be made by a trained mechanic.
- Perform all maintenance with proper equipment.

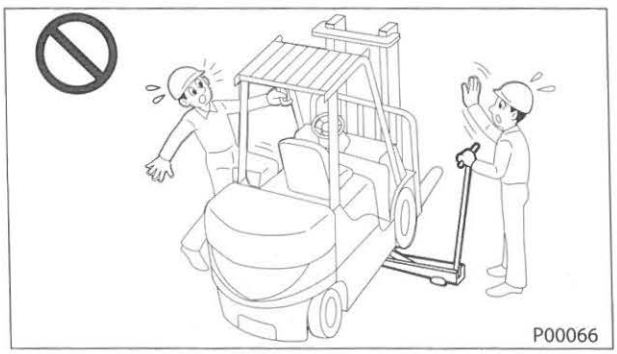
⚠ WARNING

DO NOT attempt to replace the tire with the lift truck loaded. Injury and/or damage could result.
If a tire is punctured while carrying a load, jack-up the lift truck to keep the load in horizontal position, and remove the load using another lift truck.



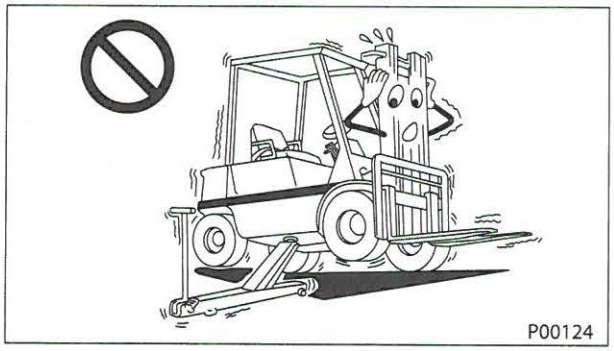
⚠ WARNING

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



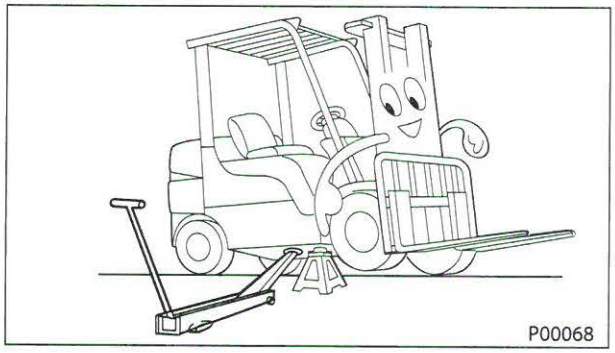
⚠ WARNING

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


P00124

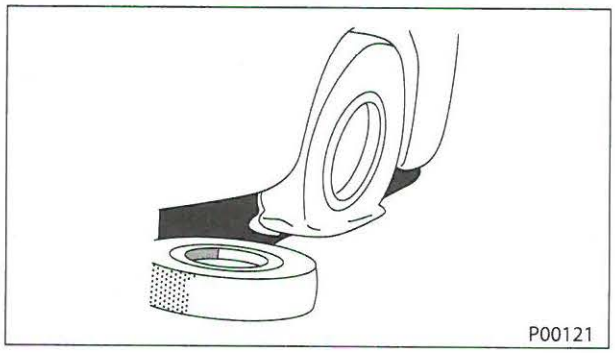
⚠ WARNING

DO NOT place any part of your body under the lift truck until the lift truck is securely supported with jack stands after jacking it up.

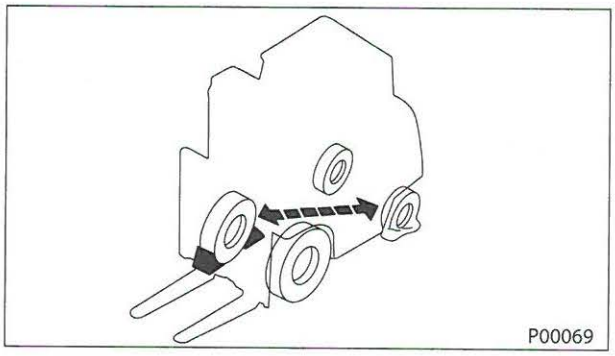

P00068

▶ Before Replacing Tires

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Turn OFF the engine.


P00121

(6) Prepare tools, jack and wheel blocks.
(7) Block the wheel diagonally opposite to a raised wheel.


P00069

Models	Jack Capacities
1 ton	3 tons (6700 lb), minimum
2 to 3 ton	5 tons (12000 lb), minimum

▶ To Remove Wheel

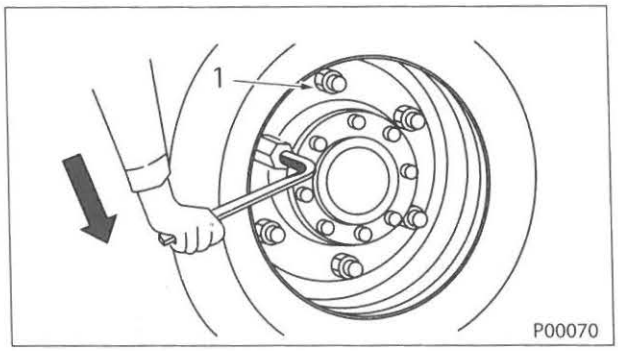
(1) Loosen the wheel nuts about two rotations.

Note: Only loosen the wheel nuts. Do not remove them.

(2) Position the jack under the lift truck at the specified jacking point.

Note: For jacking point, see 10-4 "To Raise Front Wheel" and 10-5 "To Raise Rear Wheel".

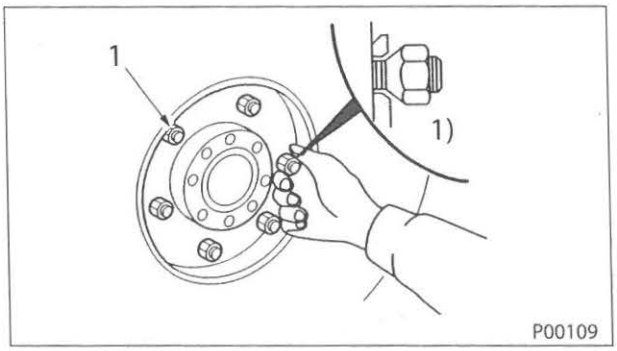
(3) Raise the lift truck by operating the jack until the tire just clears the ground.



1. Wheel nut

(4) Remove the wheel nuts (loosened in Step 1).

(5) Firmly hold the wheel with both hands and remove it from the lift truck.



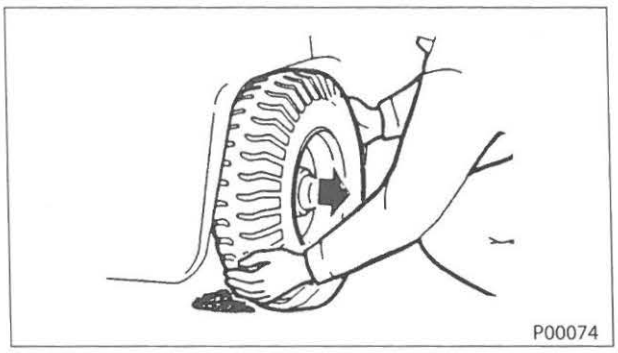
1. Wheel nut 1) Countersink

⚠ WARNING

DO NOT loosen rim bolts.

⚠ CAUTION

Be careful NOT to strip the bolt threads when removing the wheel.

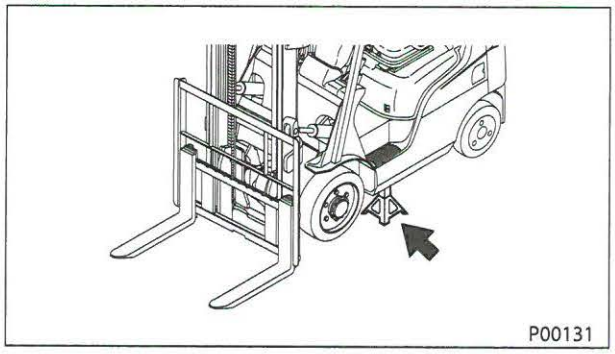


▶ To Raise Front Wheel

Jacking Method

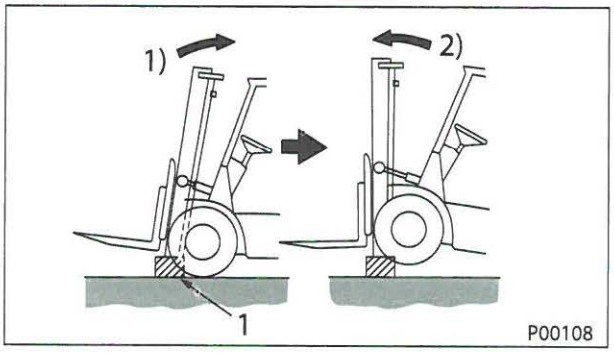
(1) Position the jack under the frame and raise the lift truck with the jack until the front wheel clears the ground.

(2) Place the jack stands on both sides under the frame to support it.



"Self-jacking" method

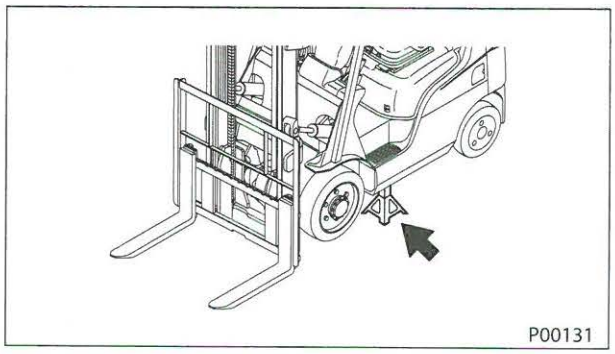
(1) Tilt the mast fully back, place wood blocks under the mast, and tilt the mast forward.



1. Wood block

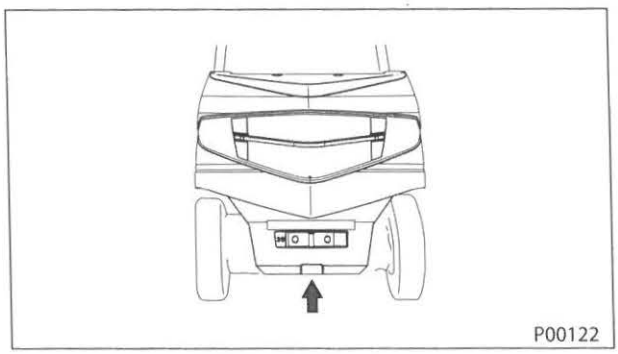
1) Tilt backward
2) Tilt forward

(2) Place the jack stands on both sides under the frame to support it.



▶ To Raise Rear Wheel

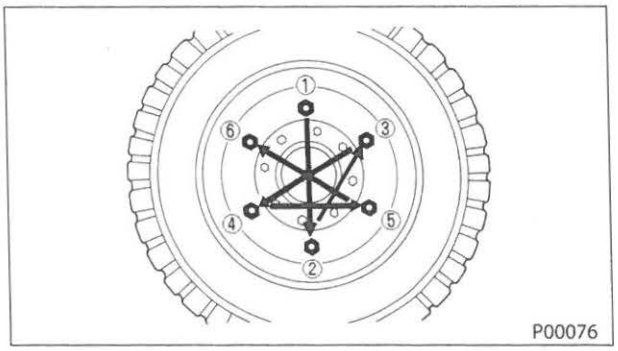
(1) Position the jack under the counterweight at the recessed point and raise the rear wheels.
(2) Place the jack stand under the frame to support it.



▶ To Install Wheel

(1) Install the wheel and tighten the wheel nuts finger tight until their clamping surfaces come into full-face contact with the counter bores in the rim.

Note: Make sure the clamping surfaces of the wheel nuts and countersinks are free of dirt.



Tightening torques for wheel nuts

Models	Side	Torque	
1 to 2 ton compact	Front	157 N·m (16 kgf·m) [116 lbf·ft]	
	Rear		
2 to 3 ton	Front	378 N·m (38.5 kgf·m) [278 lbf·ft]	
	Rear	STD (2P)	157 N·m (16 kgf·m) [116 lbf·ft]
		OP (4P)	233 N·m (23.8 kgf·m) [172 lbf·ft]
3.5 ton	Front	378 N·m (38.5 kgf·m) [278 lbf·ft]	
	Rear	233 N·m (23.8 kgf·m) [172 lbf·ft]	

(2) Lower the lift 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.
(3) Lower the lift truck fully and restore the jack and tire.
(4) Make sure the tire pressure is correct. For the pressure, see 12-5 "Specifications (Standard Models)".
(5) After tire replacement, drive the lift truck for a while and then recheck the torque of the wheel nuts.

▶ To Add Air to Tires

⚠ WARNING

- The lift truck uses high pressure tires. DO NOT overinflate the tire.
- When adding air, check the rim for damage that could permit air to leak from the tire.
- The use of an inflation cage, or some other safety device, helps reduce the risk of serious injury.
- When adding air to the tire, or when checking tire pressure, BE SURE to keep your body away from the side.


P00077

⚠ WARNING

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

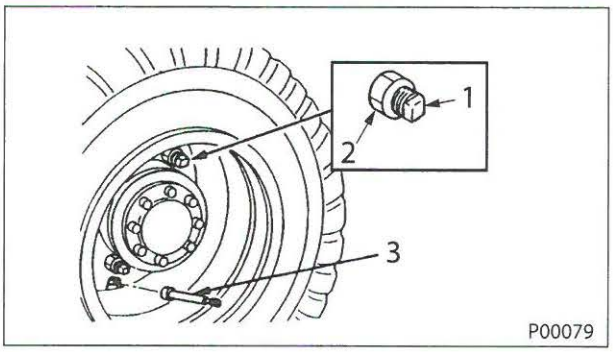

P00078

▶ Dual Tire (Optional)

Steps other than the followings are the same as those for single-wheel lift trucks.

(1) Remove extension valve.
(2) Unscrew outer wheel nuts and remove the outer wheel.
(3) Unscrew inner wheel nuts and remove the inner wheel.
(4) Install the inner wheel and, after lowering the lift truck, tighten inner wheel nuts to the specified torque.
(5) Raise the lift truck again, install the outer wheel. After lowering the lift truck, tighten outer wheel nuts.

Note: Check inner wheel nuts for tightness even when replacing the outer wheel.



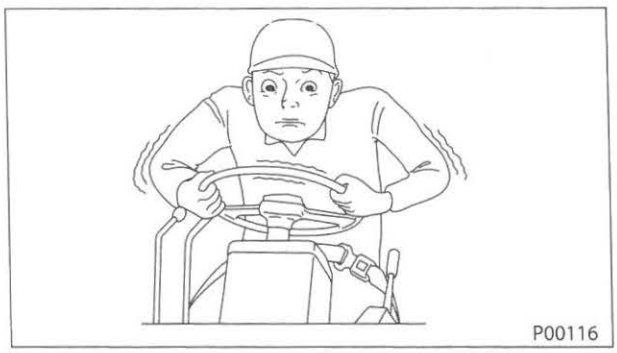
P00079

1. Inner wheel nut
2. Outer wheel nut
3. Extension valve

◆Stalled Engine

If the engine stalls, hydraulic pressure is lost in the power steering. This increases your steering effort.

In this case, stop your lift truck in a safe area and restart the engine.



▶ Before Starting the Engine Again

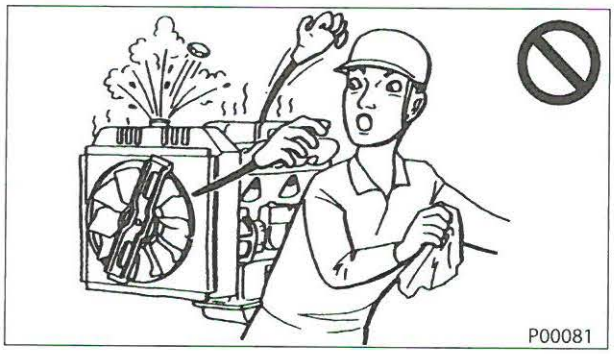
Check the following items, and remove the cause of the stall:

- Lack of fuel
- Engine overloading

◆If the Engine Coolant Temperature Gauge Shows Red Zone

⚠ WARNING

- DO NOT attempt to remove the radiator filler cap if the engine is overheated. To avoid scalding hot coolant and steam from blowing out of the radiator, wait until the engine has cooled.
- DO NOT add cold water to an overheated engine, this could cause engine damage. Wait for the engine to cool, if possible. If not, slowly pour water into the radiator.
- Immediately stop the engine if the fan belt is broken.

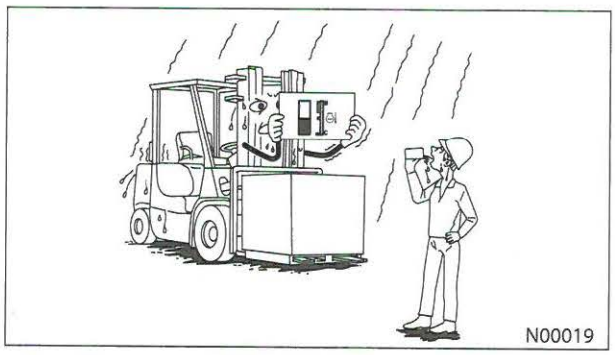

P00081

⚠ CAUTION

If any of the following liquids are spilled on the floor, clean them up immediately. If not cleaned up, it may result in slipping, skidding or environmental pollution:

- Oil or grease
- Coolant
- Gasoline or diesel fuel
- Brake fluid
- Electrolyte

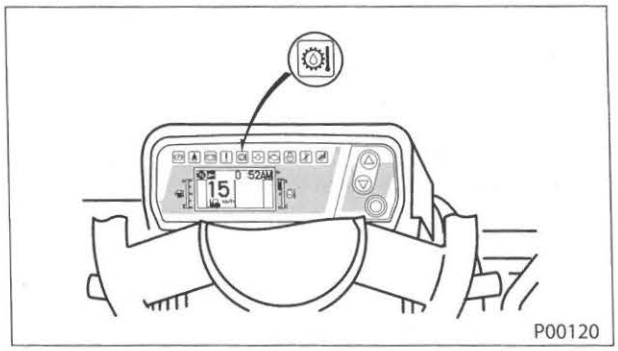
(1) Park the lift truck in a safe area.
(2) Raise the engine hood and seat assembly to ventilate the engine compartment.
(3) Allow the engine to idle for a while. Do not attempt to stop the engine.
(4) Stop the engine after the engine coolant temperature gauge shows the WHITE zone.


N00019

(5) Check for:
- Lack of coolant.
- Loose or broken fan belt.
- Engine oil level.
- Dirt buildup in radiator air passages.

◆If Torque Converter Oil Temperature Warning Light Glows (Powershift Model)

(1) Stop the lift truck in a non-traffic area.
(2) Apply the parking brake.
(3) Place the direction lever in the NEUTRAL position.
(4) Run the engine at low idle for a while.
(5) After the warning light has gone out, operate the lift truck again.



⚠ CAUTION

If the warning light does not go out, or if it constantly glows, contact your authorized Cat lift truck dealer.

◆Trouble with the LPG Equipment

⚠ WARNING

- If you smell gas or notice something wrong with LPG equipment during operation, immediately stop the lift truck in a safe area, turn the key switch to the OFF position, close the fuel valve of the LPG tank, and try to find the cause. (It is recommended that the fuel lines and fittings be checked with a soap solution after filling the tank or when looking for leaks.)
- If the internal pressure of the LPG 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 lift truck. Ventilate the work place.
- 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 the lift truck turns over. If this happens, close the LPG fuel valve of the LPG tank as soon as possible.
- Use a dry chemical (powder) or carbon dioxide type extinguisher. DO NOT use water. When possible, however, have large quantities of water poured over the LPG tank to cool it down while the fire is being extinguished.

◆Starting with Jumper Cables

To start a lift truck with a "run-down" battery, use a booster battery or jumper cables from the battery of a second lift truck.

⚠ WARNING

- Batteries give off flammable gas which could explode.
- Keep flames and sparks away from batteries.
  They could cause gas to explode.
- DO NOT smoke when checking battery electrolyte levels.

⚠ WARNING

- Improper jump start procedures could cause an explosion that could 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 engine body.
  Jump only with a battery source of the same voltage as the stalled lift truck.
- DO NOT allow jumper cable ends to contact each other or the lift truck.
- Electrolyte is an acid and could cause injury if it contacts skin or eyes. Always wear eye protector when starting an engine in the lift truck with jumper cables.

⚠ WARNING

- DO NOT try to start the engine by pushing the lift 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.

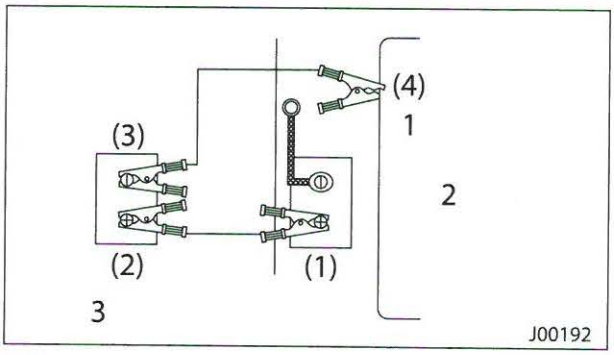
⚠ CAUTION

- Connect the jumper cables away from the moving parts in the engine compartment.
- When carrying batteries, provide short circuit prevention to the terminals. If metals come in contact with the terminals, a short circuit could result.
- DO NOT touch the cable with wet hands. If touched, it may result in an electrical shock.

Note:

- Use 12 volt jumper cables to jump start the lift truck. This lift truck has a 12 volt starting system. Use only equal voltage for jump starting. Use of a welder or higher voltage will damage the electrical system.
- You can buy jumper cables from your authorized Cat lift truck dealer.
- Turn OFF 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.

(1) Position the second lift truck, with its engine running, within jumper cable distance.
(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 second lift truck's engine and then start the engine of the stalled lift truck that has the "run-down" battery.
(4) After the engine starts, disconnect the jumper cables in the reverse sequence.



1. Cable end
2. Truck being started
3. "Good" Battery

◆If Lights Won't Glow

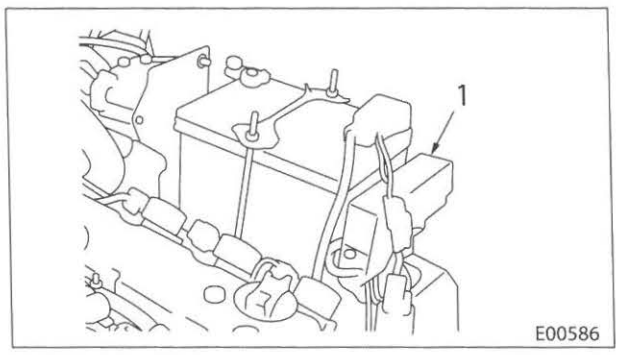
⚠ CAUTION

- DO NOT use a fuse that is overrated. DO NOT use a wire or aluminum foil for a fuse. It can overheat or burn.
- Always replace fuses with fuses of the correct amperage.
- If a fuse burns out immediately after being changed and you cannot locate the cause, have your authorized Cat lift truck dealer make a circuit check.
- Always use a light bulb of the same wattage.

Circuit	Capacity	
	Gasoline	Diesel
Head light	15A	15A
Horn	10A	10A
Stop light	10A	10A
(Optional)	15A	15A
Working light	15A	15A
EGI	30A	-
EGI	30A	-
(Optional)	20A	20A
ETC	15A	-
VCM	20A	20A
Meter panel	10A	10A
Backup light	15A	15A
Fuel pump	10A	20A

▶ How to Check Fuses and Lights

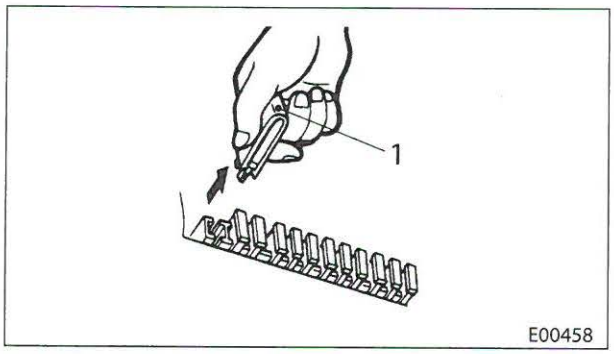
(1) Remove the engine cover.



1. Fuse

(2) Use the puller.

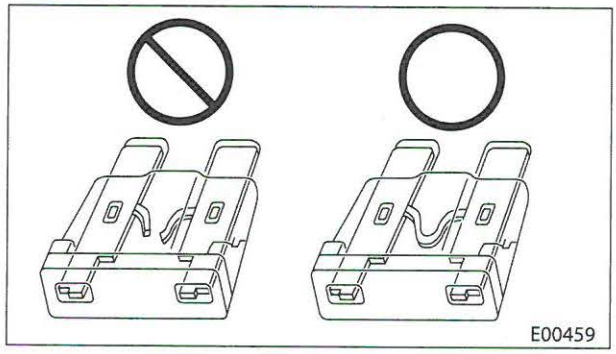
Note: To remove the fuse or insert a replacement fuse, use the puller located inside the fuse panel lid.



1. Puller

(3) Check to see if fuse is blown.

(4) Check to see if light is burned out If there is no problem with the fuses.
Lights may be burned out.

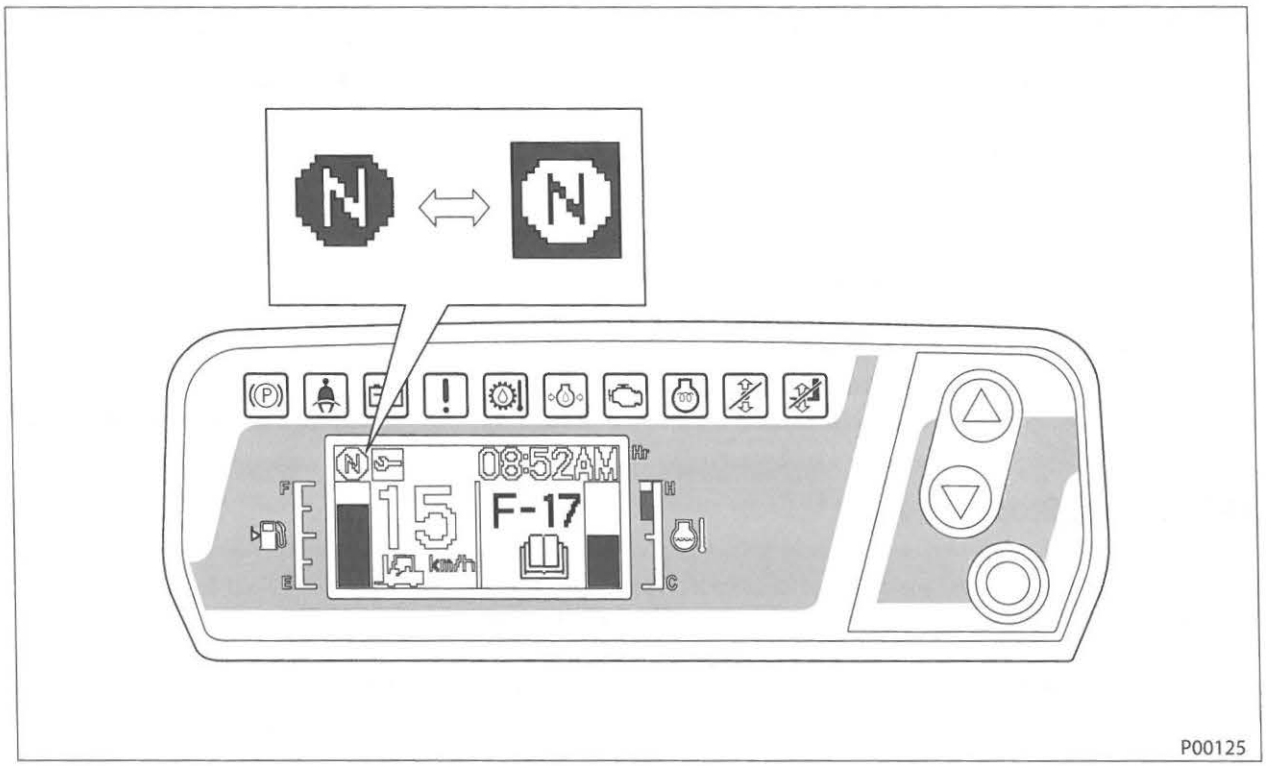


Light Type		Capacity
Head light		12V-55W
Working light (optional)		12V-55W
Front	Turn signal light	12V-27W
	Clearance light	12V-10W
Rear	Tail / Stop light	12V-23W / 8W
	Backup light	12V-18.4W
	Turn signal light	12V-20W

◆If the forklift Truck Won't Change Directions

If an operator half rises from the operator seat for more than 3 seconds with the direction lever being placed in the FORWARD or REVERSE position, a built-in seat switch in the operator seat activates the driving interlock system.

Check the following points If the lift truck will not move even after the direction lever is shifted to the FORWARD or REVERSE position.



Does the driving interlock indicator icon flicker on the LCD screen?

YES

(1) Sit properly on the operator seat.
(2) Return the direction lever to the NEUTRAL position.
(3) Place the lever to the FORWARD or REVERSE position.

NO

It is broken.

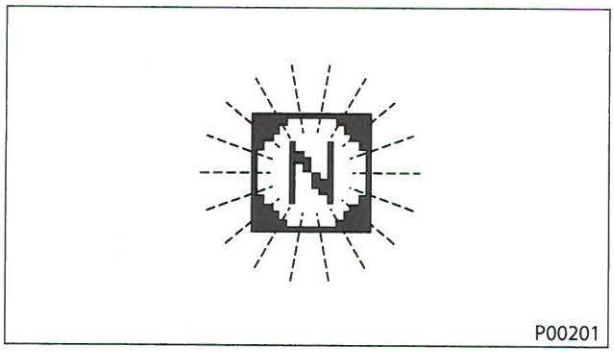
Contact your authorized Cat lift truck dealer after taking the following safety measures.

(1) Return the direction lever to the NEUTRAL position.
(2) Apply the parking brake.
(3) Turn the key switch to the OFF position.
(4) Attach a "DO NOT OPERATE" or similar warning tag to a conspicuous place at the operator compartment of the lift truck in order to let other people know your lift truck is broken.

◆If the Lift Truck Won't Change Directions (For Powershift Models With Australia Specification Only)

Make sure that the lift truck is in the following condition before starting the engine:

- Key switch is in the ON position.
- Seat belt is unbuckled.
- Direction lever is in the NEUTRAL position.
- Parking brake is applied.



(1) Sit on the operator seat.
(2) Turn the key switch to the START position to crank the engine.
(3) Fasten the seat belt.
(4) Release the parking brake.
(5) Place the direction lever to FORWARD or REVERSE position.

Note: See 2-32 "Driving Interlock System Functions (For Powershift Models With Australia Specification Only)" for the correct starting procedure.

◆If the Mast Stops Moving

If an operator half rises from the operator seat for more than 3 seconds without the lift/tilt lever being placed in the NEUTRAL position, a built-in seat switch in the operator seat activates the mast interlock system.

The mast interlock indicator icon starts blinking the mast stops moving (MC model).

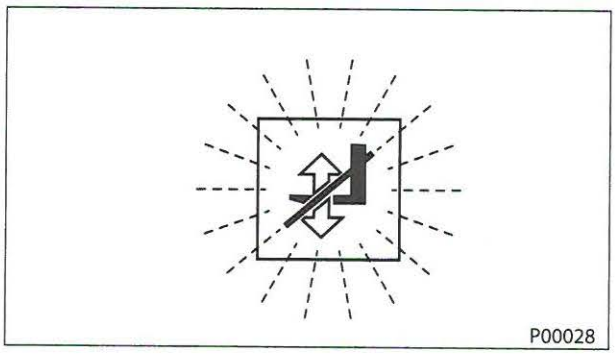
Are you seated?

YES

Stop working and move the lift truck to a safe area. Stop the engine and contact your authorized Cat lift truck dealer.

NO

Place the lift and tilt levers to the NEUTRAL position and sit securely, with the seat belt fastened.



The mast interlock indicator icon is OFF the mast fails to move (MC model).

MC model

Stop working and move the lift truck to a safe area. Stop the engine and contact your authorized Cat lift truck dealer.

Note: The mast interlock will work only for the lift and tilt levers. Attachments can be moved regardless of whether the mast interlock function is operating or not. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight.

◆Diagnostic Codes and Explanations

Contact your authorized Cat lift truck dealer when the diagnostic code is displayed.

Diagnostic Code	Explanation	Diagnostic Code	Explanation
D-51	Memory check warning	E-32	Overheat signal (STEP1)
D-52	Battery voltage warning	E-33	Overheat signal (STEP2)
D-53	VCM communication warning	E-34	Spark system warning signal
D-54	ECM communication warning	E-35	LPG F/INJ disconnection diagnostic result signal
D-55	DCM communication warning	E-36	LPG fuel pressure sensor diagnostic result signal
D-57	MP communication warning	E-37	LPG fuel temperature sensor diagnostic result signal
D-61	Engine overrun		
D-62	Revolution pulse warning	E-38	LPG vaporizer diagnostic result signal
D-63	Overheat signal (STEP1)	E-39	Mast-high SW diagnostic result signal
D-64	Overheat signal (STEP2)	E-40	Oil pressure sensor diagnostic result signal
D-71	Accelerator sensor warning signal	E-41	Stop light SW warning signal
D-73	Engine revolution sensor warning		
D-75	Idling SW warning	F-01	Memory check warning
D-76	Throttle close position warning	F-02	Battery voltage warning
D-77	Throttle open position warning	F-03	VCM communication warning
D-78	Throttle reference point warning	F-04	ECM communication warning
D-79	Throttle close SW stick warning	F-05	DCM communication warning
D-91	Stepping motor warning	F-07	MP communication warning
		F-10	Lift lever neutral warning
E-03	VCM communication warning	F-11	Tilt lever neutral warning
E-04	ECM communication warning	F-12	Attach-1 lever neutral warning
E-05	DCM communication warning	F-13	Attach-2 lever neutral warning
E-07	MP communication warning	F-14	Attach-3 lever neutral warning
E-21	Air flow meter warning signal	F-16	Shift lever warning
E-22	Water temperature sensor warning signal	F-17	Speed warning
E-23	Throttle sensor warning signal	F-20	Lift lever warning
E-24	Accelerator sensor warning signal	F-22	Tilt lever warning
E-25	0_2 sensor warning signal	F-24	Attach-1 lever warning
E-26	0_2 sensor heater warning signal	F-26	Attach-2 lever warning
E-27	POS sensor warning signal	F-28	Attach-3 lever warning
E-28	PHASE sensor warning signal	F-29	Joystick duplicate warning
E-29	Self-shut system warning	F-31	VCM-IM sensor voltage warning
E-30	ECCS C/U warning signal	F-32	Lift oil pressure sensor warning
E-31	Electronic control throttle control warning signal	F-34	Speed sensor warning

Diagnostic Code	Explanation	Diagnostic Code	Explanation
F-36	Tire angle sensor warning		
F-38	Tilt angle sensor warning		
F-40	Steering warning		
F-73	Hour meter gap warning		
F-75	Unload solenoid warning		
F-77	Lift lock solenoid warning		
F-79	Unload / Lift lock solenoid leak		
F-80	Knob position solenoid warning		
F-84	Knob position solenoid leak		
F-85	T/M forward solenoid warning		
F-87	T/M backward solenoid warning		
F-89	T/M solenoid leak		
P-03	VCM communication warning		
P-04	ECM communication warning		
P-05	DCM communication warning		
P-07	MP communication warning		

■ MAINTENANCE

◆General

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 identification of potential maintenance problems. If your lift truck requires any repairs, contact your authorized Cat lift truck dealer. The dealer's lift truck mechanics are well trained and know how to safely make repairs.

⚠ WARNING

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

- Make sure the service area is safe.
- Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.
- All repairs must be made by authorized personnel.
- Follow the recommended safety procedures.
- Use only the right tools for the job.

⚠ WARNING

DO NOT bypass any electrical switches on this lift truck.

⚠ WARNING

If during operation, the lift truck becomes unsafe in any way, the matter must be reported immediately to the user's designated authority, and the lift truck must not be operated until it has been restored to a safe operating condition.

⚠ WARNING

BE SURE to perform inspections.

- If you fail to perform required inspections, it could lead to accidents.
- Operate the lift truck at a reduced speed when performing an operational inspection.
- If operated at higher speeds during an operational inspection, it could cause an accident if the lift truck is faulty.
- Dress properly for the job. DO NOT wear loose clothing or accessories---loose cuffs, dangling chains, neckties, scarves, or rings---that could catch in moving parts.
- Wear personal protective equipment appropriate for the conditions of your work places.

⚠ WARNING

Lines, Tubes, and Hoses

- Leaks could cause fires. Contact your authorized Cat lift truck dealer for repair or replacement.
- DO NOT bend or strike high pressure lines. Check lines, tubes, and hoses carefully.
- DO NOT install bent or damaged lines, tubes, or hoses.
- Repair loose or damaged fuel and oil lines, tubes, or hoses.
- DO NOT use your bare hands to check for leaks, use a board or cardboard.
- Tighten connections to the recommended torque.
- 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.
- 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.

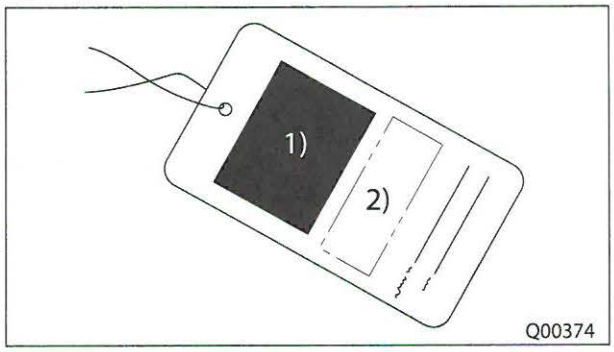
◆Inspection Precautions

⚠ WARNING

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.

⚠ WARNING

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



1) DANGER 2) DO NOT OPERATE

⚠ CAUTION

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 a safe operating condition. Always inspect your lift truck under the following condition:

- Lift truck on level ground
- Mast in vertical position
- Fork tips on ground
- Engine stopped
- Parking brake applied
- Control levers in the NEUTRAL position.
- Wheels blocked

⚠ CAUTION

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

⚠ CAUTION

Contact your authorized Cat lift truck dealer for the proper disposal of wastes accumulated after replacement of tires, batteries, oils and fluids.

◆Maintenance Schedule

As the operator, you are responsible for the performance of the 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 a proper working condition.

For questions regarding maintenance required at designated service intervals and periodic replacement of rubber parts, contact your authorized Cat lift truck dealer.

Periodic inspection time intervals

- Every 10 service hours or daily (pre-start), whichever comes first
- Every 50 service hours or weekly, whichever comes first
- One month (30 days) or 200 service hours after delivery of a new truck, whichever comes first
- Every 500 service hours or 3 months, whichever comes first
- Every 1000 service hours or 6 months, whichever comes first
- Every 2000 service hours or 1 year, whichever comes first

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

Item	Service	Page
Faulty Operation Found the Day Before	Check	11-9
Oil, Fuel or Coolant Leaks	Check	11-9
Fuel Cap	Check	11-9
Tires and Rims	Check	11-10
Tire Pressure	Check	11-11
Wheel Nuts	Check	11-12
Lights and Lens	Check outside	11-12
Assist Grip	Check	11-12
Overhead Guard	Check	11-13
Mast and Forks	Check	11-13
Load Backrest Extension	Check	11-14
Lift Chains	Check / Adjust	11-15
Mast and Lift Bracket	Check	11-15
Lift Cylinder Mounting Bolts	Check	11-17
Tilt Cylinder Socket Bolts	Check	11-17
Battery	Check electrolyte level	11-18
Engine Coolant	Check coolant level	11-19
Engine Oil	Check oil level	11-20
Engine Cooling Fan	Check	11-21
Hydraulic Oil	Check oil level	11-22
Transmission Oil	Check	11-23
Electrical Wires	Check	11-24
Operator Seat	Check	11-24
Steering Column	Check/Adjust	11-24
Steering Wheel	Check movement	11-24

Item	Service	Page
Horn	Check	11-25
Service Brakes	Check fluid level	11-25
Parking Brake Lever	Check	11-25
Brake Pedal	Check	11-26
Inching Pedal (Powershift Model)	Check	11-26
Clutch Pedal	Check	11-26
Accelerator Pedal	Check	11-26
Seat Belt	Check	11-27
Fuel	Check	11-27
Head Light and Working Light	Check	11-27
Turn Signal Light	Check	11-27
Stop Lights	Check	11-28
Backup Lights	Check	11-28
Lamp of Meter Panel	Check	11-28
Meter Panel	Check	11-28
Engine (Exhaust, Noise, and Vibration)	Check	11-29
Mast Strip Sliding Surfaces	Check	11-29
Clutch	Check	11-29
Brake Pedal	Check	11-30
Steering Wheel	Check	11-30
Parking Brake Warning Buzzer	Check	11-31
Mast Interlock System	Check	11-32
Driving Interlock System	Check	11-33
After the Daily (Pre-Start) Inspection	Check	11-33

▶ Every 50 Service Hours or Weekly, Whichever Comes First

Item	Service	Page
Brake Hoses, Pipes and Joints	Check	-
Fan & Alternator Drive Belt	Check	11-34
Fuel Hoses, Pipes and Joints	Check	-
Hydraulic Hoses, Pipes, and Joints	Check	11-35
Air Cleaner Element	Check	11-35

▶ One Month (30 days) or 200 Service Hours after Delivery of a New Truck, Whichever Comes First

Item		Service	Page
Radiator Fin		Check/Clean	-
Radiator Filler Cap		Check	11-36
Radiator Rubber Hose		Check	11-37
Alternator		Check	11-37
Battery		Check specific gravity of electrolyte	11-37
Electrical Wires		Check	11-38
Starter		Check	11-38
Cylinder Head Bolt & Manifold Nut		Check	11-38
Engine Idle Speed		Check	11-38
Intake & Exhaust Valve		Check clearance	11-38
Engine Oil		Replace oil / filter	11-39
Bolts and Nuts (Frame & Chassis)		Check	11-39
Tar in Vaporizer		Check/Drain	11-39
Injection Nozzle (for G and G/L dual engine w/o electric control)		Check	-
Fuel Filter (Diesel Model)		Replace	11-39
Fuel Filter (Gasoline Model)	Standard	Replace	11-39
	*Electronic Control Engine	Not required	
Note: This fuel filter is a part of the fuel pump assembly.			
Hydraulic Tank Return Oil Filter		Replace	11-39
Distributor Point, Cap and Rotor (for G and G/L dual engine w/o electric control)		Check	-
Ignition Timing (for G and G/L dual engine w/o electric control)		Check	-
Spark Plug		Check gap	11-39
Lift Chains		Check	11-40
Mast Support		Lubricate	11-40
Tilt Socket Pins		Lubricate	11-40
King Pins		Lubricate	11-40
Tie Rod Pins		Lubricate	11-41
Differential		Check oil level	11-41
Clutch Pedal Shifter Shaft (Manual Model)		Lubricate	11-42
Transmission Change Levers (Manual Model)		Lubricate	11-42

▶ Every 500 Service Hours or 3 Months, Whichever Comes First

Item	Service	Page
Brake Drum Nuts and Bolts	Check	-
Brake Drum and Shoes	Check	-
Radiator Fin	Check/Clean	11-42
Battery	Check specific gravity of electrolyte	11-37
Electrical Wires	Check	-
Engine Idle Speed	Check	11-42
Intake and Exhaust Valve Clearance	Check	-
PCV Valve and Hose	Check	-
Engine Oil	Replace oil and filter	11-43

For Diesel

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

Sulfur Percentage	Oil Grade Spec.	Replacement Interval
0 to 0.2%	CF or higher	500 hrs. or 3 months*
0.2 to 0.5%	CF or higher	300 hrs. or 3 months*
Over 0.5%	CF or higher	200 hrs. or 3 months*

* Whichever comes first

Whenever the engine oil is changed, the manufacturer recommends the filter be changed at the same time with a genuine Cat lift truck oil filter.

Bolts, Nuts (Frame & Chassis)	Check	11-44
Tar in Vaporizer*1	Check/Drain	11-39
Injection Nozzle (for G and G/L dual engine w/o electrical control)	Check	-
Gasoline Fuel Filter (for G and G/L dual engine w/o electrical control)	Clean	-
LPG Fuel Filter (for G and G/L dual engine w/o electrical control)	Clean	-
Distributor Point, Cap and Rotor (for G and G/L dual engine w/o electric control)	Check	-
Ignition Timing (for G and G/L dual engine w/o electric control)	Check	-
Spark Plug*2	Check gap	11-39
Lift Chains*3	Lubricate	11-40
Mast Support*3	Lubricate	11-40
Tilt Socket Pins*3	Lubricate	11-40
Mounting Bush of Rear Axle*2	Lubricate	11-40
King Pins	Lubricate	11-40
Tie Rod Pins	Lubricate	11-41
Differential	Check oil level	11-41

Item	Service	Page
Clutch Pedal Shifter Shaft (Manual Model)	Lubricate	11-42
Transmission Change Levers (Manual Model)	Lubricate	11-42

*1 Check and drain in every 200 service hours or 1 month, whichever comes first, in EPA area.

*2 Check in every 200 service hours or 1 month, whichever comes first, in EPA area.

*3 In corrosive or abrasive environment, more frequent clean, lubricate, and replace.

▶ Every 1000 Service Hours or 6 Months, Whichever Comes First

Item	Service	Page
Brake, Clutch/Inching Pedal Rod	Lubricate	-
Alternator	Check	11-37
Starter	Check	11-38
Fuel Filter (Diesel Model)	Replace	11-46
Fuel Filter (Gasoline Model)	Replace	11-46
Hydraulic System	Replace return oil filter / Wash strainer	11-47
Air Cleaner Element	Replace	11-48
Last Chance Filter	Clean	-
Transmission	Replace oil / Wash strainer	11-48
Differential	Replace oil	11-49

▶ Every 2000 Service Hours or 1 year, Whichever Comes First

Item	Service	Page
Brake Master Cylinder Hose and Rubber Parts	Replace	-
Service Brake Fluid	Replace	11-50
Brake Wheel Cylinder Rubber Parts	Replace	-
Radiator Filler Cap	Check	-
Rubber Hose	Check	-
Engine Coolant	Replace	11-50
Intake and Exhaust Valve	Check clearance	-
Injection Nozzle (Diesel Model)	Check	-
LPG Fuel Filter	Replace	11-52
Vaporizer Rubber Parts	Replace	-
Control Valve	Check	-
Hydraulic Pump	Check	-
Hydraulic Oil	Replace	11-53
Distributor Inside (for G and G/L dual engine w/o electric control)	Clean	-

Item	Service	Page
Front Axle	Check	-
Power Steering Cylinder	Check	-
Rear Axle	Check	-
Steering Gear Box	Check	-
Transmission Gear and Bearing	Check	-
Inching Pedal (Powershift Transmission)	Adjust	-
Clutch Master Cylinder Hoses and Rubber Parts	Replace	-
Clutch Release Cylinder Hoses and Rubber Parts	Replace	-
Knuckles	Check	-

◆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 procedure.

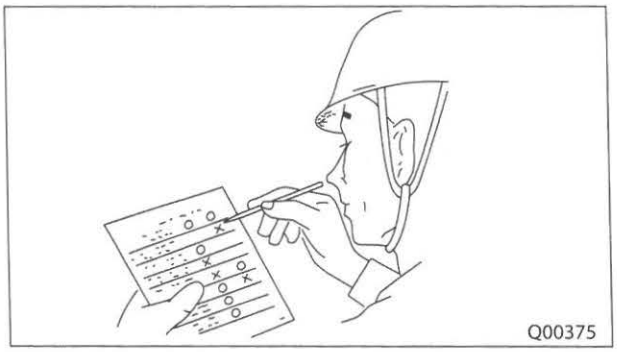
▶ Faulty Operation Found the Day Before

- Have repairs been made properly?
- Check the daily inspection sheet.

⚠ WARNING

Fill out a daily inspection sheet.

Remember, the complete performance of a daily inspection is the best protection against injury and property damage.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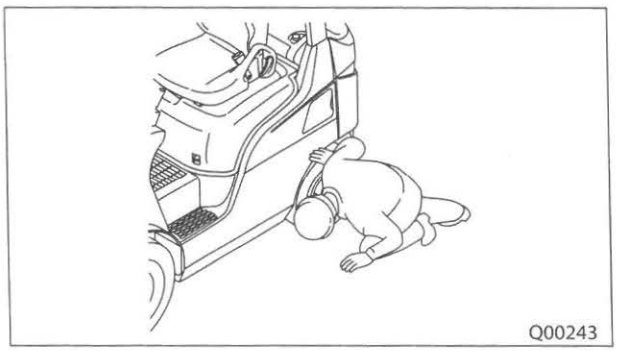
▶ Oil, Fuel or Coolant Leaks

- Check on the floor for oil, fuel or coolant leaks.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▶ Fuel Cap

Be sure to check the looseness of fuel cap.

▶ Tires and Rims

Check

⚠ WARNING

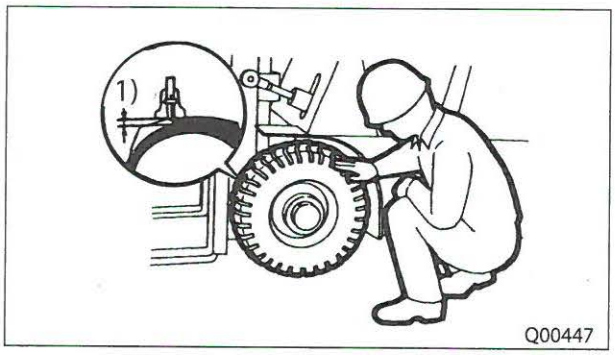
- Make sure the replacement tire is of the same size, type, and load range. See manufacturer name plate located on the front of the lift truck for correct tire size.
- When replacing tires, replace them in sets, even if only one of the tires is damaged. If new and used tires are used on the same axle, tilting of the mast and rapid tire wear will result.
- Use only tires recommended by the manufacturer.

⚠ CAUTION

The lift truck tires are highly inflated. Even slight damage to the tire or rim may cause a blowout of the tire.

How to check

- Are all the tires free of cuts, gouges, or foreign objects?
- Are all the rims free of distortion or cracks?
- Is the tread groove depth more than 5 mm (0.2 in.) when checked with a tire depth gauge?
  If not, replace the tire.



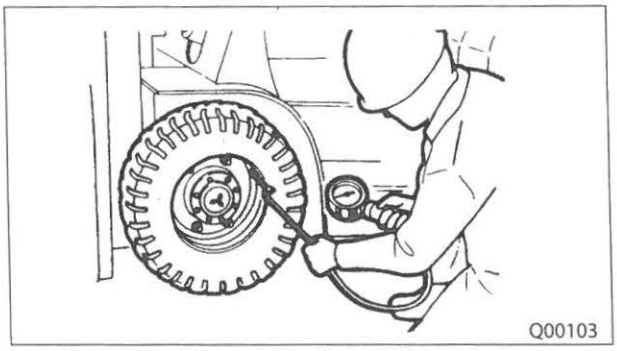
1) Limit: 5 mm (0.2 in.)

Note:

- For replacing tires, see 10-1 "Replacing Tires".
- Contact your authorized Cat lift truck dealer when requesting to replace tires.

▶ Tire Pressure

- Make sure the tire pressure is correct.



Model	Tire		Pressure
FGE35A FG35A	Front	Single	850 kPa
		Double	700 kPa
FD35A	Rear		900 kPa
Other Model (Single Tire, Double Tire)		Front	700 kPa
		Rear	700 kPa

⚠ CAUTION

- The inflation pressure has a great effect on the useful life of tires and the safety of lift truck.
- Uneven pressure of tires can cause a pull to one side or heavy steering wheel.

▶ Wheel Nuts

Check--tighten when required

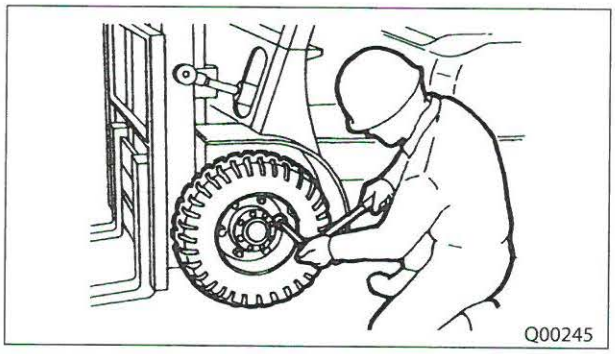
Wheel nuts should be visually inspected everyday. Any loose nuts should be tightened and any missing or damaged nuts should be replaced.

- Are the wheel nuts tightened properly?

Use a torque wrench.

How to retighten

(1) Always stand behind the tread of the tire, NOT in front of the rim.
(2) Tighten the nuts evenly and in a diagonal sequence to the specified torque.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Tightening torques for wheel nuts

Models	Side	Torque
1 to 2 ton compact	Front	157 N·m (16 kgf·m) [116 lbf·ft]
	Rear	
2 to 3 ton	Front	378 N·m (38.5 kgf·m) [279 lbf·ft]
	Rear: 2P	
	157 N·m (16 kgf·m) [116 lbf·ft]	
	Rear: 4P	
	233 N·m (23.8 kgf·m) [172 lbf·ft]	
3.5 ton	Front	378 N·m (38.5 kgf·m) [279 lbf·ft]
	Rear	233 N·m (23.8 kgf·m) [172 lbf·ft]

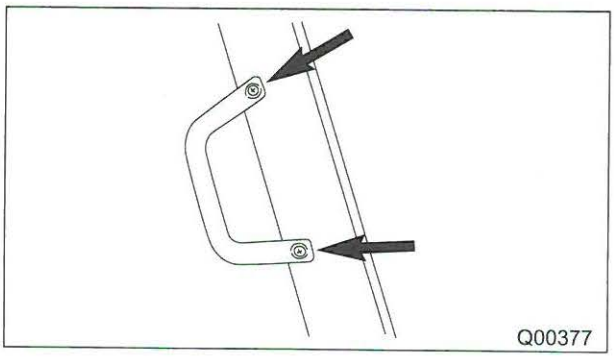
▶ Lights and Lens

Are their lenses clean and not defective?

▶ Assist Grip

- Inspect the assist grip for damage or cracks and also check that it is firmly secured.

Note: Contact your authorized Cat lift truck dealer if repairs are needed.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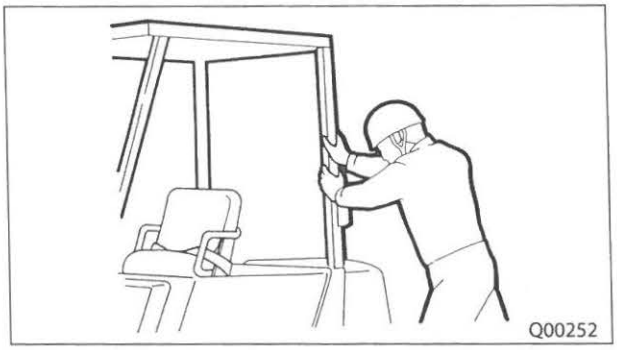
▶ Overhead Guard

- Check the front and rear overhead guard mounting bolts on each side.



Tightening Torque for the Bolt
49 to 69 N·m (5.0 to 7.0 kgf·m) [36 to 51 lbf·ft]

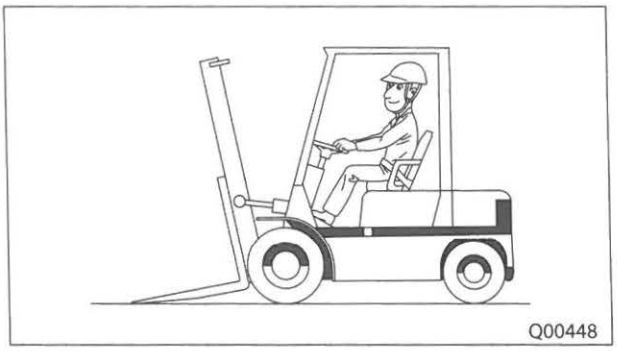
- Inspect overhead guard for bent or cracked sections.

Note: Contact your authorized Cat lift truck dealer if repairs are needed.

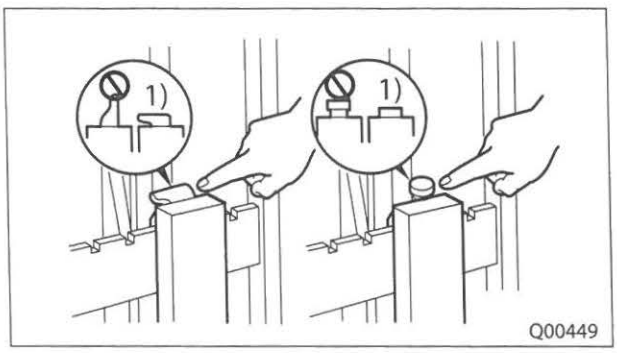
▶ Mast and Forks

Check

- Does the mast move completely up and down smoothly when you operate the lift lever?
- Does the mast tilt forward and back smoothly when you operate the tilt lever?
- Are there any oil leaks from the cylinders and hydraulic lines?



- Is the fork locking pin properly engaged?
- Are the forks free of distortion and cracks?
- Are the welds of the hangers free of cracks?

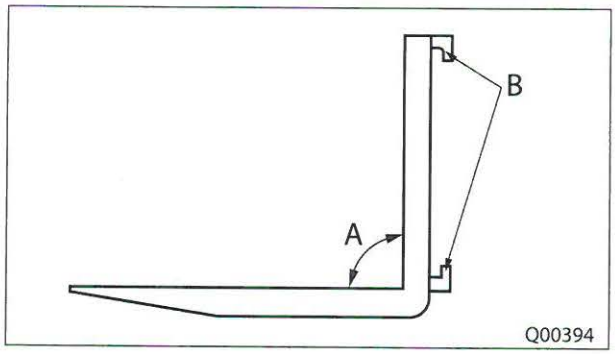


1) OK

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

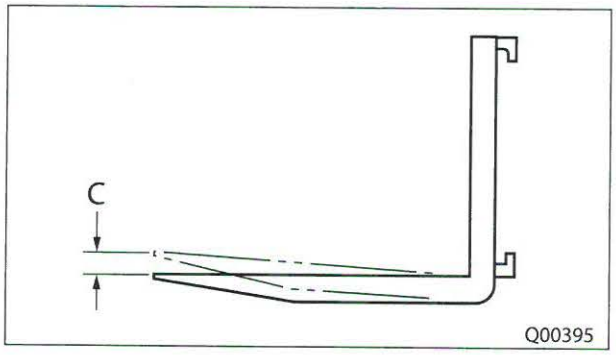
(1) Carefully inspect the forks for cracks. Special attention should be given to the heel section A, all weld areas and mounting brackets B.

Note: Do not use cracked forks. "Wet Test" magnetic particle inspection is generally recommended due to its sensitivity and the ease of interpreting the results. Portable equipment is usually recommended so it can be easily moved to the lift truck. Contact your authorized Cat lift truck dealer for further information.



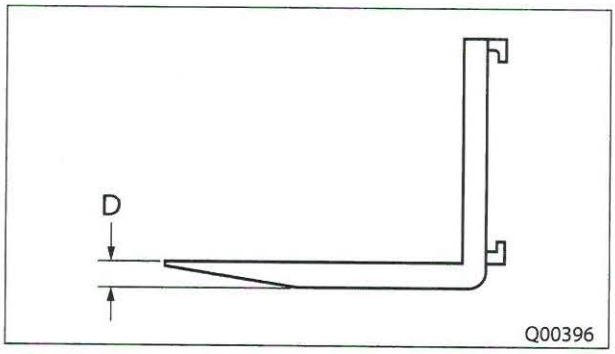
(2) Check the difference in height of one fork tip to the other when mounted on the lift bracket. Also check each fork for its deviation by setting a straight fork length pole against the fork to measure a difference in height between the fork tip and pole.

Note: A difference in fork tip height could 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.



(3) Check the fork blade D.

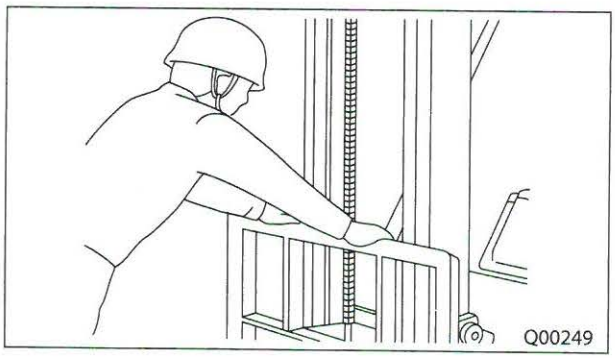
Note: Do not use the forks if the thickness is reduced to less than the tolerant thickness. Fork blade length may also be reduced by wear, especially on tapered forks and platens. Do not use the forks when the blade length is no longer adequate for the intended loads.



Tolerant Thickness	Standard	Limit
1 to 2 ton compact models	35 mm (1.4 in.)	32 mm (1.3 in.)
2 to 2.5 ton models	40 mm (1.6 in.)	36 mm (1.4 in.)
3 to 3.5 ton models	45 mm (1.7 in.)	40 mm (1.6 in.)

▶ Load Backrest Extension

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



▶ Lift Chains

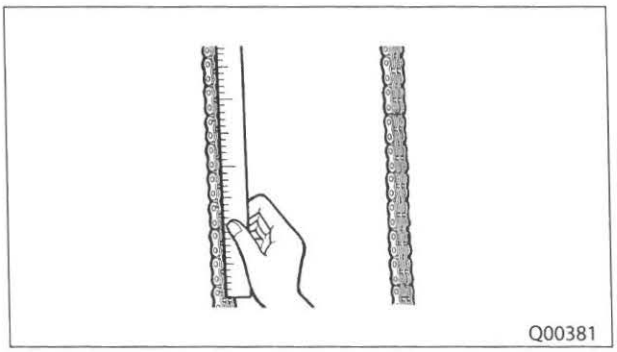
Check and adjust

⚠ WARNING

- Check the lift chains daily 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 could cause accidents.
- If something is wrong with the chains, contact your authorized Cat lift truck dealer for repair or replacement.
- DO NOT put your foot under the forks.
- Stop the engine before working on lift chains.
- DO NOT lean over from the lift truck to perform inspections. It could cause accidents.

How to check

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



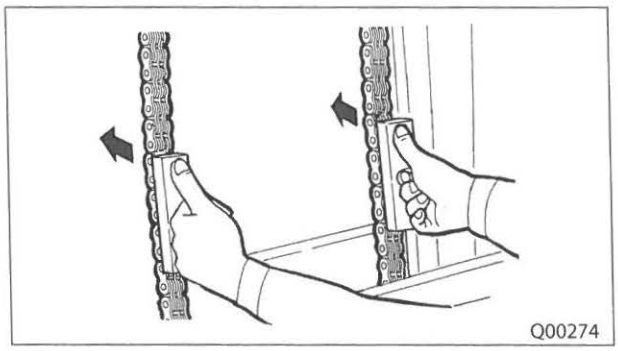
Lift chain elongation limit (20 links)

Models	Limit
1 to 1.8 ton	327 mm (12.9 in.)
2 to 2.5 ton	392 mm (15.4 in.)
3 to 3.5 ton	523 mm (20.6 in.)

(2) Lift the forks high enough to put their full weight on the top carriage bar and chains.

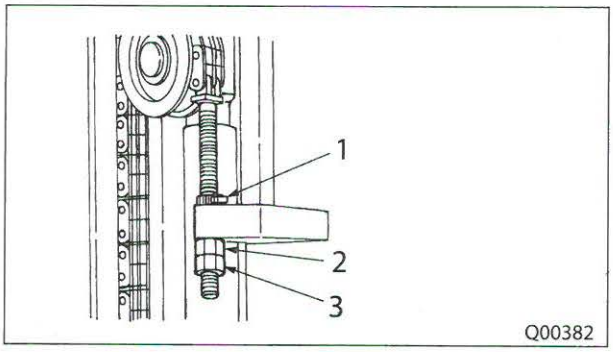
(3) Make sure the lift chains have equal tension.

(4) If the chains are loose or the tension is not equal, adjust the chain tension.



How to adjust

(1) Loosen the locknut and clamp.
(2) Turn the nut to adjust tension.
(3) Hold the nut and tighten the clamp.
(4) Hold the nut and tighten the locknut to specified torque.



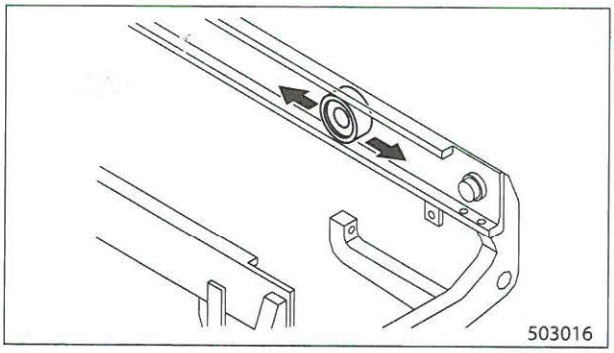
1. Clamp
2. Nut
3. Locknut

Models	Tightening Torque
1 to 2.5 ton	98 N·m (10.0 kgf·m) [72 lbf·ft]
3 to 3.5 ton	147 N·m (15.0 kgf·m) [108 lbf·ft]

▶ Mast and Lift Bracket

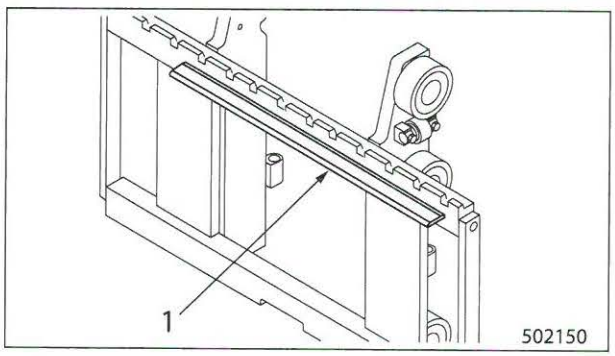
Mast

(1) Check the sticking, wear, and cracks of roller.
(2) Check the wear, damage, or distortion on rolling surface.
(3) Check the mast member and the welded joints of cross-members, shafts, and supports for cracks.



Lift bracket

(1) Check the main rollers and side rollers for binding, wear, and cracks.
(2) Check the welded areas of lift bracket for cracks.
(3) Check the finger bar for bend or distortion.



1. Scale

Item	Standard
Distortion of finger bar	Lower 5 mm (0.20 in.)

Mast strip

Check damage, wear or distortion.

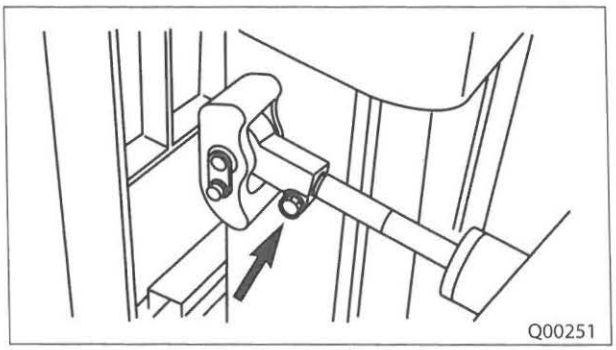
▶ Lift Cylinder Mounting Bolts

Check

- Check for looseness.

▶ Tilt Cylinder Socket Bolts

- Are the bolts tightened properly?
  Use a torque wrench to check for proper torque.



Tightening Torque for the Bolt
153 to 182 N·m (16 to 19 kgf·m) [113 to 134 lbf·ft]

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

▶ Battery

Check electrolyte level

Contact your authorized Cat lift truck dealer or the battery manufacture for operation and maintenance information for your specific battery.

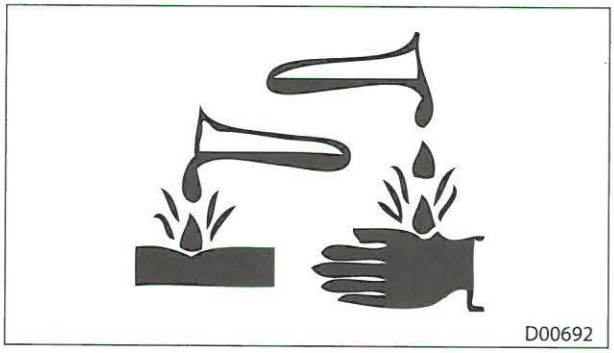
⚠ WARNING

Batteries give off flammable gas which could explode.
DO NOT smoke or place open flames near the battery.


D00680

⚠ WARNING

- If acid contacts your skin or clothes which could cause burns, FLUSH THEM IMMEDIATELY WITH LARGE AMOUNTS OF WATER.
- If acid gets in your eyes by accident, FLUSH THEM IMMEDIATELY WITH LARGE AMOUNTS OF WATER AND SEE A DOCTOR.
- If you drink acid by accident, DRINK LARGE AMOUNTS OF WATER AND SEE A DOCTOR AT ONCE.

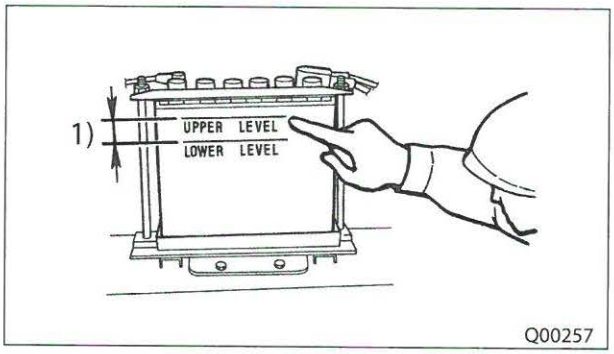

D00692

⚠ WARNING

- To disconnect battery terminals, negative terminal (-) must be removed first.
- To connect battery terminals, negative terminal (-) must be installed last in reverse sequence from the disconnection.

How to 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 distilled water, tighten the caps securely.



Q00257

1) Correct level range

▶ Engine Coolant

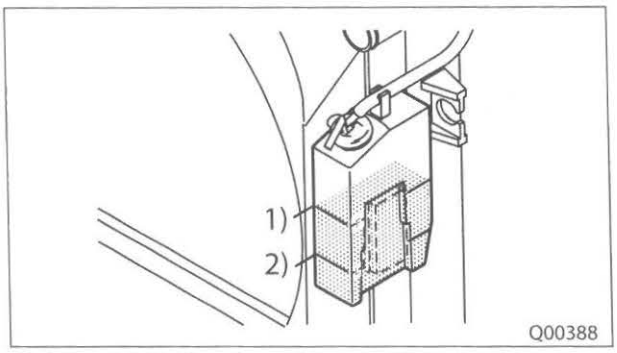
Check coolant level

Preparation

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Turn OFF the engine.
(6) Block the wheels.

How to check coolant level

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



1) FULL 2) LOW

Add 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 (ASC) with tap water (soft water).
- If coolant has to be added frequently, have your authorized Cat lift truck dealer check the cooling system.

⚠ CAUTION

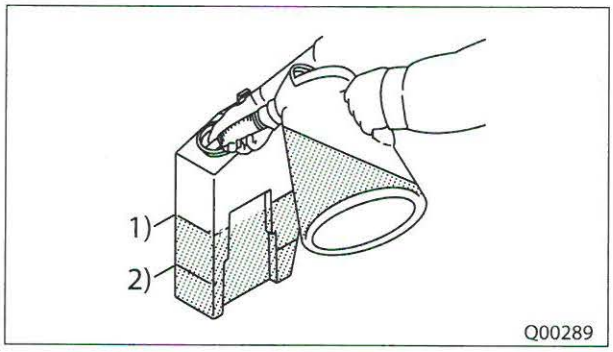
- Recommended concentration range of ASC is 30% to 60% by volume.
- ASC of less than 30% concentration does not provide sufficient corrosion protection.
- Concentrations over 60% adversely affect freeze protection and heat transfer rates.
- Avoid mixing different brands of coolant.
- Select an ASC suitable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

How to add coolant

(1) Remove the reserve tank cap and add coolant to the FULL mark.

(2) When adding coolant, maintain the same concentration of antifreeze solution.

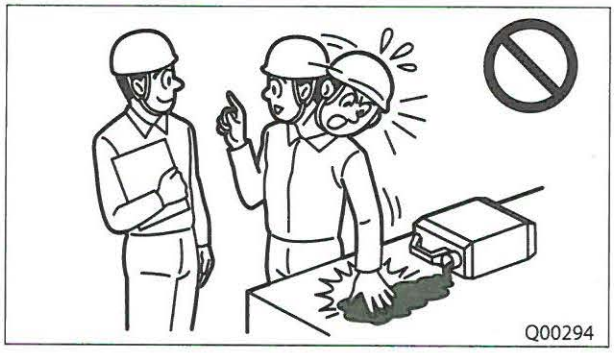
Note: The engine cooling system is protected to -30°C (-22°F) with 50% concentration of antifreeze/summer coolant (ASC) when shipped from the manufacturer.



1) FULL 2) LOW

⚠ WARNING

- Antifreeze solution is TOXIC. In case of contact with your skin, FLUSH IMMEDIATELY WITH WATER.



- Have your authorized Cat lift truck dealer discard antifreeze solution drained from the engine.

▶ Engine Oil

Check Oil Level

⚠ WARNING

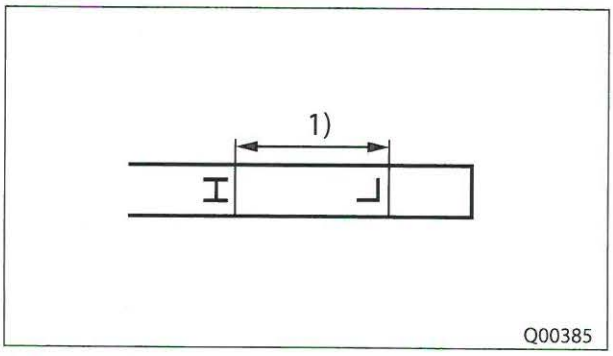
Hot oil and components could cause injury. DO NOT allow hot oil or components to contact your skin.

Preparation

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Turn OFF the engine.
(6) Block the wheels.
(7) Cool down the engine.

How to check oil level

(1) Raise the engine hood.
(2) Remove the dip stick and wipe it clean, then reinsert it.
(3) Maintain the correct level range on the dip stick.
(4) Close and secure the hood.



1) Correct level range

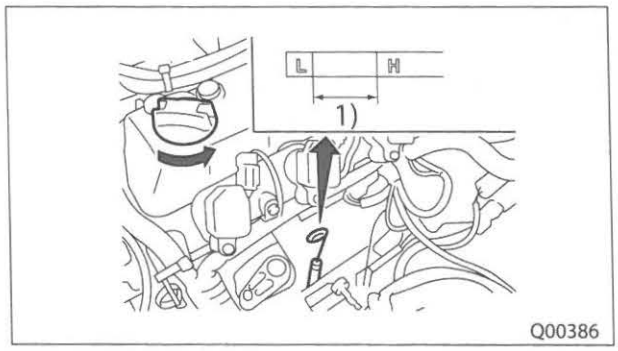
How to add engine oil

⚠ WARNING

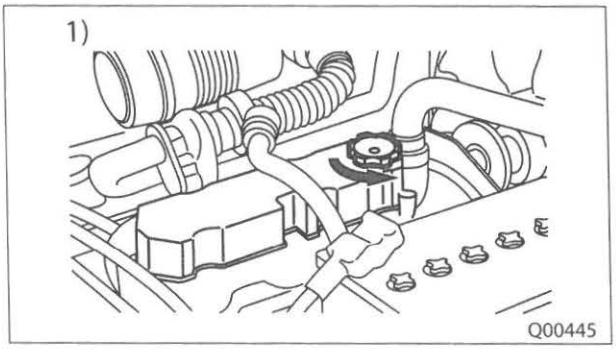
When adding engine oil:

- 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.

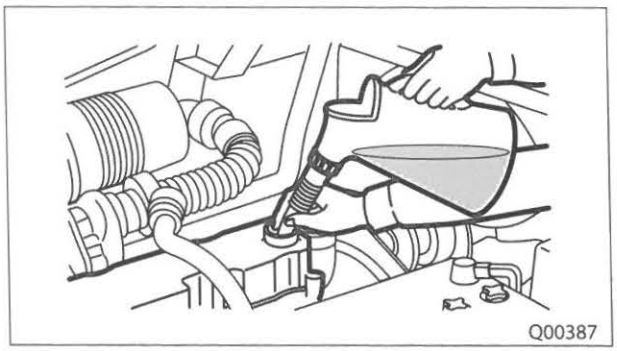


1) Correct level range



1) DIESEL

(2) Add engine oil as required.
For engine oil, see 12-4 "Recommended Fuels and Oils".
(3) After adding oil, make sure the level is in the correct range on the dip stick.
(4) Close and tighten the filler cap.



▶ Engine Cooling Fan

Check

- Check for damage and rotation.

▶ Hydraulic Oil

Check Oil Level

⚠ WARNING

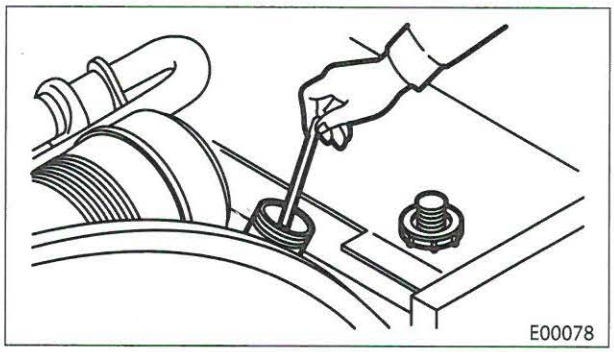
- Hot oil and components could cause personal injury. DO NOT allow hot oil or components to contact your skin.
- Remove the hydraulic tank filler cap only after the engine has been stopped and the cap is cool enough to remove with your bare hand.
- Remove the hydraulic tank filler cap slowly to relieve pressure.

Preparation

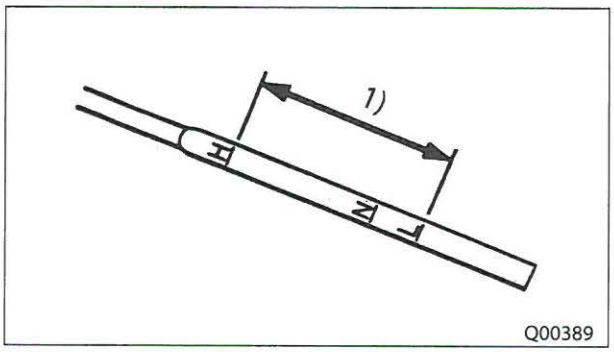
(1) Operate the lift truck for a few minutes to warm the oil.
(2) Park the lift truck on level ground.
(3) Lower the forks until the fork tips touch the ground.
(4) Tilt the mast back.
(5) Apply the parking brake.
(6) Place the direction lever in the NEUTRAL position.

How to check oil level

(1) Remove the hydraulic tank filler cap by turning it counterclockwise.
(2) Add oil needed to raise it to the correct level range on the dip stick.



(3) Put the hydraulic tank filler cap back on.
(4) Check for oil leaks.
(5) Close and secure the engine hood.



1) Correct level range

Add Hydraulic Oil

⚠ CAUTION

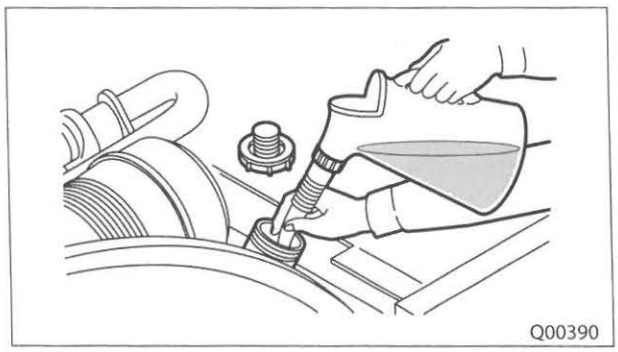
The followings are the safety precautions when adding hydraulic oil.

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

How to add hydraulic oil

(1) Remove the hydraulic tank filler cap.
(2) Add oil to the hydraulic tank.

For hydraulic oil, see 12-4 "Recommended Fuels and Oils".



▶ Transmission

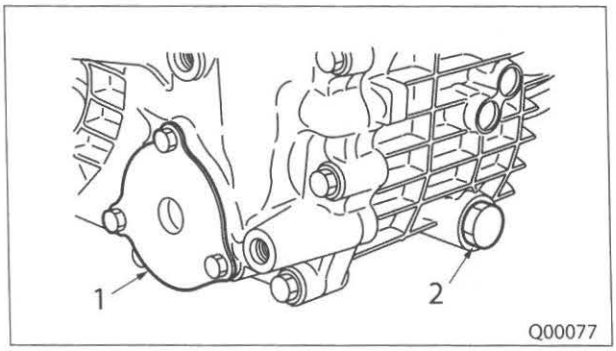
Check

⚠ WARNING

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

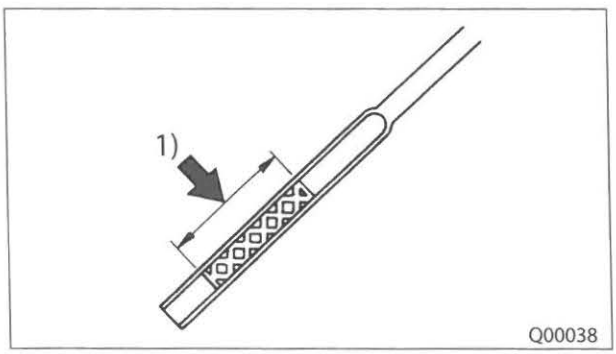
Note: Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.

(1) Remove the drain plug and allow the oil to drain. Remove the cover, 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.



1. Cover 2. Drain plug

(3) Remove the floor plate.
(4) Remove the dip stick. Fill the transmission with oil. See 12-11 "Refill Capacities". Install the dip stick.
(5) Start the engine.
(6) Run the engine at low idle.
(7) Stop the engine.
(8) Remove the dip stick. Check the oil level.
(9) Add oil, if needed, to reach the correct level range on the dip stick.
(10) Check for oil leaks at the strainer and drain plug.
(11) Install the floor plate.



1) Correct level range

▶ Electrical Wires

Check

Visually check all the electrical wires for any damage.

- Are there any loose connections at joints?
- Are there any loose clamps?

▶ Operator Seat

- Check that the operator seat is securely locked into place by adjusting the operator seat with the slide lever.
- Make sure that there is no looseness with the operator seat.

▶ Steering Column

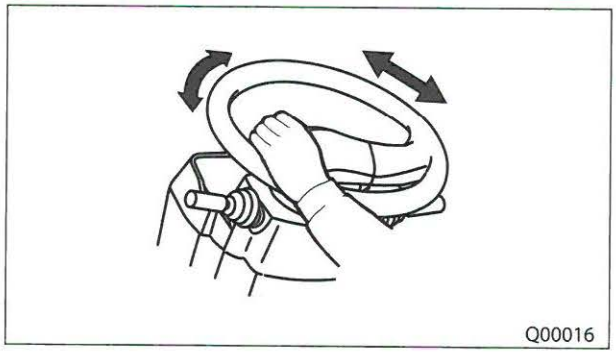
Check for defects of the steering column and steering column tilt lever.

▶ Steering Wheel

- Does the steering wheel have a free play of 15 to 30 mm (0.6 to 1.2 in.)?

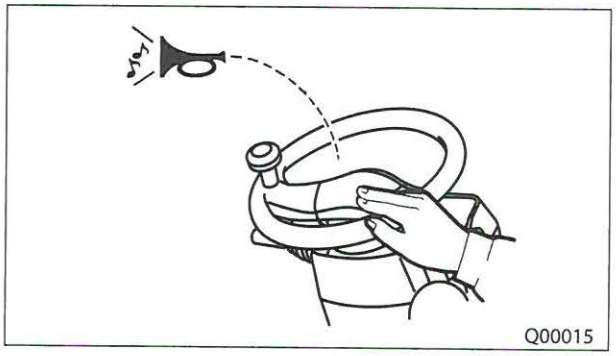
Check the play at the rim of the wheel by rotating the wheel in both directions.

- Is the steering wheel loose?
  Shake the steering wheel up and down.



▶ Horn

- Does the horn activate properly when you push the horn switch?



▶ Service Brakes

Check fluid level (Clutch Oil Level)

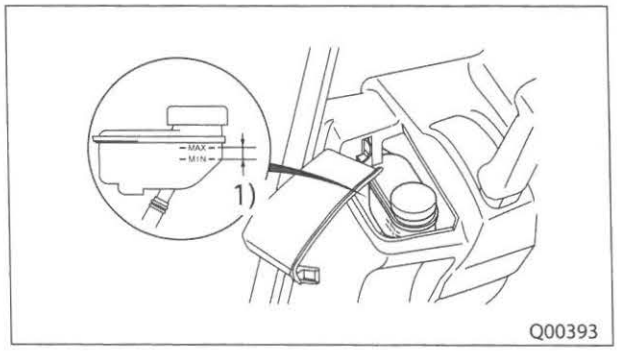
⚠ WARNING

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

⚠ CAUTION

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

(1) Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.
(2) Open the cover.
(3) Check the brake fluid level at the reserve tank.
(4) Maintain the brake fluid level between the MAX and MIN marks on the reserve tank.
(5) Close the cover.



1) Correct level range

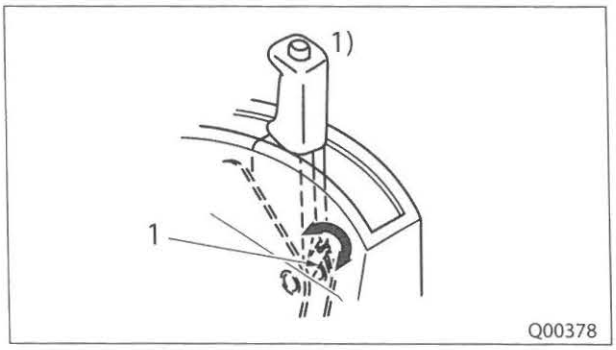
▶ Parking Brake Lever

Can you pull the parking brake lever all the way back with reasonable effort?

Can you hold your lift truck on a grade by pulling the parking brake lever?

How to adjust:

(6) Put the lever in the released position.
(7) Turn the rod clockwise to increase the lever's tension; counterclockwise to decrease it.



1. Rod 1) Release

Lever operating effort

Models	Limit
1 ton	150 to 200 N (15 to 20 kgf) [34 to 45 lbf]
2 ton	200 to 250 N (20 to 25 kgf) [45 to 56 lbf]
3 ton	230 to 250 N (23 to 25 kgf) [52 to 56 lbf]

▶ Brake Pedal

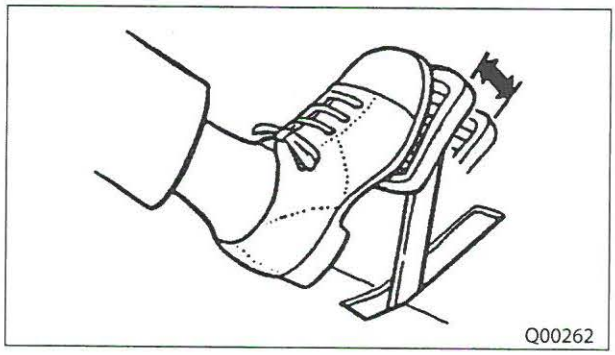
- Do you have sufficient pedal travel?
- Is the free play correct?
- Does the brake pedal return to the full, upward position?

Free play

Models	Powershift	Manual
1 to 3.5 ton	7 mm (0.3 in.)	7 mm (0.3 in.)

▶ Inching Pedal (Powershift Model)

- Is the free play correct?
- Does the inching pedal return to the full, upward position?



Correct free play.

Models	Value
1 to 3.5 ton	2.5 to 7.5 mm (0.1 to 0.3 in.)

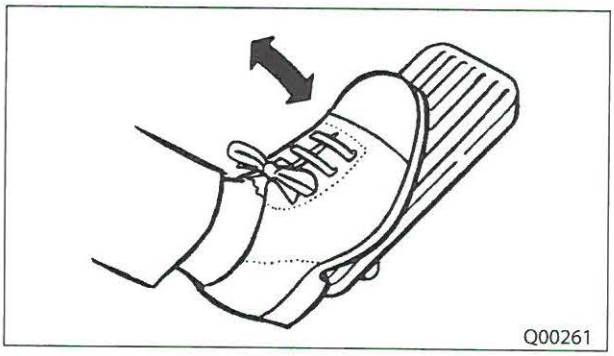
▶ Clutch Pedal

Check the play of clutch pedal.

Play	
Manual model	0.6 mm (0.02 in.)

▶ Accelerator Pedal

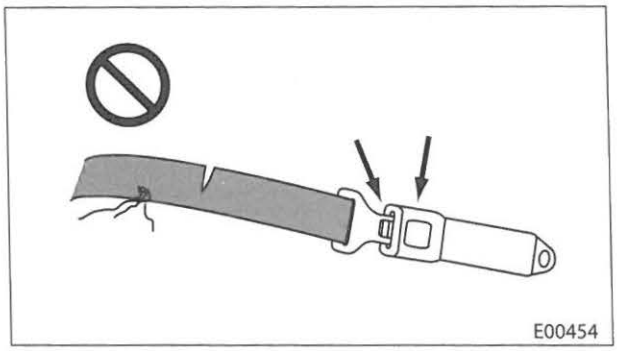
- Can you press the accelerator pedal smoothly without any sign of rubbing?
- Does the accelerator pedal return to the full, upward position?



▶ Seat Belt

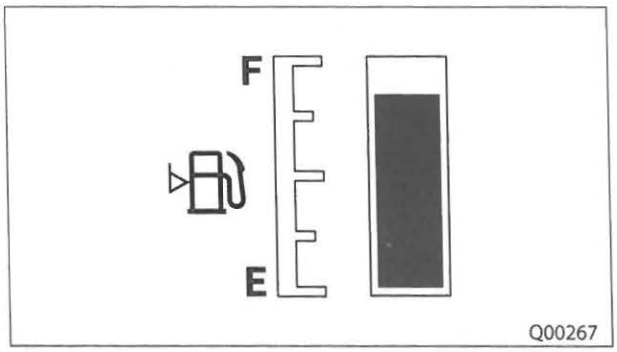
The following maintenance guidelines detail how to inspect seat belt for "cuts, fraying, extreme or unusual wear of the webbing, etc., and damage to the buckle, retractor, hardware, or other factors", which indicate that belt replacement is necessary.

- Cuts, fraying, or excessive wear on the webbing would indicate the need for replacement of the seat belt system.
- Check buckle and latch for proper operation and to determine if latch plate is worn, deformed, or buckle is damaged or casing broken.
- Check the retractor web storage device operation to make sure that it locks properly and that it spools out and retracts webbing properly.



▶ Fuel

- Is the amount of fuel in the tank enough for the day's work?
- Is the filler cap installed and secured?

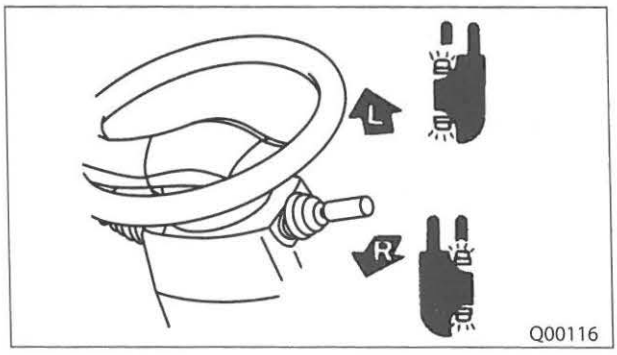


▶ Head Light and Working Light

- Are all the lights in a safe working condition?
- Are the lenses clean and not defective?
- Do the tail (if equipped) and head lights turn ON properly when you switch them ON?

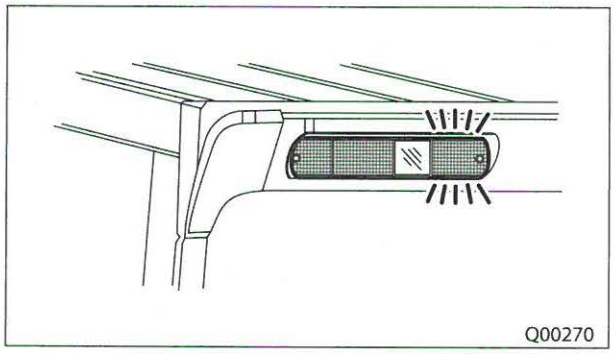
▶ Turn Signal Light

Check the blinking of the turn signal light.



▶ Stop Lights

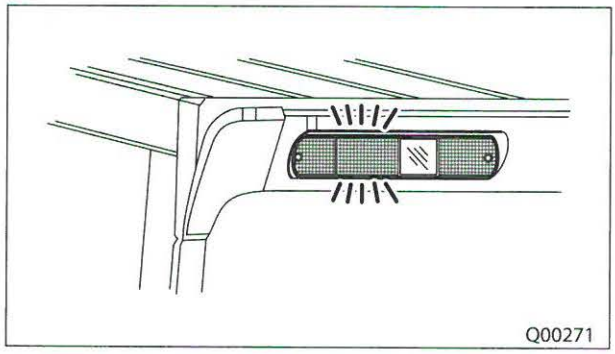
- Do all the stop lights turn ON properly when you press the brake pedal?
- Are their lenses clean and not defective?



▶ Backup Lights

Place the direction lever into REVERSE position, and check the following:

- Do the backup lights turn ON?
- Is the backup alarm activated?
- Are their lenses clean and not defective?

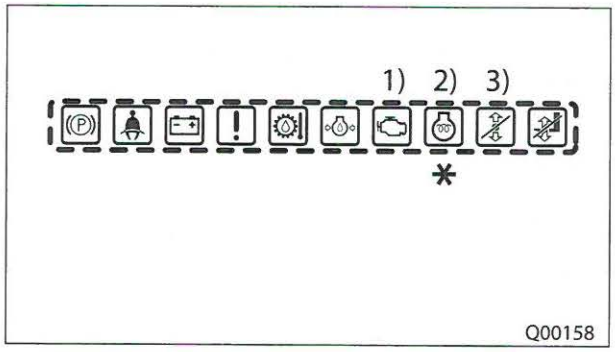


▶ Icons of Meter Panel

- Do all the warning icons and indicator icons glow when the key switch is in the ON position?

Note:

- When these icons do not glow with the key switch in the ON position, the LED (Light-Emitting Diode) may have a defect.
- Contact your authorized Cat lift truck dealer for repairs.



1. G: LPG Models
2. D: Diesel Models
3. OPT: Optional

▶ Meter Panel

Did the warning icon of meter panel turn OFF?

▶ Engine (Exhaust, Noise, and Vibration)

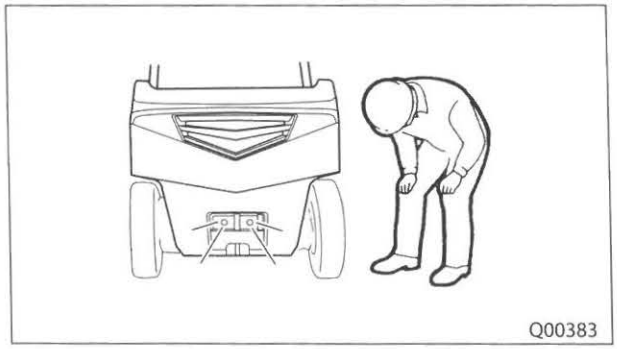
⚠ WARNING

Exhaust fumes could kill you!

If it is necessary to start the engine in an enclosed area, make sure there is adequate ventilation.

Fire hazards!

- 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.

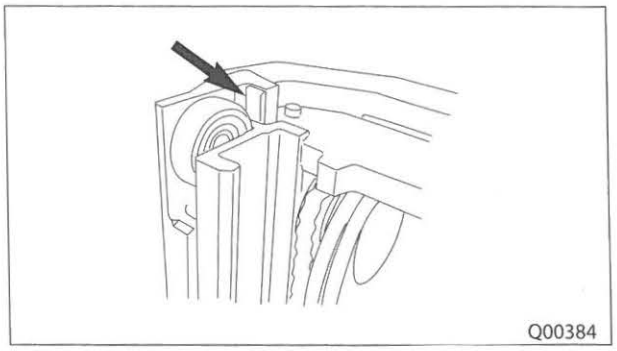

Q00383

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

▶ Mast Strip Sliding Surfaces

Inspect the mast strip sliding surfaces for wear and cracks.

- Do the mast and rollers move smoothly? If not, lubricate on each side of the inner mast.

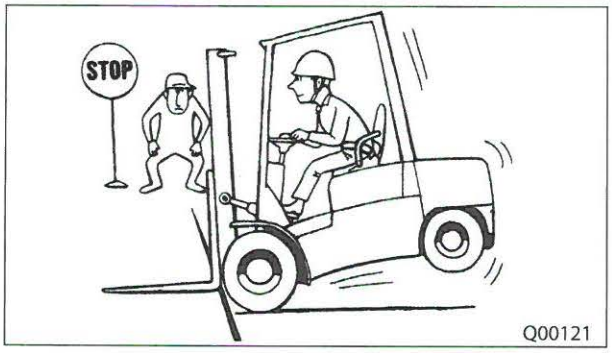

Q00384

▶ Clutch (Manual Model)

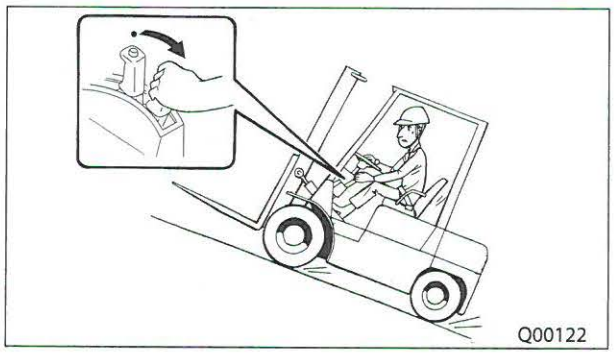
Does transmission clutch (Powershift model) move smoothly, or show slip? The clutch is sticking when the inching pedal (Powershift model) is pressed down but the lift truck speed does not decrease. The clutch is slipping when the accelerator pedal is pressed but the lift truck speed does not increase.

▶ Brake Pedal

- Do the brakes apply and stop the lift truck properly without pulling, dragging, chattering, or squealing?

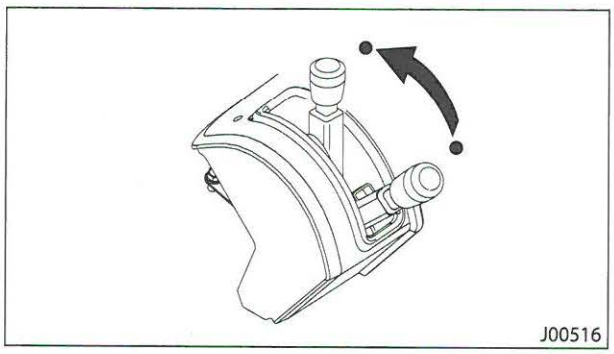


- Check if the lift truck stops when pulling the parking brake lever on a grade.



▶ Steering Wheel

Check the condition of steering wheel.



▶ Parking Brake Warning Buzzer

Check

⚠ CAUTION

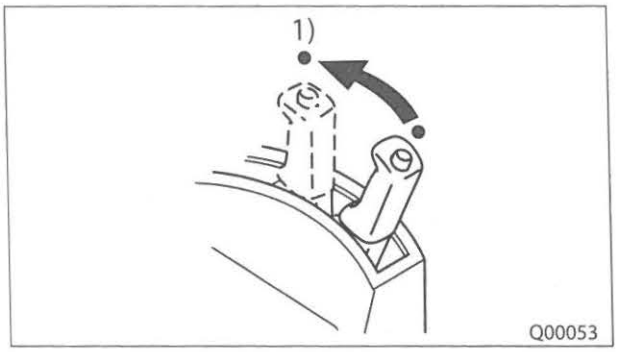
Check this system on level and hard ground. Make sure no one is around the lift truck.

Preparation

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Stop the engine.
(6) Block the wheels.
(7) Remove the key.

How to check

(1) Release the parking brake and half rise from the operator seat.
(2) After approximately 3 seconds, check that the warning buzzer will be activated with the warning light blinking.
(3) Apply the parking brake.



1) Release

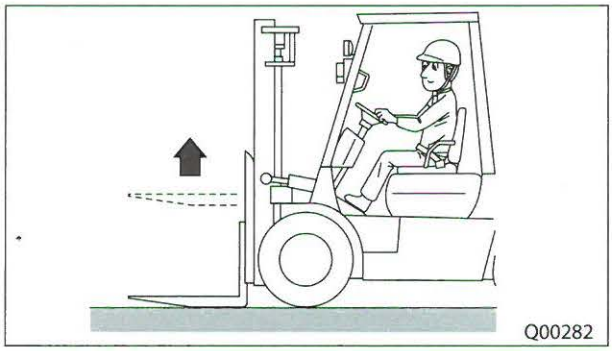
▶ Mast Interlock System

Check

⚠ CAUTION

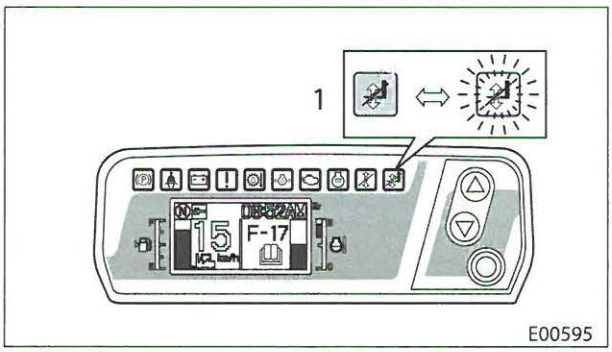
- Make sure that the area is clear of pedestrians and obstacles when checking the mast and driving interlock systems.
- Make sure that sufficient space is available for the lift truck to move around and that no one or obstacle is around the lift truck.

(1) Raise the forks high enough to see them from the operator seat.
(2) Apply the parking brake
(3) Place the direction lever to the NEUTRAL position.
(4) Run the engine idling (not pressing the accelerator pedal)
(5) Half rise from the operator seat



(6) Check the following after approximately 3 seconds:
- Check that the mast interlock indicator icon is blinking in approximately 3 seconds.
- Operate the lift lever and check that the forks do not move up and down.
- Operate the tilt lever and check that the mast does not tilt forward or backward.

Note: The mast interlock will work only for the lift and tilt levers. Attachments can be moved regardless of whether the mast interlock function is operating or not. Therefore, when the attachment lever is operated, some of the attachments will move, even though the engine is not running or the key switch is in the OFF position, as a result of the handling load or of its own weight.



1. Mast interlock indicator icon

▶ Driving Interlock System

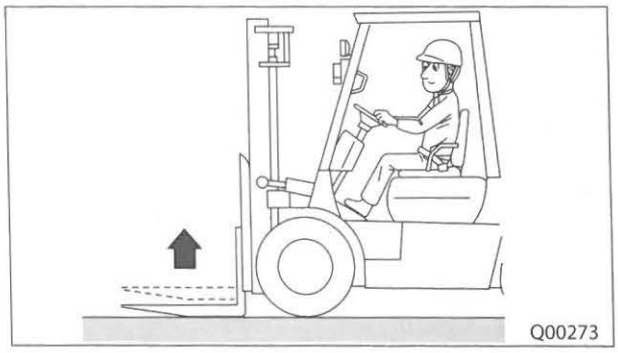
Check

⚠ CAUTION

- Make sure that the area is clear of pedestrians and obstacles when checking the mast and driving interlock systems.
- Check this system on level, hard ground.
- To ensure the lift truck does not begin rolling, DO NOT park the lift truck on a grade.
- Make sure that sufficient space is available for the lift truck to move around and that no persons or obstacles are around the lift truck.

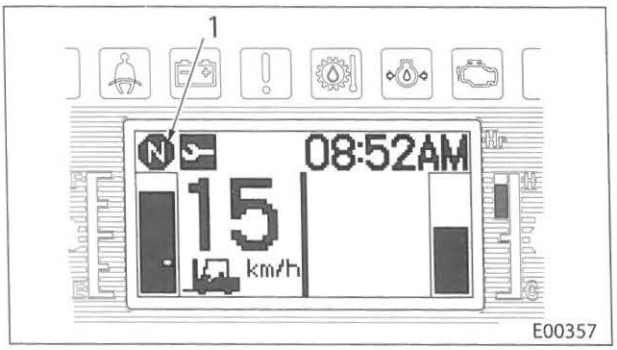
How to check

(1) Slightly raise the forks from the floor.
(2) Run the engine idling (not pressing on the accelerator pedal).
(3) Place the direction lever to the FORWARD or REVERSE position.
(4) Half rise from the operator seat.
(5) Check the following after approximately 3 seconds:



- Does the symbol "N" blink on the LCD screen of the meter panel?

Note: The transmission should electrically shift into NEUTRAL with the driving interlock indicator icon blinking.
If you are on a grade, the lift truck will continue to roll because the transmission is in NEUTRAL. Therefore an operator must always apply the parking brake before leaving the lift truck when stopped on level ground or a grade.



1. Travel direction

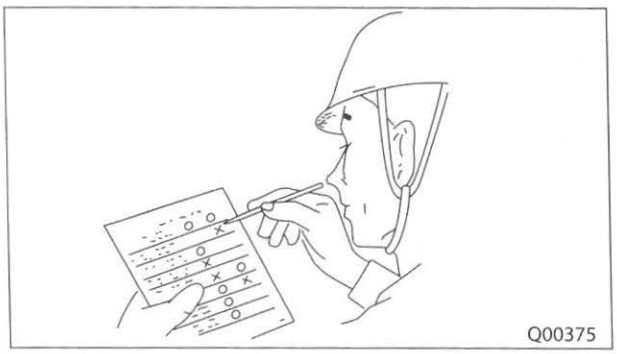
How to restore

(1) Sit properly in the operator seat and press the brake pedal to hold the lift truck.
(2) Return the direction lever to the NEUTRAL position, then place the lever to the FORWARD or REVERSE position.

▶ After the Daily (Pre-Start) Inspection

⚠ CAUTION

Record the result of pre-start inspection items and if you find any abnormality, correct or take necessary steps at once.
DO NOT operate the lift truck until abnormality is corrected. Failure to do so could result in accidents or shorten the life of lift truck.
Inspect the attachment by referring to the manuals.



◆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 operation or maintenance procedure.

▶ Fan & Alternator Drive Belt

Check and Adjust

⚠ CAUTION

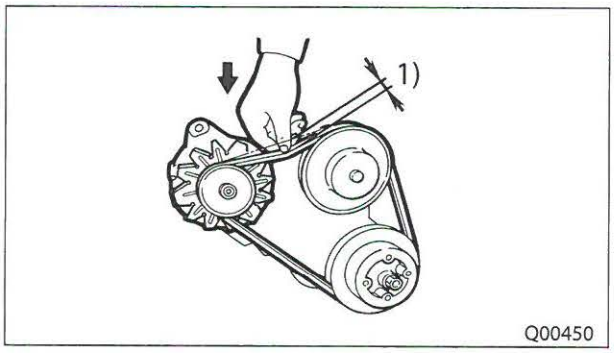
- If the belt is too tight unnecessary stress is placed on the alternator bearing and belt.
- Such stress will shorten the service life of both the alternator bearing and belt.
- Keep the belt free of oil and grease to prevent slipping.

Preparation

(1) Park the lift truck on level ground.
(2) Lower the forks until the fork tips touch the ground.
(3) Apply the parking brake.
(4) Place the direction lever in the NEUTRAL position.
(5) Turn OFF the engine.
(6) Block the wheels.

How to check

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



1) Deflection

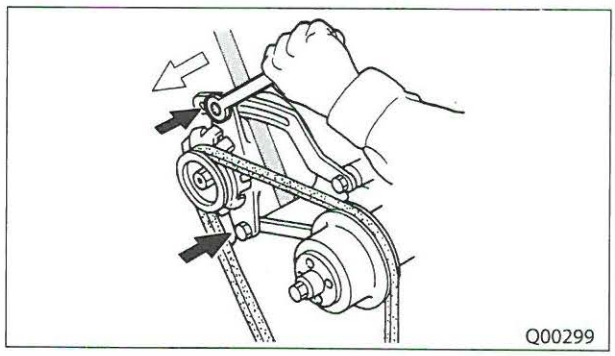
Item		Limit
Deflection	Gasoline	11 to 13 mm (0.4 to 0.5 in.)
	Diesel	10 to 12 mm (0.4 to 0.5 in.)

Adjust

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

How to adjust

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



▶ Hydraulic Hoses, Pipes, and Joints

Check

- Hoses, pipes, and joints should be checked for damage, cracks, and hydraulic oil leaks.

▶ Air Cleaner Element

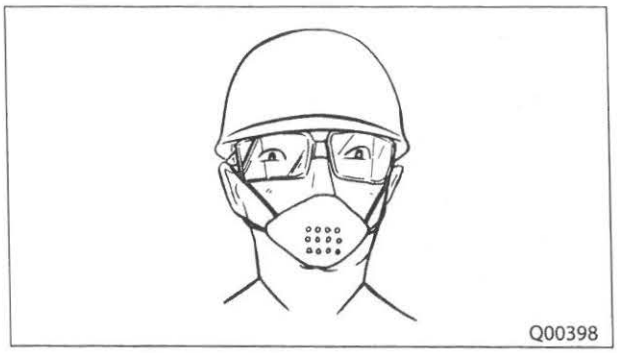
Note:

- Always inspect the element. If necessary, remove and clean the element. Clean the air cleaner element at least once a month.
- After the fifth cleaning, you must replace the air cleaner element even if it is within the scheduled maintenance period. Clean and replace more frequently in corrosive or abrasive environments.

Clean and inspect

When using compressed air for cleaning, wear an approved face shield and protective clothing.

Use a maximum air pressure of 196 kPa (2 kgf/cm^2) [30 psi] for cleaning purposes.

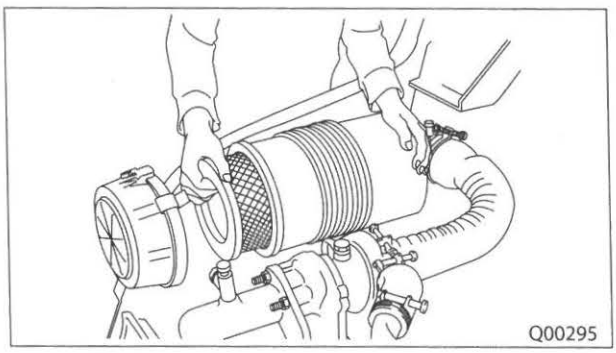

Q00398

⚠ WARNING

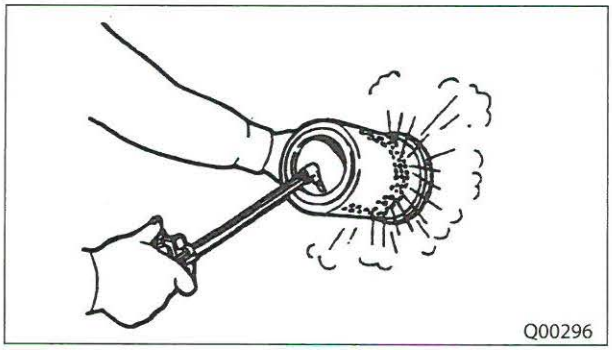
- DO NOT wash the air cleaner element.
- DO NOT use damaged air cleaner element.
- DO NOT operate the lift truck without the air cleaner element installed. If not followed, dust, water droplets, or foreign objects will get in the engine, which may result in engine damage.

Note: Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked.

(1) Raise the engine hood.
(2) Unclamp the dust cup (at 3 places) and take out the element.
(3) Clean the inside of the air cleaner housing.

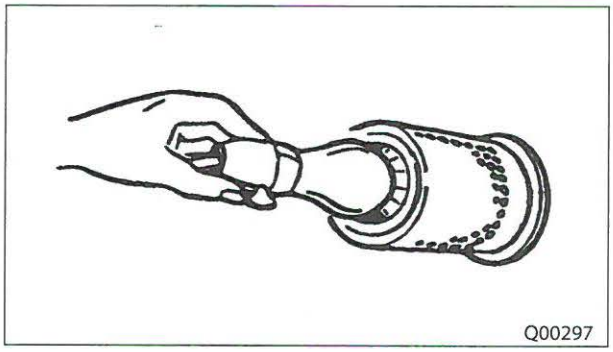

Q00295

(4) Direct air inside the element along the pleats, and lightly tap it.
(5) Insert a light inside a clean element and check.
(6) Replace the element if tears or rips are found.
(7) Install the air cleaner element.
(8) Close the engine hood.


Q00296

Note:

- Double-cyclone cleaner element (optional) requires cleaning of its outer element only.
- DO NOT service the air cleaner with the engine running.
- DO NOT clean the elements by pounding them against another object.
- Always inspect the element before and after cleaning.
- After the fifth cleaning, you must replace the air cleaner element even if it is within the scheduled maintenance period.
- Clean and replace more frequently in corrosive or abrasive environments.


Q00297

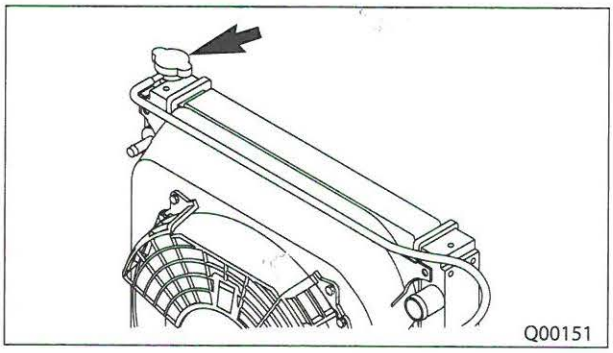
◆One Month (30 days) or 200 Service Hours after Delivery of a New Truck, Whichever Comes First

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

▶ Radiator Filler Cap

Check

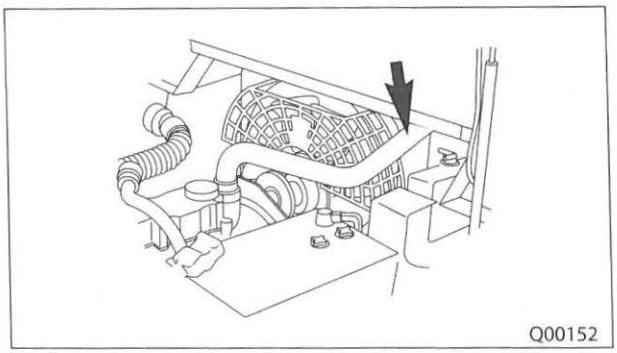
Visually check the radiator cap for any damage.


Q00151

▶ Radiator Rubber Hose

Check

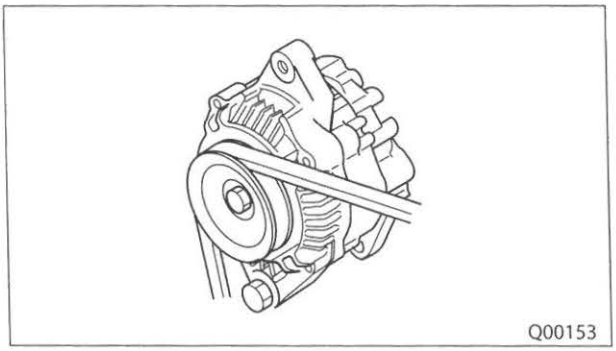
Visually check the radiator rubber hoses for any damage.



▶ Alternator

Check

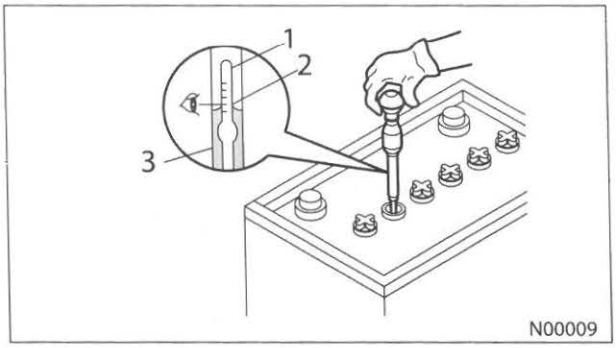
- Run the engine, and check the alternator for any unusual noise or vibration.



▶ Battery

Check specific gravity of electrolyte

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



1. Float
2. Electrolyte
3. Glass tube
1) Electrolyte level

Electrolyte Specific Gravity, Corrected to 20°C (68°F)	Battery Condition
1.260 to 1.280	Fully charged
1.220 to 1.260	Three-fourths charged (to be recharged)
Below 1.220	Completely discharged (to be recharged and retested)

⚠ WARNING

- If acid gets in your eyes, FLUSH THEM IMMEDIATELY WITH LARGE AMOUNTS OF WATER AND SEE A DOCTOR AT ONCE.
- Charge the battery in a well-ventilated area.
- Conduct battery charging when the temperature of the battery is 35°C or lower. (If the temperature goes up to 50 °C or above, stop charging and wait until the temperature lowers below 35°C, and then start charging again.)
- When using the battery charger, remove the cap of battery.

▶ Electrical Wires

Check

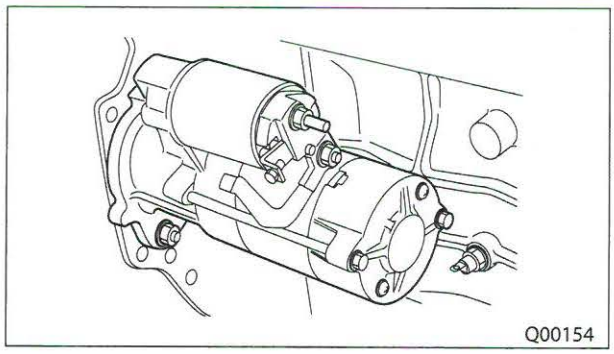
Visually check all the electrical wires for any damage.

- Are there any loose connections at joints?
- Are there any loose clamps?

▶ Starter

Check

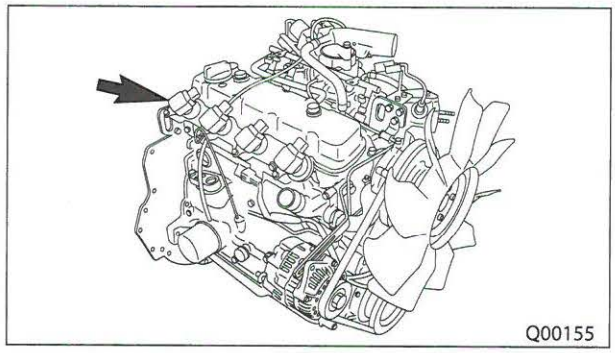
Does the starter crank the engine?



▶ Cylinder Head Bolt & Manifold Nut

Check

Check all the cylinder head bolts and manifold nuts for tightness with torque wrench.



▶ Engine Idle Speed

Check

Check that engine idle speed is at around 700 min^{-1} for gasoline engine and 770 min^{-1} for diesel engine.

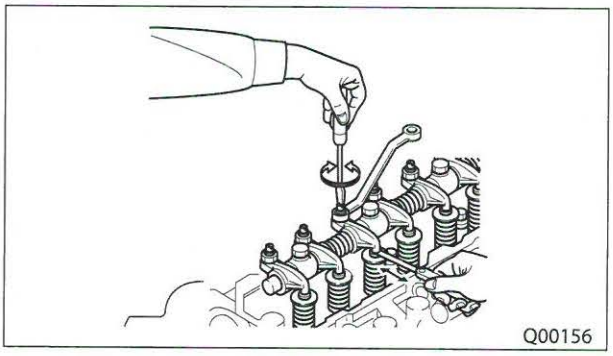
▶ Intake & Exhaust Valve

Check clearance

Check the intake & exhaust valve clearances with a feeler gauge.

(1) Adjust the clearance by turning the screw in either direction for the appropriate thickness (0.25 mm [0.0098 in.]).

(2) After adjusting the clearance, tighten the lock nut firmly, and inspect the clearance again.



▶ Engine Oil

Replace oil and filter

- Replace oil and filter.

See 11-43 "Engine Oil".

▶ Bolts and Nuts (Frame & Chassis)

Check

Bolts and nuts of frame and chassis should be retightened.

▶ Tar in Vaporizer (LPG Model)

Check / Drain

Check the tar in vaporizer for dirt.

▶ Fuel Filter (Diesel Model)

Replace

- Replace filter.

See 11-46 "Fuel Filter (Diesel Model)".

▶ Fuel Filter (Gasoline Model)

Replace

- Replace filter. (Standard engine)

See 11-46 "Fuel Filter (Gasoline Model)".

▶ Hydraulic Tank Return Oil Filter

Replace

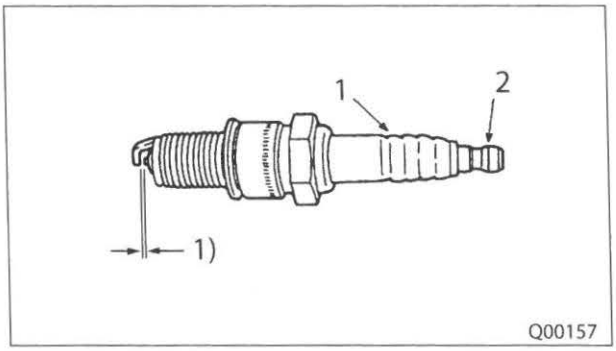
- Replace return filter.

See 11-47 "Hydraulic System".

▶ Spark Plug

Check gap

- Visually check electrode for dirt and damage and insulator for burning.
- Check if the electrode gap is within the standard (0.8 to 0.9 mm [0.0315 to 0.0354 in.]) with a feeler gauge.



1. Insulator
2. Terminal

1) Point gap

▶ Lift Chains

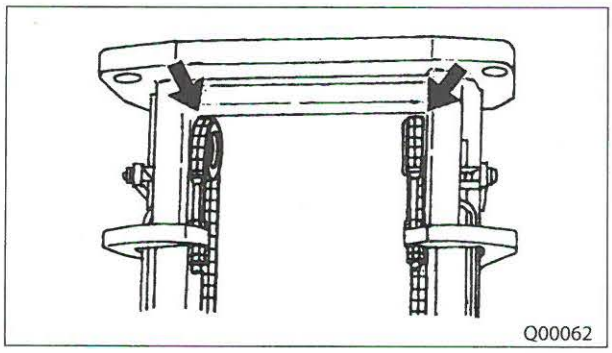
Lubricate

Inspect the chain anchors and individual links for wear, loose pins, or cracked leaves.

- Does the chains move smoothly? If not lubricate each chain on the left and right of the mast.

For lubrication of the lift chains, have it done by the authorized Cat lift truck dealer.

Note: Lubricate chains more frequently than normal where the atmosphere could cause corrosion of components or when the lift truck must work in rapid lift cycles.


Q00062

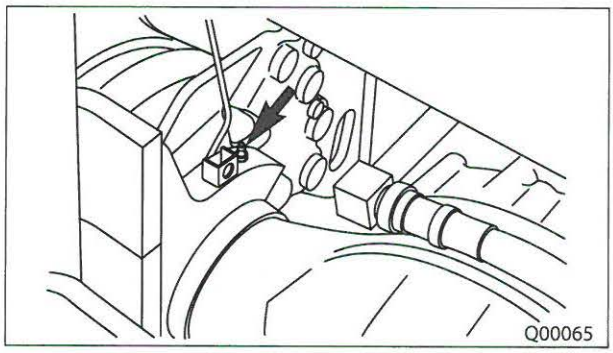
▶ Mounting Bush of Rear Axle

Lubricate the mounting bush of rear axle.

▶ Mast Support

Lubricate

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


Q00065

▶ Tilt Socket Pins

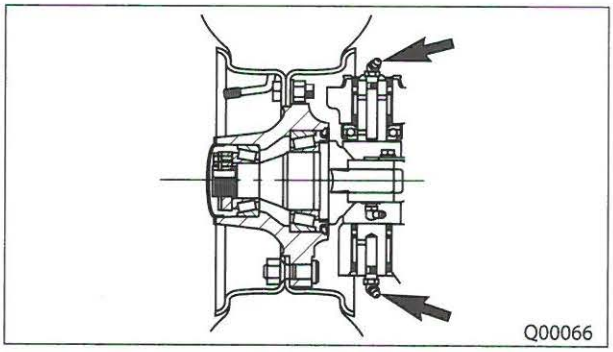
Lubricate

- Lubricate tilt socket pins.

▶ King Pins

Lubricate

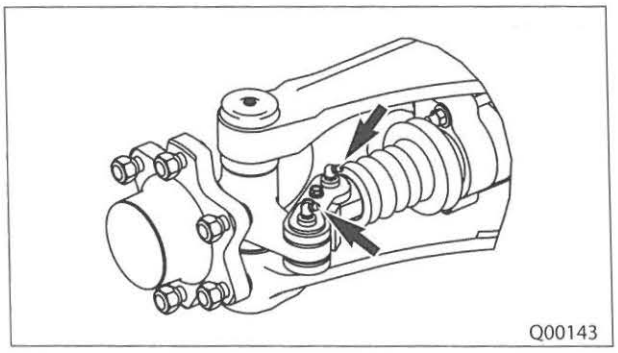
Lubricate 2 fittings on each side for a total of 4 fittings.


Q00066

▶ Tie Rod Pins

Lubricate

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



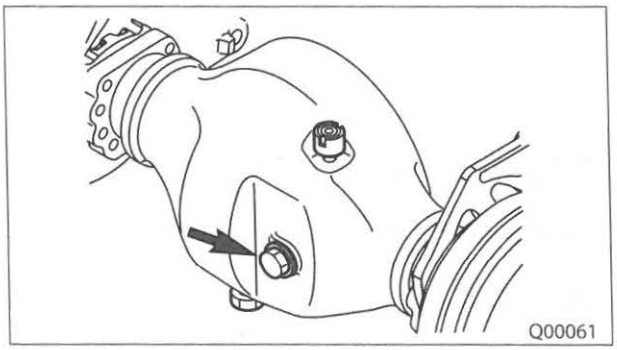
▶ Differential

Check oil level

Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked.

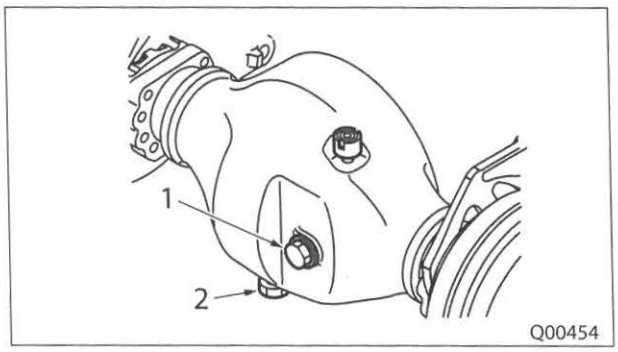
(1) Raise the lift bracket high enough to gain access to the level/fill plug.
(2) Use blocking under the inner mast to secure the lift bracket in this position.

(3) Remove the level/fill plug.
Maintain lubricant level to the bottom of the level/ fill hole.
(4) Clean and install the level/fill plug.
(5) Remove the blocking. Lower the lift bracket.



Adding Oil

(1) Raise the lift bracket high enough to gain access to the level/fill plug.
(2) Use blocking under inner mast to secure the lift bracket in this position.
(3) Remove the drain plug and the level/fill plug.
(4) Allow the oil to drain. Clean and install 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 the blocking. Lower the lift bracket.

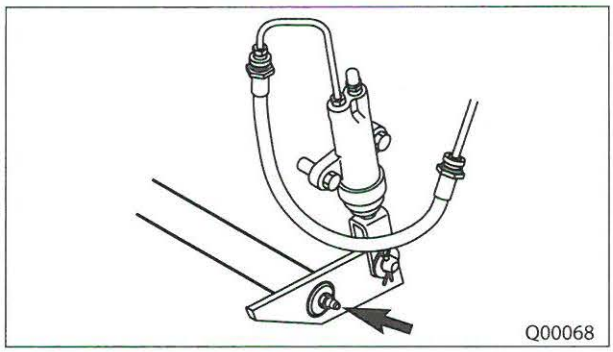


1. Level/fill plug 2. Drain plug

▶ Clutch Pedal Shifter Shaft (Manual Model)

Lubricate

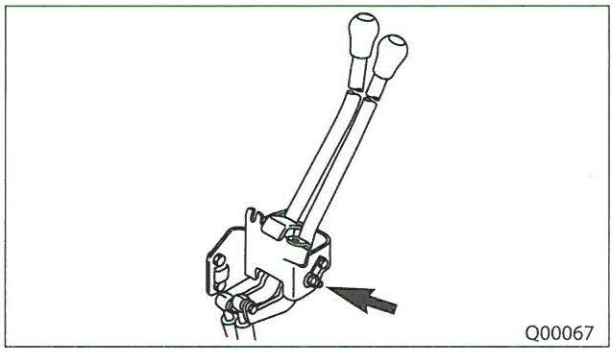
Lubricate 1 fitting.



▶ Transmission Change Levers (Manual Model)

Lubricate

Lubricate 1 fitting.

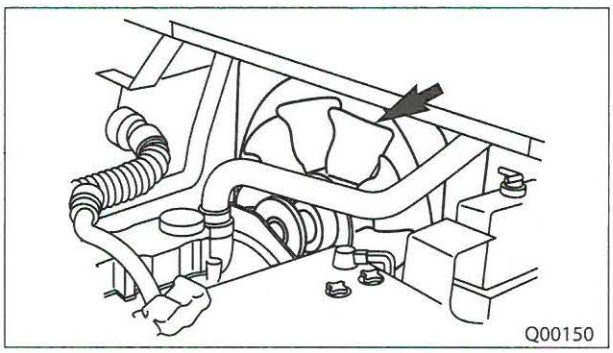


◆Every 500 Service Hours or 3 Months, Whichever Comes First

▶ Radiator Fin

Check / Clean

Visually check all the radiator fins for dirt or damage.



▶ Engine Idle Speed

Check

Check that engine idle speed is at around 700 min^{-1} for gasoline engine and 770 min^{-1} for diesel engine.

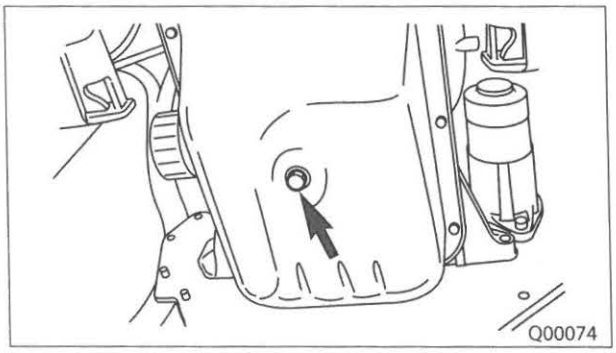
▶ Engine Oil

Replace oil and filter

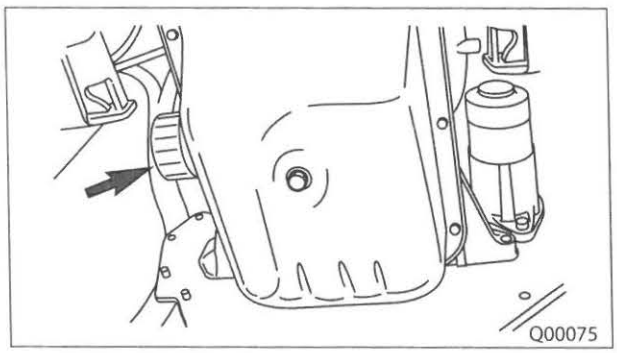
⚠ WARNING

Hot oil and components could cause injury. DO NOT allow hot oil or components to contact your skin.

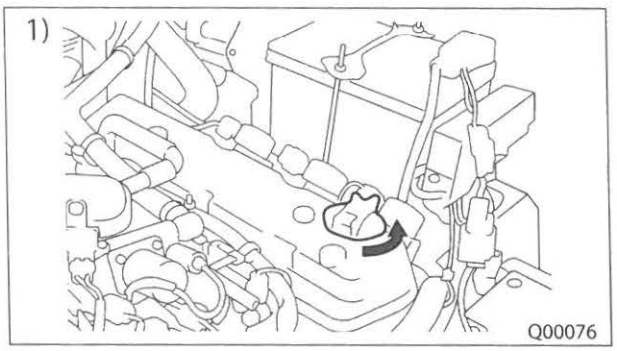
(1) Operate the lift truck a few minutes to warm the oil.
(2) Park the lift truck on level ground with forks lowered until fork tips touch the ground, parking brake applied, direction lever in NEUTRAL position and engine stopped. Block the wheels securely.
(3) Raise the engine hood.
(4) Remove the drain plug at the side of the engine oil pan. Allow the oil to drain. Clean and install the drain plug.



(5) Remove and discard the oil filter elements.
(6) Wipe the sealing surface of the oil filter element mounting base.
(7) Apply a small amount of clean engine oil to each filter element gasket. Install a new filter element.

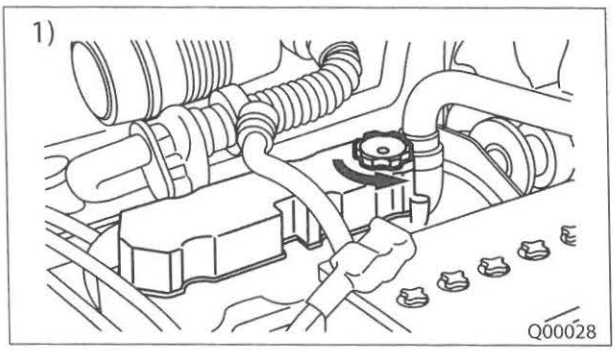


(8) Fill the crankcase.



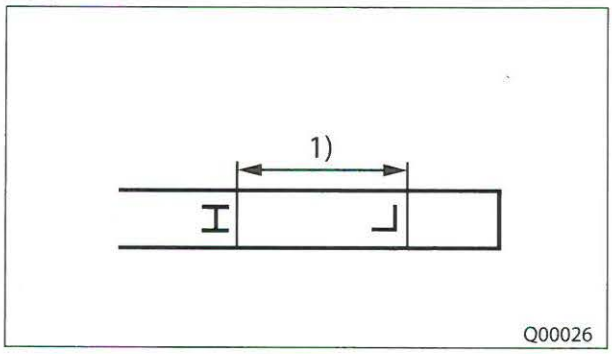
1) Gasoline model

(9) See 12-5 "Specifications (Standard Models)". 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 dip stick.



1) Diesel model

(12) Close and secure the engine hood.



1) Correct level range

▶ Bolts, Nuts (Frame & Chassis)

Check

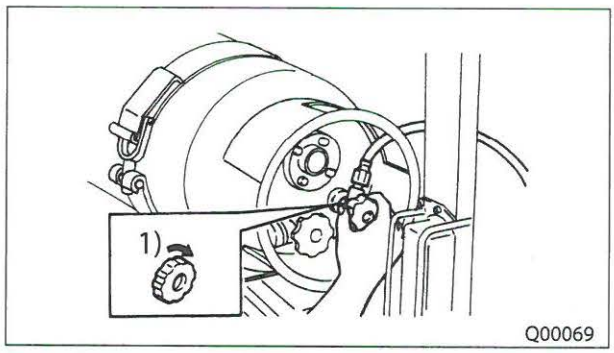
- Bolts and nuts of frame and chassis should be retightened.

▶ Fuel Filter (LPG Model)

Clean

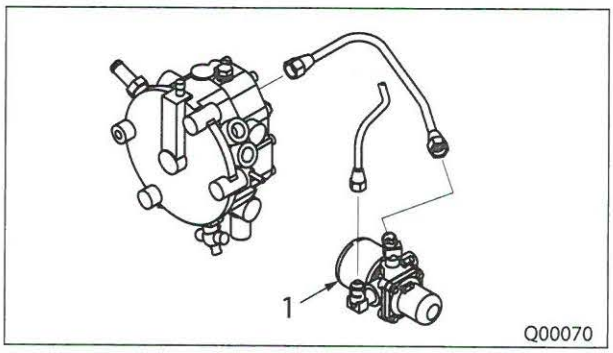
Note: Park the lift truck in an authorized refueling area with the forks lowered until the fork tips touch the floor or ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked. The engine must be cooled down.

(1) Close the fuel valve on the LPG tank. The fuel shutoff valve turns clockwise to close. Run the engine until fuel in the fuel line runs out and the engine stops. Turn the key switch to OFF.
(2) Raise the engine hood.



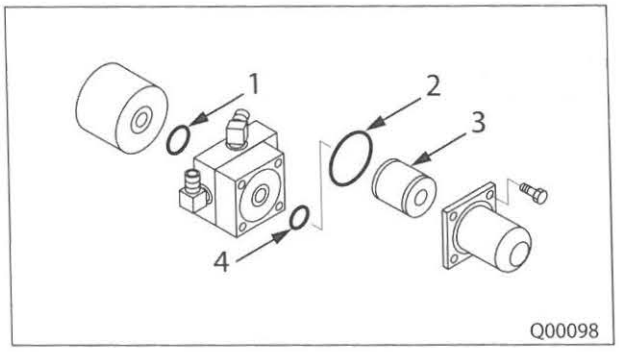
1) Close

(3) Disconnect the fuel line.
(4) Remove the fuel lock filter.



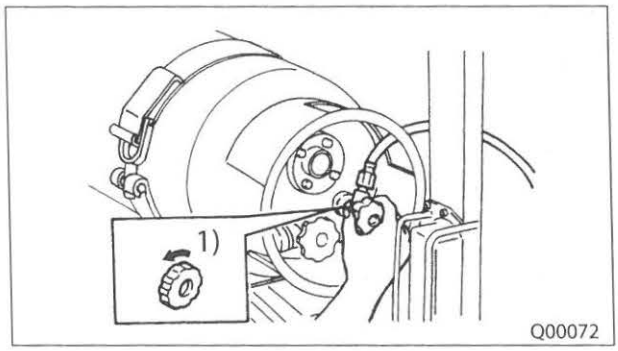
1. Fuel lock filter

(5) Disassemble the fuel lock filter as shown.
(6) Remove the filter and O-rings.
(7) Wash the filter in cleaner. And direct air inside the filter to clean.
(8) Assemble and install the fuel lock filter.
(9) Connect the fuel line.



1. O-ring
2. O-ring
3. Filter
4. O-ring

(10) Open the fuel valve.
(11) Check the filter for fuel leaks with a soap solution.



1) Open

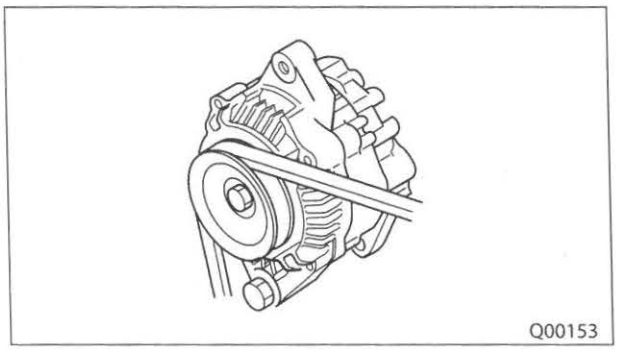
◆Every 1000 Service Hours or 6 Months, Whichever Comes First

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

▶ Alternator

Check

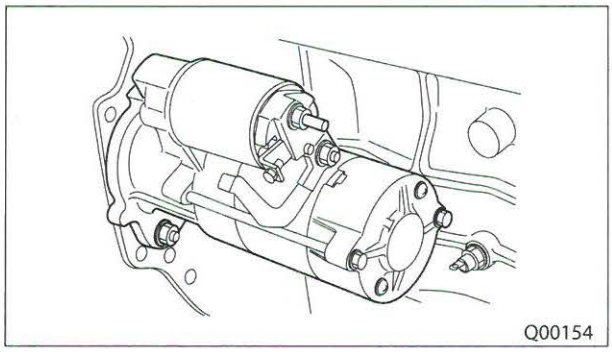
- Run the engine, and check the alternator for any unusual noise or vibration.



▶ Starter

Check

Does the starter crank the engine?



▶ Fuel Filter (Diesel Model)

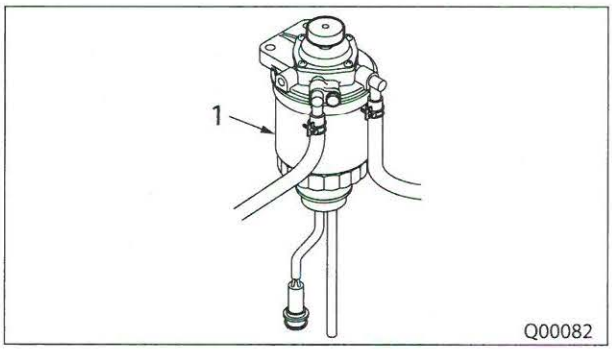
Replace

⚠ WARNING

- Fuel leaked or spilled onto hot surfaces or electrical components could cause a fire.
- Clean up any fuel spillage.
- Know the location of all emergency devices (such as fire extinguisher, first aid kit, etc.) and how to use them.
- Disconnect the battery when replacing fuel filters.

Note: Park the lift truck in an authorized refueling area with the forks lowered until the fork tips touch the floor or ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked. The engine must be cooled down.

(1) Raise the engine hood.
(2) Remove the filter.
(3) Use filter wrench to remove filter element.
(4) Clean sealing surface of filter base.
(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 engine hood.

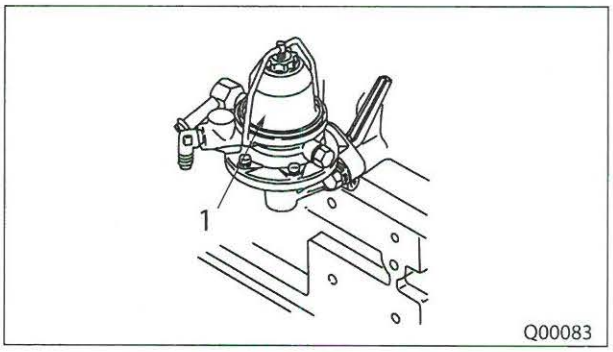


1. Filter element

▶ Fuel Filter (Gasoline Model)

Replace

- Filter of standard engine should be changed.



▶ Hydraulic System

Replace Return Oil Filter and Wash Strainer

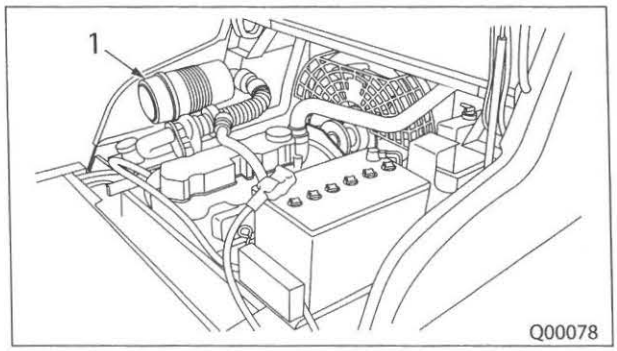
⚠ WARNING

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

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

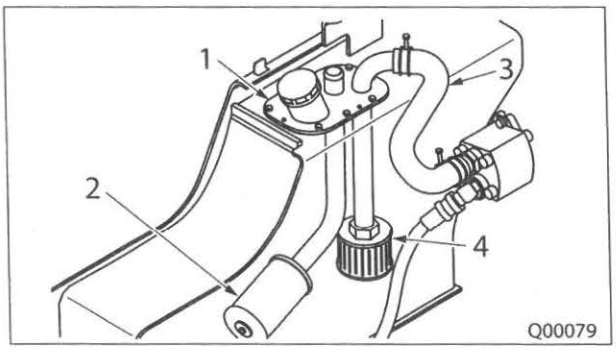
Note: Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked.

(1) Raise the engine hood.
(2) Remove the air cleaner.



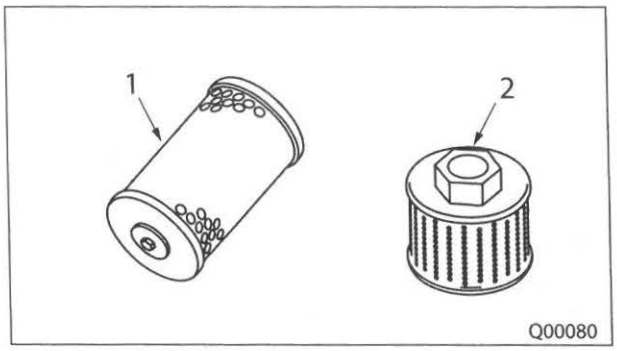
1. Air cleaner

(3) Remove the hose and tank cover.



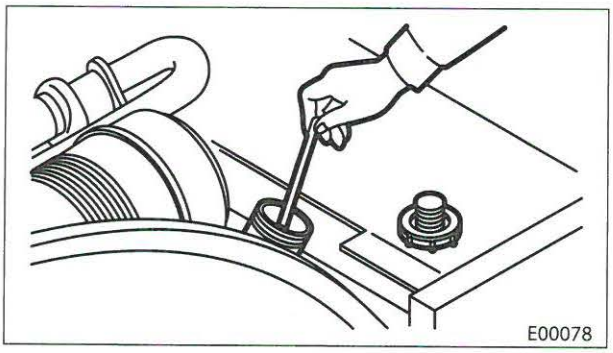
1. Tank cover
2. Return oil filter
3. Hose
4. Strainer

(4) Remove the gasket and strainer.
(5) Remove the gasket and return oil filter. Discard the filter element.
(6) Clean the filter parts and replace the seal and gasket, if necessary. Install a new filter element.
(7) Install the filter body assembly and tighten the retaining bolt.

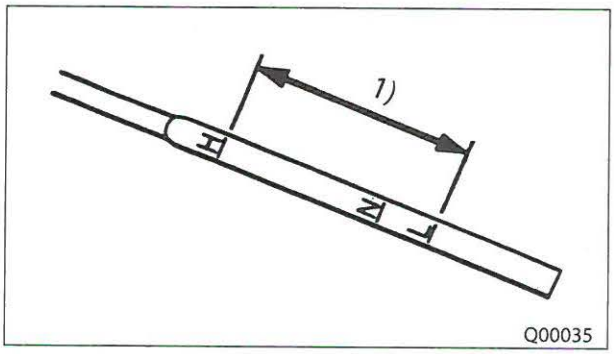


1. Return oil filter
2. Strainer

(8) Wash the strainer in clean, nonflammable solvent.
(9) Inspect the gasket and replace it if necessary.
(10) Install the strainer, gasket and cover.



(11) Remove the filler cap. Check the oil level.
(12) Add oil, if needed, to reach the correct level range on the dip stick.
(13) Install the dip stick.
(14) Check for oil leaks.
(15) Close and secure the engine hood.



1) Correct level range

▶ Air Cleaner Element

Replace

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.

Recommended replacement intervals

Conditions	Interval
Normal Conditions	Every 1000 service hours or 6 months, whichever comes first
Severe Dust or Lint Conditions	Clean and replace more frequently in corrosive or abrasive environments.

Note:

- Have spare elements available to use while cleaning used elements.
- In severe dust or lint conditions, check the radiator core frequently for clogging or dirt accumulation. Clean or wash the lift truck as needed. See "Air Cleaner Element, Clean and Inspect" under "Every 50 Hours or Weekly, Whichever comes first".

▶ Transmission

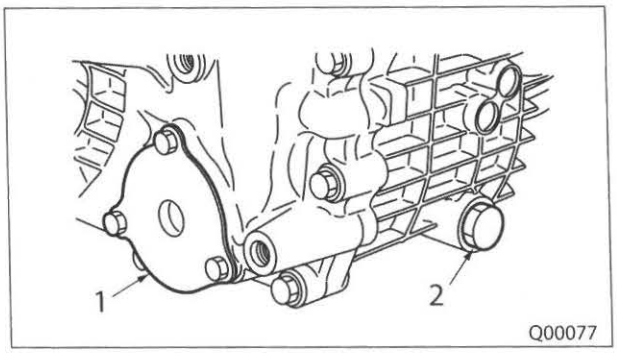
Replace oil and wash strainer

⚠ WARNING

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

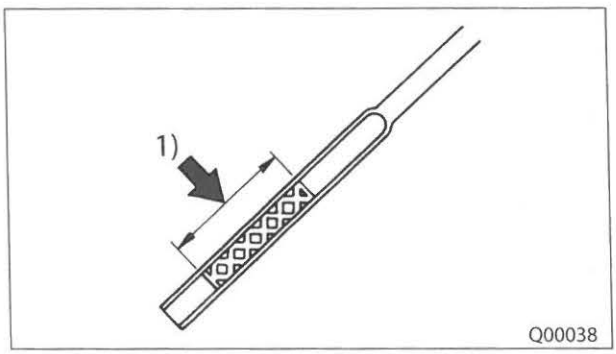
Note: Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.

(1) Remove the drain plug and allow the oil to drain. Remove the cover, 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.



1. Cover 2. Drain plug

(3) Remove the floor plate.
(4) Remove the dip stick. Fill the transmission with oil. See 12-5 "Specifications (Standard Models)". Install the dip stick.
(5) Start the engine.
(6) Run the engine at low idle.
(7) Stop the engine.
(8) Remove the dip stick. Check the oil level.
(9) Add oil, if needed, to reach the correct level range on the dip stick.
(10) Check for oil leaks at the strainer and drain plug.
(11) Install the floor plate.



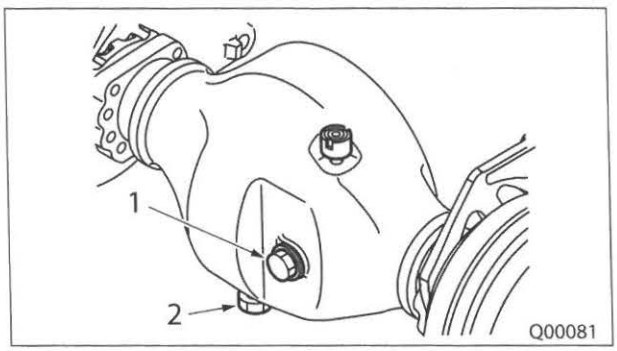
1) Correct level range

▶ Differential

Replace oil

Note: Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, lubricant warm, 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 inner mast to secure the lift bracket in this position.
(3) Remove the drain plug and the level/fill plug.
(4) Allow the oil to drain. Clean and install 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 the blocking. Lower the lift bracket.



1. Level/fill plug 2. Drain plug

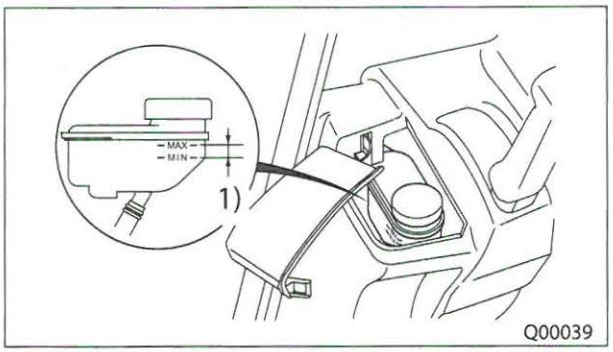
◆Every 2000 Service Hours or 1 Year, Whichever Comes First

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

▶ Service Brake Fluid

Replace

Note: When replacing fluid, contact with your authorized Cat lift truck dealer.



1) Correct level range

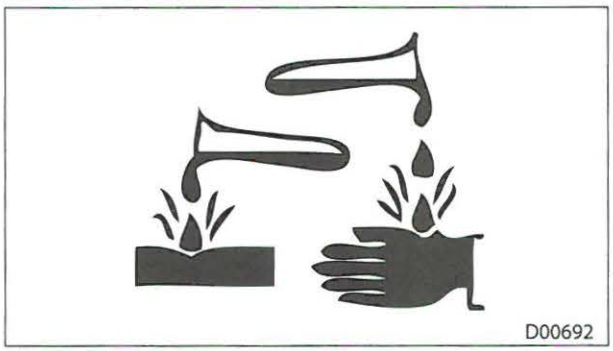
▶ Engine Coolant

Replace

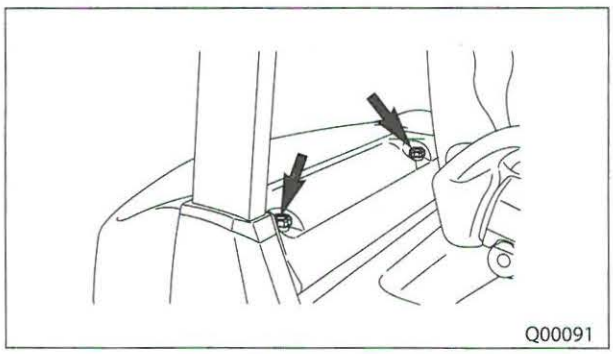
See 11-19 "Engine Coolant".

⚠ WARNING

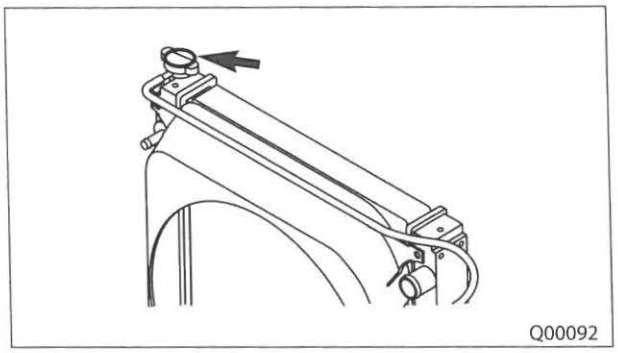
- At operating temperature, the engine coolant is hot and could be under pressure.
- Steam could cause severe burns.
- Park the lift truck in an authorized refueling area with the forks lowered until the fork tips touch the floor or ground, parking brake applied, direction lever in the NEUTRAL position, 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.



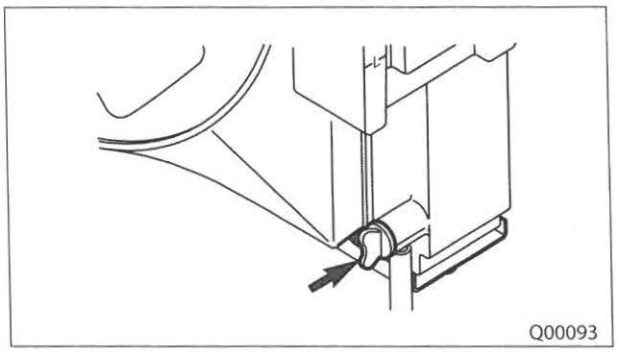
(1) Loosen the radiator cover retaining knob. Lift and remove the radiator cover.



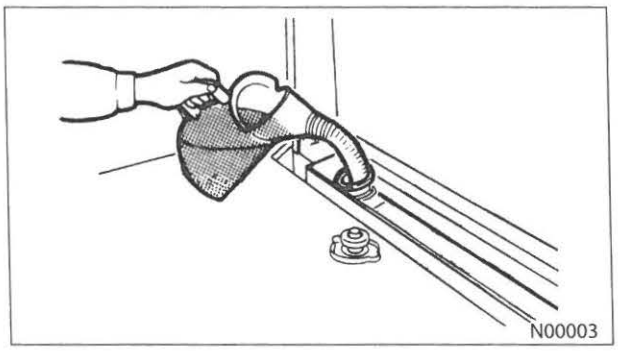
(2) Turn the radiator filler cap slowly to relieve the pressure, then remove the cap.


Q00092

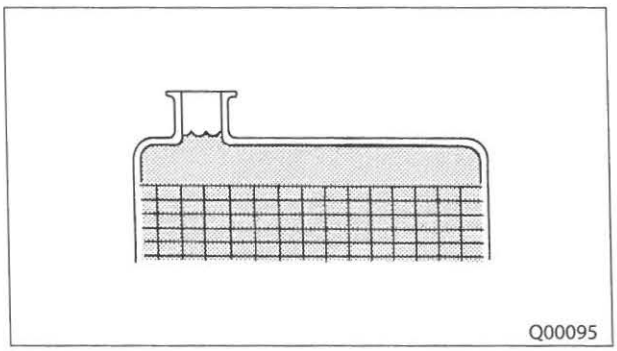
(3) Open radiator drain valve. Allow the coolant to drain.
(4) Drain the reserve tank.
(5) Close the radiator drain valve.
(6) Fill the cooling system with 1 kg sodium bisulfate per 40 liters of water. Most commercial cooling system cleaners can be used.
(7) Start and run the engine for 30 minutes.
(8) 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 sodium carbonate per 40 liters 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 the draining water is clear.
(14) Close the drain valve.


Q00093

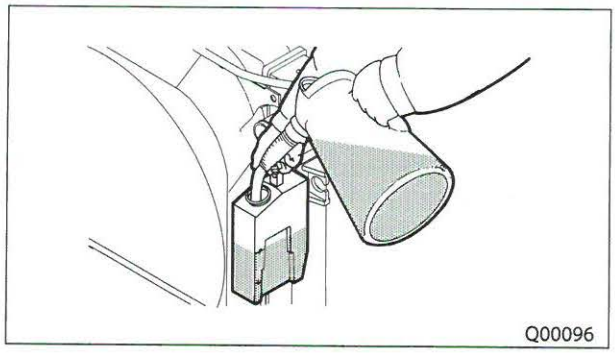
(15) Mix a coolant solution of distilled water and antifreeze.
(16) Fill the cooling system. See 12-11 "Refill Capacities". To avoid air locks, add the coolant slowly.


N00003

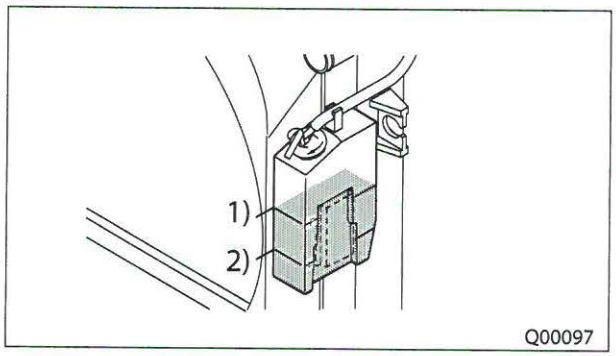
(17) Start and run the engine until the coolant level is stabilized.
(18) Turn OFF the engine.
(19) Add coolant, if necessary, to maintain the level to below the bottom of the filler hole.
(20) Put the radiator filler cap back on.


Q00095

(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.



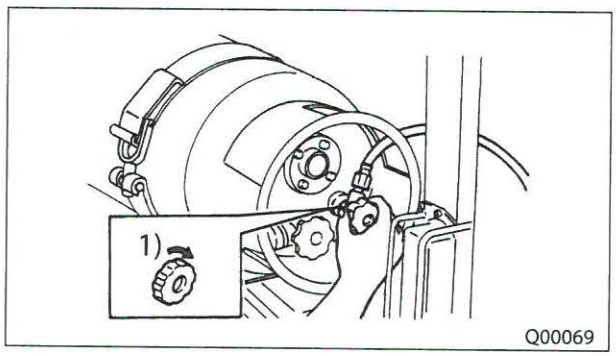
1) FULL 2) LOW

▶ Fuel Filter (LPG Model)

Replace

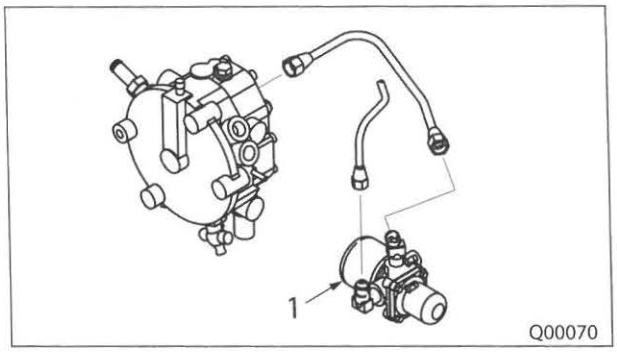
Note: Park the lift truck in an authorized refueling area with the forks lowered until the fork tips touch the floor or ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped and the wheels blocked. The engine must be cooled down.

(1) Close the fuel valve on the LPG tank. The fuel shutoff valve turns clockwise to close. Run the engine until fuel in the fuel line runs out and the engine stops. Turn the key switch to OFF.
(2) Raise the engine hood.



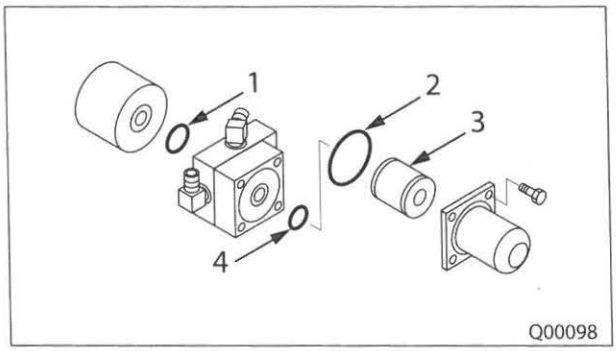
1) Close

(3) Disconnect the fuel line.
(4) Remove the fuel lock filter.



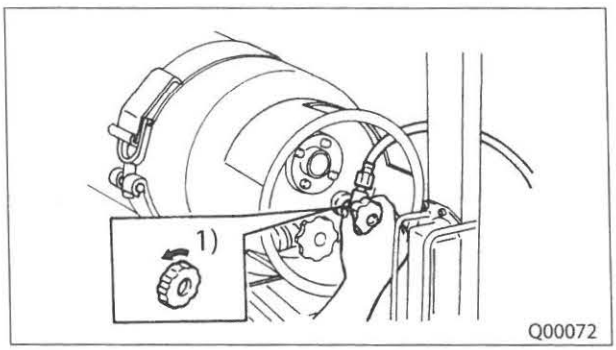
1. Fuel lock filter

(5) Disassemble the fuel lock filter as shown.
(6) Replace the filter and O-rings.
(7) Assemble and re-install the fuel lock filter.
(8) Connect the fuel line.



1. O-ring
2. O-ring
3. Filter
4. O-ring

(9) Open the fuel valve.
(10) Check the filter for fuel leaks with a soap solution.



1) Open

▶ Hydraulic Oil

Replace

⚠ WARNING

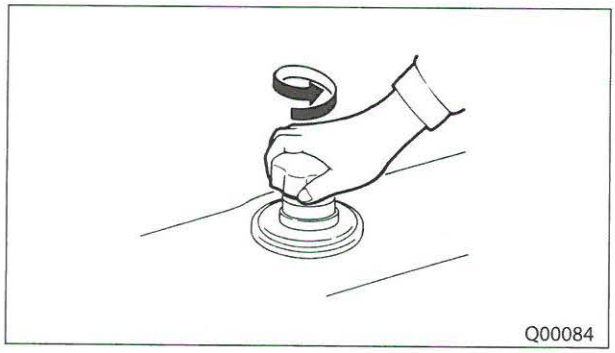
Hot oil and components could cause injury. DO NOT allow hot oil or components to contact your skin.

Remove the hydraulic tank filler cap only after the engine has been stopped and the filler cap is cool enough to remove with your bare hand.

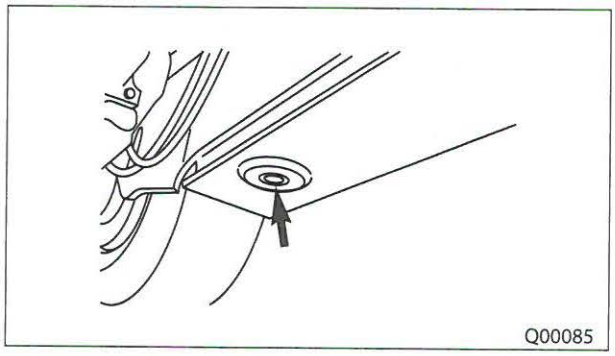
Remove the hydraulic tank filler cap slowly to relieve pressure.

Note: Operate the lift truck to warm the oil.
Park the lift truck on level ground with the forks lowered until the fork tips touch the ground, parking brake applied, direction lever in the NEUTRAL position, engine stopped, and the wheels blocked.

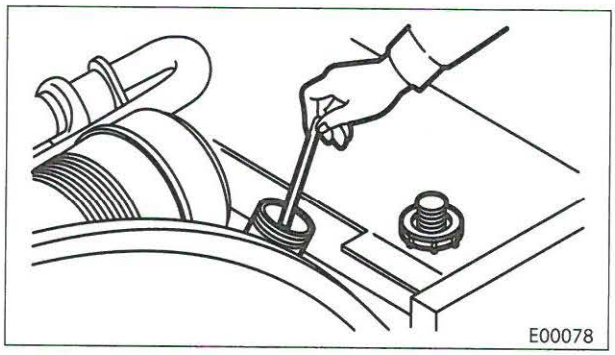
(1) Remove the filler cap.



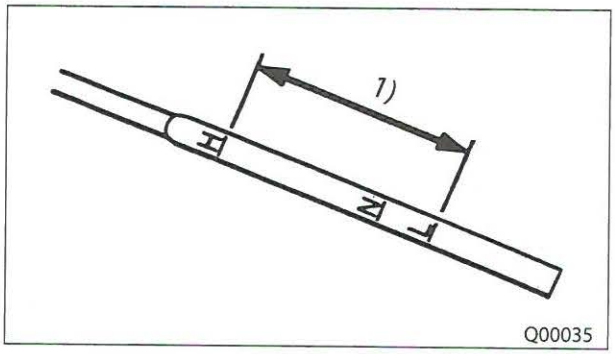
(2) Remove the hydraulic tank drain plug. Allow the oil to drain. Clean and install the drain plug.
(3) Fill the hydraulic tank. See 12-11 "Refill Capacities". Put the filler cap back on.
(4) Start the engine and operate the hydraulic controls and the steering system through a few cycles to fill the filters and lines.
(5) Retract all hydraulic cylinders and stop the engine.



(6) Remove the filler cap and the dip stick. Keep the oil level at the HIGH mark on the dip stick.



(7) Put the drain plug back in place.



1) Correct level range

▶ Parts to Be Changed Periodically

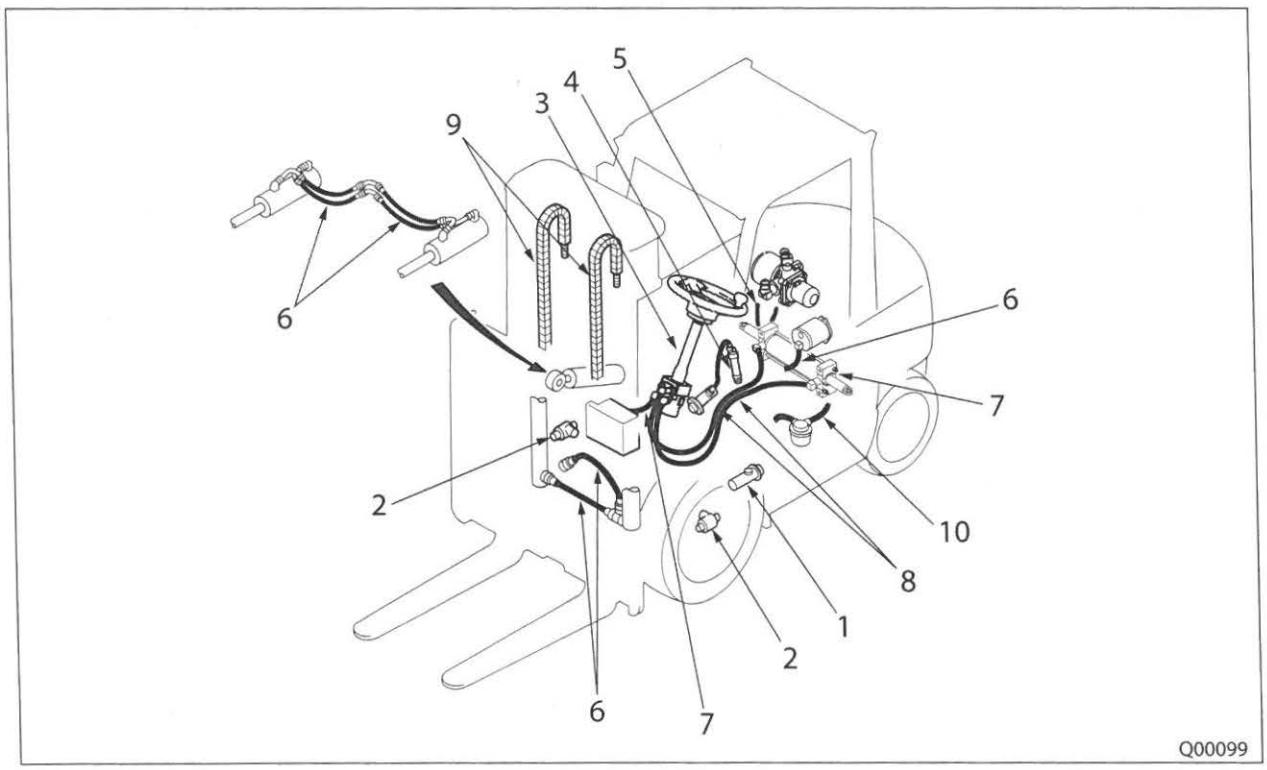
The following parts must be periodically changed as noted below:

Note:

- These parts are made of materials which will deteriorate overtime.
- It is difficult to determine visually whether or not they are still in good condition.
- Replacing at proper intervals will reduce the risk of injury to the operator and damage to the lift truck.

Ref. No.	Parts to be changed	Interval
1	Hose and Rubber Parts of Brake Master Cylinder	2000 service hours or 1 year, whichever comes first
2	Rubber Parts of Brake Wheel Cylinders	2000 service hours or 1 year, whichever comes first
3	Rubber Parts and Hoses of Clutch Master Cylinder (Manual model)	2000 service hours or 1 year, whichever comes first
4	Rubber Parts of Clutch Release Cylinder (Manual model)	2000 service hours or 1 year, whichever comes first
5	Vaporizer rubber parts (LPG model)	6000 service hours or 30 months, whichever comes first
6	High Pressure Hoses of Hydraulic System	2000 to 4000 service hours or 1 to 2 years, whichever comes first
7	Hose and Rubber Parts of Power Cylinder	4000 service hours or 2 years, whichever comes first
8	Hydraulic Hoses of Steering System	4000 service hours or 2 years, whichever comes first
9	Lift Chains	4000 to 8000 service hours or 2 to 4 years, whichever comes first
10	Fuel Hoses	4000 to 8000 service hours or 2 to 4 years, whichever comes first

Note: Periodic changes of these parts are not covered by warranty.



■ SERVICE DATA

◆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 contain oxygenates such as ethanol, methanol, and MTBE (Methyl Tertiary Butyl Ether), although they 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 could 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.

Note: If you experience driving problems which you suspect are fuel related, try switching to a different fuel.

▶ Diesel Fuel Specifications

Fuel types

The recommended 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).

Note: The manufacturer strongly recommends the use of fuels that meet the recommended 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 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 (LPG Model)

Specifications

Use grade HD5 LPG.

Note: LP-Gas is a highly volatile fuel with an octane rating of 100 to 140. Follow local ordinances regarding storage and/or filling of LPG tanks.

◆Coolant Information

The manufacturer recommends that the coolant mix contain 50% commercially available automotive antifreeze, and 50% water.

Note:

- To reduce the risk of damage to your engine, DO NOT 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 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 per minute could 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 could arise without a thermostat.

▶ Coolant Water

The manufacturer recommends the use of distilled water or deionized water to reduce the potential and severity of chemical insolubility.

- 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.
- 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.

Acceptable Water	
Water Content	**Limits (ppm)**
Chlorides (Cl)	50 ppm (maximum)
Sulfates (SO4)	50 ppm (maximum)
Total Hardness	80 mg/l
Total Solids	250 ppm (maximum)
pH	6.0 to 8.0

ppm = parts per million

▶ Antifreeze Solution

The manufacturer 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.

Note:

- Do not add pure (100%) antifreeze to the cooling system. Add antifreeze mixed with distilled water using the same freeze protection ratio that is in your cooling system.
- 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.

◆Recommended Fuels and Oils

Fuel or Oil		Recommendation	Recommendation for Ambient Temperatures, °C (°F) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86)
Fuel			Contact your authorized Cat lift truck dealer
Engine Oil	**Gasoline Models**	API service classification SJ, min.	SAE10W-30
	Diesel Models	API service classification CF, min.	SAE10W-30
Transfer and Differential Oil		API service classification multi-purpose type GL-4 or GL-5	SAE80W / SAE90
Powershift Transmission Oil		Dexron II	Contact your authorized Cat lift truck dealer
Hydraulic Oil	**Powershift, Dry Clutch**	ISO VG32	
	Wet Clutch	API service classification SJ, min.	SAE10W
Brake Fluid		F.M.V.S.S. No. 116 - DOT3 or DOT4 (SAE J1703)	
Grease	**Wheel Bearings**	NLGI No.2 grade multipurpose type (lithium base), consistency: 265 - 295	
	Chassis	NLGI No.1 grade multipurpose type (lithium base), consistency: 310 - 340	

Antifreeze Solution								
	Ambient Temperature, °C (°F)	-45 (-49)	-39 (-38)	-30 (-22)	-25 (-13)	-20 (-4)	-15 (5)	-10 (14)
	Concentration (%)	60	55	50	45	40	35	30

Note:

- 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 12-5 "Specifications (Standard Models)".

◆Specifications (Standard Models)

Item			Truck Model						
			GP15N GP18N	DP15N DP18N	GPE15N GPE18N	GP15ZN GP18ZN	GP20CN	GPE20CN	DP20CN
Alternator Drive Belt Deflection When Pushed Inward With 98 N (10 kgf) [22 lbf] Pressure, mm (in.)			11 to 13 (0.4 to 0.5)	10 to 12 (0.4 to 0.5)	11 to 13 (0.4 to 0.5)				10 to 12 (0.4 to 0.5)
Spark Plug	Type	NGK	FR2A-D	---	FR2A-D				---
	Gap, mm (in.)		0.9 (0.04)	---	0.9 (0.04)				---
Engine Idling Speed, rpm			700	750	700				750
Steering Wheel Free Play When Measured at Rim With Engine Idling, mm (in.)			15 to 30 (0.6 to 1.2)						
Clutch Pedal Free Play When Measured at Rim With Engine Idling, mm (in.)			0 to 6 (0 to 0.2)						
Clutch Pedal Free Play (Dry Clutch), mm (in.)			0 to 6 (0 to 0.2)						
Inching Pedal Free Play, mm (in.)			2.5 to 7.5 (0.1 to 0.3)						
Brake Pedal Free Play, mm (in.)	Manual model		7 (0.3)						
	Powershift model		7 (0.3)						
Parking Brake Lever Operating Effort, N (kgf) [lbf]			150 to 200 (15 to 20) [34 to 45]						
Tire Size	Front Single		6.50-10-10PR				6.50-10 / 5.00		
	Front Dual		4.50-12-8PR				---		
	Rear		5.00-8-8PR				5.00-8 / 3.00		
Tire Pressure, kPa (kgf/cm^2) [BAR] (Pneumatic)	Front Single		700 (7.0) [100]						
	Front Dual		700 (7.0) [100]						
	Rear		700 (7.0) [100]						
Tightening Torque for Wheel Nuts, N·m (kgf·m) [lbf·ft]	Front		157 (16) [116]						
	Rear		157 (16) [116]						
Lift Chain Elongation Limit, mm (in.) / 20 Links			327 (12.9)				392 (15.4)		

* Rear tires must have 1050 kg (2315 lb) capacity at 19 km/h (11.8 mph).

Item			Truck Model				
			GP20N GP25N	DP20N DP25N	GPE20N GPE25N	GP20ZN GP25ZN	GPE20ZN GPE25ZN
Alternator Drive Belt Deflection When Pushed Inward With 98 N (10 kgf) [22 lbf] Pressure, mm (in.)			11 to 13 (0.4 to 0.4)	10 to 12 (0.4 to 0.5)	11 to 13 (0.4 to 0.4)		
Spark Plug	Type	NGK	FR2A-D	---	FR2A-D		
	Gap, mm (in.)		0.9 (0.04)	---	0.9 (0.04)		
Engine Idling Speed, rpm			700	750	700		
Steering Wheel Free Play When Measured at Rim With Engine Idling, mm (in.)			15 to 30 (0.6 to 1.2)				
Clutch Pedal Free Play When Measured at Rim With Engine Idling, mm (in.)			0 to 6 (0 to 0.2)				
Clutch Pedal Free Play (Dry Clutch), mm (in.)			0 to 6 (0 to 0.2)				
Inching Pedal Free Play, mm (in.)			2.5 to 7.5 (0.1 to 0.3)				
Brake Pedal Free Play, mm (in.)	Manual model		7 (0.3)				
	Powershift model		7 (0.3)				
Parking Brake Lever Operating Effort, N (kgf) [lbf]			200 to 250 (20 to 25) [45 to 56]				
Tire Size	Front Single		7.00-12-12PR				
	Front Dual		5.50-15-8PR				
	Rear		6.00-9-10PR				
Tire Pressure, kPa (kgf/cm^2) [BAR] (Pneumatic)	Front Single		700 (7.0) [100]				
	Front Dual		700 (7.0) [100]				
	Rear		700 (7.0) [100]				
Tightening Torque for Wheel Nuts, N·m (kgf·m) [lbf·ft]	Front		378 (38.5) [278]				
	Rear		157 (16) [116]				
Lift Chain Elongation Limit, mm (in.) / 20 Links			392 (15.4)				

Item			Truck Model					
			GPE30N	GP30N	DP30N	GPE35N	GP35N	DP35N
Alternator Drive Belt Deflection When Pushed Inward With 98 N (10 kgf) [22 lbf] Pressure, mm (in.)			11 to 13 (0.4 to 0.4)		10 to 12 (0.4 to 0.5)	11 to 13 (0.4 to 0.4)		10 to 12 (0.4 to 0.5)
Spark Plug	Type	NGK	FR2A-D		---	FR2A-D		---
	Gap, mm (in.)		0.9 (0.04)		---	0.9 (0.04)		---
Engine Idling Speed, rpm			700		750	700		750
Steering Wheel Free Play When Measured at Rim With Engine Idling, mm (in.)			15 to 30 (0.6 to 1.2)					
Clutch Pedal Free Play When Measured at Rim With Engine Idling, mm (in.)			0 to 6 (0 to 0.2)					
Clutch Pedal Free Play (Dry Clutch), mm (in.)			0 to 6 (0 to 0.2)					
Inching Pedal Free Play, mm (in.)			2.5 to 7.5 (0.1 to 0.3)					
Brake Pedal Free Play, mm (in.)	Manual model		7 (0.3)					
	Powershift model		7 (0.3)					
Parking Brake Lever Operating Effort, N (kgf) [lbf]			230 to 250 (23 to 25) [52 to 56]					
Tire Size	Front Single		28x9-15-12PR			250-15-16PR		
	Front Dual		6.00-15-10PR					
	Rear		6.50-10-10PR			6.50-10-12PR		
Tire Pressure, kPa (kgf/cm^2) [BAR] (Pneumatic)	Front Single		700 (7.0) [100]			850 (8.5) [120]		
	Front Dual		700 (7.0) [100]					
	Rear		700 (7.0) [100]			900 (9.0) [130]		
Tightening Torque for Wheel Nuts, N·m (kgf·m) [lbf·ft]	Front		378 (38.5) [278]					
	Rear		157 (16) [116]			233 (23.8) [172]		
Lift Chain Elongation Limit, mm (in.) / 20 Links			523 (20.6)					

◆Refill Capacities

Item			Truck Model						
			GP15N GP18N	DP15N DP18N	GPE15N GPE18N	GP15ZN GP18ZN	GP20CN	GPE20CN	DP20CN
Refill Capacities liter (U.S. gal.)	Fuel Tank		53 (14)						
	Engine Cooling System -- 0.65 liter (1.4 pt) Reserve Tank Included		7.4 (2.0)	6.8 (1.8)	7.4 (2.0)	6.8 (1.8)			
	Engine Lubrication System	Crankcase	3.5 (0.9)	7.5 (2.0)	3.5 (0.9)				7.5 (2.0)
		Oil Filter	0.3 (0.1)	1.0 (0.3)	0.3 (0.1)				1.0 (0.3)
		Total	3.8 (1.0)	8.5 (2.2)	3.8 (1.0)				8.5 (2.2)
	Transmission	Manual model	4.0 (1.1)						
		Powershift model	8.0 (2.1)						
	Transfer and Differential		5.5 (1.5)						
	Hydraulic Tank N level		28 (7.4)						
	Brake Fluid Reserve Tank, cc		135 (35.7)						
Battery Electrolyte Specific Gravity, Corrected to 20°C (68°F)			1.26 to 1.28						

Note: The service data are subject to change without notice.

Item			Truck Model				
			GP20N GP25N	DP20N DP25N	GPE20N GPE25N	GP20ZN GP25ZN	GPE20ZN GPE25ZN
Refill Capacities liter (U.S. gal.)	Fuel Tank		76 (20)				
	Engine Cooling System -- 0.65 liter (1.4 pt) Reserve Tank Included		6.8 (1.8)	8.7 (2.3)	6.8 (1.8)	7.4 (2.0)	
	Engine Lubrication System	Crankcase	3.5 (0.9)	9.0 (2.4)	3.5 (0.9)		
		Oil Filter	0.3 (0.1)	1.0 (0.3)	0.3 (0.1)		
		Total	3.8 (1.0)	10.0 (2.6)	3.8 (1.0)		
	Transmission	Manual model	4.0 (1.1)				
		Powershift model	8.0 (2.1)				
	Transfer and Differential		9.3 (2.5)				
	Hydraulic Tank N level		39 (10.3)				
	Brake Fluid Reserve Tank, cc		135 (8.2)				
Battery Electrolyte Specific Gravity, Corrected to 20°C (68°F)			1.26 to 1.28				

Note: The service data are subject to change without notice.

Item			Truck Model					
			GPE30N	GP30N	DP30N	GPE35N	GP35N	DP35N
Refill Capacities liter (U.S. gal.)	Fuel Tank		76 (20)					
	Engine Cooling System -- 0.65 liter (1.4 pt) Reserve Tank Included		7.4 (2.0)		8.7 (2.3)	7.4 (2.0)		8.7 (2.3)
	Engine Lubrication System	Crankcase	3.5 (0.9)		9.0 (2.4)	3.5 (0.9)		9.0 (2.4)
		Oil Filter	0.3 (0.1)		1.0 (0.3)	0.3 (0.1)		1.0 (0.3)
		Total	3.8 (1.0)		10.0 (2.6)	3.8 (1.0)		10.0 (2.6)
	Transmission	Manual model	4.0 (1.1)					
		Powershift model	8.0 (2.1)					
	Transfer and Differential		8.7 (2.3)					
	Hydraulic Tank	N level	39 (10.3)					
	Brake Fluid Reserve Tank, cc		135 (8.2)					
Battery Electrolyte Specific Gravity, Corrected to 20°C (68°F)			1.26 to 1.28					

Note: The service data are subject to change without notice.

◆Capacities and Lift Truck Weight (Standard Models)

Item		Truck Model			
		GP15N	DP15N	GPE15N	GP15ZN
Capacity, kg (lb) / 500 mm (24 in.)		1500 (3310)			
Lift Truck Weight kg (lb)	Single Wheel	2550 (5620)	2600 (5730)	2550 (5620)	

Item		Truck Model						
		GP18N	DP18N	GPE18N	GP18ZN	GP20CN	GPE20CN	DP20CN
Capacity, kg (lb) / 500 mm (24 in.)		1750 (3860)				2000 (4410)		
Lift Truck Weight kg (lb)	Single Wheel	2750 (6060)	2800 (6170)	2750 (6060)	2740 (6040)	3050 (6730)		3100 (6840)

Item		Truck Model						
		GP20N	GP20ZN GPE20ZN	DP20N	GP25N	GPE25N	GP25ZN GPE25ZN	DP25N
Capacity, kg (lb) / 500 mm (24 in.)		2000 (4410)			2500 (5510)			
Lift Truck Weight kg (lb)	Single Wheel	3350 (7390)		3460 (7630)	3620 (7980)			3730 (8230)

Item		Truck Model					
		GP30N	DP30N	GPE30N	GP35N	DP35N	GPE35N
Capacity, kg (lb) / 500 mm (24 in.)		3000 (6620)			3500 (7720)		
Lift Truck Weight kg (lb)	Single Wheel	4290 (9460)	4400 (9700)	4290 (9460)	4700 (10360)	4800 (10580)	4700 (10360)

Note: Rated capacities shown apply to lift trucks with genuine Cat lift truck standard tires.

■ TO THE CAT LIFT TRUCK OWNER

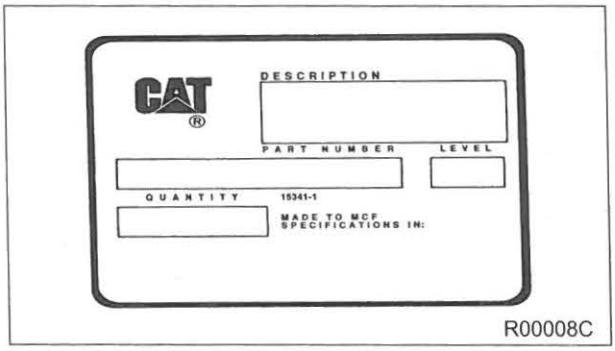
◆The Importance of Genuine Parts

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 a short part life and a higher maintenance cost.

Genuine parts give safe and reliable performance.

⚠ CAUTION

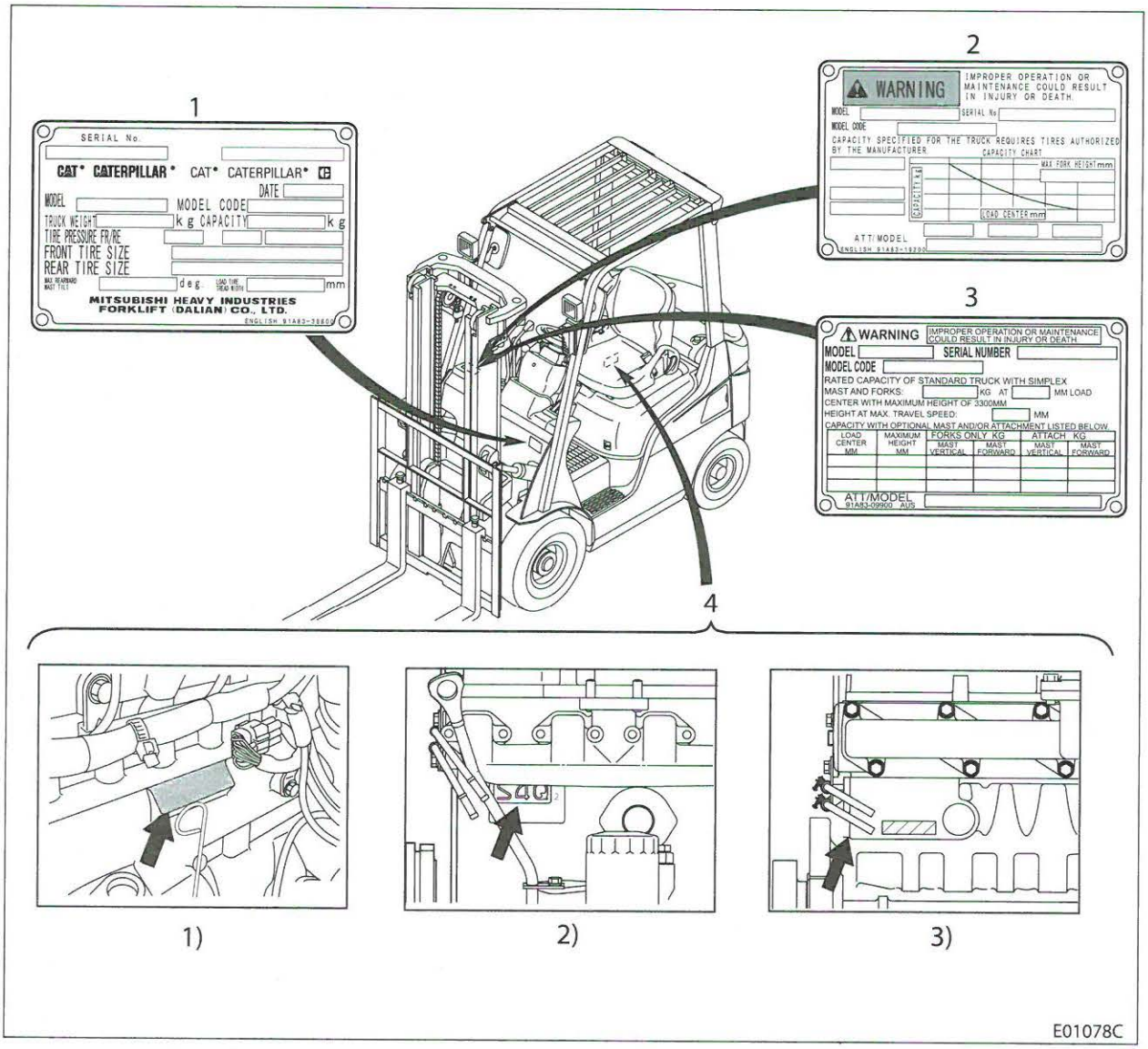
The damage caused by parts other than genuine parts is not covered by Cat Lift Trucks' warranty.



◆Instructions for Ordering Parts

When ordering parts, or when asking your authorized Cat lift truck dealer to have your lift truck repaired, be sure to provide the following items:

- Lift truck model
- Lift truck serial number
- Engine serial number



E01078C

1. Manufacturer Name Plate
2. Capacity Plate
3. Capacity Plate (for Australia)
4. Engine Serial Number

1) Gasoline model (Left side of engine)
2) Diesel model 1 ton capacity (Left side of engine
3) Diesel model 2 to 3 ton capacity (Left side of engine)

◆Service Registration

Fill out this sheet for your ready reference.

SERVICE REGISTRATION

<table>
<tr><td colspan="2">Lift Truck Model, Serial No.</td><td>Engine Model, Serial No.</td></tr>
<tr><td colspan="2">Mast Model, Serial No.</td><td>Attachment Model, Serial No.</td></tr>
<tr><td rowspan="3">Delivering Dealer:</td><td colspan="2">Name:</td></tr>
<tr><td colspan="2">Address:</td></tr>
<tr><td colspan="2">Delivery Date:</td></tr>
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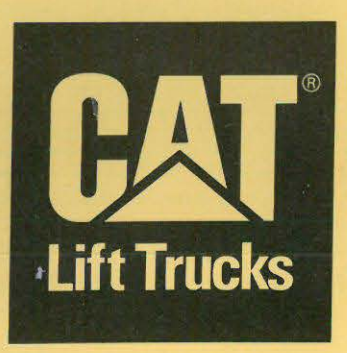

Mitsubishi Logisnext Asia Pacific Pte. Ltd.
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99710-3E130 **11/17**