

# OPERATION & MAINTENANCE MANUAL

AX and BX FORKLIFT TRUCKS

Federal Environmental Agency (EPA) Emission Control-Compliant

AX S/N 670001A~

BX S/N 580001A~

AX – Gasoline & LPG FG15/18(S)(H)-17

BX – Gasoline & LPG FG20/25/30(S)(H)-14

BX – Diesel FD20/25/30-14

**AX**

**BX**



*Tire Pressure (front and rear) = 100 psi*



## WARNING

Read and observe all warnings on this unit before operating it.

DO NOT operate this equipment unless all factory-installed guards and shields are properly secured in place.

**KOMATSU**<sup>®</sup>

Komatsu Forklift USA, Inc.

ISSUED: FEBRUARY 2004

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**AX**  
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## WARNING

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DO NOT operate this equipment unless all factory-installed guards and shields are properly secured in place.

ISSUED: FEBRUARY 2004

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Komatsu Forklift USA, Inc.

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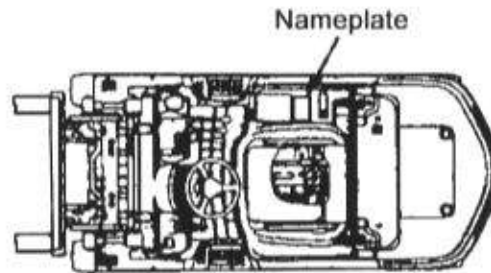
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# AX and BX



ADB1793B

The "Name Plate / Data Plate" is located on the top of the lift truck hood to the right of the operator's seat. The lift truck model can be determined by viewing the information on this name plate. AX and BX lift truck model designations are displayed as shown in the following table.

## Komatsu Current Production Model Coding System

### Internal Combustion Engine Trucks

#### Class IV (cushion tire) and Class V (pneumatic tire)

Example: F G 20 SHT LS - 14

Positions: 1 2 3 4 5 6

1 Type of Vehicle	2 Type of Motive Power	3 Load Capacity (Model: lbs)	4 Designations	5 UL Rating	6 Model Change Number
F = Forklift truck	G= Gas or LP engine  D = Diesel engine	15: 3,000 18: 3,500 20: 4,000 25: 5,000 30: 6,000	S = Cushion tire type  1st H = High performance  T = Torqflow-type power-shift trans w/torque converter  C = Clutch-type manual trans w/dry, single-disc clutch	LS = LPG Special (Anti-Spark)  US = Gas or Diesel Special (Anti-Spark)	1 = Original model built  2, 3, etc. = Changes in models

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# FOREWORD



**WARNING**

**READ AND FOLLOW ALL SAFETY PRECAUTIONS. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.**

# 1. FOREWORD

---

This manual provides rules and guidelines which will help you use this lift truck safely and effectively. Always be sure to read and understand this manual thoroughly before operating and performing maintenance. Some actions involved in operation and maintenance of the lift truck can cause a serious accident if they are not done in the manner described in this manual.



## **WARNING**

- Improper operation and maintenance of this lift truck can be hazardous and could result in serious injury or death.
- Operators and maintenance personnel should read this manual thoroughly before beginning operation or maintenance.
- Keep this manual handy and have all personnel read it periodically.
- Do not use this lift truck unless you are sure that you understand the contents completely.
- If this manual has been lost, or has become dirty or worn and cannot be read, request a replacement manual from your Komatsu Forklift distributor/dealer.
- Komatsu Forklift delivers lift trucks that comply with (to the best of our knowledge at the time of delivery) all applicable regulations and standards of the country to which they have been shipped. If this lift truck has been purchased in another country or purchased from someone in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult your Komatsu Forklift distributor/dealer before operating the lift truck.
- Continuing improvements in the design of this lift truck may not be reflected in this manual. Consult Komatsu Forklift or your Komatsu Forklift distributor/dealer for the latest available information on your lift truck or for questions regarding information in this manual.
- Information on safety is given in the SAFETY, OPERATION and MAINTENANCE sections throughout this manual; please read it carefully and completely.

## 2. SAFETY INFORMATION

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Most accidents are caused by a failure to follow fundamental safety rules for the operation and maintenance of lift trucks.

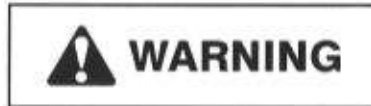
To avoid accidents, read, understand and follow all precautions and warnings in this manual and on the lift truck before operating and performing maintenance.

Do not operate or carry out maintenance of this lift truck unless you are sure that you understand the explanations and procedures completely.

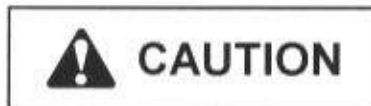
To identify safety messages in this manual and on lift truck labels, the following signal words are used.



These safety messages or labels describe precautions that must be taken to avoid a hazard which carries a serious risk of serious injury or death.



These safety messages or labels usually describe precautions that must be taken to avoid a hazard which may lead to serious injury or death.



This word is used on safety messages and safety labels for hazards which could result in injury or damage to the lift truck or surrounding property if the hazard is not avoided.



This word is used for precautions that may not lead to damage or failure, but which must be taken to avoid actions that could shorten the life of the lift truck.

Safety precautions are described in the SAFETY, OPERATION and MAINTENANCE sections of this manual.

Komatsu Forklift cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety messages in this manual and on the lift truck may not include all possible safety precautions.

If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to be sure that you and others can do such procedures and actions safely and without damaging the lift truck. If you are unsure about the safety of some procedures, contact your Komatsu Forklift distributor/dealer.

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

## 3. RUNNING IN A NEW LIFT TRUCK

### 3.1 RUNNING IN A NEW LIFT TRUCK

Your Komatsu Forklift truck has been thoroughly adjusted and tested before shipment.

However, operating the lift truck under severe conditions at the beginning can adversely affect performance and shorten the lift truck life. Be sure to take special care concerning the following items during this initial period of operation.

- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starting or acceleration, unnecessarily abrupt braking and sharp turning, except in the case of emergency.

### 3.2 FIRST MONTH OF SERVICE (OR INITIAL 200 HOURS OF SERVICE) FOR NEW LIFT TRUCK

For new lift truck, carry out the following maintenance only after the first month or 200 hours.

Unit	Check Items	Remarks
Engine	Change oil in engine oil pan	Page 3-21
	Replace oil filter element	Page 3-21
	Check & adjust engine valve clearance	
	Tighten (retorque) engine cylinder head bolts	
	Check spark plugs for burning of electrode, burning of insulator	Page 3-24
	Check & clean air filter element	Page 3-28
	Check ignition timing	
	Check & adjust alternator belt (drive belt) tension	Page 2-25
TORQFLOW transmission	Change transmission fluid	Page 3-23
	Clean strainer	
Differential	Change oil	Page 3-24
Hydraulic tank	Change oil	Page 3-20
	Replace line filter	
	Clean strainer	
	Clean inside tank	
Misc. bolts & nuts	Tighten	Particularly lug (hub) nuts, overhead guard mounting bolts, backrest mounting bolts, and operator's seat mounting bolts
Other	Refer to "Check Before Operation"	Page 2-21



### 3.3 MODEL LINE UP

<b>APPLICABLE "EPA" LIFT TRUCK MODELS</b>	
<b>Model</b>	<b>Description</b>
<b>AX (K21 Gasoline Engine)</b>	
FG15HC-17	3,000 lb. capacity, Clutch Spec, Pneumatic Tire
FG15HT-17	3,000 lb. capacity, Torqflow Spec, Pneumatic Tire
FG15HTLS-17	3,000 lb. capacity, Torqflow Spec, LP Special, Pneumatic Tire
FG15ST-17	3,000 lb. capacity, Torqflow Spec, Cushion Tire
FG15STLS-17	3,000 lb. capacity, Torqflow Spec, LP Special, Cushion Tire
FG18HT-17	3,500 lb. capacity, Torqflow Spec, Pneumatic Tire
FG18HTLS-17	3,500 lb. capacity, Torqflow Spec, LP Special, Pneumatic Tire
FG18ST-17	3,500 lb. capacity, Torqflow Spec, Cushion Tire
FG18STLS-17	3,500 lb. capacity, Torqflow Spec, LP Special, Cushion Tire
<b>BX (K21 and K25 Gasoline Engines)</b>	
FG20C-14	4,000 lb. capacity, K21 Engine, Clutch Spec, Pneumatic Tire
FG20T-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, Pneumatic Tire
FG20TUS-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, Gasoline Special, Pneumatic Tire
FG20TLS-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, LP Special, Pneumatic Tire
FG20ST-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, Cushion Tire
FG20STUS-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, Gasoline Special, Cushion Tire
FG20STLS-14	4,000 lb. capacity, K21 Engine, Torqflow Spec, LP Special, Cushion Tire
FG20HT-14	4,000 lb. capacity, K25 Engine, Torqflow Spec, Pneumatic Tire
FG20HTLS-14	4,000 lb. capacity, K25 Engine, Torqflow Spec, LP Special, Pneumatic Tire
FG20SHT-14	4,000 lb. capacity, K25 Engine, Torqflow Spec, Cushion Tire
FG25C-14	5,000 lb. capacity, K21 Engine, Clutch Spec, Pneumatic Tire
FG25T-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, Pneumatic Tire
FG25TUS-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, Gasoline Special, Pneumatic Tire
FG25TLS-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, LP Special, Pneumatic Tire
FG25ST-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, Cushion Tire
FG25STUS-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, Gasoline Special, Cushion Tire
FG25STLS-14	5,000 lb. capacity, K21 Engine, Torqflow Spec, LP Special, Cushion Tire
FG25HT-14	5,000 lb. capacity, K25 Engine, Torqflow Spec, Pneumatic Tire
FG25HTUS-14	5,000 lb. capacity, K25 Engine, Torqflow Spec, Gasoline Special, Pneumatic
FG25HTLS-14	5,000 lb. capacity, K25 Engine, Torqflow Spec, LP Special, Pneumatic Tire
FG25SHT-14	5,000 lb. capacity, K25 Engine, Torqflow Spec, Cushion Tire
FG25SHTLS-14	5,000 lb. capacity, K25 Engine, Torqflow Spec, LP Special, Cushion Tire
FG30C-14	6,000 lb. capacity, K21 Engine, Clutch Spec, Pneumatic Tire
FG30HT-14	6,000 lb. capacity, K25 Engine, Torqflow Spec, Pneumatic Tire
FG30HTUS-14	6,000 lb. capacity, K25 Engine, Torqflow Spec, Gasoline Special, Pneumatic Tire
FG30HTLS-14	6,000 lb. capacity, K25 Engine, Torqflow Spec, LP Special, Pneumatic Tire
FG30SHT-14	6,000 lb. capacity, K25 Engine, Torqflow Spec, Cushion Tire
FG30SHTLS-14	6,000 lb. capacity, K25 Engine, Torqflow Spec, LP Special, Cushion Tire
<b>BX (4D94E Diesel Engine)</b>	
FD20T-14	4,000 lb. capacity, Diesel, Torqflow Spec, Pneumatic Tire
FD25T-14	5,000 lb. capacity, Diesel, Torqflow Spec, Pneumatic Tire
FD25TUS-14	5,000 lb. capacity, Diesel Special, Torqflow Spec, Pneumatic Tire
FD30T-14	6,000 lb. capacity, Diesel, Torqflow Spec, Pneumatic Tire

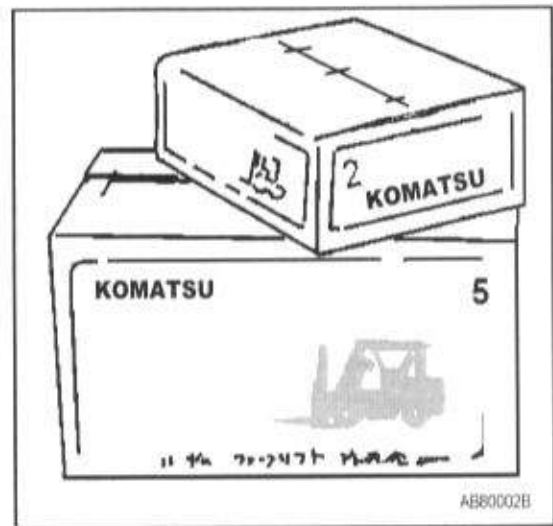
## 4. WARRANTY AND SERVICE FOR NEW LIFT TRUCK

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### 4.1 KOMATSU FORKLIFT GENUINE PARTS

Komatsu Forklift genuine parts are manufactured from the same materials, and by the same methods, as the parts built in the new lift truck.

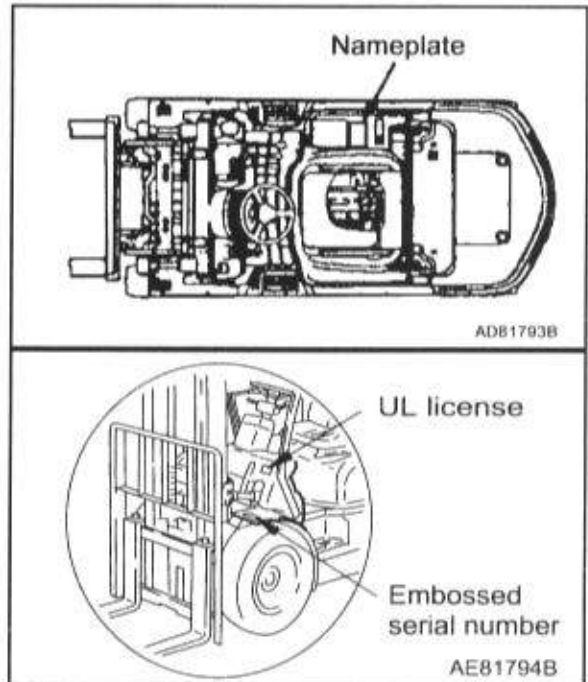
In the event that the customer uses imitation parts, Komatsu Forklift will not be held accountable for any faults which result from the use of such imitation parts, and Komatsu Forklift warranty will not be applicable. Always use genuine Komatsu Forklift parts when replacing parts.



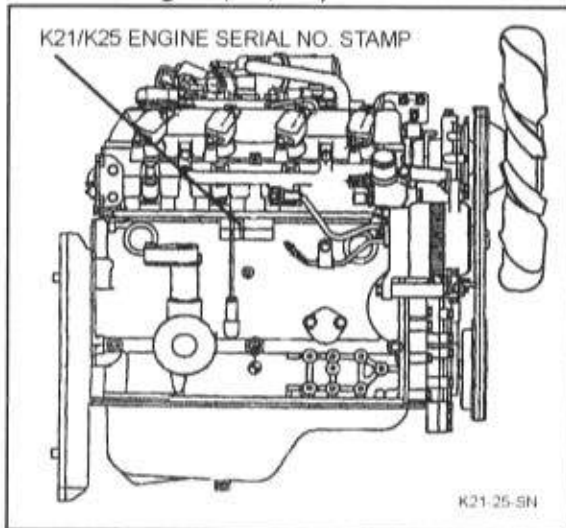
## 5. LOCATION OF PLATES

### 5.1 LIFT TRUCK SERIAL NO. PLATE POSITION

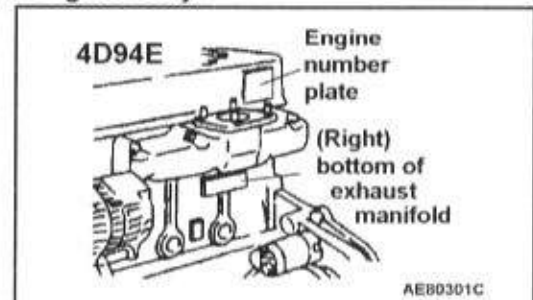
- **Nameplate location:**  
The nameplate is installed on the top of the hood on the right side of the operator's seat.  
The serial number is located on the nameplate.
- **Embossed serial number location:**  
The embossed serial number is stamped on top of the front fender on the left side of the lift truck.  
In addition, the UL license is installed to the left of the front side of the dashboard.  
The engine serial number is stamped in the position shown below.  
(Left) and (Right) in the diagram are as follows:  
(Left): Left side of engine.  
(Right): Right side of engine.



#### Gasoline engine (AX, BX)



#### Diesel engines only



- **Contacting Komatsu Forklift:**  
When contacting a Komatsu Forklift distributor/dealer for parts ordering or problem consultation, always give the lift truck serial number embossed on the lift truck.

#### NOTICE

Take care not to damage or remove the embossed serial number.

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# SAFETY



## **WARNING**

**READ AND FOLLOW ALL SAFETY PRECAUTIONS. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.**

## 6. SAFETY MANAGEMENT

---

### 6. SAFETY MANAGEMENT



#### **WARNING**

#### **OPERATION MANUAL AND SAFETY LABELS**

- Read the instructions in this Manual and the Safety Labels attached to the various parts of the lift truck, and make sure that you understand and follow them. If you do not understand or do not follow the instructions, this will lead to improper operation which may lead to damage, personal injury or death.
- Be sure that you understand the proper method of using the lift truck and the procedure for carrying out an inspection, and ensure that they are carried out safely.
- Read this Manual and the Safety Labels again from time to time. If the Operation and Maintenance Manual or Safety Labels have been lost or become dirty and cannot be read, obtain replacements from your Komatsu Forklift distributor/dealer and attach the Safety Labels in the specified positions.



#### **WARNING**

#### **OPERATING QUALIFICATIONS**

- This lift truck should be operated only by qualified personnel. Be sure you have proper qualifications before operating the lift truck.
- When operating this lift truck, even if you have experience in operating other lift trucks, obtain instructions from an authorized person who has experience in operating this lift truck or the same type of lift truck.



#### **WARNING**

#### **CLOTHING AND PERSONAL PROTECTIVE ITEMS**

- Avoid loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death.
- Always wear a hard hat and safety boots.
- Depending on the working conditions, wear other safety equipment as well.



#### **WARNING**

#### **OVERHEAD GUARD, LOAD BACKREST**

- Do not use this lift truck unless it is equipped with the overhead guard and load backrest shipped with the lift truck from the factory by Komatsu Forklift.



### WARNING

#### UNAUTHORIZED MODIFICATION

- Any modification made without authorization from Komatsu Forklift can create hazards.
- Before making any modification whatsoever, consult your Komatsu Forklift distributor/dealer. Komatsu Forklift will not be responsible for any damage, injury or death caused by any unauthorized modification.
- Do not install any equipment or parts which obstruct or limit the operator's view.



### WARNING

#### EXHAUST GAS

- Do not leave the engine running where there is poor ventilation. The engine exhaust gas contains carbon monoxide. There is a danger that this will cause gas poisoning which may result in serious injury or death.



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### WARNING

#### FIRE EXTINGUISHER AND FIRST AID KIT

- If any abnormality in the lift truck occurs, stop operation immediately, park the lift truck in a safe place and safe condition, then contact the person in charge.
- Be sure that fire extinguishers have been provided and that you read the labels to ensure that you know how to use them.
- Know what to do in the event of a fire.
- Be sure that you know the phone numbers of persons you should contact in case of an emergency.
- Provide a first aid kit at the storage point.
- Do not use the lift truck if it is leaking fuel. Inform the person on charge of the nature of the abnormality, and repair the leakage before using the lift truck.
- Do not leave the lift truck with the engine running. Always apply the parking brake securely, lower the forks to the ground, stop the engine, and remove the key before leaving the lift truck.



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## 6. SAFETY MANAGEMENT

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### WARNING

#### SAFETY RULES

- Do not operate the lift truck if you are fatigued, or when you have been drinking, or you have taken any medication which can make you drowsy or sleepy.
- When carrying out operation, inspection, or maintenance of the lift truck, always follow all work shop rules, safety regulations and precautions.
- During operation, always pay attention to safety and be careful of pedestrians, traffic and other surrounding conditions.



### WARNING

#### CHECK WHEN TRAVELING IN REVERSE

- When reversing, depending on the situation, an optional alarm, reversing lamp or rotary lamp should be used. In all cases, be sure to face the rear and check around before traveling in reverse.



### WARNING

#### TRAVELING REGULATIONS ON PUBLIC ROADS

- Do not travel on public roads unless you comply with local, state or other laws which regulate such activity.
- Always observe all traffic regulations when operating the lift truck.
- Do not drive on public roads with the lift truck loaded.
- Do not tow other machines on public roads. (Do not tow other machines even when not on public roads).
- Always carry your driver's license when traveling on public roads.



### WARNING

#### SAFETY EQUIPMENT

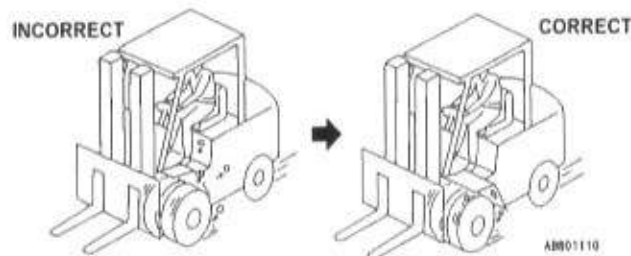
- The overhead guard is installed to protect the operator from falling objects. It is designed to withstand the force of light boxes or small packages. It is not designed to withstand every possible impact. Always be careful to prevent damage or injury from falling objects.



### WARNING

#### TIRE FENDERS

- The tire fenders prevent objects from being thrown up by the tires. When changing from a single tire to a double tire arrangement on your forklift truck, always extend the tire fenders to cover the additional tires. If the fenders are not extended, small stones and other objects will be thrown up and may injure the operator or other people in the surrounding area.







### **WARNING**

#### **SAFE WORKING AREA**

- Always work on level surfaces and wipe up all oil or grease from the ground.
- When working on quays, platforms, docks or other places where there is a danger of falling, set up blocks to prevent the lift truck from going over the edge.
- Put warning signs up in dangerous places to warn the operator not to approach.
- Mark the travel areas clearly and maintain the road surfaces in good condition.
- Put up signs to prevent unauthorized machines from entering areas where trucks are being operated.
- Ensure that there is adequate lighting to enable operations to be carried out safely.



### **WARNING**

#### **CLEAN OPERATOR'S COMPARTMENT**

- Keep the operator's compartment clean and tidy. Be sure to clean up all oil or mud. If the operator's hand or foot slips, this may lead to a serious accident.
- Do not leave tools or spare parts lying around in the operator's compartment. They may damage or obstruct the control levers or pedals. Always keep them in the tool box when not being used.



### **WARNING**

#### **SAFE OPERATING PLAN**

- Before operation, establish an operating plan and hold a meeting to discuss operating safety.
- In confined areas, position a signal person and carry out operations in accordance with his/her instructions.
- When carrying out operations on roads, put up fences around the working area and carry out operations in accordance with instructions from the signal person.



### **WARNING**

#### **REDUCE LOAD FOR LIFT TRUCKS WITH ATTACHMENT**

- The permissible load for any lift trucks equipped with an attachment is lower than the permissible load for the standard lift truck.  
Reason:
  - 1) The permissible load must be reduced by an amount equivalent to the weight of the attachment itself.
  - 2) Because of the thickness of the attachment, the load center moves forward.
- Always observe the permissible load as stated on the capacity plate (also called "nameplate") strictly (this plate is stuck to the lift truck or the attachment). Never exceed the permissible load.



### **WARNING**

#### **"NO JUMP START" SAFETY PLATE (DECAL)**



- DO NOT JUMP START the engine by short circuiting the starting motor terminals.
- This SAFETY PLATE (DECAL) is located on the top center of the starter's magnet switch.
- If your machine is not equipped with this SAFETY PLATE, install a new plate (decal) in the specified location after cleaning the surface.

## 6. SAFETY MANAGEMENT

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### FIRE PREVENTION FOR FUEL

FUEL IS EXTREMELY FLAMMABLE AND CAN CAUSE FIRES AND EXPLOSIONS

- Carry out refueling away from flames or sparks.
- Stop the engine when refueling.
- After refueling, tighten the gas cap securely and wipe up any spilled fuel.
- The specific gravity of LPG is heavier than air, so it is easy for the vapors to accumulate in low places (holes, road surface depressions, etc.). This can create a fire or explosion hazard. Be extremely careful!



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A0055030



A0055040



### NO STARTING AIDS

Engine starting aids are highly flammable and may cause an explosion.

- Do not use starting aids to start the engine.



### LPG SAFETY / FUEL SYSTEM SAFETY

Accidents involving fuel systems are always dangerous and can cause fire and explosion, serious injury, death and property damage. Keep the following points in mind when working with fuel systems.

- Read, understand and remember relevant information in the **NATIONAL FIRE PROTECTION AGENCY (NFPA)** standard for fuel in use. Do this **BEFORE** working on any fuel system.
- Ensure you are wearing proper personal protective equipment.
- Check for fuel leaks before you begin work on any fuel system.
- On LPG systems, **DO NOT** work on the system if the fuel storage container is filled with fuel past the 80% liquid level.
- Ensure there are **NO SOURCES OF IGNITION** nearby before beginning work.
- Be sure your work area is adequately ventilated.
- Disconnect the battery before working on the fuel system.
- **LPG is heavier than air** and will sink to the lowest area possible. Avoid areas near floor drains or lubrication pits where escaped fuel may collect.
- LPG is stored under high pressure. Ensure the LPG fuel storage container valve is turned **OFF** (closed), and pressure is released from the lines, before working on system.
- Store all LPG cylinders **OUTDOORS** in a secured area and safe from any vehicle traffic.
- **NEVER WELD ON AN LPG PRESSURE VESSEL, STORAGE TANK OR CYLINDER.**
- LPG fuel tanks mounted horizontally **MUST BE** positioned properly. See **MAINTENANCE** Section.
- Always utilize a UL listed LPG tank.

## 7. SAFE TRAVEL

**WARNING****PRECAUTIONS WHEN STARTING ENGINE**

- Before starting the engine, always check that the parking brake is applied and that the directional and speed levers are in neutral. Depress the clutch pedal (for clutch type trucks), or the brake pedal (for TORQFLOW transmission trucks), firmly, and then start the engine.
- Adjust the operator's seat and the steering wheel before starting the engine. Always lock them in position after adjusting. Adjusting the seat or steering wheel during operation is dangerous and it may cause you to lose your balance or to operate the lift truck improperly.
- Before starting the engine, check that the surrounding area is safe. **ALWAYS SIT IN THE OPERATOR'S SEAT** when starting the engine.
- Before starting the engine, sound the horn to warn people in the area.
- With large-sized lift trucks, get off the lift truck and walk around it to check that no one is near the engine compartment, tires or counterweight, then get on the lift truck, sit in the operator's seat, and start the engine.



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**Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.**

**WARNING****PRECAUTIONS WHEN OPERATING DIRECTIONAL OR SPEED LEVERS**

- When switching between FORWARD and REVERSE, always stop the lift truck. It is dangerous to change the direction of travel suddenly or when the lift truck is moving.
- When operating the directional lever or speed lever, always depress the clutch pedal before moving the lever (for clutch type lift trucks).  
If the lever is moved without disengaging the clutch, the lift truck will move suddenly and may cause injury.

**WARNING****TIPPING**

- If the load-engaging means or load is raised, the center of gravity of the lift truck will also rise and increase the danger of the lift truck tipping. Do not turn the lift truck when the forks are raised high.
- Do not suddenly raise the forks or tilt the mast to the front or rear when the forks are loaded. There is danger that the lift truck will tip.
- Reduce speed before turning the lift truck. In particular, when traveling unloaded, the rear of the lift truck is heavy.
- If the lift truck is turned at high speed, there is a greater chance of tipping than with the forks loaded.
- Always ensure that the hood is properly latched.



AB801130

## 7. SAFE TRAVEL

### **WARNING** TRAVEL ON SLOPES

- Do not turn, or travel across or at an angle on slopes. There is danger that the lift truck will tip.
- Before starting to drive up a slope, stop the lift truck and adjust the clearance between the ground surface and the bottom of the forks so that the bottom of the forks or pallet do not contact the ground surface or the tip of the fork does not stick into the ground when traveling.
- For safe travel on slopes:
  - When loaded: Travel **FORWARD** up the slope and in **REVERSE** down the slope with the load upgrade.
  - When unloaded: Travel in **REVERSE** up the slope and **FORWARD** down the slope with the load-engaging means downgrade.
- When traveling down slopes, use the braking force of the engine together with the foot brake, and travel slowly down the slope.

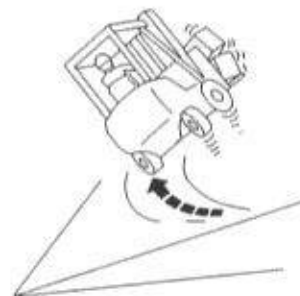


ABB01140



ABB01150

### **WARNING** DO NOT JUMP OFF LIFT TRUCK EVEN IF IT TIPS

**NEVER JUMP OFF** the lift truck even if it seems that it will tip. Always do as follows:

- Hold the steering wheel securely.
  - Stay in the operator's seat.
  - Brace your legs.
  - **If you jump off the lift truck when it turns over, there is danger that you will be fatally crushed under the lift truck.**
- Always stay in the operator's compartment if the lift truck turns over, then escape from the lift truck after it has stopped.
- Always wear the seat belt correctly.

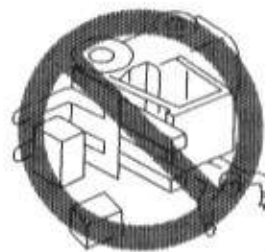
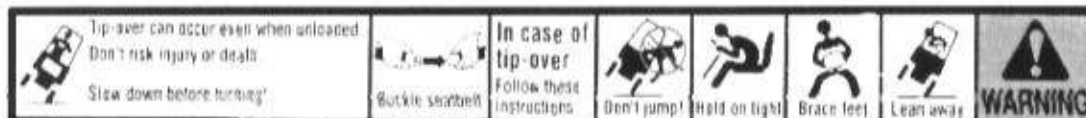


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**WARNING****ROAD SHOULDER**

- There is danger that soft road shoulders may collapse, so do not go near them with the lift truck.
- Always maintain a safe distance from the edge of road shoulders and platforms.

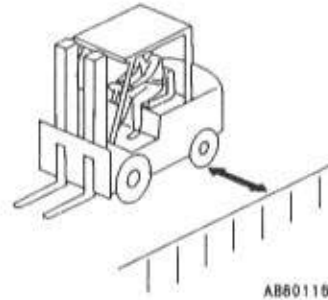


ABB01160

**WARNING****LOADING HIGHWAY TRUCKS OR RAILROAD CARS**

- Do not travel on the edge of docks. There is danger that the lift truck may fall, which may result in serious injury or death.
- Before starting operations, check the load limit for the gangplanks (dock boards), and do not use them if they do not have ample strength to take the weight of the lift truck when loaded.
- Apply the brakes on the highway truck and block the wheels.
- With trailers, use jacks and take steps to prevent the trailer from sinking when the forklift truck travels on it.
- When driving the forklift inside trucks, reduce speed when backing out and be sure to check that the gangplanks are safe.
- Be careful of pedestrians.
- Tell the truck driver not to move the truck until the operation is completed.
- If there is some system to secure the truck to the dock, always use this system. Secure the gangplanks so that they do not slip and fall.



ABB01170

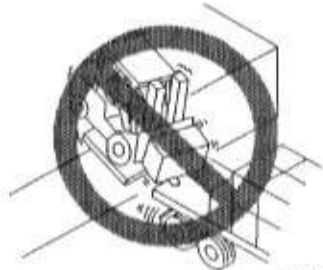


ABB01180

**WARNING****ESCAPING FROM A RAILROAD CROSSING**

- If engine trouble occurs on a railroad crossing and the lift truck cannot move, you cannot use the starting motor to move the truck as can be done in automobiles. The lift truck's neutral safety switch prevents this action.
- In such an emergency, light a flare or smoke candle, to warn approaching trains, vehicles and persons in the area that there is a broken down truck on the tracks.
- It is critically important to remove the lift truck from the tracks as soon as possible.

## 7. SAFE TRAVEL



### WARNING

#### NO RIDERS

#### FORKLIFT TRUCKS ARE ONE-PERSON MACHINES

Do not allow any other person to ride on the truck under any circumstances. Never allow anyone to act as an extra counterweight.



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### WARNING

#### DRIVING IN REVERSE

- When driving in REVERSE, turn to face the rear and check the area directly behind the lift truck.



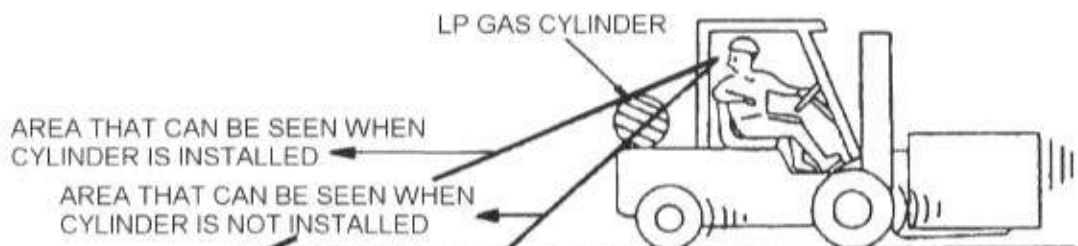
AB801200



### WARNING

#### OBSTRUCTION OF REAR VIEW WHEN USING LP GAS FUEL

- The LP gas cylinder may partially block the view to the rear, so extra care is required to minimize the potential danger of hitting personnel, products or buildings in the surrounding area. Always turn to face the rear to check directly behind the lift truck when driving in reverse direction. If appropriate for your environment, you should consider installing backup warning devices (backup buzzer, rotating backup lamp, etc.) or backup confirmation devices (rear view mirror, etc.) to warn personnel in the surrounding area and to confirm that the area to the rear is safe.



AB80121C





### WARNING

#### WHEN FRONT VIEW IS POOR

- If the view to the front is obstructed by the load, turn to the rear and drive the forklift truck in reverse.
- When driving in reverse with a high load, use a signal person to ensure the safety of the load and the safety in the surrounding area.



ABB01220



### WARNING

#### CHECK BEFORE STARTING

- When checking the lift truck before starting, follow the procedure given in this Manual, and do not start the lift truck until all the checks have been completed.
- If anything abnormal is found, inform the person in charge and carry out the necessary repairs.



### WARNING

#### LAMPS

- Check that the lamps light up correctly. Replace any broken or inoperative bulbs.



### WARNING

#### KEEP HANDS FREE FROM OIL AND WATER

- Do not drive the lift truck if your hands are wet or covered with oil. Your hands will slip on the work equipment control levers or directional lever, and this may cause a serious accident.



### WARNING

#### MOUNTING AND DISMOUNTING

- **NEVER jump on or off the lift truck.**
- When getting on or off the lift truck, always stop the lift truck and use the handrails and steps to ensure that you support yourself.
- Never hold any control levers or the steering wheel when getting on or off the lift truck.
- If there is any oil, grease or mud on the handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage.



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## 7. SAFE TRAVEL



### WARNING

#### ALWAYS SIT IN OPERATOR'S SEAT

- Never operate the lift truck from outside the operator's compartment.
- Always keep your body under the overhead guard.
- Do not extend your arms and legs outside the operator's compartment.



ABB01240



### WARNING

#### SEAT BELT

- Always wear your seat belt correctly when on the operator's seat. The seat belt will reduce the risk of injury.
- Always check the seat belt mounts and check for any damage to the seat belt itself. If any abnormality is found, repair or replace the seat belt immediately.



ABB01700



### WARNING

#### SAFETY WHEN STARTING

- Before starting and moving the lift truck, check that the surrounding area is safe.
- Before moving the lift truck, raise the forks (approx. 8 in. (20cm) from the ground surface), and tilt the mast back.
- Before moving the lift truck, release the parking brake.

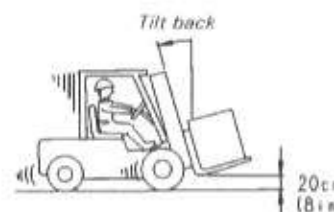


ABB01250



### WARNING

#### BRAKING WHEN TRAVELING

- Do not stop the engine when traveling. If the engine is stopped, the power steering (for lift trucks with power steering) and power brake (for trucks with power brakes) will not work.
- If the inching pedal is depressed, the braking effect of the engine will be lost.
- Do not use the brake excessively. Do not rest your foot on the brake pedal or inching pedal unless you are operating it.  
If you do, the brake will overheat and the braking effect will be lost.  
For TORQFLOW lift trucks, if you leave your foot on the inching pedal, the multiple disc clutch inside the transmission will overheat. In the worst case, the clutch discs will be deformed and the clutch will not function normally.

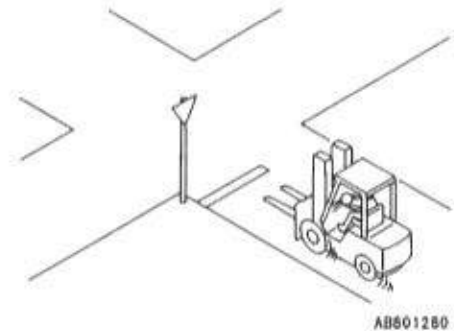


**WARNING****SAFETY DURING TRAVEL**

- Keep a clear view of the path of travel and observe for other traffic, personnel and safe clearances.
- Yield the right of way to pedestrians,
- When passing oncoming vehicles, reduce speed and keep a safe distance from the other vehicle.
- In places where there are speed limits, observe the speed limit and maintain a safe distance from other vehicles.

**WARNING****CONFIRMING SAFETY**

- When traveling, always pay careful attention to the area around your lift truck, particularly in the direction of travel or when turning.
- Do not pass other vehicles on narrow roads or at crossings or other places where the view is poor.
- When traveling through crossings or other places where the view is poor, or when entering or leaving narrow roads, stop and sound the horn to confirm safety before driving on.
- Even if you sound the horn, not everyone in the surrounding area will necessarily hear it. Always pay careful attention to the movements of people in the surrounding area.
- When crossing roads or turning corners, stop and confirm safety before continuing.
- Always pay careful attention to the movements of people in the surrounding area, and take steps to prevent people from entering the working area.

**WARNING****SAFETY DURING TRAVEL**

- Avoid traveling in places which are flooded or where there are holes.
- Do not try to drive the lift truck on soft ground.
- Avoid curbs, rails, ditches or other obstacles, and do not travel directly over them.
- Do not travel on slippery roads or other slippery surfaces.
- When entering buildings, check the weight limit of the floor and be careful not to exceed the limit.

**WARNING****GIVE PRIORITY TO LOADED LIFT TRUCKS**

- When traveling on slopes or in confined areas, unloaded lift trucks should always give the right of way to loaded trucks.

## 7. SAFE TRAVEL



### WARNING

#### HEIGHT OR WIDTH LIMITS

When going in or out of places with height or width limits:

- Ensure that there is ample height and width for the lift truck to pass.
- Do not extend your hands or legs outside the lift truck.
- Check that the surrounding area is safe.
- Be careful of electric wires and other obstacles inside and outside the building.

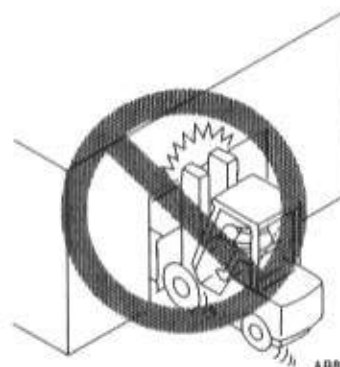


ABB01280



### WARNING

#### PRECAUTIONS WHEN TURNING

- When turning while traveling forward, the counterweight will swing far out. Keep an ample clearance from walls and other objects to ensure safety.
- When turning, travel slowly and be careful that the front or rear wheels do not come off the ground. When turning on soft road shoulders, there is danger that the rear wheels may come off the road shoulder and cause the lift truck to tip.

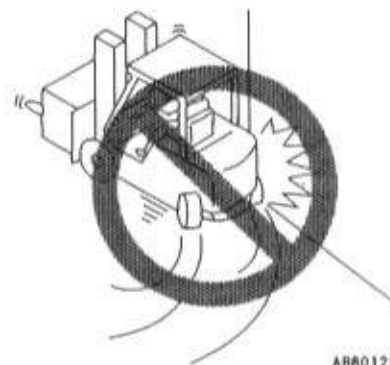


ABB01290



### WARNING

#### STOPPING DISTANCE

- When traveling downhill, it requires a longer distance for the lift truck to stop than when traveling on level ground.
- When traveling downhill, reduce the speed and make sure that you have ample room at the bottom of the slope to stop.
- When traveling on wet surfaces, it requires a longer distance to stop than when traveling on normal road surfaces. Always have ample room to stop.



### WARNING

#### NO TOWING

If there is any problem with the brakes or steering system of your lift truck, do not use another lift truck to tow it.

There is danger that the lift truck may run away.

### 8. LOADING OPERATIONS

#### **WARNING** NO OVERLOADING

- Do not load the lift truck over the capacity set forth in the load capacity chart. If the rear wheels come off the ground because of overloading, the lift truck cannot travel or turn. There is also danger that it may tip.
- Always check the load capacity chart to confirm the loading capacity.



AB801190

#### **WARNING** DON'T GO UNDER FORKS

- Never allow anyone to go under the load-engaging means or load when it is raised.  
**The area under the forks is a danger area. If the forks come down, the person under the forks may be crushed, or seriously injured or killed.**
- Never allow anyone to go under the load-engaging means or load even if it is elevated, stuck or caught in the up-position. It may fall down suddenly at any moment.



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#### **WARNING** DO NOT LIFT PEOPLE ON FORKS

- Do not use the forks to lift people. If the person falls from the forks he/she may be seriously injured.



AD817980

## 8. LOADING OPERATIONS

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### BE CAREFUL NOT TO GET CAUGHT OR FALL

- Never put your hands or feet into the mast structure. There is danger that you will get caught in moving parts and be seriously injured.



AB801320

- Do not use the mast, load backrest or dashboard as a ladder or step. If you slip, there is danger that you will fall.



AB801330



### OPERATE FROM OPERATOR'S COMPARTMENT

- Always operate the mast and forks from the operator's compartment.



### NO UNSTABLE LOADS

- Make sure that the center of gravity of the load is in line with the center of the lift truck. Do not carry loads off-center. There is danger that unbalanced loads may cause the lift truck to tip.
- Place the load so that it contacts the load backrest.
- Do not handle unstable loads. If there is danger that the load may fall off, secure it in position and take steps to prevent the load from collapsing or falling.
- When carrying stacked loads, tie with rope or otherwise secure it to prevent the load from falling.



AB801340



### WARNING

#### DO NOT LOAD ABOVE HEIGHT OF LOAD BACKREST

- Keep the height of the load within the height of the load backrest. Do not carry any load that is higher than the load backrest. If the load is higher than the load backrest, there is danger that it will fall back on top of the operator. **This may lead to serious injury or death.**



ABB01350



### WARNING

#### DO NOT TILT MAST FORWARD WHEN LOADED

- Do not tilt the mast forward when the forks are loaded and raised. There is danger that the load may fall and that the lift truck may tip.
- Do not travel with the mast tilted forward.
- Do not load and unload on slopes.



ABB01360



### WARNING

#### KEEP TENSION ON CHAIN

- If the mast rail or forks catch in a load or on a shelf, slack in the lift chain may be created, resulting in danger that the load may fall and the lift truck tip. Always be careful that there is no slack in the chain when pulling the forks out from a pallet or shelf.

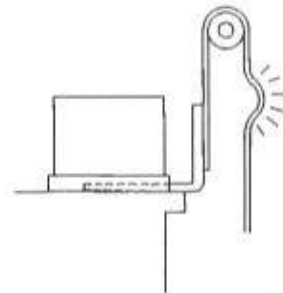


ABB01370

## 8. LOADING OPERATIONS

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### WARNING

#### USE ONLY FOR INTENDED PURPOSES

- Do not use the lift truck for anything other than the intended use (loading operations using the forks).
- Do not use the forks to open or close the doors of railroad cars or warehouses.
- Do not push any other vehicle.
- Do not hook ropes or cables on the forks and use the forks to lift loads.
- Do not use the drawbar pin for towing operations.



AB801380



### WARNING

#### LEVER OPERATION

- Be careful not to operate the lever by mistake. There is danger that the forks or work equipment may cause serious injury.
- Do not operate the levers when getting off the lift truck.



### WARNING

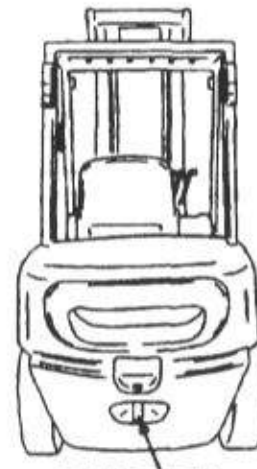
#### USING DRAWBAR PIN



#### WARNING

Do not use the drawbar pin for towing other lift trucks, for being towed by other lift trucks, or for lifting operations.

- The drawbar pin installed to the rear of the counterweight is used only to free the truck when the tires have become stuck in mud or in a ditch and the lift truck cannot move, or when loading the lift truck on to a trailer or truck.



DRAWBAR PIN

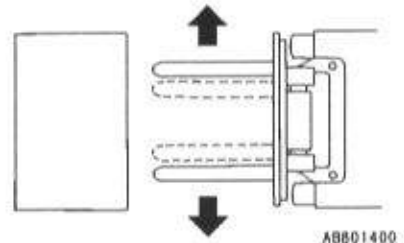
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### WARNING

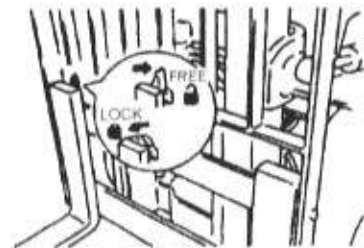
#### FIT FORKS SECURELY IN POSITION

- When adjusting the position (width) of the forks, be careful not to get your hands caught.



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- After adjusting, check that the forks are held securely in position by the fork stopper. If the forks are not held in position, there is a danger that the forks may move when the lift truck is traveling and the load may fall off.



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### CAUTION

#### ADJUST CHAIN

- Be sure the tension of the left and right chains is the same. (See CHECK BEFORE OPERATION). If the tension is not the same, the load will be unbalanced even if it is loaded correctly in the center, and there is danger that the lift truck may tip. (For details of adjustment, see page 2-30).

## 8. LOADING OPERATIONS

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### WARNING

#### BE CAREFUL OF FORK TIPS

- Do not allow the tips of the forks to get close to people. The tips of the forks are pointed, so there is a risk that they may cause injury.
- Do not hook the tips of the forks under objects. If the forks slip out, there is danger that the lift truck or object may move unexpectedly.



### WARNING

#### PEOPLE IN WORKING AREA

- Do not allow anyone except the signal person in the working area.
- Do not let any person or another lift truck come close during operation.
- When working with a signal person, always follow their instructions.



### WARNING

#### USE STRONG PALLETS AND SKIDS

- Always be sure that the pallets and skids have ample strength. If broken or damaged pallets or skids are used, there is a risk that the load may fall.



### WARNING

#### HANDLING LONG OR WIDE LOADS

- Be extremely careful when carrying long or wide loads. Raise the load slowly and be careful not to touch anything in the surrounding area.
- Keep the load as low as possible and be sure to maintain the balance.
- When turning, operate slowly and be careful not to let the load move.







### WARNING

#### OVERHEAD OBJECTS

- Be careful not to let the mast, overhead guard or load contact electrical wiring, pipes, sprinklers or roof beams. If the truck hits such objects, there is a risk that the load will fall or the lift truck will tip. When the forks are raised, the mast height increases, so be particularly careful when the forks are raised.

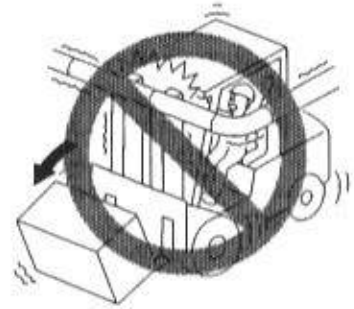


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### WARNING

#### NO PUSHING

- Do not use the forks to push or pull loads. There is a risk that the load will be damaged or fall.



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### WARNING

#### PRECAUTIONS WHEN LOADING / UNLOADING

- Do not let anyone place a load on the forks.
- Do not let anyone remove a load directly from the forks.
- Standing on the forks is dangerous because the forks are slippery and the load may move.
- Do not use anyone to keep the load stable. The lift truck may move unexpectedly, causing the load to fall and crush the person.

## 9. STOPPING AND PARKING

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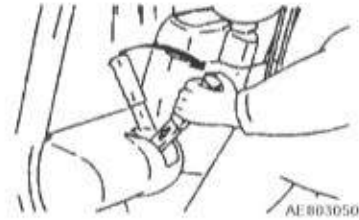
### 9. STOPPING AND PARKING



#### PRECAUTIONS WHEN STOPPING OR PARKING

Observe the following procedure when stopping or parking the lift truck:

- 1) Stop the lift truck on level ground.
- 2) Apply the parking brake securely to make sure that the lift truck cannot move.
- 3) Set the directional lever and the speed lever to neutral.
- 4) Lower the forks to the ground.
- 5) Turn the key switch OFF to stop the engine.
- 6) Remove the key from the key switch. Then get off the lift truck.



#### PARKING

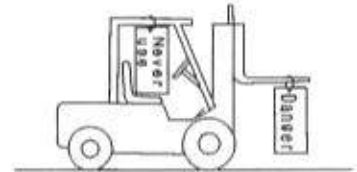
- Park the lift truck in the specified place.
- Park the lift truck on a firm surface.
- Do not park near any emergency exit, stairway, fire extinguisher or other safety equipment. Park the lift truck in a place where it will not obstruct pedestrians or other vehicles.
- Never park the lift truck near any flammable object.
- When parking the lift truck on a slope, park as specified above (PRECAUTIONS WHEN STOPPING OR PARKING), then put blocks under the tires to prevent the lift truck from moving.
- Do not park near any holes for construction or elevator shafts. If LPG leaks, it can accumulate and cause fire or explosion.



### WARNING

#### PARKING MACHINE AFTER FAILURE

- If the lift truck has suffered a failure and the lift truck must be parked without lowering the forks, put markers on the tips of the forks and take steps to prevent pedestrians or other vehicles from hitting the forks.
- Select a parking place where people or vehicles do not pass, and stop the lift truck so that it is difficult for anyone to go under the forks. (The area under the forks is a DANGER zone).
- Place a stand or something similar under the inner mast rail or forks to prevent unexpected drop of the forks.
- Remove the key from the faulty lift truck and hang signs in the operator's compartment to prevent its use.



AB60140B



### WARNING

#### ABRUPT LOWERING OF STUCK FORK

- Because a stuck fork may drop down unexpectedly, do not go under the fork when it is in this condition.
- Be very careful when dealing with this problem to prevent damage or injury, and warn those in the work area.

## 10. INSPECTION AND MAINTENANCE

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### 10. INSPECTION AND MAINTENANCE



#### USE QUALIFIED PERSONNEL FOR INSPECTION AND MAINTENANCE

- Only persons authorized by the owner or operator of the equipment and having proper certification (local or national) may carry out inspection, maintenance and repairs of the lift truck.
- If inspection, maintenance or repair work is carried out incorrectly, it is very dangerous.



#### MAINTENANCE LOCATION

- When carrying out inspection and maintenance, use a level, dry, dust-free area.
- If the work is carried out inside a building, make sure that there is ample ventilation.



#### PRECAUTIONS FOR INSPECTION AND MAINTENANCE

- To be prepared in the event of a fire, have a fire extinguisher nearby and make sure that you know how to use it.
- Before carrying out inspection, lower the forks to the ground and stop the machine.
- Do not run the engine unless it is necessary.
- Place the directional lever, speed lever and work equipment control levers in neutral.



#### PRECAUTIONS WHEN CARRYING OUT INSPECTION AND MAINTENANCE

- Wipe off any oil or grease. Immediately wipe up any oil that has leaked. If the lift truck is dirty, it becomes difficult or impossible to find cracks or other problems. Always clean the lift truck before starting inspection.
- Do not smoke or allow any flame to exist under any circumstances. Do not use any cloth which is soaked in fuel, flammable solvent, oil or grease. There is danger that it may catch fire.
- Wear suitable clothes for the job.
- Use suitable safety and protective equipment (hard hat, safety boots, safety glasses, gloves) for the job.
- When working on top of the lift truck, be careful not to fall.
- Do not put your feet under the forks.
- When opening or closing the floor plate or engine hood, be careful not to get your hands or body caught.
- When carrying out inspection with the forks raised, insert a stand under the inner mast to prevent the forks and mast from dropping.
- When carrying out the job with another worker, decide who is the leader and carry out the job in accordance with instructions from that person.
- After repairing, make sure that the trouble has been corrected by performing a trial run.
- During the trial run, start and operate the lift truck carefully because it is possible that the trouble has not been fully corrected or that defective parts have not been removed.



### CAUTION

#### USE SUITABLE TOOLS

- Always use tools that are suited for inspection and maintenance.
- It is extremely dangerous to use broken tools or tools designed for another purpose.



A0056120



### WARNING

#### REPLACE SAFETY CRITICAL PARTS PERIODICALLY

- Even if no abnormality is found, always replace safety critical parts periodically. As time passes, these parts deteriorate and may cause fire or failure in the work equipment system. The list of safety critical parts is on page 3-15.
- However, if these parts show any abnormality before the replacement interval has passed, they should be repaired or replaced immediately.



### WARNING

#### PRECAUTIONS WITH HIGH TEMPERATURE COOLANT

- Immediately after using the lift truck, the engine coolant is at high temperature (HOT!) and high pressure. Do not remove the radiator cap under these conditions. Hot water may spurt out and cause burns.
- When removing the radiator cap, use a rag and turn it slowly to release the internal pressure.
- When checking the coolant level, stop the engine and wait for the engine to cool down before checking. For lift trucks equipped with a sub-tank or reservoir, check the level in the sub-tank.
- When adding water on lift trucks equipped with a sub-tank, add the water to the sub-tank.



A0055050

## 10. INSPECTION AND MAINTENANCE



### WARNING

#### PRECAUTIONS WITH HIGH PRESSURE, HIGH TEMPERATURE OIL

- Immediately after using the lift truck, the oil is at high temperature. Do not drain the oil or replace the filter when the oil is hot. Hot oil may spurt out and cause burns.
- When carrying out inspection and maintenance, wait for the oil temperature to go down, and carry out the operation in the order given in this manual.
- Do not forget that the work equipment circuits are always under pressure. Do not add oil, drain oil or carry out maintenance or inspection before completely releasing the internal pressure.
- If oil is leaking under high pressure from holes, it is dangerous if the jet of high-pressure oil hits your skin or eyes. Always wear safety glasses and thick gloves, and use a piece of cardboard or a sheet of plywood to check for oil leakage.
- Release the internal pressure before checking the accumulator piping.
- If you are hit by a jet of high-pressure oil, consult a doctor immediately.

INCORRECT



A0055180

CORRECT



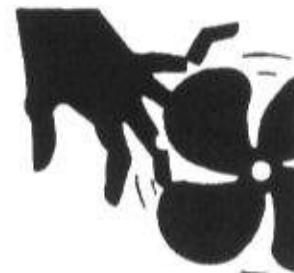
A0055190



### WARNING

#### ROTATING FAN AND BELT

- It is extremely dangerous if you or any tool touches or gets caught in the fan or fan belt when the fan is rotating. Never touch the fan when it is rotating.
- Always stop the engine before inspecting rotating parts.
- When inspecting the areas around rotating parts, do not allow anything to come close which may get caught.



AB801500A





### WARNING

#### BE CAREFUL NOT TO GET CAUGHT OR FALL

- NEVER put your hands or feet into the mast structure. There is danger that you will get caught in moving parts and be seriously injured.
- Do not use the mast, load backrest or dashboard as a ladder. If you slip, there is danger that you will fall.



AB001320



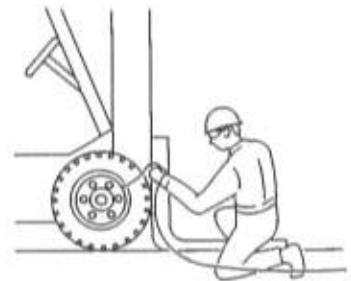
AB001330



### DANGER

#### CHECKING AND INFLATING TIRES

- If the tire inflation pressure is low, it will affect truck stability. However, do not inflate the tires immediately. The inflation pressure may have gone down because of damage to the rim. If the rim is damaged or cracked and the tires are inflated, there is danger that the rim will break when the tire is under high pressure, and this may cause personal injury or death.
- For safety, when checking tire pressure, place your body in front of the tread face of the tire. Do not check from the side face of the tire.
- Suitable qualifications are needed for tire inflation work on a lift truck. It is not like an automobile. Always have the work carried out by properly qualified personnel.
- The tire inflation pressure on a forklift truck is several times higher than the pressure on an automobile. When the tires are being inflated, there is danger that dirt or dust may be thrown up by the compressed air and enter your eyes. Always wear safety glasses to protect your eyes.



AB001510

## 10. INSPECTION AND MAINTENANCE

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### **WARNING** HANDLING TIRES

Disassembly and assembly of tires should be carried out by a tire dealer. The tire pressure is extremely high, so caution is needed when handling tires.

- The wheel is fitted with mounting (lug) nuts. It also has rim nuts and bolts used to join the rim halves. When removing the tire from the lift truck, do not loosen the rim nuts and bolts. The tire is under high pressure, and there is a significant risk that the rim nuts and bolts may fly off. Relieve tire inflation pressure before removing.
- When the tires have been replaced, carry out a test drive and check again for any loose mounting bolts. If the tightening torque is low, tighten to the specified torque.

### **WARNING** JACKING UP LIFT TRUCK (when checking or replacing tires)

- Do not go under the fork lift truck when it is jacked up.
- Check the following before jacking up the lift truck. (For details, see 3-page 41).
  - 1) Check that there is no one on the lift truck.
  - 2) Check that there is no load on the forks.
- When jacking up, stop when the tires come off the ground surface. Put blocks under both sides of the frame to prevent the lift truck from coming down.
- Put blocks under any tires contacting the ground to prevent the lift truck from moving.



### **WARNING** LIFTING LIFT TRUCK (when checking tires)

- Lift truck slinging work should be carried out by a qualified person who has completed a course in correct lifting methods.
- Fit wire ropes to the specified lifting points.
- When lifting the lift truck, check that the wire ropes have ample strength and are not damaged.
- Block the tires contacting the ground to prevent the lift truck from moving.
- Insert blocks to prevent the lift truck from coming down.
- Do not go under the lift truck during the lifting operation.
- If the specified lifting point is the counterweight, check that the counterweight mounting bolts are tightened to the specified torque before carrying out the lifting operation. Check also that there is no damage to the lifting portion on the counterweight.



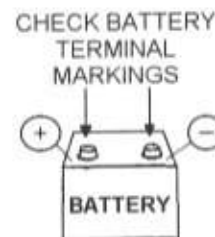




### WARNING

### BATTERY HAZARD PREVENTION

- Battery electrolyte contains sulfuric acid and can quickly burn the skin and eat holes in clothing. If you spill electrolyte on yourself, immediately flush the area with a large quantity of water.
- Battery electrolyte can cause blindness if splashed into the eyes. If electrolyte gets into your eyes, flush them immediately with large quantities of water and consult a doctor at once.
- If you accidentally drink electrolyte, drink a large quantity of water or milk mixed with beaten egg white or vegetable oil. Call a doctor or poison control center immediately.
- When working with batteries, ALWAYS wear safety glasses or goggles.
- Batteries generate hydrogen gas. Hydrogen gas is highly EXPLOSIVE, and is easily ignited with a small spark or flame. Do not smoke or create any spark near a battery.
- Before working with batteries, stop the engine and turn the starting switch to the OFF position.
- When removing the battery, remove the cable from the negative (-) terminal first. When installing the battery, install the cable to the positive (+) terminal first. This prevents possible sparks or arcing between the positive terminal and the positive cable.
- Avoid short-circuiting the battery terminals through accidental contact with tools or other metal objects across the terminals.
- Tighten the battery terminals securely. Loose terminals can generate sparks and lead to an explosion.
- When removing or installing the battery, confirm which is the positive (+) terminal and which is the negative (-) terminal. Be careful not to connect the cables to the opposite / incorrect terminals.
- Tighten the battery caps securely.
- When cleaning the battery, leave the battery caps tightened.



AC055100A



### WARNING

### DO NOT PUT METAL OBJECTS ON TOP OF BATTERY

- Never place any metal objects on top of the battery. There is danger that they will cause a short circuit and start a fire.



### WARNING

### CHANGING LPG FUEL TANKS

- Only trained and certified personnel may change LPG tanks.
- Turn ignition switch to the OFF position.
- Change LPG tanks in designated and well ventilated area approved for this operation.
- Check LPG tank and lines for fuel leaks.
- Ensure no sparks, flame or ignition sources are present.
- Once the full tank is in place, ensure it is mounted correctly and securely. Check all connections.
- Do not attempt to start the truck until all LPG odor is gone.
- If the truck is hard to start, contact a certified mechanic to repair the problem. Tag the truck "Out of Service" until properly repaired.



### **WARNING**

#### **PRECAUTIONS WHEN CHARGING**

When the battery is charged, hydrogen gas is generated and the battery is heated by the chemical change. To prevent the danger of gas explosion, always do as follows:

- Carry out the charging operation in a well-ventilated place.
- Do not smoke or allow any flame.
- Start the charging operation when the temperature of the battery electrolyte is below 95° F (35° C). If the electrolyte temperature goes above 122° F (50° C) during the charging operation, wait for it to go down below 95° F (35° C) before starting charging operation again.
- When using a battery charger to charge the battery, take the battery caps off.



### **WARNING**

#### **STARTING WITH BOOSTER CABLES**

- ALWAYS wear safety glasses or goggles when starting the lift truck with booster (jumper) cables.
- When starting using the battery of another lift truck, do not allow the two lift trucks to touch.
- Stop the engine before connecting the cables.
- Be extremely careful not to let the cables get caught in the fan or fan belt.
- Connect the batteries in parallel; positive-to-positive and negative-to-negative. NEVER connect positive to negative.
- DO NOT short-circuit the starter terminals to start a forklift truck.



### **WARNING**

#### **DO NOT PUSH START**

- Do not push the lift truck to start the engine. There is danger that the lift truck may suddenly start and operate unexpectedly.



### **WARNING**

#### **HANDLING BRAKE FLUID**

It is dangerous if the brakes do not work because, in this condition, the lift truck cannot be stopped. Always do the following:

- Check the level of the brake fluid periodically.
- Always use the specified brake fluid.
- Check that the breather of the brake fluid reserve tank is not clogged.
- Be careful not to let dirt or dust get into the brake fluid reserve tank.



### HANDLING ANTIFREEZE

- Antifreeze can be flammable. Keep away from flame when handling.
- Antifreeze is poisonous, so do not drink it. If you drink it by mistake, drink large amounts of water, vomit it out, and get medical attention immediately. Follow safety precautions on container.



### WASTE MATERIALS

- Obey appropriate laws and regulations when disposing of harmful items and materials such as oil, fuel, solvent, filters and batteries.

INCORRECT



AB801560

## 11. STRUCTURE AND STABILITY OF THE LIFT TRUCK

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### 11. STRUCTURE AND STABILITY OF THE LIFT TRUCK (TO PREVENT LIFT TRUCK FROM TIPPING)

To operate the lift truck safely, it is important to understand the structure and stability of the lift truck.

#### **CAUTION** STRUCTURE OF LIFT TRUCK

A forklift truck consists basically of the lifting mechanism (the forks and mast) at the front and the lift truck itself (with tires) at the rear.

The front wheels of the lift truck act as the fulcrum, and the center of gravity of the lift truck and center of gravity of the load are kept in balance.

The relationship between the position of the center of gravity of the lift truck and the center of gravity of the load is extremely important for maintaining the safety of the lift truck.

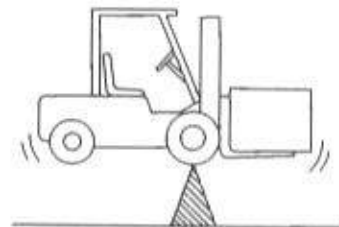


ABB01570

#### **CAUTION** CENTER OF GRAVITY OF LOAD

The loads carried by forklift trucks come in various shapes (and weights) from boxes to planks and long objects. To judge the stability of the lift truck, it is important to distinguish the position of the center of gravity for loads of various shapes.



ABB01580



## CAUTION

### CENTER OF GRAVITY AND STABILITY

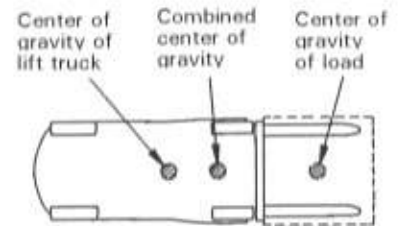
The stability of the lift truck is determined by the position of the combined center of gravity resulting from the combination of the centers of gravity of the lift truck and the load.

When the lift truck is carrying no load, the center of gravity remains as it is, but when the lift truck is loaded, the combined center of gravity becomes the combination of the centers of gravity of both the lift truck and the load.

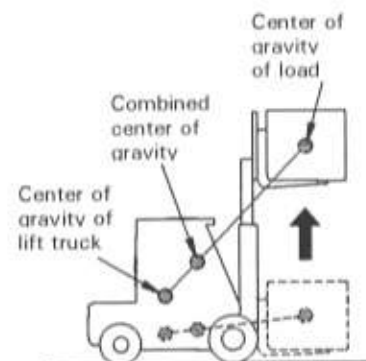
The position of the center of gravity of the load changes according to whether the mast is tilted forward or back or whether the mast is raised or lowered.

The position of the combined center of gravity of the lift truck is governed by the following factors:

- Size, weight, shape of load
- Lifting height
- Tilting angle of mast
- Inflation pressure of tires
- Acceleration, deceleration, turning radius
- Condition of road surface, angle of road
- Type of attachments



AB80159B



It is assumed that the lift truck body is constant. AB80160B

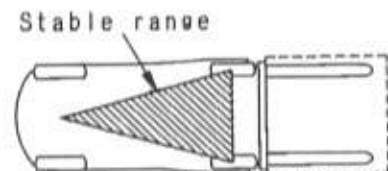


## CAUTION

### STABLE RANGE OF CENTER OF GRAVITY

For the lift truck to be stable, the position of the combined center of gravity must be inside the triangle (stable range of center of gravity) formed by the ground contact points of the left and right front tires and the center of the rear axle.

If the position of the overall center of gravity is in front of the front axle, the front tires will form the fulcrum and the lift truck will tip to the front. If the position of the combined center of gravity moves outside the triangle forming the stable area for the center of gravity, the lift truck will tip in the direction where the combined center of gravity moves outside of the triangle.



AB80161B



## 11. STRUCTURE AND STABILITY OF THE LIFT TRUCK

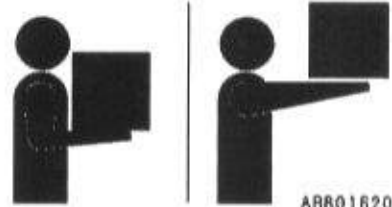


### CAUTION

### MAXIMUM LOAD (weight and center of gravity of load)

The horizontal distance between the center of gravity of the load on the forks and the load backrest of the forks, or the front face of the forks (whichever is shorter), is called the load center.

The maximum load is the maximum weight of the load that can be loaded at the standard load center. The relationship between the maximum load and the load center is given in the load capacity charts on the nameplate on the lift truck. If the load center moves to the front of the forks, the overall center of gravity also moves to the front, so this means that the load must be reduced.



AB801620



### CAUTION

### ALLOWABLE LOAD

The allowable load is stamped on the nameplate to show the relationship regarding the position of the load center, the height of the fork and the maximum load. Before loading the forks, check that the load and load center are within the permitted range on the stamped allowable load.

If the shape of the load is complex, set it so that the heaviest part of the load is at the center of the forks and set the load close to the load backrest.

If the forks are loaded more than the allowable value, the drive wheels will float during travel and the steering system will not work. This is very dangerous. Furthermore, the lift truck will tip over easily under this condition. Therefore, be sure to keep the load below the allowable value and properly balanced.

Komatsu Forklift U.S.A., Inc.						
MODEL	TYPE			YEAR	SERIAL #	
FRONT TIRE	SERIAL #			TILT		
REAR TIRE						
ATTACHMENT MODEL	A	B	C	CAPACITY	TRUCK WEIGHT	TRUCK WEIGHT
	10	20	30	50	10	15
	20	30	40	75	15	20
	30	40	50	100	20	25
	40	50	60	125	25	30
	50	60	70	150	30	35
	60	70	80	175	35	40
	70	80	90	200	40	45
	80	90	100	225	45	50
	90	100	110	250	50	55
	100	110	120	275	55	60
	110	120	130	300	60	65
	120	130	140	325	65	70
	130	140	150	350	70	75
	140	150	160	375	75	80
	150	160	170	400	80	85
	160	170	180	425	85	90
	170	180	190	450	90	95
	180	190	200	475	95	100
	190	200	210	500	100	105
	200	210	220	525	105	110
	210	220	230	550	110	115
	220	230	240	575	115	120
	230	240	250	600	120	125
	240	250	260	625	125	130
	250	260	270	650	130	135
	260	270	280	675	135	140
	270	280	290	700	140	145
	280	290	300	725	145	150
	290	300	310	750	150	155
	300	310	320	775	155	160
	310	320	330	800	160	165
	320	330	340	825	165	170
	330	340	350	850	170	175
	340	350	360	875	175	180
	350	360	370	900	180	185
	360	370	380	925	185	190
	370	380	390	950	190	195
	380	390	400	975	195	200
	390	400	410	1000	200	205
	400	410	420	1025	205	210
	410	420	430	1050	210	215
	420	430	440	1075	215	220
	430	440	450	1100	220	225
	440	450	460	1125	225	230
	450	460	470	1150	230	235
	460	470	480	1175	235	240
	470	480	490	1200	240	245
	480	490	500	1225	245	250
	490	500	510	1250	250	255
	500	510	520	1275	255	260
	510	520	530	1300	260	265
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	530	540	550	1350	270	275
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	560	570	580	1425	285	290
	570	580	590	1450	290	295
	580	590	600	1475	295	300
	590	600	610	1500	300	305
	600	610	620	1525	305	310
	610	620	630	1550	310	315
	620	630	640	1575	315	320
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	640	650	660	1625	325	330
	650	660	670	1650	330	335
	660	670	680	1675	335	340
	670	680	690	1700	340	345
	680	690	700	1725	345	350
	690	700	710	1750	350	355
	700	710	720	1775	355	360
	710	720	730	1800	360	365
	720	730	740	1825	365	370
	730	740	750	1850	370	375
	740	750	760	1875	375	380
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	760	770	780	1925	385	390
	770	780	790	1950	390	395
	780	790	800	1975	395	400
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	800	810	820	2025	405	410
	810	820	830	2050	410	415
	820	830	840	2075	415	420
	830	840	850	2100	420	425
	840	850	860	2125	425	430
	850	860	870	2150	430	435
	860	870	880	2175	435	440
	870	880	890	2200	440	445
	880	890	900	2225	445	450
	890	900	910	2250	450	455
	900	910	920	2275	455	460
	910	920	930	2300	460	465
	920	930	940	2325	465	470
	930	940	950	2350	470	475
	940	950	960	2375	475	480
	950	960	970	2400	480	485
	960	970	980	2425	485	490
	970	980	990	2450	490	495
	980	990	1000	2475	495	500
	990	1000		2500	500	505



### WARNING

### SPEED AND ACCELERATION

If a stationary object is not subjected to external force, it will remain stationary. In the same way, if a moving object is not subjected to external force, it will continue to move at the same speed. This is called inertia.

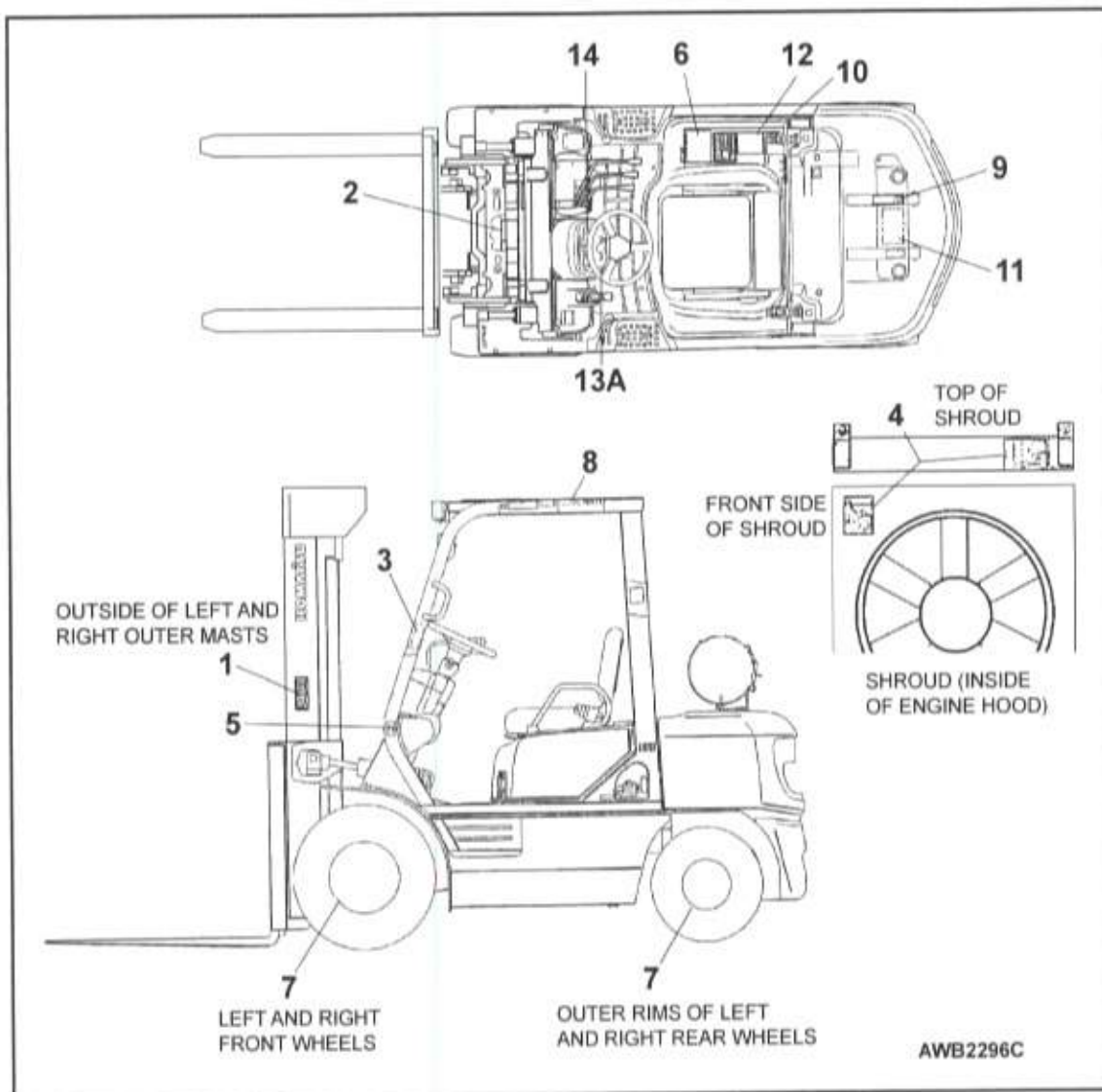
Because of inertia, a force is applied towards the rear when the lift truck starts to move, and is applied towards the front when the lift truck stops. If the brakes are applied suddenly, there is danger of a large force being applied towards the front which may make the lift truck tip or the load come off the forks.

When the lift truck is turned, a centrifugal force is applied to the outside from the center of the turn. This force pushes the lift truck to the outside and makes it tip. The range of stability to the left and right is particularly small, so it is necessary to reduce speed when turning, in order to prevent the lift truck from tipping. If the lift truck is traveling with a raised load, the position of the overall center of gravity is high, so the danger of tipping to the front, left or right becomes greater.

## 12. SAFETY LABEL STICKING POSITIONS

### 12.1 SAFETY LABEL STICKING POSITIONS

Keep these labels clean. If a label (decal) comes off, stick it on again in the same location or replace with a new one. Treat all labels (decals) in the same way, whether they are safety related or not.



See following pages for labels corresponding to numbered locations in figure above.

## 12. SAFETY LABEL STICKING POSITIONS

1. Prohibit the operator from riding on the forks and lifting or lowering himself. Never enter the area under the forks. (Part No. 3EB-96-A5920)



2. Do not put your hand on the mast! (Warning to avoid getting hand caught) (Part No. 3EB-96-A5940)



3. Caution before operating machine. (Part No. 3EB-96-A5960)



4. Never touch fan when rotating. (Part No. 3EB-96-A5930)




5. No one is permitted to ride the lift truck together with the operator. (Part No. 3EB-96-A5910)





**6. Warning for operation (decal)  
(Part No. 3EB-96-A5990)**

 **WARNING**

SERIOUS INJURY OR DEATH MAY RESULT IF YOU FAIL TO FOLLOW THESE PRECAUTIONS!

Before Operating

- Do not operate or repair truck unless trained and authorized.
- Read and understand all warnings and instructions in manuals and on truck before operating.
- Dealers have replacement manuals.
- Check truck before use. If truck is in need of repair, do not operate until restored to safe condition.
- Do not start truck if fuel is leaking or has leaked.
- Use attachments for intended purpose only.

While Operating

- Operate truck only from operator's seat.
- Keep truck under control at all times.
- Do not over load truck. Check capacity plate for load weight and load center.
- Avoid any sudden starts, stops, turns or change of direction.
- Obey traffic safety rules. Yield right of way to pedestrians.
- Keep clear view of travel path. If load being carried blocks forward view, travel with load trailing.
- Slow down and sound horn when vision is blocked.
- Watch clearances, especially forks, mast, overhead guard and tailswing area.
- Slow down for turns and on uneven or slippery surfaces.
- Avoid running over loose objects.
- Never angle or turn on incline.
- Travel with load uphill when loaded.
- Travel with lifting mechanism downhill when empty.
- Secure dockboard or bridgeplate properly.
- Do not exceed rated capacity.
- Use special care when operating on dockboard or bridgeplate.
- Do not handle unstable loads or loosely stacked loads.
- Do not handle loads higher than load backrest.
- Space forks as far as load permits.

- Be sure load is centered and forks are completely under load.
- Never lift load with mast tilted forward.
- Do not tilt forward when elevated except to pick up or deposit load.
- Travel with load or lifting mechanism low and tilted back.
- Tipover can occur if operated improperly.
- Do not jump if truck begins to tipover. Hold on firmly and lean away from point of impact. Avoid being trapped between truck and ground.

General Precautions


- Allow no one to stand or pass under or near load or lifting mechanism.
- Never place any part of body into mast structure, between mast and truck or outside truck.
- Do not carry passengers on any part of truck.
- Lift no one under any circumstances.
- Do not operate without overhead guard and load backrest.
- Fill fuel or charge battery only in specified place.
- Stop engine when fueling and avoid open flame or sparks, and provide adequate ventilation.
- Keep vent caps clear when charging battery.
- Disconnect battery during servicing.

After Operating

- Before getting off truck, shift F-R lever and high-low lever (clutch type) to neutral position, fully lower lifting mechanism, and pull parking lever securely.
- Shut off power when leaving truck unattended.
- Block wheels when parking on incline.

3EB-96-A5990

**7. Warning for use of split rim (pneumatic tires only)(decal)  
(Part No. 3EB-96-A5970)**

 **WARNING**

Deflate tire completely  
before removing rim nuts.

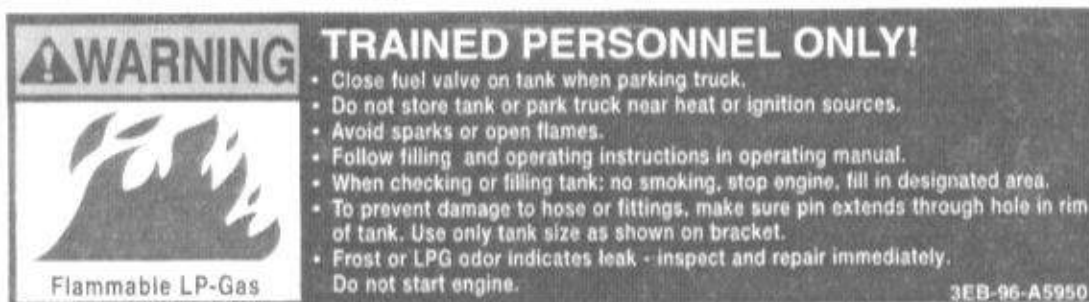
3EB-96-A5970

## 12. SAFETY LABEL STICKING POSITIONS

### 8. Prevention of tip-over (decal) (Parts No. 3EB-96-A5111)



### 9. Warning for handling LPG/FLAMMABLE GAS (decal) (Part No. 3EB-96-A5950)



### 10. "NO JUMP START" decal (Part No. 09842-A0481) Located top center of starter solenoid.



## 12. SAFETY LABEL STICKING POSITIONS

### 11. LPG TANK CHANGE INSTRUCTIONS DECAL (On LPG Tank Bracket Base Plate) (Part No. 3EB-05-F5690)

**LPG FUEL CYLINDER REPLACEMENT PROCEDURE**

1. NO SMOKING — DO NOT REPLACE FUEL CYLINDERS IN AREAS THAT HAVE A SOURCE OF FUEL IGNITION.
2. CLOSE CYLINDER VALVE AND RUN ENGINE UNTIL IT STOPS PRIOR TO DISCONNECTING THE FUEL HOSE FROM THE TANK.
3. REPLACE FUEL CONTAINER. BE SURE TO USE THE CORRECT SIZE AND TYPE PER THE CYLINDER DESCRIPTION PLATE. SECURELY MOUNT AND POSITION AS FOLLOWS:
  - a. WITH LOCATING PIN THROUGH POSITIONING HOLE IN COLLAR.
  - b. WITH SLOT IN FOOTRING OVER LOCATING KEYWAY.
4. CONNECT FUEL HOSE. OPEN VALVE SLOWLY SO THE HOSE AND TANK PRESSURE CAN EQUALIZE OR THE VALVE MAY SLUG. SHOULD LEAKAGE OCCUR, CLOSE VALVE AND HAVE QUALIFIED PERSONNEL MAKE REPAIRS.
5. USE FUEL MANUFACTURED TO NATIONAL GAS PROCESSORS ASSOCIATION "HD-5" SPECIFICATION.

NOTE: THE ABOVE IS PROVIDED AS A GUIDE. FOR ADDITIONAL INFORMATION, CONSULT THE NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET 58 FOR THE SAFE STORAGE AND HANDLING OF LIQUIFIED PETROLEUM GASES.

3EB-05-F5690

### 12. LPG SAFETY MAINTENANCE DECAL (Right side of seat on hood upper surface) (Part No. 3EB-05-F5730)

**RECOMMENDED SAFETY MAINTENANCE PROCEDURE  
FOR LP GAS FUELED FORKLIFT TRUCKS**

**WARNING:** All fuels used in internal combustion engines are flammable and should be treated with caution. All cigarette smoking and open flames should be prohibited. Sparks should be avoided. The fuel cylinder should be mounted so that it does not extend outside the truck and should also be properly positioned by using the locating pin or key way.

The fuel valve should be turned off when the machine is not in service.  
Cast fittings should not be used in the LP-GAS system.  
Use only Underwriters Laboratories or Factory Mutual listed LP-GAS hose assemblies where pressure fuel lines are required.  
All pipe threaded fittings should be installed using an approved sealing compound.  
Fuel lines should be supported by clamps to minimize chafing and wear.  
The LP-GAS solenoid valve should be wired to an automatic shut off switch (oil pressure or vacuum) to prevent leakage of gas in the event the ignition is on without the engine running.

Check the propane solenoid or vacuum shutoff valve for leakage as follows:

1. Turn fuel cylinder valve off, start and run engine until it stops.
2. Install a 0 to 30 PSI pressure gauge per instruction A or B.
  - A. For propane systems with a single unit consisting of primary and secondary regulators, install at the primary test port.
  - B. For propane systems consisting of two separate regulators, install between the primary and secondary stages.
3. Turn cylinder fuel valve on. The pressure gauge should maintain a zero reading. If it does not, the solenoid valve or vacuum shutoff valve must be repaired or replaced.

An odor is added to LP-GAS to help detect leaks. If the gas odor is detected the fuel cylinder supply valve and engine should be turned off. Remove all sources of ignition, and ventilate the area. Make all of the necessary repairs before you turn the fuel supply on.

The complete LP-GAS system should be inspected periodically. Check all hoses for wear, connections for leaks and all parts for damage.

NOTE: Fuel hoses have a limited life expectancy. They should be checked for cracking and drying due to age. Hoses with visible signs of age should be replaced. Use only Underwriters Laboratories or Factory Mutual listed LP-GAS parts for replacements.

NOTE: The above information is provided as a guide. Consult the National Fire Protection Association pamphlet 58 for the safe storage and handling of liquefied petroleum gases. Governmental safety regulations in your locality could vary. Check with the authority having jurisdiction to be sure that you meet all of their requirements. Contact the manufacturer for detailed service information.

**SERVICE WORK SHOULD BE PERFORMED BY  
QUALIFIED PERSONNEL ONLY.**

## 12. SAFETY LABEL STICKING POSITIONS

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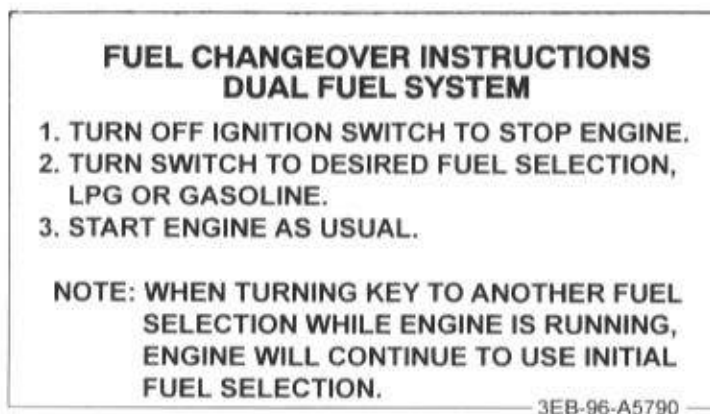
### 13. LPG FUEL SYSTEM DECALS

- A. LPG LOW FUEL ALARM LIGHT (On dashboard to left of steering column)(OP)



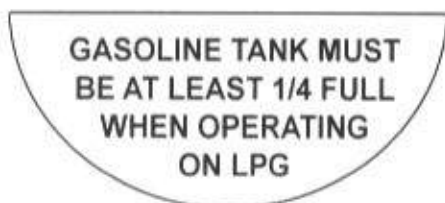
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- B. DUAL-FUEL SYSTEM FUEL CHANGE-OVER INSTRUCTIONS (On air cleaner housing)  
(Part No. 3EB-96-A5790)



3EB-96-A5790

14. FUEL LEVEL REQUIREMENTS - GASOLINE AND LPG (On dashboard over Fuel Gauge) (Dual-Fuel applications only)



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Dual-Fuel Truck

LPG Fuel Truck