Yale
Industrial Trucks

Materials Handling Corporation
Sullivan Drive
No. 12011
ville, NC 27834-2011

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Printed in U.S.

Part No. 524138813

OPERATING MANUAL

Operating Instructions
Service Instructions
User Support Information

MODELS: ERC 040RG ERC 040ZG
ERC 050RG ERC 050ZG
ERC 060RG ERC 060ZG
ERC 065RG ERC 065ZG

Yale

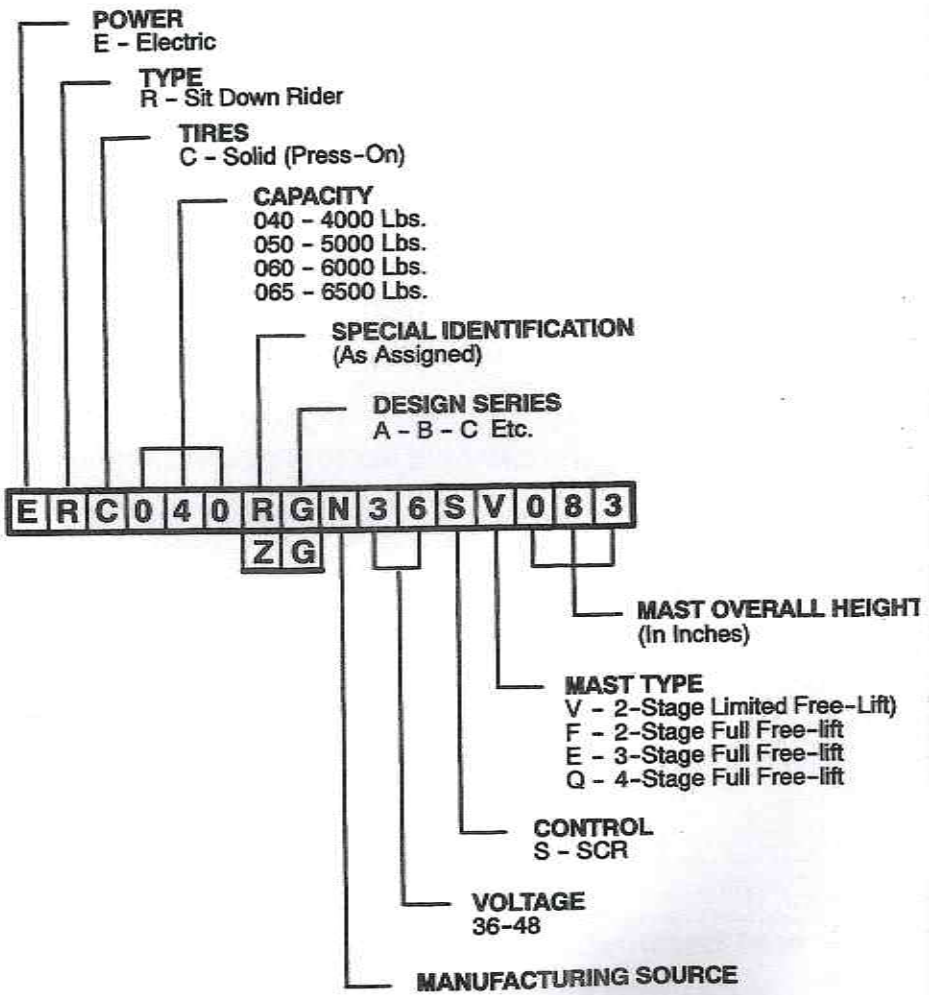
FOR DRIVER'S USE
DO NOT REMOVE MANUAL FROM TRUCK
STORE IN CONTAINER ON BACK OF SEAT
READ THIS MANUAL BEFORE OPERATING TRUCK

Yale

⚠ 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.

EXPLANATION OF MODEL CODE



For Service & Parts - Contact

Authorized Dealer

CONTENTS

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 basic operator training program is available from YALE. For further details, contact your dealer for YALE lift trucks.

This **OPERATOR'S 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 **OPERATOR'S 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, 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.

MODEL INFORMATION

TRUCK MODEL _____

SERIAL NUMBER _____

BATTERY _____

SERIAL NUMBER _____

DRIVE TIRES _____

STEER TIRES _____

SPECIAL EQUIPMENT OR ATTACHMENTS

_____

_____

_____

_____

Yale Industrial Trucks are equipped with certain safety devices as standard equipment. For example, all high lift trucks are equipped with a load backrest extension. In addition, all high lift sit down rider trucks are equipped with an operator's overhead guard and an operator's restraint system. When it is specified that the lift truck will be used to raise a worker, a work platform must be used. **Yale will supply only vehicles equipped with acceptable safety devices and recommends that these vehicles be operated with the safety devices supplied.** Yale will not assume any liability for injuries or damage arising from, or caused by, the removal of any safety devices from their vehicles by the user. Specifications are subject to change without notice.

GUIDE TO CORRECT OPERATION

This Operator's Manual is designed to help lift truck operators learn how to operate the lift truck correctly. It is written as a permanent reference, and must be available for operator use at any time. If your Yale model ERC040-065RG/ZG does not have this manual, ask your supervisor to obtain one for you.

This manual describes the correct operation procedures. You, as a professional operator, must operate the lift truck correctly to help prevent injury to yourself and others. Correct operation of the lift truck can help prevent injuries and deaths from industrial accidents each year.

The manual also describes the correct operating techniques that can help you become more efficient and increase your production. Increased efficiency and production can make you a more valuable employee.

SAFETY IS YOUR BUSINESS

You can only operate your lift truck safely if you observe the WARNINGS on the next page and follow the operating procedures described in this **OPERATOR'S MANUAL.** It is also important that you read and understand the information contained in the publications listed in the FOREWORD.

A new lift truck must be inspected before it is operated. Visually inspect the complete lift truck for any damage that occurred during shipment. Make sure to inspect each of the following: the complete drive train, the electrical system, the brake system, the steering system and the lift system. Make sure all safety devices such as the overhead guard, the load backrest extension and the operator restraint system are complete and correctly installed. Make sure the **OPERATOR'S MANUAL** is on the truck and all plates and labels are installed. Make sure there are no leaks and all fluids are at the correct level.

When performing maintenance, follow the maintenance procedures, Maintenance Schedule and tables in the **OPERATOR'S MANUAL.**

⚠ WARNING

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 wherever 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.

KNOW THE AREA:

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

USE COMMON SENSE:

- NEVER transport people on any part of the truck.
- DO NOT use truck to lift people unless there is no other practical option. Then use only a securely attached special work platform. Follow instructions in manual.
- ALLOW NO ONE under or near lift mechanism or load.
- DO NOT move truck if anyone is between truck and stationary object.
- OPERATE truck only from operator's seat.

- KEEP arms, legs, and head inside operator's compartment.
- OBEY traffic rules. Yield right-of-way to pedestrians.
- BE in complete control at all times.
- BEFORE DISMOUNTING, neutralize travel control, lower carriage, set brake. WHEN PARKING, also shut off power, close LPG fuel valve, block wheels on inclines.

PROTECT YOURSELF, FASTEN YOUR SEAT BELT

- 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.

SAFETY AND INFORMATION LABELS

Safety and information labels on this truck must be read and understood. Install new labels if any of these labels are missing or damaged. Refer to the **PARTS MANUAL** for part number and location of all labels.

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

⚠ DANGER
Indicates a condition that will cause immediate death or injury!

⚠ WARNING
Indicates a condition that can cause injury!

⚠ CAUTION
Indicates a condition that can cause property damage!

MODEL DESCRIPTION

GENERAL

This OPERATOR'S MANUAL is for the following models of lift trucks:

ERC040RG, ERC050RG, ERC060RG, ERC065RG

ERC040ZG, ERC050ZG, ERC060ZG, ERC065ZG

These lift trucks have solid rubber tires (often called cushion tires) that are pressed onto the rim.

The operation of the lift truck is the same for all models. A battery supplies power for the traction motor, the hydraulic pump motor, and the power steering pump motor. It also supplies power to the control panel and instruments.

These models all use a transistor motor controller for the traction motor. The hydraulic pump motor can be controlled by a contactor or a transistor motor controller. The motor controller for the traction uses the Separately Excited Motor (SEM) technology. The pump motor is a series motor. The optional motor controller for the lift pump motor does not use SEM technology.

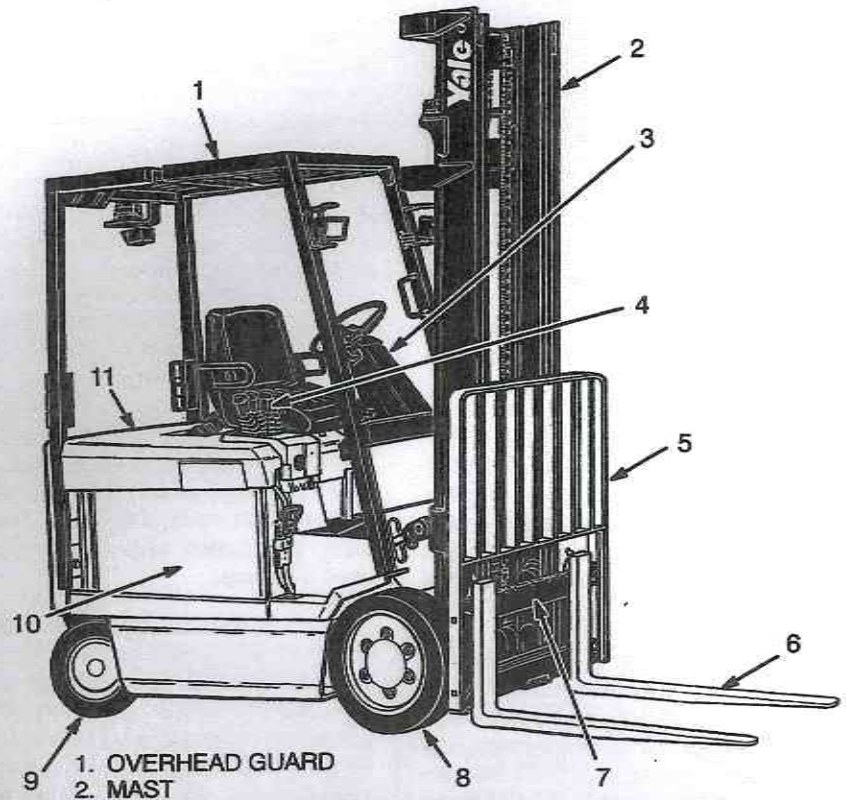
The electric lift trucks described in this manual have regenerative braking. This is in addition to the drum brakes on the drive wheels.

An electric switch in the seat is actuated when the operator is in the seat. The operator must be in the seat before the traction control circuit and the power steering system can be energized. The seat switch permits the electronic traction controller to operate when the key switch is in the "ON" position. The power to the traction controller and the power steering motor will stop within a few seconds after the operator leaves the seat. This delay permits an operator to change positions in the seat without loosing power to the traction controller and the steering system.

A brake pedal actuates the hydraulic service brakes at the drive wheels. The parking brake mechanically actuates the same brakes. The parking brake is actuated by the foot pedal. Some lift trucks have additional linkage that actuates a parking brake on the drive shaft of the traction motor. This extra parking brake is actuated when the operator leaves the seat.

Forward or reverse movement is controlled either by a direction control pedal or an optional direction control lever mounted on the steering column. When a direction control lever is installed, the lift truck has an accelerator pedal for speed control. If the lift truck has a direction control pedal, the pedal controls both direction and speed.

All lift trucks are equipped with a battery discharge indicator and an hourmeter. The bar graph type of battery discharge indicator shows the state-of-charge of the battery. The system also has a "lift interrupt" function. These lift trucks have a "light emitting diode" (red LED) display panel as indicators and a "liquid crystal display" (LCD) screen. The LCD screen shows the battery bar graph and gives other service information. Hourmeter operating time(s) are shown on the (LCD) screen.



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

Figure 1. Model View Showing Major Components

OPERATOR PROTECTION EQUIPMENT (See Figure 1.)

The SEAT BELT and HIP RESTRAINT BRACKET provide additional means to help the operator keep the head and torso substantially within the confines of the truck frame and operator compartment 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 bracket will help the operator resist side movement if the seat belt is not fastened. It is not a substitute for the seat belt. Always fasten the seat belt.

The OVERHEAD GUARD is intended to offer reasonable protection to the operator from falling objects, but cannot 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 BATTERY RESTRAINT is intended to hold the battery substantially within the battery compartment if a tipover occurs. It is a steel plate (hood frame) under the hood that is connected to the truck frame with hinges. A restraint rod under the hood helps keep the battery in the battery compartment. A latch holds the hood assembly in the down position for battery restraint. The hood can be raised for battery access. Gas springs help raise and hold the hood in the up position.

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 truck is required, contact your dealer for *YALE* lift trucks.

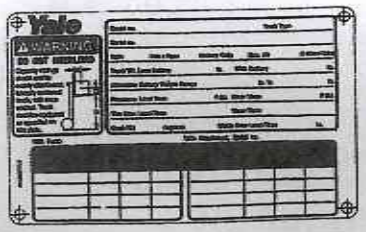


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Figure 2. Capacity Plate

CAPACITY PLATE

The capacity for the lift truck, as it is equipped, must be shown on the Capacity Plate. See Figure 2. If the Capacity Plate for the lift truck already has a rating for special load handling equipment, it will be shown. If the Capacity Plate for the lift truck does not show the capacity, or if the lift truck equipment does not match that shown on the Capacity Plate, do not operate the lift truck. The Capacity Plate also has the serial number of the lift truck. The serial number is also on the frame as shown in Figure 3.

When a lift truck is shipped incomplete from the factory, the Capacity Plate is not complete. If your lift truck does not have a Capacity Plate or has an incomplete Capacity Plate, do not operate the lift truck. Contact your dealer for *YALE* lift trucks to obtain a complete Capacity Plate.

⚠ WARNING

Do NOT add to or modify the lift truck. A 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 Capacity Plate must show the new capacity rating.

Make sure the battery weight (on the battery) is correct as shown on the Capacity Plate.

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.

THE LIFT TRUCK SERIAL NUMBER IS ON THE CAPACITY PLATE TO THE LEFT OF THE STEERING COLUMN. IT IS ALSO ON THE TOP EDGE OF THE REAR BULKHEAD OF THE FRAME NEAR THE RIGHT REAR LEG OF THE OVERHEAD GUARD.

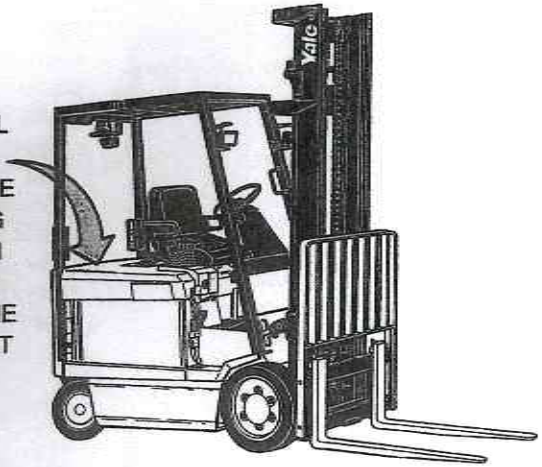
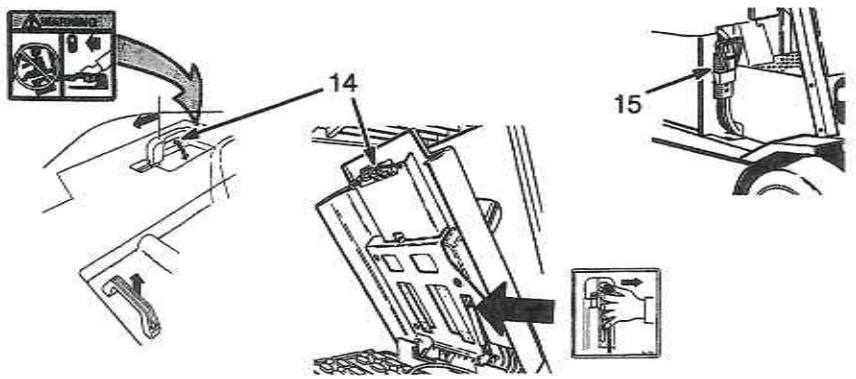


Figure 3. Serial Number Location



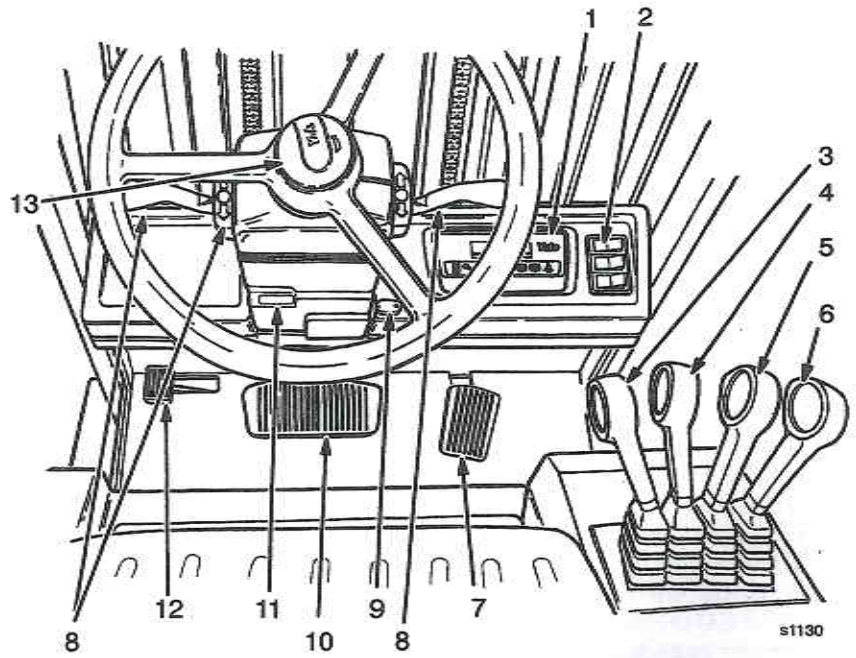


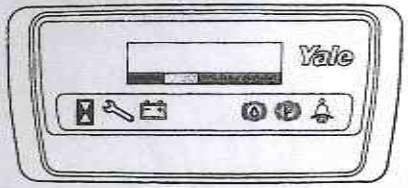
Figure 4. Instruments And Controls

CONTROLS AND DISPLAY PANELS

⚠ WARNING

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

1. Standard Display Panel



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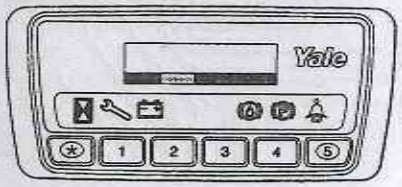
1. Premium Display Panel (Not Shown In Figure 4.)



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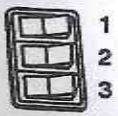
See DISPLAY PANEL FEATURES of this section, Figure 5. and the description by each item for information on the Standard Display Panel. See DISPLAY PANEL FEATURES, Figure 6. and the description by each item for information on the Premium Display Panel.

2. Light Switches



There is a rocker switch for each of the following light functions: (1) Front Driving lights, (2) Rear Driving light and (3) Operator Compartment light. All of these lights are not on every unit.

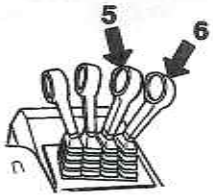
3. Lift/Lower Control Lever

The LIFT/LOWER control lever is the first control lever at the right of the seat. Pull backward to raise the forks. Push forward to lower the forks. The further the knob is pushed or pulled, the faster the operation of the function.

4. Tilt Control Lever

The TILT control lever is to the right of the LIFT/LOWER control lever. Push the lever forward to tilt the mast and forks forward. Pull the lever backward to tilt the mast and forks backward toward the lift truck. The further the knob is pushed or pulled, the faster the operation of the function.

5 & 6. Attachment Control Levers



5 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. The further the lever is pushed or pulled, the faster the operation of the function. See AUXILIARY CONTROL LEVERS.

⚠ WARNING

The control lever with a detent must be installed when an attachment with a clamp action is installed. See your dealer for Yale lift trucks to get the correct control lever.

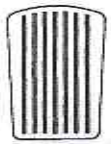
Control Lever with a Detent - Attachments with a clamp action: The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and backward.

Control Lever without a Detent - For attachments without a clamp action only: The lever is operated by moving it forward and backward.

6 The fourth control lever is installed to the right of the third control lever. The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and backward. See AUXILIARY CONTROL LEVERS for possible attachment functions.

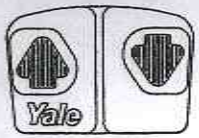
Control Lever without a Detent - For attachments without a clamp action only: The lever is operated by moving it forward and backward.

7. Accelerator Pedal



Push on the accelerator pedal to increase the truck speed.

7a. Direction Control Pedal (not shown in Figure 4.)



The direction 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. Pushing on the left side of the pedal causes the lift truck to move in FORWARD. Speed increases as the pedal is depressed.

8. Direction Control Levers

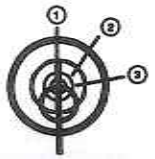
There is a direction control lever on each side of the steering column. These direction control levers have three positions: **Forward**, **Neutral** and **Reverse**.

Move a lever to **Neutral** when stopping the lift truck. A lever must also be in the **Neutral** position to begin operation.

Push a lever forward to the **Forward** position to select travel in the direction of the forks.

Pull a lever back to the **Reverse** position to select travel with the forks following.

9. 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. The key switch will be in this position during normal operation.

No. 3 Position: **START** position. NOT USED. However, if the key is moved to this position, 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.

10. Brake Pedal

This pedal, controlled by the operator's foot, applies the service brakes at the load wheels.

11. Handle For Steering Column Adjustment

This handle permits five adjustments of the angle of the steering column for operator comfort and removal of the battery. Lift and hold the handle while moving the steering column. Release the handle when the steering column is in the correct position. Make sure the handle is in the latch position before operating the lift truck.

12. Parking Brake Pedal

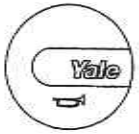
The truck is equipped with a pedal for operating the parking brake. The pedal is to the left of the brake pedal. Push down to apply the parking brake. Pull the release handle to the left of the steering column to release the parking brake. If the parking brake is not applied and the operator leaves the seat or turns the key to the OFF position, a warning buzzer will make a noise for approximately 10 seconds.

⚠ WARNING

Correct adjustment is necessary to provide enough braking force. Adjust the parking brake if it needs adjustment. See Parking Brake in the MAINTENANCE section.

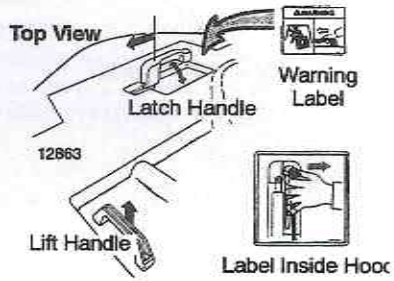
Always apply the parking brake when you leave the lift truck.

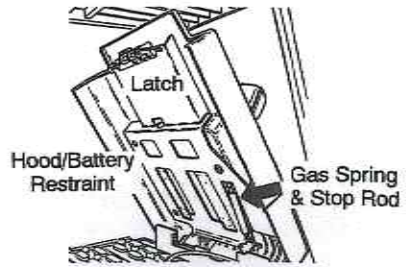
13. Horn Button



The horn button is in the hub of the steering wheel. Push the horn button to operate the horn.

14. Hood/Battery Restraint Latch





Raise The Hood: If the unit has a seat brake, raise the seat and seat plate assembly. Use the latch handle at the rear of the hood to release the hood frame and battery restraint. Raise the latch handle and slide the handle toward the

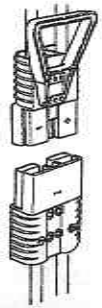
right side of the truck. A spring moves the handle back to the left. Use the lift handle by the seat to raise the hood. A gas spring and stop rod will hold the assembly in the up position.

⚠ WARNING

Make sure the hood/battery restraint is correctly fastened. If not fastened, the battery can come out of the battery compartment during a tipover and cause an injury.

Lower The Hood: Release the stop rod by moving it to the right before lowering hood. See the label. Make sure the latch handle is fully to the right when closing the hood so that the latch can engage the latch piece. Make sure the hood is locked securely. Try to raise the hood using only the lift handle to make sure the hood is latched and will not move.

15. Battery Connector



The battery connector is in two parts. One half of the connector is attached to the battery cables and has a handle as shown. The other half of the connector is connected to the electrical system of the lift truck.

Make sure the handle is installed on the connector. The handle is used to connect and disconnect the two halves of the connector.

⚠ CAUTION

Make sure both halves of the connectors are the same type and color. Make sure the voltage of the battery is the same as specified on the Capacity Plate. The halves of the connector must be joined for operation. Separate the halves of the connector to disconnect the battery.

DISPLAY PANEL FEATURES

The following features are part of both the Standard and Premium Display Panels:

- LED (Light Emitting Diode) symbol indicators
- LCD (Liquid Crystal Display) screen
- Battery Discharge Indicator (BDI) (with lift interrupt when enabled)
- Service Reminder (if enabled)
- Status Codes
- Hourmeter of traction and lift pump times

These features are shown in the standard display panel. See Figure 5. The symbol indicators are shown and described by each item. Since they are common features, these features are also shown in the premium display pan-

el. See Fligure 6. Descriptions of these features follows. The symbol indicators are also shown and described by each item.

Descriptions Of Common Features

LED SYMBOL INDICATORS

The LED symbol indicators are bright red and indicate the function that is shown on the LCD screen. Some of them are also used as a visual warning for the operator of a potential problem that needs an action from the operator.

LCD SCREEN

The LCD screen shows operator messages for the different functions. The Standard display panel can show a maximum of 16 numbers (including spaces).

BATTERY DISCHARGE INDICATOR (BDI)

The Battery Discharge Indicator (BDI) uses a bar graph as a "fuel" gauge for the battery state-of-charge. As the battery discharges, the bar gets shorter to show less "fuel". The green band near the bar shows the normal operating range for the battery. The yellow band is the area that the battery can still be operated in without damage. This band is yellow to indicate that the battery is nearing the point of discharge where it can be damaged with continued hard use. The red band indicates the discharge condition where battery damage can occur. The battery indicator symbol will come ON at this time. Charge the battery very soon to prevent battery damage. Continued operation will cause Lift-Interrupt (if enabled) to occur to help prevent battery damage. At lift-interrupt, the last two segments of the bar graph are the only ones shown and are alternately ON and OFF. The lift pump motor will not operate and there will be a reduction of travel speed.

SERVICE REMINDER

The Service Reminder feature (if enabled) lets the operator know when it is time for periodic maintenance. A status code of 99 will show on the LCD screen and the wrench symbol will be ON. If maintenance is not done within 20 more hours of operating time, lift truck operation will be slower until maintenance is done. Have the maintenance done by authorized maintenance personnel. The service personnel must also set the memory for the next maintenance interval to allow normal operation again.

STATUS CODES

Status Codes give an indication to the operator that a possible malfunction or incorrect truck use has occured. Status Codes are code numbers for a symptom or malfunction. The wrench symbol will flash and the status code number will be shown on the LCD screen if a possible symptom or malfunction occurs during operation. Have authorized service personnel check and repair the lift truck if a status code number appears. The symptoms for each status code are shown in the Service Manual.

HOURMETER

The Hourmeter shows the operating time in hours on the the LCD screen as a five digit number. The display is shown for four seconds after the lift truck has been operating and the key is moved to the **OFF** position. Traction time is the time that the key has been in the **ON** position with the operator in the seat. The operating time for the pump motor (with illuminated symbol) will also be displayed as a five digit number for four seconds following the traction time.

The Premium Display Panel will show the hours as described above. TRACTION HOURS will also be shown on the LCD screen following the traction motor hours. PUMP HOURS will also be shown on the LCD screen when the pump motor hours are shown.

Normal Sequence Of Operation - Standard Display Panel

Following is the normal sequence that occurs after the operator is on the seat with the battery connected:

- Red indicator symbols and all 16 segments of LCD screen are on for one second after the key is moved to the **ON** position. Seat belt symbol will be on for an additional four seconds.
- The bar graph for battery-state-of charge is on LCD screen. If the battery is discharged to Lift-Interrupt, the battery indicator symbol will also be flashing. If a battery of the wrong voltage has been installed, the battery indicator symbol will also be on. If necessary correct these problems before attempting normal operation.

Turn the key to the **OFF** position. The following display sequence will occur:

- Display shows the hourmeter hours for the traction motor for four seconds.
- Display shows the hourmeter hours for the hydraulic pump motor for four seconds. If there is no motor controller for the hydraulic pump , the display will be blank.

Additional Features Of Premium Display Panel

The following *additional* features are part of the Premium Display Panel:

- Operator Passwords for restricted use and custom lift truck operation (if enabled)
- Daily Check List And Service Items shown on LCD screen (if enabled)
- Performance Modes of operation
- Status Code Lists of possible malfunctions or symptoms that have occurred
- Adjustable battery discharge indicator for condition and capacity of battery

The *additional* features of the premium display panel are described and shown with Fligure 6. Also see the description by each item.

Descriptions Of Additional Features (Available With The Premium Display)

LCD SCREEN

NOTE: The words shown in all capital letters show the words that are on the LCD Screen in the following descriptions.

The LCD Screen shows the information for the *additional* features as follows: 1) password request (if enabled), 2) operator Check List (if enabled), 3) status code history and 4) information for adjustment of Battery Discharge Indicator. The Premium display panel

can show a maximum of 20 letters or numbers (including spaces) in each of two lines. The additional 24 spaces can be used for short messages. The messages provide the operator with necessary information for these features and correct operation.

OPERATOR PASSWORDS

The Operator Passwords are a series of four numbers. Each of the four number digits can be the numbers **1** through **5**. If enabled, the password number series must be entered into the memory by a technician and assigned to an operator. Up to 255 passwords can be entered. The password numbers are not displayed, for security, when entered. Remember the password. A technician can use a personal computer (PC), connected to the display panel, to check as well as assign the passwords.

NOTE: The computer does not always respond immediately for every pushbutton entry. The push button can also "click" without an actual change occuring. Make sure to watch LCD screen and wait for response before requesting anothor action.

The LCD screen will show ENTER PASSWORD after the key is moved to the **ON** position when this function is enabled. Use the numbered pushbuttons to enter your four digit password. A "star" symbol will be shown for each digit. The operator has two tries to enter password correctly. If system does not find the password after the first entry, REENTER PASSWORD INPUT PASSWORD ERROR will appear. If system still does not find the password after this second entry, CALL SUPERVISOR INPUT PASSWORD ERROR will appear.

DAILY CHECK LIST AND SERVICE ITEMS

A list of items for Daily Checks And Service will be shown on the LCD screen (if enabled) after the password is accepted. The Check List has items the operator needs to check as having been done. This Check List MUST be completed before the lift truck will operate. Push the push button **#1** for YES and **#4** for NO after each item in Check List. These YES answers indicate that the operator says the check or maintenance has been done. The screen will show SERVICE REQUIRED for a NO answer and the lift truck will only operate in "MODE 1". This operating mode will continue until a service person performs the required service and "clears" the message. Additional Check List items will not appear until after service is complete.

PERFORMANCE MODES

Four different Performance Modes of operation can be selected. Each mode can change acceleration and lifting speeds. The factory settings increase operating speeds from slowest **1** to fastest **4**. After the message MODE #X is on the LCD screen, you can change modes. The mode number that was last activated will appear. If you want to change the mode, push the number pushbutton **1**, **2**, **3**, or **4** to select a new mode. The screen will show REQUESTING MODE # Y (Y is the new mode number just entered). The message will then show MODE #Y unless this mode is not permitted under your password. The lift truck will now operate within the parameters set for that mode number until you change the operating mode

number again. A service person can change the operating parameters of each of the four different levels or modes of operation.

STATUS CODE LISTS

The Status Code Lists are lists of all status codes for the malfunctions or symptoms that have occurred *since the list was last cleared of entries by a technician*. These status codes are NOT of malfunctions or symptoms that are currently present, but those that have occurred in the past. There are separate lists for the Traction Circuit and the Lift Pump Circuit. The lists can only be read with the key in the **OFF** position.

To access the status code history, wait until after the traction and pump hours have been displayed, then push the "STAR" pushbutton. The first item in the Menu on the LCD screen is ACTIVATE FAULT CODE DATA KEY 5 NXT 1/4. Now push pushbutton **5** for a display of: REQUESTING TRACT 1 HISTORY. All of the status codes in the list for the traction circuit will now be shown in turn. The screen will then show REQUESTING PUMP HISTORY followed by the status codes in the list for the lift pump circuit. After the last status code, END FAULT CODE HISTORY will be shown.

ADJUSTMENT OF BDI

This adjustment allows adjustment for more accurate indication of Battery-State-Of-Charge and Lift-Interrupt (if enabled). This adjustment can be necessary initially and when using batteries in different conditions in your lift truck. The adjustment can only be made with the key in the **OFF** position. If you think the bar graph is not correct for the battery in your lift truck, have a technician check the the battery with a hydrometer. The technician can then change the setting as necessary.

Normal Sequence Of Operation - Premium Display Panel

Following is the normal sequence that occurs after the operator is on the seat with the battery connected:

- After the key is moved to the **ON** position, ENTER PASSWORD will be on the LCD screen if this function is enabled.
- After password is correctly entered, or if it is disabled, the first item of the Check List will be on the LCD screen if this function is enabled.
- After Check List is complete, or if it is disabled, the red indicator symbols and all 40 segments of LCD screen are on for one second. Seat belt symbol will be on for an additional four seconds.
- The last Performance Mode operation will be on the LCD screen as MODE #__ . The bar graph for battery-state-of charge is also on LCD screen. If the battery is discharged to Lift-Interrupt, the battery indicator symbol will also be flashing. If a battery of the wrong voltage has been installed, the bat-

tery indicator symbol will also be on. If necessary correct these problems before attempting normal operation.

Turn the key to the **OFF** position. The following display sequence will occur:

- Display shows the hourmeter hours for the traction motor and the words TRACTION HOURS for four seconds.
- Display shows the hourmeter hours for the hydraulic pump motor and the words PUMP HOURS for an additional four seconds. If there is no motor controller for the hydraulic pump , the display will be blank.

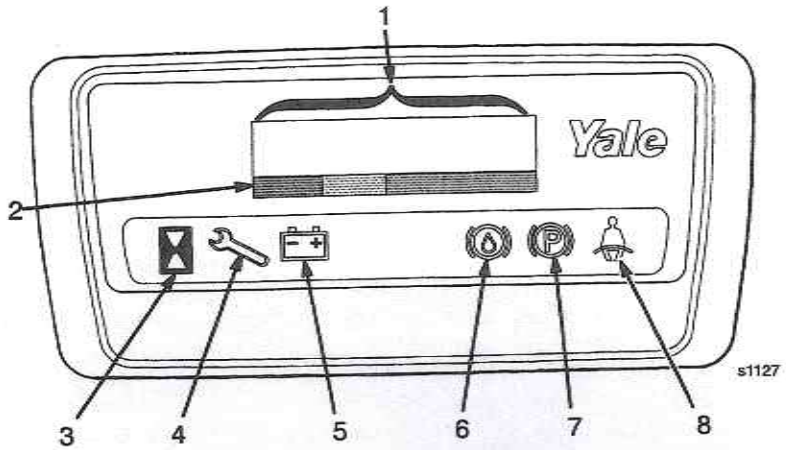


Figure 5. Standard Display Panel

COMMON FEATURES

1-3 and 5-7. All Indicator Symbols

STANDARD DISPLAY PANEL - The red indicator symbols are ON for one second after the key is moved to the **ON** position. This on time checks that the indicators are operating.

PREMIUM DISPLAY PANELThe red indicator symbols are ON for one second after the Check List (if enabled) is complete. If there is no Check List, the indicator is ON after password (if enabled) or after the key is moved to the **ON** position. This on time checks that the indicators are operating.

1. Hourmeter Indicator Symbol

The hourmeter symbol is ON when the traction or lift pump hours are shown on the LCD screen.

2. Wrench Indicator Symbol

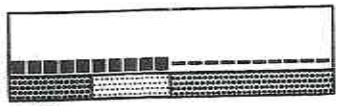
This red indicator is ON when status code numbers are shown or when maintenance is due (99).

3. Battery Indicator Symbol

This red indicator is ON when the battery needs charging or the wrong

voltage battery is connected to the battery connector of the lift truck.

4. Battery State-Of-Charge (BDI)



The Battery Indicator Symbol is on and the bar graph is shown on the LCD screen. See Common Features for more information.

STANDARD DISPLAY PANEL

The bar graph is on the LCD screen after the indicator function check.

PREMIUM DISPLAY PANEL

The bar graph and the message MODE #X are on the LCD screen after the LED Indicator check is complete.

5. Brake Fluid Too Low Symbol

If this indicator symbol is illuminated during operation, the fluid level in the brake fluid reservoir is low and the reservoir must be filled.

6. Parking Brake Symbol

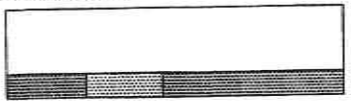
This indicator symbol is illuminated when the parking brake is applied and the seat switch is closed. The indicator will go OFF when the parking brake is released.

If the parking brake is *not* applied and the operator leaves the seat or turns the key to the OFF position, the symbol and a warning tone will be ON for approximately 10 seconds.

7. Fasten Seat Belt Symbol

This indicator symbol will stay illuminated for approximately four seconds, after the indicator check, to remind the operator to fasten the seat belt.

8. LCD "Screen"



The display panel, on the right side of the instrument panel (dash), has an LCD window as an operator's "screen" readout for the SEM motor controllers. The screen is illuminated whenever the key is in the **ON** position and for the first two minutes after the key is first moved to the **OFF** position. Information with a maximum of 16 characters can be shown. This information includes the following: (1) traction operating time in hours, (2) lift pump operating time in hours, (3) status code numbers, (4) service reminder code 99 (if enabled) and (5) state-of-charge of the battery.

All of the screen segments are shown as solid blocks during the indicator check to show that each segment is operating.

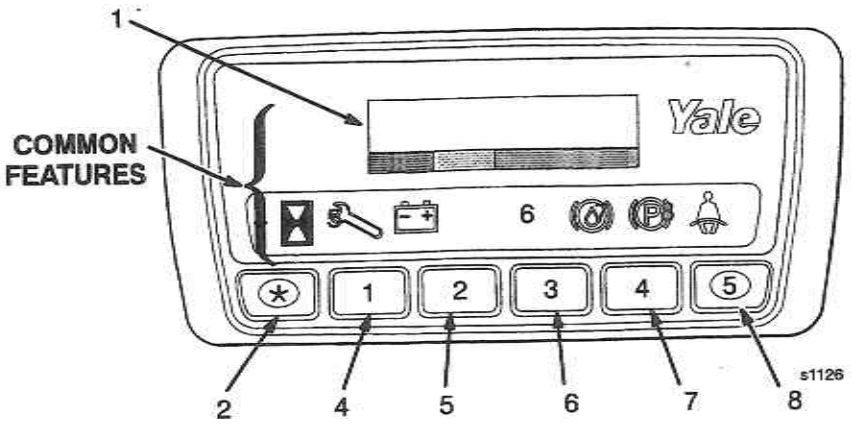
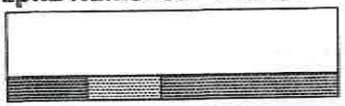


Figure 6. Premium Display Panel

ADDITIONAL FEATURES

1. Alpha Numerical "Screen"



This LCD screen shows the information for the common features and information for the additional features of the premium display panel, Information with a maximum of 20 characters per line in two lines can be shown. This additional information includes the following (display letters shown in all capital letters): 1) ENTER PASSWORD (if enabled), 2) Check List items (if enabled), 3) status code list (history) with number and short description and 4) Battery Compensation information. The hourmeter times are also identified as TRACTION HOURS or PUMP HOURS. MAINTENANCE REQUIRED is also included with the maintenance reminder code 99 if the function is enabled.

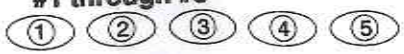
All of the screen segments are shown as solid blocks during the indicator check to show that each segment is operating.

2. "STAR" Push Button

MENU ACCESS

This push button will ONLY make a change when the key is in the **OFF** position. The star button is used to "open" the Menu from the memory of the display panel. After the Menu is "open", only one Menu item is shown on the LCD screen at one time.

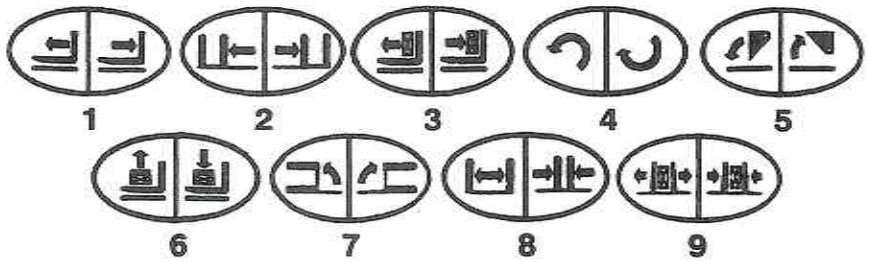
3, 4, 5, 6 and 7. Push Buttons #1 through #5



These push buttons are used as described in Descriptions Of Additional Features of this manual.

***The control levers will be arranged in the following order from left to right**

FUNCTION*	DIRECTION OF MOVEMENT	
	LOAD OR EQUIPMENT	CONTROL LEVER
1 REACH	Retract / Extend	Backward/Forward
2 SIDE-SHIFT	Right / Left	Backward/Forward
3 PUSH-PULL	Down (Clamp) / Up (Release)	Backward/Forward
4 ROTATE	Up / Down	Backward/Forward
5 SCOOP	Backward / Forward	Backward/Forward
6 LOAD STABILIZER	Clamp / Release	Backward/Forward
7 SWING (FORKS)	Clockwise / Counterclockwise	Backward/Forward
8 FORK SPREAD	Together / Apart	Backward/Forward
9 CLAMP	Right / Left	Backward/Forward



NOTES

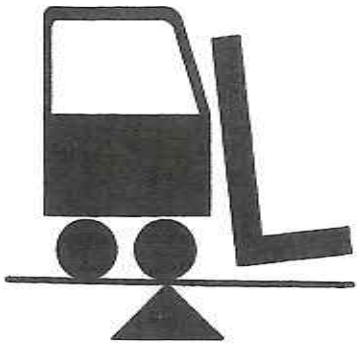
OPERATING PROCEDURES

GENERAL

Know Your Lift Truck

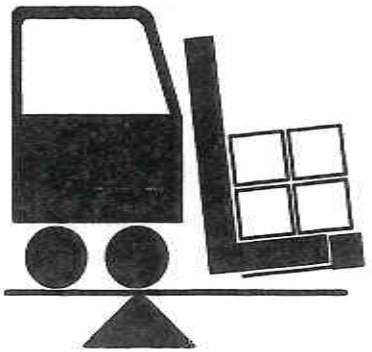
The fork lift truck is designed to pick up and move materials. The basic lift truck has a lift mechanism and forks on the front to engage the load. The lift mechanism lifts the load so that it can be moved and stacked.

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.



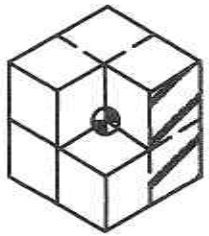
The operation of a lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum). This is the same principle used for a see-saw. In order for this principle to work for a lift truck, the load on the forks must be balanced by the weight of the iift truck. The location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



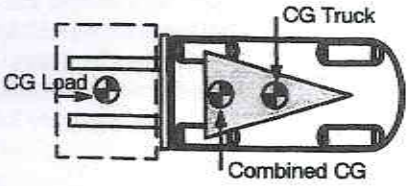
Stability And Center Of Gravity

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



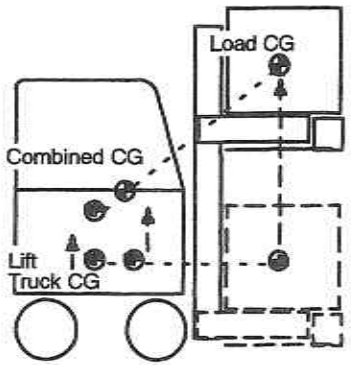
Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG.

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



The lift truck has moving parts that change the CG of the lift truck. The CG moves forward and back as the mast is tilted forward and backward. The CG

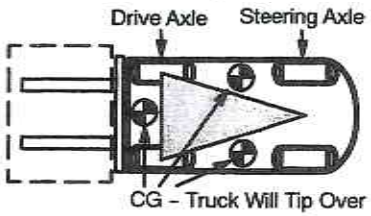
moves up and down as the mast moves up and down.



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 (if the lift truck has pneumatic tires); and the dynamic forces created when the lift 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.

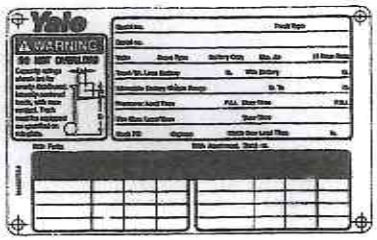
In order for the lift truck to be stable (not tip over forward or to the side) the CG must stay within the area of the lift truck represented by a triangle drawn between the drive axle and the pivot of the steering axle.

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



Capacity (Weight and Load Center)

The capacity of the lift truck is shown on the Capacity Plate. The capacity is listed in terms of weight and load center. The weight is specified in kilograms or pounds. The load center is specified in millimeters or inches. The capacity is the maximum load that the lift truck can handle. This load must weigh less than the maximum weight for a load center shown on the Capacity Plate.



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. It is also assumed that the location of the center of gravity in the vertical direction is no greater than the specified horizontal dimension.

The operator must determine that the weight of a load to be handled is not greater than the capacity shown on the Capacity Plate. The operator **must not** handle any load that is greater than the capacity shown on the Capacity Plate.

INSPECTION BEFORE OPERATION

Checks With The Key Switch OFF

Inspect the lift truck before use and every eight hours or daily as described in the MAINTENANCE section of this **OPERATOR'S MANUAL**.

Before using the lift truck, make the following checks:

- Oil level is correct in the hydraulic tank.
- Electrolyte level and specific gravity of the battery are correct.
- Battery weight is within the range of battery weights on the Capacity Plate.
- Make sure the battery fits correctly in the battery compartment for this truck.
- Battery restraint mechanism operates correctly and is latched.
- Condition of forks, carriage, chains, mast and overhead guard is good.
- Hydraulic system does not have leaks.
- Condition of wheels and tires are good.
- Seat belt latches correctly.
- Seat is securely fastened to the seat plate or hood.

⚠ WARNING

Report damage or faulty operation immediately. Do not operate a damaged lift truck. A lift truck will only do its job correctly 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.

The PMT Circuit

There is a circuit in the traction control system that monitors components and circuits to make sure they are functioning correctly. This circuit is called the "Pulse Monitor Trip" (PMT) circuit.

The PMT circuit can be checked for correct operation, but a temporary fault must be installed and the wheels raised. Have an authorized person install the temporary fault, raise the drive wheels and then check PMT operation.

The lift truck must not be operated if the PMT circuit does not function correctly.

How To Check The SRO Circuit

The lift truck is equipped with a "Static Return to OFF" (SRO) circuit that prevents travel of the lift truck if the starting sequence is not correct. The function of the SRO circuit is to make sure the operator is in the correct position to operate the controls before the lift truck will operate. The starting sequence:

a. Sit on the seat to close seat switch and turn the key switch to the **ON** position.

b. Select the direction of travel and release the parking brake.

c. Push the accelerator or direction control pedal.

If step c is done before step a and the lift truck moves, the SRO function is not operating correctly. The sequence within step a and step b is not important, but step c must be last. The lift truck must not be operated if the SRO circuit does not function correctly. If the SRO circuit does not operate correctly, have the motor controller checked by authorized service personnel.

When you want the lift truck to travel in the **FORWARD** or **REVERSE** direction:

a. Make sure a charged battery of the correct voltage is installed and connected.

b. Sit on the seat to close seat switch and turn the key switch to the **ON** position.

c. Fasten your seat belt.

d. Select the direction of travel using the direction control lever.

e. Release the parking brake.

f. Push the accelerator or direction control pedal for acceleration.

Checks With The Key Switch ON

Do not start or operate the lift truck, including any of its functions or attachments, from any place other than the designated operator's position.

Move the lift truck only enough to check for correct operation.

⚠ WARNING
FASTEN SEAT BELT

If the lift truck tips over

- **Do Not Jump - Stay on Truck**
- **Hold Firmly To Steering Wheel - Brace Feet - Lean Forward And Away From Impact.**

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

The SEAT BELT AND HIP RESTRAINT BRACKET provide a means to help the operator keep his 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 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.

Turn the key switch to the **ON** position and check the operation of the following functions as described in the MAINTENANCE section:

- Check the operation of the horn, gauges and indicator lights. See INSTRUMENTS AND CONTROLS.
- Operate the LIFT, TILT, and auxiliary functions to check for correct operation of the mast, carriage and attachments.
- Check the operation of the steering system.
- Check the operation of the direction control levers and accelerator or direction control pedal.
- Check the operation of the service brakes and parking brake.

OPERATING TECHNIQUES

⚠ WARNING
Before operating the lift truck FASTEN YOUR SEAT BELT.

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 pages in the front of this OPERATOR'S 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. For example, 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.

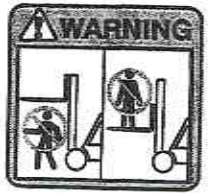
2. Operate the lift truck only in areas that have been approved for lift truck operation.

Certain areas contain hazardous flammable gases, liquid, dust, fibres or other materials. Lift trucks that are operated in these areas must have special fire safety approval.

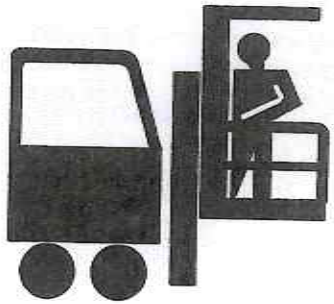
These areas must be designated to show the type of lift truck approval required for operation in the area. Changes to special equipment or poor maintenance can make the lift truck lose its special approval.

3. 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.

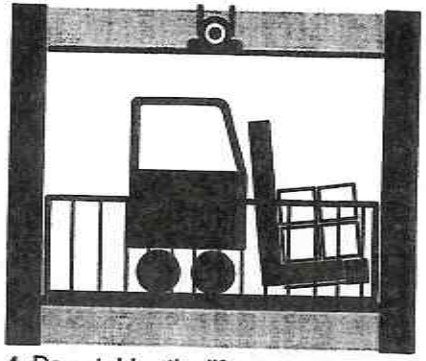
⚠ WARNING
This lift truck is designed and intended for handling materials. A lift truck is not designed to lift people and may not meet the requirements of ANSI A92.6 for lifting people. Do not use a lift truck to lift people unless it has been determined that there is no other practical option (scaffolds, raised 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. The platform must be specially built to meet or exceed the requirements of ANSI B56.1. 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 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.



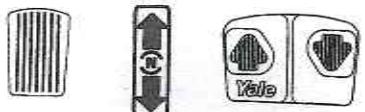
4. Do not drive the lift truck into an elevator unless authorized to do so. Make sure the elevator has the capacity to move the lift truck and its load. Approach the elevator slowly. After the elevator is properly levelled, the lift truck must be centered so that the elevator is balanced.

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. All other personnel must leave the elevator before the lift truck enters or leaves.

5. 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 described in this OPERATOR'S MANUAL.

Driving And Direction Changes

Move the direction control lever toward the front of the lift truck to travel Forward and toward the rear of the lift truck to travel in Reverse.



ACCEL. PEDAL | LEVER | DIRECTION CONTROL PEDAL

⚠ WARNING

DO NOT select the travel direction if the accelerator pedal is depressed.

The lift truck will move rapidly and can cause damage or injury.

To move the lift truck, select a direction, release the parking brake, and push down on the accelerator pedal.

The operator can change the direction of travel while the lift truck is moving by changing the direction control lever to the opposite direction. This action uses the motor for braking and can take place at any travel speed.

⚠ CAUTION

Do not change direction to travel in reverse when the lift truck is traveling fast. The traction components can be damaged and the load can come off the forks.

The lift truck will come to a stop and then accelerate in the opposite direction, unless the accelerator pedal is released. The braking action of the motor can be used to stop the lift truck. To stop the lift truck quickly, use the service brakes.

Steering (Turning)

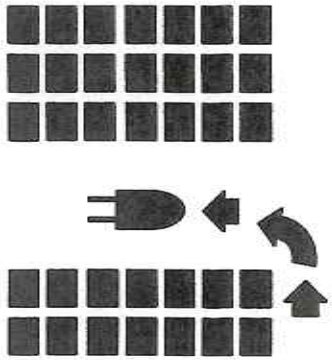
Most operators can understand the need to be careful when handling loads. But some operators do not realize that a tipover can occur with an empty lift truck because similar dynamic forces are present. In fact, the lift truck will actually tip to the side easier when empty, than when loaded with the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

⚠ WARNING

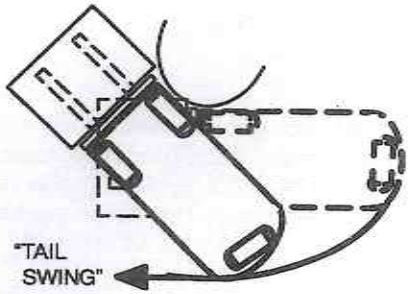
TRAVEL SLOWLY WHEN TURNING. Lift trucks can tip over even at very slow speeds. The combination of speed and the sharpness of a turn can cause a tipover. A lift truck is less stable when the forks are raised, with or without a load.

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.

Because lift trucks are designed to work in a relatively small space, they can turn sharper than some other vehicles.

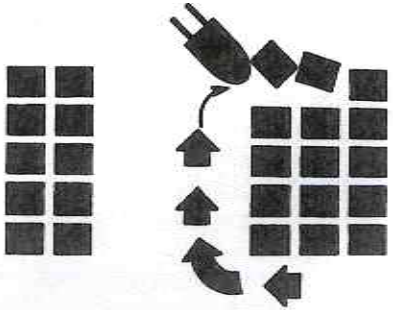


These lift trucks are steered by the rear wheels; the rear of the truck can move to the side very fast during a turn. This movement is called "tail swing". An operator must be aware of tail swing and always check to make sure the tail swing area is clear before turning.

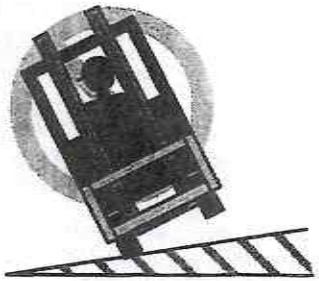


⚠ WARNING

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

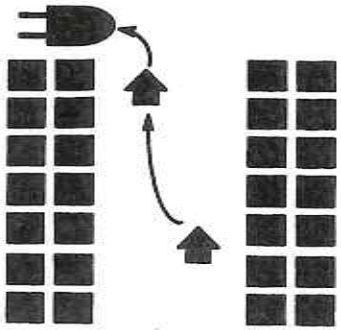


Do not turn on an incline. To reduce the possibility of a tipover, a lift truck must not be driven across an incline.

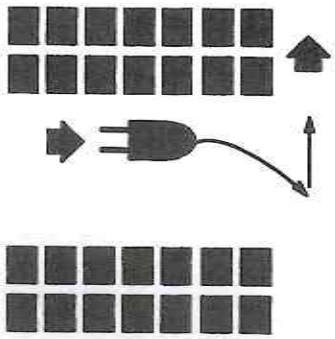


When possible, keep both hands on the steering wheel. During most loading or unloading operations, the operator steers with the left hand. The right hand is used to operate the lift, tilt, and attachment controls.

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.



When turning the lift truck while travelling in a reverse direction, make sure there is enough room for the load and the forks.



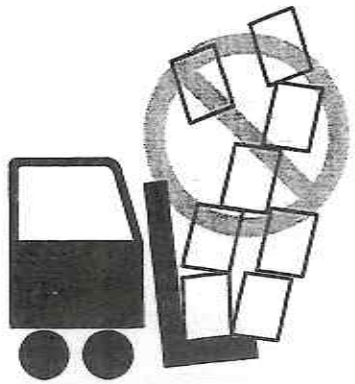
Load Handling, General

1. Handle only loads within the rated capacity as shown on the Capacity Plate. This rating represents the maximum load that can be lifted.

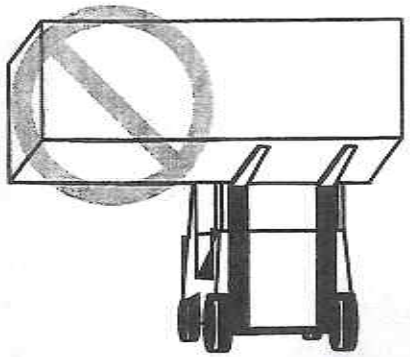
However, such factors as weak floors, uneven terrain, special load handling attachments or loads having a high center of gravity can mean that the safe working load is less than the capacity. When such conditions exist, the operator must reduce the load so that the lift truck will remain stable.

2. Handle only stable loads. A load can have unstable items that can easily shift

and fall on someone. Do not handle a load if any loose part of it is above the load backrest extension 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 the load allows 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.

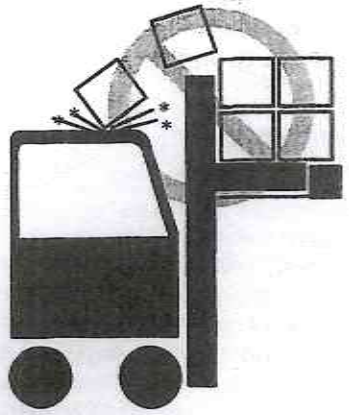
4. Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Load Handling, Lifting, Lowering And Tilting

The LIFT and TILT functions are controlled by separate levers. Refer to the INSTRUMENTS AND CONTROLS section for operation of the levers on this lift truck.

The speeds of the hydraulic functions are 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 cannot protect against every possible impact.



A lift truck without an overhead guard provides no such protection. Avoid hitting objects such as stacked material that could become dislodged and fall. Other personnel in the area have no overhead protection. The operator must exercise care while working near such objects. Whether the lift truck is

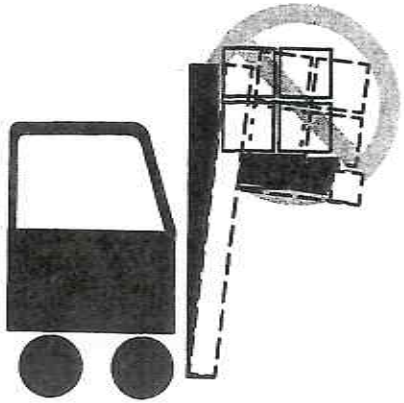
loaded or empty, do not travel with the carriage in a raised position.

⚠ 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.

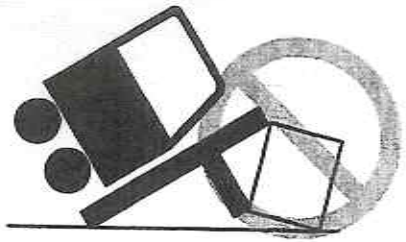
Lift and lower with the mast vertical or tilted slightly backward from vertical. Tilt elevated loads forward only when directly over the unloading place. If the lift mechanism is raised to pick up or deposit a load, keep the tilt angle in either direction to a minimum. Backward and forward tilt are helpful, but they affect side and forward stability. Do not tilt in either direction any more than necessary when handling a load in the raised position. The lift truck can tip forward if the mast is tilted forward with a load in the raised position.



⚠ 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.

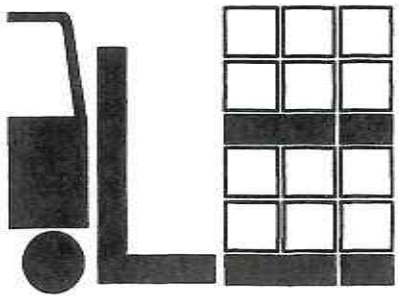
IF THE LIFT TRUCK TIPS OVER, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN AWAY FROM POINT OF IMPACT.



Load Handling, How To Engage And Disengage A Load

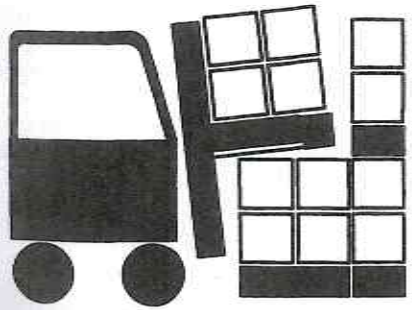
1. Approach the load carefully. Make sure that the truck is perpendicular to the load. Raise the forks to the proper height for engaging the load.

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.

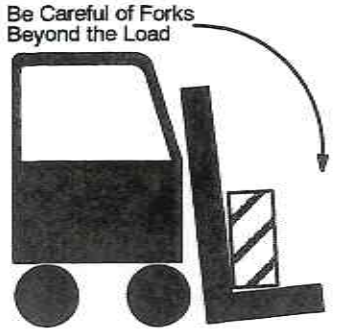


Make sure that the load is centered between the forks. Make sure that the forks do not extend past the load so that loads or equipment that are behind the load being lifted are not damaged.

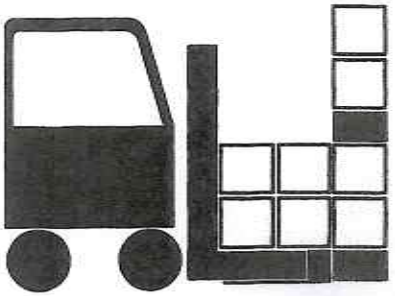
If the load is being removed from a stack, slowly tilt the mast backward and move the lift truck away from the stack. When the load is clear of the stack, lower the load for travelling. Always travel with the load as low as possible and tilted backward. Lowering speed is controlled by the position of 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.



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.



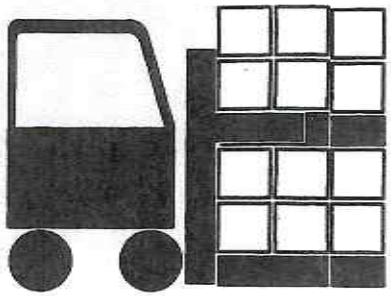
4. To put the load on a stack, align the lift truck with the stack. Raise the load higher than the point where it will be placed. Do not raise the load to a point below where the load is to be placed and "jog" the load up into position. This operation uses added energy, particularly with an electric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

⚠ WARNING

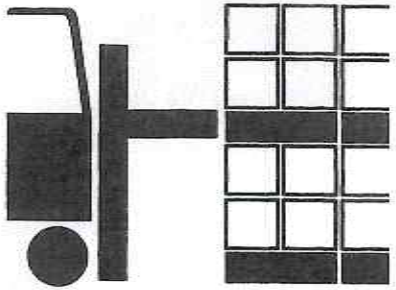
Move carefully and smoothly when the load is raised over a stack. When the load is raised the center of gravity of the lift truck and the load is

much higher. The lift truck can tip over when the load is raised.

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 for lowering on a stack, tilt the mast to a vertical position and lower the load. 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.



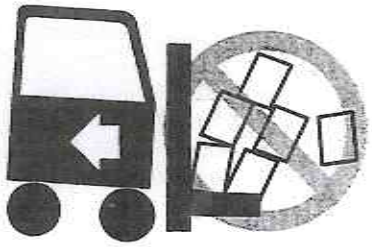
Tilt the mast forward just enough to permit smooth removal of the forks from under the load. Carefully move the lift truck backward to remove the forks from under the load. Lower the forks when travelling.

5. 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.

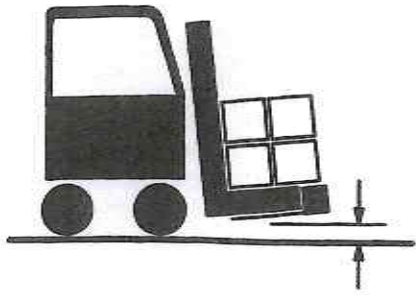
NOTE: Not every load can be lifted using only the forks of a lift truck. Some loads will require a special attachment.

Load Handling, Travelling

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



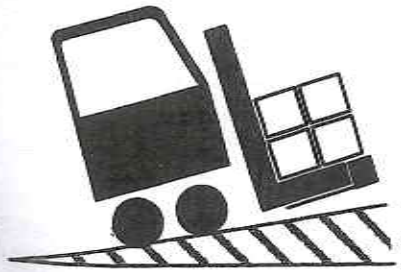
2. When travelling with the load lowered, keep the load against the carriage and the mast tilted fully backward. This action will help keep the load on the forks and give good forward and side stability.



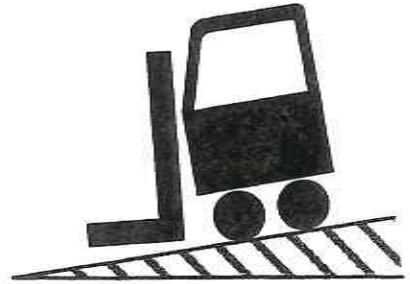
3. Travel with the lift mechanism raised only enough to clear the ground or obstacles.

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.

4. For better visibility with large loads, travel with the load trailing, but always look 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 look-out helper can be required.



5. 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.

6. 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.

7. 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.

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

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

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

9. Watch clearances, especially forks, masts, 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. Because of this, the operator may hit an object or lift another load. Serious accidents can be caused by masts and overhead guards hitting pipes and beams near the ceiling.

10. Do not indulge in stunt driving or horseplay.

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

12. 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.

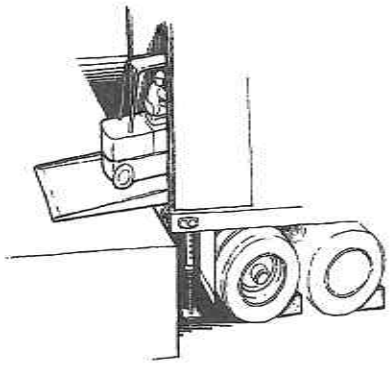
13. Under all travel conditions, operate the lift truck at a speed that will permit it to be brought to a stop in a safe manner.

HIGHWAY TRUCKS, RAILROAD 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 railroad car, observe the following:

DO NOT use a lift truck to move a railroad car.

DO NOT use a lift truck to open or close the door on a railroad car, unless the lift truck has a special attachment 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 railroad car brakes are set and the wheels are blocked while loading or unloading. Do this so that the railroad car will not move due to the movement of the lift truck in and out of the railroad 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 plate is secured, in good condition and of the proper capacity.

When entering a railroad car the operator can enter at an angle (if the dock plate or bridge is wide enough). This action will reduce the turning required after entering.

ATTACHMENTS

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before operating the attachment. See "AUXILIARY CONTROL LEVERS" at the end of the MODEL DESCRIPTION section for the operation of attachment control levers.

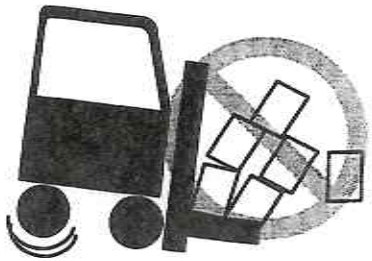
⚠ WARNING

Do NOT exceed the capacity for a truck with an attachment. Make sure the Capacity Plate shows the capacity for the lift truck with your attachment.

Make sure the attachment is the correct model and type shown on the Capacity Plate.

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:

a. Stop the lift truck and apply the parking brake.

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

c. Move the direction control lever to Neutral.

d. Turn the key to OFF position and remove the key.

e. Disconnect the battery when leaving the lift truck.

f. 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 park the lift truck so that it limits access to fire aisles, stairways, fire equipment and other users.

NOTES

GENERAL LIFT TRUCK MAINTENANCE AND LUBRICATION SCHEDULE

GENERAL

A YALE WARRANTY STATEMENT covering new trucks is available from your dealer for YALE lift trucks. To maintain your YALE WARRANTY in good standing, you must follow this schedule and perform the daily safety and operational checks as well as the maintenance functions outlined herein. If you require a Warranty Repair, you must contact your dealer for YALE lift trucks for Warranty Service during the periods outlined in the Warranty Statement. Your dealer for YALE lift trucks has complete details on what components are covered and the types of repairs that have a warranty. When in doubt about your warranty coverage, be sure to contact him. If you have a warranty problem that cannot be resolved with your dealer for YALE lift trucks, you may request a review of your problem by contacting the YALE Field Service Department.

All new YALE trucks will be provided with a **STANDARD PARTS MANUAL** through your dealer for YALE lift trucks. Additional **STANDARD PARTS MANUALS**, special **PARTS MANUALS** and **MAINTENANCE MANUALS** are available from your dealer for YALE lift trucks to help users who do their own maintenance. For the optimum in professional repair and maintenance, we recommend your dealer for YALE lift trucks for factory trained mechanics for YALE service and a YALE Maintenance Agreement.

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

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

a. If the lift truck is used more than eight hours per day.

b. If the lift truck must work in dirty operating conditions.

Your dealer for YALE lift trucks has the facilities and trained personnel to do the maintenance. A complete program of inspection, lubrication, and maintenance will help your lift truck perform efficiently and operate over a longer period of time.

Some users have service personnel and facilities to do the items listed in the MAINTENANCE SCHEDULE. **MAINTENANCE MANUALS** are available from your dealer for YALE lift trucks to help users who do their own maintenance.

YALE *trucks are built with quality components; the use of inferior spare parts can result in inadequate safety and poor reliability. We strongly recommend the use of genuine YALE spare parts. YALE will not recognize any complaint resulting from the use of unauthorized spare parts*

⚠ 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. Disconnect the battery connector.

Do not work under a raised carriage. Lower the carriage or use a chain to prevent the carriage and the inner or intermediate weldments from lowering when doing maintenance. Make sure that the moving parts are attached to parts that can not move.

Before doing maintenance, put the lift truck on a level surface. Lower the carriage and forks, apply the parking brake and turn the key to the **OFF** position. Disconnect the battery connector.

See the correct Lubrication List in this section for the oils and grease that are recommended for use on these 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 and drive assembly, battery or the counterweight. When the lift truck is put on blocks, put additional blocks in the following positions to maintain stability:

a. **Before removing the mast and drive assembly, put blocks under the counterweight so that the lift truck can not tip backward.**

b. **Before removing the battery and counterweight, put blocks under the mast assembly so that the lift truck can not tip 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 lift points 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 tire 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 Capacity Plate.

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 Capacity Plate.

3. Put the jacks under the rear of the frame to raise the lift truck. Put blocks under the frame and counterweight to support the lift truck.

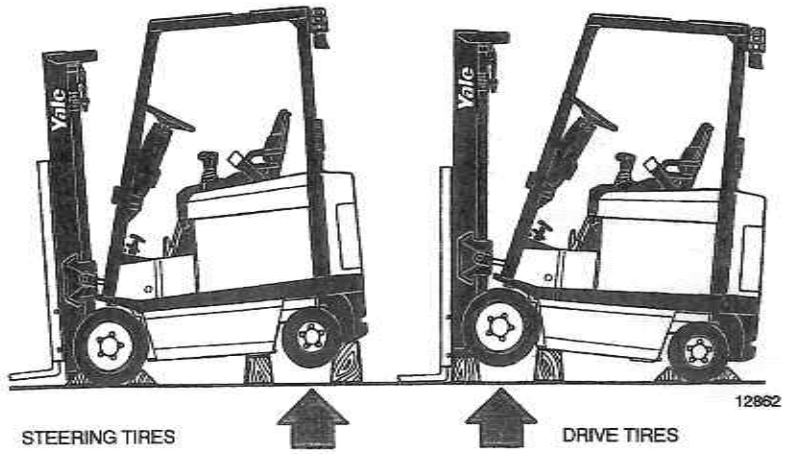
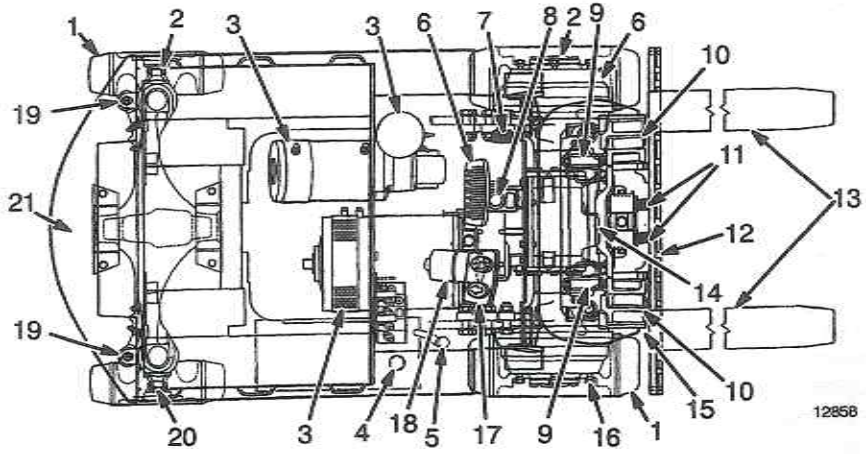


Figure 7. Put A Lift Truck On Blocks



1. WHEELS AND TIRES
2. WHEEL BEARINGS
3. MOTOR BRUSHES
4. HYDRAULIC DIPSTICK, AND FILL CAP
5. HYDRAULIC TANK BREATHER
6. SERVICE BRAKE
7. PARKING BRAKE
8. MASTER CYLINDER
9. MAST PIVOTS
10. MAST SLIDING SURFACES AND ROLLERS
11. LIFT CHAINS
12. CARRIAGE
13. FORKS
14. DIFFERENTIAL
15. FORK GUIDES & LOCKS
16. WHEEL NUTS
18. HYDRAULIC OIL FILTER
17. DIRECTION CONTROL PEDAL
19. SPINDLE BEARINGS
20. SPINDLE NUT
21. CONTACTORS

Figure 8. Location Of Maintenance And Lubrication Points

LUBRICATION INSTRUCTIONS

The Lubrication Instructions below are for general reference. The location of some lubrication fittings, filters, dipsticks and etc. can be different. See your Maintenance Manual for exact locations for your truck.

See both the Maintenance Schedule and these Lubrication Instructions when inspecting, lubricating and servicing these models.

See the correct Lubrication List in this section for the oils and greases that are recommended for use on these lift trucks.

See the information under the General heading at the beginning of this section and be sure to follow the Warnings shown there.

NOTE: The numbers in ( ) of the following paragraphs refer to the item numbers in Figure 8.

EVERY 8 HOURS OR DAILY

Do all safety and operational checks as shown in the MAINTENANCE SCHEDULE.

Some batteries are sealed. These batteries do not need checking or filling. On batteries that are not sealed, check the battery electrolyte level and add distilled water if necessary. The electrolyte level must be maintained at the level recommended by the battery manufacturer. Some water loss in the battery cells is normal. Always add water after a charge. See the Battery Maintenance section for precautions and instructions.

(4) Hydraulic Oil Level -- Use the dipstick in the tank to check the hydraulic oil level. Check the oil level when the oil is at normal operating temperature and the mast is in the fully lowered position. Check dipstick while filling. DO NOT FILL TOO FULL. See CAPACITIES table.

NOTE: Change the hydraulic oil filter on NEW lift trucks at the first 100 hours on the hourmeter.

NOTE: Lubricate the tie rods and king pin bearings at 200 hours. See EVERY 350 HOURS OR TWO MONTHS below for points of lubrication.

EVERY 350 HOURS OR TWO MONTHS (See MAINTENANCE SCHEDULE)

Do all safety and operational checks as shown in the MAINTENANCE SCHEDULE.

Use the correct grease in a high pressure gun to lubricate the following lubrication fittings. Clean the lubrication fittings before and after lubricating.

Location and number of lubrication fittings

(19) Lower Bearings of Steering Spindles 2

(9) Mast Trunnion 2

Put a thin coat of grease on all friction points of the following:

(10) Mast Sliding Surfaces and Rollers

Put a thin coat of engine oil on all friction points of the following using an oil can or spray:

(15) Fork Guides and Locks

Hinges, Levers, Pedals and Linkages

Spray a thin coat of silicone spray on all friction points of the following:

Seat Rails

Tilt Cylinder Pins

Do the following procedures:

(11) Lift Chains -- Remove old oil and dirt using a clean cloth, then use compressed air to blow chains. With a clean brush, apply SAE 30 or 40 weight engine oil to the full length of the chains every 1000 hours. Oil must get into chain joints.

(8) Brake Master Cylinder -- The indicator on the display panel will come ON if the fluid level is too low during operation. Remove floor plates and clean cap and top of master cylinder. Remove cap from reservoir and check fluid level. Correct level is 0.5 inch from top of reservoir. Use SAE J-1703 hydraulic brake fluid. See CAPACITIES table for the reservoir capacity.

(5) Hydraulic Tank Breather -- Wear protective clothing and eye protection. Clean breather using solvent, blow dry using compressed air and install. Replace breather if damaged or if it cannot be cleaned.

(14) Use the dipstick to check the differential and speed reducer oil level when the oil is at operating temperature. The dipstick is near the brake master cylinder. See CAPACITIES table for the capacity of the differential, speed reducer and axle housing.

(16) Check drive and steer wheel nuts for the correct torque 2 to 5 hours after a wheel has been installed. Tighten the drive wheel nuts in a cross pattern to 175 to 225 lb_f ft torque. Check frequently until the nuts stay tight for eight hours or more. The interval for checking the torque can then be increased to 350 hours.

(20) Tighten the castle nuts of the steer wheel spindles of these units to 50 lb_f ft torque while rotating the wheel in each direction at EACH installation. Loosen the nuts 1/4 turn. Pull and push at top of wheel to check for movement (end play). If there is movement, tighten the castle nuts to 2 lb_f ft torque. Install the cotter pins at the nearest alignment positions. Install the hub cap. Additional torque checks are not required.

EVERY 2000 HOURS OR YEARLY

Do all safety and operational checks as shown in the MAINTENANCE SCHEDULE.

(4) Hydraulic Oil Tank -- Replace at the first 100 hours then with each oil change. Remove hose from filter that comes from hydraulic control valve. Lift and tip filter to drain oil into tank. Remove drain plug from bottom of tank to drain oil. Install new filter with flow arrow pointing in the same direction as the old filter. Clean the breather and install the drain plug before filling the tank. See CAPACITIES table for the capacity of the empty system. The refill quantity is less. Fully raise and lower the forks and tilt the mast fully forward and backward. Fully lower the forks and check the oil level using the dipstick. Add oil if necessary, DO NOT FILL TOO FULL. Refer to the Recommended Hydraulic Oil Table in this section for the correct oil.

(21) Contactors -- Check the condition of the contactor tips. Replace contactor tips when tip thickness is 30 % of thickness when new. If your unit has a lift pump that is operated by a contactor, replace the contactor tips every 1000 hours of operation.

(14) Differential and Speed Reducer — Remove differential drain plug and drain oil. Allow time for speed reducer oil to flow through bearings. Install drain plug. Remove fill plug and add gear oil through fill hole. See CAPACITIES table for approximate quantity. Fill until oil begins to run out hole. Install fill plug. Add oil slowly to allow filling of speed reducer through bearings. DO NOT FILL TOO FULL. Clean breather. Refer to Gear Oil table in this section for the correct oil.

(11) Lift chains — Remove, Clean and Lubricate all Lift Chains as described in the **MAINTENANCE MANUAL**.

(2) Wheel Bearings — Remove drive wheels, axles, brake drums and bearings. Remove steer wheels. Remove old grease and wash all parts thoroughly using solvent and dry. Do NOT install and rotate bearings while dry. Force grease between the rollers and inner race of all but outer bearings of drive wheels. The grease must fill the spaces between the rollers completely. Refer to Grease table in this section for the correct grease. The wheel hub cavity must be filled with the same grease to a level even with the inner diameter of the bearing cups. The hub cavity of drive wheels is between the inner bearing cups and the inner seal(s). The hub cavity of steer wheels is between bearings. Put a light coat of grease on seal surface(s) of spindle. Install the brake drum (drive) or wheel (steer) and the bearings using one of the following instructions:

Steer Wheels — Tighten the castle nuts of the steer wheel spindles of these units to 50 lb_f ft torque while rotating the wheel in each direction at EACH installation. Loosen the nuts 1/4 turn. Pull and push at top of wheel to check for movement (end play). If there is movement, tighten the castle nuts to 2 lb_f ft torque. Install the cotter pins at the nearest alignment positions. Install the hub cap. Additional torque checks are not required. Tighten the steer wheel nuts as described in EVERY 350 HOURS OR TWO MONTHS.

Drive Wheels — Install the oil seals and inner bearings on the axle housings. Do NOT damage the seals. Install the oil seals in the hubs. Fill the inner bearing and cavity of the hub with grease as described above. Lubricate the outer bearing cones with differential oil. Carefully install the hubs without damaging the seals. Install the outer bearings, lockwashers and lock nuts. Tighten the lock nuts while turning the hubs until they will not turn. Loosen the nuts until the hub turn freely (approximately 30 to 60 degrees. The torque must be less than 2 lb_f ft. Tighten the nuts again to 2.5 lb_f ft torque and lock the nuts with the lockwashers at first possible clockwise position. Put adhesive sealant on the axle flanges and install the axle shafts. Install the capscrews and tighten them in a cross pattern to 72 lb_f ft torque. Install the wheels and wheel nuts as described in EVERY 350 HOURS OR TWO MONTHS.

MAINTENANCE SCHEDULE

LEGEND

A -- Every 8 Hours or Daily
B -- Every 350 Hours or 2 Mo
C -- Every 2000 Hours or 1 Yr

***Not all units have all lights**

X -- Indicates Visual Inspection, Testing, Adjustingas required
CIL— Check Indicator Light during operation*
O -- Indicates Drain and Fill
R -- Indicates Replacement
IR -- Initial Replacement
CO -- Complete Overhaul

SAFETY AND OPERATIONAL CHECKS (Before each shift) Only the 8-hour CHECKS are to be done by the operator. Have a **qualified** mechanic correct all problems.	A	B	C
Leaks — Hydraulic Oil	X		
Tires — Condition and Pressure. (See NOTE 1)	X		
Forks, Top Clip, Retaining Pin and Heel — Condition	X		
Load Backrest Extension — Attached	X		
Hydraulic Hoses, Mast Chains and Stops — Check Visually	X		
Overhead Guard — Attached Cracks, Mounting	X		
Safety Labels - Attached and can be read (See **PARTS MANUAL** for location and replacement part number)	X		
Internal Checks:			
Battery — Water/Electrolyte Level and Charge (Not Sealed Batt.)	X		
Hydraulic Tank Fluid Level — Dipstick	X		O
Speed Reducer and Differential Level — Dipstick		X	O
Operator's Compartment:			
Operator's Manual in Case	X		
Capacity Plate Attached — Information matches model, serial number and attachments	X		
Battery Restraint System — Latched	X		
Seat Belt, Buckle and Retractors — Operate Smoothly	X		
Accelerator Linkage — Operates Smoothly	X		
Brake Fluid — Check Level	CIL	X	

Controls (Start Lift Truck) — Immediately Check Noises That Are Not Normal:	A	C	D
Parking Brake — Operates Correctly	X CIL		
Service Brake — Operates Smoothly and Correctly	X		
Steering Operation — Operates Smoothly and Correctly	X		
Drive Control — Forward/Reverse — Operates Correctly	X		
Lift and Lowering Control — Operates Smoothly and Correctly	X		
Tilt Control — Operates Smoothly and Correctly Forward and Backward	X		
Attachment Controls — Operate Smoothly and Correctly	X		
Horn — Operates Correctly	X		
Optional Lights — Operate Correctly	X		

Gauges:	A	C	D
Hour Meter — Operates Correctly	X		
Battery Discharge Indicator — Operates Correctly	X		

LUBRICATION CHECK: Use compressed air to clean. Inspect for damage.	A	B	C
Lubricate — All Fittings and Friction Surfaces		X	
Mast Pivots (Blocks under Outer Channels and Tilt Forward before lubricating 2 Fittings)		X	
Chain Sheaves (At Assembly if no Fittings Installed)		X	
All Linkages. (See NOTE 2)		X	X
Friction Surfaces of Mast		X	
Friction Surfaces of Carriage or Attachment		X	
Clean and Lubricate Lift Chains		X	O
Clean and Fill Wheel Bearings with grease			O
Hydraulic Tank Breather		X	
Differential/Speed Reducer — Gear Oil		X	O

HYDRAULIC SYSTEM CHECK	A	B	C
Lift Cylinders for Leaks	X		
Tilt Cylinder for Leaks	X		
Lift Pump for Noise and Operation	X		
Power Steering Pump for Noise and Operation	X		
Hydraulic Control Valve for Leaks and Operation	X		
All Hoses, Tubing and Fittings for Wear And Leaks	X		
Attachment Operation	X		
Attachment Cylinders for Leaks	X		
For General Leaks	X		
Hydraulic Oil			O
Hydraulic Oil Filter Element ("IR" - Filter 1st 100 Hours)	IR		R
Hydraulic Tank Breather		X	

MAST, CARRIAGE, AND ATTACHMENT CHECK	A	B	C
Mast and Carriage Stops		X	
Mast Channel Wear		X	
Mast Rollers and Wear Strips		X	
Carriage Rollers		X	
Chain Anchors, Adjustment		X	
Chain for Cracks and Wear	X		
Forks — See Figure 11. and Figure 12. (See NOTE 3)	X		
Attachment — Sliding Surface Wear		X	
Attachment — Check Rotating Parts and Torque On Bolts and Nuts		X	

DRIVE ASSEMBLY	A	B	C
Brake Drums and Linings			X
Wheel Nuts — Refer to EVERY 350 HOURS OR TWO MONTHS		X	
Wheel Bearings — Refer to EVERY 2000 HOURS OR YEARLY			O

STEERING	A	B	C
Axle Bearings — Refer to EVERY 2000 HOURS OR YEARLY		X	O
Spindle Nuts — Refer to EVERY 350 HOURS OR TWO MONTHS		X	
Wheel Nuts — Refer to EVERY 350 HOURS OR TWO MONTHS		X	

ELECTRICAL SYSTEM	A	B	C
Clean all Controls (Never use steam to clean electrical parts.)			X
Accelerator Switch and Potentiometer (Check Connections)		X	
Traction and Pump (if installed) Motor Controller Connections		X	
Direction Switches (Check Connections)		X	
Hydraulic Control Switches (Check Connections)		X	
All Motors — Clean with a vacuum cleaner. If compressed air must be used, use carefully and at a low pressure.		X	
All Motors — Check Brushes and Springs	CIL	X	
All Motors — Check Power Cable Connections		X	
Battery, Compartment and Connectors — Clean and make Neutral		X	
Battery Condition — Structure and Electrical		X	
Charger Operation		X	
All Wire Connections		X	
Contactors — Contacts and Wire Connections (Replace the contact set for the lift pump, if installed, contactor every 1000 hours of operation. Replace other contactor sets when contact thickness is 30% of thickness when new.)		X	R

GENERAL CHECK:	A	B	C
All Bolts, Nuts, Cotter Pins, Etc.		X	
Overhead Guard & Load Backrest Extension—Cracks, Mounting, Etc.		X	

ROAD TEST AND LOAD TEST THE LIFT TRUCK — Do these tests daily and after every maintenance inspection or repair. Do the tests in a clear area using a capacity load in the correct position on the forks. Drive carefully and observe all traffic regulations and operating procedures. Report all functions or noises that are not normal.	A	B	C
Steering	X		
Brakes — Service, Parking, Seat (if equipped)	X		
Horn, Lights	X		
Traction System — Acceleration, Creep	X		
Mast — Check for the correct sequence of channel operation. Do the checks with and without a load. Lifting — Full Lift (**Do Not Tilt Forward**) and Lower. Tilt — With load lowered, tilt fully Forward and Backward.	X		
Attachment — Operate all functions.	X		

NOTE 1. TIRES — Condition and pressure can change STABILITY, OPERATOR SAFETY and LOAD CAPACITY that can be safely handled.

NOTE 2. Lubricate hinges, levers, linkage pedals and other linkages with multi-purpose grease with 2-4% molybdenum disulfide at "B" interval. Lubricate seat rails with a silicone spray at "C" interval.

NOTE 3. Have authorized personnel use Magnaglo or equivalent Fatigue Crack Detector to test forks. Refer to Service News Bulletin SE-643 for Procedure on Field Testing Load Forks. The Bulletin also has the minimum acceptable fork thickness due to wear.

NOTE 4. Lubricate lower spindle bearings at 250 hours and upper bearings at assembly.

For more information on Service Bulletins, contact your authorized dealer for YALE lift trucks.

CAPACITIES	
HYDRAULIC OIL (Full Mark)(approximately)	24.3 quarts
DIFFERENTIAL/SPEED REDUCER	4.4 quarts
BRAKE FLUID	0.5 pint

Hydraulic Oils	
TYPE	For all Hydraulically Actuated Equipment
Ambient Air Temperature Condition	Normal Use*
Anticipated Ambient Air Temperature Range	0° to 100° F
Actual Usable Operating Oil Temperature Range	0° to 100° F
ASTM Viscosity Grade Number/Index (Reference)	SAE J300/90 Minimum
Pour °F Maximum	-20°F
Approved Sources	
American Oil Company	AMCO 200 Motor Oil SAE 10W
Ashland Oil, Inc.	Ashland HD-10W
Atlantic Richfield (Arco)	4-014-10W
British Petroleum	BP Vanellus M-10W
Chevron Oil Company	Chevron Delo 100 Motor Oil 10W
Citgo	C300 Series Motor Oil Grade C310
Elf	HB I-B-10W
Exxon	HDX 10W
Fina Oil Company	Delta Motor Oil 10W
Gulf	Gulflube Motor Oil XHD 10W
Imperial Oil Ltd.	Esso lube HD-10W
Mobil Oil Corporation	Delvac 100 Aweiwa-10W
Shell Oil Company	Rotella Oil-10W
Sinclair Oil Corporation	Super Tenol SAE 10W
Standard Oil Company of California	RPM Delo 200 Motor oil 10W
Sun Oil Company	Sunfleet Mil-b-10W
Texaco Inc.	Union Unitec Motor Oil-10W
Total, NV	Total HD1B SAE 10W
Union Oil Company	Union Unitec Motor Oil-10W

Field Personnel Note: The hydraulic oils shown in this list are approved by **YALE** MATERIALS HANDLING CORP. These sources meet or exceed the specifications shown. The use of hydraulic oils other than those in the list is not authorized.

* For lift trucks used in cold storage or arctic areas, see your authorized dealer for YALE lift trucks.

Gear Oil	
FOR USE IN THE SPEED REDUCER AND DIFFERENTIAL	
Type	Ultra Gear Lube Gear Oil
SAE Weight	SAE 80W or SAE 90W EP
Approved Source	
Chevron Oil	Ultra Gear Lube Gear Oil or SAE 80W-90 gear oil

Field Personnel Note: The greases shown in this list are approved by **YALE** MATERIALS HANDLING CORP. These sources meet or exceed the specifications shown. The use of greases other than those in the list is not authorized.

* For lift trucks used in cold storage or arctic areas, see your authorized dealer for YALE lift trucks.

Grease	
*STANDARD FOR HIGH PRESSURE FITTINGS, PLAIN AND ANTI-FRICTION BEARINGS, WHEEL BEARINGS AND ALL MASTS	
Type	Quality Automotive
Compound Type	High grade lithium soap, 2 to 4% micronized molybdenum disulfide additive and high grade mineral oil
NLGI Grade	2
Dropping Point Approx.	340 (Minimum)
Viscosity At 38°C **At 99°C**	750 (Minimum) 75 (Minimum)
Approved Source	
American Oil Company	Molylith Grease #2
Ashland Oil, Inc.	Special Moly Grease
BP Oil International Ltd.	BP Energrease LMS 22 or Energrease L21M
Castrol	Spheerol LMM
Chevron USA Inc.	Chevron Moly Grease 2
Citgo	Premium Moly Lithium #2 Grease
Elf	Grease M_oS_2 Special
Exxon	Beacon Q-2
Fina Oil Company	Marson LM2
Gulf	Gulflex Moly Grease
Mobil Oil Corporation	Mobilgrease Special
Shell Oil Company	Lithall MDS Grease
Sinclair Oil Corporation	Litholine EP Molylith Grease
Sun Oil Company	Prestige Moly Grease M3
Texaco Inc.	Molytex #2
Total, NV	Total Multis MS

Field Personnel Note: The greases shown in this list are approved by **YALE** MATERIALS HANDLING CORP. These sources meet or exceed the specifications shown. The use of greases other than those in the list is not authorized.

* For lift trucks used in cold storage or arctic areas, see your authorized dealer for YALE lift trucks.

NOTE: This Daily Check List is available for the Operator. Some items on this list may not be applicable to your truck. This convenient check list is in tablet form and can be ordered through your YALE lift truck dealer. Form Number 944-6418-A.

Yale *Industrial Trucks*

Daily inspection before each shift is an OSHA requirement. We recommend that you make a record that these inspections have been made.

Electric Truck Operator's Daily Check

Date _____ Operator _____ Record of Fluid Added
Truck Number _____ Model Number _____ Battery Water _____
Department _____ Serial Number _____ Hydraulic Oil _____
Shift _____ Drive Hour Meter Reading _____ Hyd. Hour Meter Reading _____

SAFETY AND OPERATIONAL CHECKS (Before each shift)

Have a **qualified** mechanic correct all problems.

	OK (√)	Need Maint.
Leaks — Hydraulic Oil, Battery		
Tires — Condition and Pressure		
Forks, Top Clip Retaining Pin and Heel — Condition		
Load Backrest Extension — Attached		
Hydraulic Hoses, Mast Chains & Stops — Check Visually		
Finger Guards — Attached		
Overhead Guard — Attached		
Safety Labels — Attached (Refer to Parts Manual For Location)		
Internal Checks: Battery — Water/Electrolyte Level and Charge		
Hydraulic Tank Fluid Level — Dipstick		
Operator's Compartment: Operator's Manual in Case		
Capacity Plate Attached — Information matches model, serial number and attachments		
Battery Restraint System — Latched		
Accelerator Linkage — Operates Smoothly		
Brake Fluid — Check Level		
Controls (Turn Truck On) Unusual Noises Must Be Investigated Immediately: Parking Brake — Operates Correctly		
Service Brake — Operates Smoothly & Correctly		
Steering System — Operates Smoothly & Correctly		
Drive Control — Forward/Reverse -- Operates Correctly		
Lift and Lowering Control — Operates Smoothly & Correctly		
Tilt Control — Forward and Back--Operates Smoothly & Correctly		
Attachment Control -- Operate Smoothly & Correctly		
Horn — Operates		
Lights — Operate		
Gauges: Hour Meter — Operates		
Battery Discharge Indicator — Operates		
Instrument Monitors — Operate		

Form 944-6418-A Elec.

MAINTENANCE PROCEDURES
EVERY 8 HOURS OR DAILY

Do all safety and operational checks as shown in the MAINTENANCE SCHEDULE.

⚠ 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.

⚠ CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

HOW TO MAKE CHECKS WITH THE KEY OFF

Inspect the lift truck every eight hours or daily before use. Put the lift truck on a level surface. Lower the carriage and forks and turn the key to the OFF position. Apply the parking brake. Remove the floor plates and inspect for leaks and conditions that are not normal. Clean any oil spills. Make sure that lint, dust, paper and other materials are removed from the compartments.

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".

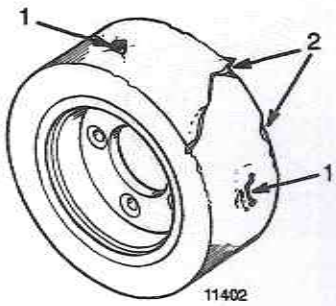
When air is added to the tires, use a remote air chuck. The person adding air must stand to the side of the safety cage and not in front of it.

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.

If the lift truck has pneumatic tires, keep the tires at the correct air pressure. See the Capacity Plate. 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.

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.

Tighten the castle nuts of the steer wheel spindles of these units to 68 Nm torque while rotating the wheel in each direction at EACH installation. Loosen the nuts 1/4 turn. Pull and push at top of wheel to check for movement (end play). If there is movement, tighten the castle nuts to 3 Nm torque. Install the cotter pins at the nearest alignment positions. Install the hub cap. Additional torque checks are not required.



1. CHECK FOR DAMAGE AND REMOVE NAILS, GLASS, METAL AND OTHER OBJECTS
2. MAKE EDGES SMOOTH

Figure 9. Check The Tires

⚠ CAUTION

Check all wheel nuts after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when the 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 350 hours.

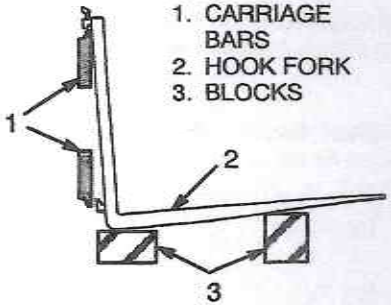


Figure 10. Remove A Hook Fork

Forks

The identification of a fork is determined by how it is connected to the carriage. These lift trucks have hook forks.

Fork Adjustment (See Figure 11.)

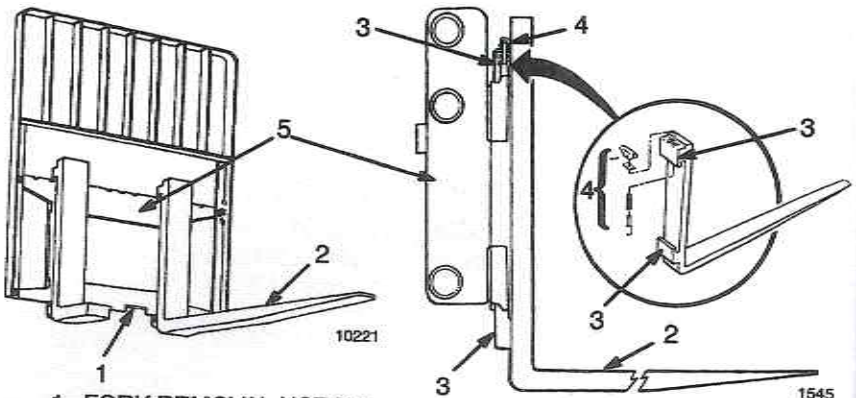
Hook forks are connected to the carriage by hooks and lock pins. See Figure 11. These lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Adjust the forks as far apart as possible for maximum support of the load. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure the lock pin is engaged in the carriage bar to lock the fork in position after making adjustments.

Fork Removal (See Figure 10.)

⚠ WARNING

Do not try to lift a fork without a lifting device. The forks can weigh up to 250 lbs each.

Slide a hook fork to the fork removal notch on the carriage. See Figure 11. Lower the fork onto blocks so that the bottom hook of the fork moves through the fork removal notch. 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.



1. FORK REMOVAL NOTCH
2. FORK
3. HOOK
4. LOCK PIN ASSEMBLY
5. CARRIAGE

Figure 11. Hook Fork

Fork Installation

Move the fork and carriage so that the top hook on the fork can engage the top 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 top carriage bar.

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

⚠ WARNING

NEVER work under a raised carriage or forks. Lower the carriage or 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.

Do not try to correct fork tip alignment by bending the forks or adding shims. Replace bent 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 nuts and bolts are tight.

2. Inspect the channel for excessive wear in the areas of roller contact. Check the rollers for wear or damage.

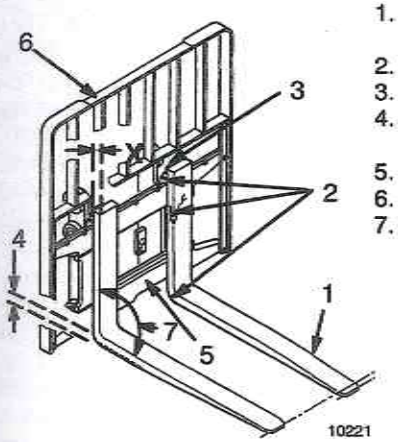
3. Inspect the load backrest extension for cracks and damage.

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).

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

6. Inspect the lift chains for the correct lubrication. Use engine oil.

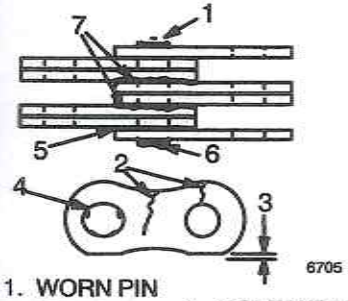
7. Inspect the lift chains for cracks or broken links and pins. See Figure 13.



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°

FORK TIP ALIGNMENT	
LENGTH OF FORKS	3% DIMENSION
36 inches	1.10 inch
48 inches	1.45 inch
72 inches	2.15 inch

Figure 12. Check The Forks



1. WORN PIN
2. CRACKS
3. EDGE WEAR (MAXIMUM 5% OF NEW)
4. HOLE WEAR
5. LOOSE LEAVES
6. DAMAGED PIN
7. CORROSION

Figure 13. Check The Lift Chains

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

9. Make sure the lift chains are adjusted so that they have equal tension. If the chains need repair or adjustment, it must be done by authorized personnel.

Safety Labels

⚠ WARNING

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.

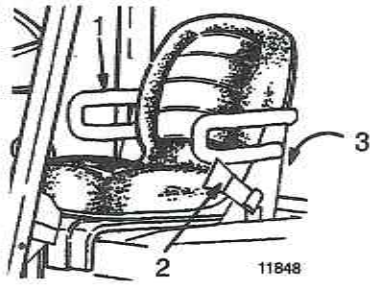
Check that all safety labels are installed in the correct locations on the lift truck. See the **PARTS MANUAL** or the lift truck. See the **PARTS MANUAL** or the **GENERAL LIFT TRUCK MAINTENANCE AND LUBRICATION SCHEDULE** section of the **MAINTENANCE MANUAL** for the correct locations of the safety labels.

Operator Restraint System (See Figure 14. and Figure 15.)

There is an indicator light on the display panel for the seat belt. The red light is ON as described in the MODEL DESCRIPTION section of this manual. The light can help the operator remember to fasten the seat belt.

The seat belt, hip restraint brackets, seat and mounting are the parts of the operator restraint system. The hood latch is also part of the operator and battery restraint system. Each item must be checked to make sure it is attached securely, functions correctly and is in good condition.

The seat belt must latch securely. Make sure the seat belt extends and retracts smoothly and is not damaged nor torn. If the seat belt can not be pulled from the belt housing, the seat belt must be replaced. Keep the belt straight so that it pulls out and retracts smoothly.



1. HIP RESTRAINT BRACKETS
2. SEAT BELT
3. HOOD LATCH (REAR CENTER OF HOOD)

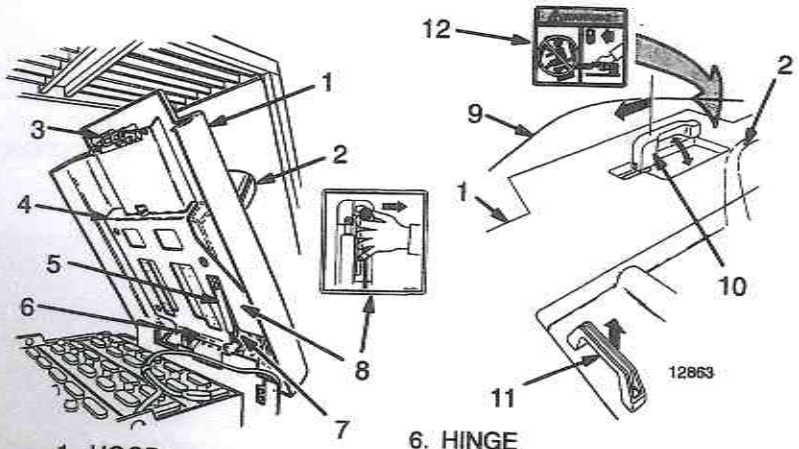
Figure 14. Operator Restraint System

Make sure the seat rails are not loose. The seat rails must lock securely in position, but move freely when unlocked. The seat rails must be securely attached to the mounting surface.

Battery Restraint System (See Figure 15.)

The battery restraint and hood frame is a heavy steel weldment that has a hinge at the front of the battery compartment. An adjustable spacer plate is used inside the battery compartment to prevent forward and backward movement of the battery. Side spacers prevent side-to-side movement. Maximum movement allowed is 0.5 inch in any horizontal direction.

If necessary, adjust the front and side spacer plates for the battery as shown in Figure 20.



1. HOOD
2. SEAT
3. LATCH ASSEMBLY
4. BATTERY RESTRAINT & HOOD FRAME
5. GAS SPRING
6. HINGE
7. STOP ROD
8. RELEASE LABEL FOR STOP ROD
9. COUNTERWEIGHT
10. LATCH HANDLE
11. LIFT HANDLE
21. LATCH WARNING LABEL

Figure 15. Battery Restraint

The hood must be locked in the down position during operation. The battery must have the front spacer plate and side spacers correctly adjusted to prevent any horizontal movement of more than 0.5 in. If the unit has a seat brake, raise the seat and seat plate assembly. Use the latch handle at the rear of the hood to release the hood frame and moves the handle back to the left. Use the lift handle by the seat to raise the hood. A gas spring and stop rod will hold the assembly in the up position. Make sure that the battery can not move more than a total of 0.5 inch in any one horizontal direction. Release the stop rod by moving it to the right before lowering hood. See the label in Figure 15. Make sure the latch handle is fully to the right when closing the hood so that the latch can engage the latch piece. Make sure the hood is locked securely. Try to raise the hood using only the lift handle to make sure the hood is latched and will not move.

⚠ WARNING

The hood and battery restraint with its latch mechanisms must operate correctly before a lift truck is operated.

Battery

Make sure that the voltage and the weight of the battery are correct as shown on the Capacity Plate. See BATTERY SPECIFICATIONS at the rear of this manual to check for correct battery dimensions.

⚠ WARNING

The acid in the electrolyte can cause injury. If electrolyte is spilled, use water to flush the area. Make the acid neutral with a solution of sodium bicarbonate (soda). Acid in the eyes must be flushed with water immediately.

⚠ CAUTION

Disposal of batteries must meet local environmental regulations.

Keep the battery case, top cover and the area for the battery clean and painted. Leakage from the battery and corrosion can cause a malfunction in the electric controls of the lift truck. Use a water and sodium bicarbonate (soda) solution to clean the battery and the battery area. Keep the top of the battery clean, dry and free of corrosion.
Make sure the battery is charged and has the correct voltage and ampere hour rating for the lift truck. See the Capacity Plate.

Inspect the battery case, connector and cables for damage, cracks or breaks. See the battery dealer in the area to repair any damage.

⚠ WARNING

Never put tools or other metal on the battery. Metal on the battery can cause a short circuit and possible damage or injury.

Batteries generate explosive fumes. Keep the vents in the caps clean. Keep sparks or open flames away from the battery area. Do not make a spark from the battery connections.

Disconnect the battery when doing maintenance.

Some batteries are sealed. These batteries do not need checking or filling. On batteries that are not sealed, check the level of the electrolyte and add distilled water if necessary. The electrolyte level must be maintained at the level recommended by the battery manufacturer. Some water loss in the battery cells is normal. Always add water after a charge.

Hydraulic System (See Figure 16.)

⚠ WARNING

At operating temperature the hydraulic oil is HOT. Do not permit the oil to contact 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 pump without oil in the hydraulic system. The operation of the hydraulic pump without oil will damage the pump.

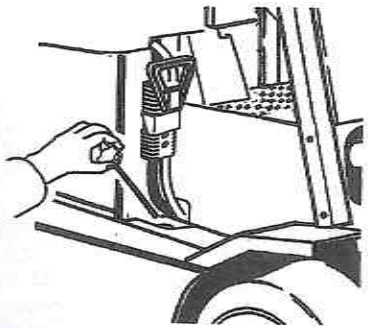


Figure 16. Checking Hydraulic Oil

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered and the key is in the **OFF** position. The fill/dipstick cap is under the floorboard at the left-hand side. 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.

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

HOW TO MAKE CHECKS WITH THE KEY ON

⚠ 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 the area around the lift truck is clear before moving the lift truck. Be careful when making the checks. Proceed carefully.

Gauges, Horn And Fuses (See MODEL DESCRIPTION Section)

1. Check the operation of the gauges and horn. The horn can operate when the key is in any position. On both the standard and premium panels, the hourmeters record the hours during operation. The hours are displayed on the LCD screen of the display panel as described in the MODEL DESCRIPTION section of this manual.

2. The battery indicator will operate as described in the MODEL DESCRIPTION section of this manual.

3. All fuses are located in the electrical compartment.

Steering System (See MODEL DESCRIPTION Section)

⚠ WARNING

Because the lift truck has hydraulic power steering, the steering can be difficult when the power steering pump is not operating.

Make sure that the steering system operates smoothly and gives good steering control.

Service Brakes (See MODEL DESCRIPTION Section)

There is an indicator light on the display panel for the brake fluid level. The red light is ON as described in the MODEL DESCRIPTION section of this manual. If the light is ON during operation, the fluid in the reservoir for the brake master cylinder is too low. Add brake fluid and check for leaks. The reservoir is under the brake pedal and floor plate. Clean the area around the fill cap so that no dirt enters the reservoir.

Check the operation of the service brakes. Push on the brake pedal. The brakes must be applied before the pedal reaches the floor plate. The brake pedal must stop firmly and must not move slowly down after the brakes are applied. The brakes must apply equally to both drive wheels with no noticeable pull to either side. The service brakes are automatically adjusted as the brakes are applied when the lift truck changes directions.

NOTE: Some lift trucks are used in operations where the automatic adjusters can be slow to adjust the brake shoes. If the brakes need adjustment, operate the lift truck in forward and reverse 10 times. Apply the brake pedal firmly, but do not cause the wheels to slide. If the automatic adjusters do not adjust the brake shoes, a qualified service person must check the operation and condition of the 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.

Parking Brake (See MODEL DESCRIPTION Section)

There is an indicator light on the display panel for the parking brake. The red light is ON as described in the MODEL DESCRIPTION section of this manual. If the light is ON after approximately one second, the operator is not on the seat or the key is in the **OFF** position. An alarm will also make a noise. ALWAYS apply the parking brake when leaving the seat.

Make sure the service brakes operate correctly before checking the operation of the parking brake. Check the operation of the parking brake. The parking brake, when in good condition and correctly adjusted, will hold a lift truck with a capacity load on a 15% grade 1.5 ft rise in 10 ft. If necessary, adjust the parking brake by first making sure the lift truck cannot move (block wheels). Release the parking brake and remove the floor plates for access to the adjustment knob at the bottom of the pedal linkage. Turn the knob clockwise to increase the braking force.

Some lift trucks are equipped with an additional linkage that automatically actuates a separate brake when the operator leaves the seat (seat brake). When correctly adjusted, this brake will also hold the lift truck with a capacity load on a 15% grade. If the brake does not hold the lift truck on the grade, the seat brake must be adjusted by authorized service personnel according to the procedure in the **MAINTENANCE MANUAL**.

Control Levers And Pedals (See MODEL DESCRIPTION Section)

Check that the levers for the mast and attachment operate as described in CONTROLS AND DISPLAY PANELS of the MODEL DESCRIPTION section. The brake pedals are checked in the Service Brakes and Parking Brake paragraphs of this section when checking the brakes.

Lift System Operation (See MODEL DESCRIPTION Section)

⚠ WARNING

NEVER work under a raised carriage or forks. Lower the carriage or 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.

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

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

2. Slowly raise and lower the mast several times without a load. The mast components must raise and lower smoothly in the correct sequence. The carriage raises first, then the inner weldment and intermediate weldments (triplex masts only).

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

3. The inner and intermediate weldments and the carriage must lower completely.

4. Raise the forks three feet, with a capacity load. The inner weldment and carriage must raise smoothly. Lower the forks. All moving components must lower smoothly.

5. With the load lowered, tilt the mast backward and forward. 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.

HOW TO CHARGE THE BATTERY

⚠ WARNING

The acid in the electrolyte can cause injury. If electrolyte is spilled, use water to flush the area. Make the acid neutral with a solution of sodium bicarbonate (soda) and water. Acid in the eyes must be immediately flushed with water.

Batteries generate explosive fumes when they are being charged. Keep fire, sparks and burning material away from the battery charger area. Prevent sparks from the battery connectors.

Charge batteries only in the special area for charging batteries. When charging the batteries, keep the vent caps clean. The battery charger area must have ventilation so that explosive fumes are removed. Open the hood over the battery or remove the cover if the battery has a cover.

Disconnect the battery when doing cleaning and maintenance.

NOTE: The trucks can have one of two types of batteries. One type has removable cell caps. The other type has sealed cells and the electrolyte cannot be checked. **These sealed batteries also require a different charger.**

⚠ CAUTION

Never connect the battery charger plug to the plug of the lift truck. You can damage the traction control circuit. Make sure the charger voltage is the correct voltage for the battery.

Always make sure the color of the charger connector is the same as the color of the battery connector.

Correct use of the hydrometer (Figure 17.) and proper operation of the battery charger is important. Follow the instructions of the charger manufacturer. Never let the battery discharge below the minimum value given by the battery manufacturer. A fully charged battery will have a specific gravity of 1.265 to 1.310 at 77°F. See Figure 17. Never charge a battery at a rate that will raise the electrolyte temperature above 120°F.. Never let a battery stay discharged for long periods.

1. NORMAL CHARGE: This charge is normally given to a battery that is discharged from normal operation. Many customers charge the battery at regular intervals that depend on use. This procedure will keep the battery correctly charged if the battery is not discharged below the limit. Always use a hydrometer to check the battery if the battery is charged at regular intervals. Frequent charging of a battery that has a $^2/_3$ or more charge can decrease the life of the battery.

2. EQUALIZING CHARGE: This charge is at a low rate and balances the charge in all of the cells. The equalizing charge is normally given approximately once a month. It is a charge at a slow rate for three to six hours in addition to the regular charging cycle. Do not give an equalizing charge more than once a week. The most accurate specific gravity measurements for a charged battery will be after an equalizing charge. If the specific gravity difference is more than 0.020 between cells of the battery after an equalizing charge, there can be a defective cell. Consult your battery dealer.

NOTE: Many installations have battery chargers that can follow a program to automatically charge a battery according to recommendations of the battery manufacturer. Use the recommendations of the battery manufacturer for charging the battery.

SPECIFIC GRAVITY READING	ELECTRO-LYTE TEMP.	CORRECTION POINTS	CORRECT VALUE
1.210	31°C (87°F)	+0.003	1.213
1.210	27°C (80°F)	+0.001	1.211
1.210	25°C (77°F)	0.000	1.210
1.210	18°C (64°F)	-0.004	1.206

+0.001 or -0.001 for each 2 degrees C from the 25 degree base value.

Figure 17. Check Specific Gravity

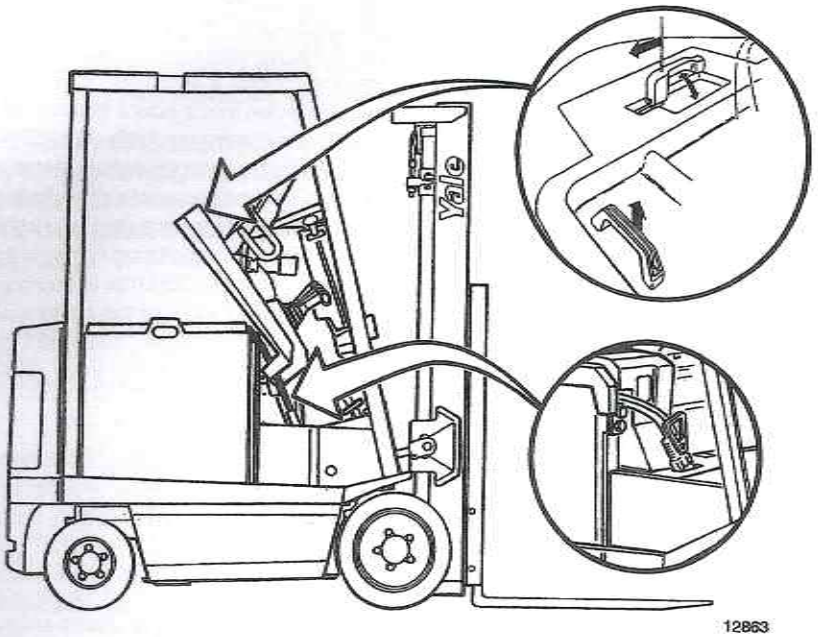


Figure 18. Open The Hood

HOW TO CHANGE THE BATTERY (See Figure 18. and Figure 19.)

⚠ WARNING

Batteries are heavy and can cause an injury. Use care to avoid injury. Do NOT put hands, arms, feet and or legs between the battery and a solid object.

Make sure the capacity of the crane and spreader bar is greater than the weight of the battery. The weight of the battery is normally shown on the battery case. The maximum battery weight is shown on the lift truck Capacity Plate. The spreader bar must NOT be made of metal or it must have insulated straps.

The replacement battery must fit the battery area correctly. Adjust the front spacer plates to prevent battery movement in the battery compartment.

Make sure that the battery voltage and weight of the replacement battery is correct as shown on the Capacity Plate.

Make sure the battery restraint is in the down position and locked before the lift truck is operated.

Before connecting the battery, make sure the key is in the OFF position and the parking brake is applied.

1. Disconnect the battery. Move the connector and cables so that they will not be damaged when the battery is moved. Tilt the steering column forward and make sure the detent engages to hold the steering column. Slide the seat to the rear adjustment position. Open the hood/battery restraint as shown in Figure 18. Tilt the hood/battery restraint and seat to the up position. Make sure the battery restraint is locked in the up position. If the hood has a side door, make sure it is open.

2. Use a spreader bar and crane to lift the battery from the lift truck. See Figure 19. When a replacement battery is installed, make sure the battery fits the battery compartment. The battery must have the front spacer plate and side spacers correctly adjusted to prevent any horizontal movement of more than 0.5 inch. There must be enough clearance for battery removal.

⚠ WARNING

Correct operation of the battery restraint system requires that the battery does not move more than 0.5 inch.

3. Make sure the front battery spacer plate and side spacers are correctly adjusted.

4. Lower the hood. Release the stop rod by moving it to the right before lowering hood. See the label Figure 18. Make sure the latch handle is fully to the right when closing the hood so that the latch can engage the latch piece. Make sure the hood is locked securely. Try to raise the hood using only the lift handle to make sure the hood is latched and will not move. If the hood has a side door, make sure it is closed.

5. Connect the battery connector.

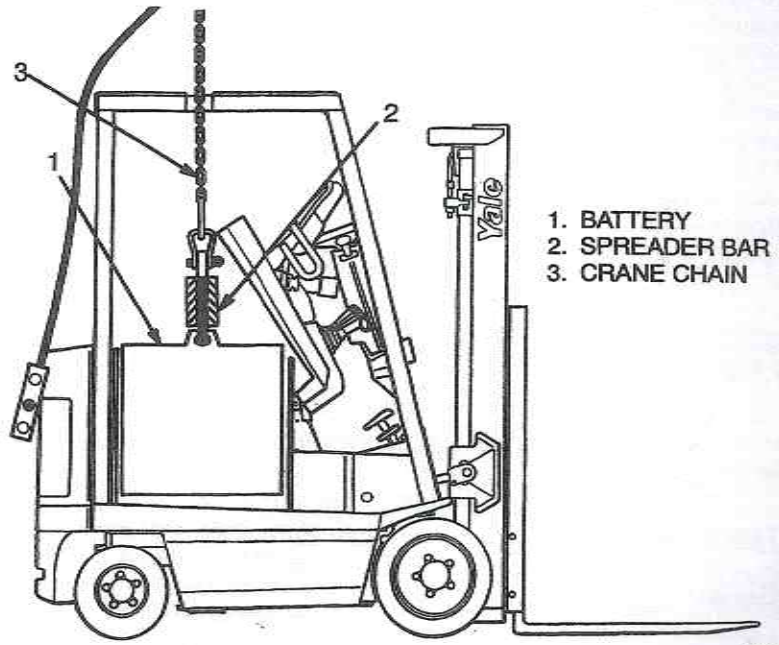
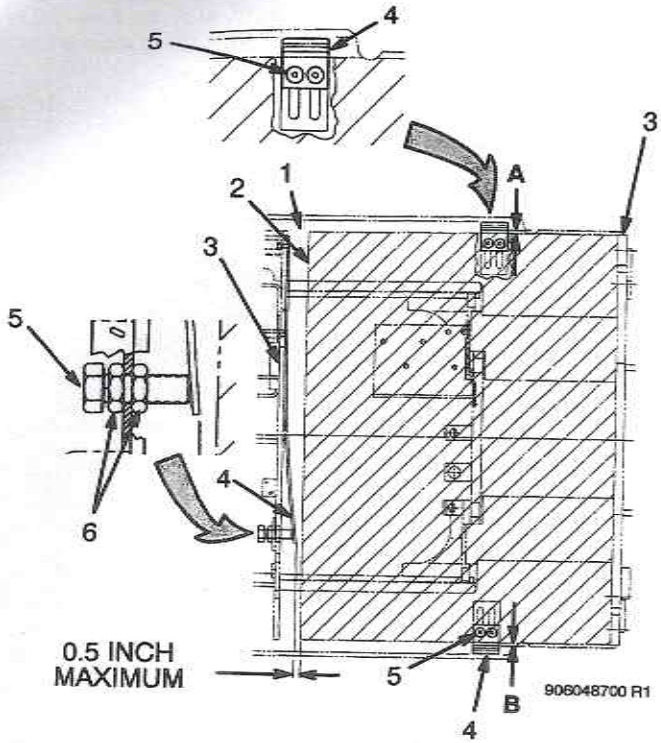


Figure 19. Change The Battery



A + B = 0.5 INCH MAXIMUM

1. BATTERY COMPARTMENT
2. BATTERY
3. BULKHEAD
4. SPACER PLATE
5. ADJUSTMENT CAPSCREW
6. JAM NUTS

Figure 20. Spacer Plates Of Battery Compartment

TIRES AND WHEELS

General

⚠ WARNING

The tire type is shown on the nameplate. Make sure the nameplate is correct for the type of tires on the lift truck.

These lift trucks have solid rubber or polyurethane tires. The tread on the tires can be smooth or have a tread pattern. Do not mix types of tires or tread on the lift truck.

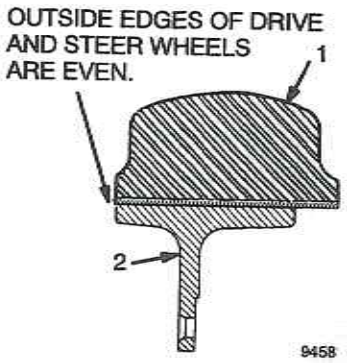
Remove The Wheels From The Lift Truck

⚠ WARNING

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

Always wear safety glasses.

1. Raise the lift truck as described in HOW TO PUT A LIFT TRUCK ON BLOCKS in this manual.



1. SOLID RUBBER TIRE
2. WHEEL

Figure 21. Tire And Wheel

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

Remove And Install The Tire From The Wheel

1. The correct tools, equipment and a press ring must be used for each size of wheel. Use a press to push the wheel from the rim and tire. The capacity of the press must be approximately 80,000 to 400,000 lb. For the tire sizes, see the nameplate

NOTE: Make sure the tires are installed on the wheels according to the dimensions shown in FIGURE 21. The two drive and two steer tires must be installed so the outside edges are the same. Also check the nameplate of the lift truck for the correct tire size and tread width.

⚠ 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 wheels have been removed and installed. Tighten the nuts in a cross pattern to the correct torque value shown in the MAINTENANCE SCHEDULE, TABLE 5. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 350 hours.

2. When the drive wheels are installed on the lift truck, tighten the wheel nuts to the value shown in the MAINTENANCE SCHEDULE.

3. The steering wheels are fastened to the spindle of the steering axle with a large castle nut. Make sure the inner and outer bearings are correctly lubricated with grease. Install the inner bearing assembly and wheel on the spindle. Install the outer bearing cone and castle nut. Tighten the castle nuts of the steer wheel spindles of these units to 50 lb_f ft torque while rotating the wheel in each direction at EACH installation. Loosen the nuts 1/4 turn. Pull and push at top of wheel to check for movement (end play). If there is movement, tighten the castle nuts to 2 lb_f ft torque. Install the cotter pins at the nearest alignment positions. Install the hub cap. Additional torque checks are not required.

HOW TO PUT AN ELECTRIC SIT DOWN RIDER TRUCK IN STORAGE

To prevent problems, the lift truck must be correctly serviced and maintained during storage.

Components that need extra care during storage are electric motors, hydraulic components and electric truck batteries.

Electric trucks can best be protected by being operated for a short period of time each month.

Before any lift truck is put in storage, you must choose an area which is clean, dry and free from dust or fumes in the air that can harm the lift truck.

Electric drive motors must be operated to keep them free of rust and dirt caused

by condensation over periods when the truck is not used. Operate the truck with the motor at its normal temperature for at least five minutes.

This operating period will also allow the Motor Controller to remove any moisture in the control area.

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

Before operating a truck each month, make a visual inspection for leaks or signs of wear or damage. Take care of any problems immediately. Also, check the fluid level in the hydraulic tank and brake master cylinder.

Electric trucks must not have batteries installed during storage. A fully charged battery must be available to operate the lift truck.

⚠ CAUTION

Do not use a battery charger as a power source for any reason, Refer to YALE Service News SE-819. This Bulletin can be obtained from your nearest authorized dealer for YALE lift trucks.

All hydraulic cylinders must be put through a complete operation cycle several times each month. This will help keep the seals active and coat the interior walls with oil. Operate each cylinder, to the stop in both directions.

To protect the tilt cylinder rods, park your truck with the mast tilted fully backward (cylinders fully retracted).

When parked with the power off, operate each control handle to release hydraulic pressure.

Masts are to be stored fully lowered.

Coat any exposed part of all cylinder rods with SAE 30 or SAE 40 engine oil.

Put blocks at the front and rear of a drive tire when parked – do not use the hand brake.

HOW TO PUT BATTERIES IN STORAGE

Batteries are to be placed on a wood pallet and put in storage in a dry, cool area.

Lead acid batteries will slowly "self-discharge" over a period of time due to their chemical properties. If the self-discharge is not controlled, to much sulfation can occur which is difficult to reduce and can damage the plates. A discharged battery with a specific gravity of 1.100 will freeze at 18° F. A fully charged battery with a specific gravity of 1.280 will freeze at -87° F.

This "self-discharge" is due to chemical action; therefore, that chemical action can be accelerated by heat resulting in a more rapid "self-discharge". The rate of discharge can be an average of about 0.001 point drop in specific gravity each day.

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

1. Give equalizing charge before placing new batteries in storage. Used batteries must be fully charged and allowed to balance for approximately three more hours.

2. Neutralize and clean the battery. Clean with a solution of 16 ounces of baking soda in one (1) gallon of water.

3. Put the battery in a cool, dry location for storage.

4. Check each cell in the battery at least once every 30 days (batteries with cell caps only). Give an additional charge when specific gravity falls below 1.240.

5. Protect batteries from getting dirty.

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

Battery chargers must be disconnected from the AC power source when not in use.

When a truck is to be placed in service, it must be given the 350 hour checks shown in the Recommended Schedule of Maintenance found in this manual.

HOW TO MOVE A DISABLED LIFT TRUCK

⚠ WARNING

Use extra care when towing a lift truck if there is a problem with any of the following:

a. Brakes do not operate correctly.

b. Steering does not operate correctly.

c. Tires are damaged.

d. Traction conditions are bad.

e. The lift truck must be moved on a steep grade.

If the steering pump motor does not operate, steering control of the lift truck can be slow. This can make the control of the lift truck difficult. If there is no electrical power, there is no power steering. DO NOT tow the lift truck if there is no power. Poor traction can cause the disabled lift truck or towing vehicle to slide. Steep grades will require additional brake force to stop the lift truck.

Never carry a disabled lift truck unless the lift truck MUST be moved and cannot be towed. The lift truck used to carry the disabled lift truck MUST have a rated capacity equal to or greater than the weight of the disabled lift truck. The capacity must be for a load center equal to half the width of the disabled lift truck. See the Capacity Plate of the disabled lift truck for the approximate total weight. The forks must extend the full width of the disabled lift truck. Center the weight of the disabled lift truck on the forks and be careful not to damage the under side of the lift truck.

How To Tow The Lift Truck

1. The towed lift truck must have an operator.

2. Release the parking brake tow the lift truck slowly.

3. Raise the carriage and forks approximately 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 an approximate half-capacity load on the forks of the lift truck that is being used to tow the disabled lift truck. This half-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 attaches to the tow pins in the counterweights of both lift trucks.

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 or drilling. Welding, or drilling holes that are too big in the wrong location, can reduce the strength of the overhead guard. See your dealer for Hyster lift trucks before making any changes to the overhead guard.

SUPPORT INFORMATION

Your new YALE Industrial Truck is important to you and to your dealer for YALE lift trucks. You measure the return on your truck through the performance of those trucks, the drivers who operate them and the mechanics who service them safely and efficiently. The following information and programs are made to help fill your needs:

How To Order Service Parts

In order to prevent delay, too much communication and to have your orders filled correctly, quickly and at the least possible cost, the following is the correct procedure to use to order replacement parts.

When You Order Parts

Contact your authorized dealer for YALE Industrial Trucks and provide the following information:

1. Your Purchase Order number.

2. Complete addresses for sending the invoice and parts.

3. Tell us how you want your parts sent. If we do not get this information, we will send the parts using the lowest priced method.

4. Correct part number(s) and description(s). Use your Parts Manual as a reference.

5. Model and serial number of the truck.

Technical Service Publications

To help you maintain your YALE Industrial Trucks in a useful condition, additional Service literature with more detailed information is available. Included are **PARTS MANUALS** with complete replacement parts identification and **MAINTENANCE MANUALS** which give proper service and overhaul procedures. Additional copies of this Operator's Manual can also be obtained from your dealer for YALE lift truck .

Operator Training

Your dealer for YALE lift trucks offers a complete operator training program to help industrial truck users increase their materials handling production and safety through correct lift truck operation, training and motivation. The YALE program is based upon real life experience - not theoretical concepts. We developed a "complete" program that is totally self-contained - incorporating the most modern instructional techniques, including elements of self-study, audio-visual support (both video and slides), and classroom study. Contact your dealer for YALE lift trucks for more information.

Service Training Courses

Service technicians can improve their technical ability for maintaining and repairing YALE Industrial Trucks and decrease repair time and cost by taking the YALE Service Training courses. Different types of mechanical, electric and electronic subjects are available. Courses are available at customer and dealer locations in addition to regularly scheduled courses. Contact your dealer for YALE lift trucks for more information.

Service Training Materials

Your own service training is supported through a complete line of YALE Service Training materials.

For additional information or help in getting these operator support publications and programs, see your dealer for YALE lift trucks or contact the following:

Yale Materials Handling Corporation
1400 Sullivan Drive
Caller No. 12011
Greenville, NC 27834-2011