

width of the disabled lift truck. Center the weight of the disabled lift truck on the forks and be careful not to damage the under side of the lift truck.

### HOW TO TOW THE LIFT TRUCK

1. The towed lift truck must have an operator.
2. Tow the lift truck slowly.
3. Raise the carriage and forks approximately 30 cm (12 inches) from the surface. Install a chain to prevent the carriage and mast channels from moving.
4. If another lift truck is used to tow the disabled lift truck, that lift truck must have an equal or larger capacity than the disabled lift truck. Install 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. Make sure the tow chain has the capacity to tow the weight. Make sure the chain is fastened so that the chain will not cause damage to either lift truck.

### HOW TO PUT A LIFT TRUCK ON BLOCKS



**WARNING:** The lift truck must be put on blocks for some types of maintenance and

repair. The removal of the following assemblies will cause large changes in the center of gravity: mast, drive axle, battery, and the counterweight.

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

1. Before removing the mast and drive axle, put blocks under the counterweight so that the lift truck cannot tip backward.
2. Before removing the battery or 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 TIRE (SEE FIGURE 6.)

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.

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 TIRE  
(SEE FIGURE 6.)**

1. 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 tire. Make sure that the jack has a capacity of at least 2/3 of the total weight of the lift truck as shown on the nameplate.
3. Put the jack under the steering axle or frame to raise the lift truck. Put blocks under the frame to support the lift truck.

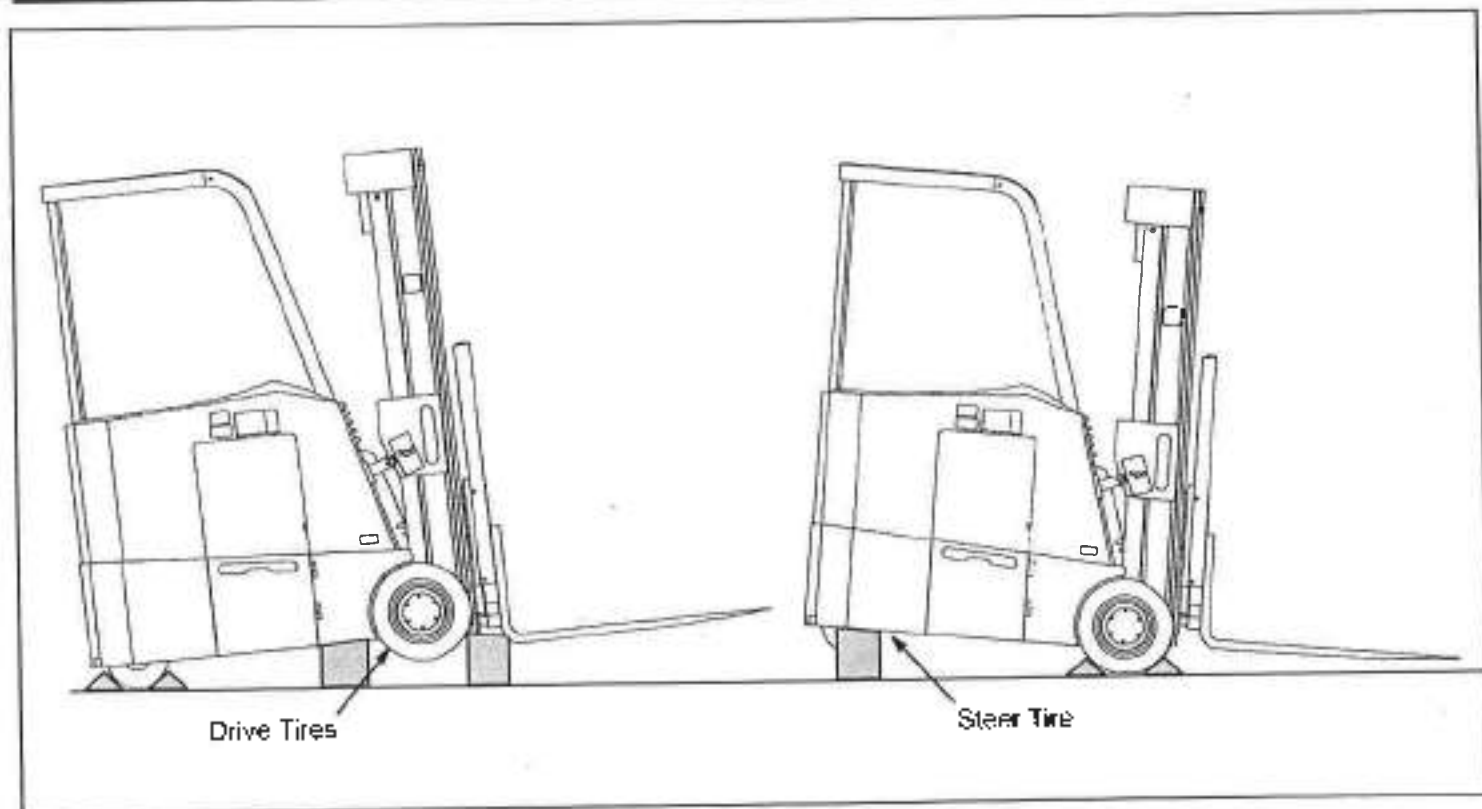



FIGURE 6. PUTTING THE LIFT TRUCK ON BLOCKS

**MAINTENANCE PROCEDURES**


 **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.

 **CHECKS WITH THE KEY SWITCH OFF**


Inspect the lift truck every eight hours or daily between use. Put the lift truck on a level surface. Lower the carriage and forks and turn the key to the **OFF** position. 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 checks 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".

**HYDRAULIC SYSTEM**

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

 **WARNING:** Do not try to locate hydraulic leaks by putting hands on pressurized hydraulic components. Hydraulic oil can be injected into the body by pressure. At operating temperature the hydraulic oil is **HOT**. Do not permit the oil to contact the skin and cause a burn.

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

 **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.

**FORKS**

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

## Adjustment

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

## Removal



**WARNING:** Do not try to lift a fork without a lifting device. On some trucks the forks can weigh up to 180 kg (400 lb) each.

Slide a hook fork to the fork removal notch on the carriage. Lower the fork onto blocks so that the bottom hook of the fork moves through the fork removal notch. Lower the carriage further so that the top hook of the fork is disengaged from the top carriage bar. Move the carriage away from the fork, or use a lifting device to move the fork away from the carriage. On sideshift carriage, remove bolt from removal notch.

## Installation

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

## INSPECTION OF MAST, FORKS, AND LIFT CHAINS



**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. See the PERIODIC MAINTENANCE section included with this truck for specific instructions.

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

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

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

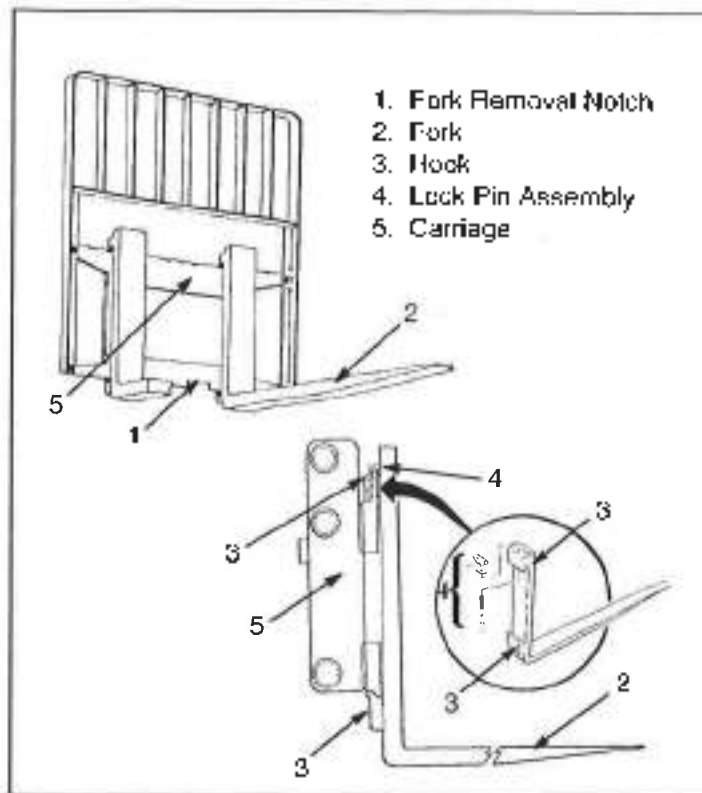


FIGURE 7. HOOK FORK

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

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

4. Inspect the forks for cracks and wear. Check that the fork tips are aligned within 3% of the length of the fork of each other [40 mm (1.5 in.) for a 1220 mm (48 in.) fork]. Some applications can require closer alignment. Check that the bottom of the fork is at least 90% of dimension "X". See Item 4, FIGURE 9

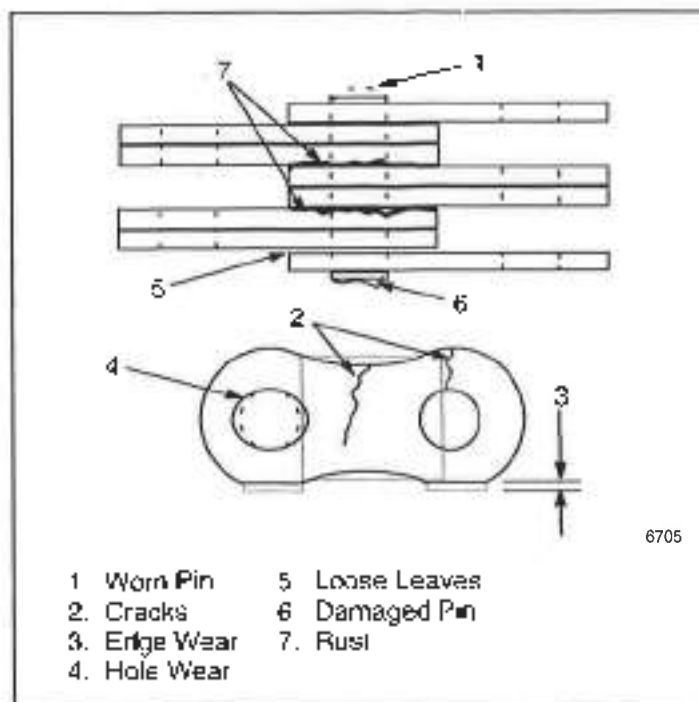
5. Replace any damaged or broken parts that are used to keep the forks locked in position.

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

7. Check that the lift chains are correctly lubricated. See the **PERIODIC MAINTENANCE** section included with this truck for specific instructions

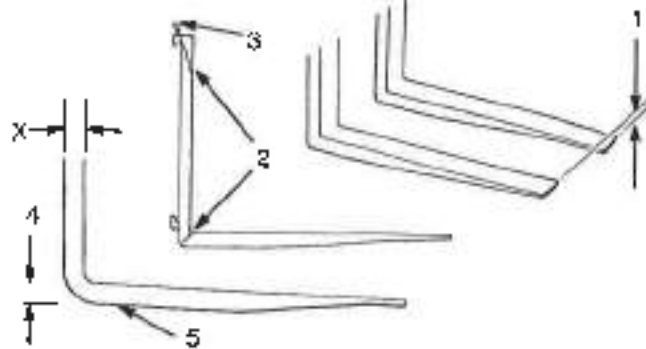
8. Inspect the lift chains for cracks or broken links and pins

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



**FIGURE 8. CHECK THE LIFT CHAINS**

1. Tip Alignment (Must be within 3% of Fork Length)
2. Cracks
3. Latch Damage
4. Heel of Fork (Must be 90% of Dimension "X")
5. Heel Wear



**FORK TIP ALIGNMENT**

Length of Forks	3% Dimension
914 mm (36 in)	27 mm (1.10 in)
1067 mm (42 in)	32 mm (1.10 in)
1220 mm (48 in)	37 mm (1.44 in)
1371 mm (54 in)	40 mm (1.58 in)
1524 mm (60 in)	46 mm (1.80 in)

**FIGURE 9. CHECK THE FORKS**

10. Make sure the lift chains are adjusted so that they have equal tension. If the chains need to be replaced or adjusted it must be done by authorized personnel.

### STEERING SYSTEM

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

### BATTERY



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

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

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 rear 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.

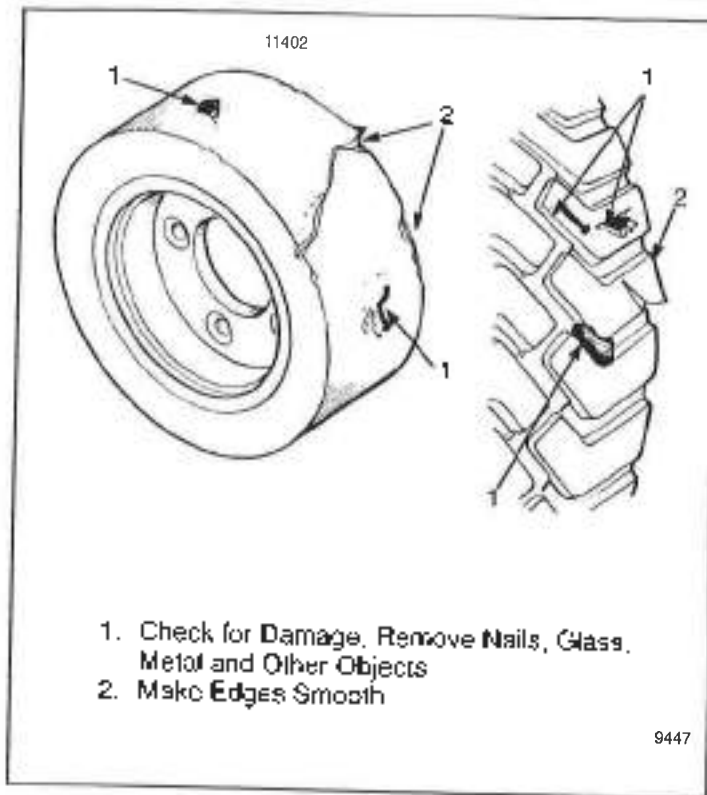
Make sure the battery is charged and has the correct voltage and ampere rating for the lift truck. See the nameplate.

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 daily on 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 half-way between the top of the plates and the bottom of the fill hole.



**WARNING:** Batteries are heavy and can cause injury. Use extreme caution when moving a battery to check the fluid level in the cells. Always use the battery puller and stand to move the battery. See **FIGURE 12**.



**FIGURE 10. CHECK THE TIRES**

### TIRES AND WHEELS

Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts, and other damage. 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. (SEE FIGURE 10)

Make sure the wheel nut is tight. Tighten the wheel nut to 60 ft lbs of torque



**CAUTION:** Check wheel nut after 2 to 5 hours of operation: when new lift trucks begin operation and on all lift trucks when they have been removed and installed. Tighten the nut to the 60 ft. lbs. of torque. When the nut stays tight for eight hours, the interval for checking the torque can be extended to 350 hours.

### SAFETY LABELS



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

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



## CHECKS WITH THE KEY SWITCH ON

### INDICATIONS, HORN, AND FUSES

1. The electrical controls will not operate until the key switch is in the "I" (ON) position and the battery is connected. Check the operation of the operator's display and horn. If a fault code is displayed, contact authorized service personnel.
2. Check the fuses in the electrical compartment above the battery. Disconnect the battery before checking or replacing fuses. Some types of fuses must be checked with an ohmmeter. Replace any fuses that are burned or are not the correct size.

### CONTROL LEVERS AND PEDALS

Check that the multi-function handle and brake operate as described in Table 1.

### LIFT SYSTEM OPERATION



**WARNING:** Lower the lift mechanism completely. Never allow anyone under a raised carriage. Do not put any part of your body in or

through the lift mechanism unless all parts of the mast are completely lowered and the key switch is OFF.

Before making any repairs, See PERIODIC MAINTENANCE manual for instructions on how to pull 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 pressure.**

1. Check for leaks in the hydraulic system. Check the condition of the hydraulic hoses and tubes.
2. Slowly raise and lower the mast several times without a load. The mast components must raise and lower smoothly in the correct sequence. The carriage raises first, then the inner mast and intermediate mast (three-stage full free-lift mast only).

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

3. The inner mast and the carriage must lower completely.
4. Raise the mast one meter (three feet) with a capacity load. The inner mast and carriage must raise smoothly.

Lower the mast. All moving components must lower smoothly.

5. With the load lowered, tilt the mast backward and forward. The mast must tilt smoothly and both lift cylinders must stop evenly.

6. Check that the controls for the attachment correctly operate the functions of the attachment. See the symbols by each of the controls. Make sure all of the hydraulic lines are connected correctly and do not leak.

## BRAKES

Check the operation of the brake. The brake, when correctly adjusted, will hold a lift truck with a capacity load on a 15% grade (1.5 meter rise in 10 meters; 1.5 ft rise in 10 ft).

If the brake does not hold the lift truck on the grade, the brake must be adjusted by authorized service personnel according to the procedure in the **SERVICE MANUAL**.

## STEERING SYSTEM



**WARNING:** Because the lift truck has power steering, the lift truck can be difficult to steer when the power steering pump is not operating. Make sure the power steering is operating correctly before moving the lift truck.

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

## HOW TO CHARGE THE BATTERY

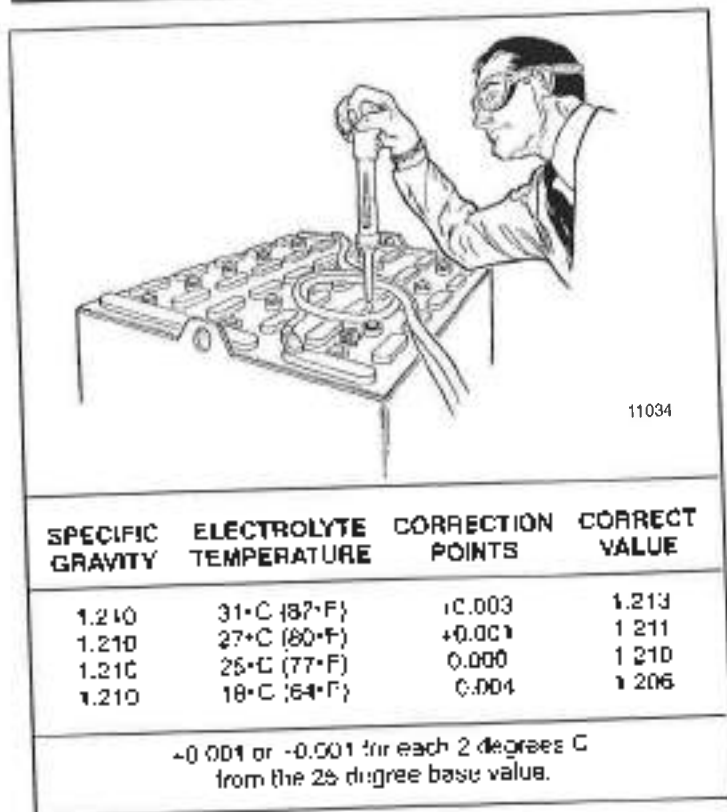


**WARNING:** Batteries generate explosive fumes when they are being charged. Keep fire, sparks, and burning material away from the battery charger area. Prevent sparks from the battery connectors.



**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.

## MAINTENANCE



11034

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

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

FIGURE 11. CHECK SPECIFIC GRAVITY

**NOTE.** Some battery chargers have a program to automatically charge the battery according to recommendations of the battery manufacturer. Use the recommendations of the battery manufacturer to charge the battery.



**WARNING:** 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.

Correct use of the hydrometer 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.



**WARNING:** If the lift truck has been operated with a low battery, check the contactors for welded contacts before a charged battery is connected. The circuit will not reset and lift truck operation cannot be controlled if the contacts are welded. To check the contacts, see the SERVICE MANUAL section, PERIODIC MAINTENANCE, shipped with the lift truck or available from a Dealer for HYSTER Lift Trucks.



**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.

A fully charged battery will have a specific gravity of 1.265 to 1.310 at 25° C (77° F). Never charge a battery at a rate that will raise the electrolyte temperature above 49° C (120° F). Do not let a battery stay discharged for a long period of time.

1. **Normal Charge:** This charge is normally given to a battery that is discharged from normal operation. Many customers charge the battery at regular intervals that depend on use. This procedure will keep the battery correctly charged if the battery is not discharged below the limit. Always use a hydrometer to check the battery if the battery is charged at regular intervals. Frequent charging of a battery that has a 2/3 or more charge can decrease the life of the battery.

2. **Equalizing Charge:** Is a low rate charge and balances the charge in all the cells. The equalizing charge is 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 taken after an equalizing charge. If the specific gravity difference is more than 0.020 between cells of the battery after an equalizing charge, there can be a defective cell. Consult your battery dealer.

**NOTE:** Some battery chargers have a program to automatically charge the battery according to recommendations of the battery manufacturer. Use the recommendations of the battery manufacturer to charge the battery.

### HOW TO CHANGE THE BATTERY (SEE FIGURE 12.)



#### 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.



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

The replacement battery must fit the battery area correctly. Use spacers to prevent the battery from moving horizontally in the battery compartment.

## MAINTENANCE

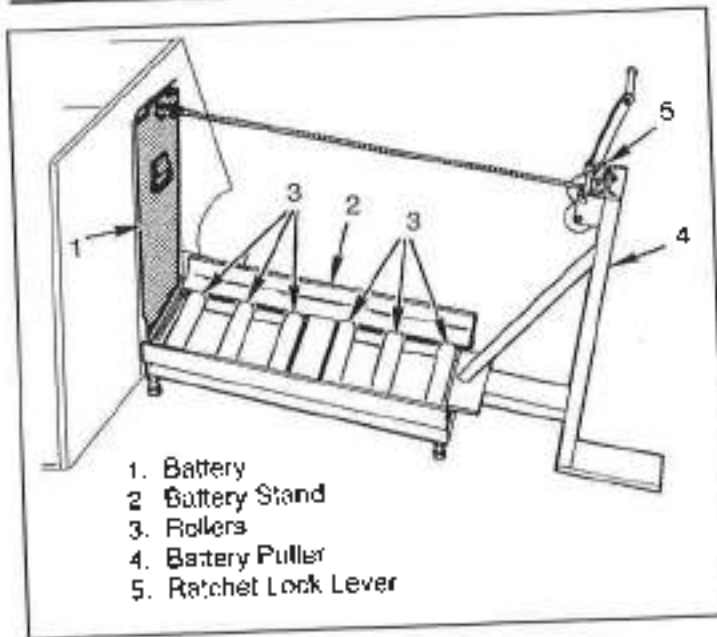


FIGURE 12. CHANGE THE BATTERY



**WARNING:** To prevent personal injury and battery movement that is not expected, the battery must be level when it is moving. Make sure the battery stand is on a level surface and is aligned and adjusted as described in the following procedure.

1. Make sure the key is in the OFF position. Disconnect the battery. Move the connector and cables so that they will not be damaged when the battery is moved.

2. Move to a position in front of the battery compartment panel on the side for the battery stand. Remove the panel.

3. Align the battery stand with the battery so that the end of the stand is against the roller frame for the battery. Adjust the capscrew legs of the battery stand so that the tops of the rollers are the same height as the bottom of the battery. Adjust all four capscrew legs of the stand so that the rollers are level. Stand on the base of the battery puller and pull the battery onto the battery stand.



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

4. If the battery is lifted, use a spreader bar and crane to lift the battery from the battery stand.



**WARNING:** Make sure that the battery does not move more than 13 mm (0.5 in). Make sure the battery spacers are correctly adjusted. Use only spacers supplied with the truck.



**WARNING:** If the lift truck was operated with a low battery or de-energized using the Battery Disconnect, inspect for welded contacts before connecting a charged battery. See SERVICE MANUAL to check contacts.



**CAUTION:** Batteries must be discarded according to local environmental regulations.

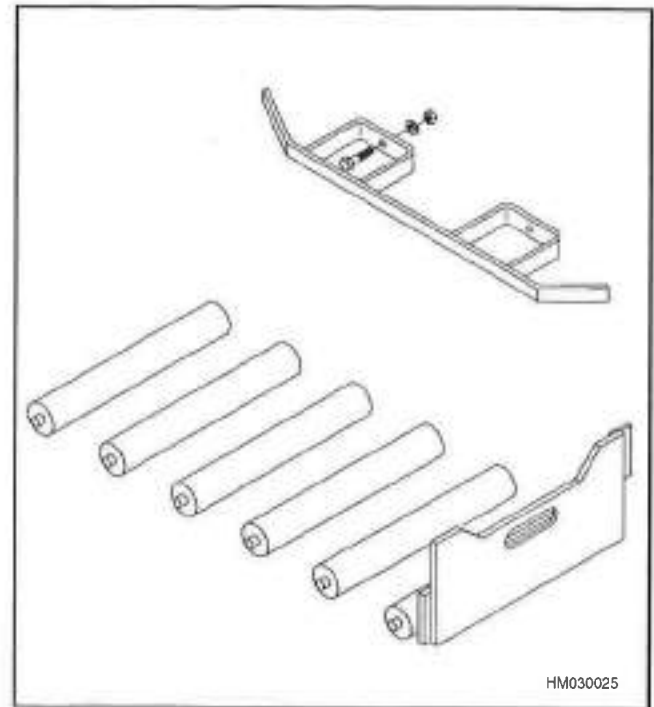




FIGURE 13. BATTERY ROLLERS AND SPACERS



## CHANGES TO THE OVERHEAD GUARD


 **WARNING:** Do not operate the lift truck without the overhead guard correctly fastened to the lift truck. Do not make changes to the overhead guard by welding. Changes that are made by welding, or by drilling holes that are too big in the wrong location, can reduce the strength of the overhead guard. See your dealer for HYSTER lift trucks before making any changes to the overhead guard.

## TIRES AND WHEELS

 **WARNING:** The lift truck capacity can change with different types of tires. Make sure the capacity on the nameplate is for the type of tires installed on the truck.

Cushion tires made from softer or harder material can be installed as optional equipment. The tread on the cushion tires can be either smooth or it can have lugs. Do not mix types of tires or treads on the lift truck.

### Removing the Wheel from the 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 THE LIFT TRUCK ON BLOCKS in this section.

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



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



**CAUTION:** To change cushion tires, the wheel must be pressed out of the rim. The proper tools, equipment, and press ring must be used. Do not attempt to change tires or wheels unless you have the proper tools, equipment, and experience.

Tire sizes are listed below for both drive and steer tires.

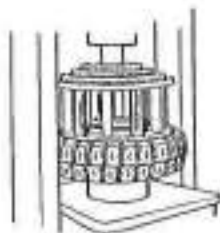
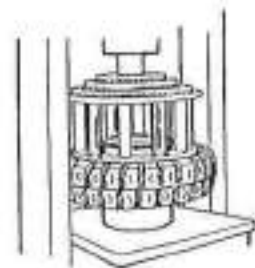
3. Clean and inspect the wheel before installing the tire. Paint any parts that have rust or corrosion. **DO NOT** use a damaged or repaired wheel.

4. Make sure the wheel is the correct size for the tire. Do **NOT** mix types of tires, types of tire treads, or wheels of different manufacturers on any one lift truck.

**Removing the Tire from the Wheel**

1. Put a support on the bed of the press. Put the tire and wheel on the support. Make sure the wheel is at least 150 to 200 mm (6 to 8 inches) from the bed of the press.

2. Put the cage in position on the tire. Use the press to push the tire away from the wheel.

**Installing the Tire on the Wheel**

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

**TABLE 2. TIRE SIZES**

MODEL	DRIVE TIRE	STEER TIRE
E30-40HSD	18 x 7 Rubber	10 x 5 Polyurethane

## MAINTENANCE

TABLE 3. BATTERY SPECIFICATIONS

Truck Capacity	Volts	Battery Compartment Size			Maximum Suggested Battery Size			
		Length	Width	Height	Length	Width	Height	Weight, Minimum
3000Lbs	36	463.5 mm 18.25 in	984.3 mm 38.75 in	822.5 mm 32.38 in	454 mm 17.88 in	982.7 mm 38.69 in	787.4 mm 31.0 in	1885 lb 855 kg
3500 <sup>a</sup> Lbs	36	463.5 mm 18.25 in	984.3 mm 38.75 in	822.5 mm 32.38 in	454 mm 17.88 in	982.7 mm 38.69 in	787.4 mm 31.0 in	2315 lb 1050 kg
3500 <sup>b</sup> Lbs	36	528.32 mm 20.8 in	984.3 mm 38.75 in	822.5 mm 32.38 in	518.2 mm 20.4 in	982.7 mm 38.69 in	787.4 mm 31.0 in	2315 lb 1050 kg
4000Lbs	36	528.32 mm 20.8 in	984.3 mm 38.75 in	822.5 mm 32.38 in	518.2 mm 20.4 in	982.7 mm 38.69 in	787.4 mm 31.0 in	2540 lb 1152.50 kg

<sup>a</sup> Short Wheel Base

<sup>b</sup> Long Wheel Base

**WARNING:** The battery must fit the battery compartment correctly. Use spacers to prevent the battery from moving more than 13mm (0.5 in) in any horizontal direction.



**NOTE:**

The battery specification chart shows the maximum size tolerances that will permit the battery to still fit into the battery compartment.

TABLE 4. BATTERY RETENTION SETUP

"X" Dimensions	Left Side Bolt	Right Side Bolt	Washer Placement (Qty)	
			Left Side	Right Side
984.85mm 38.77 in	293613	293613	1	1
982.1mm 38.67 in	293613	293613	1	2
979.35mm 38.56 in	293613	293613	1	2
976.6mm 38.45 in	293613	293615	1	4
973.85mm 38.34 in	293613	293615	2	4
971.1mm 38.23 in	293613	293615	2	5
968.35mm 38.12 in	293615	293615	4	4
965.6mm 38.02 in	293615	293615	4	5

# NOTES


# NO MATTER HOW YOU SAY IT . . .

La Prudence Paye  
La Seguridad Paga  
Betriebsicherheit Macht Sich Bezahlt  
Passua On Huolellinen  
Veiligheid Voor Alles  
Säkerhet Först  
Essere Sicuro Paga  
Seguranca Paga  
Sikkerhet Først  
Pinte! Ba Awas

सावधान श्रम बिन्दा रहै ।

في التاني السلامة

安全第一



202(12/01) Litho in U.S.A.