

# OPERATING MANUAL

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**SitDrive®**

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**J40-65Z (A416)  
E25-35Z and E40ZS (E114)  
E45-65Z (G108)**



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**DO NOT REMOVE THIS MANUAL FROM THIS UNIT**

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PART NO. 1534729

2/10

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LIFT TRUCK MODEL \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

TRACTION MOTOR \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

HYDRAULIC PUMP MOTOR \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

STEERING PUMP MOTOR \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

MAST LIFT HEIGHT \_\_\_\_\_

GROUP NUMBER \_\_\_\_\_


CARRIAGE TYPE \_\_\_\_\_

GROUP NUMBER \_\_\_\_\_

DRIVE TIRE SIZE \_\_\_\_\_

STEERING TIRE SIZE \_\_\_\_\_

## SPECIAL EQUIPMENT OR ATTACHMENTS

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**HYSTER**

Foreword

## 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, pursuant to OSHA 1910.178(l) dated 12/98, 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 properly understand the warnings, instructions, 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 (OSHA) (USA)
- Canada Material Handling Regulations

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

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

Some of the components and systems described in this **Operating Manual** will NOT be installed on your unit. If you have a question about any item described, contact your dealer for Hyster 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: Industrial Truck Standards Development Foundation, ANSI/ITSDF B56.1 *Safety Standard for Low Lift and High Lift Trucks*).
- Publications from government; safety agencies, government insurers, private insurers, and private organizations (Example: *Accident Prevention Manual For Industrial Operations*, from the National Safety Council).
- *Guide for Users of Industrial Lift Trucks* (Hyster Part No. 952930) describes lift truck safety, good maintenance practices, and training programs and is available from your dealer for Hyster lift trucks.

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

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

 **WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury and property damage.

On the lift truck, the **WARNING** symbol and word are on orange background. The **CAUTION** symbol and word are on yellow background.

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 **WARNING**

**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!  
 AUTHORIZED, TRAINED OPERATOR ONLY!**

The following **WARNING** is a label and must be on the lift truck.

**KNOW THE EQUIPMENT:**

- **KNOW** operating, inspection, and maintenance instructions in **Operating 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. Always use **Hyster Approved** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- **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** lift swing area is clear before turning.
- **SOUND** horn at intersections or whenever vision is blocked.
- **WATCH** clearances, especially overhead.

**KNOW YOUR LOADS:**

- **HANDLE** only stable loads within specified weight and load center. See Nameplate 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.

## WARNING

**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!  
AUTHORIZED, TRAINED OPERATOR ONLY!**

### KNOW THE AREA:

- CHECK dockboard width, capacity, and security.
- NEVER enter a trailer or railroad car unless the 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.
- 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, and set brake.
- WHEN PARKING, also shut off power, close LPG fuel valve, block wheels on inclines.

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## WARNING

**FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH!  
AUTHORIZED, TRAINED OPERATOR ONLY!**

### PROTECT YOURSELF, FASTEN YOUR SEAT BELT!

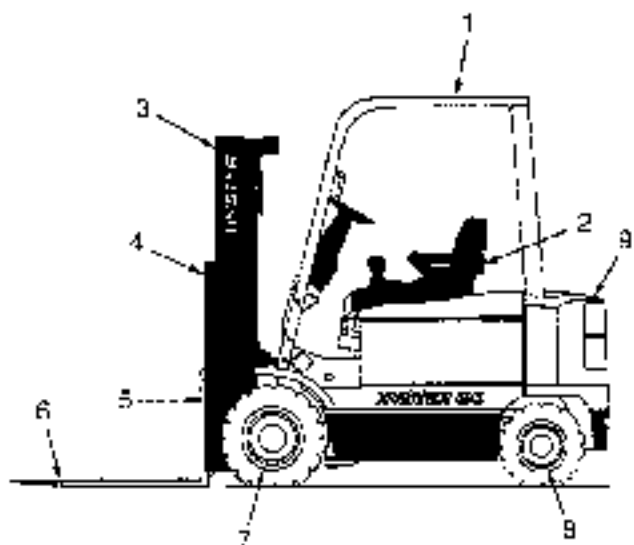
- AVOID bumps, holes, loose materials, and slippery areas.
- AVOID sudden movements. Operate all controls smoothly.
- NEVER turn on, or angle across an incline. Travel slowly.
- TRAVEL on inclines with load uphill or unloaded with mast downhill.
- TILT mast slowly and smoothly.
- LIFT or LOWER with mast 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 LIFT TRUCK TO TIP OVER!

**DO NOT JUMP off if the truck tips! HOLD steering wheel firmly. BRACE your feet. LEAN FORWARD and AWAY from point of impact.**

- 1 OVERHEAD GUARD
- 2 SEAT BELT AND H.P. RESTRAINT BRACKET
- 3 MAST
- 4 LOAD BACKREST EXTENSION
- 5 CARRIAGE
- 6 FORKS
- 7 DRIVE AXLE AND WHEELS
- 8 STEERING AXLE AND WHEELS
- 9 COUNTERWEIGHT

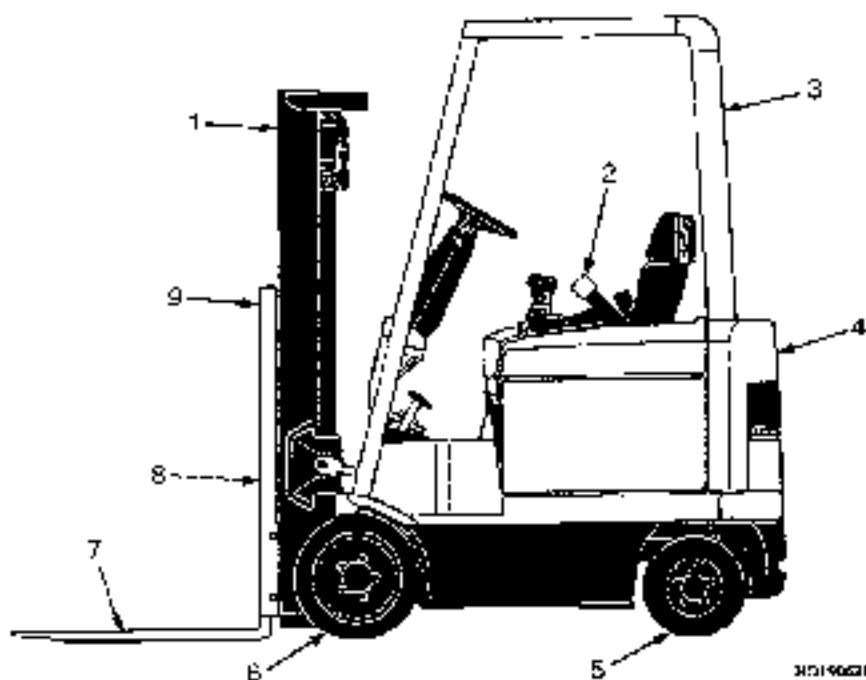


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Figure 1. Model View Showing Major Components for J40-60Z (A416)

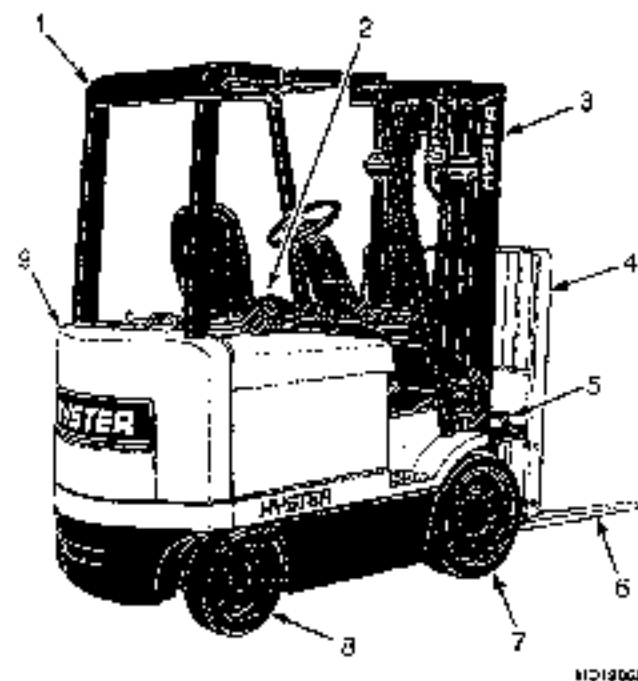
10

1. MAST
2. SEAT BELT
3. OVERHEAD GUARD
4. COUNTERWEIGHT
5. STEERING AXLE AND WHEELS
6. DRIVE AXLE AND WHEELS
7. FORKS
8. CARRIAGE
9. LOAD BACKREST EXTENSION



310160218

Figure 2. Model View Showing Major Components for E25-35Z and E40ZS (E114)



1. OVERHEAD GUARD
2. SEAT BELT
3. MAST
4. LOAD BACKREST EXTENSION
5. CARRIAGE
6. FORKS
7. DRIVE AXLE AND WHEELS
8. STEERING AXLE AND WHEELS
9. COUNTERWEIGHT

Figure 3. Model View Showing Major Components for E45-65Z (G108)

## Model Description

### General

This series of SilDrive® electric lift trucks is available in the following models:

**J40Z, J50Z, J60Z, and J65Z (A416)**

**E25Z, E30Z, E35Z, and E40ZS (E114)**

**E45Z, E50Z, E55Z, E60Z, and E65Z (G108)**

The "J" series of lift trucks are equipped with pneumatic tires or solid rubber tires that look like pneumatic tires.

The "E" series of 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, the power steering pump motor, and the control panel and instruments.

These models all use AC motor and control technology for the traction system. The hydraulic pump motor can be a DC motor controlled by a contactor, or an AC motor controlled by an AC motor controller. The steering motor is a DC brushless motor.

The electric lift trucks described in this manual have regenerative braking. This is in addition to the regular service brakes at the drive wheels. Regenerative braking allows the operator to change the direction of travel, without applying the service brakes. When a new direction of travel is selected, regenerative braking uses the motor to stop the lift truck before traveling in new direction.

A brake pedal actuates the hydraulic service brakes at the drive wheels. A foot-operated parking brake also actuates the same brakes. 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 can be controlled by a direction control lever mounted on the steering column or by a MONOTROL® pedal. When a direction control lever is installed, the lift truck has an accelerator pedal for speed control. If the lift truck has a MONOTROL® pedal, the pedal controls both direction and speed.



The E45-E65Z lift trucks can be equipped with either stand-arc manual hydraulic levers (see Figure 6) or Electro-Hydraulic (E-Hydraulic) levers which consists of either mini-levers or a joystick (see Figure 7).

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 which prevents the operator from lifting loads, when battery power is low and saves enough battery power for operator to move lift truck to a battery recharger. 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 line(s) are shown on the (LCD) screen. See Figure 1, Figure 2, or Figure 3.

### Operator Protection Equipment

The OVERHEAD GUARD (see Figure 1) 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.

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## **HYSTER**

a truck tipover. An adjustable battery spacer plate prevents the front-to-back movement of the battery. Batteries for this series of lift trucks must all have the same length dimension to just fit the battery compartment width. For correct battery sizes, see **Battery Specifications**, at the rear of this manual.

The SEAT BELT and HIP RESTRAINT BRACKETS 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 cannot 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 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 backward. If a load backrest extension that is different from the one installed on your truck is required, contact your dealer for Hyster lift trucks.

The BATTERY RESTRAINT is designed to hold the battery within the battery compartment if a tipover occurs. The "J" series of lift trucks have a restraint rod fastened in the bulkhead of the battery compartment. The assembly for the hydraulic control levers holds the hood in the closed position. On lift trucks equipped with manual hydraulic control levers, the assembly for the hydraulic control levers holds the hood in the closed position. The hood can be raised for battery access. Gas springs help raise and hold the hood in the up position. A lever fastened to the restraint rod will retract the restraint rod for battery removal and prevent closing the hood if the restraint rod is not correctly engaged.

The "E" series lift trucks have a steel plate (hood frame) under the hood that is connected to the truck frame with hinges. A gas spring helps raise the hood. A stop rod holds the hood in the up position. A latch locks the hood assembly in the down position.

The battery restraint system must function so that the operator restraint system can operate correctly. Operation of the battery restraint system requires that the maximum movement allowed for the battery is 13 mm (0.5 in.) in any horizontal direction. This will reduce the risk of operator injury in

## Model Description

### Nameplate

#### WARNING

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

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

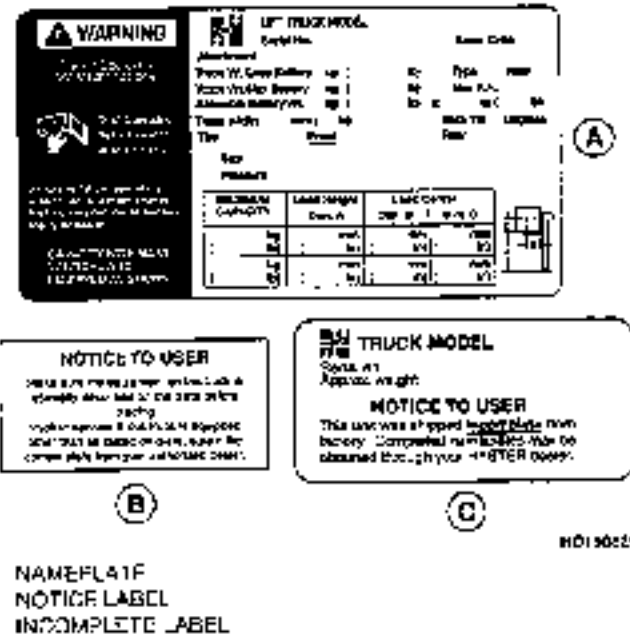
The maximum capacity for the lift truck, at full load height, must be shown on the Nameplate. Special capacities with the load height reduced or with optional load centers, may also be shown on the Nameplate.

The lift truck serial number code is on the Nameplate. The serial number code is also stamped on the right side of the rear bulkhead (battery compartment) on the top edge or on the front face near the top.

When a lift truck is shipped incomplete from the factory, the Nameplate is covered by the labels as shown in Figure 4. If your lift truck has this type of label, do not operate the lift truck. Contact your dealer for Hyster lift trucks to obtain a complete correct Nameplate.

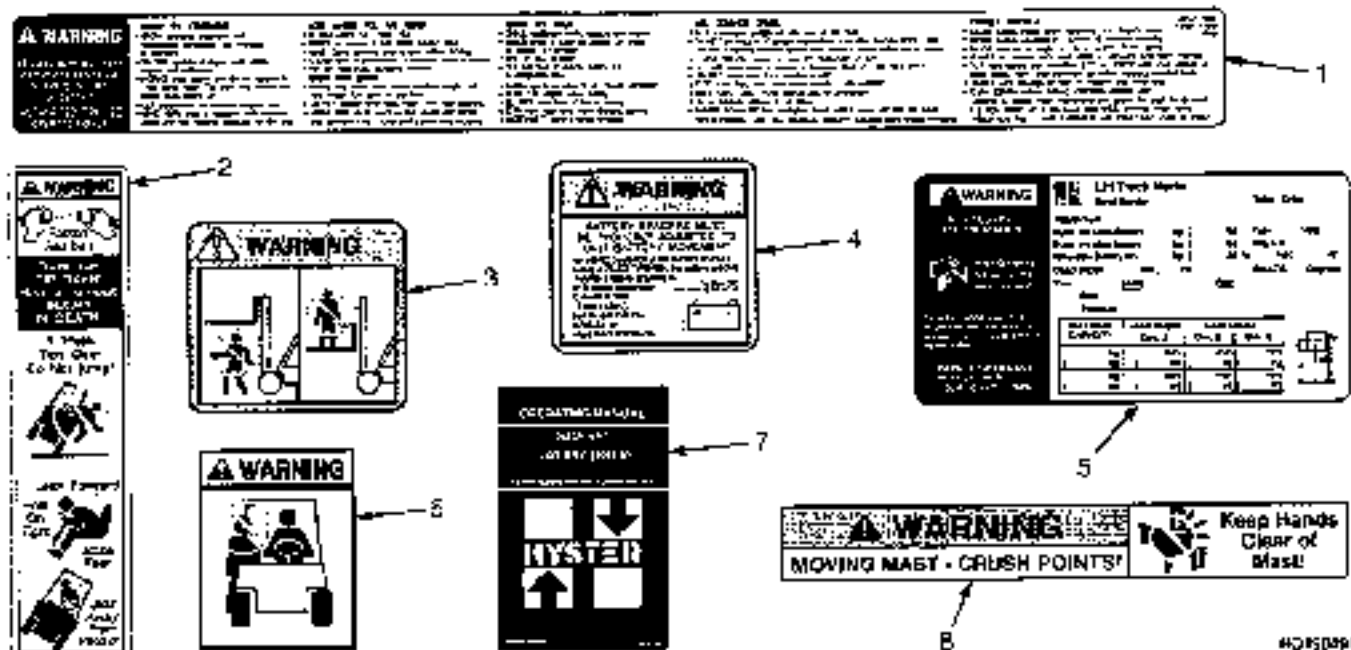
**Safety Labels**

Safety labels are installed on the lift truck to give information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read. See Figure 5.



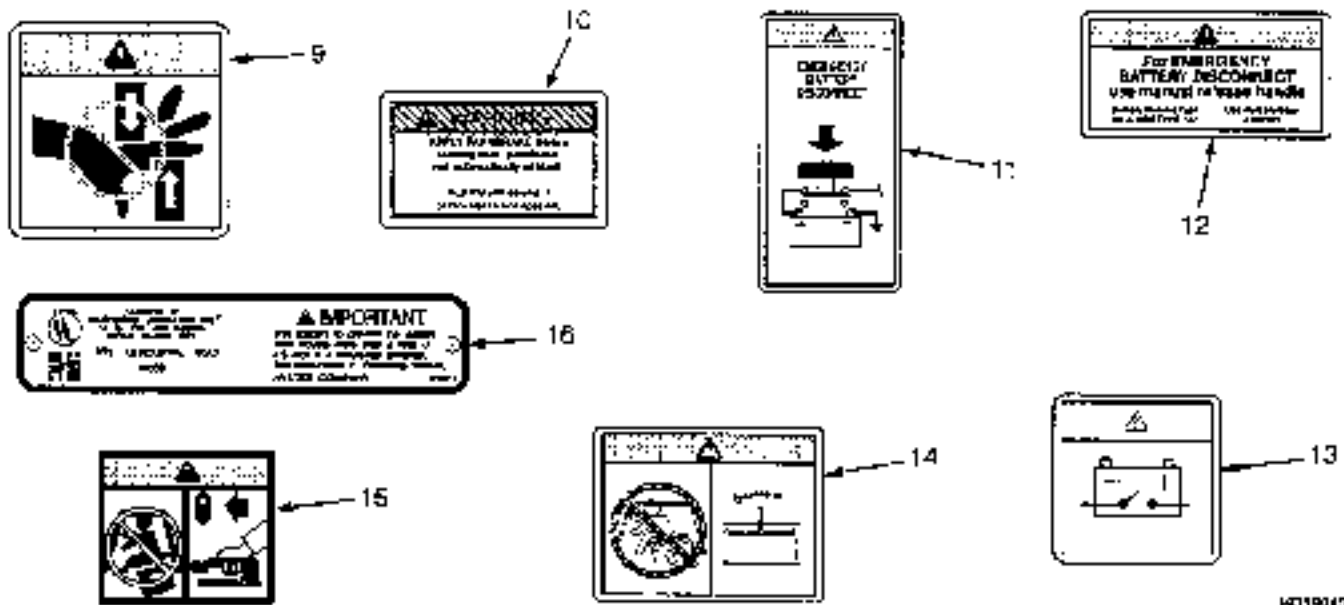
- A. NAMEPLATE
- B. NOTICE LABEL
- C. INCOMPLETE LABEL

Figure 4. Nameplate and Label



REFER TO PARTS MANUAL FOR PART NUMBER AND LOCATION.

Figure 5. Warning and Safety Labels (Sheet 1 of 2)



REFER TO PARTS MANUAL FOR PART NUMBER AND LOCATION.

Figure 5. Warning and Safety Labels (Sheet 2 of 2)

Legend for Figure 5

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. WARNING LABEL - OPERATION</li> <li>2. TIPOVER WARNING LABEL</li> <li>3. NO ONE ON OR UNDER THE FORKS</li> <li>4. BATTERY SPACER WARNING</li> <li>5. NAMEPLATE</li> <li>6. NO RIDERS</li> <li>7. CASE WITH OPERATING MANUAL</li> <li>8. PINCH POINT (MAST)</li> </ul> | <ul style="list-style-type: none"> <li>9. PINCH POINT (COWL AND SEAT)</li> <li>10. APPLY PARKING BRAKE WARNING (WITHOUT SEAT BRAKE)</li> <li>11. EMERGENCY DISCONNECT (J* TRUCKS)</li> <li>12. EMERGENCY DISCONNECT (E* TRUCKS)</li> <li>13. BATTERY DISCONNECT</li> <li>14. BATTERY RESTRAINT WARNING (J* TRUCKS)</li> <li>15. BATTERY RESTRAINT WARNING (E* TRUCKS)</li> <li>16. UL INSPECTION PLATE</li> </ul> |
|--|---|

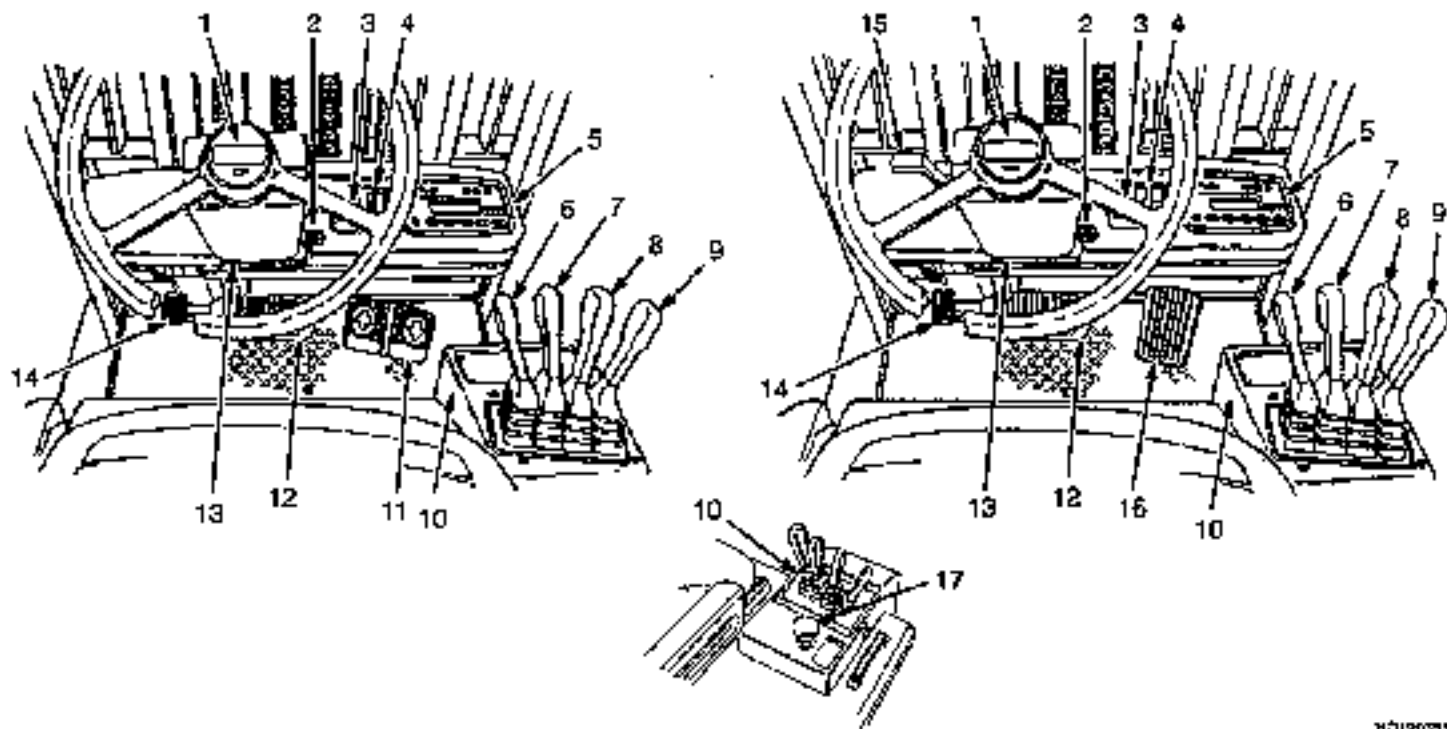
**Instrument and Controls**

(See Figure 6, Figure 7, and Table 1)

**WARNING**

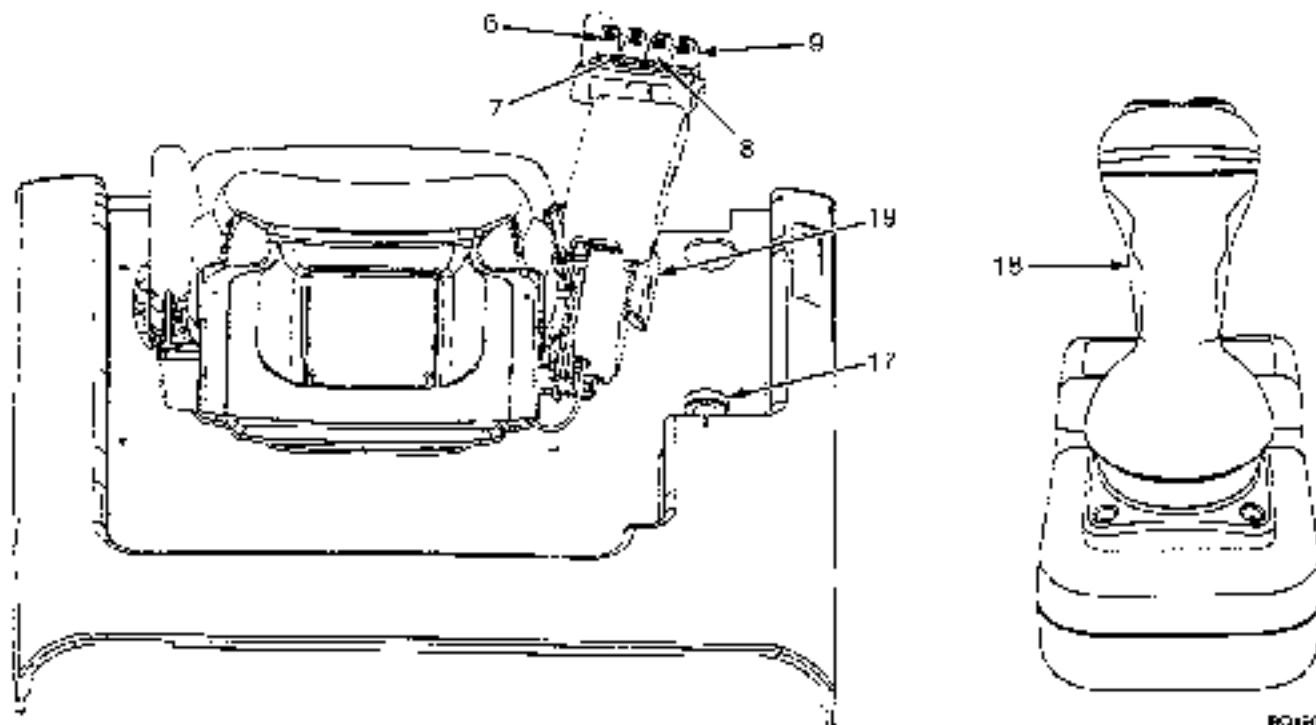
If any of the instruments, levers, or pedals do not operate as described in the following table, report the problem

immediately. **DO NOT** operate the vehicle until the problem is corrected.



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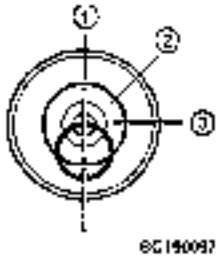
Figure 6. Instruments and Controls - Manual Hydraulic Controls



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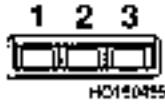


Figure 7. Instruments and Controls - Electro-Hydraulic Controls E45-E65Z (G108) Lift Trucks Only

Table 1. Instruments and Controls (See Figure 6 and Figure 7)

Item No.	Item	Function
1	Horn Button 	Push the horn button to warn pedestrians and others when approaching intersections and other blind areas.
2	Key Switch: 	<p>The key switch has three positions:</p> <p>No. 1 Position: <b>OFF</b> position. De-energizes all electric circuits except for the horn.</p> <p>No. 2 Position: <b>ON</b> position. Energizes all electric circuits. The key switch will be in this position during normal operation.</p> <p>No. 3 Position: <b>START</b> position. <b>NOT USED.</b> However, if the key is moved to this position, a spring returns the key to position No. 2 (<b>ON</b> position) when the key is released.</p> <p><b>NOTE:</b> There is a mechanical lockout that prevents the key switch from being returned to the <b>START</b> position without first being returned to the <b>OFF</b> position.</p>
3	Steering Wheel	The steering wheel controls the movement of the steer wheels. Rotate the steering wheel clockwise for a right turn and counterclockwise for a left turn.

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Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
4	Light Switches 	There is a rocker switch for each of the following light functions: (1) Front Driving/Brake/Reverse/Parking lights, (2) Rear Driving light and the Strobe light or sometimes Strobe light only, (3) Operator Compartment light or sometimes Strobe light only. All of these lights are not on every unit.
5	Standard or Premium Display Panel: 	<p><b>NOTE:</b> Both the Standard and Premium display panels look the same. The difference is in the software programs used by each display panel. A description of these functions is found in the section <b>Display Panel Features</b> in this manual.</p> <p>See <b>Display Panel Features</b> of this section, and Figure 9, Table 3, and Table 4 for information on the Standard and Premium Display Panels.</p>
6	Lift/Lower Control Lever 	<p><b>NOTE:</b> On lift truck models E45-65Z, manual hydraulic control levers are standard (see Figure 5). Two optional E-Hydraulic controls are available for the hydraulic functions: electronic hydraulic mini-levers (see Figure 7) or a joystick (see Figure 8 and Table 2).</p> <p><b>NOTE:</b> On lift truck models F45-65Z, to operate the mini-levers, the operator must be on the seat and the armrest must be in the down position.</p> <p>The lift/lower control lever can be either the first manual lever or first mini-lever to the right of the operator's seat. Pull backward toward operator to raise the carriage and forks. Push forward to lower the carriage and forks.</p>

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Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)


Item No.	Item	Function
7	Tilt Control Lever 	<p><b>NOTE:</b> On lift truck models E45-65Z, manual hydraulic control levers are standard (see Figure 6). Two optional E-Hydraulic controls are available for the hydraulic functions: electronic hydraulic mini-levers (see Figure 7) or a joystick (see Figure 8 and Table 2).</p> <p><b>NOTE:</b> On lift truck models E45-65Z, to operate the mini-levers, the operator must be positioned in the seat and the armrest must be in the down position.</p> <p>The tilt control lever can be either the second manual lever or second mini-lever to the right of the operator's seat. Push the lever forward to tilt the mast and forks forward. Pull the lever backward toward operator to tilt the mast and forks backward.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

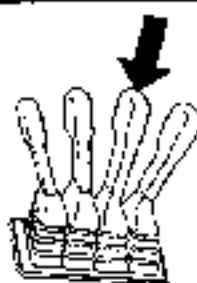
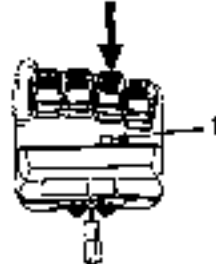

Item No.	Item	Function
8	Manual Control Lever for Auxiliary Hydraulic Functions (3rd Lever) 	<p><b>WARNING</b> A manual control lever with a detent must be installed when an attachment with a clamp is installed. See your dealer for Hyster lift trucks to get the correct control lever.</p> <p><b>NOTE:</b> On lift truck models E45-65Z, manual hydraulic control levers are standard (see Figure 6). Two optional E-Hydraulic controls are available for the hydraulic functions: electronic hydraulic mini-levers (see Figure 7) or a joystick (see Figure 8 and Table 2).</p> <p>The third manual control lever is installed to the right of the manual tilt control lever. This lever can have two methods of operation, depending on the attachment.</p> <p><b>NOTE:</b> If truck is equipped with only three levers and clamp attachment, the last (3rd) lever controls clamp functions.</p> <p><b>Control Lever with a Detent - Attachments with a clamp action:</b> The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and back.</p> <p><b>Control Lever without a Detent - Attachments without a clamp action:</b> The lever is operated by moving it forward and back.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
8	<p>Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (3rd lever) E45-65Z Trucks Only</p>  <p>1. OVERRIDE BUTTON</p>	<p>The third electronic control mini-lever (see Figure 7) is installed to the right of the electronic tilt control lever. This lever can have two methods of operation, depending on the attachment.</p> <p><b>NOTE:</b> To operate the mini-levers, the operator must be on the seat and the armrest must be in the down position.</p> <p><b>NOTE:</b> If truck is equipped with only three levers and clamp attachment, the last (3rd) lever controls clamp functions.</p> <p><b>Trucks with Clamp Attachment:</b> To engage the clamp, move the mini-lever backward. To disengage the clamp, press the override button located directly behind the mini-lever and push the mini-lever forward.</p> <p><b>Trucks without Clamp Attachment:</b> The lever is operated by moving it forward and back. The lever is spring loaded to return to the neutral position when released.</p>

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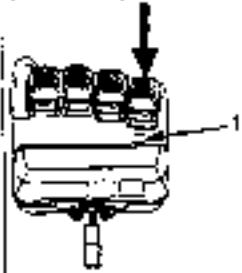
Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
9	<p>Manual Control Lever for Auxiliary Hydraulic Functions (4th lever)</p>  <p>110120436</p>	<p><b>NOTE:</b> On lift truck models E45-65Z only, manual hydraulic control levers are standard (see Figure 6). Two optional E-Hydraulic controls are available for the hydraulic functions: electronic hydraulic mini-levers (see Figure 7) or a joystick (see Figure 8 and Table 2).</p> <p>The fourth manual control lever is installed to the right of the third manual control lever. This lever can have two methods of operation, depending on the attachment.</p> <p><b>NOTE:</b> If truck is equipped with four levers and clamp attachment, the last (4th) lever controls clamp functions.</p> <p><b>Control Lever with a Detent - Attachments with a clamp action:</b> The lever is spring-loaded toward the operator. The lever is operated by moving it to the right, then forward and back.</p> <p><b>Control Lever without a Detent - Attachments without a clamp action:</b> The lever is operated by moving it forward and back.</p>

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## Model Description

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
9	<p>Electronic Control Mini-Lever for Auxiliary Hydraulic Functions (4th lever) E45-65Z Trucks Only</p>  <p>1. OVERRIDE BUTTON</p>	<p>The fourth electronic control lever (see Figure 7) is installed to the right of the third electronic control lever. This lever can have two methods of operation, depending on the attachment:</p> <p><b>NOTE:</b> To operate the mini-levers, the operator must be on the seat and the armrest must be in the down position.</p> <p><b>NOTE:</b> If truck is equipped with four levers and clamp attachment, the last (4th) lever controls clamp functions.</p> <p><b>Trucks with Clamp Attachment:</b> To engage the clamp, move the mini-lever backward. To disengage the clamp, press the override button located directly behind the mini-lever and push the mini-lever forward.</p> <p><b>Trucks without Clamp Attachment:</b> The lever is operated by moving it forward and back. The lever is spring loaded to return to the neutral position when released.</p>

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## HYSTER

## Model Description

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)




Item No.	Item	Function
10	<p>Control Lever Lock (E40-65Z Only)</p>  <p>HD190292</p>	<p>This lock is for the adjustable hydraulic control levers. Move the lock lever counter-clockwise to release the control levers to move them to the correct position. Move the lock lever clockwise to lock the control levers in position.</p>
11	<p>MONOTROL Pedal</p>  <p>HD190243</p>	<p>When the lift truck is equipped with a MONOTROL pedal, the direction and the speed of travel is controlled by the MONOTROL pedal. When the right (REVERSE) side of the pedal is pushed, the lift truck will move in the reverse direction. When the left (FORWARD) side of the pedal is pushed, the lift truck will move in the forward direction. The speed of the lift truck increases when the pedal is pushed further.</p>
12	<p>Brake Pedal</p>  <p>HD190390</p>	<p>This pedal, controlled by the operator's foot, applies the service brakes when pushed.</p>



Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

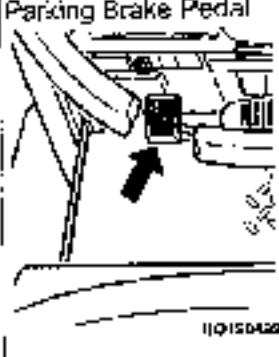
Item No.	Item	Function
13	Handle for Steering Column Adjustment	This handle permits moving the steering column so that the battery can be removed. It also permits adjustment of the angle of the steering column to five positions for operator comfort. Lift and hold the handle while moving the steering column. Release the handle when the steering column is in the correct position. Make sure the handle is latched before operating the lift truck.
14	 <p>Parking Brake Pedal</p>	<p><b>WARNING</b></p> <p>Correct adjustment is necessary to provide enough braking force. Adjust the parking brake if it needs adjustment. See Parking Brake in the Maintenance section.</p> <p>Always apply the parking brake when you leave the lift truck.</p> <p>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 tone will be ON for approximately 10 seconds.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

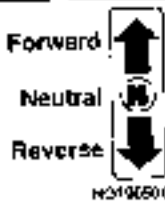

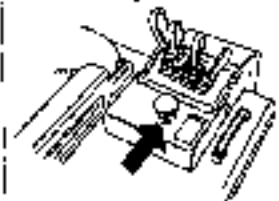
Item No.	Item	Function
15	<p>Direction Control Lever</p> 	The direction control lever is used on some lift trucks. When the lift truck is equipped with a direction control lever, it will also have an accelerator pedal instead of a MONOTROL pedal. The direction control lever has three positions: Forward, Neutral, and Reverse. Move the lever to one of the direction positions for travel.
16	<p>Accelerator Pedal</p> 	The accelerator pedal is used with the direction control lever described in Item 15. Push down on the accelerator pedal to increase the speed of the lift truck.
17	<p>Emergency Stop Knob (J40-65Z Trucks Only)</p> 	The Emergency Stop Knob is to the rear of the hydraulic control levers on the hood on lift trucks equipped with manual hydraulic levers. The operator can shut off all electrical power to the lift truck by pushing the knob down to operate the power disconnect circuit. To reset the Emergency Stop Knob and energize the electrical circuits, the operator must pull the knob to the UP position.

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
17	Emergency Stop Knob (E45-65Z Lift Trucks with E-Hydraulic Controls)	The Emergency Stop Knob is on the right side of the hood toward the rear of the seat on lift trucks equipped with E-Hydraulic control levers. The operator can shut off all electrical power to the lift truck by pushing the knob IN to operate the power disconnected circuit. To reset the Emergency Stop Knob and energize the electrical circuits, the operator must pull the knob OUT.

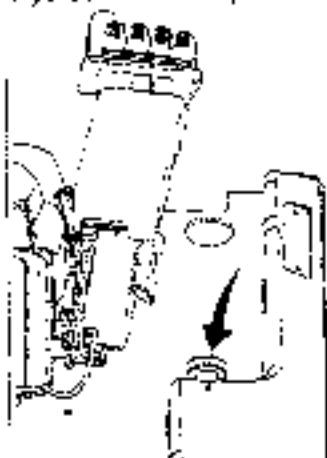


Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

Item No.	Item	Function
18	Joystick (E45-65Z Lift Trucks with E-Hydraulic Controls)	The E45-65Z lift trucks in this manual can be equipped with an optional joystick to control the hydraulic functions. See Figure 8 and Table 2 for a description of the joystick features.
19	Armrest Adjustment Handle (E45-65Z Lift Trucks with E-Hydraulic Controls)	Pull the adjustment handle up and slide the armrest forward or backward to adjust the position of the armrest and E-Hydraulic controls. Push the adjustment handle down to lock armrest and E-Hydraulic controls into position. See Figure 7.



Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)


Item No.	Item	Function
	<p>Hood Latch (J40-G5Z Trucks Only) (Not Shown In Figure 6)</p>  <p>A. OPEN B. LOCKED</p>	<p>The lever near the driver's right knee controls the latch for the control lever assembly. Pull up on lever to release the latch and move the control lever assembly forward to permit the hood to raise. Move the steering wheel to the forward position and use the handle on the hood to raise the hood. Before lowering the hood, make sure the battery restraint rod is over the battery and the handle is down. Lower the hood, hold it down, and move the control lever assembly over the hood to the latched position (one click).</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

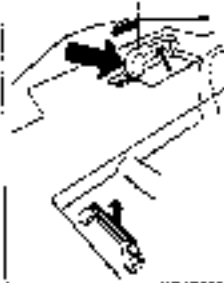
Item No.	Item	Function
	<p>Hood Latch ("E" Series Trucks Only) (Not Shown in Figure 6)</p>  <p>A. OPEN B. LOCKED</p>	<p><b>WARNING</b> Make sure the hood/battery restraint is correctly fastened. If not fastened, the battery can come out of the battery compartment during a tipover and cause an injury.</p> <p>The handle at the rear of the hood releases the hood frame and battery restraint. To release the latch for the battery restraint and hood, raise the latch handle, slide 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 hold the assembly in the up position. Move the latch handle to the right, release the stop rod, lower the hood completely and move the handle back to the left. Try to lift the hood to make sure the hood is fastened correctly.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

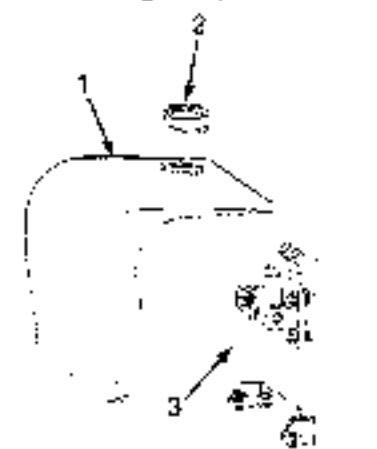
Item No.	Item	Function
	<p>Hood Latch (E45-65Z Lift Trucks with E-Hydraulic Controls) (Not Shown In Figure 7)</p>  <p>1. COVER 2. LATCH 3. HOOD RELEASE HANDLE</p>	<p><b>NOTE:</b> Before raising the hood, move the steering column to the forward position and slide the seat all the way back, and if necessary, move the armrest all the way back (see Figure 7)</p> <p>The latch that secures the cover for the hood release handle can be either a locking or non locking latch. If the latch is a locking latch, unlock latch with key first. The cover, latch, and hood release handle are located on the right side of the hood.</p> <p>Pull the latch handle, located on the top of the latch, to the up position and then pull on latch handle to move cover away from hood release handle. Pull hood release handle up to release hood latch and use handle on the hood to put hood in the raised position.</p> <p>Before lowering the hood, make sure the battery restraint rod is over the battery cover over the hood and push hood release handle down to secure hood to frame. Move cover over hood release handle and push latch handle down to secure cover to hood. If latch is a locking latch, lock latch with key.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)


Item No.	Item	Function
	<p>Battery Connector (Not Shown in Figure 6)</p> <p>36V Grey 48V Blue 72V Green 80V Black</p>  <p>30199229</p>	<p><b>CAUTION</b> 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 Nameplate. The halves of the connector must be joined for operation. Separate the halves of the connector to disconnect the battery.</p> <p>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.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)


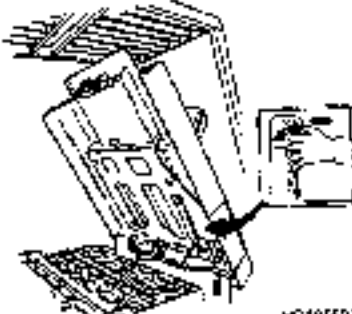
Item No.	Item	Function
	<p>Battery Restraint (40-65Z Trucks Only) (Not Shown In Figure 6)</p> 	<p><b>WARNING</b>                      Make sure the battery restraint is correctly in the forward position and the handle is lowered. If not in the correct position, the hood will not lower and the battery can come out of the battery compartment during a tipover and cause an injury.</p> <p>The battery restraint is under the hood at the rear of the battery. Lift the hood and raise the handle for the battery restraint rod. Move the rod to the rear to release the battery. Move the restraint rod forward and lower the handle for correct battery restraint operation. Lower the hood and latch the control lever assembly over the hood.</p>

Table 1. Instruments and Controls (See Figure 6 and Figure 7) (Continued)

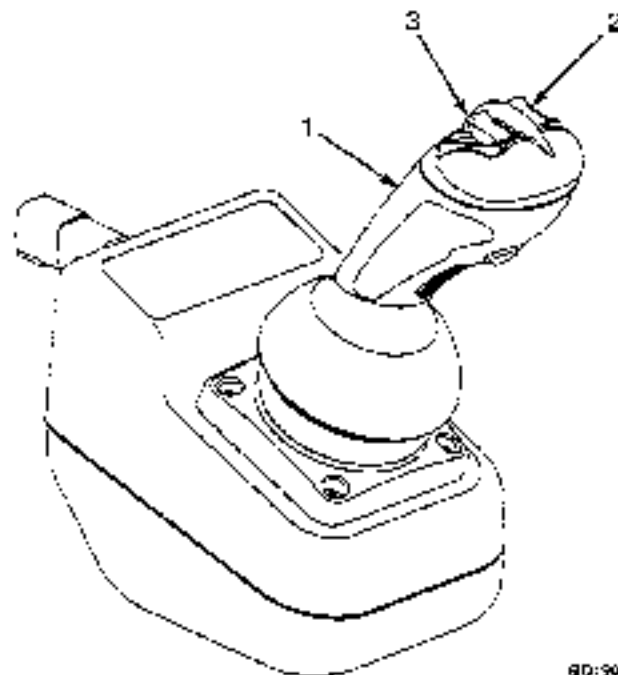
Item No.	Item	Function
	 <p>Battery Restraint ("E" Series Trucks Only) (Not Shown In Figure 6)</p>	<p><b>WARNING</b>                      The hood and battery restraint, with its latch mechanisms, must operate correctly before the lift truck is operated.</p> <p>The battery restraint and hood frame is a steel weldment that has a hinge at the front of the battery compartment. 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. A gas spring and stop rod will hold the assembly in the UP position. Release the stop rod by moving it to the right before lowering the hood.</p>

**Operator Controls - Joystick Features**

(See Figure 8 and Table 2)

**⚠ WARNING**


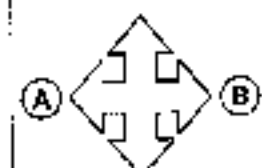
If any of the controls, instruments, levers, or pedals do not operate as described in the following table, report the problem immediately. DO NOT operate the vehicle until the problem is corrected.





80-90124

Figure 8. Joystick

Table 2. Operator Controls - Joystick Features (See Figure 8)

Item No.	Item	Function
1	Lift/Lower Function A. Lower B. Lift 	Push the joystick lever forward to lower the carriage and forks. Pull the joystick lever rearward to raise the carriage and forks.  <b>NOTE:</b> To operate the joystick, the operator must be on the seat and the armrest must be in the down position.
2	Tilt Function  A. Backward B. Forward	Move the joystick lever to the left to tilt the mast backward Move the joystick lever to the right to tilt the mast forward.  <b>NOTE:</b> To operate the joystick, the operator must be on the seat and the armrest must be in the down position.

**Table 2. Operator Controls - Joystick Features (See Figure 8) (Continued)**

Item No.	Item	Function
2	Auxiliary Hydraulic Function (Left Rocker Switch) 	This rocker switch can have two methods of operation, depending on the attachment.  <b>NOTE:</b> To operate the joystick, the operator must be on the seat and the armrest must be in the down position.
3	Auxiliary Hydraulic Function (Right Rocker Switch) 	This rocker switch can have two methods of operation, depending on the attachment.  <b>NOTE:</b> To operate the joystick, the operator must be on the seat and the armrest must be in the down position.

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## Display Panel Features

### General

There are two dash display options, Standard and Premium. Both displays look identical. The only difference is in the display software and the resulting functionality described as follows:

### Premium Display Panel

- Allows pre-assigned user passwords to control driver access to the vehicle
- Provides 4 driving Modes that are accessed through the key pad

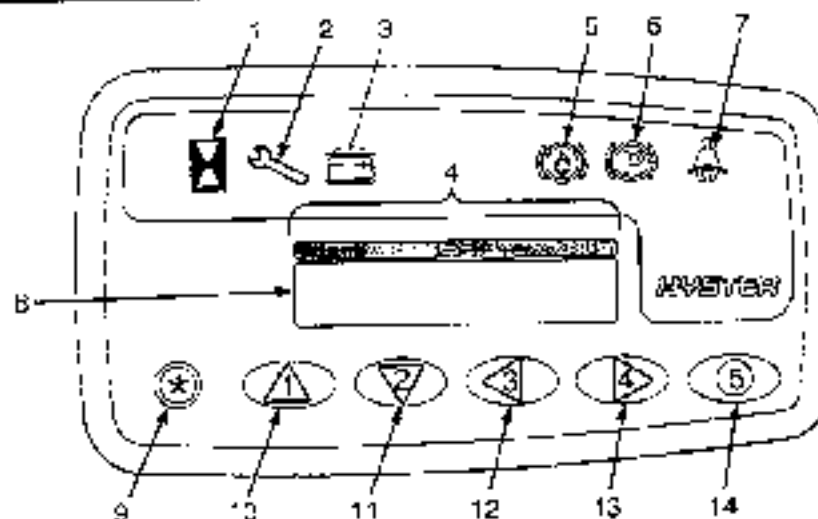
### Display Panel Features

The following features are common to both the Standard and Premium Display Panels. See Figure 9.

- 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 Cues
- STAR push button
- Hourmeter of traction and lift pump times
- Numeric push button keys
- Allow pre-assigned service passwords to control access to Service Functions available through the dash display
- Provides a set of Service Functions which are accessed through the Mode buttons and LCD screen

The symbol indicators are shown and described in Table 3.



HD190128

- |                                |                     |
|--------------------------------|---------------------|
| 1. HOURMETER INDICATOR SYMBOL  | 8. LCD SCREEN       |
| 2. WRENCH INDICATOR SYMBOL     | 9. STAR PUSH BUTTON |
| 3. BATTERY INDICATOR SYMBOL    | 10. PUSH BUTTON #1  |
| 4. BATTERY DISCHARGE INDICATOR | 11. PUSH BUTTON #2  |
| 5. BRAKE OIL SYMBOL            | 12. PUSH BUTTON #3  |
| 6. PARKING BRAKE SYMBOL        | 13. PUSH BUTTON #4  |
| 7. FASTEN SEAT BELT SYMBOL     | 14. PUSH BUTTON #5  |

Figure 9. Features of the Standard and Premium Display Panels

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## HYSTER

## Display Panel Features

### 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 of a potential problem that needs action from the operator.

#### LCD Screen

The LCD screen shows operator messages for the different functions. The display panel can show a maximum of 20 numbers or letters (including spaces) on each of two lines.

#### 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 lift truck can still be operated without battery damage. This band indicates 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. Charge the battery very soon to prevent battery damage. When the battery is discharged to approximately 75%, segments 1 and 2 alternately flash on and off, and the Battery symbol flashes. Continued operation will cause lift-interrupt (if enabled) to occur to help prevent battery damage. Lift-interrupt prevents the operator from lifting loads and saves enough battery power for operator to move lift truck to a battery recharger. At lift-interrupt, there are no segments (bars) displayed, and the Battery symbol is flashing.

#### 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 flashing. If maintenance is not done within 20 more hours of operating time, lift truck performance will be reduced until maintenance is completed. Have the maintenance done by authorized maintenance personnel. The service personnel must also set the memory for the next maintenance time to allow normal operation again.

#### Status Codes

Status Codes give an indication to the operator that a possible malfunction or incorrect truck use has occurred. Status



## Display Panel Features

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 an incorrect truck use 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 **AC Motor Controllers 2200 SRM 1255**.

### Hourmeter

The Hourmeter shows the operating time in traction hours and pump hours on 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 hours are the time that the key has been in the ON position with the operator in the seat. The operating time for the hydraulic pump motor (with illuminated Hourmeter symbol) will also be displayed as a five-digit number for four seconds following the traction hours.

The word TRACTION HOURS will be displayed on the LCD screen when the traction motor hours are shown. The word PUMP HOURS will be displayed on the LCD screen when the pump motor hours are shown.

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## Descriptions of Additional Features (Available With the Premium Display)

The additional features of the premium display panel are described below and shown in Figure 9. Also see Table 4.

**NOTE:** In the following descriptions, words shown in all capital letters represent what is displayed on the LCD screen.

### LCD Screen

The LCD Screen shows the information for the additional features as follows:

1. User password request (if enabled)
2. Operator Check List (if enabled)

The Premium display panel can show a maximum of 20 letters or numbers (including spaces) on each of two lines.

### Operator Passwords

The Operator Passwords are a series of five numbers. Each of the five 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. For security, the password numbers are not displayed when entered. Remember the password. A technician can use a

## HYSTER

personal computer (PC), connected to the vehicle, to check as well as assign the passwords.

**NOTE:** The display does not always respond immediately for every push button entry. The push button can also "click" without an actual change occurring. Make sure to watch LCD screen, and wait for response before requesting another action.

After the key is moved to the ON position, the LCD screen will show ENTER PASSWORD, if this function is enabled. Use the numbered push buttons to enter your five-digit password. A STAR symbol will be shown for each digit. The password can be entered as many times as needed. If the password is entered incorrectly, the message PASSWORD ERROR will appear and the operator will again be prompted to ENTER PASSWORD.

### 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 before the lift truck can be operated. Press 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

## Display Panel Features

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 top speed. 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 push button 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.

**Display Panel Features****Status Code Lists**

The Status Code Lists is a stored history list of selected status codes for malfunctions or incorrect truck use that have occurred since the list was last cleared of entries by a technician. A total of 16 status codes can be stored on the list. When the 17th status code is stored onto the list, the first stored status code will be removed from the list. These selected status codes are NOT of malfunctions or symptoms that are currently present, but those that have occurred in the past. 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 push button. All of the status codes in the list will now be shown in sequence. After the last status code, END FAULT CODE HISTORY will be 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:

- After the key is moved to the **ON** position, all 40 segments of the LCD screen will be displayed as solid bars and the red indicator symbols will light up from left to right. The Seat Belt symbol will be on for an additional 10 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 Wrench light symbol will also be flashing. Install a battery with the correct voltage 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.

**HYSTER****Display Panel Features****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, all 40 segments of the LCD screen will be displayed as solid bars and the red indicator symbols will light up from left to right. Seat Belt symbol will be on for an additional 10 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 Wrench symbol will also be flashing. Install a battery with the correct voltage 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.

Table 3. Common Features (See Figure 9)

Item No.	Item	Function
1 - 3 and 5 - 7	All Indicator Symbols	<p><b>STANDARD DISPLAY PANEL</b></p> <p>When the key is moved to the <b>ON</b> position, the red indicator symbols light up from left to right and remain lit for approximately one second.</p> <p><b>PREMIUM DISPLAY PANEL</b></p> <p>When the key is moved to the <b>ON</b> position, the red indicator symbols light up from left to right and remain lit for approximately one second, after the Password function (if enabled) or Check List function (if enabled) is completed.</p>
1	Hourmeter Indicator Symbol  BD190071	The hourmeter symbol is ON when the traction or lift pump hours are shown on the LCD screen.
2	Wrench Indicator Symbol  BD190074	This red indicator is flashing when status code numbers are shown or when maintenance is due (99)
3	Battery Indicator Symbol  BD190055	This red indicator is flashing when the battery needs charging.

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Table 3. Common Features (See Figure 9) (Continued)





Item No.	Item	Function
4	<p>Battery State-Of-Charge (BDI)</p>  <p>DISCHARGED TO YELLOW AREA</p>  <p>BD190536</p>	<p>A bar graph, representing the Battery State-of-Charge is shown on the LCD screen. See <b>Descriptions of Common Features</b> for more information.</p> <p><b>STANDARD DISPLAY PANEL</b></p> <p>The bar graph is on the LCD screen after the indicator function check.</p> <p><b>PREMIUM DISPLAY PANEL</b></p> <p>The bar graph and the message <b>MODE #X</b> are on the LCD screen after the LED Indicator check is complete</p>
5	Low Brake Oil Symbol  BD190077	If this indicator symbol is illuminated during operation, the oil level in the brake oil reservoir is low and the reservoir must be filled
6	Parking Brake Symbol  BD190079	<p>This indicator symbol is illuminated when the parking brake is applied and the key is in the <b>ON</b> position. The indicator will go <b>OFF</b> when the parking brake is released.</p> <p>If the parking brake is not applied and the operator leaves the seat or turns the key to the <b>OFF</b> position, the symbol and a warning tone will be <b>ON</b> for approximately 10 seconds.</p>

Table 3. Common Features (See Figure 9) (Continued)



Item No.	Item	Function
7	Fasten Seat Belt Symbol  90192078	This indicator symbol will stay illuminated for approximately 10 seconds, after the indicator check, to remind the operator to fasten the seat belt.
8	LCD "Screen" (Standard Display Panel)  90187607	The display panel, on the right side of the instrument panel (dash), has an LCD window as an operator's "screen" readout. The screen is illuminated whenever the key is in the <b>ON</b> position and for a short time after the key is first moved to the <b>OFF</b> position. Information with a maximum of 40 characters on two lines (20 characters per line) is displayed. 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.

Table 3. Common Features (See Figure 9) (Continued)



Item No.	Item	Function
8	Alphanumeric "Screen" (Premium Display Panel)  90187607	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. 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.
9	STAR Push Button  90190905	With the key in the <b>OFF</b> position, push the STAR button once to get status code history. With the key in the <b>ON</b> position, push the STAR button twice and the display will ask for service password (turn key <b>OFF</b> to clear the screen).

Table 4. Additional Features, Premium Display Only (See Figure 9)

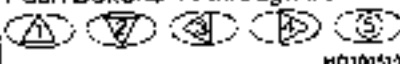
Item No.	Item	Function
10, 11, 12, 13, and 14	Push Buttons #1 through #5  HD100510	These push buttons are used as described in Descriptions of Additional Features (Available With the Premium Display) in this manual.

Table 5. Auxiliary Control Levers

Function The control levers will be arranged in the following order from left to right.	Direction of Movement	
	Load or Equipment	Control Lever
1. REACH	Retract/Extend	Backward/Forward
2. SIDESHIFT	Right/Left	Backward/Forward
3. PUSH-PULL	Backward/Forward	Backward/Forward
4. ROTATE	Clockwise/Counterclockwise	Backward/Forward
5. UPENDER	Up/Down	Backward/Forward

1	2	3	4	5	6	7	8	9	10	11	12	13	14

HD100511

Table 5. Auxiliary Control Levers (Continued)

Function The control levers will be arranged in the following order from left to right.	Direction of Movement	
	Load or Equipment	Control Lever
6. SCOOP	Up/Down	Backward/Forward
7. LOAD STABILIZER	Down (Clamp)/Up (Release)	Backward/Forward
8. SWING (FORKS)	Right/Left	Backward/Forward
9. SWING (CLAMP)	Right/Left	Backward/Forward
10. LH FORK POSITIONER	Together/Apart	Backward/Forward
11. RH FORK POSITIONER	Together/Apart	Backward/Forward
12. TURN FORK	Horizontal/Vertical	Backward/Forward
13. FORK SPREAD	Together/Apart	Backward/Forward
14. CLAMP	Clamp/Release	Backward/Forward

1	2	3	4	5	6	7	8	9	10	11	12	13	14

HD190511

**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.



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The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (fulcrum). This is the same

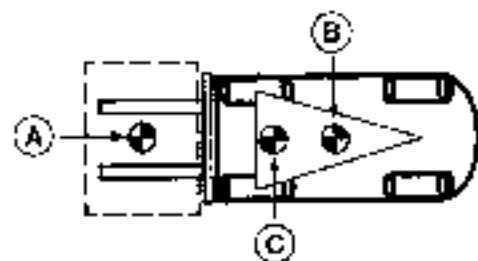
principle used for a seesaw. In order for this principle to work for a lift truck, the load on the forks must be balanced by the weight of the lift truck. The location of the center of gravity of both the truck and the load is also a factor.

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

**Stability and Center of Gravity**

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

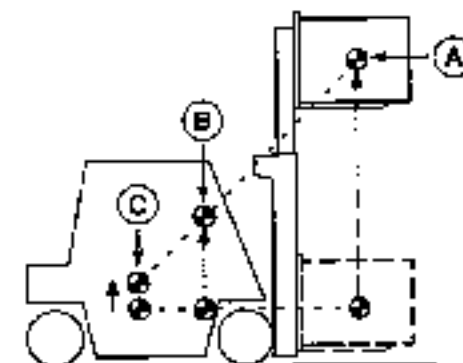
Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG.



A. CG LOAD      B. CG TRUCK      C. COMBINED CG

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

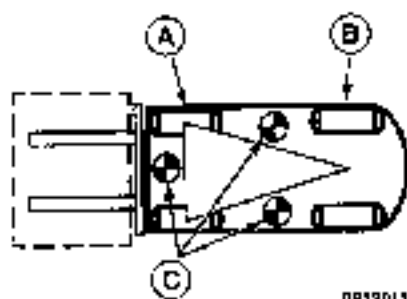
The lift truck has moving parts and therefore has a CG that moves. The CG moves forward and back as the mast is tilted forward and back. The CG moves up and down as the mast moves up and down.



A. CG LOAD      B. COMBINED CG      C. CG TRUCK

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; the pressure, and the dynamic forces created when the truck is moving. These dynamic forces are caused by things like acceleration, braking, turning, and operating on uneven surfaces or on an incline. These factors must be considered when traveling 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.



A. DRIVE AXLE  
B. STEERING AXLE

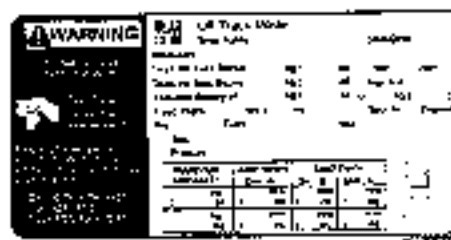
C. CG - TRUCK WILL TIP OVER

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

## Capacity (Weight and Load Center)

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

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



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

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

## Inspection Before Operation

### WARNING

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

### Checks With the Key Switch OFF

Inspect the lift truck before use and every eight hours or daily as described in the Maintenance section of this Operating Manual.

- Oil level 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 Nameplate.

- Battery restraint mechanism operates correctly and is latched.
- The spacer plate is adjusted to limit forward, backward or side-to-side battery movement.
- Condition of forks, carriage, chains, mast, and overhead guard.
- Leaks from the hydraulic system.
- Condition of wheels and tires.
- Seat belt fastens correctly.
- Seat is securely fastened to the seat plate or hood.

## Mounting and Dismounting

### WARNING

To avoid serious injury when entering or exiting the lift truck, **ALWAYS USE 3 POINTS OF CONTACT**. Maintain contact simultaneously with two hands and one foot or with two feet and one hand while climbing on or off the lift truck.

Place feet carefully. Always face the lift truck when climbing on or off. Use added care when surfaces are slippery. Keep





## Operating Procedures

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.

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

- Check the operation of the nom. gauges, and indicator lights
- Operate the LIFT, TILT, and auxiliary functions to check for correct operation of the mast, carriage, and attachments.
- Check the operation of the steering system
- Check the operation of the MONOTROL® pedal or the optional direction control lever and accelerator pedal.
- Check the operation of the service brakes and parking brake.
- Hood is securely latched.

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## HYSTER

travels, off a dock, or comes to a sudden stop, the locking mechanism will be activated and hold the operator's lower torso in the seat.

### Basic Operating Procedures

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

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

## Operating Techniques

### WARNING

Before operating the lift truck, FASTEN YOUR SEAT BELT.



H0150116

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

**NOTE:** Lift trucks manufactured before November 1, 2005 are equipped with the Automatic Locking Retractor (ALR) type seat belts. The seat belt must fasten securely. Make sure the seat belt extends and retracts smoothly and is not frayed or torn. If the seat belt is damaged or does not operate properly, it must be replaced.

**NOTE:** Lift trucks manufactured after November 1, 2005 are equipped with the Emergency Locking Retractor (ELR) style seat belt. When the ELR seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If the truck tips,

## Operating Procedures



H0150115

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.



H0150172

2. Operate the lift truck only in areas that have been approved for lift truck operation. Certain areas contain hazardous flammable gases, liquid, dust, fibers, or other materials. Lift trucks that are operated in these areas must have special fire safety approval.

Those 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.



HD190116

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

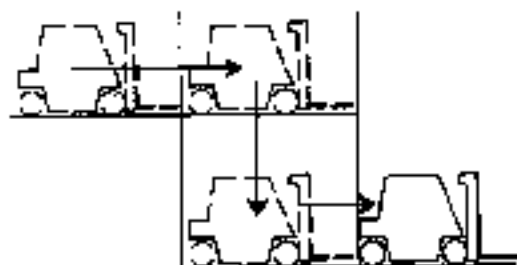
If a lift truck is used to elevate a worker, a safety platform must be attached to the forks and carriage. The platform must be specially built to meet or exceed the requirements of ITSDF B56.1. The platform must have a solid floor with a surface to prevent the feet of the worker from slipping, hand rail, toe board, and a screen or shield at least 2 m (7 ft) high between the people on the platform and the lift mechanism.



9C190117

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 a lift truck into an elevator unless authorized to do so. Approach the elevator slowly. After the elevator is properly leveled, the lift truck must be centered so that the elevator is balanced.



HD120118

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

**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 **Operating Manual**.

**Driving and Direction Changes**

These lift trucks can have either a **MONOTROL** pedal or a direction control lever. If the lift truck has a **MONOTROL** pedal, push on the left side of the pedal to go **FORWARD**, or the right side of the pedal to go in **REVERSE**. If the lift truck has a direction control lever, move the lever toward the front of the lift truck to go **FORWARD** and toward the rear of the lift truck to go in **REVERSE**.



**A**



**B**



**C**

HD190512

- A. MONOTROL PEDAL
- B. ACCELERATOR PEDAL
- C. DIRECTION CONTROL LEVER

**WARNING**

DO NOT select the travel direction if the accelerator 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.

If the lift truck is equipped with a MONOTROL pedal, place foot on the service brake pedal and release the parking brake. Select the direction of travel by slowly depressing on either the left or right side of the MONOTROL pedal. Continue pressing the MONOTROL pedal to move the lift truck in the selected direction.

The operator can change the direction of travel while the lift truck is moving by moving the foot to the other side of the MONOTROL pedal, or by moving the direction control lever for travel in 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 MONOTROL pedal or 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 tip-over can occur with an empty lift truck because similar dynamic forces are present. In fact, the lift truck will actually tip over easier when empty, than when loaded with the load lowered. Rearward tilt, off-center loads, and uneven ground will aggravate these conditions.

**WARNING**

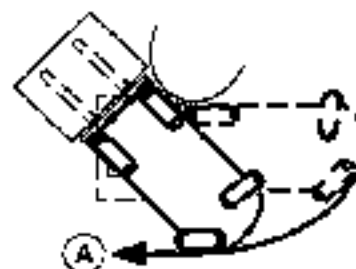
TRAVEL SLOWLY WHEN TURNING. Lift trucks can tip over even at very slow speeds. The combination of speed and the sharpness of a turn can cause a tipover. A lift truck is less stable when the forks are elevated, with or without a load.

**WARNING**

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

**WARNING**

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



A. TAIL SWING

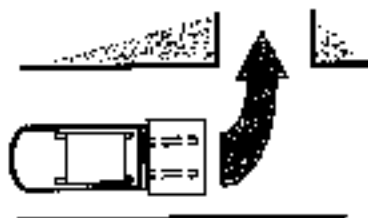
Because lift trucks are designed to work in a relatively small space, they can turn sharper than some other vehicles. Most lift trucks are steered by the rear wheels and the rear of the lift truck can move to the side very fast during a turn. This movement is called "tail swing". An operator must be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

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

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



80150123



80190125

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

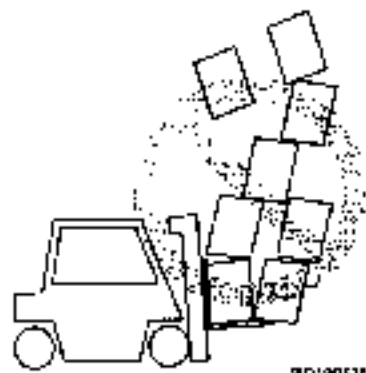
**Load Handling, General**

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



80150124

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

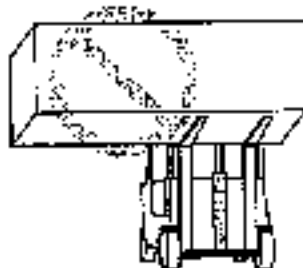


80190126

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

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

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



80190127

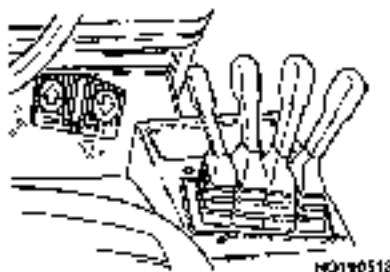
If the weight of the load is not centered between the forks, the load can fall from the forks when you turn a corner or hit a bump. An off-center load will increase the possibility of the truck tipping over to the side. Make sure the pins that keep the forks in position are engaged so that the forks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

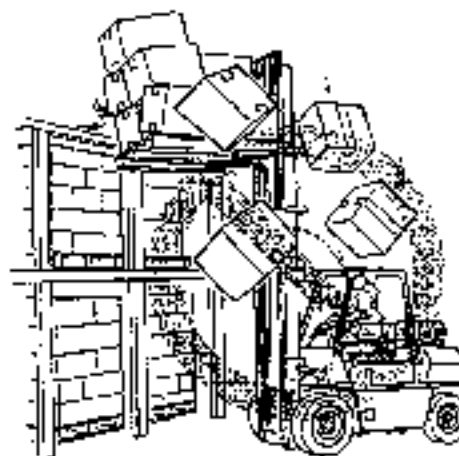
**NOTE:** On lift truck models E45-65Z (G108), manual hydraulic levers are standard. Two optional features are available to control the hydraulic functions: electronic hydraulic mini-levers (see Figure 7 and Table 1) or a joystick (see Figure 8 and Table 2).

The **LIFT** and **TILT** functions are controlled by separate levers or by moving the joystick in different directions. See the **Operator Controls - Joystick Features** section in the **Model Description** section for the correct operation.



The speed of the hydraulic functions is controlled by the position of the control levers or the position of the joystick. The farther the hand lever or joystick 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 **Hyster** 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 and other personnel have no overhead protection. Avoid hitting objects such as stacked material that could become dislodged and fall.

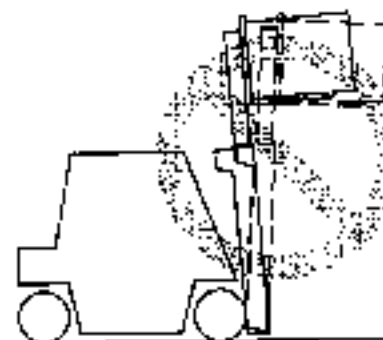
The operator must exercise care while working near such objects. Whether the lift truck is loaded or empty, do not travel with the load or carriage in a raised position.

**WARNING**



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

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

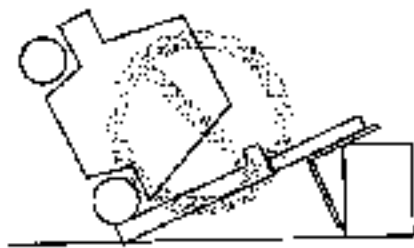


Lift and lower with the mast vertical or tilted slightly backward from vertical. Tilt elevated loads forward only when directly over the unloading place.

## WARNING

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

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



**IF THE LIFT TRUCK TIPS OVER, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR**

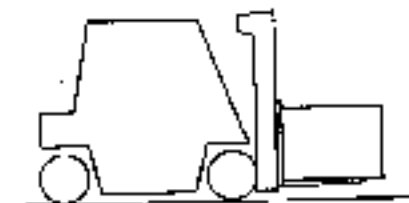
**FEET, AND LEAN FORWARD AND AWAY FROM POINT OF IMPACT.**

## Load Handling, How to Engage and Disengage a Load



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

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



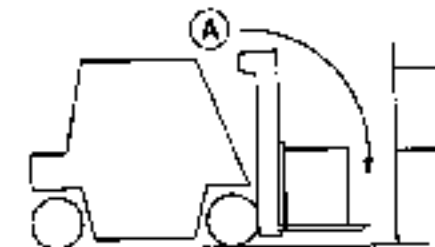
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# HYSTER

# Operating Procedures

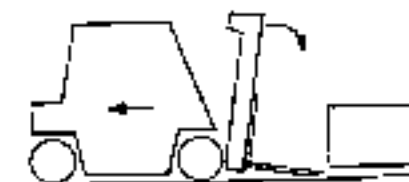
2. Move forward slowly until the forks are in position under the load. The forks must support at least two-thirds (2/3) of the length of the load.

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

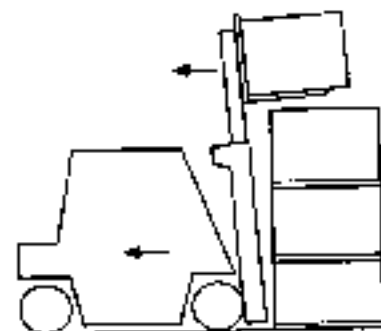


**A. BE CAREFUL OF FORKS BEYOND THE LOAD**

4. 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.



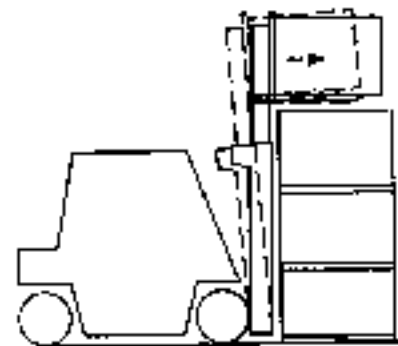
5. When a load is put on the floor, tilt the mast forward to a vertical position and lower the load. Tilt the mast forward to permit smooth removal of the forks. Carefully move the lift truck backward to remove the forks from under the load.



6. If the load is being removed from a stack, slowly move the lift truck away from the stack. When the load is clear of the stack, lower the load for traveling. Always travel with the load

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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 or joystick to the neutral position so that the load is not dropped or that the lift truck is not tipped over due to the rapid stop of the load.



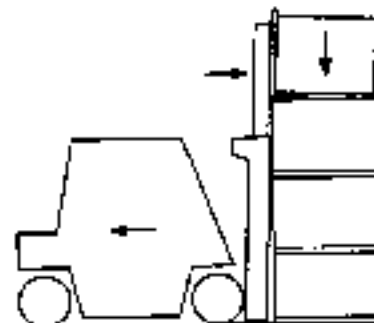
**WARNING**

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

7. To put the load on a stack, align the lift truck with the stack. Lift the load to eye level and then tilt the load forward until it

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

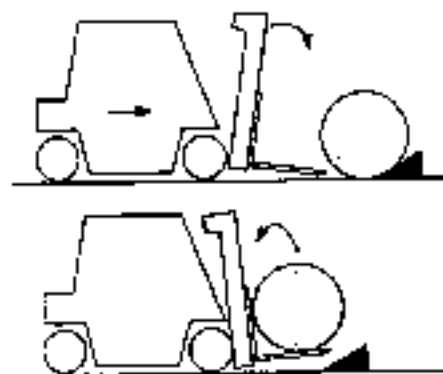
**IF THE LIFT TRUCK TIPS OVER EITHER TO THE SIDE OR FORWARD, DO NOT JUMP OFF! HOLD FIRMLY TO STEERING WHEEL, BRACE YOUR FEET, AND LEAN FORWARD AND AWAY FROM THE POINT OF IMPACT.**



8. Move forward slowly. When the load is in position, lower the load on to the stack or the rack. Lower the forks just enough to remove them from under the load. Do not lower the forks so that they will drag on the surface under the load.

Carefully move the lift truck backward to remove the forks from under the load. Lower the forks when traveling.

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



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

**Load Handling, Traveling**

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



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

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

**⚠ WARNING**

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



3. For better visibility with large loads, travel with the load trailing, but always keep a proper lookout in the direction of travel. Normally, direction of travel is determined by the best visibility available to the operator. If the lift truck must travel in a direction where visibility is obstructed, a lookout helper is required. Never drive when visibility is obstructed.



BC190143

4. When traveling up or down a grade with a heavily loaded lift truck, keep the load up grade to maintain control. When operating an unloaded lift truck on a steep grade, keep the counterweight up grade.

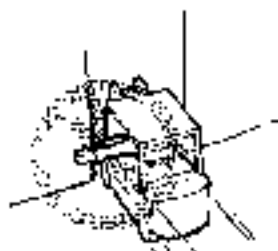
5. Watch out for pedestrians at all times. Do not drive up to anyone standing in front of an object. Use extra care at cross-aisles, doorways, and other locations where pedestrians can step into the path of travel of the lift truck.



BC190144

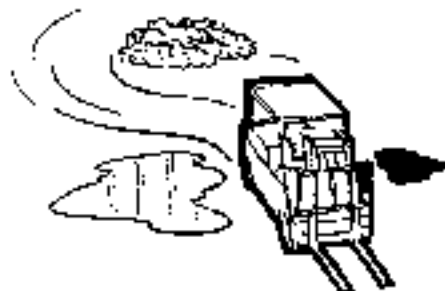
Slow down when approaching blind intersections or turns and sound the horn. The horn is to warn pedestrians that there is a vehicle in the area and to be alert to possible danger.

6. Anytime 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.



BC190145

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



BC190146

Different models of lift trucks are designed to operate under different conditions. Cushion tire models are designed to operate on relatively smooth, firm surfaces. Always make sure you pick the smoothest route for your lift truck.

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

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



BC190147



BC190148

9. Do not indulge in stunt driving or horseplay.





80192148

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

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

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



00160150

**Load Handling, Emergency Load Lowering**

**WARNING**

On E45-65Z trucks equipped with an electronic hydraulic control valve, when the electronic signal to the mini-levers or joystick is disrupted, the mast assembly can **ONLY** be lowered with the emergency load lowering valve, located on the main hydraulic valve (see Figure 11). When using the emergency load lowering valve to lower a load, serious injury can result if anyone is near the load or under the load.

**WARNING**

Always lower the mast assembly when leaving the lift truck unattended.

**NOTE:** On E45-65Z lift trucks equipped with an electronic hydraulic control valve, the emergency load lowering valve is to be used **ONLY** if the electrical signal to the electronic main control valve has been disrupted and there is a load lifted.

The emergency load lowering valve is located on the right side of the main control valve. See Figure 11.

**HYSTER**

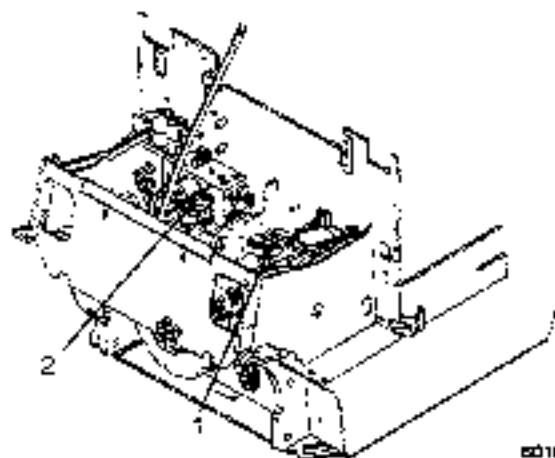
Operating Procedures

To use the emergency load lowering valve, follow these steps:

1. Move seat all the way forward and raise the steering column to its highest position and open lift truck hood.
2. Remove floor mat and floor plate.
3. Remove hydraulic breather. See Figure 10.

**NOTE:** Lowering speed can be controlled by pushing in button.

4. Push in and turn button 1/4 turn counterclockwise. Button will pop out and load will begin to lower.
5. When load has been safely lowered, push button in and turn 1/4 clockwise to set the emergency load lowering valve back into operation mode.
6. Install hydraulic breather.
7. Install floor plate and floor mat.
8. Close the hood and adjust the seat and steering column.

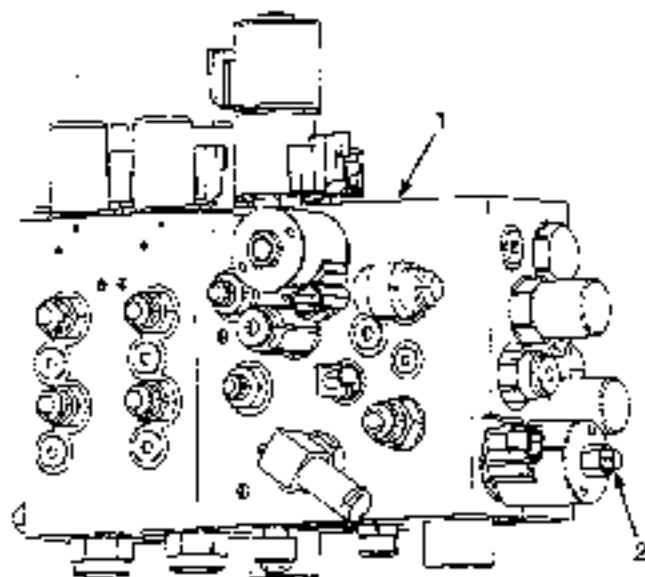


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- 1. HYDRAULIC BREATHER
- 2. MAIN CONTROL VALVE

Figure 10. Emergency Lowering Control Valve Access

1. MAIN CONTROL VALVE
2. EMERGENCY LOAD LOWERING VALVE BUTTON



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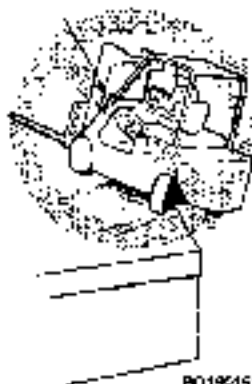
Figure 11. Emergency Load Lowering Valve E45-65Z Lift Trucks Only

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Highway Trucks, Rail Cars, and Docks

**WARNING**

Maintain a safe distance from the edge of docks, ramps, platforms, and other similar working surfaces. Watch the "tail swing." Remember when traveling 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.



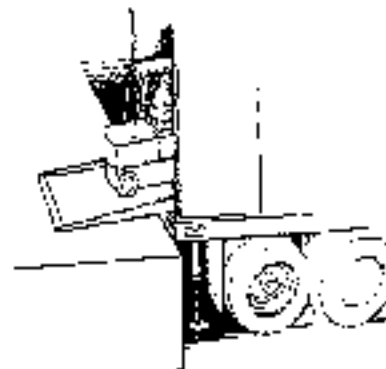
80192151

**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 an attachment that is specifically designed for opening and closing railroad car doors and the operator is trained in its use.



80192157

- 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

## Operating Procedures

check 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 board 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 will reduce the turning required after entering.

### Attachments

#### WARNING

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



801401-03

If an attachment is installed on the lift truck, make sure the operating instructions are available and understood before

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operating the attachment. See Table 5 for the operation of attachment control levers.

Attachments must be removed or installed by trained personnel only.

### Stopping



80169164

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. The lift truck can also be stopped using regenerative braking (see **Model Description**) or plugging. Regenerative braking and plugging minimize brake wear damage.

## HYSTER

## Operating Procedures

### Parking

#### WARNING

Always apply the parking brake when you leave the lift truck. Never apply parking brake while truck is moving.

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

1. Stop the lift truck and apply the parking brake.
2. Fully lower the forks or carriage. Tilt mast forward until the tips of the forks touch the ground.

3. If equipped, move the Direction Control Lever to the NEUTRAL position.

4. Turn the key switch to the OFF position.

5. Disconnect the battery when leaving the lift truck.

6. 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 cannot move.

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

## Maintenance

### General

#### WARNING

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

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

#### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

Disposal of batteries must meet local environmental regulations.

This section contains a Maintenance Schedule and the instructions for maintenance and inspection.

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

The recommendation for the time intervals are for eight hours of operation per day. Normal operation is considered to be one eight-hour shift per day in a relatively clean environment on an improved surface. The time intervals must be decreased from the recommendations in the Maintenance Schedule for the following conditions:

- If the lift truck is used more than eight hours per day.
- If the lift truck must work in dirty operating conditions.
- Your dealer for Hyster lift trucks will advise you on the maintenance time intervals based on their survey of the application.

## HYSTER

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

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

### Serial Number Data

The serial number code for the lift truck is on the Nameplate. The code is also stamped on the right side of the rear bulkhead (battery compartment) on the top edge or on the front face near the top.

### How to Move a Disabled Lift Truck

#### WARNING

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

1. Brakes do not operate correctly.

2. Steering does not operate correctly.
3. Tires are damaged.
4. Traction conditions are bad.
5. The lift truck must be 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 disabled 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 Nameplate 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 to not damage the under side of the lift truck.

## How to Tow the Lift Truck

1. The towed lift truck must have an operator.
2. Tow the lift truck slowly.
3. Raise the carriage and forks approximately 0.30 m (1 ft) 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.

## 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.

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## HYSTER

3. Tilt the mast fully forward until the drive tires are raised from the surface.
4. Put additional blocks under the frame behind the drive tires.
5. If the hydraulic system will not operate, use a hydraulic jack under the side of the frame near the front. Make sure that the jack has a capacity equal to at least half the weight of the lift truck. See the Nameplate.

## How to Raise the Steering Tires

(See Figure 12)

1. Apply the parking brake. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck.
2. Use a hydraulic jack to raise the steering tires. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck as shown on the Nameplate.

terweight. When the lift truck is put on blocks, put additional blocks in the following positions to maintain stability:

1. Before removing the mast and drive assembly, put blocks under the counterweight so that the lift truck cannot tip backward.
2. Before removing the battery and counterweight, put blocks under the mast assembly so that the lift truck cannot tip forward.

Put the lift truck on blocks only if the surface is solid, even, and level. 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 12)

1. Put blocks on each side (front and back) of the steer tires to prevent movement of the lift truck.
2. Put the mast in a vertical position. Put a block under each outer mast channel.

## Maintenance

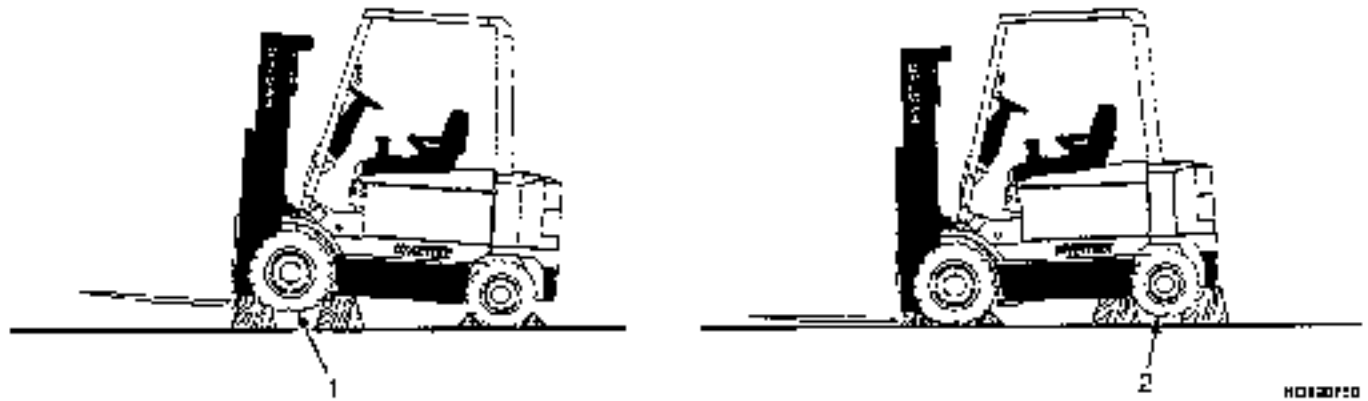
3. Put the jack under the steering axle or frame to raise the lift truck. Put blocks under the frame to support the lift truck.

## How to Clean a Lift Truck

### CAUTION

Your lift truck may be damaged if water or cleaning agents come in contact with electrical components. DO NOT directly spray any electrical components, especially connectors, switches, electro-hydraulic controls, battery area, and dash display during the cleaning process.

Portions of your lift truck may be washed with a non-heated pressure washer. Steam cleaning is not recommended in most instances, as condensation may form in electrical components causing damage or erratic behavior. For cleaning guidelines and components to avoid, see the **Periodic Maintenance** section of the **Service Manual** for your lift truck.



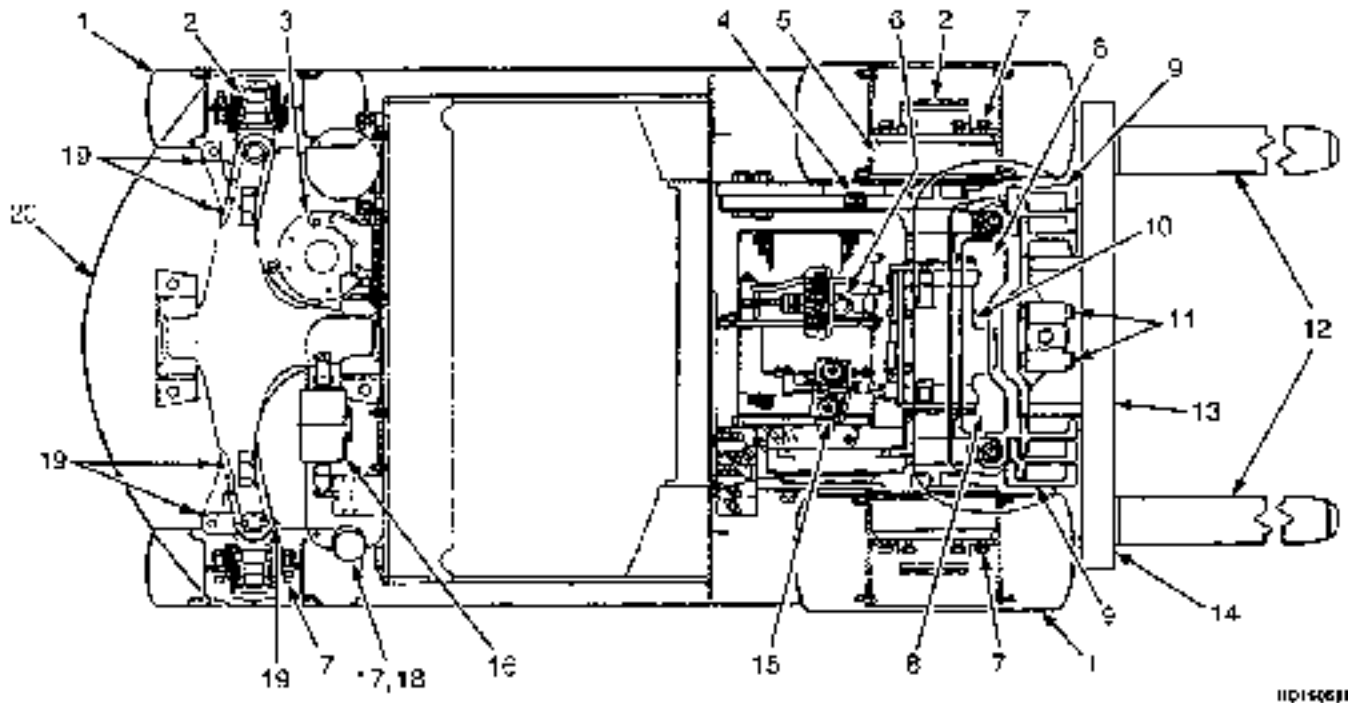
1. DRIVE TIRES

2. STEERING TIRES

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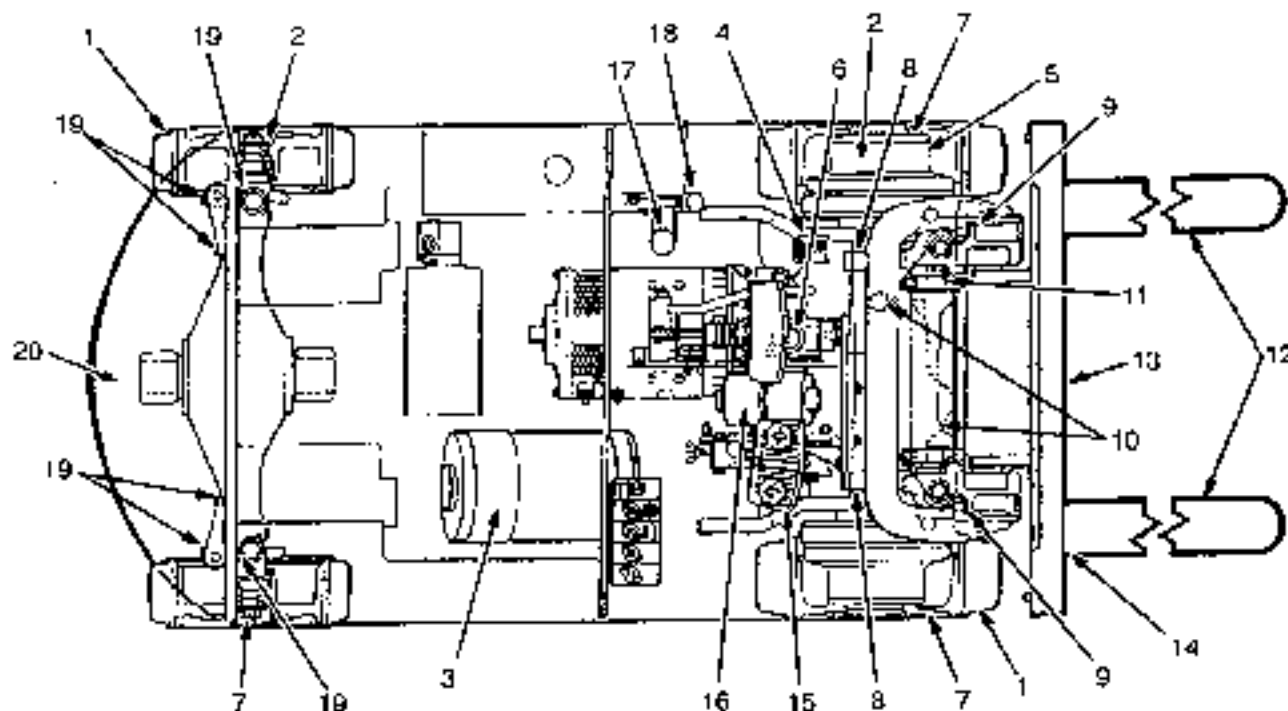
*Figure 12. Put a Lift Truck on Blocks*

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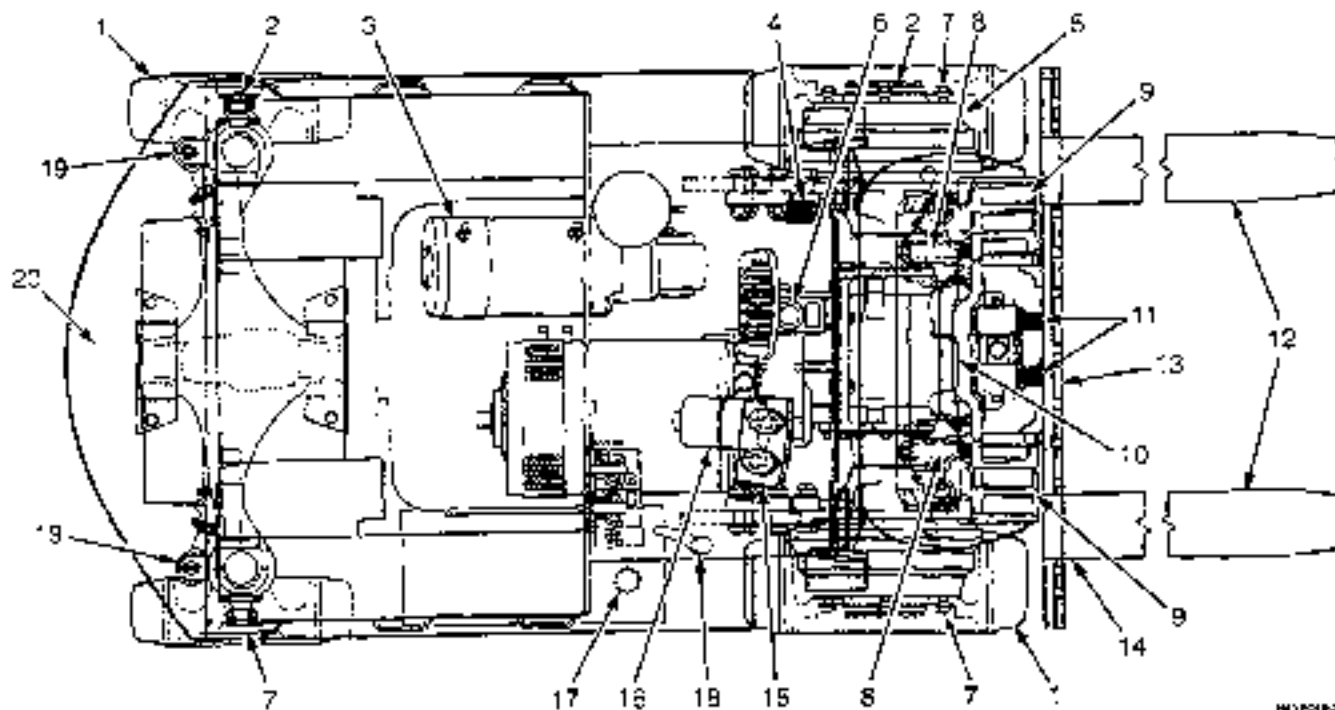
*Figure 13. Maintenance Points J40-65Z (A416)*

HO150038



40120834

Figure 14. Maintenance Points E25-35Z, E40ZS (E114)



10720820

Figure 15. Maintenance Points E45-65Z (G108)

## Maintenance Schedule

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
1	TIRES	X					Check Condition	
2	WHEEL BEARINGS					L	As Necessary	Multipurpose Grease See NOTE 1
3	DC MOTOR BRUSHES Hydraulic Pump Motor	CIL			X		Check Condition	See Parts Manual
4	PARKING BRAKE	X C L					Check Operation	
4	PARKING BRAKE ADJUSTMENT			X			Adjust as Necessary	Must Hold a Full Capacity Load on a 15% Grade
4	PARKING BRAKE				L		Lubricate Linkage See NOTE 2	Silicone Spray Hyster P/N 328388
5	SERVICE BRAKES	X CIL					Check Operation	See Parts Manual

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation

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Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
5	BRAKE LINKAGE AND SHAFTS				L			Multipurpose Grease See NOTE 1 and NOTE 2
5	SERVICE BRAKES					X	Check Condition	See Parts Manual Minimum Thickness 1 mm (0.04 in.)
6	BRAKE FLUID J40-85Z Models	CIL			X	C	0.20 liter (0.4 pt)	SAE J-1703 (DOT 3)
6	BRAKE FLUID E25-65Z, E40ZS Models	CIL		X		C	0.24 liter (0.5 pt)	SAE J-1703 (DOT 3)
7	WHEEL NUTS (J40-85Z) Drive and Steer Wheels	X					Check Condition	
7	WHEEL NUTS (J40-85Z) Drive and Steer Wheels			X			Check Torque	237 to 305 N·m (175 to 225 lbf·ft)

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation



Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
7	DRIVE WHEEL NUTS E25-35Z, E40ZS	X					Check Condition	
7	DRIVE WHEEL NUTS E25-35Z, E40ZS			X			Check Torque	330 N·m (242 lbf ft)
7	WHEEL BEARINGS Steer and Drive Wheels					L	Check Grease	Multipurpose Grease See NOTE 1
7	DRIVE WHEEL NUTS E45-65Z	X					Check Condition	
7	DRIVE WHEEL NUTS E45-65Z			X			Check Torque	257 to 305 N·m (175 to 225 lbf ft)
8	PIVOTS (MAST)			L			2 Filings Lubricate as Required	Multipurpose Grease See NOTE 1
9	MAST SLIDING SUR- FACES			L			Lubricate as Required	Multipurpose Grease See NOTE 1
9	HEADER HOSES			X			Check Condition	

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation

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Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
10	DIFFERENTIAL AND SPEED REDUCER	X					Check for Leaks	
10	DIFFERENTIAL AND SPEED REDUCER (J40-05Z)				X		3.7 liter (3.9 qt) Check Oil Level	Use Gear Lube SAE 80W or Gear Oil SAE 80W-90 (Chevron) or Equivalent
10	DIFFERENTIAL AND SPEED REDUCER (J40-65Z)					C	3.7 liter (3.9 qt) Change Oil	Use Gear Lube SAE 80W or Gear Oil SAE 80W-90 (Chevron) or Equivalent
10	DIFFERENTIAL AND SPEED REDUCER (E25-35Z, E40ZS)			X			2.9 liter (3.1 qt) Check Oil Level	Use Gear Lube SAE 80W or Gear Oil SAE 80W-90 (Chevron) or Equivalent
10	DIFFERENTIAL AND SPEED REDUCER (E25-35Z, E40ZS)					C	2.9 liter (3.1 qt) Change Oil	Use Gear Lube SAE 80W or Gear Oil SAE 80W-90 (Chevron) or Equivalent

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
9C	DIFFERENTIAL AND SPEED REDUCER (E45-65Z)			X			4.2 liter (4.4 qt) Check Oil Level	Use Gear Lube SAE 80W or Gear Oil SAE 60W-80 (Chevron) or Equivalent
10	DIFFERENTIAL AND SPEED REDUCER (E45-65Z)					C	4.2 liter (4.4 qt) Change Oil	Use Gear Lube SAE 80W or Gear Oil SAE 60W-90 (Chevron) or Equivalent
11	MAST, CARRIAGE, HEADER HOSES, LIFT CHAINS, AND ATTACHMENT	X					Check Condition	
11	LIFT CHAINS				L		See NOTE 2	Engine Oil
11	LIFT CHAINS				X		Check Adjustment and Length See NOTE 2	

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
11	LIFT CHAINS					X	Remove Lift Chains to Clean and Lubricate	See Periodic Maintenance 8000 SRM (105) for Lubrication and Removal Procedures
12	FORKS	X		X		X	Check Condition	
13	SIDESHIFT CARRIAGE			L			4 Fittings	Multipurpose Grease See NOTE 1
13	INTEGRAL SIDESHIFT CARRIAGE (Upper/Lower Bearings)				X	C	Check Wear 4 Bearings	2.5 mm (0.098 in.) Minimum Thickness
14	FORK PINS AND GUIDES				L		Lubricate as Necessary	Engine Oil
15	DIRECTION AND SPEED CONTROL PEDALS	X					Check Operation Lubricate as Necessary	See NOTE 1

X = Check C = Change L = Lubricate CIL = Check Indicator Light during operation

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
16	HYDRAULIC FILTER					C	1 Filter See NOTE 2 and NOTE 6	See Parts Manual
17	HYDRAULIC OIL (FULL Mark) J40-65Z Trucks	X				C	27.4 liter (29.0 qt)	-18 to 38 °C (0 to 100 °F) SAE 10W API SG/CC
17	HYDRAULIC OIL (FULL Mark) E25-35Z, E40ZS Trucks	X				C	19.0 liter (20.0 qt)	-18 to 38 °C (0 to 100 °F) SAE 10W API SG/CC
17	HYDRAULIC OIL (FULL Mark) E45-65Z Trucks	X				C	23.0 liter (24.4 qt)	-18 to 38 °C (0 to 100 °F) SAE 10W API SG/CC
18	HYDRAULIC TANK BREATHER J40-65Z Trucks				X	C	Clean or Replace See NOTE 2	See Parts Manual
18	HYDRAULIC TANK BREATHER E25-65Z, F40ZS			X		C	Clean or Replace See NOTE 2	See Parts Manual

X = Check C = Charge L = Lubricate CIL = Check Indicator Light during operation

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
19	STEERING KING PINS E45-65Z Trucks				L		2 Fittings See NOTE 2 and NOTE 3	Multipurpose Grease See NOTE 1
19	STEERING KING PINS J40-65Z Trucks				L		2 Fittings See NOTE 2 and NOTE 3	Multipurpose Grease See NOTE 1
19	STEERING TIE RODS J40-65Z Trucks				L		4 Fittings See NOTE 2 and NOTE 4	Multipurpose Grease See NOTE 1
19	STEERING TIE RODS AND SPIN- DLES E25-35Z, E40ZS Trucks		L				4 Fittings See NOTE 2	Multipurpose Grease See NOTE 1
20	CONTACTORS				X		Check Condition	See Parts Manual
	HORN, LIGHTS, AND ALARM	X					Check Operation	

X = Check C = Charge L = Lubricate CIL = Check Indicator Light during operation

Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
	HINGES, LEVERS, LINKAGE, PEDALS, AND SEAT RAILS				L		As Required	Multipurpose Grease See NOTE 1 and NOTE 2
	OIL LEAKS	X					Check for Leaks	
	SAFETY LABELS	X					Replace as Necessary	See Parts Manual
	BATTERY	X					Check Condition	See NOTE 5
	SEAT BELT AND SEAT RAILS	X					Check Condition	
	SEAT BRAKE OPER- ATION CHECK			X			Check Condition and Adjust as Necessary	Must Hold a Full Capacity Load on a 15% Grade
	SEAT PLATE AND SEAT BRAKE PIV- OTS				L			Use Silicon Spray (Hyster P/N 328388) See NOTE 2
	HOOD LATCH OR BATTERY RESTRAINT	X					Check Operation	

X = Check C = Change L = Lubricate OIL = Check Indicator Light during operation

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Table 6. Maintenance Schedule (See Figure 13, Figure 14, and Figure 15) (Continued)

Item No.	Item	8 hr/ 1 day	250 hr/ 6 wk	500 hr/ 3 mo	1000 hr/ 6 mo	2000 hr/ 1 yr	Procedure or Quantity	Specifications
	STEERING COLUMN TILT MECHANISM	X					Lubricate as Necessary	Use Silicon Spray (Hyster P/N 328388)
	LIFT AND TILT CON- TROLS	X					Lubricate as Necessary	Use Silicon Spray (Hyster P/N 328388)

NOTE 1: Multi-purpose grease with 2 to 4% Molybdenum Disulfide.

NOTE 2: Recommended service intervals are based on a normal application in a clean environment. Applications involving contaminated environments such as high levels of airborne debris (dust and waste paper), chemical or abrasive compounds, poor ground conditions, intensive usage at high performance levels, or other abnormal conditions will require more frequent servicing. At your request, your Hyster dealer will advise you of the appropriate service intervals based on an application survey.

NOTE 3: Lubricate lower spindle bearings at 1000 hours and upper bearings during assembly. If truck is used outdoors or on wet floors, lubricate lower spindle bearings at 250 hours.

NOTE 4: If truck is used outdoors or on wet floors, reduce service interval to 500 hours.

NOTE 5: Equalization charge is required approximately each month.

NOTE 6: Replace hydraulic filler after first 100 hours.

X = Check C = Change L = Lubricate OIL = Check Indicator Light during operation

## Maintenance Procedures Every 8 Hours or Daily

### How to Make Checks With the Key Switch OFF

#### **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.

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. Make the additional check as described in the following paragraphs of **How to Make Checks With the Key Switch OFF** and **How to Make Checks With the Key Switch ON**.

### Tires and Wheels

#### **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.

Put the lift truck on blocks as described in the beginning of this section.

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 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.

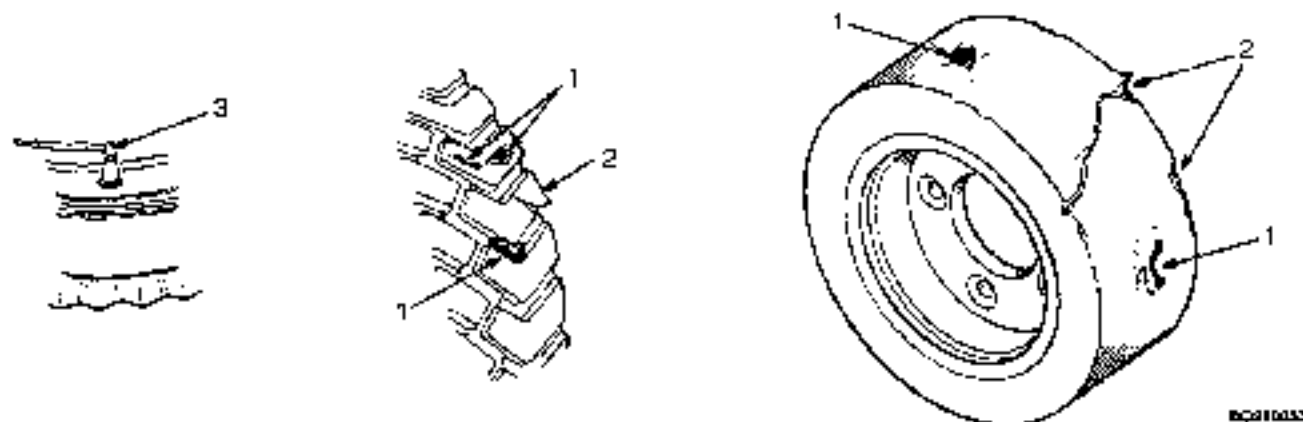
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**HYSTER****Maintenance**

Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts, and other damage. See Figure 16. Remove any object that will cause damage. Check for loose or missing hardware. Remove any wire strapping or other material that is wrapped around the axle. Inspect the wheel nuts to ensure they are in good condition.

If the lift truck has pneumatic tires, keep the tires at the correct air pressure. See the Nameplate. Check the air pressure with

a gauge when the tires are cold. If it is necessary to add air to a tire that is warm, check one of the other tires on the same axle and add air to the tire that has low pressure so that the air pressures are equal. The air pressure of the warm tires must always be equal to or greater than the specification for air pressure for cold tires. Check pneumatic wheels for bent or damaged rims. Check for loose or missing parts.



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

Figure 16. Check the Tires

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## HYSTER

## Maintenance

### Forks

**NOTE:** Forks must be removed or installed by trained personnel only.

The identification of a fork describes how the fork is connected to the carriage. These lift trucks have hook forks. See Figure 17.

### Forks, Inspect

#### **WARNING**

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. Forks are to be replaced only in sets and not individually.

1. Inspect the forks for cracks and wear. Check that the fork tips are aligned as shown in (Item 1, Figure 17). Check that the bottom of the fork is not worn (Item 4).

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

### Forks, Adjust

The forks are connected to the carriage by hooks and lock pins. See Figure 17. The lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Adjust the forks as far apart as possible for maximum support of the load. Hook forks will slide along the carriage bars to adjust for the load to be lifted. Raise the lock pin in each fork to slide the fork on the carriage bar. Make sure the lock pin is engaged in the carriage bar to lock the fork in position after the width adjustment is made.

## Forks, Remove

**WARNING**

Do not try to move a fork without a lifting device. The forks can weigh up to 180 kg (400 lb).

A fork can be removed from the carriage for replacement of the fork or other maintenance. Slide a hook fork to the fork removal notch on the carriage. See Figure 17 and Figure 18. Lower the fork onto blocks so that the bottom hook of the fork moves through the fork removal notch. See Figure 18. Lower the carriage further so that the top hook of the fork is disengaged from the top carriage bar. Move the carriage away from the fork, or use a lifting device to move the fork away from the carriage.

## Forks, Install

**WARNING**

Do not try to move a fork without a lifting device. The forks can weigh up to 180 kg (400 lb).

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.

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Maintenance

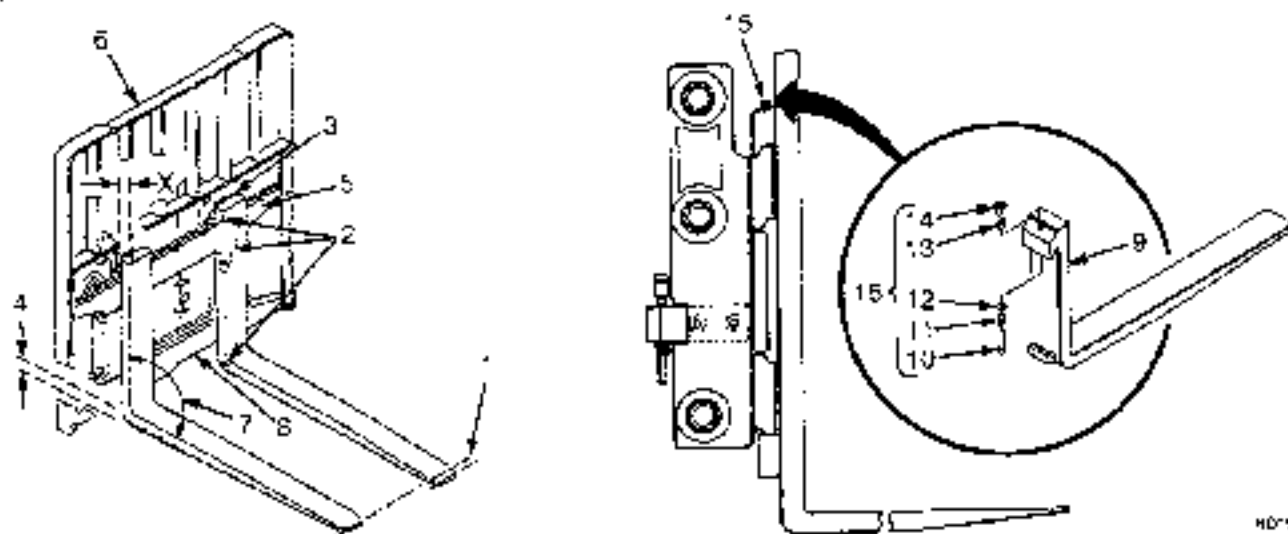


Figure 17. Carriage and Forks

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## Legend for Figure 17

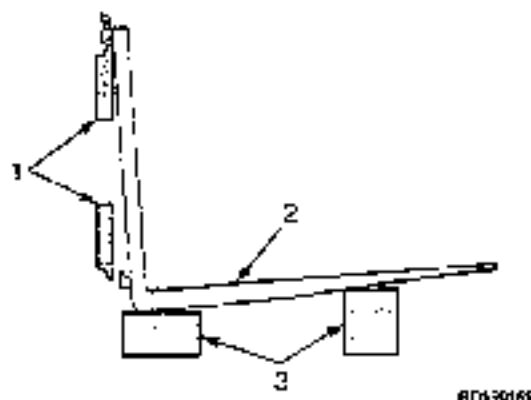
Fork Tip Alignment	
Length of Forks	3% Dimension
915 mm (36 in.)	27 mm (1.10 in.)
1220 mm (48 in.)	37 mm (1.45 in.)
1830 mm (72 in.)	55 mm (2.15 in.)

- |   |                       |
|---|-----------------------|
| 1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH) | 9. FORK               |
| 2. CRACKS   | 10. LOCK PIN          |
| 3. LATCH DAMAGE                                     | 11. SPRING            |
| 4. HEEL OF FORK (MUST BE 90% OF DIMENSION X)        | 12. WASHER            |
| 5. CARRIAGE   | 13. WEDGE             |
| 6. LOAD BACKREST EXTENSION                          | 14. KNOB              |
| 7. MAXIMUM ANGLE 93°                                | 15. LOCK PIN ASSEMBLY |
| 8. FORK REMOVAL NOTCH                               |                       |

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Maintenance



1. CARRIAGE BARS
2. HOOK FORK
3. BLOCKS

Figure 18. Hook Fork Removal

### Inspection of Mast, Carriage, Header Hoses, Lift Chains, and Attachment

(See Figure 17 and Figure 19)

#### WARNING

NEVER work under a raised carriage or forks. Lower the carriage or use chains on the mast weldments and car-

riage so that they cannot 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. **ALWAYS** replace forks in pairs.

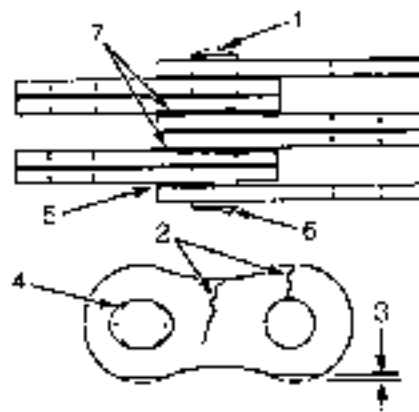
1. Inspect the welds on the mast and carriage for cracks. Make sure that the nuts and bolts are tight.
2. Inspect the channel for excessive wear in the areas of roller contact. Check the load rollers for wear or damage.
3. Inspect the load backrest extension for cracks and damage.
4. Inspect the lift chains for the correct lubrication. Use engine oil or Hyster Chain and Cable Lubricant available from your dealer or for Hyster lift trucks.
5. Visually inspect hoses/fittings for hydraulic leaks; hose cover for cuts, cracks, or exposed reinforcement; defective or broken clamping devices or sheaves, and proper tracking during operation. Adjust/repair/replace hose/components as necessary.

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6. Inspect the lift chains for cracks or broken links and pins. See Figure 19.

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



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

Figure 19. Check the Lift Chains

8. 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 provide information about possible hazards. It is important that all safety labels are installed on the lift truck and can be read.

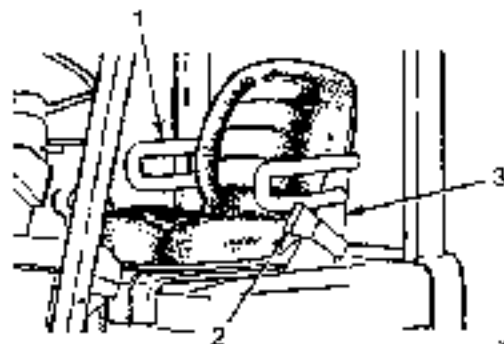
Check that all safety labels are installed in the correct locations on the lift truck. See the **Parts Manual** or the **Frame** section of the **Service Manual** for the correct locations of the safety labels.

## Steering Column Latch

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

## Operator Restraint System

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.



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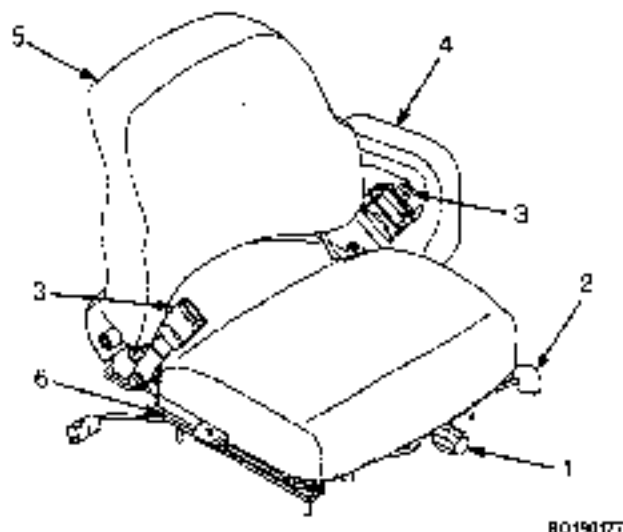
- |                           |
|---------------------------|
| 1. HIP RESTRAINT BRACKETS |
| 2. SEAT BELT              |
| 3. HOOD LATCH             |

Figure 20. Operator Restraint System With ALR Seat Belt

The seat belt, hip restraint brackets, and the seat and mounting are the parts of the operator restraint system. See Figure 20 and Figure 21. The control lever assembly and latch are also part of the operator 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 or torn. If the seat belt cannot be pulled from the belt housing, the seat belt assembly must be replaced. Keep the belt straight so that it pulls out and retracts smoothly.

Make sure the seat rails are not loose (see Figure 21). The seat rails must lock securely in position, but move freely when unlocked. The seat rails must be securely attached to the mounting surface.



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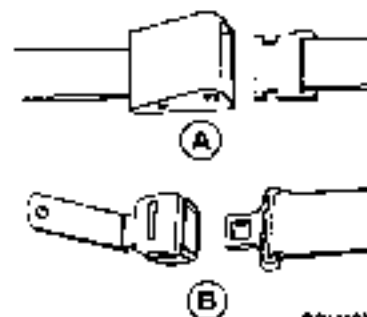
- 1 OPERATOR WEIGHT ADJUSTMENT
- 2 FORWARD/BACKWARD ADJUSTMENT
- 3 SEAT BELT
- 4 HIP RESTRAINT
- 5 SEAT
- 6 SEAT RAIL

Figure 21. Operator Restraint System With ELR Seat Belt

### Automatic Locking Retractor (ALR)

NOTE: Lift trucks produced before November 1, 2005 are equipped with the ALR type seat belts. See Figure 22.

The seat belt must fasten securely. Make sure the seat belt extends and retracts smoothly and is not frayed or torn. If the seat belt is damaged or does not operate properly, it must be replaced.



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- A AUTOMATIC LOCKING RETRACTOR SEAT BELT (ALR)
- B EMERGENCY LOCKING RETRACTOR SEAT BELT (ELR)

Figure 22. ALR and ELR Seat Belts

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## Maintenance

### Emergency Locking Retractor (ELR)

NOTE: Lift trucks produced after November 1, 2005 are equipped with the Emergency Locking Retractor (ELR) style seat belt. See Figure 22.

When the ELR style seat belt is properly buckled across the operator, the belt will permit slight operator repositioning without activating the locking mechanism. If the truck tips over, travels off a dock, or comes to a sudden stop, the locking mechanism will be activated and hold the operator's lower torso in the seat.

A seat belt that is damaged, worn, or does not operate properly will not provide protection when it is needed. The end of the belt must fasten correctly in the latch. The seat belt must be in good condition. Replace the seat belt if it is damaged or worn.

The following seat belt operation checks must be performed:

- With the hood closed and in the locked position, pull the seat belt slowly from the retractor assembly. Make sure

the seat belt pulls out and retracts smoothly. If the seat belt does not pull out of the retractor assembly, the internal latch may be locked. Pull firmly on the seat belt and hold for a moment to remove slack from the belt in the retractor. Release the seat belt. Seat belt will retract and the internal latch will unlock. If the seat belt cannot be pulled from the retractor assembly or the belt will not retract, replace the seat belt assembly.

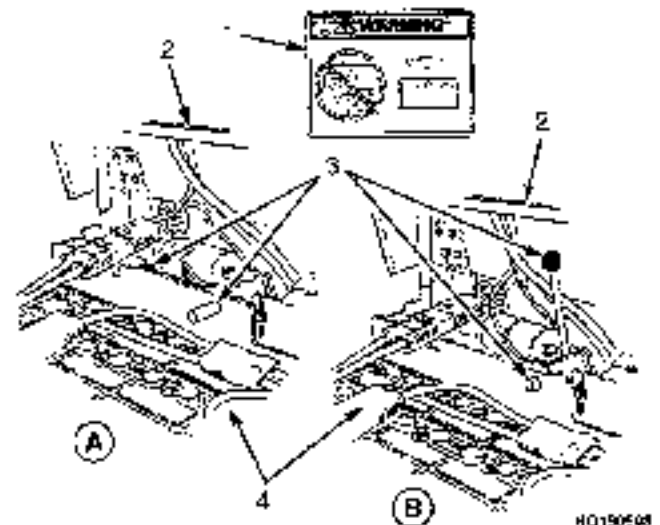
- With the hood closed and in the locked position, pull the seat belt with a sudden jerk. Make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor when it is pulled with a sudden jerk, replace the seat belt assembly.
- With the hood in the open position, make sure the seat belt will not pull from the retractor assembly. If the seat belt can be pulled from the retractor, with the hood in the open position, replace the seat belt assembly.

**Battery Restraint System J40-65Z Lift Trucks****WARNING**

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

The battery restraint is a heavy steel rod at the rear of the battery compartment. See Figure 23. An adjustable spacer plate is used inside the battery compartment to prevent forward and backward movement of the battery. The batteries for these lift trucks must fit the battery compartment width with a maximum of 13 mm (0.50 in.) clearance.

The hood cannot be closed unless the battery restraint is engaged. The battery restraint rod at the top rear of the battery compartment must be aligned over the edge of the battery. The handle of the battery restraint must also be in the down position to close the hood. Use the handle to move the battery restraint rod over the edge of the battery so that the handle can be moved to the down position.



- A.** RETRACTED  
**B.** EXTENDED

1. WARNING LABEL BATTERY RESTRAINT  
2. HOOD  
3. BATTERY RESTRAINT  
4. BATTERY

**Figure 23. Battery Restraint J40-65Z Lift Trucks**

**HYSTER****Maintenance****Battery Restraint System E25-35Z, E40ZS, and E45-65Z Lift Trucks****WARNING**

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

The battery restraint and hood frame is a steel weldment that has a hinge at the front of the battery compartment. See Fig-

ure 24. 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 of the battery in the E25-35Z and E40ZS models. The batteries for the E45-65Z models must fit the battery compartment width with a maximum of 13 mm (0.50 in.) clearance. Maximum movement allowed is 13 mm (0.50 in.) in any horizontal direction.

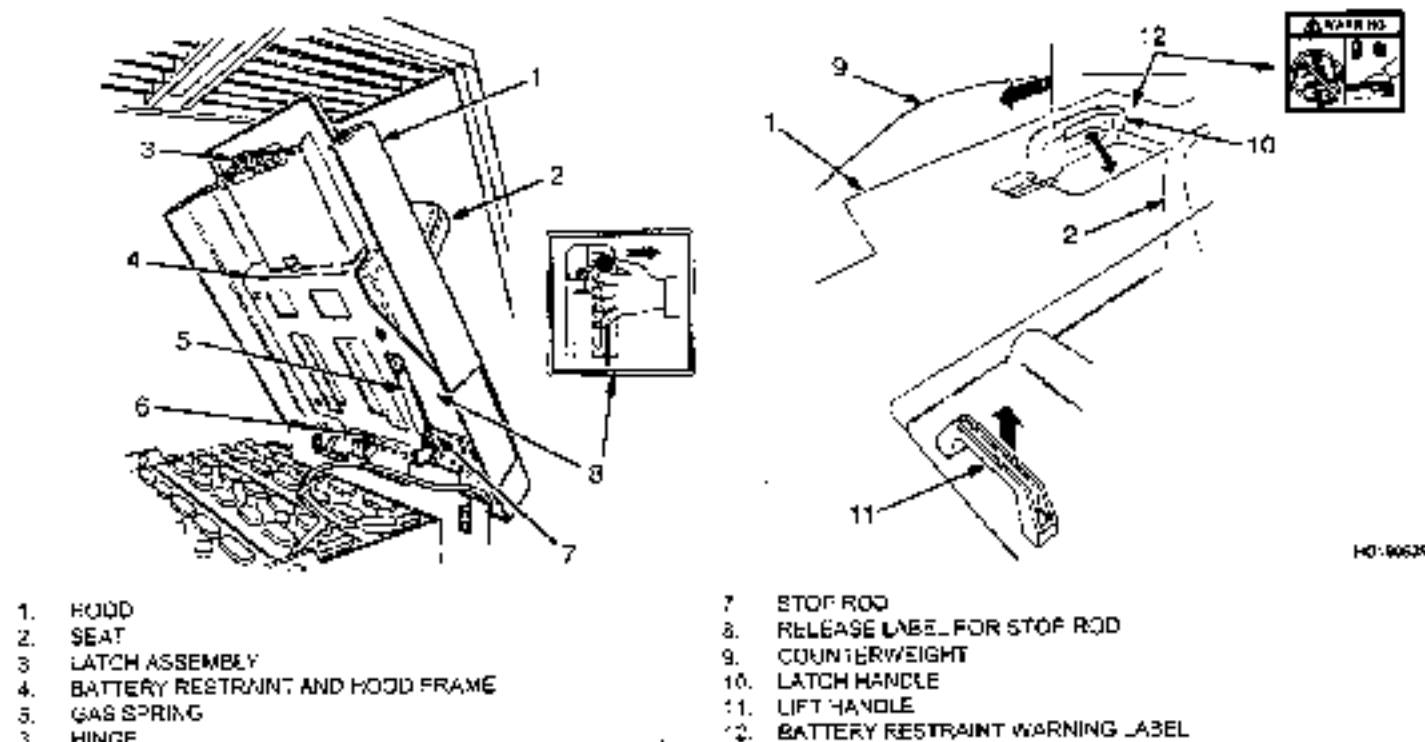


Figure 24. Battery Restraint E25-35Z, E40ZS, and E45-65Z Lift Trucks

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## HYSTER

The hood must be locked in the down position during operation. The battery must have the spacer plate and side spacers correctly adjusted to prevent any horizontal movement of more than 13 mm (0.50 in.). Use the latch handle at the rear of the hood (see Figure 24) 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 seal to raise the hood. A gas spring and stop rod will hold the assembly in the up position. Make sure that the battery cannot move more than 13 mm (0.50 in.) in any one horizontal direction. Release the stop rod by moving it to the right before lowering hood. See the label in Figure 24. 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.

If necessary, adjust the front and side spacer plates for the battery as shown in Figure 30 and Figure 33.

## Maintenance

### Battery

#### WARNING

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

The acid in the electrolyte can cause injury. If the 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.

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.

**NOTE:** There can be one of two types of batteries. One type has removable cell caps. The other type has sealed cells. The sealed batteries require a different charger. The electrolyte level or specific gravity cannot be checked and water cannot be added to the electrolyte.

Make sure that the voltage and the weight of the battery are correct as shown on the Nameplate. See **Battery Specifications** at the back of this manual to check for correct battery dimensions.

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 Nameplate.

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

On batteries with cell caps, check the level of the electrolyte every or a minimum of one cell. Add only distilled water, as necessary, to all cells that do not have the correct electrolyte level. The correct level is halfway between the top of the plates and the bottom of the fill hole.

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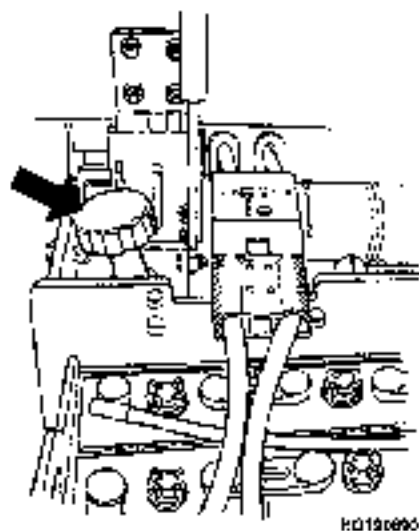


Figure 25. Hydraulic Tank Fill and Dipstick J40-65Z

## Hydraulic System

### 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.

NOTE: The dipstick/fill for J40 65Z trucks is under the hood in front of the counterweight. See Figure 25.

Maintenance

NOTE: The dipstick/fill for the E25-35Z and E40ZS trucks is under the floor plate near the left side. See Figure 26

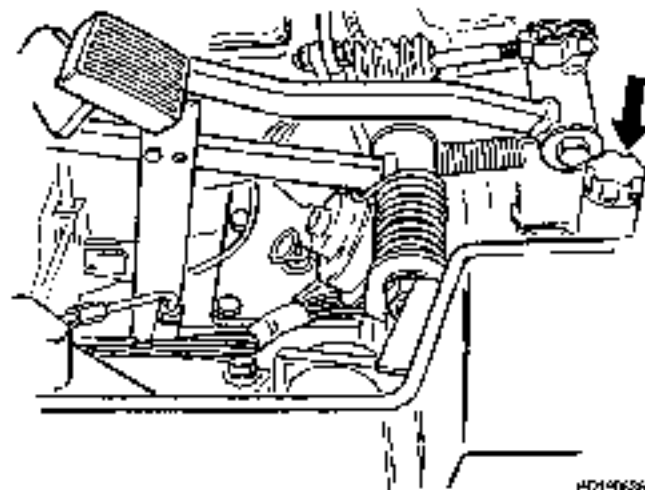


Figure 26. Hydraulic Tank Fill and Dipstick E25-35Z and E40ZS

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**NOTE:** The dipstick/fill for the E45-65Z trucks is under the battery connector on the left side. See Figure 27.



Figure 27. Check Hydraulic Oil E45-65Z

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered, and the key is in the OFF position. 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.

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## HYSTER

3. Check the strobe light by turning the key in the ON position and check the operation of the light. The strobe light can also be operated with a rocker switch.

4. Check the backup alarm on lift trucks equipped with forward and reverse lever by sitting in the seat, turning the key to the ON position, and pulling back on the forward and reverse lever. The alarm will sound.

5. Check the backup alarm on lift trucks equipped with MONO-TROL pedal by sitting in the seat, turning the key to the ON position, and pressing the reverse arrow on the MONO-TROL pedal. The alarm will sound.

### Steering System

#### WARNING

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

Make sure the steering system operates smoothly and provides good steering control. See the Model Description section of this manual.

### How to Make Checks With the Key Switch ON

#### WARNING

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

#### WARNING

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

Make sure that the area around the lift truck is clear before moving the lift truck. Proceed carefully when making the checks.

### Horn, Lights, and Alarm

1. Check the operation of the horn by pressing the horn button on the steering column. The horn will operate when the key is in any position.

2. Check the operation of the lights using the appropriate rocker switch located on the right-hand side of the dash panel. The lights will operate when the key is in any position.

## Maintenance

### Service Brakes

#### WARNING

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

**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.

There is an indicator light on the display panel for the brake oil level. The red light is ON as described in the Model Description section of this manual. If the light is ON during operation, the oil in the reservoir for the brake master cylinder is too low. Add brake oil 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 brake system. 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.

### Parking Brake

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 (a slope that increases 1.5 m in 10 m (1.5 ft increase 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.

### Control Levers and Pedals

Check that the levers for the mast and attachment operate as described in **Model Description** section of this manual. The brake pedals are checked as described in the preceding **Service Brakes and Parking Brake** paragraphs with the operation of the brakes.

### Direction and Speed Control Pedals

Check that the direction and speed control pedals operate as described in the **Model Description** section. Lubricate the direction lever and the accelerator pedal joints as needed. See the **Maintenance Schedule**.

### 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 cannot 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 the pressure.

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

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

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

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

4. Raise the forks 1 m (3 ft) 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 (Table 5). Make sure all of the hydraulic lines are connected correctly and do not leak.

### Oil Leaks

Visually check the hydraulic system, steering system, brake system, and the differential for leaks.

### 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.

### 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.

Use only battery chargers approved by the battery manufacturer or dealer.

### CAUTION

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

**NOTE:** The lift trucks covered in this **Operating Manual** can have one of two types of batteries. One type has removable cell caps. A green key for battery voltage shows in the window of the battery connector for batteries with cell caps. The other type has sealed cells and the electrolyte cannot be

checked. A gray key for battery voltage shows in the window of the battery connector for sealed batteries. These sealed batteries also require a different charger.

**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.

Correct use of the hydrometer (Figure 28) 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 25 °C (77 °F). See Figure 28. Never charge a battery at a rate that will raise the electrolyte temperature above 43 °C (120 °F). Never let a battery stay discharged for long periods.

**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

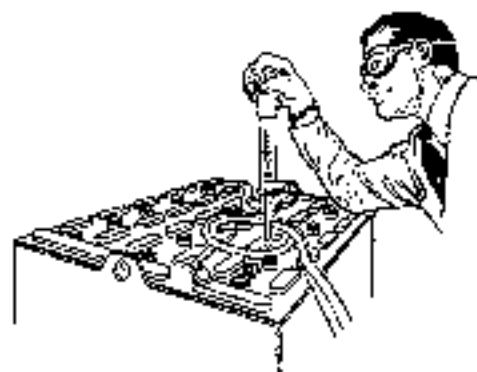
## HYSTER

intervals and has cell caps. Frequent charging of a battery that has a 2/3 or more charge can decrease the life of the battery.

**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.

Also see the section **Industrial Battery 2240 SRM 1** of the **Service Manual** for additional information on the charging and maintenance of a battery.

## Maintenance

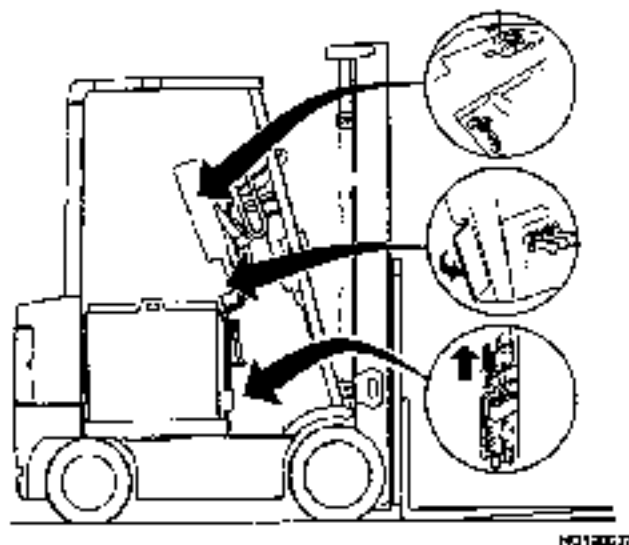


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Specific Gravity Reading	Electrolyte Temp.	Correction Points	Correct Value
1.210	31 °C (87 °F)	-0.003	1.213
1.210	27 °C (80 °F)	-0.001	1.211
1.210	25 °C (77 °F)	0.000	1.210
1.210	19 °C (64 °F)	+0.004	1.206
+0.001 or -0.001 for each 2 degrees C from the 25-degree base value.			

Figure 28. Check Specific Gravity





HC120037

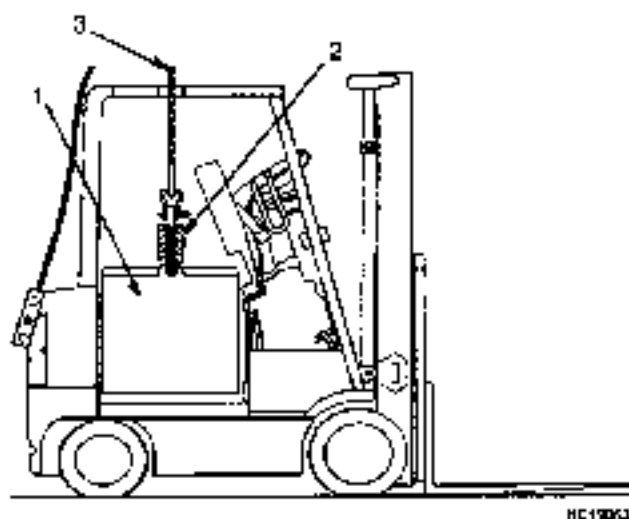
NOTE: MANUAL HYDRAULIC CONTROL SHOWN

**Figure 31. Open the Hood E25-85Z and E40ZS**

Tilt the battery restraint and seat to the up position. Make sure the battery restraint is locked in the up position. If the truck has optional side covers, remove them.

Use a spreader bar and crane to lift the battery from the lift truck. See Figure 32. 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 (E25-85Z and E40ZS only) correctly adjusted to prevent any horizontal movement of more than 13 mm (0.50 in.). There must be enough clearance for battery removal. See Figure 30 and Figure 33.

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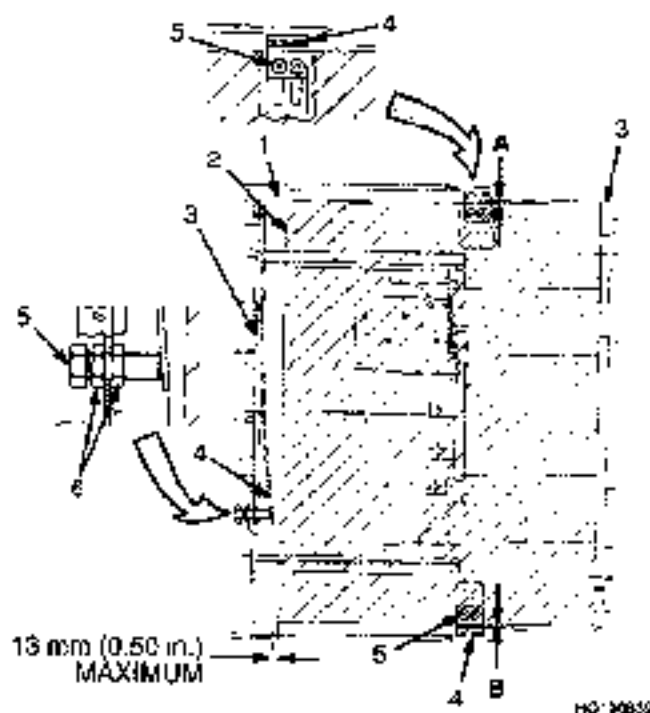


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**Figure 32. Change the Battery E25-85Z and E40ZS****Legend for Figure 32**

NOTE: MANUAL HYDRAULIC CONTROLS SHOWN.

1. BATTERY
2. SPREADER BAR
3. CRANE CHAIN



NOTE: A + B = 13 MM (0.50 IN.) MAXIMUM.

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

Figure 33. Spacers of Battery Compartment E25-35Z and E40ZS

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## HYSTER

## Maintenance

### WARNING

Correct operation of the battery restraint system requires that the battery does not move more than 13 mm (0.50 in.) in any horizontal direction. Make sure the front battery spacer plate and side spacers (E25-35Z and E40ZS only) are correctly adjusted.

If the lift truck has side covers, install them. Lower the hood. Release the stop rod by moving it to the right before lowering hood. See the label in Figure 24. Make sure the latch handle is fully to the right when closing the hood so that the latch can engage the latch piece. On E45-65Z (G108) lift trucks equipped with E-Hydraulic controls, move the cover over the hood. See Table 1. 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 lift truck has a side door, make sure it is closed.

Connect the battery connector.

### Wheels and Tires

#### Solid Rubber Tires

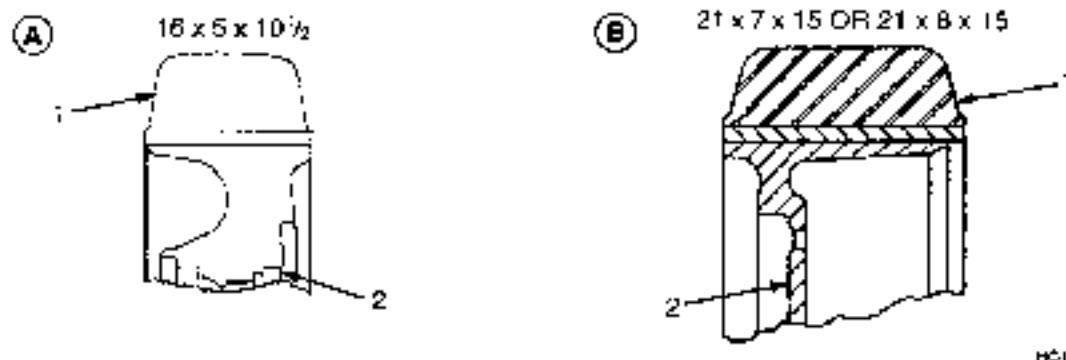
### WARNING

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

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

Always wear safety glasses.

The models of lift trucks beginning with an 'ERC' are equipped with solid rubber tires. See Figure 34. Solid rubber tires made from softer or harder materials can be installed as optional equipment. The tread on solid rubber tires can be either smooth or it can have lugs. Electric or dual compound tires are recommended. Do not mix types of tires or tread on the lift truck.



**A. STEERING TIRES AND WHEELS**

1. SOLID RUBBER TIRE

**B. DRIVE TIRES AND WHEELS**

2. WHEEL

Figure 34. Tires and Wheels E25-35Z, E40ZS, and E45-65Z Trucks

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## HYSTER

## Maintenance

### Remove the Wheels From the Lift Truck

#### **WARNING**

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

Raise the lift truck as described in **How to Put a Lift Truck on Blocks** in this manual.

Remove the wheel nuts or spindle nut and remove the wheel from the lift truck. Lift truck wheels are heavy.

### Remove and Install the Tire on the Wheel

**NOTE:** Make sure the tires are installed on the wheels so that the outside edges of the tire and wheel are as shown in Figure 34. Also check the Nameplate of the lift truck for the correct tire size and tread width.

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 355 to 1779 kN (80,000 to 400,000 lb). For the tire sizes, see the Nameplate.

#### **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. When the nuts stay tight for eight hours, the interval for checking the torque can be extended to 500 hours.

When the drive wheels are installed on the lift truck, tighten the wheel nuts to the torque value shown in the **Maintenance Schedule**.

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 68 N·m (50 lbf ft) 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, lighten the castle nuts to 3 N·m (25 lbf in). Install the cotter pins at the nearest alignment positions. Install the hub cap. Additional torque checks are not required.

## Solid Rubber Tire, Disassemble

 **WARNING**

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

**NOTE:** When you disassemble the wheels, see Figure 34 and Figure 35. There are several types of wheels used on these series of lift trucks.

See **Remove Solid Rubber Tire From Wheel** for disassembly procedures.

*Remove Solid Rubber Tire From Wheel* **WARNING**

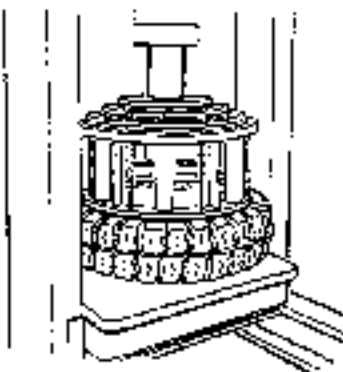
Failure to follow these procedures will cause damage to the tire and wheel assembly and can cause an injury.

- Clean and inspect all parts of the wheel before installing the tire.

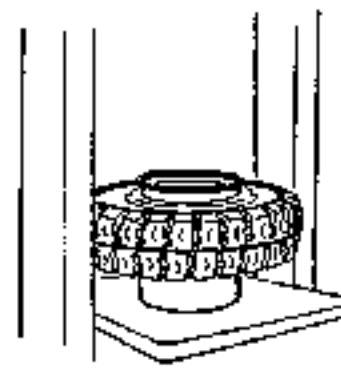
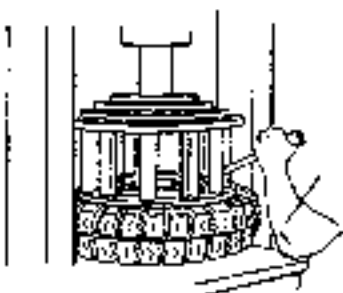
- **DO NOT** use any damaged or repaired wheel parts.
- **Make sure that all parts of the wheel are the correct parts for that wheel assembly.**
- **DO NOT** mix parts between different types or manufacturers of wheels.
- **DO NOT** mix types of tires, type of tire tread, or wheel assemblies of different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

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

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

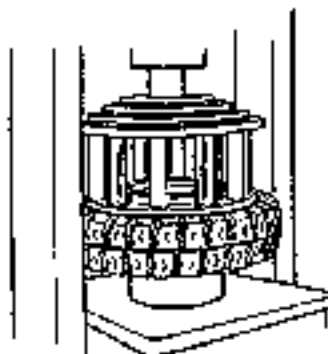


2. Put the tire tool into the slot between the lock ring and the wheel rim. Remove the lock ring and side flange. If there is a flange seat, remove it.



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

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



**Solid Rubber Tire, Assembly****⚠ WARNING**

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

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

Do not use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together. Make sure that the lock ring is in the correct position. The ends of the lock ring must not touch. The clearance at the ends of the lock ring will be approximately 13 to

25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

**NOTE:** When you assemble the wheels, see Figure 34 and Figure 35. There are several types of wheels used on these series of lift trucks. Do not use a two-piece pneumatic wheel for solid rubber tires.

See **Install Solid Rubber Tire on Wheel** for procedures to assemble the tire and wheel.

*Install Solid Rubber Tire on Wheel***⚠ WARNING**

Damage to tire and wheel assembly and injury or death can occur if you do not do the following procedures:

- Clean and inspect all parts of the wheel before installing the tire.
- **DO NOT** use any damaged or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for the wheel assembly.
- **DO NOT** mix parts between different types or manufacturers of wheels.

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**HYSTER**

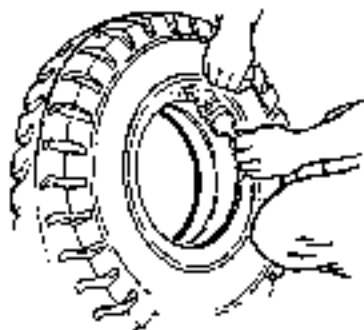
- **DO NOT** mix type of tires, type of tire tread, or wheel assemblies of different manufacturers on any one lift truck.

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

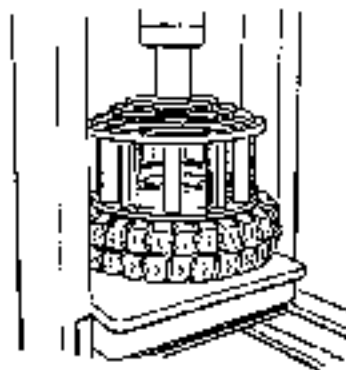
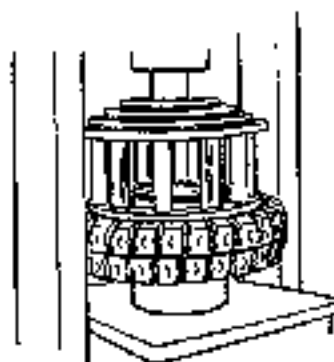
**⚠ CAUTION**

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

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



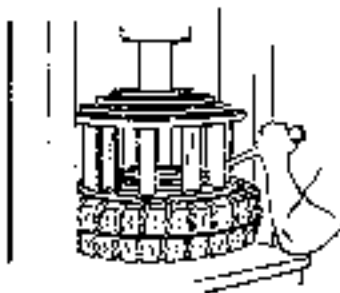
2. Put the wheel rim on the bed of the press. Put the tire over the wheel rim. Put the cage in position on the tire. Use the press to install the tire on the wheel rim.



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

## Maintenance

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



### Pneumatic Tires and Wheels

(See Figure 35; Pneumatic Tire Removal, Two-Piece Wheel; Pneumatic Tire Removal, Three- or Four-Piece Wheel; Install Wheel in Pneumatic Tire, Three- or Four-Piece Wheel; Install Wheel in Pneumatic Tire, Two-Piece Wheel; and Figure 36)

#### Remove Wheels From Lift Truck

### WARNING

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

rim can cause a failure of the wheel and cause an accident.

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

### WARNING

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

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

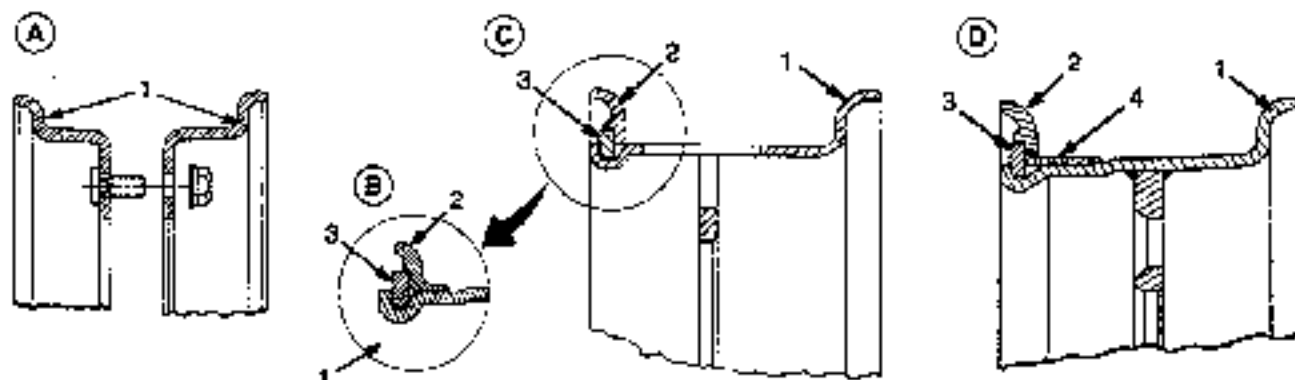
Always wear safety glasses.

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

1. Put the lift truck on blocks as described in **How to Put a Lift Truck on Blocks** at the beginning of this section.
2. Remove the air from the tire. Remove the valve core to make sure that all of the air is out of the inner tube. Push a wire through the valve stem to make sure that the valve stem does not have a restriction.

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3. Remove the wheel nuts and remove the wheel and tire from the lift truck. Lift truck tires and wheels are heavy. See Figure 35.



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- A. TWO-PIECE WHEEL  
B. OPTIONAL RIM ASSEMBLY

- C. THREE-PIECE WHEEL  
D. FOUR-PIECE WHEEL

1. WHEEL RIM  
2. SIDE FLANGE

3. LOCK RING  
4. FLANGE SEAT

Figure 35. Types of Wheels for Pneumatic and Solid Pneumatic Tires

## Pneumatic Tires and Wheels, Disassemble

### Remove Wheel From Pneumatic Tire

(See *Pneumatic Tire Removal, Two-Piece Wheel* or *Pneumatic Tire Removal, Three- or Four-Piece Wheel*)

#### WARNING

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

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

**NOTE:** There are three types of wheels that can be used on these series of lift trucks. See Figure 35. Make sure you use the correct procedure.

### *Pneumatic Tire Removal, Two-Piece Wheel*

#### WARNING

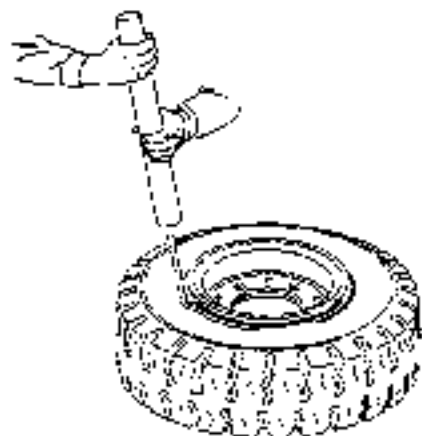
Make sure all of the air pressure is removed from the tire before a wheel is disassembled. Air pressure in the tires can cause the tire and rim parts to explode causing serious injury or death.

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

1. Remove the nuts that fasten the wheel rims together

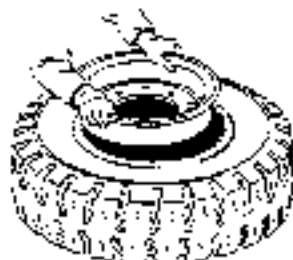


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2. Loosen the tire bead from the wheel rim.

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



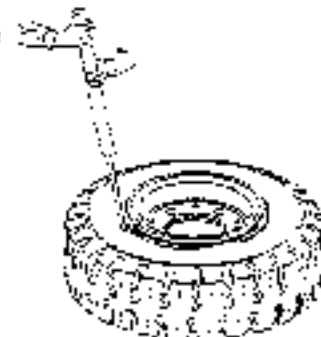
### *Pneumatic Tire Removal, Three- or Four-Piece Wheel*

#### WARNING

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

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

1. Loosen the tire bead from the side flange.



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



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



4. Remove the wheel rim from the tire.



### Pneumatic Tires and Wheels, Assemble

#### Install Wheel in Pneumatic Tire

(See *Install Wheel in Pneumatic Tire, Three- or Four-Piece Wheel* or *Install Wheel in Pneumatic Tire, Two-Piece Wheel*)

**NOTE:** There are two types of wheels used on this series of lift trucks. See Figure 35. Make sure you use the correct procedure.

#### **WARNING**

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

- Clean and inspect all parts of the wheel before installing the tire.

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

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

1. Clean and inspect all parts of the wheel. Paint any parts that have rust or corrosion.
2. Install a new inner tube in the tire. Used tubes and flaps can cause tire failure.

## Maintenance

#### **WARNING**

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

3. Apply a rubber lubricant or a soap solution to the tire bead and tube.
4. Install a new tire flap.

#### **WARNING**

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

5. Make sure the rim is the correct size for the tire. Lubricate the part of the wheel that contacts the bead and flap.
6. Install the three-piece or four-piece wheel in the tire as shown in *Install Wheel in Pneumatic Tire, Three- or Four-Piece Wheel*. Install the two-piece wheel in the tire as shown in *Install Wheel in Pneumatic Tire, Two-Piece Wheel*.



### Install Wheel in Pneumatic Tire, Three- or Four-Piece Wheel

#### WARNING

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

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

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



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



3. Turn over the rim and tire. Put blocks under the rim so that the rim is 8 to 13 cm (3 to 4 in.) above the floor. Install the flange seal (if used) and the lock ring.

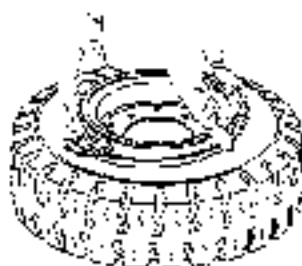


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## HYSTER

## Maintenance

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



2. Tighten the nuts that hold the rim halves together to 95 N·m (70 lbf ft). Add air pressure to the tire as described in **Add Air to Tires**.



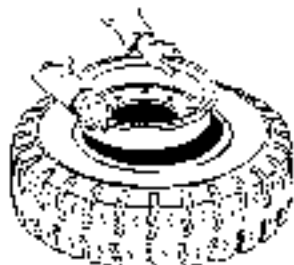
**Add Air to Tires**  
(See Figure 36)

#### WARNING

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

### Install Wheel in Pneumatic Tire, Two-Piece Wheel

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

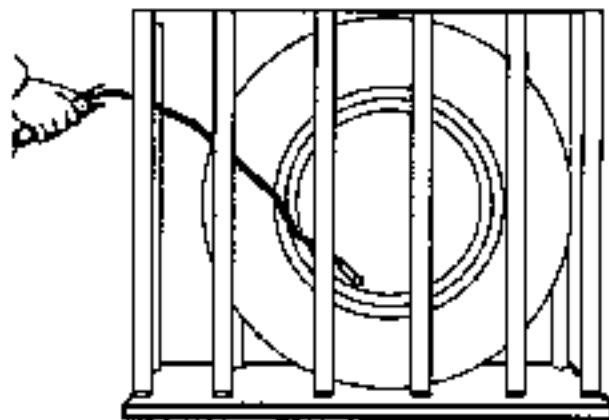


**WARNING**

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

1. Put the tire in a safety cage. See Figure 36.
2. Add 20 kPa (3 psi) of air pressure to the tire.
3. Check that all wheel parts are correctly installed. Hit the lock ring lightly to make sure that it is in the seat.
4. If installation is correct, add air pressure to the tire to the specified pressure.
5. Check that all wheel parts are correctly installed. If installation is not correct, remove all of the air pressure from the tire. Remove the valve core to make sure all of the air pressure has been removed and then make adjustments. The clearance at the ends of the lock ring will be approximately

13 to 25 mm (0.5 to 1.0 in.) when the tire has the correct air pressure.



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Figure 36. Add Air to Tires

## HYSTER

*Install the Wheels***CAUTION**

Check all steer 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 500 hours.

Install the wheel on the hub. Tighten the nuts as shown in the Maintenance Schedule.

## Solid Rubber Tires on Pneumatic Wheels

### Remove Wheels From Lift Truck

#### WARNING

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

Always wear safety glasses.

1. Put the lift truck on blocks as described in *How to Put a Lift Truck on Blocks* at the beginning of this section.
2. Remove the wheel nuts and remove the wheel and tire from the lift truck. Lift truck tires and wheels are heavy.

## Solid Rubber Tires on Pneumatic Wheels, Disassemble

### Remove Solid Rubber Tire From Pneumatic Wheel

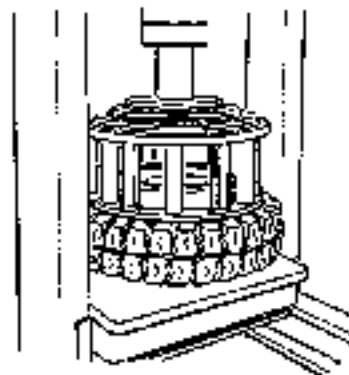
**NOTE:** There are several types of pneumatic wheels used on these trucks. See Figure 35.

#### WARNING

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

Disassemble the wheels as follows:

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

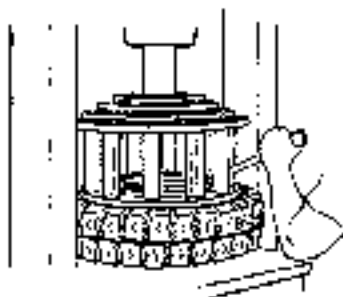


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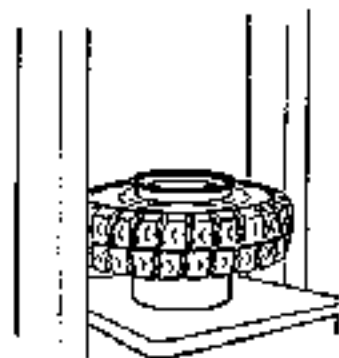
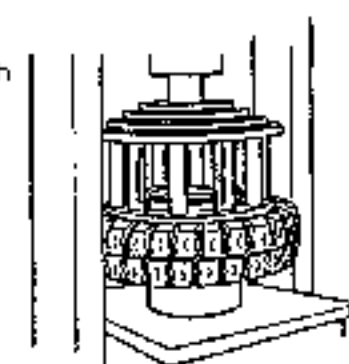
## HYSTER

## Maintenance

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



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



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

## Solid Rubber Tires on Pneumatic Wheels, Assemble

### Install Solid Rubber Tire on Pneumatic Wheel

NOTE: There are several types of pneumatic wheels used on these trucks. See Figure 35. DO NOT use a two-piece pneumatic wheel for solid rubber tires.

#### WARNING

Damage to the tire and wheel assembly and injury or death can occur if you do not do the following procedures:

- Clean and inspect all parts of the wheel before installing the tire.
- Do NOT use any damaged or repaired wheel parts.
- Make sure that all parts of the wheel are the correct parts for the wheel assembly.
- Do NOT mix parts between different types or manufacturers of wheels.
- Do NOT use a steel hammer on the wheel. Use a rubber, lead, plastic, or a brass hammer to put parts together. Make sure that the lock ring must not touch.

The clearance at the ends of the lock ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

Install the tire on the wheel as follows:

#### WARNING

Damage to tire and wheel assembly and injury or death can occur if you do not do the following procedures:

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

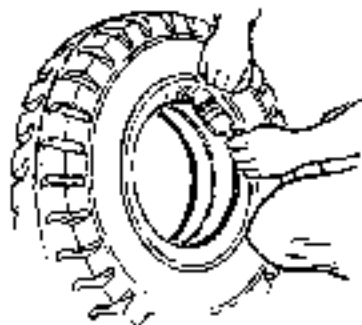
Do not use a steel hammer on the wheel. Use a rubber, lead, plastic, or brass hammer to put parts together.

Make sure that the lock ring is in the correct position. The ends of the lock ring must not touch. The clearance at the ends of the side ring will be approximately 13 to 25 mm (0.5 to 1.0 in.) after it is installed. If the clearance is wrong, the wrong part has been used.

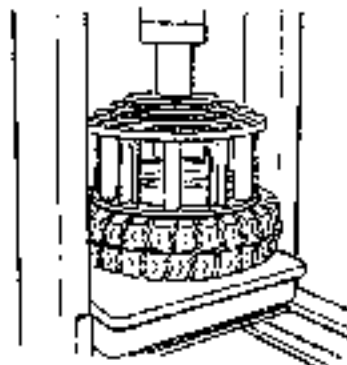
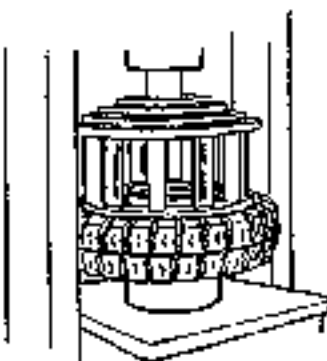
#### CAUTION

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

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

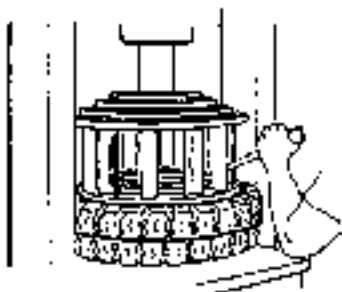


2. Put the wheel rim on the bed of the press. Put the tire over the wheel rim. Put the cage in position on the tire. Use the press to install the tire on the wheel rim.



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

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



#### Install the Wheels

#### CAUTION

Check all wheel bolts or 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 wheel nuts in a cross pattern to the correct torque value shown in the Maintenance Schedule. When the wheel nuts stay tight for eight hours, the interval for checking the torque can be extended to 500 hours.

Install the wheel on the hub. Tighten the nuts as shown in the Maintenance Schedule.

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## HYSTER

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.

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 lift 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.

## 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, it is recommended remove the forks and tag them with the truck serial number.

## Maintenance

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, too 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  $-7.8^{\circ}\text{C}$  ( $18^{\circ}\text{F}$ ). A fully charged battery with a specific gravity of 1.280 will freeze at  $-66^{\circ}\text{C}$  ( $-86.8^{\circ}\text{F}$ ).

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.

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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 500 ml. of baking soda in one 4.0 L. 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 and 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.

### How to Put a Lift Truck Back Into Service

Electric lift trucks are best protected by being operated for a short period of time each month as stated in the section **How to Put an Electric Sit Down Rider Truck in Storage**. Before

returning an electric lift truck to service, perform the following checks:

1. Install battery into lift truck. See the section **How to Change Batteries** in this maintenance section for procedures. If a new battery will be installed, give an equalizing charge before using. If a used battery will be installed, it must be fully charged and allowed to balance for approximately three hours before using.
2. If the forks were removed, install forks.
3. Operate the truck with the motor at its normal temperature for at least five minutes. This will clean any dirt or rust, caused by condensation, from the drive motor.
4. Operate the hydraulic cylinders through a complete operation cycle to coat the interior walls with oil. Operate each cylinder to the stop in both directions.
5. Check all fluid levels.
6. Check condition of tires and check the air pressure in the tires if truck is equipped with pneumatic tires.

### How to Move a Lift Truck on a Transport

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

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

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

### Loading

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

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

1. Apply the parking brake.
2. If the mast is mounted on the lift truck, fully lower the forks or carriage. Tilt the mast **FORWARD** until the tips of the forks touch the surface.
3. Put the direction control lever in **NEUTRAL**.
4. Turn the key switch to the **OFF** position. Check that all switches and accessories are turned off.

### WARNING

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

### CAUTION

Make sure that any straps or chains used to fasten the lift truck to the transport do not contact any tubes.

hoses, hydraulic cylinders, or other parts of the truck that are easily damaged.

5. Secure the lift truck tires to the transport vehicle using straps or chains.
6. Put blocks in front and back of the lift truck tires to prevent any movement of the lift truck. Make sure the blocks are attached to the load surface.

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

### Unloading

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

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

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

### Preparation for Use

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

### Preparation After Transport

1. Complete the unloading procedures.
2. Inspect the lift truck for damage and missing components.
3. Follow the steps in the section **How to Make Checks With the Key Switch OFF**.

### 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. Changes that are made by welding or by drill-

ing 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 performing any changes to the overhead guard.

### Battery Specifications

Table 7. Battery Specifications J40-65Z

Model	Min. Compartment Size Length × Width	Battery Size Minimum/Maximum		Weight	
		Length	Width	Minimum	Maximum
J40-50Z	712 × 1032 mm (28 × 40.6 in.)	1025/1028 mm (40.4/40.5 in.)	708/711 mm (27.9/28.0 in.)	1470 kg (3241 lb)	1879 kg (4142 lb)
J50-65Z	858 × 1032 mm (33.7 × 40.6 in.)		852/855 mm (33.5/33.6 in.)	1770 kg (3902 lb)	2233 kg (4923 lb)

The tolerances of the battery compartment are +3 and -0 mm (0.118 and -0 in.). The battery size column shows the size range that will permit the battery to still fit into a battery compartment.

The battery compartment length is front to back. Width is side to side. The "length" dimension of the battery must fit within the battery compartment side-to-side dimension with a clearance of 0 to 13 mm (0.50 in.) maximum. Battery width must fit within the battery compartment front-to-back dimension.

### WARNING

The battery must fit the battery compartment so that the battery restraint system will operate correctly. Use only batteries with the correct length shown above. Adjust the spacer plate and side spacers to prevent the battery from moving more than 13 mm (0.50 in.) forward or backward.

Table 8. Battery Specifications E25-35Z and E40ZS

Model	Min. Compartment Size Length × Width	Battery Size Minimum/Maximum		Weight	
		Length	Width	Minimum	Maximum
E25Z	695 × 878 mm (27.4 × 34.6 in.) OR	784/876 mm (30.9/34.5 in.) OR	654/692 mm (25.8/27.2 in.)	794 kg (1750 lb)	1132 kg (2496 lb)
F30Z				839 kg (1850 lb)	
E35Z	695 × 909 mm (27.4 × 35.8 in.)	784/907 mm (30.9/35.7 in.)		917 kg (2022 lb)	
E40ZS				943 kg (2079 lb)	

The tolerances of the battery compartment are +3 and -0 mm (0.118 and -0 in.). The battery size column shows the size range that will permit the battery to still fit into a battery compartment.

The battery compartment length is front to back. Width is side to side. The "length" dimension of the battery must fit within the battery compartment side-to-side dimension with a clearance of 0 to 13 mm (0.50 in.) maximum. Battery width must fit within the battery compartment front-to-back dimension.

### WARNING

The battery must fit the battery compartment so that the battery restraint system will operate correctly. Use only batteries with the correct length shown above. Adjust the spacer plate and side spacers to prevent the battery from moving more than 13 mm (0.50 in.) forward or backward.



Table 9. Battery Height Specifications E25-35Z and E40ZS

Model	Battery Type	Maximum Height - Standard Hood				Maximum Height - Raised Hood			
		With Battery Tray*	With Cell Cap**	Cell Connectors and Terminals		With Battery Tray*	With Cell Cap**	Cell Connectors and Terminals	
				Electrically Insulated***	Not Electrically Insulated***			Electrically Insulated***	Not Electrically Insulated***
E25-35Z, E40ZS	I	613 mm (23.9 in.)	600 mm (23.4 in.)	600 mm (23.4 in.)	581 mm (22.9 in.)	645 mm (25.2 in.)	632 mm (24.9 in.)	553 mm (21.7 in.)	613 mm (23.9 in.)
E25-35Z, E40ZS	II, III		NA	NA	NA		NA	NA	NA

NA - Not Applicable

#### BATTERY TYPES

TYPE I - Battery without a cover as part of the battery.

TYPE II - Battery with a cover that is flat and is fastened to case of battery. Cover opens from FRONT OR REAR when installed in lift truck.

TYPE III - Battery with a cover that is flat and is fastened to case of battery. Cover opens from SIDE when installed in lift truck.

\*Battery Types II and III bottom of battery to highest point (top of cover or top of hinge)

\*\*Minimum height below top of battery tray is 4 mm (0.16 in.)

\*\*\*Minimum height below top of battery tray is 0.5 mm (0.02 in.)



#### WARNING

The battery must fit the battery compartment so that the battery restraint system will operate correctly. Use only batteries with the correct length shown in above. Adjust the spacer plate and side spacers to prevent the battery from moving more than 13 mm (0.50 in.) forward, backward, or to the side.

Table 10. Battery Specifications E45-65Z

Model	Min. Compartment Size Length x Width	Battery Size Minimum/Maximum		Weight	
		Length	Width	Minimum	Maximum
E45-50Z	688 x 897 mm (27.4 x 35.5 in.)	976/993 mm (38.5/39.1 in.)	621/691 mm (24.0/27.2 in.)	1043 kg (2300 lb)	1497 kg (3300 lb)
E55-50Z	842 x 987 mm (33.1 x 38.9 in.)		600/638 mm (23.5/25.1 in.)	1317 kg (2903 lb)	1771 kg (3904 lb)
E60-55Z	1010 x 887 mm (39.8 x 34.9 in.)		1021/1026 mm (39.9/39.9 in.)	1553 kg (3424 lb)	1998 kg (4405 lb)

617 mm (24.3 in.) = maximum height for batteries with a cover.

556 mm (21.9 in.) = maximum height for batteries without a cover.

The tolerances of the battery compartment are +3 and -0 mm (0.118 and -0 in.). The battery size column shows the size range that will permit the battery to fit into a battery compartment.

The battery compartment length is front to back, width is side to side. The "length" dimension of the battery must fit within the battery compartment side-to-side dimension with a clearance of 0 to 10 mm (0.50 in.) maximum. Battery width must fit within the battery compartment front-to-back dimension.



#### WARNING

The battery must fit the battery compartment so that the battery restraint system will operate correctly. Use only batteries with the correct length shown above. Adjust the spacer plate and side spacers to prevent the battery from moving more than 13 mm (0.50 in.) forward or backward.

## NOTES

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## NO MATTER HOW YOU SAY IT . . .

La Sécurité Ça Se Paye  
 La Seguridad Compensa  
 Betriebsicherheit Macht Sich Bezahlt  
 Passaa Oll Huqlellinen  
 Veiligheid Voor Alles  
 Sakerhet Först  
 Essere Sicuro Paga  
 Seguranca Paga  
 Sikkerhet Først  
 Pinter Be Awas

सबधान और बिन्दा रहौ ।

في التاني السومة

安全第一

**SAFETY  
PAYS!**

**⚠ 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.

# OPERATING MANUAL

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**SitDrive®**

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**J40-65Z (A416)  
E25-35Z and E40ZS (E114)  
E45-65Z (G108)**



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**DO NOT REMOVE THIS MANUAL FROM THIS UNIT**

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