OPERATING MANUAL

GP/GLP/GDP040–060 RG/TG/ZG (A875)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

YALE CORPORATION

PART NUMBER 520371709

LIFT TRUCK MODEL _____	**SERIAL NUMBER** _____
ENGINE MODEL _____	**SERIAL NUMBER** _____
TRANSMISSION TYPE _____	**SERIAL NUMBER** _____
MAST LIFT HEIGHT _____	**GROUP NUMBER** _____
CARRIAGE TYPE _____	**GROUP NUMBER** _____
DRIVE TIRE SIZE _____	**STEERING TIRE SIZE** _____

SPECIAL EQUIPMENT OR ATTACHMENTS

_____

_____

_____

_____

FOREWORD

To OWNERS, USERS, and OPERATORS:

The safe and efficient operation of a lift truck requires skill and alertness on the part of the operator. To develop the skill required the operator must:

- Receive training in the proper operation of THIS lift truck.
- Understand the capabilities and limitations of the lift truck.
- Become familiar with the construction of the lift truck and see that it is maintained in good condition.
- Read and understand the warnings and operating procedures in this manual.

In addition a qualified person, experienced in lift truck operation, must guide a new operator through several driving and load handling operations before the new operator attempts to operate the lift truck alone.

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

Various laws and regulations require the employer to train lift truck operators. These laws and regulations include:

Occupational Safety and Health Act (USA)

Canada Material Handling Regulations

NOTE: A comprehensive operator training program is available from YALE CORPORATION. For further details, contact your dealer for YALE lift trucks.

This **Operating Instructions** manual contains information necessary for the operation and maintenance of a basic fork lift truck. Optional equipment is sometimes installed that can change some operating characteristics described in this manual. Make sure the necessary instructions are available and understood before operating the lift truck.

Some of the components and systems described in this **Operating Instructions** manual will NOT be installed on your unit. If you have a question about any item described, contact your dealer for YALE lift trucks.

Additional information that describes the safe operation and use of lift trucks is available from the following sources:

- Employment safety and health standards or regulations (Examples: *Occupational Safety and Health Standards (USA)*, *Canada Material Handling Regulations*.
- Safety codes and standards (Example: *American National Standard, ANSI B56.1, Safety Standard For Low Lift And High Lift Trucks*.
- Publications from government safety agencies, government insurers, private insurers and private organizations (Example: *Accident Prevention Manual For Industrial Operations,* from the National Safety Council).

NOTE: YALE lift trucks are not intended for use on public roads.

NOTE: The following symbols and words indicate safety information in this manual:

⚠ WARNING

Indicates a condition that can cause death or injury!

⚠ CAUTION

Indicates a condition that can cause injury or property damage!

CONTENTS

FOREWORD **1**
To OWNERS, USERS, and OPERATORS: 1
CONTENTS **3**
WARNING **7**
MODEL DESCRIPTION **9**
GENERAL 9
OPERATOR PROTECTION EQUIPMENT 9
NAMEPLATE 10
SAFETY LABELS 11
INSTRUMENTS AND CONTROLS 15
OPERATING PROCEDURES **27**
GENERAL 27
Know Your Lift Truck 27
Stability And Center Of Gravity 28
Capacity (Weight And Load Center) 30
INSPECTION BEFORE OPERATION 30
Checks With The Engine Stopped 30
Starting Procedures 31
Starting Procedures, LPG Engine 31
Starting Procedures, Diesel Engine 32
Checks With The Engine Running 33
OPERATING TECHNIQUES 34
Basic Operating Procedures 34
Driving And Direction Changes 36
Inching 37
Steering (Turning) 37
Load Handling, General 39
Load Handling, Lifting, Lowering And Tilting 40
Load Handling, How To Engage And Disengage A Load 42
Load Handling, Travelling 46
HIGHWAY TRUCKS, RAIL CARS AND DOCKS 49
ATTACHMENTS 50
STOPPING 51
PARKING 51
MAINTENANCE **53**
GENERAL 53
Serial Number Data 54
HOW TO MOVE A DISABLED LIFT TRUCK 54
How To Tow the Lift Truck 54
HOW TO PUT A LIFT TRUCK ON BLOCKS 55
How To Raise the Drive Tires 55
How To Raise the Steering Tires 56

MAINTENANCE SCHEDULE 58
MAINTENANCE PROCEDURES 69
EVERY 8 HOURS OR DAILY 69
HOW TO MAKE CHECKS WITH THE ENGINE STOPPED 69
Tires and Wheels 69
Forks 71
Forks, Adjustment 71
Forks, Removal 71
Forks, Installation 73
Inspection of Forks, Mast, and Lift Chains ... 73
Safety Labels 75
Operator Restraint System 75
Steering Column Latch 77
Check For Fuel, Oil Or Coolant Leaks 77
Drive Belt 77
Engine Oil 77
Powershift Transmission Oil Temperature 80
Powershift Transmission Oil Level 80
Hydraulic System Oil 81
Battery 81
Air Filter 82
HOW TO MAKE CHECKS WITH THE ENGINE RUNNING 84
Gauges, Lights, Horn, Fuses and Relays 85
"Check Engine" Light (Mazda and GM 3.0L LPG Closed-Loop With Emission System) 86
"Check Engine" Light (GM 3.0 Liter Gasoline) 86
Engine Oil Pressure 86
Cooling System 86
Steering System 87
Service Brakes 87
Parking Brake 87
Fuel System 88
Water Separator, Diesel Engine 89
Fuel Filter, Diesel Engine 89
Remove Air From The Diesel Fuel System ... 89
Control Levers and Pedals 89
Lift System Operation 90
Cooling System 91
HOW TO ADD FUEL TO THE LIFT TRUCK 92
Liquefied Petroleum Gas (LPG) 92
Gasoline or Diesel Fuel 96
WHEELS AND TIRES 96
General 96
How To Repair A Pneumatic Tire 96
Remove The Wheels From The Lift Truck 96

Remove The Wheel From The Tire 98
Install The Wheel in the Tire 101
Add Air To The Tires 103
Install the Wheels 104
INSTALLATION PROCEDURES, DUAL DRIVE WHEELS 105
SOLID RUBBER TIRES 105
Remove The Tire From The Wheel 106
Install The Tire On The Wheel 106
OPERATING PROCEDURES FOR A NEW OR REBUILT ENGINE 109
CHANGES TO THE OVERHEAD GUARD 109
HOW TO PUT INTERNAL COMBUSTION ENGINE (I.C.E.) TRUCKS IN STORAGE 109
HOW TO PUT BATTERIES IN STORAGE 110
HOW TO STORE A LIFT TRUCK 111
HOW TO MOVE A LIFT TRUCK ON A TRANSPORT 113
Loading 113
Unloading 114
PREPARATION FOR USE 115
Preparation After Transport 115
Preparation After Storage 115

NOTES

A **WARNING** label with this information must be on the lift truck.

FAILURE to follow these instructions can cause SERIOUS INJURY or DEATH!
AUTHORIZED, TRAINED OPERATOR ONLY!

KNOW THE EQUIPMENT:

- KNOW operating, inspection and maintenance instructions, and warnings in MANUAL.
- DO NOT operate or repair truck unless trained and authorized.
- INSPECT truck before use. Do not operate if truck needs repair. Tag truck and remove key. Repair truck before use.
- USE attachments for intended purpose only.
- MAKE SURE truck is equipped with overhead guard and load backrest adequate for the load.

LOOK WHERE YOU ARE GOING:
- IF YOU CAN'T SEE, DON'T GO!
- TRAVEL in reverse if load blocks forward vision.
- MAKE SURE tailswing area is clear before turning.
- SOUND horn at intersections or where vision is blocked.
- WATCH clearances, especially overhead.

KNOW YOUR LOADS:
- HANDLE only stable loads within specified weight and load center. See plate on this truck.
- DO NOT handle loose loads higher than load backrest.
- SPACE forks as far apart as load allows and center load between forks. Keep load against load backrest.

USE COMMON SENSE:

Sitdown Rider Forklift Trucks 4/91

- NEVER transport people on any part of the truck.
- OBEY traffic rules. Yield right-of-way to pedestrians.
- BE in complete control at all times.
- ALLOW NO ONE under or near lift mechanism or load.
- OPERATE truck only from operator's seat.
- KEEP arms, legs, and head inside operator's compartment.
- DO NOT move truck if anyone is between truck and stationary object.
- DO NOT use truck to lift people unless no other practical option. Then use only securely attached special work platform. Follow instructions in manual.
- BEFORE DISMOUNTING, neutralize travel control, lower carriage, set brake. WHEN PARKING, also shut off power, close LPG fuel valve, block wheels on inclines.

KNOW THE AREA:
- NEVER enter a trailer or railroad car unless its wheels are blocked.
- CONFIRM floor strength.
- FILL fuel tank or charge battery only in designated area.
- **TURN OFF engine when fueling**
- AVOID sparks or open flame. Provide ventilation.
- DO NOT start truck if fuel is leaking.
- KEEP vent caps clear when charging battery.
- DISCONNECT battery during servicing.
- CHECK dockboard width, capacity and security.

PROTECT YOURSELF, FASTEN YOUR SEATBELT!
- AVOID bumps, holes, loose materials, and slippery areas.
- AVOID sudden movements. Operate all controls smoothly.
- NEVER turn on or angle across an incline. Travel slowly.
- TRAVEL on inclines with load uphill or unloaded with mast downhill.
- TILT mast slowly and smoothly. LIFT or LOWER with mast vertical or tilted slightly back. Use minimum tilt when stacking elevated loads.
- TRAVEL with carriage as low as possible and tilted back.
- SLOW DOWN before turning--especially without load.

FAILURE to follow these instructions can cause the truck to tip over!
DO NOT JUMP off if the truck tips! HOLD steering wheel firmly.
BRACE your feet. LEAN FORWARD and AWAY from point of impact.

1. OVERHEAD GUARD
2. MAST
3. PARKING BRAKE LEVER
4. LOAD BACKREST EXTENSION
5. FORKS
6. CARRIAGE
7. LOAD WHEELS
8. COUNTERWEIGHT
9. HYDRAULIC CONTROL LEVERS
10. STEERING COLUMN WITH DIRECTION CONTROL LEVER
11. STEER TIRE

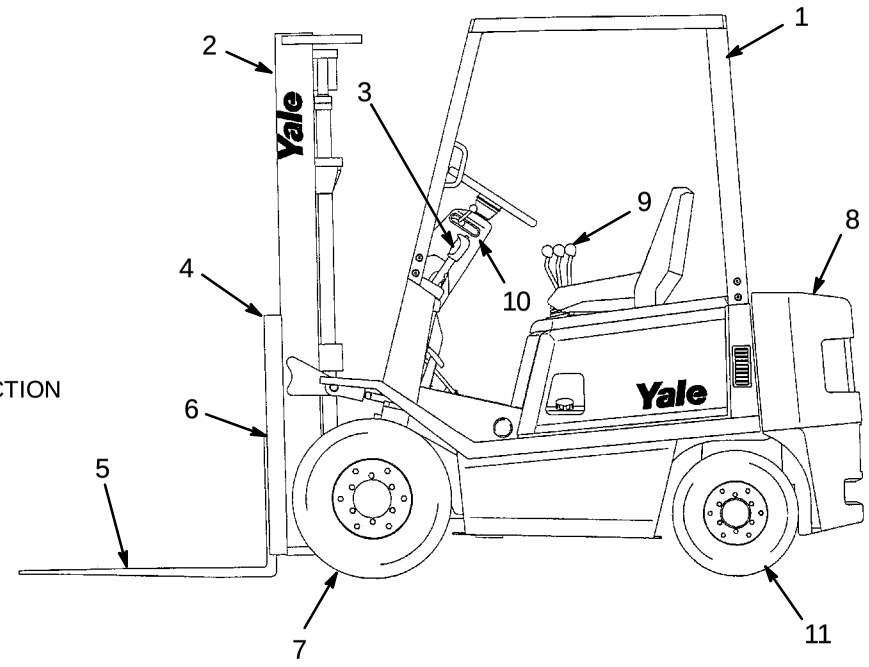

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Figure 1. Model View Showing Major Components

MODEL DESCRIPTION

GENERAL

This **OPERATING MANUAL** is for the following models of lift trucks:

GP 040–060 RG/TG

GLP 040–060 RG/TG

GDP 040–060 RG/TG

These lift trucks are available with the following engines:

- Mazda FE or F2 engines that use LPG or Gasoline fuel.
- GM 3.0L engine which uses LPG or gasoline fuel.
- Mazda XA or HA engine that use diesel fuel

GP 040–060 ZG

GLP 040–060 ZG

This lift truck has the following engine:

- GM 3.0L engine that uses gasoline or LPG fuel

A single–speed powershift transmission can be equipped with two types of controls:

- A Foot Directional Control pedal that controls both the forward and reverse operation of the powershift transmission and the speed of the engine.
- A direction control lever on the left side of the steering column that controls the forward, neutral and reverse operation of the powershift transmission. A separate accelerator pedal controls the engine speed.

This series of lift trucks are equipped with pneumatic tires or solid rubber tires that look like pneumatic tires. See **Wheels And Tires** in the MAINTENANCE SECTION for a description of these tires.

OPERATOR PROTECTION EQUIPMENT

The LOAD BACKREST EXTENSION is installed to keep loose parts of the load from falling back toward the operator. It must be high enough, with openings small enough to prevent the parts of the load from falling backwards. If a load backrest extension that is different from the one installed on your lift truck is required, contact your Yale lift truck dealer.

The OVERHEAD GUARD is intended to offer reasonable protection to the operator from falling objects, but can not protect against every possible impact. Therefore, it must not be considered a substitute for good judgment and care when handling loads. Do not remove the overhead guard.

The SEAT BELT AND HIP RESTRAINT provide additional means to help the operator keep the head and torso substantially within the confines of the lift truck frame and overhead guard if a tipover occurs. This restraint system is intended to reduce the risk of the head and torso being trapped between the lift truck and the ground, but it can not protect the operator against all possible injury in a tipover. The hip restraint will help the operator resist side movement. It is not a substitute for the seat belt. Always fasten the seat belt.

NAMEPLATE

⚠ WARNING

Any change to the lift truck, the tires or its equipment can change the lifting capacity. If the Nameplate does not show the maximum capacity, or if the lift truck equipment, including the battery for electric trucks, does not match that shown on the Nameplate, the lift truck must not be operated.

The capacity is specified in kilograms (kg) and pounds (lb). The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate. See Figure 3.

The maximum capacity for the lift truck, at full load height, must be shown on the Nameplate. Special capacities with the load height reduced or with optional load centers, may also be shown on the Nameplate.

The lift truck serial number code is on the Nameplate. The serial number code is also stamped on the lift truck frame.

When a lift truck is shipped incomplete from the factory, the Nameplate is covered by an INCOMPLETE label. If the equipment on the truck is changed, the Nameplate is covered by a NOTICE label. If your lift truck has either of these labels, do not operate the lift truck. Contact your dealer for YALE lift trucks to obtain a complete correct Nameplate.

⚠ WARNING

DO NOT add to or modify the lift truck. Any change to the lift truck, the tires or its equipment can change the lifting capacity. The lift truck must be rated as equipped and the nameplate must show the new capacity rating.

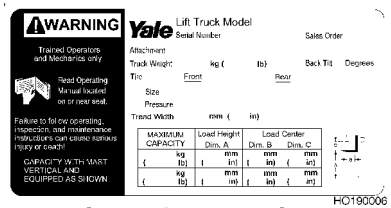
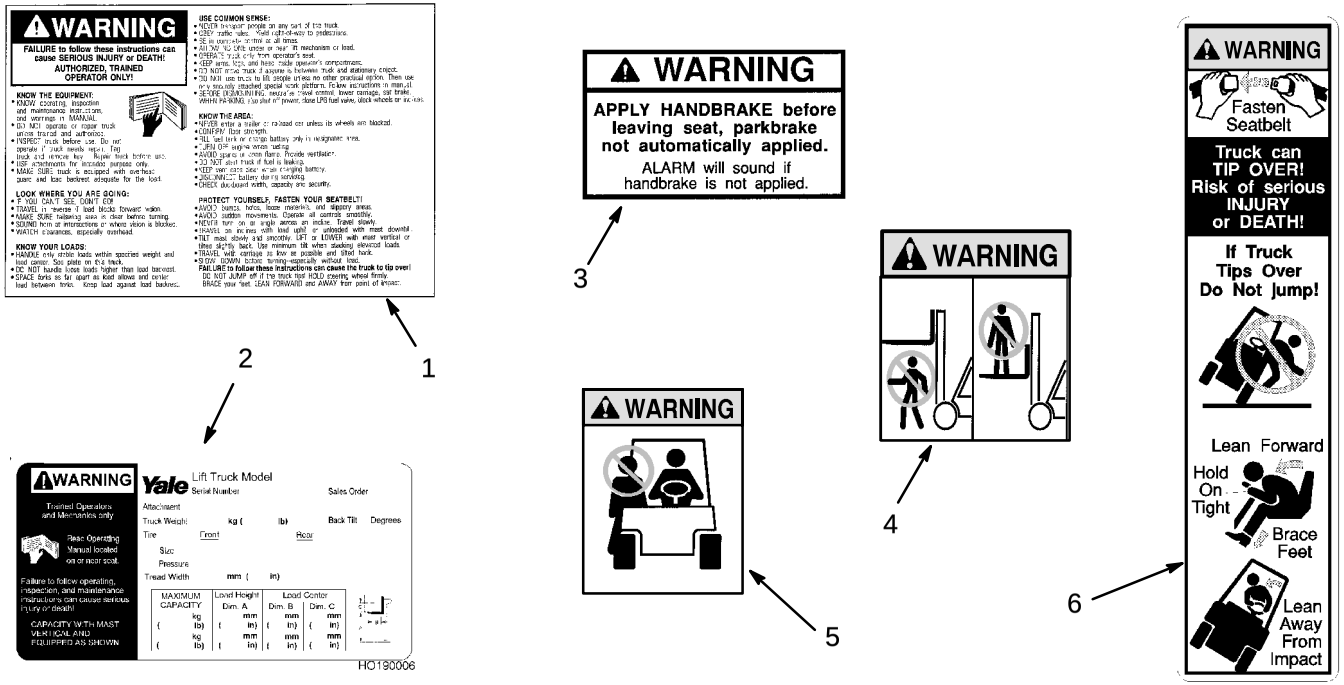


Figure 3. Nameplate

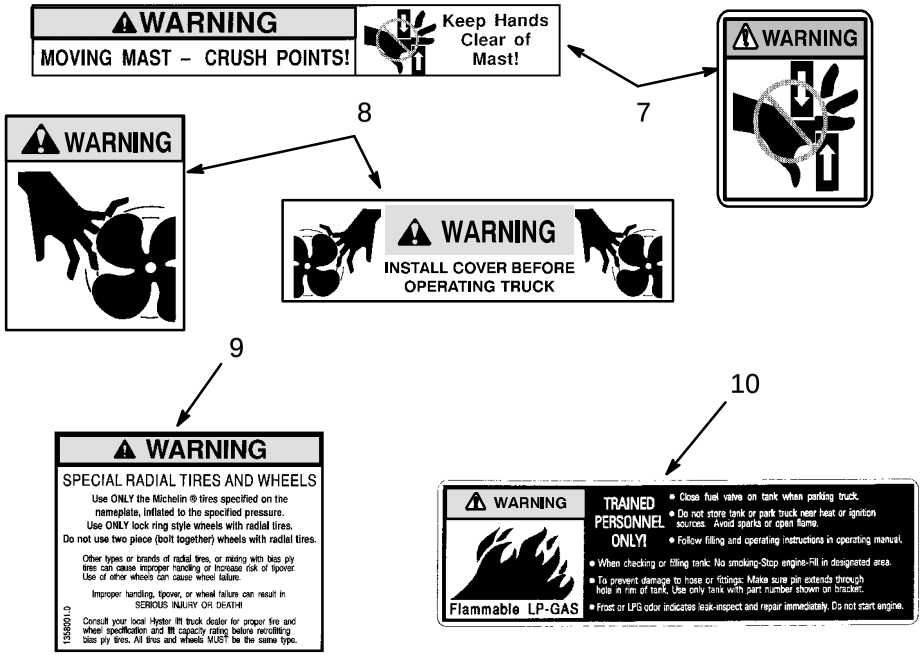
SAFETY LABELS

Safety labels are installed on the lift truck to give information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read. See Figure 4.



SEE THE **PARTS MANUAL** FOR THE PART NUMBER AND LOCATION OF LABELS

Figure 4. Warning And Safety Labels (1 of 2)



1. WARNING, OPERATION
2. NAMEPLATE
3. WARNING FOR PARKING BRAKE
4. NO ONE ON OR UNDER FORKS
5. NO RIDERS
6. TIPOVER WARNING
7. MAST WARNING
8. FAN WARNING
9. RADIAL TYRE WARNING
10. FLAMMABLE LP-GAS

SEE THE **PARTS MANUAL** FOR THE PART NUMBER AND LOCATION OF LABELS

Figure 4. Warning And Safety Labels (2 of 2)

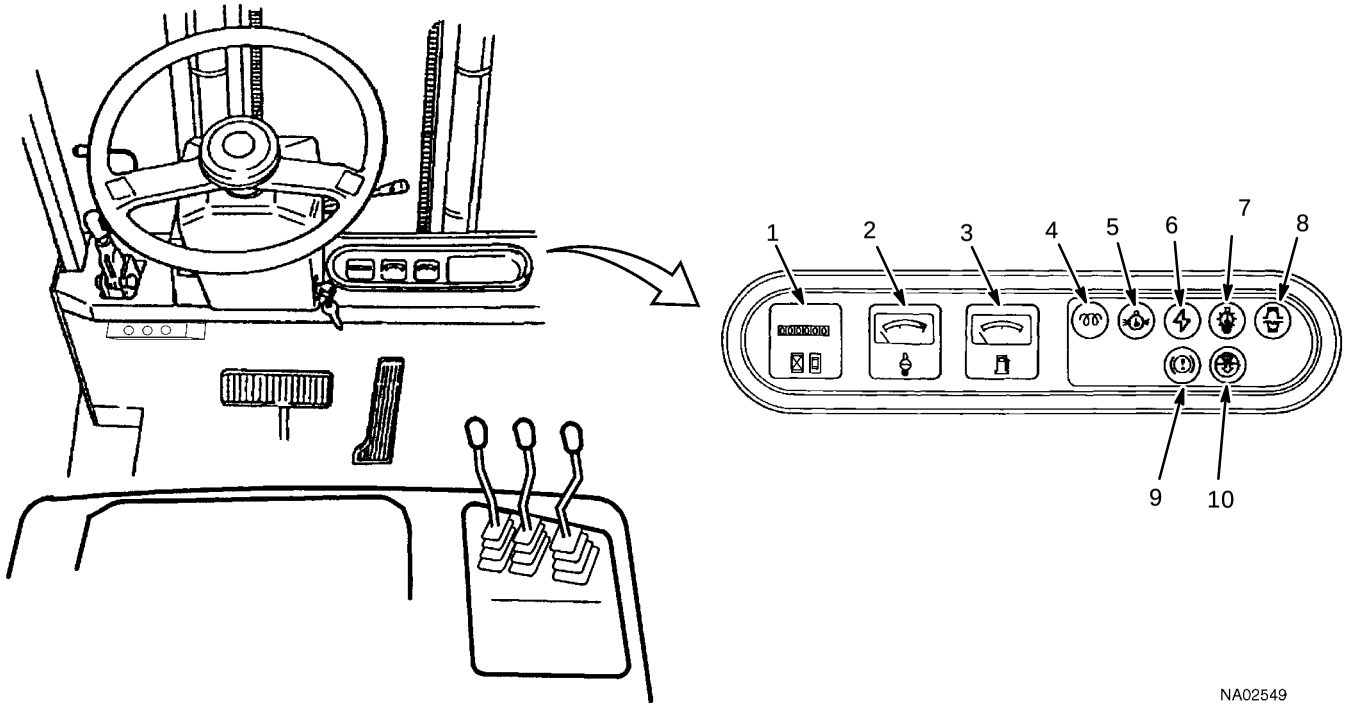


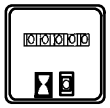
Figure 5. Instruments (See TABLE 1.)

INSTRUMENTS AND CONTROLS
(SEE TABLE 1., TABLE 2., TABLE 3., FIGURE 5. AND FIGURE 6.)

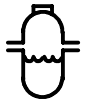
⚠ WARNING

If any of the instruments, levers, or pedals do not operate as described in the following tables, report the problem immediately. DO NOT operate the lift truck until the problem is corrected.

TABLE 1. Instruments (See Figure 5.)

ITEM NO.	ITEM	FUNCTION
1	Hour Meter 	This digital hour meter operates when the key switch is in the **ON** position. Periodic Maintenance recommendations are based on these hours.
2	Coolant Temperature Gauge 	This gauge indicates engine coolant temperature when the key switch is in the **ON** position. During normal operation the gauge needle will be in the green area. **⚠ CAUTION** **Do not continue to operate the lift truck when the gauge indicates that the engine is too hot (needle in the red zone).**
3	Fuel Gauge 	This gauge indicates the amount of fuel in the diesel or gasoline fuel tank.

ITEM NO.	ITEM	FUNCTION
4	Indicator Light, Cold Start (Diesel Only) 	The red light is **ON** when the key is in the **ON** position and the glow plugs are activated. The length of time that the light is **ON** (glow plugs activated) is determined by the temperature of the engine. When the light goes out, the engine can be started. When the starter is cranking, the light will come **ON** again until the starter is off and the engine is running.
5	Warning Light, Engine Oil Pressure 	The red light is **ON** when the key switch is in the **ON** position and must go **OFF** when the engine is running. **⚠ CAUTION** **Stop the engine immediately if the red light is ON while the engine is running.**
6	Warning Light, Alternator 	The light will be **ON** when the key switch is **ON** and the engine is not running. The light must go **OFF** when the engine is running. **⚠ CAUTION** **Do not continue to operate the lift truck if the red light is ON at engine speeds above idle.**

ITEM NO.	ITEM	FUNCTION
7	Warning light, Transmission Oil Temperature 	The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. **⚠ CAUTION** **Do not continue to operate the lift truck if the red light is ON.**
8	Warning Light, Water in Fuel Filter (Diesel Only) 	The red light is **ON** when the when the key switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, there is water in the fuel filter.
9	Warning Light, Brake Fluid Level 	The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, the brake fluid level in the reservoir is too low. **⚠ CAUTION** **Do not continue to operate the lift truck if the light is ON during operation.**
10	Optional Indicator Light, Air Filter Restriction 	The red light is **ON** when the when the key switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, the air cleaner has a restriction and needs cleaning.

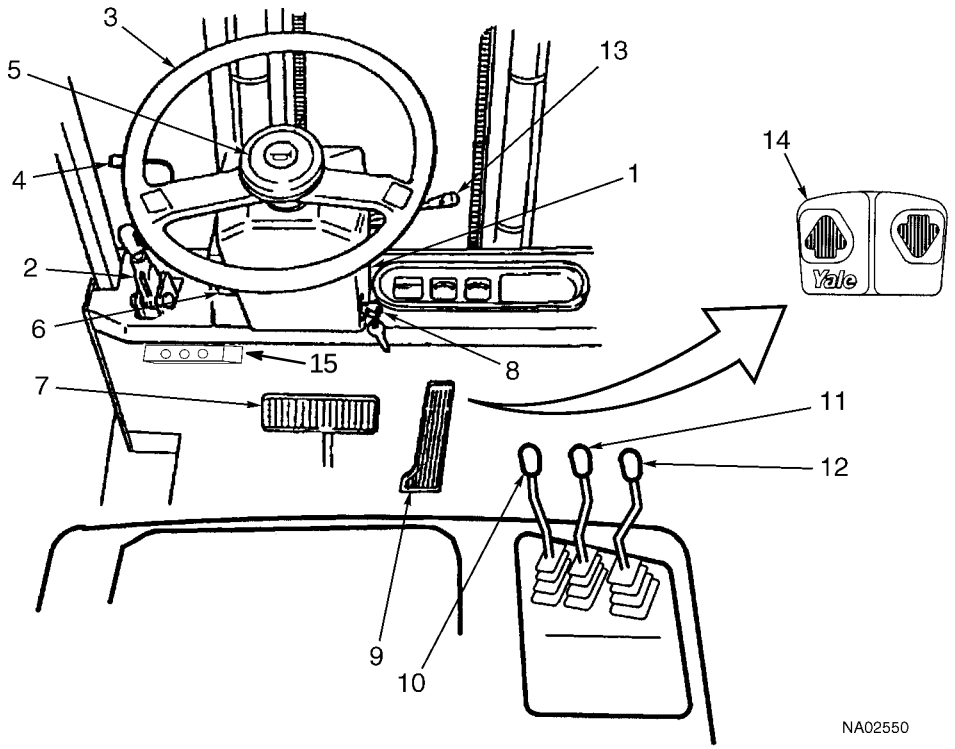
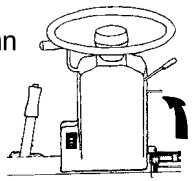
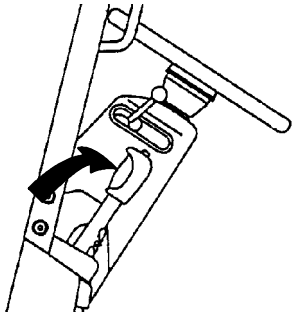
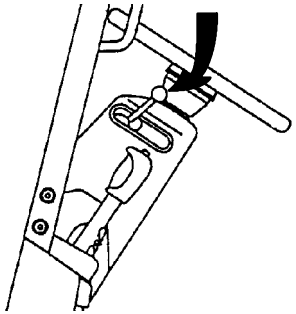
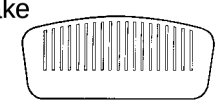
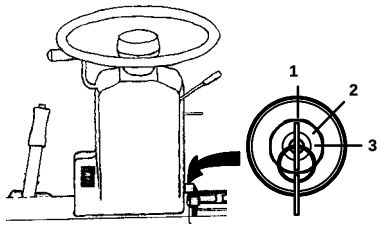
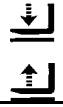


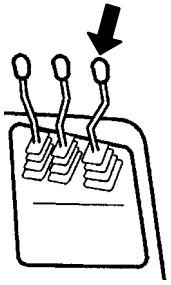
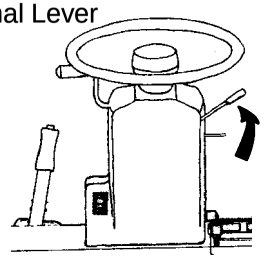
Figure 6. Controls (See TABLE 2. or TABLE 3.)

TABLE 2. Controls (See Figure 6.)		
ITEM NO.	**ITEM**	**FUNCTION**
1	Latch for Tilt Steering Column 	A latch, located on the upper right side of the steering column, allows the operator to select different positions for the steering wheel. Raise the latch to release the steering column. Move the steering column to the selected position. Release the latch to lock the steering column in position.
2	Parking Brake Lever 	The lift truck is equipped with a lever to apply the parking brake. Pull the lever to apply the parking brake. Use your thumb to release the lock on the lever when the lever is moved to release the parking brake. On lift trucks with a Foot Directional Control pedal, applying the parking brake puts the transmission in **NEUTRAL**. The parking brake must be applied when leaving the lift truck or when starting the engine. **NOTE:** There is a switch in the seat that actuates an audible buzzer. If the operator leaves the seat without applying the parking brake, the buzzer will be **ON** for 10 seconds. **⚠ WARNING** **Correct adjustment is necessary to provide adequate braking. See the MAINTENANCE section for adjustment procedures.** **Always apply the parking brake when leaving the lift truck.**

ITEM NO.	ITEM	FUNCTION
3	Steering Wheel	The steering wheel controls the position of the steer tires.
4	Optional Direction Control Lever 	The optional direction control lever for the transmission is on the left side of the steering column. The direction control lever is used on lift trucks without a Foot Directional Control pedal. This direction control lever has three positions: **FORWARD**, **NEUTRAL (N)** and **REVERSE**. Move the lever to one of the direction positions for travel. Some units can have an optional alarm that makes a sound when traveling in reverse. The direction control lever must be in the **NEUTRAL (N)** position before the engine can be started. **NOTE:** There is a switch in the seat that actuates an audible buzzer. If the operator leaves the seat with the key switch **ON** and the lever is not in **NEUTRAL**, the buzzer will pulse **ON** and **OFF** for 10 seconds.
5	Horn 	The horn button, at the center of the steering wheel, controls the operation of the horn.

ITEM NO.	ITEM	FUNCTION
6	Optional Lights Switch 	There is a rocker switch to the left of the steering column to control the optional front and rear lights. The center position is **OFF**. The top and bottom positions control lights as shown on the switch.
7	Inching/Brake Pedal 	By varying the position of the inching/brake pedal, the operator can move the lift truck slowly while a high engine speed is used for lifting loads. Completely depressing the pedal disengages the transmission and applies the service brakes. On units with a Foot Directional Control pedal, the engine can be started when the inching/brake pedal is fully depressed or when the parking brake is applied.

ITEM NO.	ITEM	FUNCTION
8	Key Switch 	The key switch has three positions: No. 1 Position: **OFF** position. Deenergizes all electric circuits except for the horn. No. 2 Position: **ON** position. Energizes all electric circuits except the starter circuit. The key switch will be in this position during normal operation. No. 3 Position: **START** position. Energizes the starter motor for starting the engine. A spring returns the key to position No. 2 (**ON** position) when the key is released. **NOTE:** There is a mechanical lockout that prevents the key switch from being returned to the **START** position without first being returned to the **OFF** position.
9	Accelerator Pedal 	This pedal controls the speed of the engine and is operated by the operator's right foot. It is used on units that have a direction control lever.
10	Lift/Lower Control Lever 	The lift/lower control lever is the first lever to the right of the operator's seat. Pull backward on the control lever to raise the carriage and forks. Push the control lever forward to lower the carriage and forks.
11	Tilt Control Lever 	The tilt control lever is on the right of the lift/lower control lever. Push the control lever forward to tilt the mast and forks forward. Pull backward on the control lever to tilt the mast and forks backward.

ITEM NO.	ITEM	FUNCTION
12	Third Control Lever for Auxiliary Hydraulic Function(s) See TABLE 3. 	The third control lever is installed to the right of the tilt control lever. This control lever can have two methods of operation, depending on the attachment. **⚠ WARNING** **The control lever with a detent must be installed when an attachment with a clamp is installed. See your dealer for YALE lift trucks to get the correct control lever.** **Control Lever Without A Detent – Attachments without a clamp action:** The lever is operated by moving it forward and backward. **Control Lever With A Detent – Attachments with a clamp action or for a fourth function:** This lever is spring–loaded toward the operator (third function without clamp action). To operate an attachment with a clamp action or to operate the fourth function, the lever is moved to the right, then forward and backward.
13	Turn Signal Lever 	This lever is on the right side of the steering column. Move the lever toward the front of the lift truck to operate the left–hand turn signals. Move the lever toward the rear of the lift truck to operate the right–hand turn signals.

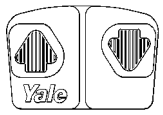
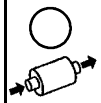
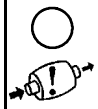
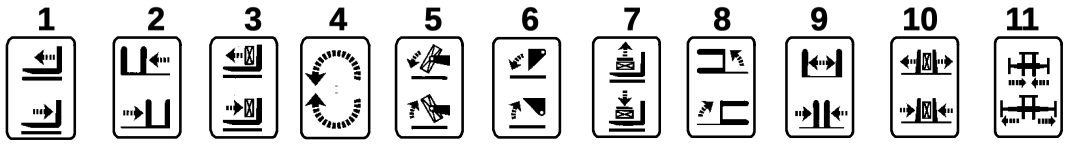
ITEM NO.	ITEM	FUNCTION
14	Foot Directional Control Pedal 	The Foot Directional Control Pedal controls the speed and direction of the lift truck. Pushing on the right side of the pedal causes the lift truck to move in REVERSE. Some units can have an optional alarm that makes a sound when traveling in reverse. Pushing on the left side of the pedal causes the lift truck to move in FORWARD. The speed of the engine increases as the pedal is depressed.
15	 White Light – Power ON  Amber Light – Exhaust Back–Pressure  Red Light – Clean Soot Trap	There are three lights for the soot trap. The white light, to the left, indicates that the soot trap is operating. The middle amber light, indicates that the soot trap is almost full and is causing back pressure on the engine. Regenerate the soot trap at this time. The red light on the right–hand side indicates that the soot trap is full and causing too much back pressure on the engine. The soot trap MUST BE REGENERATED NOW. An alarm will also sound when the red light comes on to make sure the operator knows the soot trap must be regenerated. Take the truck immediately to the regeneration station to regenerate the soot trap before any further operation. Engine and/or trap damage can result if soot trap is not regenerated.

TABLE 3. AUXILIARY CONTROL LEVERS (See Figure 6.)

FUNCTION The control levers will be arranged in the following order from left to right.		DIRECTION OF MOVEMENT	
		LOAD OR EQUIPMENT	CONTROL LEVER
1	REACH	Retract/Extend	Backward/Forward
2	SIDE-SHIFT	Right/Left	Backward/Forward
3	PUSH-PULL	Backward/Forward	Backward/Forward
4	ROTATE	Clockwise/Counterclockwise	Backward/Forward
5	UPENDER	Up/Down	Backward/Forward
6	SCOOP	Up/Down	Backward/Forward
7	LOAD STABILIZER	Down (Clamp)/Up (Release)	Backward/Forward
8	SWING (FORKS)	Right/Left	Backward/Forward
9	FORK SPREAD	Together/Apart	Backward/Forward
10	CLAMP	Clamp/Release	Backward/Forward
11	EXTEND/RETRACT	Extend/Retract	Backward/Forward



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NOTES

OPERATING PROCEDURES

GENERAL

Know Your Lift Truck

⚠ WARNING

EXHAUST GASES

Exhaust from internal combustion engines contains carbon monoxide and other harmful chemicals. Carbon monoxide is a colorless, odorless poison and can cause unconsciousness or death without warning. Long term exposure to exhaust or chemicals in the exhaust can cause cancer, birth defects and other reproductive harm. Avoid exposure to engine exhaust.

If engines are operated in confined spaces maintain adequate ventilation or vent exhaust to the outside. Do not exceed applicable air contaminant limits.

Follow the inspection and maintenance schedule and procedures in this manual. Do not alter exhaust, ignition or fuel systems.

⚠ WARNING

FIRE HAZARD

The hot engine surfaces and exhaust of internal combustion engine powered lift trucks can present fire hazards when operating in areas containing flammable gases, vapors, liquids, dusts or fibers. Engine and exhaust component surface temperatures can exceed the ignition temperatures of common solvents, fuels, oil, paper, and other organic materials (wood, agricultural grass/grain, cotton wool, etc.). Exhaust emitted sparks can ignite these materials as well. Engine and exhaust surface temperatures increase after engine shut-off, presenting increased fire hazard. Check the engine compartment immediately following truck operation in areas containing combustible dusts, fibres or paper, and remove any foreign material.

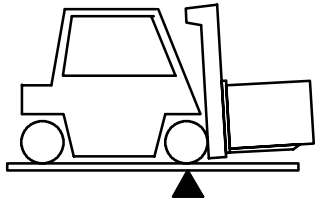
Operate the lift truck only in areas that have been approved for lift truck operation.

Only the designated types of approved lift trucks may

be used in areas classified as hazardous by the authority having jurisdiction. Areas classified as hazardous must be identified by signs to show the type of approved lift truck required for operation in the area. Modifications or poor maintenance can result in the lift truck being unsuitable for operation in areas classified as hazardous.

The fork lift truck is designed to pick up and move materials. The basic lift truck has a lift mechanism and forks on the front to engage the load. The lift mechanism lifts the load so that it can be moved and stacked.

In order to understand how the fork lift truck can pick up a load, you must first know some basic things about the lift truck.



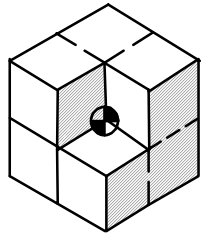
The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum). This is the same principle used for a see-saw. In order for this principle to work for a lift truck, the load on the forks must be balanced by the weight of the lift truck. The location of the center of gravity of both the truck and the load is also a factor.

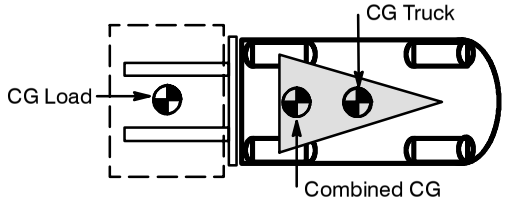
This basic principle is used for picking up a load. The ability of the lift truck to handle a load is discussed in terms of center of gravity and both forward and side stability.

Stability And Center Of Gravity

The center of gravity (CG) of any object is the single point about which the object is balanced in all directions.

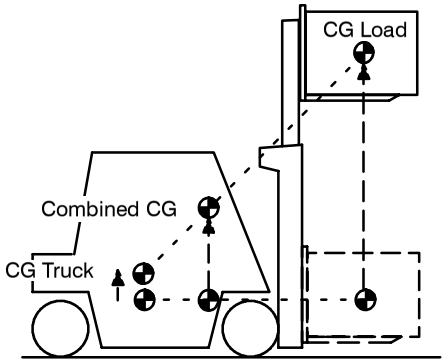
Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG.





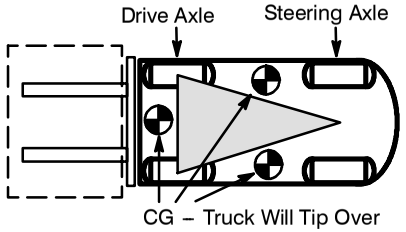
The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the combined CG.

The lift truck has moving parts and therefore has a CG that moves. The CG moves forward and back as the mast is tilted forward and back. The CG moves up and down as the mast moves up and down.



The center of gravity, and therefore the stability of the loaded lift truck, is affected by a number of factors such as size, weight, shape, and position of the load; the height to which the load is raised; the amount of forward and backward tilt; tire pressure and the dynamic forces created when the truck is moving. These dynamic forces are caused by things like acceleration, braking, turning, and operating on uneven surfaces or on an incline. These factors must be considered when travelling with an unloaded truck, as well, because **an unloaded truck will tip over to the side easier** than a loaded truck with its load in the lowered position.

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 represented by a triangle drawn between the drive axle and the pivot of the steering axle.

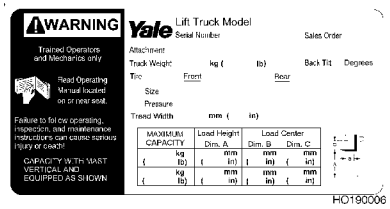


If the CG moves forward of the drive axle, the lift truck will tip forward. If the CG moves outside of the line represented by the lines drawn between the drive wheels and the steering axle pivot, the lift truck will tip to that side.

Capacity (Weight And Load Center)

The capacity of the lift truck is shown on the Nameplate. The capacity is listed in terms of weight and load center.

The weight is specified in kilograms and pounds. The load center is specified in millimeters and inches. The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate.



The load center of a load is determined by the location of its center of gravity. The load center is measured from the front face of the forks, or the load face of an attachment, to the center of gravity of the load. Both the vertical and horizontal load centers are specified on the Nameplate.

Loads should be transported while centered on the centerline of the lift truck. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.

INSPECTION BEFORE OPERATION

⚠ WARNING

Report damage or faulty operation immediately. Do not operate a lift truck that needs repair. A lift truck will only do its job when it is in proper working order. If repairs are required, install a tag in the operator's area stating "DO NOT OPERATE" and remove the key from the key switch.

Checks With The Engine Stopped

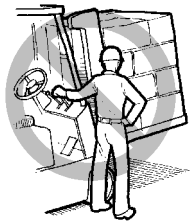
Inspect the lift truck before use and every eight hours or daily as described in the MAINTENANCE section of this **OPERATING MANUAL**. Inspect more frequently if used in severe operating conditions.

Before using the lift truck, make the following checks:

- Fuel level (if the lift truck has a diesel engine, drain water from the primary filter).
- Electrolyte level of the battery (unless maintenance free).

- Oil level in the engine and hydraulic tank.
- Coolant level in the cooling system and condition of the drive belts.
- Condition of the engine compartment. Ensure all surfaces are free of oils, lubricants, fuel, and organic dusts or fibers (paper, wood, cotton, agricultural grass/grain, etc). Remove all foreign materials.
- Condition of the radiator. Clean if necessary.
- Condition of forks, carriage, chains, mast, attachment and overhead guard.
- Leaks from the engine, transmission, hydraulic system and fuel system.
- Condition of wheels and tires.
- Seat belt fastens correctly.
- Seat is correctly fastened to its mounts. Hood is correctly latched.
- Check the oil level in the powershift transmission. Apply the parking brake and, if the lift truck has a direction control lever, put the direction control lever in the **NEUTRAL** (N) position. Run the engine for one minute to fill the torque converter with oil. Stop the engine and check the oil level within thirty seconds. Use the correct oil shown in the MAINTENANCE SCHEDULE. Keep the oil level at the "**FULL**" mark on the dipstick.

Starting Procedures



Do not start nor operate the lift truck, including any of its functions or attachments, from any place other than the designated operator's position.

Starting Procedures, LPG Engine

⚠ WARNING

LPG is very flammable. An odor of LPG fuel can indicate a leak in the fuel system. DO NOT start the engine until the fuel leak is repaired.

1. If the lift truck uses LPG fuel, open the fuel valve on the LPG tank.
2. Make sure the parking brake is applied or push on the inching/brake pedal.
3. If equipped, put the direction control lever for the transmission in the **NEUTRAL (N)** position.

⚠ CAUTION

Do not engage the starter for more than 30 seconds at a time. If the engine does not start, turn the key

switch to OFF. Wait 60 seconds before engaging the starter again.

4. Turn the key to the **START** position to engage the starter.
5. If the engine does not start after four attempts, get help from authorized service personnel.

6. When the engine is running, check the gauges and indicator lights for the correct operation. See the INSTRUMENTS AND CONTROLS section in this **OPERATING MANUAL** for a description of the correct operation.

Starting Procedures, Diesel Engine

1. Make sure the parking brake is applied or push on the inching/brake pedal.

2. If equipped, put the direction control lever for the transmission in the **NEUTRAL (N)** position.

3. Turn the key to the **ON** position to activate the cold start aid (glow plugs). The indicator light on the instrument cluster is **ON** when the cold start aid is activated. When the indicator light goes out, the engine can be started. The length of time that the light is **ON** is determined by the temperature of the engine.

4. Turn the key to the **START** position to crank and start the engine. The indicator light will be **ON** while the starter is cranking and go **OFF** when the key is released.

⚠ CAUTION

Use only approved starting aids. The use of non-approved starting aids can result in engine damage and void engine warranty.

5. If the engine does not start after four attempts, get help from authorized service personnel.

6. When the engine is running, check the gauges and indicator lights for the correct operation. See the INSTRUMENTS AND CONTROLS section for a description of the correct operation.

Checks With The Engine Running

⚠ WARNING

FASTEN SEAT BELT!

IF LIFT TRUCK TIPS OVER

- **Do Not Jump– stay On Truck**
- **Hold Firmly To Steering Wheel– Brace feet– Lean Forward And Away From Impact**

The operator must be aware that the lift truck can tip over. There is a great risk that the operator or someone else can be killed or injured if trapped or hit by the truck as it tips over. The risk of injury can be reduced if the operator stays on the truck. If the truck tips over do not jump off.

THE SEAT BELT AND HIP RESTRAINT bracket provides a means to help the operator keep the head and torso substantially within the confines of the truck frame and overhead guard if a tipover occurs. This protection system is intended to reduce the risk of the head and torso being trapped between the truck and the ground, but it can not protect the operator against all possible injury in a tipover.

Make sure that the area around the lift truck is clear before starting the engine or making any operational checks. Be careful when making the checks. If the lift truck is stationary during a check, apply the parking brake and make sure the direction control is in **NEUTRAL**. Proceed carefully.

Check the operation of the following functions as described in the MAINTENANCE section:

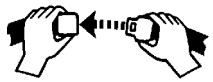
- Check the operation of the horn, gauges and indicator lights.

- Operate the **LIFT, TILT** and auxiliary functions to check for correct operation of the mast, carriage and attachments.
- Check the operation of the Foot Directional Control pedal or the operational direction control lever and accelerator pedal.
- Check the operation of the service brakes and parking brake.
- Check the operation of the steering system.

OPERATING TECHNIQUES

⚠ WARNING

Before operating the lift truck FASTEN YOUR SEAT BELT if installed.



There are a number of operations, if not performed carefully, that can cause the lift truck to tip. If you have not read the WARNING page in the front of this Operating Manual, do so NOW. As you study the following information about how to properly operate a lift truck, remember the WARNINGS.

Basic Operating Procedures

Many people make the mistake of thinking that operating a lift truck is the same as driving an automobile. This is not true. It is true that some lift truck operating procedures are as simple and obvious as driving the family automobile. (e.g. Look where you are going, start and stop smoothly, etc.) But a lift truck is a special machine designed to do a much different job than an automobile. Because of the close areas in which a lift truck operates and its other operating characteristics (like rear wheel steering and tail swing), every operator must receive additional training, even if they have a license to drive an automobile.

The following discussion lists basic procedures applicable to lift truck operation.

1. AUTHORIZED AND TRAINED OPERATOR ONLY. This means the operator must be trained to drive the lift truck and it means that the operator must thoroughly understand the procedures for lift truck operation. It also means that a qualified person experienced in lift truck operation must guide the operator through several driving and load handling operations before the operator attempts

to operate the lift truck alone. A basic education in proper driving and load handling techniques is absolutely necessary to prepare the new operator for proper defensive driving and to expect the unexpected.

2. NO RIDERS. A lift truck is built for only one person -- the operator. It is dangerous for anyone to ride on the forks or anywhere else on the lift truck.

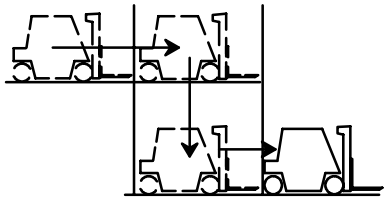
⚠ WARNING

This lift truck is designed and intended for handling materials. A lift truck is not designed to lift people. Do not use a lift truck to lift people unless it has been determined that there is no other practical option (scaffolds, elevated work platforms, aerial baskets, etc.) to perform the needed work.

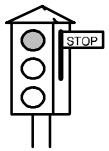
If a lift truck is used to elevate a worker, a safety platform must be attached to the forks and carriage. It must have a solid floor with a surface to prevent the feet of the worker from slipping, hand rail, toe board and a screen or shield at least 2 metres (7 feet) high between the people on the platform and the lift mechanism.

Before anyone is allowed in the platform, lift and lower the mast slowly with the platform in place to make sure the mast functions properly. Apply the parking brake. Do not travel with people in the platform. The operator must remain at the controls. Watch for overhead obstructions.

3. Do not drive a lift truck into an elevator unless authorized to do so. Approach the elevator slowly. After the elevator is properly levelled, the lift truck must be centered so that the elevator is balanced.



When the lift truck is in the proper position in the elevator, set the brakes, put the controls in **NEUTRAL** and shut off the power. It is advisable that all other personnel leave the elevator before the lift truck enters or leaves.



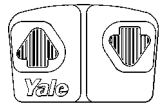
4. Drive carefully, observe traffic rules and be in full control of the lift truck at all times. Be completely familiar with all the driving and load handling techniques contained in this **OPERATING MANUAL**.

Driving And Direction Changes

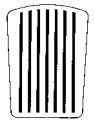
The following paragraphs describe how to operate the transmission. The lift truck can have either a Foot Directional Control pedal or a direction control lever to control the transmission. If the lift truck has a Foot Directional Control pedal, push on the left side of the pedal to go **FORWARD**, or the right side of the pedal to go in **REVERSE**. If the lift truck has a direction control lever, move the lever toward the front of the lift truck to go **FORWARD** and toward the rear of the lift truck to go in **REVERSE**. To move the lift truck, push on the inching/brake pedal and release the parking brake. Then push down on the Foot Directional Control pedal or the accelerator pedal as the inching/brake pedal is slowly released.

⚠ WARNING

DO NOT select the travel direction if the accelerator is depressed. The lift truck will move rapidly and can cause damage or injury.



FOOT DIRECTIONAL CONTROL PEDAL



ACCELERATOR PEDAL

DIRECTION CONTROL LEVER

⚠ CAUTION

The drive train can be damaged if the lift truck is travelling too fast when the controls are changed to the opposite direction of travel.

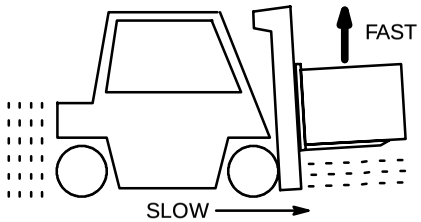
The operator can change the direction of travel at slow travel speeds (less than a walking speed), but the mast

must not be in a raised position. If the lift truck is moving rapidly, slow to a walking speed before changing the direction of travel.

Inching

Inching is the movement of a lift truck that allows a slow travel speed while keeping the engine speed high for fast operation of the lift mechanism.

The inching/brake pedal is used to control the inching operation. When the inching/brake pedal is applied, the clutch in the transmission is partially disengaged and the movement of the truck is slow. When the inching/brake pedal is fully applied, the transmission is completely disengaged and the brakes are applied. Use the accelerator pedal or Foot Directional Control pedal to keep the engine speed high while inching.



⚠ WARNING

Inching requires coordinated movement of the inching/brake pedal and the accelerator or the Foot Directional Control pedal. New operators must practice this procedure before attempting to handle loads.

Steering (Turning)

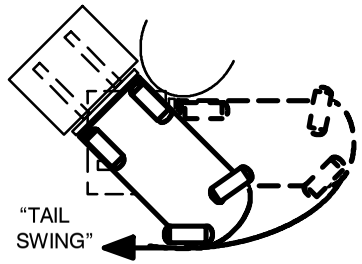
⚠ WARNING

TRAVEL SLOWLY WHEN TURNING. Lift trucks can tip over even at very slow speeds. The combination of speed and the sharpness of a turn can cause a tipover. A lift truck is less stable when the forks are elevated, with or without a load.

⚠ WARNING

IF THE LIFT TRUCK TIPS OVER, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.

Most operators can understand the need to be careful when handling loads. But some operators do not realize that a tipover can occur with an empty lift truck because similar dynamic forces are present. In fact, the lift truck will actually tip over easier when empty, than when loaded with the load lowered. Rearward tilt, off-center loads and uneven ground will aggravate these conditions.

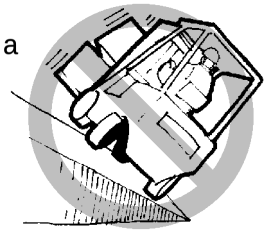


⚠ WARNING

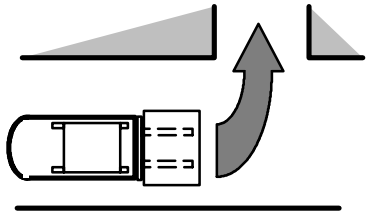
Failure to observe the tail swing area when making a turn can injure or kill someone.

Because lift trucks are designed to work in a relatively small space,they can turn sharper than some other vehicles. Most lift trucks are steered by the rear wheels and the rear of the lift truck can move to the side very fast during a turn. This movement is called "tail swing". An operator must be aware of tail swing and always check to make sure the tail swing area is clear before turning.

Do not turn on an incline. To reduce the possibility of a tipover, a lift truck must not be driven across an incline.



When possible, keep both hands on the steering wheel. During most loading or unloading operations, the operator steers with the left hand. The right hand is used to operate the lift, tilt, and attachment controls.



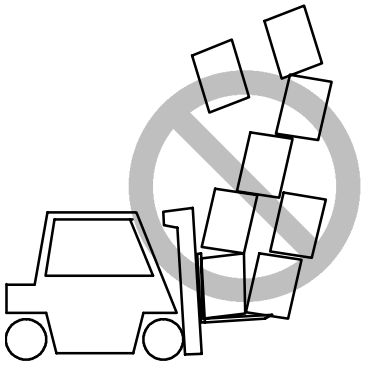
When turning the lift truck from a wide aisle into a narrow aisle, start the turn as close to the opposite stock pile as tail swing will permit. This action permits the lift truck to enter the narrow aisle going straight ahead.

Load Handling, General

1. The capacity is the maximum load that the lift truck can handle for the load condition shown on the Nameplate. The operator must know whether or not a load is within the maximum capacity of the lift truck before the load is handled.

However, such factors as weak floors, uneven terrain, special load handling attachments or loads having a high center of gravity can mean that the safe working load is less than the rated capacity. When such conditions exist, the operator must reduce the load so that the lift truck will remain stable.

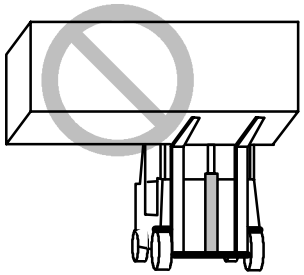
2. Handle only stable loads. A load can have unstable items that can easily shift and fall on someone.



⚠ WARNING

Do not handle a load if any loose part of it is above the load backrest or any part of the load is likely to fall.

3. Position each fork the same distance from the center of the carriage. This action will help center the load on the carriage. Set the forks as far apart as possible for maximum support of the load. Center the weight of the load between the forks.

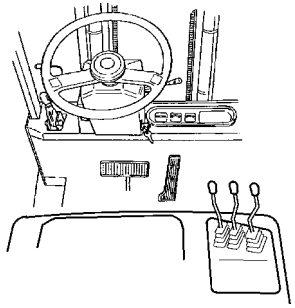


If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off−center load will increase the possibility of the truck tipping over to the side. Make sure the pins that keep the forks in position are engaged so that the forks cannot move.

4. Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Load Handling, Lifting, Lowering And Tilting

The **LIFT** and **TILT** functions are controlled by separate levers. See the INSTRUMENTS AND CONTROLS section for the correct operation.



The speed of the hydraulic functions is controlled by the position of the control levers. The farther the hand lever is

moved from the **NEUTRAL** position, the faster the speed of the hydraulic function.

Do not lift or hit anything that can fall on the operator or a bystander. Remember, a lift truck equipped with a YALE overhead guard and load backrest extension provides reasonable protection to the operator from falling objects, but can not protect against every possible impact.

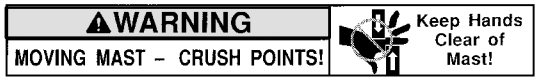
A lift truck without an overhead guard provides no such protection and other personnel have no overhead protection. Avoid hitting objects such as stacked material that could become dislodged and fall.

The operator must exercise care while working near such objects. Whether the lift truck is loaded or empty, do not travel with the load or carriage in a raised position.

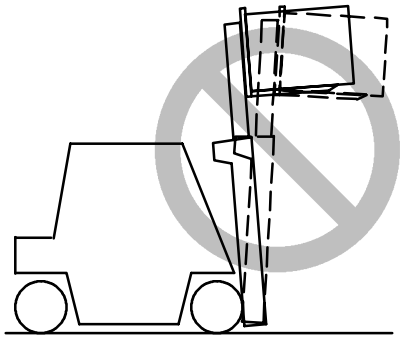
⚠ WARNING

Keep yourself and all others clear of the lift mechanism. Never allow anyone under or on the forks.

NEVER put hands, arms, head or legs through the mast or near the carriage or lift chains. This warning applies not only to the operator but also a helper. A helper must not be near the load or lift mechanism while the operator is attempting to handle a load. The lift mechanism has moving parts with close clearances that can cause serious injury.



Lift and lower with the mast vertical or tilted slightly backward from vertical. Tilt elevated loads forward only when directly over the unloading place.

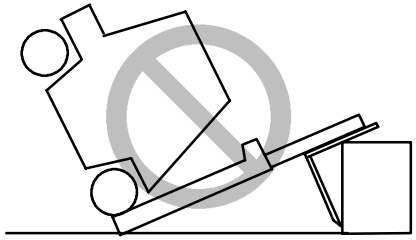


WARNING

The lift truck can tip over forward when the load is raised. Forward tipping is even more likely when tilting forward, braking when travelling forward or accelerating in reverse.

If the lift mechanism is raised to pick up or deposit a load, keep the tilt angle in either direction to a minimum. Backward and forward tilt are helpful, but they affect side and forward stability. Do not tilt in either direction more than necessary when handling a load that is raised. The lift truck can tip forward if the mast is tilted forward with a load in the raised position.

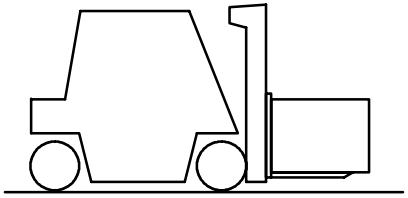
IF THE LIFT TRUCK TIPS OVER, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN AWAY FROM POINT OF IMPACT.



Load Handling,
How To Engage And Disengage A Load

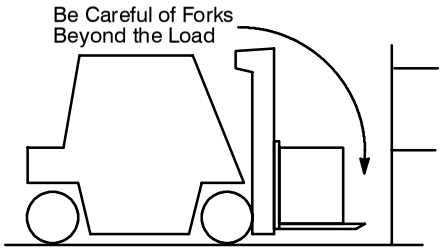
1. Avoid fast starts. Sudden movement can cause the lift truck to tip. People can be hurt or killed and material can be damaged.

Approach the load carefully. Make sure that the truck is perpendicular to the load. Raise the forks to the proper height for engaging the load.

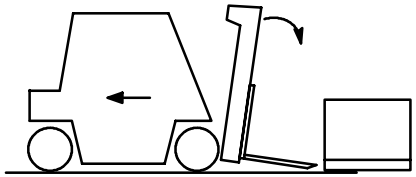


2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds ($^2/_3$) of the length of the load.

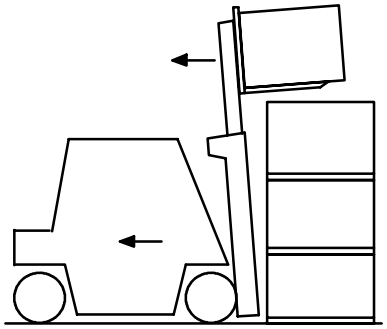
Make sure that the load is centered between the forks. Make sure that the forks do not extend past the load so that loads or equipment that are behind the load being lifted are not damaged. Lift the load a small distance from the floor to make sure the lift truck has the capacity to lift the load.



If the forks are longer than the load, move the forks under the load so that the tips of the forks do not extend beyond the load. Lift the load from the surface. Move backward a few inches, then lower the load onto the surface and inch forward to engage the load against the carriage. Tilt the mast backward just far enough to lift the load from the surface.



3. When a load is put on the floor, tilt the mast forward to a vertical position and lower the load. Tilt the mast forward to permit smooth removal of the forks. Carefully move the lift truck backward to remove the forks from under the load.

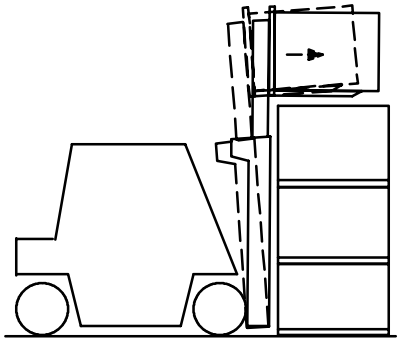


4. If the load is being removed from a stack, slowly move the lift truck away from the stack. When the load is clear of the stack, lower the load for travelling. Always travel with the load as low as possible and tilted backward. Lowering speed is controlled by the position of the control lever. Lower slowly and smoothly. Slowly return the control lever to the neutral position so that the load is not dropped or that the lift truck is not tipped over due to the rapid stop of the load.

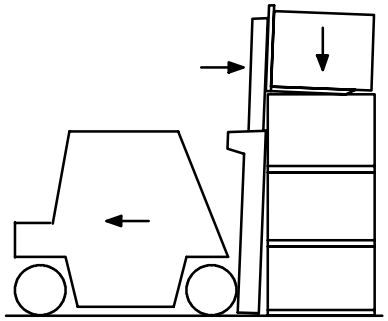
⚠ WARNING

Move carefully and smoothly when the load is raised over a stack. When the load is elevated the center of gravity of the lift truck and the load is much higher. The lift truck can tip over when the load is raised.

5. To put the load on a stack, align the lift truck with the stack. Lift the load to eye level and then tilt the load forward until it is level. Raise the load higher than the point where it will be placed. Do not raise the load to a point below where the load is to be placed and “jog” the load up into position. This operation uses added energy, particularly with an electric lift truck. Be careful not to damage or move adjacent loads.



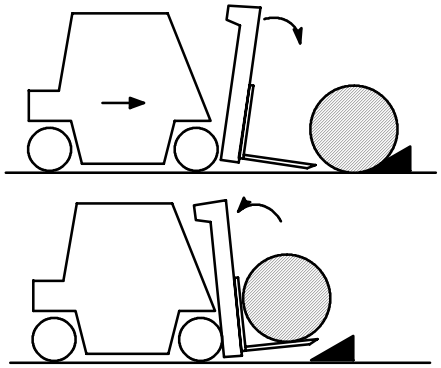
IF THE LIFT TRUCK TIPS OVER EITHER TO THE SIDE OR FORWARD, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.



Move forward slowly. When the load is in position, lower the load on to the stack or the rack. Lower the forks just enough to remove them from under the load. Do not lower the forks so that they will drag on the surface under the load. Tilt the mast forward just enough to permit smooth removal of the forks from under the load. Carefully move the lift truck backward to remove the forks from under the load. Lower the forks when travelling.

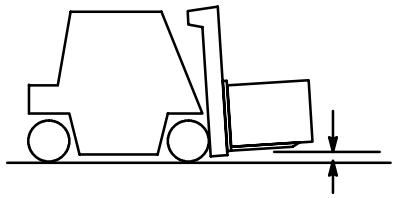
NOTE: Not every load can be lifted using only the forks of a lift truck. Some loads will require a special attachment.

6. When lifting round objects, use a block behind the object. Tilt the mast forward so that the forks can slide along the floor under the object to be lifted. Tilt the mast fully backward to help keep the load on the forks.



Load Handling, Travelling

1. When travelling with the load lowered, keep the load against the carriage and the mast tilted fully backward. This action will help keep the load on the forks and provide good forward and side stability.



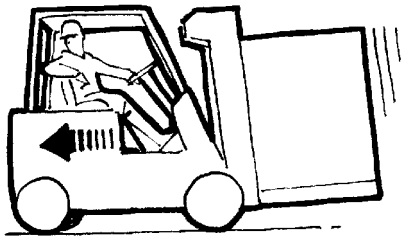
2. Travel with the lift mechanism raised only enough to clear the ground or obstacles.

When the mast, carriage or load is in a raised position the stability of the lift truck is reduced. This is also critical when the lift truck is not carrying a load. The ability of the lift truck to resist side tipping can be less on a lift truck without a load than it is on a lift truck with a load in the lowered (travel) position. Therefore, a lift truck without a load is more likely to tip sideways, especially in a turn, than a lift truck with a load carried in the lowered position.

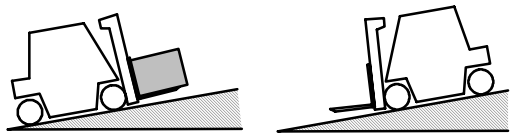
⚠ WARNING

Some lift trucks have mirrors for viewing along the side to observe the tail swing area. These mirrors are an aid to the driver, but are NOT driving mirrors and must NOT be used as such when operating in reverse. Always look in the direction of travel to avoid damage to something or injury to someone.

3. For better visibility with large loads, travel with the load trailing, but always keep a proper lookout in the direction of travel. Normally, direction of travel is determined by the best visibility available to the operator. If the lift truck must travel in a direction where visibility is obstructed, a lookout helper can be required.



4. When travelling up or down a grade with a **heavily loaded** lift truck, keep the load upgrade to maintain control.

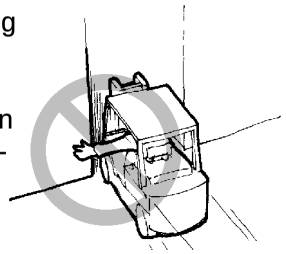


When operating an **unloaded** lift truck on a steep grade, keep the counterweight upgrade.

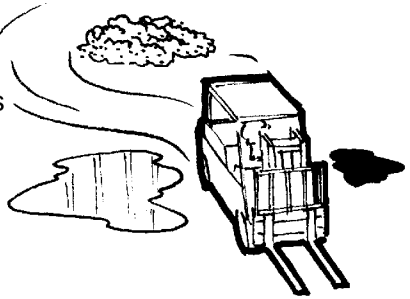
5. Watch out for pedestrians at all times. Do not drive up to anyone standing in front of an object. Use extra care at cross – aisles, doorways and other locations where pedestrians can step into the path of travel of the lift truck.

Slow down when approaching blind intersections or turns and sound the horn. The horn is to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.

6. Any time the lift truck is moving keep arms, legs, etc., inside the operator's compartment. Arms and legs outside the machine can be injured when passing obstructions.



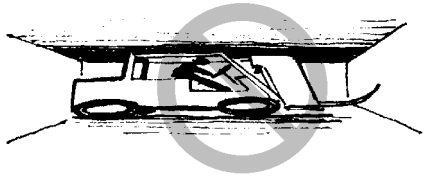
7. Avoid bumps, holes, slick spots and loose materials that may cause the lift truck to swerve or tip. If unavoidable, slow down.



Different models of lift trucks are designed to operate under different conditions. Solid rubber tire models are designed to operate on relatively smooth, firm surfaces. Lift trucks with pneumatic tires can adapt to more uneven

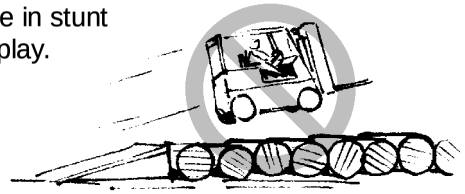
ground. Always make sure you pick the smoothest route for your lift truck.

8. Watch clearances, especially forks, mast, overhead guard and tail swing. A lift truck is designed to perform a wide variety of functions within limited space.

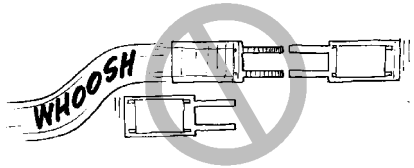


The operator must be aware that the forks can sometimes extend beyond the front of the load. If the forks extend beyond the load, the operator can hit an object or lift another load. Serious accidents can be caused by mast and overhead guards hitting pipes and beams near the ceiling.

9. Do not indulge in stunt driving or horseplay.



10. Do not pass another lift truck travelling in the same direction at intersections, blind spots or at other dangerous locations.



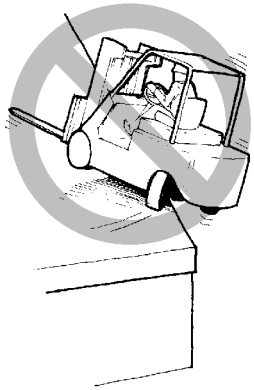
11. Stay away from the edge of the road. Keep the wheels of the lift truck, particularly the steer wheels, on the roadway. If the wheels are allowed to run off the edge of the travel surface onto soft ground, the lift truck can tip over.

12. 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.

HIGHWAY TRUCKS, RAIL CARS AND DOCKS

⚠ WARNING

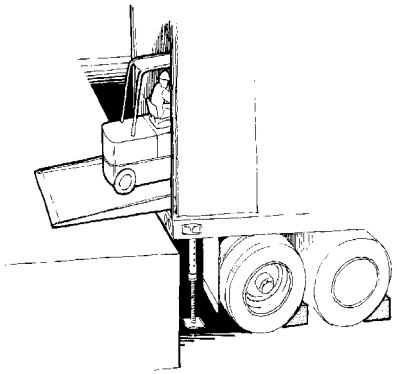
Maintain a safe distance from the edge of docks, ramps, platforms and other similar working surfaces. Watch the "tail swing". Remember when travelling in the forward direction and the steering wheel is turned to move the lift truck away from the edge of the dock the rear will swing toward the edge. This action can cause the lift truck to fall off the dock.



IF THE LIFT TRUCK FALLS OFF THE DOCK, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.

Before operating in a highway truck or rail car, observe the following:

- DO NOT use a lift truck to move a rail car.
- DO NOT use a lift truck to open or close the door on a rail car unless the lift truck has an attachment that is specifically designed for opening and closing rail car doors and the operator is trained in its use.



- Check to make sure that the brakes on the highway truck are set and that wheel blocks have been placed on both sides of the rear wheels (unless a dock locking mechanism is engaged). Fixed jacks may be necessary to support the front and rear of a highway truck trailer to prevent it from moving or tipping during loading or unloading.
- Make sure that the rail car brakes are set and the wheels are blocked while loading or unloading. Do this check so that the rail car will not move due to the movement of the lift truck in and out of the rail car.
- Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.
- Make sure the dock board is secured, in good condition and of the proper capacity.
- When entering a rail car the operator can enter at an angle (if the dock plate or bridge is wide enough). This will reduce the turning required after entering.

ATTACHMENTS

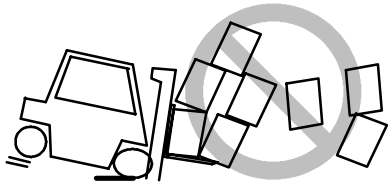
⚠ WARNING

Make sure the Nameplate is correct if an attachment has been installed.

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before operating the attachment. For the operation of attachment control levers, see TABLE 2. and Figure 6.

STOPPING

Stop the lift truck as gradually as possible. Hard braking and wheel sliding can cause the load to fall off of the forks and damage the load or hurt someone.



PARKING

The operator must never leave a lift truck in a condition so that it can cause damage and injury. When parking the lift truck, do the following operations:

1. Stop the lift truck and apply the parking brake. Applying the parking brake puts the transmission in **NEUTRAL** when the lift truck has a Foot Directional Control pedal.

2. Fully lower the forks or carriage. Tilt mast forward until the tips of the forks touch the ground.

3. If equipped, move the direction control lever to the **NEUTRAL** position.

4. Turn the key to the **OFF** position to stop the engine.

5. If the lift truck must be left on an incline, put blocks on the down hill side of the wheels so that the lift truck can not move.

6. Check engine compartment if operating in areas containing combustible material See the **FIRE HAZARD WARNING** at the beginning of the **OPERATING PROCEDURES** section.

7. If the lift truck is equipped with an LPG fuel system and is parked more than momentarily, close the fuel valve at the tank. If the lift truck is going to be left over night or longer, the truck must be parked outside or the LPG tank must be removed and stored outside.

Do not park the lift truck so that it limits access to fire aisles, stairways, and fire equipment.

MAINTENANCE

GENERAL

⚠ WARNING

Do not make repairs or adjustments unless you have both authorization and training. Repairs and adjustments that are not correct can make a dangerous operating condition.

Do not operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a "DO NOT OPERATE" tag in the operator's area. Remove the key from the key switch.

⚠ CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

This section contains a MAINTENANCE SCHEDULE and the instructions for maintenance and inspection.

The MAINTENANCE SCHEDULE has time intervals for inspection, lubrication and maintenance for your lift truck. The service intervals are given in both operating hours recorded on the lift truck hour meter, and in calendar time. Use the interval that occurs first.

The recommendation for the time intervals are for eight hours of operation per day. The time intervals must be decreased from the recommendations in the MAINTENANCE SCHEDULE for the following conditions:

1. If the lift truck is used more than eight hours per day.
2. If the lift truck must work in dirty operating conditions.

Your dealer for Yale lift trucks has the equipment and trained service personnel to do a complete program of inspection, lubrication, and maintenance. A regular program of inspection, lubrication, and maintenance will help your lift truck provide more efficient performance and operate for a longer period of time.

Some users have service personnel and equipment to do the inspection, lubrication, and maintenance shown in the MAINTENANCE SCHEDULE. Service Manuals are available from your dealer for Yale lift trucks to help users who do their own maintenance.

Serial Number Data

The serial number for the lift truck is on the Nameplate. It is also on the front crossmember of the frame, on the right-hand side.

HOW TO MOVE A DISABLED LIFT TRUCK

⚠ WARNING

Use extra caution when towing a lift truck if any of the following conditions exist:

1. **Brakes do not operate correctly.**
2. **Steering does not operate correctly.**
3. **Tires are damaged.**
4. **Traction conditions are bad.**
5. **The lift truck must be towed on a slope.**

If the engine cannot run, there is no power available for the hydraulic steering system. This condition can make the lift truck difficult to steer. Poor traction can cause the disabled lift truck or towing vehicle to slide. A slope will also make the lift truck more difficult to stop.

Never lift and move a disabled lift truck unless the disabled lift truck MUST be moved and cannot be towed. A lift truck used to move a disabled lift truck MUST have a capacity rating equal to or greater than the weight of the disabled lift truck. The capacity of the lift truck used to move a disabled lift truck must have a load center equal to half the width of the disabled lift truck. See the Nameplate of the disabled lift truck for the approximate total weight. The forks must extend the full width of the disabled lift truck. Put the weight center of the disabled lift truck on load center of the forks. Be careful to not damage the under side of the lift truck.

How To Tow the Lift Truck

1. The towed lift truck must have an operator.

2. Tow the lift truck slowly.

3. Raise the carriage and forks approximately 30 cm (12 inches) from the surface. Install a chain to prevent the carriage and mast channels from moving.

4. If another lift truck is used to tow the disabled lift truck, that lift truck must have an equal or larger capacity than the disabled lift truck. Install approximately $^1/_2$ of a capacity load on the forks of the lift truck that is being used to

tow the disabled lift truck. This $^1/_2$ capacity load will increase the traction of the lift truck. Keep the load as low as possible.

5. Use a towing link made of steel that fastens to the tow pins in the counterweights of both lift trucks.

HOW TO PUT A LIFT TRUCK ON BLOCKS

⚠ WARNING

The lift truck must be put on blocks for some types of maintenance and repair. The removal of the following assemblies will cause large changes in the center of gravity: mast, drive axle, engine and transmission, and the counterweight. When the lift truck is put on blocks, put additional blocks in the following positions to maintain stability:

1. **Before removing the mast and drive axle, put blocks under the counterweight so that the lift truck can not fall backward.**
2. **Before removing the counterweight, put blocks under the mast assembly so that the lift truck can not fall forward.**

The surface must be solid, even, and level when the lift truck is put on blocks. Make sure that any blocks used to support the lift truck are solid, one piece units.

NOTE: Some lift trucks have lifting eyes. These lifting eyes can be used to raise the lift truck so that blocks can be installed.

How To Raise the Drive Tires (See Figure 7.)

1. Put blocks on each side (front and back) of the steering tires to prevent movement of the lift truck.

2. Put the mast in a vertical position. Put a block under each outer mast channel.

3. Tilt the mast fully forward until the drive tires are raised from the surface.

4. Put additional blocks under the frame behind the drive tires.

5. If the hydraulic system will not operate, use a hydraulic jack under the side of the frame near the front. Make sure that the jack has a capacity equal to at least half the weight of the lift truck. See the Nameplate.

How To Raise the Steering Tires (See Figure 7.)

1. Apply the parking brake. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck.

2. Use a hydraulic jack to raise the steering tires. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck as shown on the Nameplate.

3. Put the jack under the steering axle or frame to raise the lift truck. Put blocks under the frame to support the lift truck.

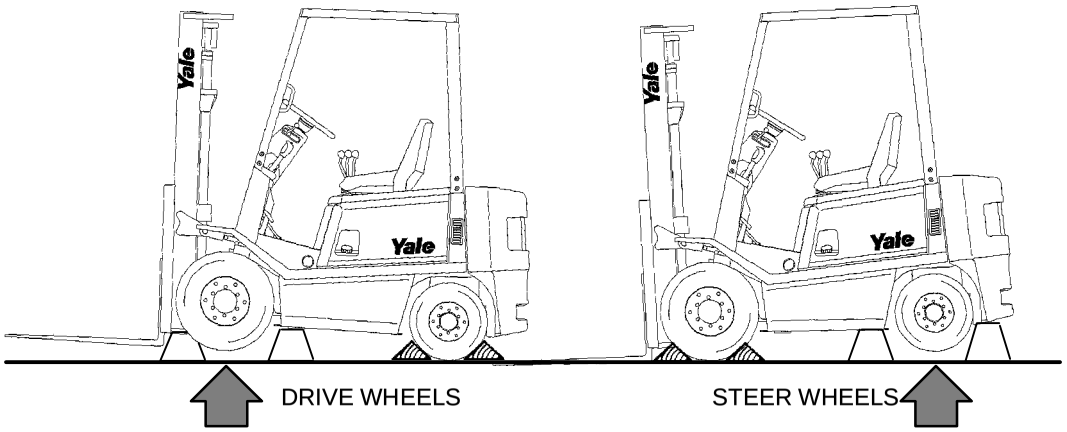


Figure 7. Put A Lift Truck On Blocks

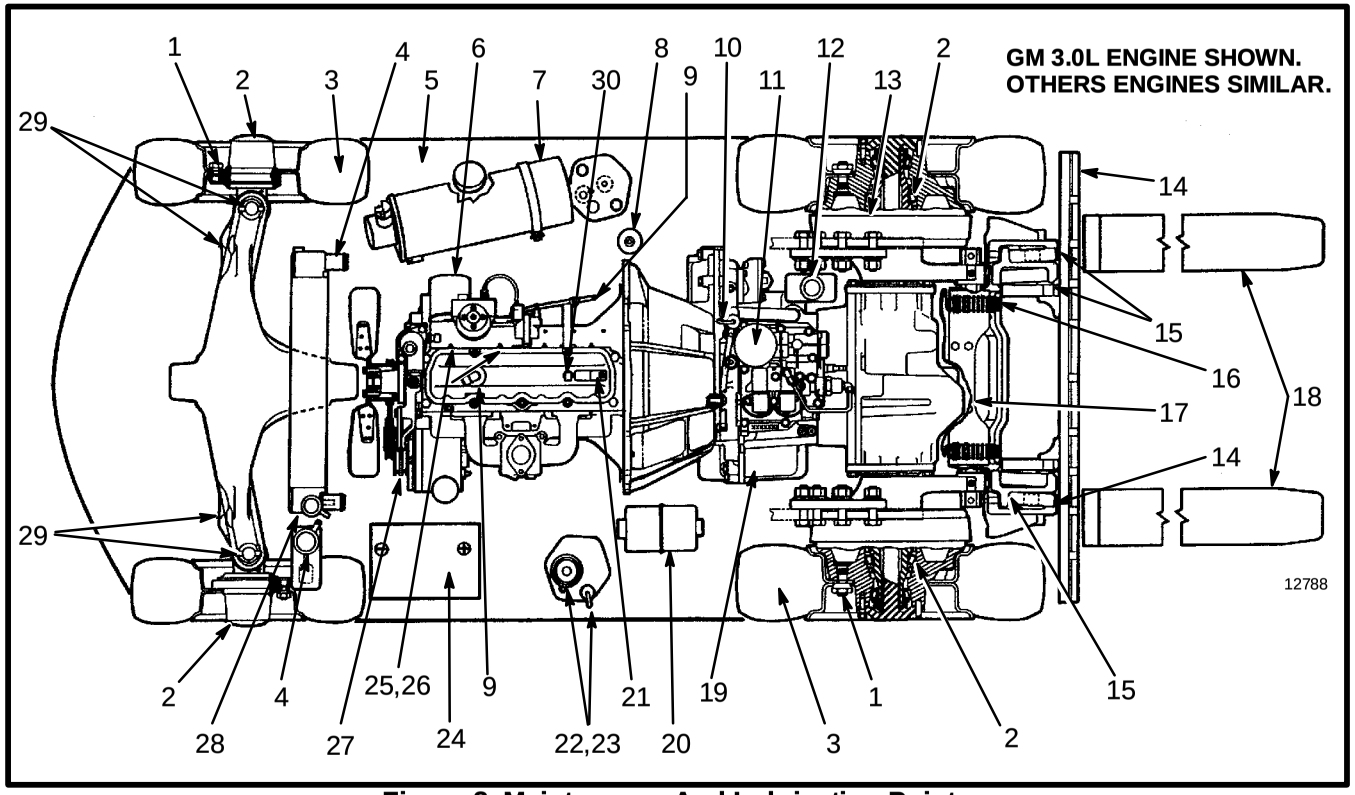


Figure 8. Maintenance And Lubrication Points

MAINTENANCE SCHEDULE (SEE Figure 8.)

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
3	TIRES, TIRE PRESSURE	X						See Nameplate
14	MAST, CARRIAGE, LIFT CHAINS	X					Check condition	See **PARTS MANUAL**
18	FORKS	X	X				Check condition	
	CHECK FOR LEAKS— FUEL, OIL, WATER	X					Check for leaks See NOTE 1	
5	FUEL TANK GM 3.0L (Gas/LPG) Mazda FE and F2 (Gas/LPG) Mazda XA and HA Diesel	X CIL					 39.4 liter (10.4 gal) 54.5 liter (14.5 gal) 54.4 liter (14.4 gal)	86 Octane — Gasoline Diesel No. 2 LPG — HD-5
	HORN, GAUGES, LIGHTS, ALARMS	X					Check operation	
13	SERVICE BRAKES AND PARKING BRAKE SERVICE BRAKES LINING	X X				 X	Check operation Check operation Check serviceability	

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 1: Check the fuel system prior to any service or maintenance activity.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
10	TRANSMISSION OIL	CIL	X			C	9.0 liter (10 qt)	Mobilfluid 424
9	ENGINE OIL Mazda FE (Gasoline and LPG) Mazda F2 (Gasoline and LPG)	X CIL CIL	C				 4.3 liter (4.5 qt) 4.6 liter (4.9 qt)	-18° to 40°C (0° to 104° F) SAE 10W-30 API SL ILSAC GF-3 SAE 2362
9	ENGINE OIL GM 3.0L (Gasoline and LPG)	X CIL	C				4.3 liter (4.6 qt)	-18° to 40°C (0° to 104° F) SAE 10W-30 API SL ILSAC GF-3 SAE 2362
9	ENGINE OIL (DIESEL) Mazda XA and HA	X CIL	C				7.4 liter (7.8 qt)	-15 to 40°C (5 to 104°F) SAE 10W-30 -10 to 50°C (14 to 122°F) SAE 15W-40 API CG4/CH4 ACEA E3/E5 MIL-PRF-2104G

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
6	ENGINE OIL FILTER		C				1 - See NOTE 2	See **PARTS MANUAL**
	FUEL FILTER, DIESEL	X			C		Clean or replace See NOTE 3	See **PARTS MANUAL**
	WATER SEPARATOR, DIESEL (Prefilter)	X CIL			C		Remove water Clean or replace	See **PARTS MANUAL**
12	BRAKE FLUID	CIL	X				0.2 liter (0.4 pt)	SAE J-1703
23	HYDRAULIC OIL	X	X			C	See NOTE 4 35.0 liter (37.0 qt)	API CC or CC/SE -18°C (0°F) and above SAE 10W
4	COOLING SYSTEM Mazda FE and F2 GM 3.0L Mazda XA and HA	CIL X				C	 11.0 liter (11.7 qt) 11.0 liter (11.7 qt) 11.0 liter (11.7 qt)	50% Water and 50% Ethylene Glycol Boron Free Anti-Freeze

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 2: Change filters on NEW lift trucks at first 100 hours on hour meter.

NOTE 3: Very dirty conditions will require daily clean and check.

NOTE 4: Heavy-duty or high-temperature operations require more frequent checks.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
4	COOLING SYSTEM GM 3.0L EPA Compliant Engine	CIL X			C		11.0 liter (11.7 qt.)	50% Water and 50% Ethylene Glycol Boron Free Anti-Freeze
	ENGINE COMPARTMENT	X					Remove Combustible Materials	
7	AIR FILTER	CIL	X				Clean or replace See NOTE 3 and NOTE 4	See **PARTS MANUAL**
7	AIR FILTER ELEMENT GM 3.0L EPA Compliant Engine					C	Clean or replace See NOTE 5	See **PARTS MANUAL**
24	BATTERY ELECTROLYTE, BATTERY CASE AND CABLES		X				Clean, check level	
22	HYDRAULIC TANK BREATHER		X				Clean or replace	See **PARTS MANUAL**

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 3: Very dirty conditions will require daily clean and check.
NOTE 4: Heavy duty or high temperature operations will require more frequent checks.

NOTE 5: In dirty or dusty environments, change at 1000 hours.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
1	WHEEL NUTS DRIVE WHEELS STEER WHEELS Two-Piece Wheels		X				Check torque	 490 510 Nm (361 to 376 lbf ft) 237 to 305 Nm (175 to 225 lbf ft)
16	LIFT CHAINS		X, L				As required	Engine Oil
	ENGINE SPEED (IDLE SPEED) Mazda FE (IMPCO) Mazda FE and F2 (Aisan Open Loop) Mazda FE and F2 (Aisan Closed Loop) GM 3.0L LPG (IMPCO) GM 3.0L (Aisan Open Loop) GM 3.0L (Aisan Closed Loop) Mazda XA and HA Diesel (Powershift Trans.) Mazda FE (Gasoline) Mazda F2 (Gasoline) GM 3.0L (Gasoline)		 X X X X X X X X X X				Adjust as required	 700 to 750 rpm 775 to 825 rpm 775 to 825 rpm 675 to 725 rpm 775 to 825 rpm 775 to 825 rpm 700 to 750 rpm 700 to 750 rpm 775 to 825 rpm 775 to 825 rpm

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
	ENGINE SPEED						Adjust as required	
	GOVERNED SPEED							
	Mazda FE (IMPCO)		X					2600 to 2700 rpm
	Mazda FE and F2 (Aisan Open Loop)		X					2700 to 2800 rpm
	Mazda FE and F2 (Aisan Closed Loop)		X					2700 to 2800 rpm
	GM 3.0L LPG (IMPCO)		X					2850 to 2950 rpm
	GM 3.0L (Aisan Open Loop)		X					2700 to 2800 rpm
	GM 3.0L (Aisan Closed Loop)		X					2700 to 2800 rpm
	Mazda XA Diesel		X					2600 to 2700 rpm
	Mazda FE (Gas)		X					2350 to 2550 rpm
	Mazda F2 (Gas)		X					2700 to 2800 rpm
	GM 3.0L (IMPCO) (Gas)		X					2850 to 2950 rpm
	Mazda HA Diesel		X					2100 to 2200 rpm

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
29	STEERING AXLE TIE RODS KING PIN BEARINGS		L		 L		 4 Fittings 2 Fittings	 Multipurpose Grease See NOTE 6
25	SPARK PLUGS Mazda FE and F2 GM 3.0L GLOW PLUGS Mazda XA and HA Diesel				C		Check Plug Wires 4 4 4	See **PARTS MANUAL** 0.8 mm (0.032 in) 1.1 mm (0.045 in.) See **PARTS MANUAL** (Change only if defective.)
26	FUEL INJECTOR (Gasoline)					X	1 See NOTE 7	See **PARTS MANUAL**
	FUEL INJECTOR (Aisan)					X	1 See NOTE 7	Check and clean if required
	PEDALS, LEVERS, SEAT RAILS, CABLES, HINGES, LINKAGES, HOOD LATCH				L		Lubricate as necessary	Yale Part No. 504236201

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 6: Multipurpose grease with 2 to 4% Molybdenum Disulfide.

NOTE 7: On Mazda FE and F2 engines, model year 2004 or newer, check the fuel injectors at 5000 hours or 7 years.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
17	DIFFERENTIAL OIL				X	C	7.6 liter (8.0 qt)	SAE 80W-90, 85W-140
21	VALVE ADJUSTMENT Mazda FE Mazda F2 GM 3.0L Mazda XA and HA Diesel				X		Adjust as required	 0.30 mm (0.012 in) Cold 0.30 mm (0.012 in) Hot Not adjustable 0.30 mm (0.012 in) Intake/Exhaust (Cold)
21	PCV VALVE				X	C	Replace as necessary See NOTE 8	See **PARTS MANUAL**
30	BREATHER ASSEMBLY Mazda XA and HA Diesel				X	C	Replace as necessary	See **PARTS MANUAL**
	BREATHER HOSE Mazda XA and HA Diesel				X		Clean and replace as necessary	See **PARTS MANUAL**
	INCHING/BRAKE PEDAL		X				Adjust as required	
27	DRIVE BELT AND TIMING BELT		X			X	Adjust or replace See NOTE 9	See **PARTS MANUAL**

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 8: On Mazda engines, replace the PCV valve at 2500 hours.

NOTE 9: Replace timing belt on Mazda FE and F2 engines every 3500 hours. Use only the hour interval.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
	TIMING Mazda FE Gasoline LPG Mazda F2 Gasoline LPG GM 3.0L Mazda XA Diesel Mazda HA Diesel				X		Adjust as required	 0° TDC (YELLOW Mark) 9° BTDC (RED Mark) 0° TDC (WHITE MARK) 9° BTDC (RED MARK) 8° BTDC 9° BTDC 3° BTDC
15	MAST PIVOTS SLIDING SURFACES and LOAD ROLLER SURFACES SIDE-SHIFT CARRIAGE INTEGRAL SIDE-SHIFT CARRIAGE (Upper/Lower Bearings)		L L L		 X	 C	 2 Fittings As required 3 Fittings Check Wear 4 Bearings	 Multipurpose Grease See NOTE 6 2.5 mm (3/32 in) or less
20	HYDRAULIC OIL FILTER					C	1 - See NOTE 1	See **PARTS MANUAL**
9	FUEL FILTER, GASOLINE & LPG					C	1	See **PARTS MANUAL**

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 1: Change filters on NEW lift trucks at first 100 hours on hour meter.

NOTE 6: Multipurpose grease with 2 to 4% Molybdenum Disulfide.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
	FUEL FILTER, LPG (IMPCO)				C		1	See **PARTS MANUAL**
	LPG REGULATOR (Aisan)			X			Drain tar	
	LPG REGULATOR (IMPCO)					X	Drain tar	
	REGULATOR PRESSURE/ DIAPHRAGM and O-RING (Aisan)				X	C		Check and adjust per specification if required. Replace if required
	IDLE CIRCUIT/INJECTOR FILTER (Aisan)				C			
	SOLENOID VALVE (Aisan)					X	Check and clean if required	
	FUEL FILTER (Aisan)				X	C	2	See **PARTS MANUAL**
	LOW EMISSIONS SYSTEM Mazda LPG and GM Closed Loop	CIL						
11	TRANSMISSION OIL FILTER					C	1 - See NOTE 1	See **PARTS MANUAL**

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 1: Change filters on NEW lift trucks at first 100 hours on hour meter.

ITEM NO.	ITEM	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	PROCEDURE OR QUANTITY	SPECIFICATION
2	WHEEL BEARINGS Drive Wheel (Inner) Steer Wheels					 L L	 .45 kg (1 lb) As required	 Multipurpose Grease See NOTE 6
28	COOLANT HOSES	X					Check condition	See **PARTS MANUAL**
	SAFETY LABELS	X					Replace as necessary	See **PARTS MANUAL**
	SEAT BELT, HIP RESTRAINTS AND SEAT RAILS	X					Check condition	
	HOOD AND SEAT LATCHES	X					Check condition	
	STEERING CONTROLS STEERING COLUMN LATCH	X X					Check operation Check operation	
19	TRANSMISSION	X					Check operation	
	ATTACHMENTS AND OPTIONS						See NOTE 10	As specified

X=Check C=Change L=Lubricate CIL=Check indicator light during operation.

NOTE 6: Multipurpose grease with 2 to 4% Molybdenum Disulfide.

NOTE 10: Perform maintenance as specified by the manufacturer.

ITEM	8 Hr./ Daily	250 Hr./ 6 wk	500 Hr./ 3 mo.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
INSPECT ENGINE ELECTRICAL SYSTEM, CONNECTORS AND FCVS CONNECTION				X			
INSPECT ENGINE VACUUM AND FUEL LINES AND FITTINGS					X		
INSPECT LOCK OFF FOR LEAKS AND ENSURE LOCK OFF CLOSING					X		
TEST LPG/GAS REGULATOR PRESSURE					X		
INSPECT LOW PRESSURE REGULATOR FOR COOLANT LEAKS					X		
CHECK AIR INDUCTION SYSTEM FOR LEAKS					X		
CHECK MANIFOLD FOR VACUUM LEAKS					X		
CHECK THROTTLE SHAFT FOR STICKING					X		
X=Check C=Change L=Lubricate CIL=Check indicator light during operation.							

ITEM	8 Hr./ Daily	250 Hr./ 6 wk	500 Hr./ 3 mo.	1000 Hr./ 6 mo.	2000 Hr./ 1 yr.	PROCEDURE OR QUANTITY	SPECIFICATION
INSPECT EXHAUST MANIFOLD AND PIPING FOR LEAKS					X		
INSPECT CATALYST INLET AND OUTLET					X		
CLEAN DEBRIS FROM RADIATOR CORE		X					
OXYGEN SENSOR CONNECTOR GM 3.0L EPA Compliant Engine					X		
X=Check C=Change L=Lubricate CIL=Check indicator light during operation.							

MAINTENANCE PROCEDURES
EVERY 8 HOURS OR DAILY

⚠ WARNING

Do not operate a lift truck that needs repairs. Report the need for repairs immediately. If repair is necessary, put a "DO NOT OPERATE" tag in the operator's area. Remove the key from the key switch.

HOW TO MAKE CHECKS WITH THE ENGINE STOPPED

Put the lift truck on a level surface. Lower the carriage and forks, stop the engine and apply the parking brake. Open the hood and check for leaks and conditions that are not normal. Clean any oil or fuel spills. Ensure all surfaces are free of oils, lubricants, fuel and organic dust or fibers (paper, wood, cotton, agricultural grass/grain, etc.).

Tires and Wheels (See Figure 9.)

⚠ WARNING

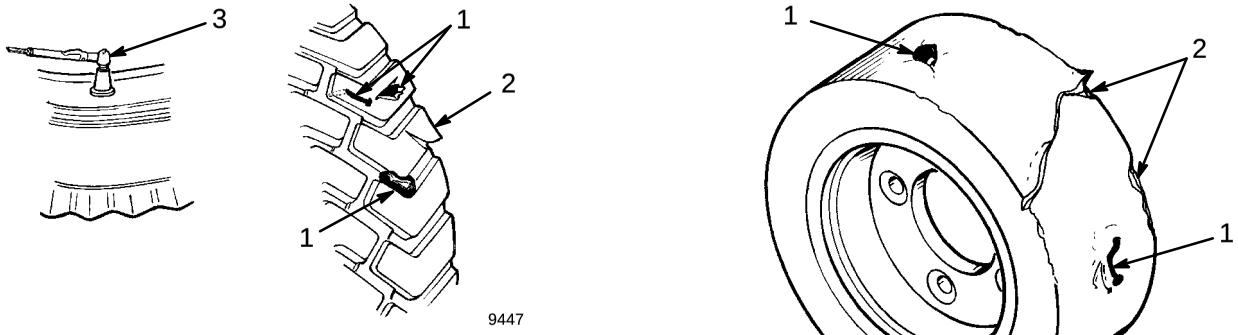
Air pressure in pneumatic tires can cause tire and wheel parts to explode. The explosion of wheel parts can cause serious injury or death.

Remove all of the air from the tires before the tires are removed from the lift truck.

If the air pressure is less than 80% of the correct air pressure, the tire must be removed before air is added. Put the tire in a safety cage when adding air pressure to the tire. Follow the procedures described in "Add Air To The Tires".

When air is added to the tires, use a remote air chuck. The person adding air must stand to the side of the safety cage and not in front of it.

If the lift truck has pneumatic tires, keep the tires at the correct air pressure. See the Nameplate. Check the air pressure with a gauge when the tires are cold. If it is necessary to add air to a tire that is warm, check one of the other tires on the same axle and add air to the tire that has low pressure so that the air pressures are equal. The air pressure of the warm tires must always be equal to or greater than the specification for air pressure for cold tires.



1. CHECK FOR DAMAGE (REMOVE NAILS, GLASS AND OTHER OBJECTS FROM THE TREAD)
2. MAKE SMOOTH EDGES
3. CHECK THE TIRE PRESSURE (PNEUMATIC TIRES)

Figure 9. Check The Tires

Check the tires for damage. Inspect the tread and remove any objects that will cause damage. Check for bent or damaged rims. Check for loose or missing parts. Remove any wire, straps or other material wrapped around the axle.

⚠ WARNING

Check all wheel nuts after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when the drive wheels have been removed and

installed. Tighten the nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 250 hours.

Make sure the wheel nuts are tight. Tighten the wheel nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE.

Forks

The identification of a fork describes how the fork is connected to the carriage. These lift trucks have hook forks. See Figure 10. and Figure 11.

Forks, Adjustment

The forks are connected to the carriage by hooks and one of two types of lock pins. See Figure 11. These lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Adjust the forks as far apart as possible for maximum support of the load. Hook forks will slide along the carriage bars to adjust for the load to be lifted. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure the lock pin is engaged in the carriage bar to lock the fork in position after the width adjustment is made.

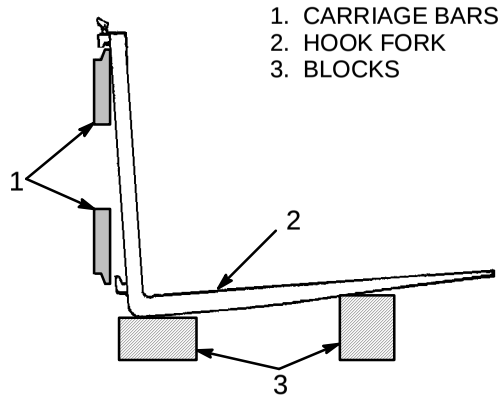
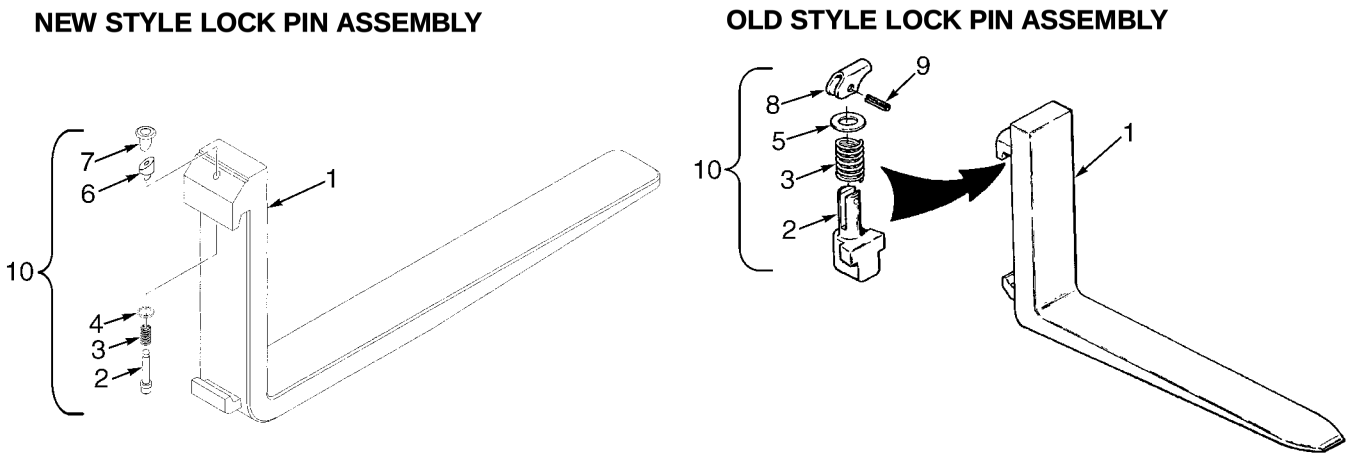


Figure 10. Remove A Hook Fork

Forks, Removal

⚠ WARNING

Do not try to move a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 kg to 115 kg (99 to 253 lbs).



1. FORK
2. LOCK PIN
3. SPRING
4. WASHER
5. WASHER
6. WEDGE
7. KNOB
8. LEVER
9. COTTER PIN
10. LOCK PIN ASSEMBLY

HO190101

Figure 11. Fork Lock Pin Assembly

A fork can be removed from the carriage for replacement of the fork or other maintenance. Slide a hook fork to the fork removal notch on the carriage. See Figure 12. Lower the fork onto blocks so that the bottom hook of the fork

moves through the fork removal notch. See Figure 12. Lower the carriage further so that the top hook of the fork is disengaged from the top carriage bar. Move the carriage away from the fork, or use a lifting device to move the fork away from the carriage.

Forks, Installation

Move the fork and carriage so that the top hook on the fork can engage the upper carriage bar. Raise the carriage to move the lower hook through the fork removal notch. Slide the fork on the carriage so that both upper and lower hooks engage the carriage. Engage the lock pin with a notch in the upper carriage bar.

Inspection of Forks, Mast, and Lift Chains (See Figure 12. and Figure 13.)

⚠ WARNING

Lower the lift mechanism completely. Never allow any person under a raised carriage. Do not put any part of your body in or through the lift mechanism unless all parts of the mast are completely lowered and the engine is STOPPED.

Do not try to correct the alignment of the fork tips by bending the forks or adding shims. Replace damaged forks.

Never repair damaged forks by heating or welding. Forks are made of special steel using special procedures. Replace damaged forks.

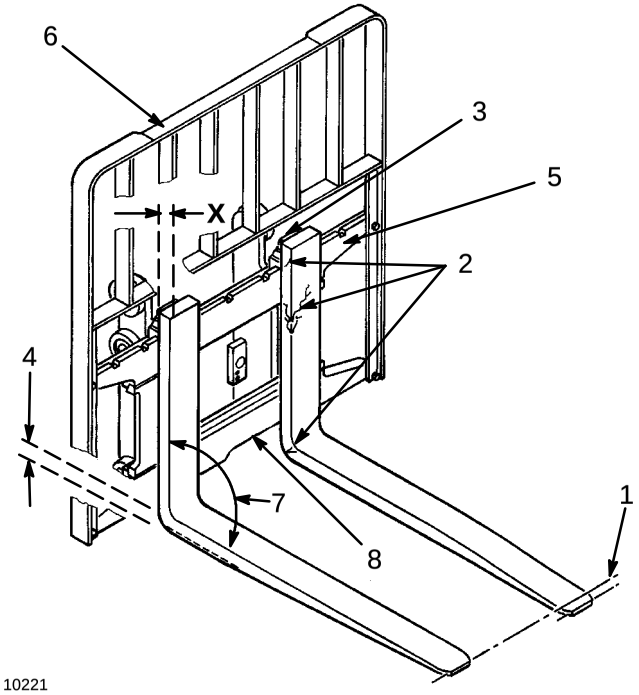
1. Inspect the welds on the mast and carriage for cracks. Make sure that the capscrews and nuts are tight.

2. Inspect the channels for wear in the areas where the rollers travel. Inspect the rollers for wear or damage.

3. Inspect the load backrest extension for cracks and damage.

4. Inspect the forks for cracks and wear. Check that the fork tips are aligned as shown in Figure 12. Check that the bottom of the fork is not worn (Item 4 in Figure 12.).

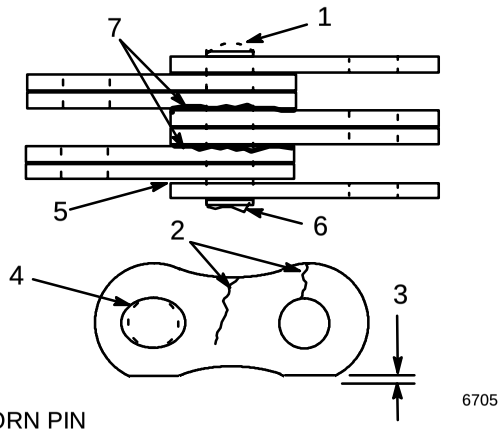
5. Replace any damaged or broken parts that are used to keep the forks locked in position.



1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)
2. CRACKS
3. LATCH DAMAGE
4. HEEL OF FORK (MUST BE 90% OF DIMENSION “X”)
5. CARRIAGE
6. LOAD BACKREST EXTENSION
7. MAXIMUM ANGLE 93°
8. FORK REMOVAL NOTCH

FORK TIP ALIGNMENT	
LENGTH OF FORKS	3% DIMENSION
915 mm (36 in)	27 mm (1.10 in)
1220 mm (48 in)	37 mm (1.45 in)
1830 mm (72 in)	55 mm (2.15 in)

Figure 12. Check The Forks



1. WORN PIN
2. CRACKS
3. EDGE WEAR
4. HOLE WEAR
5. LOOSE LEAVES
6. DAMAGED PIN
7. CORROSION

Figure 13. Check The Lift Chains

6. If the lift truck is equipped with a side–shift carriage or attachment, inspect the parts for cracks and wear. Make sure the parts that fasten the side–shift carriage or attachment to the carriage are in good condition.

7. Check that the lift chains are correctly lubricated. Use SAE 30 engine oil to lubricate the lift chains.

8. Inspect the lift chains for cracks or broken links and pins. See Figure 13.

9. Inspect the chain anchors and pins for cracks and damage.

10. Make sure the lift chains are adjusted so that they have equal tension. **Adjustments or replacement of the lift chains must be done by authorized personnel.**

Safety Labels

⚠ WARNING

Safety labels are installed on the lift truck to give information about operation and possible hazards. It is important that all safety labels are installed on the lift truck and can be read.

Check that all safety labels are installed in the correct location on the lift truck. See the **PARTS MANUAL** or the **FRAME** section of the **SERVICE MANUAL** for the correct location of the safety labels.

Operator Restraint System (See Figure 14.)

The seat belt, hip restraint brackets, seat and mount, hood and latches are all part of the operator restraint sys-

tem. Each item must be checked to make sure it is fastened correctly, functions correctly and is in good condition.

See Figure 14. Make sure the seat rails and latch striker are not loose. The seat rails must lock tightly in position, but move freely when unlocked. The seat rails must be correctly fastened to the hood and the hood fastened to the cowl with the latch. Try to lift the hood to make sure it is fastened correctly and will not move.

1. HOOD LATCH
2. LATCH HOOK
3. PUSH KNOB
4. SEAT
5. HIP RESTRAINT
6. SEAT BELT
7. UPPER HOOD PANEL
8. HINGE
9. TORSION SPRING

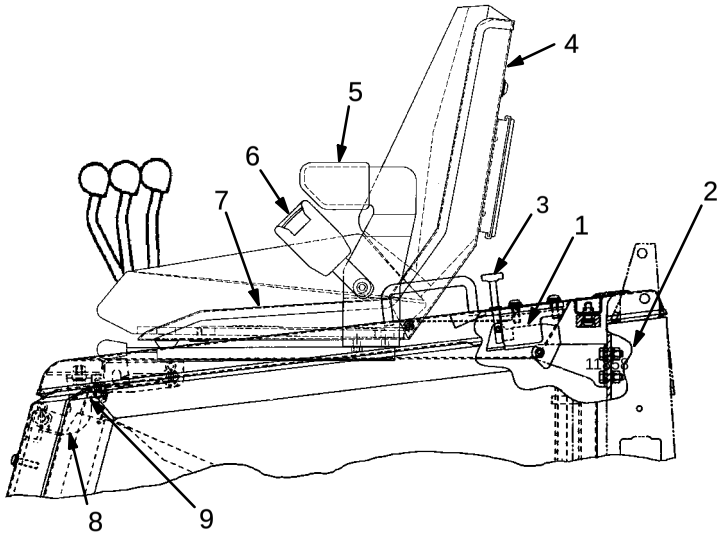


Figure 14. Check The Hood Latch And Seat

The end of the seat belt must fasten correctly in the latch. Make sure the seat belt pulls from the retractor assembly and retracts smoothly. The seat belt must be in good condition. A seat belt that is damaged or worn will not give protection when it is needed. If the seat belt can not be pulled from the retractor assembly, replace the seat belt assembly.

Steering Column Latch

Make sure the latch for the steering column operates correctly. The latch must NOT allow the column to move unless the latch is released.

Check For Fuel, Oil Or Coolant Leaks

⚠ WARNING

All fuels are very flammable and can burn or cause an explosion. Do not use an open flame to check the fuel level or to check for leaks in the fuel system. If there is a leak in the fuel system, extra care must be used during the repair. Do not operate the lift truck until a leak is repaired.

Make a visual check for leaks on and under the lift truck. If possible, find and repair the leak at the source. Leaks often indicate a need for repair of damaged or worn components. Leaks in the LPG fuel system are usually not visible unless ice is visible. There is however, usually a strong odor. Fuel leaks MUST be repaired NOW.

Check the fuel system for leaks and the condition of parts. When fuel is added to the lift truck, see the section, **How To Add Fuel To The Lift Truck**.

Also check the condition of the radiator or heater hoses that are not leaking. Soft or cracked hoses need to be replaced before a major leak occurs.

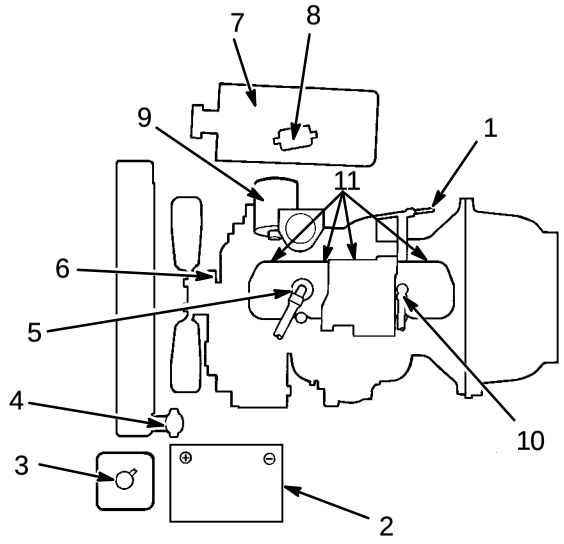
Drive Belt (See Figure 15. and Figure 16.)

Check the drive belt for wear and damage.

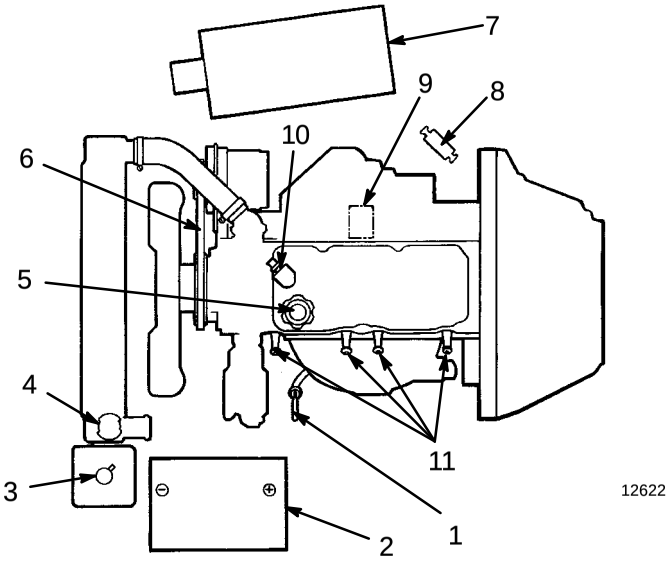
Engine Oil (See Figure 15. and Figure 16.)

After the engine has stopped, wait one minute before checking the oil level. Keep the oil at the correct level as indicated on the dipstick. Use the correct oil as shown in the MAINTENANCE SCHEDULE.

GM 3.0L, LPG AND GASOLINE

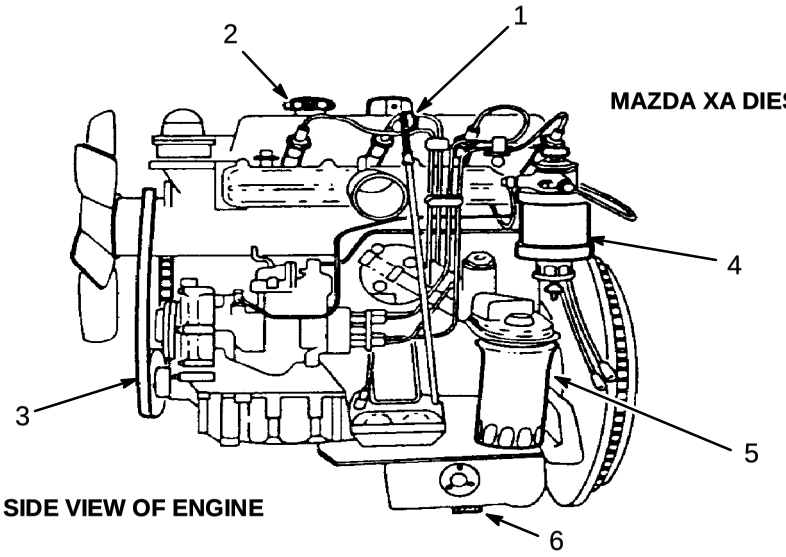


MAZDA FE, LPG AND GASOLINE



1. DIPSTICK FOR ENGINE OIL
2. BATTERY
3. AUXILIARY COOLANT RESERVOIR
4. RADIATOR CAP
5. ENGINE OIL FILL
6. DRIVE BELTS
7. AIR FILTER
8. FUEL FILTER
9. ENGINE OIL FILTER
10. PCV VALVE
11. SPARK PLUGS

Figure 15. Engine Maintenance Points



MAZDA XA DIESEL ENGINE SHOWN.

SIDE VIEW OF ENGINE

1. DIPSTICK FOR ENGINE OIL
2. ENGINE OIL FILL
3. DRIVE BELTS
4. FUEL FILTER
5. ENGINE OIL FILTER
6. OIL DRAIN PLUG

Figure 16. Engine Maintenance Points

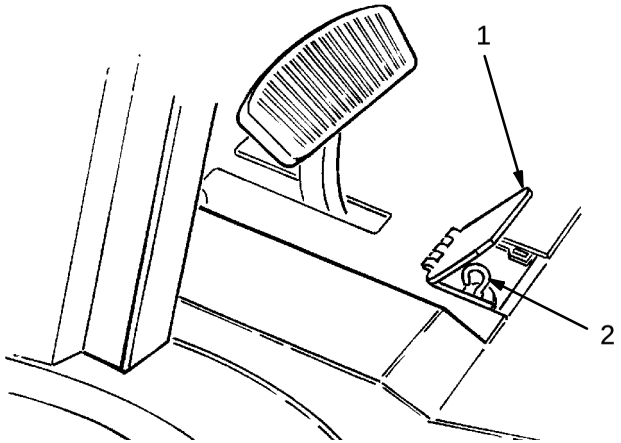
Powershift Transmission Oil Temperature

NOTE: The engine will stop after a 30 second warning buzzer if transmission oil is over 133°C (271°F) on lift trucks with protection system.

There is an indicator light on the instrument cluster for the transmission oil temperature. The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, the temperature of the transmission oil is too high. Stop the operation of the lift truck. Make a visual check of the transmission and check the level of the transmission oil.

Powershift Transmission Oil Level (See Figure 17.)

To check the transmission oil, apply the parking brake and, if the lift truck has a direction control lever, put the direction control lever in the **NEUTRAL** (N) position. Run the engine for one minute to fill the torque converter with oil. Stop the engine and check the oil level within thirty seconds. Use the correct oil shown in the MAINTENANCE SCHEDULE. Keep the oil level at the "**FULL**" mark on the dipstick.



1. ACCESS DOOR
2. DIPSTICK FOR TRANSMISSION

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Figure 17. Check The Oil Level For The Powershift Transmission

Hydraulic System Oil (See Figure 18.)

⚠ WARNING

At operating temperature the hydraulic oil is HOT. Do not permit the hot oil to touch the skin and cause a burn.

⚠ CAUTION

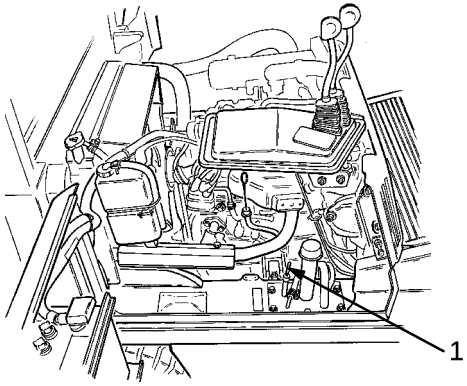
Do not permit dirt to enter the hydraulic system when the oil level is checked or the filter is changed.

Never operate the hydraulic pump without oil in the hydraulic system. The operation of the hydraulic pump without oil will damage the pump.

Check the level of hydraulic oil every 250 hours. Heavy duty or high temperature operations can require more frequent checks.

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered and the engine is stopped. Add hydraulic oil only as needed. If more hydraulic oil is added than the “FULL” level, the hydraulic oil will leak from the breather during operation. The oil level indicated by the dipstick is most accurate when the oil temperature is 53 to 93°C (130 to 200°F).

Check the hydraulic system for leaks and damaged or loose components.



1. HYDRAULIC TANK DIPSTICK

Figure 18. Check Hydraulic Oil

Battery (See Figure 15. And Figure 16.)

⚠ WARNING

The acid in the electrolyte can cause injury. If the electrolyte is spilled, use water to flush the area. Use a solution of sodium bicarbonate (soda) to make the

acid neutral. Acid in the eyes must be flushed with water immediately. Wear eye protection.

Batteries generate explosive fumes. Keep the vents in the caps clean. Keep sparks or open flame away from the battery area. Do not make sparks from the battery connections. Disconnect the battery ground cable when doing maintenance.

1. Keep the battery and cable terminals clean. Check the electrolyte level (unless maintenance-free battery). Keep the electrolyte level above the separators and plates. Use distilled water. Do not fill the battery more than to the bottom of the internal filler neck.

2. If the battery becomes discharged and requires a booster battery to start the engine, follow these procedures carefully when connecting the jumper cables:

a. Always connect the positive jumper cable to the positive terminal of the discharged battery and the negative jumper cable to the negative terminal.

b. Always connect the jumper cable that is the ground cable last.

c. Always connect the jumper cables to the discharged battery before connecting them to the booster battery.

Air Filter (See Figure 19.)

⚠ WARNING

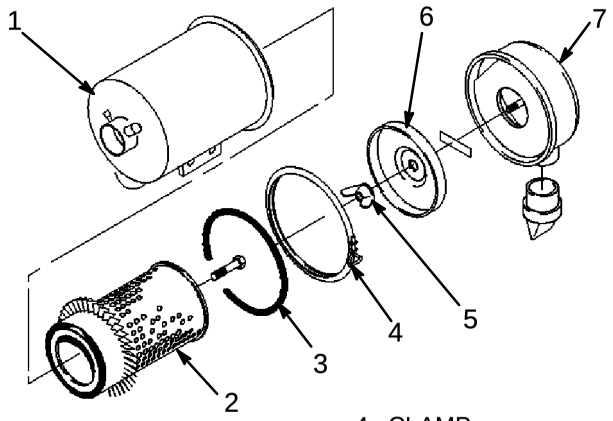
Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

Check the air filter every 250 hours of operation. Very dirty conditions will require a daily inspection and cleaning or installation of a new filter element. Use compressed air to clean the filter element. Air pressure must be less than 210 kPa (30 psi). Apply the air from the inside to the outside of the filter element.

⚠ WARNING

Cleaning solvents can be flammable and toxic, and can cause skin irritation. When using cleaning solvents, always follow the recommendations of the manufacturer.

Inspect the filter element. Put a bright light inside the filter element and look for holes or other damage. If the filter element is damaged, replace it with a new filter element. Use a cloth with solvent to clean the inside of the canister when the filter element is replaced.



1. CANISTER
2. FILTER ELEMENT
3. SEAL
4. CLAMP
5. WING NUT
6. BAFFLE
7. END COVER

Figure 19. Air Filter

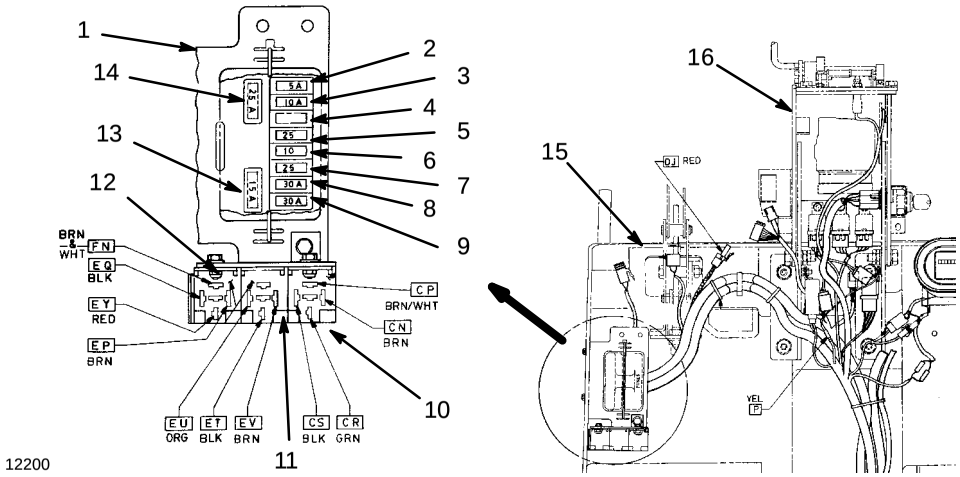
HOW TO MAKE CHECKS WITH THE ENGINE RUNNING

⚠ WARNING

FASTEN YOUR SEAT BELT! The seat belt is installed to help the operator stay on the truck if the lift truck tips over. IT CAN ONLY HELP IF IT IS FASTENED.

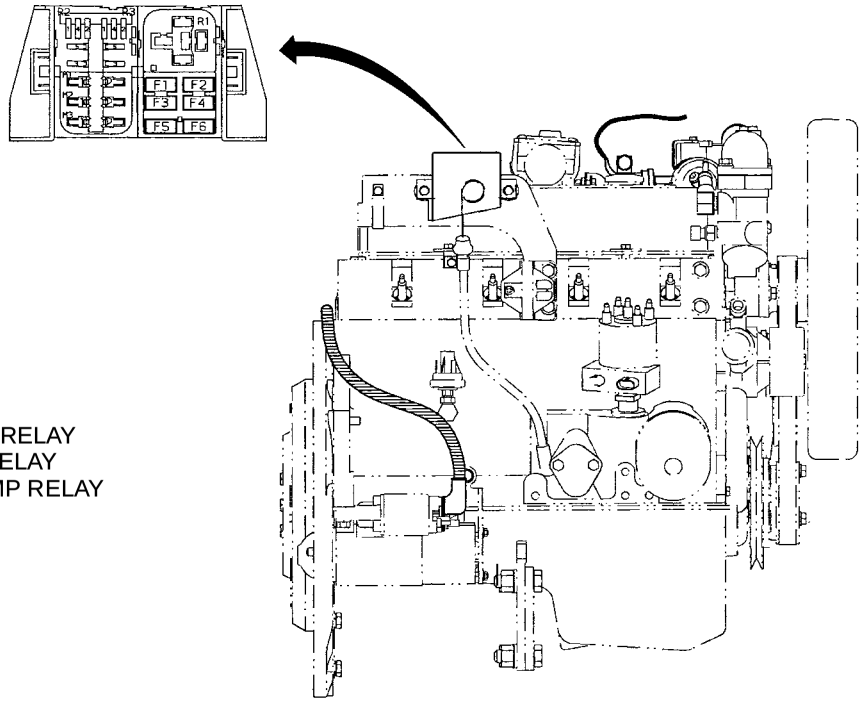
Make sure that the area around the lift truck is clear before starting the engine or making any checks of the operation. Be careful when making the checks. If the lift truck is stationary during a check, apply the parking brake and put the transmission in **NEUTRAL**. Make the checks carefully.

NOTE: THERE IS ALSO A SPECIAL FUSE LINK IN THE BATTERY POSITIVE WIRE NEAR THE STARTER SOLENOID TO PROTECT ALL CIRCUITS.



1. FUSE PANEL
2. TRANSMISSION FUSE
3. HORN FUSE
4. NOT USED
5. LIGHTS FUSE
6. TURN/BRAKE FUSE
7. OPTIONAL LIGHTS FUSE
8. POWER CLUSTER FUSE
9. CAB ACCESSORY FUSE
10. CAB ACCESSORY RELAY
11. TURN SIGNAL FLASHER
12. OPTIONAL LIGHT RELAY
13. REAR WIPER FUSE
14. FRONT WIPER FUSE
15. INSTRUMENT PANEL
16. STEERING COLUMN

Figure 20. Fuses And Relays



F1 20 AMPS
F2 5 AMPS
F3 15 AMPS
F4 15 AMPS
R1 STARTER RELAY
R2 POWER RELAY
R3 FUEL PUMP RELAY

Figure 21. Engine Compartment Fuses And Relays, GM 3.0L EPA Compliant Engine (Newer Lift Truck Models)

Gauges, Lights, Horn, Fuses and Relays

Start the engine. Check the gauges and indicator lights for correct operation as described in TABLE 1. Check the operation of the horn. If any of the indicator lights or gauges do not operate correctly, check the fuses. The fuses are under the instrument panel on the left side of the cowl. See Figure 20.

On newer lift truck models with the GM 3.0L emissions compliant engine, there are additional fuses and relays located in the engine compartment. See Figure 21.

"Check Engine" Light (Mazda and GM 3.0L LPG Closed-Loop With Emission System)

When the ignition switch is turned to the ON position, the "Check Engine" light on the instrument panel will illuminate to indicate that the ECM has completed the circuit. If the light does not illuminate, refer to **LPG FUEL SYSTEM, AISAN CLOSED-LOOP, 900 YRM 948** or **LPG/GASOLINE FUEL SYSTEM GM 3.0L, 4.3L EPA COMPLIANT ENGINES, 900 YRM 1088** for troubleshooting. When the engine is started, the light will go off. If the light stays on while the engine is running, refer to **LPG FUEL SYSTEM, AISAN CLOSED-LOOP, 900 YRM 948** or **LPG/GASOLINE FUEL SYSTEM GM 3.0L, 4.3L EPA COMPLIANT ENGINES, 900 SRM 1088** for troubleshooting.

"Check Engine" Light (GM 3.0 Liter Gasoline)

When the ignition switch is turned to the ON position, the "Check Engine" light on the instrument panel will illuminate to indicate that the ECM has completed the circuit. If the light does not illuminate, refer to **GM 3.0L Engine, 600 YRM 3** or **GM 3.0L GAS/LPG ENGINE, 600 YRM 1020** for troubleshooting. When the engine is started, the light will go off. If the light stays on while the engine is running, there is a problem with the fuel injection system. Refer to **GM 3.0L Engine, 600 YRM 3** or **GM 3.0L GAS/LPG ENGINE, 600 YRM 1020** for troubleshooting.

Engine Oil Pressure

NOTE: The engine will stop after a 30 second warning buzzer if engine oil pressure is less than 13.8 kPa (2 psi) on lift trucks with protection system.

There is an indicator light on the instrument cluster for the engine oil pressure. The red light is **ON** when the key

switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, the engine oil pressure is low.

Some units have a gauge for oil pressure. If the needle is in the red zone, the oil pressure is too low. Stop the engine and check the oil level.

Cooling System

⚠ WARNING

DO NOT remove the radiator cap from the radiator when the engine is hot. When the radiator cap is removed, the pressure is released from the system. If the system is hot, the steam and boiling coolant can cause burns.

NOTE: The engine will stop after a 30 second warning buzzer if coolant is over 121°C (250°F) on lift trucks with protection system.

Some units have a gauge for coolant temperature. If the needle is in the red zone when the engine is running, the coolant and engine are too hot. Stop the engine and check the coolant level in the coolant recovery reservoir.

Check for and remove any debris on the radiator core.

Steering System

⚠ WARNING

The lift truck has hydraulic power steering. The steering can be difficult if the engine is not running.

Make sure the steering system operates smoothly and provides good steering control.

Service Brakes

⚠ WARNING

Loss of fluid from the brake fluid reservoir indicates a leak. Repair the brake system before using the lift truck. Replace the brake fluid in the system if there is dirt, water or oil in the system.

There is an indicator light on the instrument cluster for the brake fluid. The red light is **ON** when the key switch is in the **START** position and must go **OFF** when the engine is running. If the light is **ON** when the engine is running, the brake fluid level in the reservoir is too low.

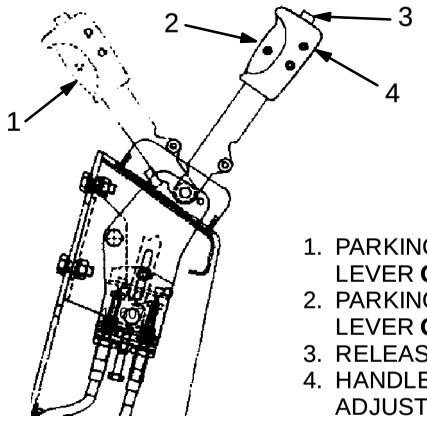
Check the operation of the service brakes. Push on the inching/brake pedal. The service brakes must be applied before the inching/brake pedal reaches the floor plate. The pedal must stop firmly and must not move slowly

down after the brakes are applied. The service brakes must apply equally to both drive wheels. The service brakes must not pull the lift truck to either side of the direction of travel when they are applied. The service brakes are automatically adjusted when the brakes are applied and the lift truck changes direction. Full application of the inching/brake pedal applies the service brakes and puts the transmission in **NEUTRAL**.

Lift trucks with a Foot Directional Control pedal: when the inching/brake pedal is fully applied, a switch in the starting circuit is closed so that the engine can be started.

Parking Brake

Check the operation of the parking brake. The operator must adjust the parking brake so that the lift truck does not move if it is parked on an incline. The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade [a slope that increases 1.5 meters in 10 meters (1.5 ft increase in 10 ft)].



1. PARKING BRAKE LEVER **OFF** POSITION
2. PARKING BRAKE LEVER **ON** POSITION
3. RELEASE BUTTON
4. HANDLE (ROTATE TO ADJUST)

Figure 22. Parking Brake Adjustment

To adjust the parking brake, turn the adjustment knob as shown in Figure 22. Do not tighten the adjustment so that the brake is applied when the lever is released. The lever for the parking brake has a lock. Use your thumb or finger to release the lock on the lever when the parking brake is released.

Lift trucks with a Foot Directional Control pedal: when the parking brake is applied, a switch in the starting circuit is closed so that the engine can be started. The switch also puts the transmission in **NEUTRAL** when the parking brake is applied**.**

Fuel System

⚠ WARNING

All fuels are very flammable and can burn or cause an explosion. Do not use an open flame to check the fuel level or to check for leaks in the fuel system. If there is a leak in the fuel system, extra care must be used during the repair. Do not operate the lift truck until a leak is repaired.

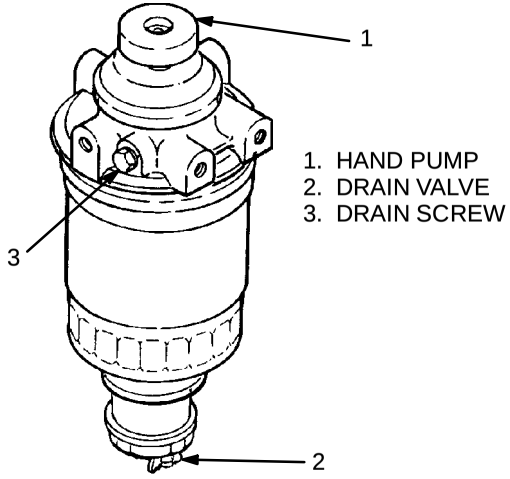
Check the fuel system for leaks and the condition of parts. When fuel is added to the lift truck, see the section, **How To Add Fuel To The Lift Truck**.

Water Separator, Diesel Engine

The water separator is replaced every 1000 hours or six months of operation.

Fuel Filter, Diesel Engine

The fuel filter is replaced every 1000 hours or six months of operation.



1. HAND PUMP
2. DRAIN VALVE
3. DRAIN SCREW

Figure 23. Diesel Fuel Filter

Remove Air From The Diesel Fuel System

NOTE: The fuel injection pump will normally remove small amounts of air from the fuel system when the engine is started. If the fuel pump, fuel injection pump, or the fuel filter is empty, it is necessary to disconnect a fitting and fill the components of the fuel system before the engine will start. See the **SERVICE MANUAL** for the procedure.

Control Levers and Pedals

Check that the control levers for the transmission, mast and attachment operate as described in TABLE 2. Check that the pedals operate correctly as described in TABLE 2.

Lift System Operation

⚠ WARNING

Lower the lift mechanism completely. Never allow any person under a raised carriage. Do not put any part of your body in or through the lift mechanism unless all parts of the mast are completely lowered and the engine is STOPPED.
If the mast cannot be lowered, use chains on the mast weldments and carriage so that they can not move. Make sure the moving parts are attached to a part that does not move. See the PERIODIC MAINTENANCE section that was included with your lift truck for additional information.

Do not try to find hydraulic leaks by putting hands on pressurized hydraulic components. Hydraulic oil can be injected into the body by the pressure.

Do the following checks and inspections:

1. Check for leaks in the hydraulic system. Check the condition of the hydraulic hoses and tubes.

NOTE: Some parts of the mast move at different speeds during raising and lowering.

2. Slowly raise and lower the mast several times without a load. Raise the mast to its full height at least once. The mast components must raise and lower smoothly in the correct sequence.
3. The inner weldments and the carriage must lower completely.

4. Raise the mast one meter (three feet) with a capacity load. The inner weldments and the carriage must raise smoothly. Lower the mast. All moving components must lower smoothly.
5. Lower the load to approximately 0.3 meter (one foot). Tilt the mast forward and backward. The mast must tilt smoothly and both tilt cylinders must stop evenly.
6. Check that the controls for the attachment operate the functions of the attachment. See the symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

Cooling System (See Figure 24.)

⚠ WARNING

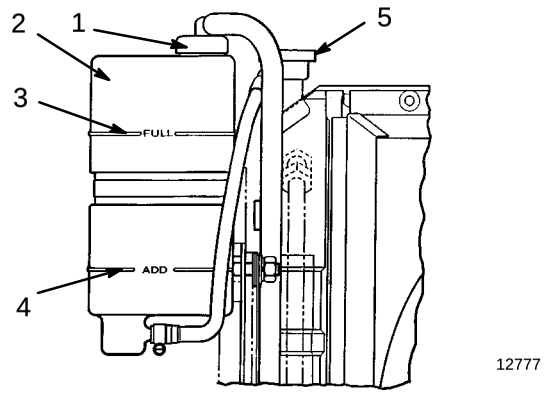
DO NOT remove the radiator cap from the radiator when the engine is hot. When the radiator cap is removed, the pressure is released from the system. If the system is hot, the steam and boiling coolant can cause burns.

Make sure the coolant level is between the “FULL” and the “ADD” mark on the auxiliary coolant reservoir. The coolant will expand as it is heated and the level in the auxiliary coolant reservoir will increase. If coolant is added, use the correct mixture of water and ethylene glycol shown in the MAINTENANCE SCHEDULE.

⚠ WARNING

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the path of the compressed air is away from all personnel. Wear protective goggles or a face shield to prevent injury to the eyes.

Check the radiator fins. Clean the radiator with compressed air or water as needed.



1. FILL CAP
2. AUXILIARY COOLANT RESERVOIR
3. **FULL** MARK
4. **ADD** MARK
5. RADIATOR CAP

Figure 24. Auxiliary Coolant Reservoir

HOW TO ADD FUEL TO THE LIFT TRUCK

⚠ WARNING

Stop the engine. Turn the key switch to OFF. The operator must be off of the lift truck while fuel is added.

No smoking.

All fuels for internal combustion engines are very flammable.

Fill the fuel tank only in a designated area with good ventilation. Have a fire extinguisher available.

Never fill the fuel tank near an open flame or near equipment that can create sparks. Never check fuel level or check for leaks with an open flame.

Breathing fuel vapor may cause nausea, unconsciousness or death. Avoid breathing vapor.

Liquefied Petroleum Gas (LPG)

⚠ WARNING

Close the fuel valve on the tank when parking the lift truck more than momentarily. Do not park the lift truck near heat or ignition sources.

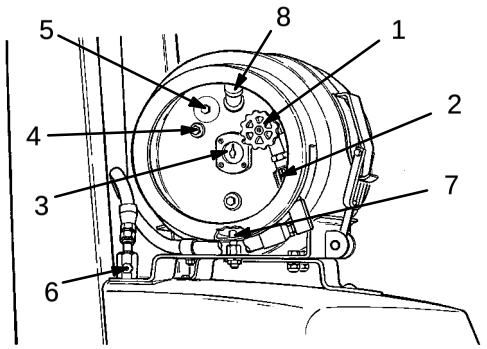
Do not store LPG tanks near heat or an open flame.

LPG is extremely flammable. When checking or filling an LPG tank: No smoking. Stop engine.

Frost on the surface of the tank, the valves or fittings and the odor of LPG fuel indicates a leak. Inspect the LPG system and repair a leak immediately. An LPG fuel leak creates an explosion and fire hazard. Do not attempt to start the engine if there is a leak in the LPG fuel system.

Only trained and authorized personnel are permitted to operate filling equipment.

Use only the LPG tank indicated on the label on the tank bracket. Do not use an LPG tank that is damaged. A damaged LPG tank must be removed from service.



1. TANK VALVE
2. QUICK DISCONNECT FITTING
3. FUEL GAUGE
4. PLUG
5. LIQUID LEVEL INDICATOR
6. RELIEF VALVE
7. ALIGNMENT PIN
8. TANK RELIEF VALVE

NOTE: Some LPG tanks have an auxiliary fill fitting instead of a plug for Item 4.

Figure 25. LPG Tank

⚠ WARNING

LPG tanks are heavy. The weight of an LPG tank can exceed the maximum recommended weight for safe lifting by an individual. Get assistance when lifting or lowering an LPG tank. Use correct lifting procedures.

Fill LPG tanks outdoors. Stay at least 15 meters (50 feet) from buildings, motor vehicles, electrical equipment or other ignition sources. Stay at least 5 meters (15 feet) from LPG storage tanks.

Use the following procedure to remove the LPG tank**:**

1. Removable LPG tanks can be replaced indoors only if the lift truck is a minimum of 8 meters (25 feet) from any open flame or ignition source.
2. Move the lift truck to the area where LPG tanks are changed.
3. See Figure 25. Turn the fuel valve clockwise until the fuel valve is completely closed.
4. Run the engine until it stops, then turn the key switch to the **OFF** position.
5. Release the latch that holds the LPG tank in its bracket.
6. Raise the LPG tank from its bracket so that the quick disconnect fitting can be disconnected. Remove the LPG tank from the bracket.

Use the following procedure to install the LPG tank:

1. Before the LPG tank is installed on the lift truck, check the operation of the fuel gauge. Look at the fuel gauge and move the tank. If the gauge needle does not move, a new tank must be installed.

⚠ WARNING

Make sure the alignment pin extends through the correct hole in the rim of the LPG tank. See Figure 25. The hose or the fittings can be damaged if the LPG tank is not installed in the correct position. A damaged hose or fitting can release LPG fuel and cause an explosion and fire hazard.

2. Install the LPG tank in its bracket so that the alignment pin is in the correct hole as shown in Figure 25. Close the latch on the tank bracket.
3. Connect the quick disconnect fitting to the fuel valve on the LPG tank. Use your hand to tighten the fitting.
4. Turn the fuel valve counter–clockwise to open the fuel valve.

5. Inspect the fuel system for leaks when the fuel valve is open. Frost on the surface of the tank, valves or fittings or a strong odor of LPG fuel indicates a leak.

Use the following procedure to fill the LPG tank:

⚠ WARNING

Read and follow all the refuelling precautions and instructions under Liquefied Petroleum Gas (LPG).

NOTE: The following instructions are general procedures. There is a variation in equipment for filling LPG tanks. The local authorities that have jurisdiction have specific rules and regulations for filling LPG tanks. Make sure these rules and regulations are available and understood.

1. Check the LPG tank to make sure it needs filling. During the fill operation, the LPG tank must be in a position so that the liquid level indicator will always be in the vapor space above the liquid level. See Figure 25.
2. Open the liquid outlet valve and by-pass return valve on the storage tank.
3. Start the pump.
4. Connect the supply hose to the quick disconnect fitting on the LPG tank. If the LPG tank has an auxiliary fill fitting, connect the supply hose to this fitting. Make sure the correct adapter is used to connect the supply hose to the auxiliary fill fitting.
5. Open the vent valve on the liquid level indicator.
6. Open the fuel valve on the LPG tank.
7. Open the valve on the end of the supply hose.
8. Watch for a discharge from the vent valve on the liquid level indicator. When a cloud of visible vapor appears, the LPG tank is full. Do not fill the LPG tank to more than the maximum level indicated by the liquid level indicator. Immediately close the valve at the end of the supply hose.
9. Close the vent valve on the LPG tank.
10. Close the fuel valve on the LPG tank.
11. Disconnect the hose supply.
12. Stop the pump.
13. Close the liquid outlet and the by-pass return valve on the storage tank.

Gasoline or Diesel Fuel

⚠ WARNING

When fuel is added, keep the funnel or fuel nozzle in contact with the metal of the fuel tank to reduce the possibility of static electric sparks. Clean any spilled fuel.

1. Remove the fuel cap. Make sure the fuel tank is filled with the correct fuel for the type of engine in the lift truck. Clean the fuel cap.

2. Replace the fuel cap.

WHEELS AND TIRES

General

The GP/GLP/GDP040–060RG/TG/ZG series of lift trucks are equipped with pneumatic tires or solid rubber tires that look like pneumatic tires. These variations in the tires also cause a variation in the types of wheels and the disassembly and assembly procedures.

How To Repair A Pneumatic Tire

⚠ WARNING

A solid rubber tire that is the same shape as a pneumatic tire can be installed on a three-piece or four-piece wheel for a pneumatic tire. DO NOT make changes in the parts of the rim if this type of solid rubber tire is installed instead of a pneumatic tire. Changes to the parts of the rim can cause a failure of the wheel and cause an accident.

The type of tire and the tire pressure (pneumatic tires) are shown on the Nameplate. Make sure the Nameplate is correct for the type of tires on the lift truck.

Remove The Wheels From The Lift Truck

⚠ WARNING

Wheels must be changed and tires repaired by trained personnel only.

Deflate tire completely before removing the wheel from the lift truck. If dual wheels are used, deflate both tires. Air pressure in the tires can cause the tire and rim parts to explode causing serious injury or death.

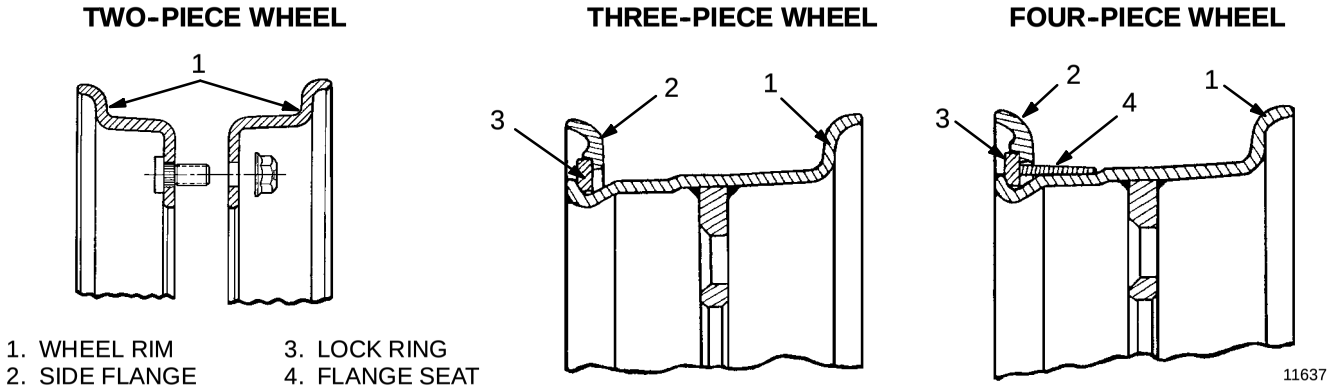
Always wear safety glasses.

Never loosen the nuts that hold the inner and outer wheel halves together when there is air pressure in the tire.

1. Put the lift truck on blocks as described in **How To Put The Lift Truck On Blocks** at the beginning of this section.

2. Remove the air from the tire. Remove the valve core to make sure that all of the air is out of the inner tube. Push a wire through the valve stem to make sure that the valve stem does not have a restriction.

3. Remove the wheel nuts and remove the wheel and tire from the lift truck. Lift truck tires and wheels are heavy.



1. WHEEL RIM
2. SIDE FLANGE
3. LOCK RING
4. FLANGE SEAT

Figure 26. Types of Wheels

Remove The Wheel From The Tire (See Figure 27. or Figure 28.)

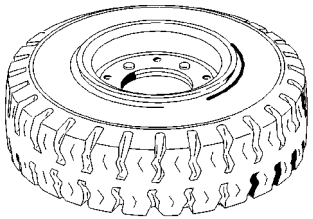
NOTE: When you disassemble the wheels, See Figure 26. There are several types of wheels used on this series of lift trucks.

⚠ WARNING

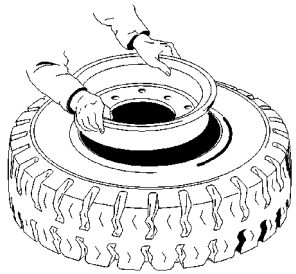
Make sure all of the air pressure is removed from the tire before a wheel is disassembled. Air pressure in the tires can cause the tire and rim parts to explode causing serious injury or death.

Keep tire tools in firm contact with the wheel parts. If the tool slips, it can move with enough force to cause an injury.

SEE WARNINGS



STEP 1. Remove the nuts that fasten the wheel rims together.



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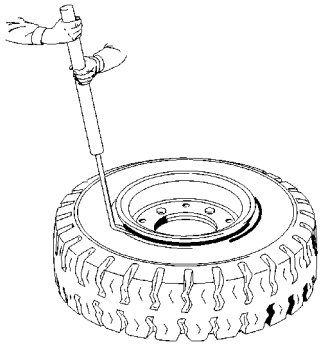
STEP 2. Loosen the tire bead from the wheel rim.

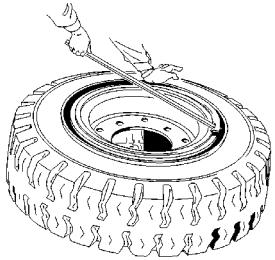
STEP 3. Remove the wheel rims from tire. Remove the inner tube and flap.

Figure 27. Tire Removal, Two-piece Wheel

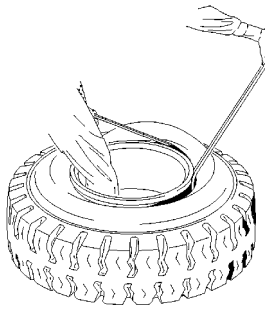


SEE WARNINGS

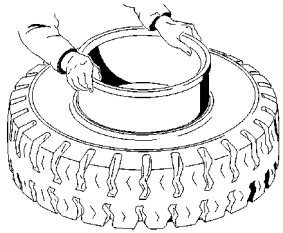
STEP 1. Loosen the tire bead from the side flange.



STEP 2. Put the tire tool into the slot between the lock ring and wheel rim. Remove the lock ring and side flange. If there is a flange seat, remove it.



STEP 3. Loosen the bead from the other side of the wheel rim. Remove the valve stem from the wheel.



STEP 4. Remove the wheel rim from the tire.

Figure 28. Tire Removal, Three And Four-piece Wheels

Install The Wheel in the Tire (See Figure 29. or Figure 30.)

⚠ WARNING

Wheels can explode and cause injury or death if the following procedures are not followed:

- **Clean and inspect all parts of the wheel before installing the tire.**
- **DO NOT use any damaged or repaired wheel parts.**
- **Make sure that all parts of the wheel are the correct parts for that wheel assembly.**
- **DO NOT mix parts between different types or manufacturers of wheels.**
- **DO NOT mix types of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.**

Do not use a steel hammer on the wheel. Use a rubber, lead, plastic or brass hammer to put parts together. Make sure that the lock ring is in the correct position. The ends of the lock ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in) after it is installed. If the clearance is wrong, the wrong part has been used.

1. Clean and inspect all parts of the wheel. Paint any parts that have rust or corrosion.

2. Install a new inner tube in the tire. Used tubes and flaps can cause tire failure.

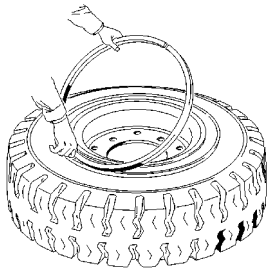
⚠ WARNING

Do not lubricate the tire bead with anti-freeze or petroleum based liquid. Vapors from these liquids can cause an explosion during inflation or use.

3. Apply a rubber lubricant or a soap solution to the tire bead and tube.

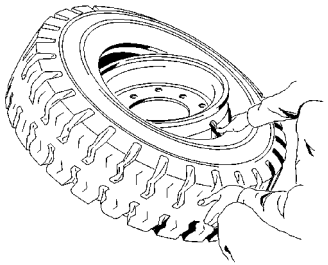
4. Install a new tire flap.

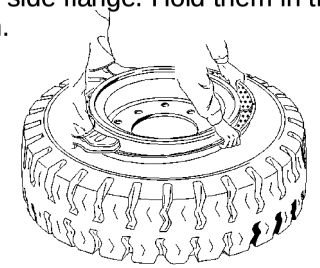
SEE WARNINGS



STEP 1. Install the inner tube and the rubber flap in the tire.

STEP 3. Turn over the rim and tire. Put blocks under the rim so that the rim is 8 to 10 cm (3 to 4 in) above the floor. Install the flange seat (if used) and the side flange. Hold them in the correct position.

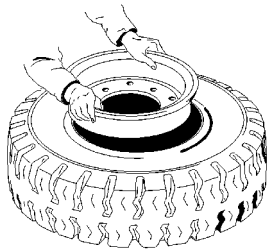




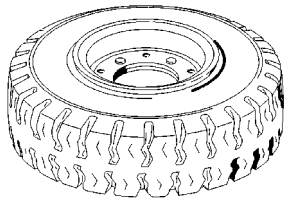
STEP 2. Install the wheel rim in the tire. Make sure the stem of the inner tube is aligned with the slot in the rim.

STEP 4. Put the lock ring in the correct position on the rim. Add air pressure to the tire as described in "**Add Air To The Tires**".

Figure 29. Install The Wheel In The Tire, Three Or Four-piece Wheel



STEP1. Install the inner tube and the rubber flap in the tire. Install both halves of the wheel rim in the tire. Make sure the stem of the inner tube is aligned with the slot in the rim.



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STEP 2. Tighten the nuts that hold the rim halves together to 175 Nm (130 lbf ft). Add air pressure to the tire as described in "**Add Air To The Tires**".

Figure 30. Install The Wheel In The Tire, Two-piece Wheel

5. Make sure the rim is the correct size for the tire. Lubricate the part of the wheel that contacts the bead and flap.

6. Install the three-piece or four-piece wheel in the tire as shown in Figure 29. Install the two-piece wheel in the tire as shown in Figure 30.

Add Air To The Tires (See Figure 31.)

⚠ WARNING

Add air pressure to the tires only in a safety cage. Inspect the safety cage for damage before use. When air pressure is added, use a chuck that fastens onto the valve stem of the inner tube. Make sure there is enough hose to permit the operator to stand away from the safety cage when air pressure is added to the tire.

Do not sit or stand by the safety cage. Do not use a hammer to try and correct the position of the side flange or lock ring when the tire has air pressure greater than 20 kPa (3 psi).

1. Put the tire in a safety cage.

2. Add 20 kPa (3 psi) of air pressure to the tire.

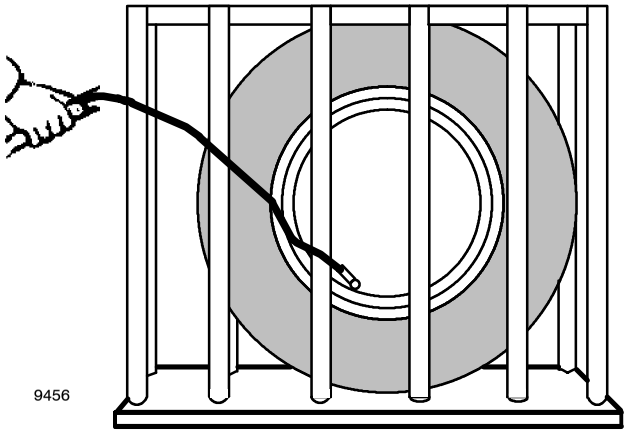


Figure 31. Add Air To The Tires

3. Check that all wheel parts are correctly installed. Hit the lock ring lightly to make sure that it is in the seat.

4. If installation is correct, add air pressure to the tire to the specified pressure. See Nameplate.

5. Check that all wheel parts are correctly installed. If installation is not correct, remove all of the air pressure from the tire. Remove the valve core to make sure all of the air pressure has been removed and then make adjustments. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in) when the tire has the correct air pressure.

Install the Wheels

⚠ WARNING

Check all wheel nuts after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when the drive wheels have been removed and installed. Tighten the nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 250 hours.

Install the wheel on the hub. Tighten the nuts as shown in the MAINTENANCE SCHEDULE**.** If the wheels are the two-piece rims, make sure the nuts that fasten the rim halves together are toward the hub when they are installed.

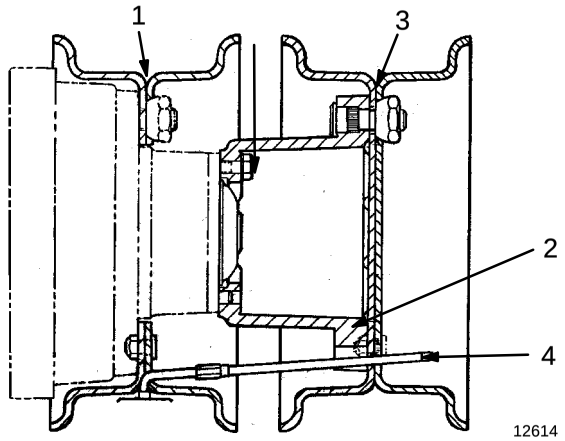
INSTALLATION PROCEDURES, DUAL DRIVE WHEELS

NOTE: Some lift trucks can have dual drive wheels. The following procedures describe the steps to install the dual sets of wheels.

1. See Figure 32. Install the inner wheel on the hub. Tighten the nuts as shown in the MAINTENANCE SCHEDULE**.** If two-piece wheels are installed, make sure the nuts that fasten the rim halves together are toward the brake drum when they are installed.

2. Install the spacer to the axle shaft. Tighten the nuts 98 Nm (80 lbf ft).

3. Install the outer wheel on the spacer. Tighten the nuts as shown in the MAINTENANCE SCHEDULE**.** If the wheels are the two-piece rims, make sure the nuts that fasten the rim halves together are toward the brake drum when they are installed.



1. INNER WHEEL
2. SPACER
3. OUTER WHEEL
4. EXTENSION, AIR VALVE

Figure 32. Installation, Dual Drive Wheels

SOLID RUBBER TIRES

⚠ WARNING

Wheels must be changed and tires repaired by trained personnel only.

Always wear safety glasses.

1. Put the lift truck on blocks as described in "**How To Put The Lift Truck On Blocks**" at the beginning of this section.

2. Remove the wheel nuts and remove the wheel and tire from the lift truck. Lift truck tires and wheels are heavy.

Remove The Tire From The Wheel (See Figure 33.)

⚠ WARNING

Keep tire tools in firm contact with the wheel. If the tool slips, it can move with enough force to cause serious injury.

NOTE: See Figure 26. when you disassemble the wheels. There are several types of wheels used on these series of lift trucks.

Install The Tire On The Wheel (See Figure 34.)

⚠ WARNING

Failure to follow these procedures will cause damage to the tire and wheel assembly and can cause injury.

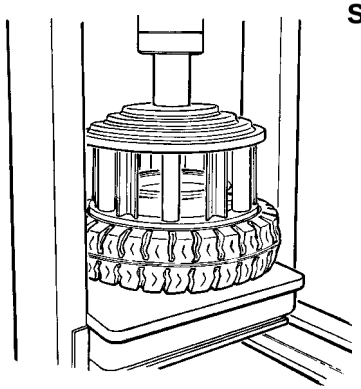
- **Clean and inspect all parts of the wheel before installing the tire.**
- **DO NOT use any damaged or repaired wheel parts.**
- **Make sure that all parts of the wheel are the correct parts for the wheel assembly.**
- **DO NOT mix parts between different types or manufacturers of wheels.**
- **DO NOT mix type of tires, type of tire tread or wheel assemblies of different manufacturers on any one lift truck.**

Do not use a steel hammer on the wheel. Use a rubber, lead, plastic or brass hammer to put parts together. Make sure that the lock ring is in the correct position. The ends of the lock ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in) after it is installed. If the clearance is wrong, the wrong part has been used.

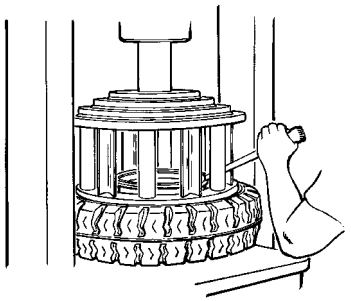
NOTE: When you assemble the wheels see Figure 26. There are several types of wheels used on this series of lift trucks. Do not use a two–piece pneumatic wheel for solid rubber tires.

SEE WARNINGS

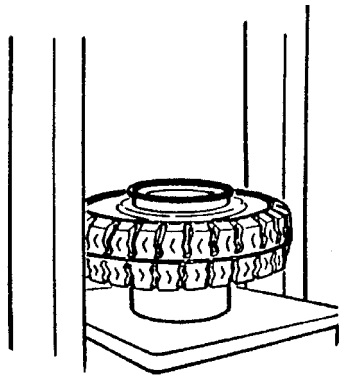
STEP1. Put the wheel rim on the bed of the press. Put the cage in position on the tire. Use the press to push the tire away from the side flange.



STEP 2. Put the tire tool into the slot between the lock ring and the wheel rim. Remove the lock ring and side flange.



STEP 3. Turn the tire over. Put a support under the wheel rim. Make sure the wheel rim is at least 150 to 200 mm (6 to 8 inches) from the bed of the press.



STEP 4. Put the cage in position on the tire. Use the press to push the tire from the wheel rim.

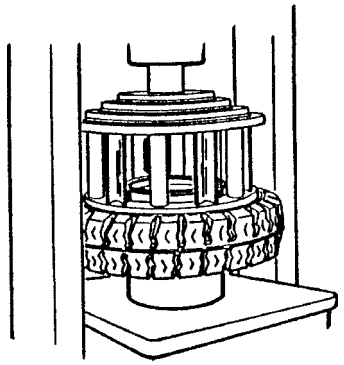
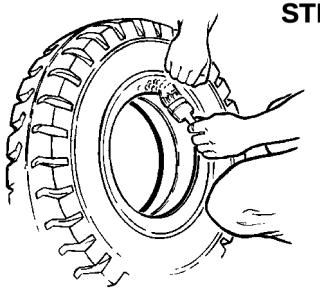


Figure 33. Remove The Tire From The Wheel

SEE WARNINGS

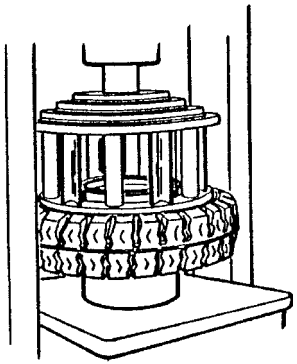
CAUTION

Too much lubricant can cause the tire to slide and move around the wheel rim.

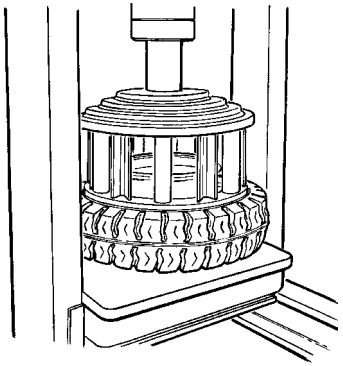


STEP 1. Lubricate the wheel rim and the inner surface of the tire with tire lubricant or soap.

STEP 2. Put the wheel rim on the bed of the press. Put the tire over the wheel rim. Put the cage in position on the tire. Use the press to install the tire on the wheel rim.



STEP 3. Remove the cage and put the flange seat (if used), the side flange and the lock ring in position on the wheel rim. Install the cage on the tire. Use the press to push the tire onto the wheel rim so that the side flange and lock ring can be installed.



STEP 4. While the cage is holding the tire on the wheel rim, install the lock ring. Use a tire tool to make sure the lock ring is in the correct position.

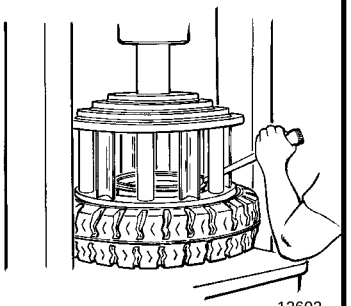


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Figure 34. Install The Tire On The Wheel

OPERATING PROCEDURES FOR A NEW OR REBUILT ENGINE

A new or rebuilt engine must be operated under special conditions during the first 50 hours. These special conditions prevent damage to the engine until the new parts can wear and adjust to fit each other.

1. Make sure the fluid levels of oil and coolant are correct.

2. Start and run the engine at approximately one–half throttle for 30 minutes for the first operation. Check the gauges and indicators for the correct operation during this first operating period. Check for leaks.

3. If the work conditions are slow and the loads are less than 50% of the truck capacity, a simulated work condition must be used during the first four hours of operation. Operate the lift truck with a minimum load of 75% capacity. Operate the engine through cycles from idle to full throttle and back to idle. Avoid long periods of high engine speeds with a light load during the first 50 hours of operation. High engine speeds with a light load can cause damage to the cylinders in the engine.

CHANGES TO THE OVERHEAD GUARD

⚠ WARNING

Do not operate the lift truck without the overhead guard correctly fastened to the lift truck.

Do not make changes to the overhead guard by welding. Changes that are made by welding, or by drilling holes that are too big in the wrong location, can reduce the strength of the overhead guard. See the instructions for “Changes To The Overhead Guard” in the PERIODIC MAINTENANCE section.

HOW TO PUT INTERNAL COMBUSTION ENGINE (I.C.E.) TRUCKS IN STORAGE

Experience has taught that complications can arise as a result of improper handling of lift trucks during long periods of storage.

The main areas of concern are engines, hydraulic components and truck batteries.

I.C.E. powered lift trucks can best be protected by being operated for a short period of time each month.

Before placing any lift truck in storage, you must choose an area which is clean, dry and free from airborne contaminates.

Lift trucks powered by I.C.E. must be started and run at 700 RPM until normal operating temperature is reached. This will coat the internal engine components with a film of oil and rid the engine of built-up condensation.

Do not shut down an engine before it reaches operating temperature.

For safety and increased usable floor area, remove the forks and tag them with the lift truck serial number.

Prior to operating a lift truck each month, make a visual inspection for leaks or signs of deterioration. Take corrective action immediately. Also, check the fluid level in the radiator, hydraulic tank and brake master cylinder.

All hydraulic cylinders must be cycled several times each month to keep the seals active and to coat the interior walls with oil. Actuate each cylinder, in both directions, until it reaches the stops.

To protect the tilt cylinder rods, park your lift trucks with the mast tilted fully **BACKWARD** (cylinders retracted).

When parked with the power **OFF**, actuate each control handle to relieve hydraulic pressure.

Mast is to be stored fully lowered.

Coat any exposed portion of all cylinder rods with fresh, high grade SAE 30 or 40 weight engine oil.

Install blocks, front and rear, at the drive wheels when parked – DO NOT USE THE HAND BRAKE.

HOW TO PUT BATTERIES IN STORAGE

Batteries are to be placed on a wooden pallet and stored in a dry, moderately cool area.

Lead acid batteries will slowly “self-discharge” over a period of time due to their chemical make-up. If the self-discharge is left uncontrolled, excessive sulphation can occur which is difficult to reduce and can damage the anodes. A discharged battery with a specific gravity of 1.000 will freeze at -7.8°C (18°F) A fully charged battery with a specific gravity of 1.280 will freeze at -66°C (-87°F).

This “self-discharge” is due to a chemical reaction; therefore, that chemical reaction can be accelerated by heat resulting in more rapid “self-discharge”. the rate of dis-

charge can amount to an average of about 0.001 point drop in specific gravity per day.

The following procedure can be followed when placing a battery in storage or when not in operation for more than 30 days.

1. Give an equalizing charge prior to placing new batteries in storage. Used batteries are to be fully charged then allowed to balance for approximately three more hours.
2. Neutralize and clean the battery. Clean with a solution of 100 grams of sodium bicarbonate(baking soda) per litre of water.
3. Store in a cool dry location.
4. Check each cell in the battery at least once every 30 days and boost charge when specific gravity falls below 1.240.
5. Protect batteries from ambient contamination.

If a greasy film forms on the top of a battery, this is acid and must be neutralized with the solution described above.

When a lift truck is to be placed in service after storage, it must be given the 250 hour inspection shown in the RECOMMENDED SCHEDULE OF MAINTENANCE.

HOW TO STORE A LIFT TRUCK

The following storage procedures are for conditions and temperatures above 0° C. Adjust these procedures for local conditions and any changes in conditions during storage. The preparations necessary for storage is also determined from the following conditions:

- Short–term storage is from 1 to 6 months. Long–term storage is over 6 months.
- Storage Location. A lift truck stored indoors will not require as much external protection as a lift truck stored outdoors.

Short–Term Storage. Do the following steps to prepare the lift truck for storage from 1 to 6 months:

1. Check lubricant and fluid levels. Completely fill the fuel tank. Make sure the coolant mixture will protect cooling system and engine to lowest temperature expected during storage. Make sure all caps and dipsticks are installed correctly.

2. Fully lower the forks or carriage. Tilt mast **FORWARD** until the tips of the forks touch the earth. Apply a thin coat of engine oil to the cylinder rods.

3. Check that all switches and accessories are in the **OFF** position.

4. If the lift truck must be left on an incline, put blocks on the down hill side of the wheels so that the lift truck can not move – do not use the parking brake.

5. Disconnect the battery cables from the batteries. Apply a protective coat to the cable connectors and battery terminals to prevent corrosion.

6. Check the tyre pressure. Make sure the tyres have the correct pressure (see the Nameplate).

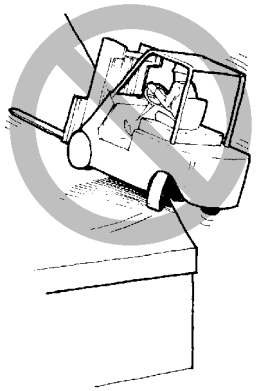
7. Clean the lift truck and engine compartment to prevent corrosion.

8. If the lift truck is not stored in a shelter, put a cover over the lift truck to prevent damage from the weather. In wet conditions, a cover will not prevent corrosion to a lift truck that is in long–term storage outside of a dry storage area.

Long–Term Storage. Do the following steps to prepare the lift truck for storage for 6 months or longer:

1. Complete all short–term storage procedures.
2. Wrap or cover all exterior lights, radiator grille, and air vents with a moisture barrier cover. Use tape to hold the covers in position..
3. Remove the batteries from the lift truck. Store the batteries in an approved space. Be sure to follow local regulations. Batteries that are stored for long periods can become damaged. A recommendation is that the batteries be used in service if possible.
4. Spray exterior surfaces and frame with preservative coating.

HOW TO MOVE A LIFT TRUCK ON A TRANSPORT



⚠ WARNING
Stay a safe distance from the edge of docks, ramps, platforms and other similar working surfaces. Watch the “tail swing”. Remember when travelling in the forward direction and the steering wheel is turned to move the lift truck away from the edge of the dock the rear will swing toward the edge. This can cause the lift truck to fall off the dock.

⚠ WARNING
IF THE LIFT TRUCK FALLS OFF THE DOCK, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.

Before the lift truck is moved on a transport, check the selected route to make sure there is enough clearance for the lift truck as loaded on the transport vehicle. Bridges, overpasses, powerlines, natural barriers can prevent clearance. Removal of the mast can be necessary.

If a trailer is the method of transportation, use blocks in front and back of the trailer tyres to prevent movement of the trailer when the lift truck is loaded and unloaded. If a loading ramp is used, make sure that the ramp is the correct design and capacity.

If the lift truck is equipped with lifting eyes, use a crane to load and unload the lift the truck from the transport. If the truck is not equipped with approved lifting eyes, do not lift the truck by attaching a lifting device to any other part of the lift truck for the purposes of loading or unloading.

Loading

⚠ WARNING
The straps or chains used to fasten the lift truck to the transport must be directly connected to the lift truck frame or to a component (drive axle, tow pin) that is solidly attached to the frame. Do not fasten a strap or chain to the mast or any attachment to hold the lift truck on the transport.

⚠ CAUTION

Make sure that any straps or chains used to fasten the lift truck to the transport do not contact any tubes, hoses, hydraulic cylinders, or other parts of the truck that are easily damaged.

If components and attachments must be removed for transport of the lift truck, see the **SERVICE MANUAL** for removal procedures.

The operator must never leave a lift truck in a condition so that it can cause damage and injury. When the lift truck is loaded on the transport, do the following operations:

1. Apply the parking brake.
2. If the mast is mounted on the lift truck, fully lower the forks or carriage. Tilt the mast **FORWARD** until the tips of the forks touch the surface.
3. Put the direction control lever for the powershift transmission in **NEUTRAL** (N). If the lift truck has a manual transmission, leave the gears of the transmission engaged. DO NOT leave a manual transmission in **NEUTRAL** (N).
4. Turn the key switch to **OFF** to stop the engine. Check that all switches and accessories are turned **OFF**.
5. Put blocks in front and back of the lift truck tyres to prevent any movement of the lift truck. Make sure the blocks are attached to the load surface.

If the lift truck is equipped with an LPG fuel system and is parked more than momentarily, close the fuel valve at the tank. If the lift truck is going to be left overnight or longer, the truck must be parked outside or the LPG tank must be removed and stored outside.

If the lift truck is transported in severe weather or any other condition that can damage the lift truck, cover the lift truck. Make sure the protective cover is designed for the application and is securely fastened.

Unloading

If components normally attached to the lift truck were removed for transport, see the **SERVICE MANUAL** for installation procedures.

1. If used, remove any protective cover.
2. Make sure the parking brake is applied.

3. Disconnect the straps or chains.
4. Remove the wheel blocks.
5. Check that all switches and accessories are turned **OFF**.
6. Unload the lift truck.

PREPARATION FOR USE

After being transported or stored, the lift truck must be prepared for use for proper operation. All problems must be corrected before use of the lift truck, see the **SERVICE MANUAL** for procedures.

Preparation After Transport

1. Complete the unloading procedures.

2. Inspect the lift truck for damage and missing components.

3. Follow the steps in the section CHECKS WITH THE ENGINE STOPPED.

Preparation After Storage

1. Remove all tape, covers, and preservation materials.

2. Check the lift truck for damage and missing components. Repair damage and/or replace missing components.

NOTE: If the lift truck has been stored longer than one year, all lubricants and fluids must be drained and replaced. See the **PERIODIC MAINTENANCE** section for the procedures.

3. Clean the battery cables and terminals. Check the battery voltage. If the voltage is not correct, charge battery. Connect battery cables to battery.

4. Do the procedures in the section EVERY 8 HOURS OR DAILY.

NOTES

NO MATTER HOW YOU SAY IT . . .

La Prudence Paye
La Seguridad Paga
Betriebssicherheit Macht Sich Bezahlt
Passaa Oll Huolellinen
Veiligheid Voor Alles
Säkerhet Först
Essere Sicuro Paga
Seguranca Paga
Sikkerhet Først
Pinter Be Awas

सावधान और जिन्दा रहो !

في التأني السلامة

安全第一

⚠ WARNING

California Proposition 65 – This product contains and/or emits chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

12/03 (8/03)(10/02)(6/01)(10/00)(7/99) Litho in The United States

OPERATING MANUAL

GP/GLP/GDP040–060 RG/TG/ZG (A875)

DO NOT REMOVE THIS MANUAL FROM THIS UNIT

YALE CORPORATION

PART NUMBER 520371709