

**SERVICE REPAIR**

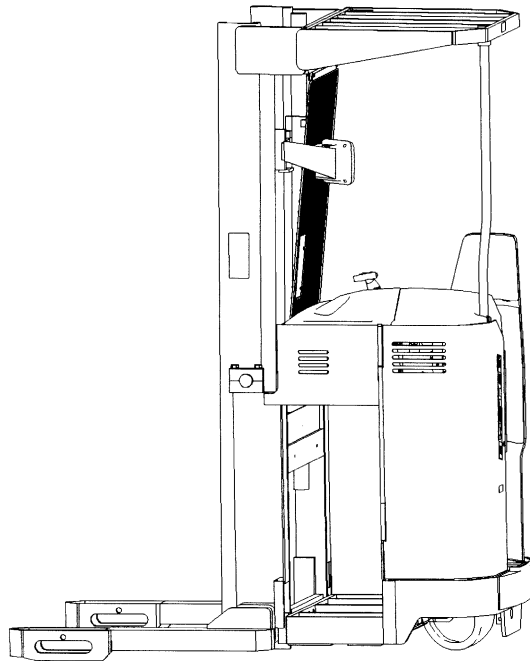
**MANUAL**

Hyster C471 (N50XMA3) Forklift

***HYSTER***

# PERIODIC MAINTENANCE

N25XMDR3, N30/40XMR3 [C470];  
N50XMA3 [C471];  
N30XMDR3, N45XMR3 [G138];  
N30XMADR3, N45XMAR3 [B264]



HM210492

# ***HYSTER***

# SAFETY PRECAUTIONS

## MAINTENANCE AND REPAIR

- When lifting parts or assemblies, make sure all slings, chains, or cables are correctly fastened, and that the load being lifted is balanced. Make sure the crane, cables, and chains have the capacity to support the weight of the load.
- Do not lift heavy parts by hand, use a lifting mechanism.
- Wear safety glasses.
- **DISCONNECT THE BATTERY CONNECTOR** before doing any maintenance or repair on electric lift trucks.
- Disconnect the battery ground cable on internal combustion lift trucks.
- Always use correct blocks to prevent the unit from rolling or falling. See **HOW TO PUT THE LIFT TRUCK ON BLOCKS** in the **Operating Manual** or the **Periodic Maintenance** section.
- Keep the unit clean and the working area clean and orderly.
- Use the correct tools for the job.
- Keep the tools clean and in good condition.
- Always use **HYSTER APPROVED** parts when making repairs. Replacement parts must meet or exceed the specifications of the original equipment manufacturer.
- Make sure all nuts, bolts, snap rings, and other fastening devices are removed before using force to remove parts.
- Always fasten a **DO NOT OPERATE** tag to the controls of the unit when making repairs, or if the unit needs repairs.
- Be sure to follow the **WARNING** and **CAUTION** notes in the instructions.
- Gasoline, Liquid Petroleum Gas (LPG), Compressed Natural Gas (CNG), and Diesel fuel are flammable. Be sure to follow the necessary safety precautions when handling these fuels and when working on these fuel systems.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.

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



### **WARNING**

**Indicates a condition that can cause immediate death or injury!**



### **CAUTION**

**Indicates a condition that can cause property damage!**

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This section is for the following models:  
 N25XMDR3, N30/40XMR3 [C470];  
 N50XMA3 [C471];  
 N30XMDR3, N45XMR3 [G138];  
 N30XMXDR3, N45XMXR3 [B264]

## General

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

The Maintenance Schedule has time intervals for inspection, lubrication, and maintenance. The time intervals are based on a normal operation. A normal operation is considered to be one 8-hour shift per day in a relatively clean environment on an improved surface. Multiple shifts, dirty operating conditions, etc., will require a reduction in the recommended time periods in the Maintenance Schedule.



### 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 to your supervisor immediately. If repair is necessary, put a DO NOT OPERATE tag on the control handle. Remove the key from the key switch.**

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

Some users have service personnel and facilities to do the items listed in the Maintenance Schedule. Service Manuals are available from your lift truck dealer to help users who do their own maintenance.

Do not make repairs or adjustments unless specifically authorized to do so.

Put the lift truck on a level surface. Lower the carriage and forks, apply the parking brake, and turn the key switch to **OFF**. Open the access panels 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.

## HOW TO MOVE DISABLED TRUCK

### How to Tow Lift Truck



### WARNING

**Use extra care when moving a lift truck during the following conditions:**

- **Brakes do not operate correctly.**
- **Steering does not operate correctly.**
- **Tires are damaged.**
- **Traction conditions are bad.**
- **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, steering can be difficult. Poor traction can cause the disabled lift truck or towing vehicle to slide. Steep grades will require additional brake force to stop the lift truck.**

**Never carry a disabled lift truck unless the lift truck MUST be moved and cannot be towed. The lift truck used to carry the disabled lift truck MUST have a rated capacity equal to or greater than the weight of the disabled lift truck. The capacity must be for a load center equal to half the width of the disabled lift truck. See the 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 not to damage the under side of 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 in.) from the surface.
4. If a counterbalanced 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. Do not attempt to tow a reach truck with another reach truck.

## HOW TO PUT LIFT TRUCK ON BLOCKS

### How to Raise Load Wheels

#### 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 load axle, battery, and the counterweight. When the lift truck is put on blocks, put additional blocks under the rear of the frame before removing the mast so the lift truck cannot fall backward or to the side.

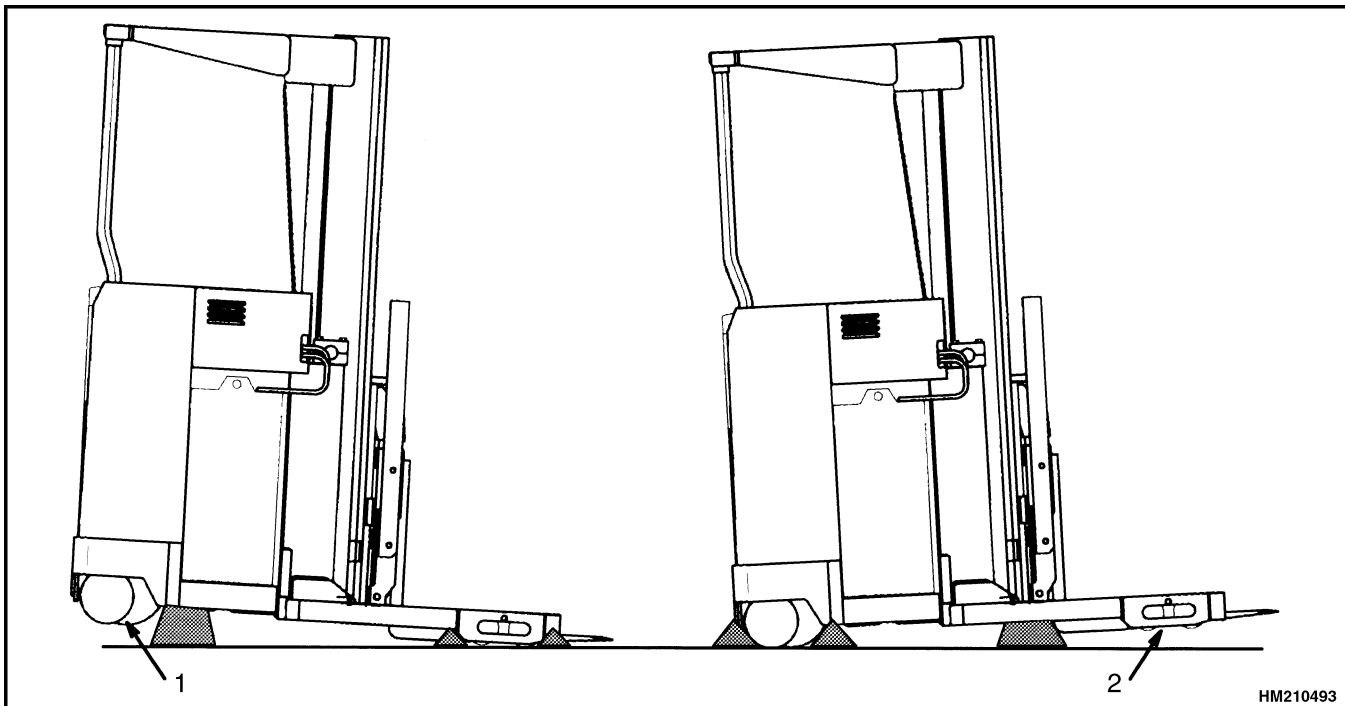
Put the lift truck on blocks only if the surface is solid, even, and level. Make sure that any blocks used to support the lift truck are solid, one-piece units. Put blocks in front and back of the tires to prevent movement of the lift truck.

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

1. Put blocks on each side (front and back) of the steer tires to prevent movement of the lift truck. See Figure 1.
2. 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.
3. Put additional blocks under the frame behind the drive tires.

### How to Raise Steer Wheel

1. Apply the parking brake. Put blocks on both sides (front and back) of the drive tires to prevent movement of the lift truck. See Figure 1.
2. Use hydraulic jacks to raise the steer tire. Make sure that the jacks have a capacity of at least 2/3 of the total weight of the lift truck, as shown on the nameplate.
3. Put the jacks under the rear of the frame to raise the lift truck. Put blocks under the frame to support the lift truck.



1. DRIVE AND CASTER WHEELS

2. LOAD WHEELS

*Figure 1. Put Lift Trucks on Blocks*



## Safety Procedures When Working Near Mast

The following procedures must be used when inspecting or working near the mast. Additional precautions and procedures can be required when repairing or removing the mast.



### WARNING

**Mast parts are heavy and can move. Distances between parts are small. Serious injury or death can result if part of the body is hit by parts of the mast or the carriage.**

- **Never put any part of the body into or under the mast or carriage unless all parts are completely lowered or a safety chain is installed. Also make sure that the power is off and the key is removed. Put a DO NOT OPERATE tag in the operator's compartment. Disconnect the battery on electric lift trucks and put a tag or lock on the battery connector.**
- **Be careful of the forks. When the mast is raised, the forks can be at a height to cause an injury.**
- **Do NOT climb on the mast or lift truck at any time. Use a ladder or personnel lift to work on the mast.**
- **Do NOT use blocks to support the mast weldments nor to restrain their movement.**
- **Mast repairs require disassembly and removal of parts and can require removal of the mast or carriage. Follow the repair procedures in the correct Service Manual section for the mast.**

### WHEN WORKING NEAR THE MAST, ALWAYS:

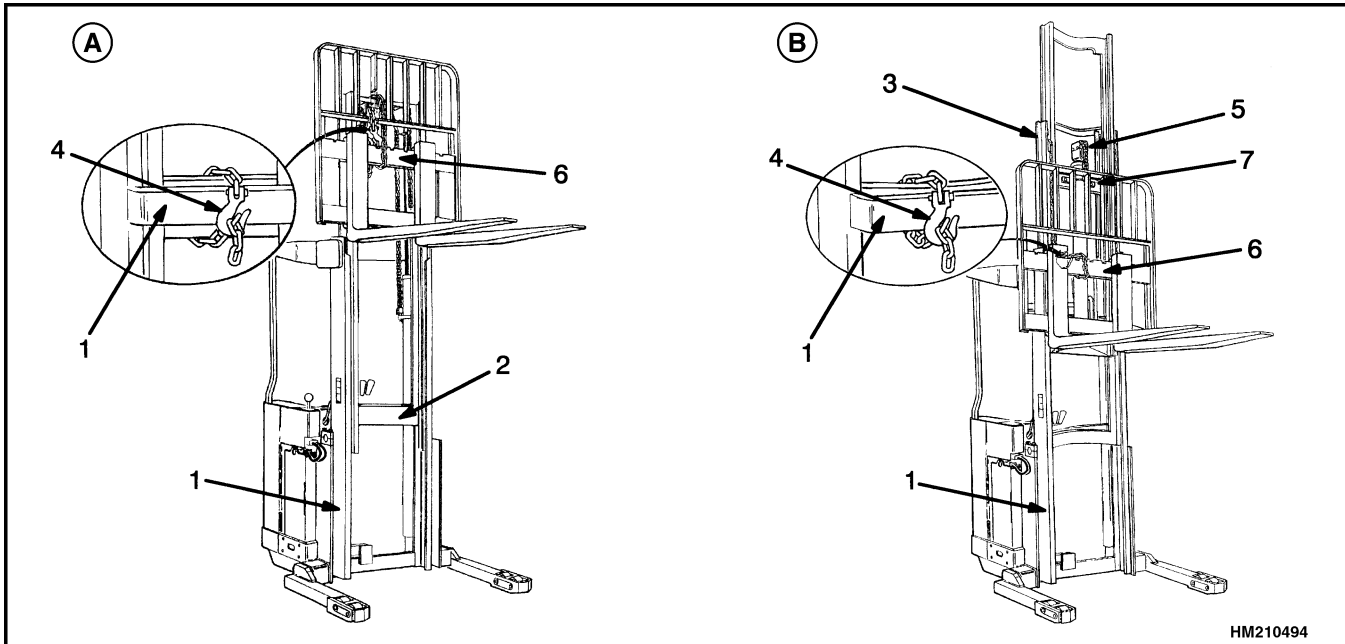
1. Lower the mast and carriage completely. Push the lift/lower control lever forward and make sure there is no movement in the mast. Make sure that all parts of the mast that move are fully lowered.

**OR**

2. If parts of the mast must be in raised position, install a safety chain to restrain the moving parts

of the mast. Connect moving parts to a part that does not move. Follow these procedures:

- a. Put the mast in a vertical position.
  - b. Raise the mast to align the bottom crossmember of the weldment that moves in the outer weldment with a crossmember on the outer weldment (1). On the two-stage and free-lift mast, the moving part is the inner weldment (2). On the three-stage mast, it is the intermediate weldment (3). See Figure 2.
  - c. Use a 3/8-in. minimum safety chain with a hook (4) to fasten the crossmembers together so that the movable member cannot lower. Put the hook on the back side of the mast. Make sure the hook is completely engaged with a link in the chain. Make sure the safety chain does not touch lift chains or chain sheaves, tubes, hoses, fittings, or other parts on the mast.
  - d. Lower the mast until there is tension in the safety chain, and the free-lift cylinder (5) (free-lift and three-stage masts) is completely retracted. If the engine is running, stop the engine. Apply the parking brake. Install a **DO NOT REMOVE** tag on the safety chain(s).
  - e. Install another safety chain (3/8 in. minimum) between the top or bottom crossmember (6) of the carriage and a crossmember (7) on the outer weldment.
3. Apply the parking brake. After lowering or restraining the mast, shut off the power and remove the key. Put a **DO NOT OPERATE** tag in the operator's compartment. Disconnect the battery on electric lift trucks and put a tag or lock on the battery connector.



**A. TWO-STAGE MAST**

- 1. OUTER WELDMENT
- 2. INNER WELDMENT
- 3. INTERMEDIATE WELDMENT
- 4. HOOK

**B. THREE-STAGE MAST**

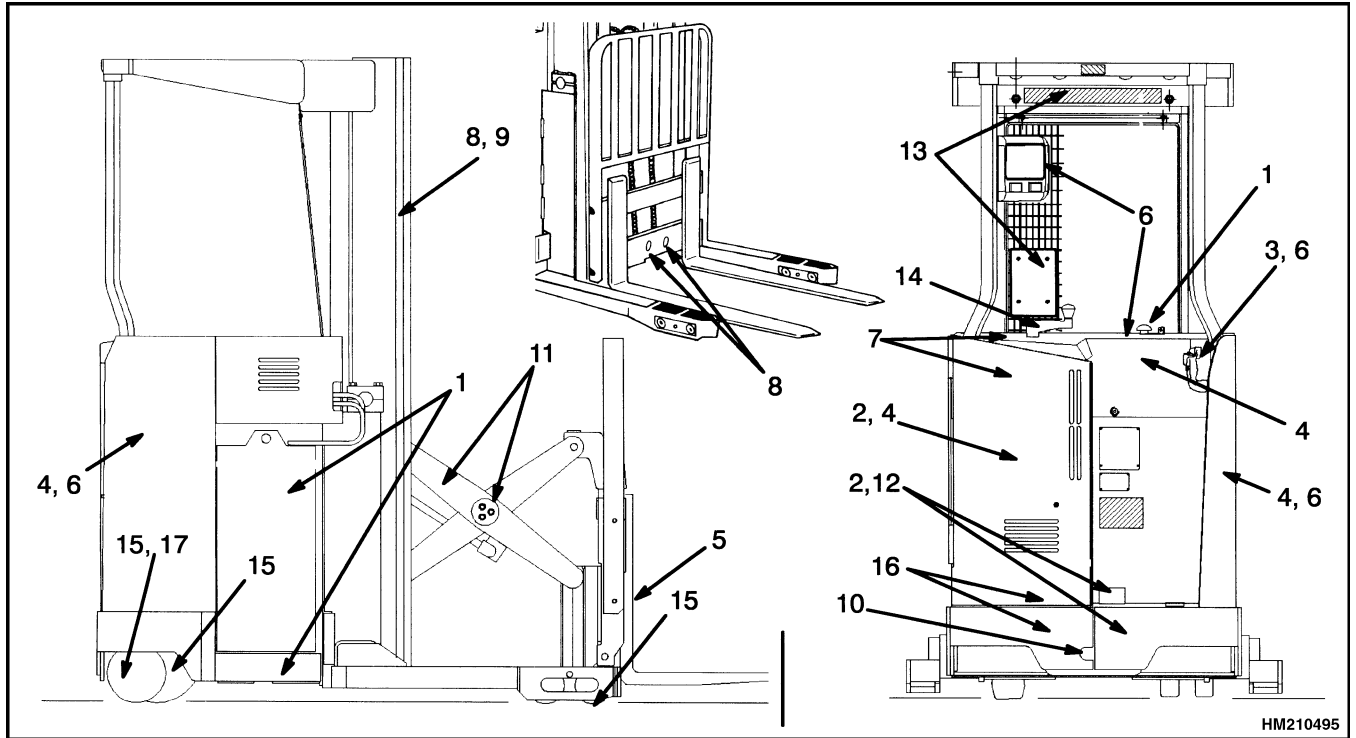
- 5. FREE-LIFT CYLINDER
- 6. CROSSMEMBER
- 7. CROSSMEMBER

*Figure 2. Two-Stage and Three-Stage Masts*

## Maintenance Schedule

The Maintenance Schedule has two time periods in which the service technician can perform the maintenance. For lift trucks operated less than 8 hours each day, use the 1-DAY, 2-MONTH, and 1-YEAR

period schedule. For lift trucks operated more than 8 hours each day, use the 8-HOUR, 350-HOUR, and 2000-HOUR schedule.



*Figure 3. Maintenance Points*

Table 1. Maintenance Schedule

Item No.	Item	8 hr/ 1 day <sup>4</sup>	350 hr/ 2 mo <sup>4</sup>	2000 hr/ 1 yr <sup>4</sup>	Procedure or Quantity	Specification
1	Battery	X	<sup>5</sup>		Check Level	See Specifications
	Restraint Panels	X			Check Condition	
	Power Disconnect	X			Check Operation	
2	Brake	X			Check Operation	
	Fluid		X		0.45 liter (0.12 gal)	SAE J-1703 Brake Fluid
	Rods and Drum Splines		L		As Required	Antiseize Lubricant <sup>3</sup>
	Master Cylinder			C	Drain, Flush, Fill	SAE J-1703 Brake Fluid
3	Control Handle	X			Check Operation	
4	Electrical Circuits	X			Check Operation	
	Contactors		X		Check Condition	
	Motor Brushes		X		Check Condition	
	Traction Motor			X,C <sup>8,4</sup>		Bearings Seal
5	Forks-All	X			Check for Damage	
	Hook Fork Guides and Locks	X	L		As Required	Antiseize Lubricant <sup>3</sup>
6	Gauges, Horn, Lights, Fuses	X			Check Operation	
7	Hydraulic Oil Leaks	X			Check for Leaks	
	Hydraulic Oil Level (Full Mark)	X		C	18 liter (4.75 gal)	Above 0°C (32°F) <sup>1</sup> Below 0°C <sup>2</sup>
	Dipstick/Breather Cap		X		Clean or Replace	
	Hydraulic Oil Filter			C	Replace	See Parts Manual
	Hydraulic Oil Strainer			C	Clean or Replace	See Parts Manual
X=Check C=Change L=Lubricate						
<sup>1</sup> Hydraulic Oil						
<sup>2</sup> Chevron EP Hydraulic Oil 68 or equivalent						
<sup>3</sup> Antiseize Lubricant						
<sup>4</sup> Whichever comes first						
<sup>5</sup> Equalization Charge approximately each month but not more than each week						
<sup>6</sup> Multipurpose Grease with 2-4% Molybdenum Disulfide for normal operations						
<sup>7</sup> Change after 150 to 500 hours. No subsequent change for life of unit						
<sup>8</sup> Change every 3000 hours or 3 years						

Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day <sup>4</sup>	350 hr/ 2 mo <sup>4</sup>	2000 hr/ 1 yr <sup>4</sup>	Procedure or Quantity	Specification
8	Lift Chains	X	L		Check for Damage	Engine Oil
	Articulating Chain Anchors - 3-Stage Mast		L		2 Lube Fittings	Multipurpose Grease <sup>6</sup>
9	Mast and Carriage	X			Check Operation	
	Pivots, Sliding Surfaces		L <sup>6</sup>		As Required	Multipurpose Grease <sup>6</sup>
10	Articulation Shaft		L		1 Lube Fitting	Multipurpose Grease <sup>6</sup>
	Articulation Shaft Retaining Bolt		L			Antiseize Lubricant <sup>3</sup>
	Articulation Shaft Ends		L			Antiseize Lubricant <sup>3</sup>
11	Reach Arms-Single Reach	X	L		6 Lube Fittings	Multipurpose Grease <sup>6</sup>
	Reach Arms-Double Reach		L		12 Lube Fittings	Multipurpose Grease <sup>6</sup>
	Reach Cylinder Pivot Pins		L		4 Lube Fittings	Multipurpose Grease <sup>6</sup>
	Thrust Rollers-Reach Frame		L		2 Lube Fittings	Multipurpose Grease <sup>6</sup>
12	Pedals, Levers, Cables, Hinges, Linkages		L		As Required	Antiseize Lubricant <sup>3</sup>
13	Safety Labels and Operating Man.	X			Replace if Necessary	See Parts Manual
14	Steering Operation	X			Check Operation	
15	Tire and Wheels	X			Check Condition	
	Caster Wheel Assembly	X	L		4 Lube Fittings	Multipurpose Grease <sup>6</sup>
	Load Wheel Bolts		L			Antiseize Lubricant <sup>3</sup>
X=Check C=Change L=Lubricate						
<sup>1</sup> Hydraulic Oil						
<sup>2</sup> Chevron EP Hydraulic Oil 68 or equivalent						
<sup>3</sup> Antiseize Lubricant						
<sup>4</sup> Whichever comes first						
<sup>5</sup> Equalization Charge approximately each month but not more than each week						
<sup>6</sup> Multipurpose Grease with 2-4% Molybdenum Disulfide for normal operations						
<sup>7</sup> Change after 150 to 500 hours. No subsequent change for life of unit						
<sup>8</sup> Change every 3000 hours or 3 years						

Table 1. Maintenance Schedule (Continued)

Item No.	Item	8 hr/ 1 day <sup>4</sup>	350 hr/ 2 mo <sup>4</sup>	2000 hr/ 1 yr <sup>4</sup>	Procedure or Quantity	Specification
16	Master Drive Unit Bearing		L		2 Lube Fittings	Multipurpose Grease <sup>6</sup>
	Master Drive Unit Chain		L		Apply to Chain	Multipurpose Grease <sup>6</sup>
	Master Drive Unit Small trucks, HFK 300 BF Large trucks, ZF 400 SF		X, C <sup>7</sup>		0.66 liter (0.17 gal)	SAE 80W-90 or Mobilgear 627
	Master Drive Unit Small trucks, GK - 20 Large trucks, GK - 25		X, C <sup>7</sup>		0.98 liter (0.26 gal)	SAE 80W-90 or Mobilgear 627
	Articulation Adjustment Stops		X, L			Antiseize Lubricant <sup>3</sup>
	Adjustment Stop Retaining Bolt		L		Adjust	Antiseize Lubricant <sup>3</sup>
17	Wheel Bolt Torque		X		Tighten if Required	135 N•m (100 lbf ft)
	Drive Wheel Lugs		L			Antiseize Lubricant <sup>3</sup>
X=Check C=Change L=Lubricate						
<sup>1</sup> Hydraulic Oil						
<sup>2</sup> Chevron EP Hydraulic Oil 68 or equivalent						
<sup>3</sup> Antiseize Lubricant						
<sup>4</sup> Whichever comes first						
<sup>5</sup> Equalization Charge approximately each month but not more than each week						
<sup>6</sup> Multipurpose Grease with 2-4% Molybdenum Disulfide for normal operations						
<sup>7</sup> Change after 150 to 500 hours. No subsequent change for life of unit						
<sup>8</sup> Change every 3000 hours or 3 years						

## Maintenance Procedures Every 8 Hours or Daily



### WARNING

**Do not operate a lift truck that needs repairs. If a 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 8 hours or daily before use. Put the lift truck on a level surface. Lower the carriage and forks, and turn the key switch to **OFF**. If repair is required, put a tag in the operator's area that indicates the lift truck cannot be operated. **DO NOT** operate a lift truck until the problems are corrected.

### CHECKS WITH KEY SWITCH TURNED OFF

Make the following checks:

- Electrolyte and specific gravity of the battery
- Make sure the battery is clean and the correct size and weight for the lift truck
- Check that the battery restraint plates are in place
- Oil level in the hydraulic tank
- Leaks in the hydraulic system
- Condition of the wheels and tires
- Condition of the forks, carriage, mast, and overhead guard

## Battery



### WARNING

**Do not put tools on the battery.**

**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.**

**The battery must fit the battery compartment so the battery restraint panels will operate correctly. Use spacers to prevent the battery from moving more than 13 mm (0.5 in.) in any direction.**



### CAUTION

**Disposal of batteries must meet local environmental regulations.**

Make sure the battery weight is within the maximum and minimum weight shown on the nameplate.

Keep the battery case, top cover, and the area for the battery clean and painted. Leakage and corrosion from the battery can cause a malfunction in the electric controls of the lift truck. Use a water and sodium bicarbonate solution (soda) 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. Check the level of the electrolyte daily on a minimum of one cell. The

correct level is halfway between the top of the plates and the bottom of the fill hole. Add only distilled water.

Make certain the battery restraint panels are properly installed.



### WARNING

**Make sure the key switch is OFF and the brake is set before connecting the battery.**

**If the lift truck was operated with a discharged battery, check all contactors for welded tips before a charged battery is connected.**

The battery should have an equalization charge each month, but not more than each week.

## Hydraulic System



### WARNING

**At operating temperature, the hydraulic oil is HOT. Do not permit the oil to contact the skin and cause a burn.**



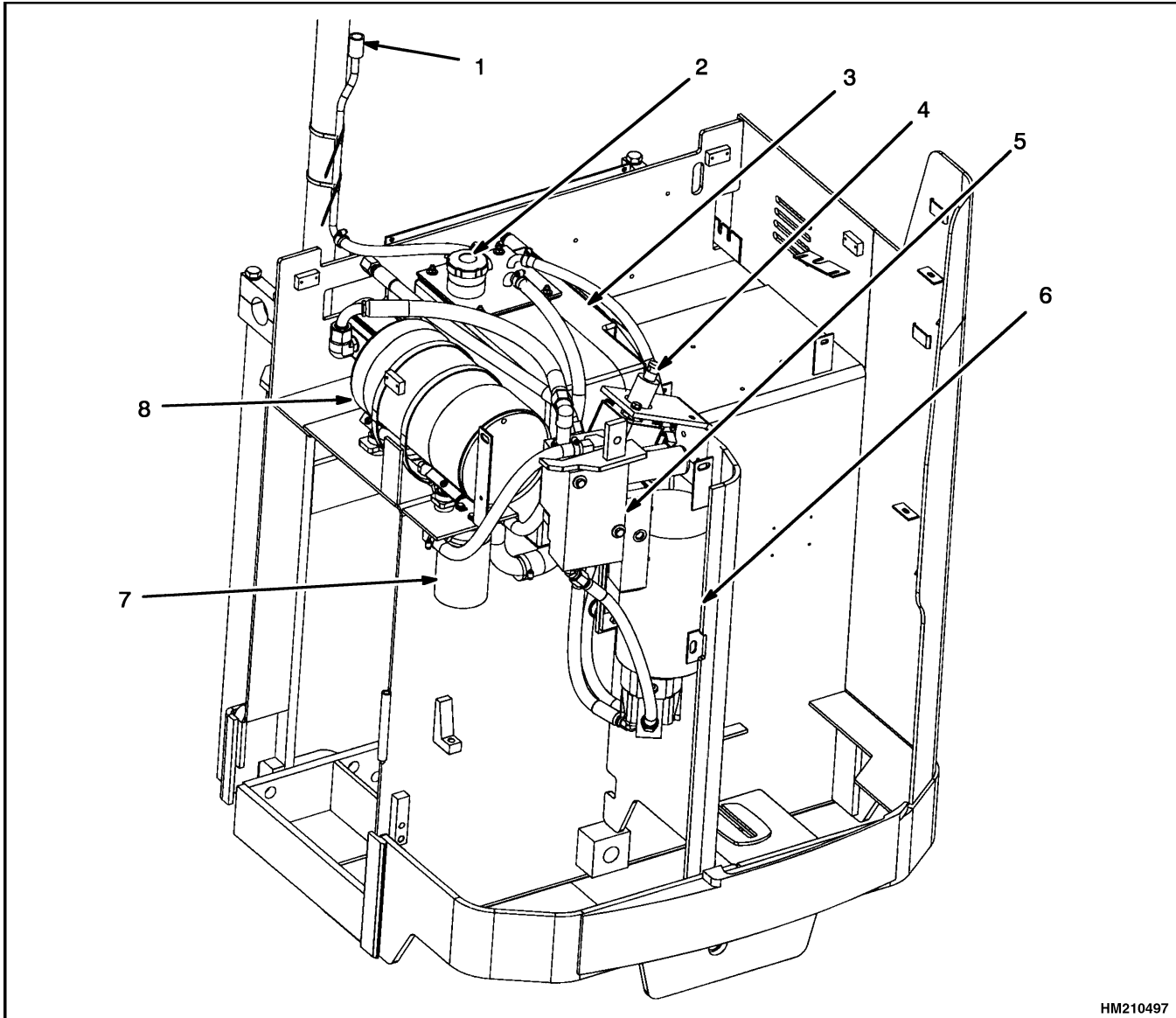
### CAUTION

**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.**

Check the hydraulic oil level when the oil is at operating temperature, the carriage is lowered, the reach mechanism is retracted, and the key switch is in the **OFF** position. See Figure 4. Add hydraulic oil only as needed. If more hydraulic oil is added than the **FULL** level on the dipstick, hydraulic oil will leak from the breather during operation. See Table 4 for the capacities of the hydraulic tanks used on these models of lift trucks.

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



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- |                          |                            |
|--------------------------|----------------------------|
| 1. BREATHER              | 5. CONTROL VALVE           |
| 2. DIPSTICK/FILLER CAP   | 6. STEERING PUMP AND MOTOR |
| 3. TANK                  | 7. FILTER                  |
| 4. STEERING CONTROL UNIT | 8. LIFT PUMP AND MOTOR     |

*Figure 4. Typical Hydraulic System*

## Tires and Wheels

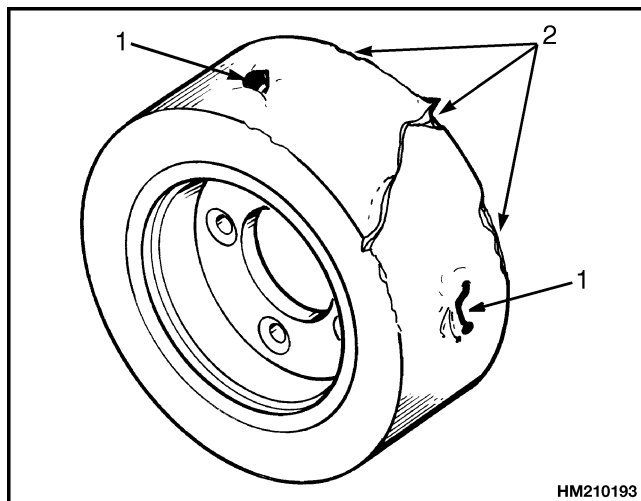


### CAUTION

When the wheels have been installed, check all wheel nuts after 2 to 5 hours of operation. Tighten the nuts in a cross pattern to the correct torque value shown in the Maintenance Schedule, Table 1. When the nuts stay tight after an 8-hour check, the interval for checking the torque can be extended to 350 hours.

Inspect the tires for wire, rocks, glass, pieces of metal, holes, cuts, and other damage. See Figure 5. 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. Make sure the drive wheel nuts are tight. Tighten the drive wheel nuts in a cross pattern to the correct torque value shown in the Maintenance Schedule, Table 1.





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

*Figure 5. Check Tires*

### 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 100 SRM 975** for the correct locations of the safety labels.

### 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.

Do not weld mounts for lights or accessories to the legs of the overhead guard. The strength of the overhead guard can be reduced by welding or heating.

#### WARNING

Make sure the capscrew that holds the vertical post that supports the overhead guard is in the correct position and is tight. The capscrew allows the support post to provide protection to the operator if the truck hits a rack.

Make certain the overhead guard is in place and securely attached to the body of the lift truck. Make certain that the mast guard is installed between the mast and the operator's compartment.

### Mast, Forks, and Lift Chains

#### WARNING

When working on or near the mast or carriage, see **Safety Procedures When Working Near Mast**.

The identification of a fork describes how the fork is connected to the carriage. These lift trucks can have hook type forks.

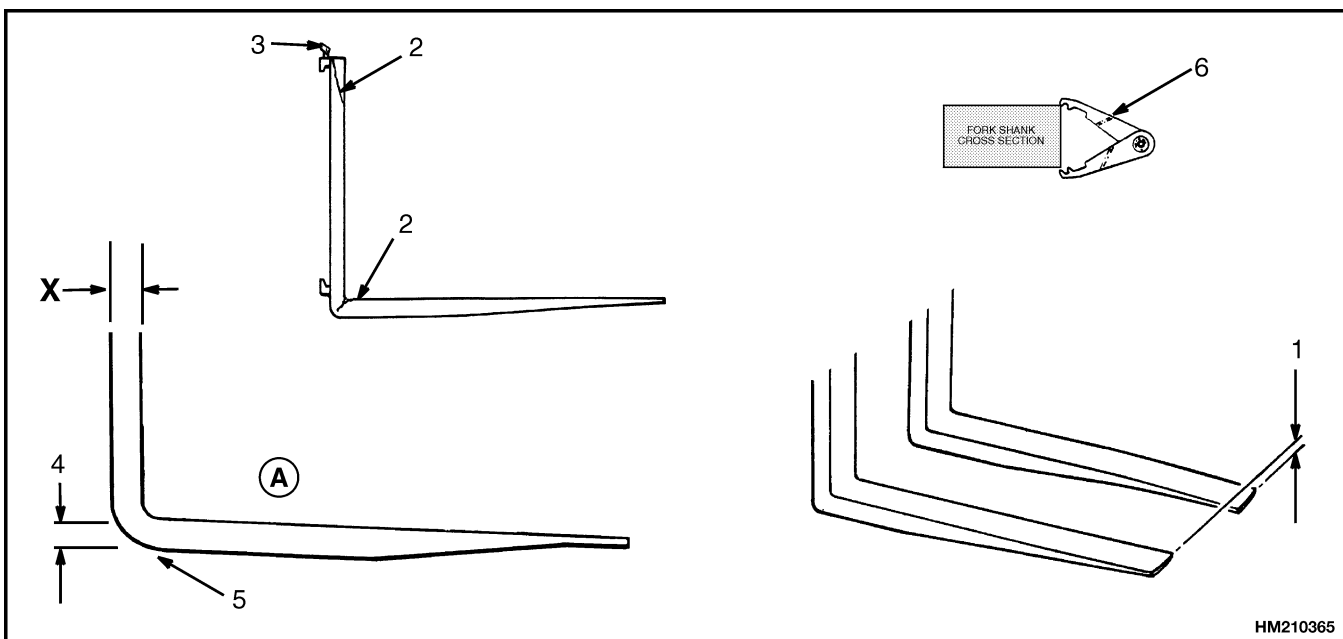
Adjust the forks as far apart as possible for maximum support of the load. Hook forks are connected to the carriage by hooks and lock pins. These lock pins are installed through the top fork hooks and fit into slots in the top carriage bar. Raise the lock pin in each fork to slide the fork on the carriage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

#### WARNING

Do not try to correct fork tip alignment by bending the forks or adding shims. 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 the nuts and capscrews are tight.
2. Inspect the channel for excessive wear in the areas of roller contact. Check the rollers for wear or damage.

3. Inspect the 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 (1.6 in.) for a 1220 mm (48 in.) fork]. Some applications can require closer alignment. Check that the bottom of the fork is not worn (5, Figure 6). Check the heel of the fork using fork tool. The heel of the fork must be 90% of DIMENSION X. See Figure 6.
4. Replace any damaged or broken parts that are used to keep the forks locked in position.
5. If the lift truck is equipped with a sideshift carriage or attachment, inspect the parts for cracks and wear. See Reach, Tilt, and Sideshift.
6. Check that the lift chains are correctly lubricated.
7. Inspect the lift chains for cracks or broken links and pins.
8. Inspect the chain anchors and pins for cracks and damage.
9. Make sure the lift chains are adjusted so they have equal tension. If the chains need to be replaced or adjusted, it must be done by authorized personnel.



Fork Tip Alignment	
Length of Forks	3% Dimension
0914 mm (36 in.)	27 mm (1.08 in.)
1067 mm (42 in.)	32 mm (1.26 in.)
1220 mm (48 in.)	37 mm (1.44 in.)
1371 mm (54 in.)	41 mm (1.62 in.)
1524 mm (60 in.)	46 mm (1.80 in.)

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)</li> <li>2. CRACKS</li> <li>3. LATCH DAMAGE</li> </ol> | <ol style="list-style-type: none"> <li>4. HEEL OF FORK (MUST BE 90% OF DIMENSION X)</li> <li>5. HEEL WEAR</li> <li>6. FORK TOOL</li> </ol> |
|---|--|

**Figure 6. Check the Forks**

## Reach, Tilt, and Sideshift



### WARNING

Make sure the key switch is in the OFF position and the key is removed from the switch before doing this check.

1. Check for cracks at the welds on the reach frames and scissor arms.
2. Check the frame channel for excessive wear in the areas of roller contact. Check the rollers for wear or damage.
3. Check the load backrest extension for cracks and damage. Make sure the nuts and bolts for the load backrest extension are tight.

## Forks

### Remove



### WARNING

Do not try to move a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 to 115 kg (100 to 253 lb).

**Hook Forks** - Slide a hook fork to the fork removal notch on the carriage. See Figure 7 and Figure 8. Lower the fork onto blocks so the bottom hook of the fork moves through the fork removal notch. Lower the carriage further so 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.

### Install

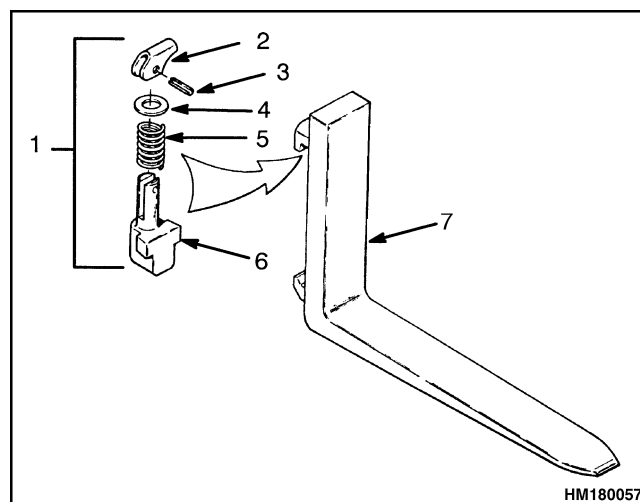


### WARNING

Do not try to move a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 to 115 kg (100 to 250 lb).

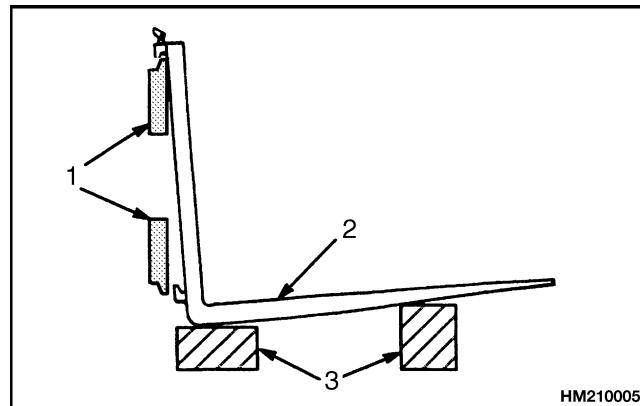
**Hook Forks** - Move the fork and carriage so the top hook on the fork can engage the top carriage bar. Raise the carriage to move the lower hook through

the fork removal notch. Slide the fork on the carriage so both upper and lower hooks engage the carriage. Engage the lock pin with a notch in the top carriage bar.



- |                   |              |
|-------------------|--------------|
| 1. LATCH ASSEMBLY | 5. SPRING    |
| 2. LEVER          | 6. LATCH PIN |
| 3. ROLL PIN       | 7. FORK      |
| 4. WASHER         |              |

Figure 7. Hook Fork



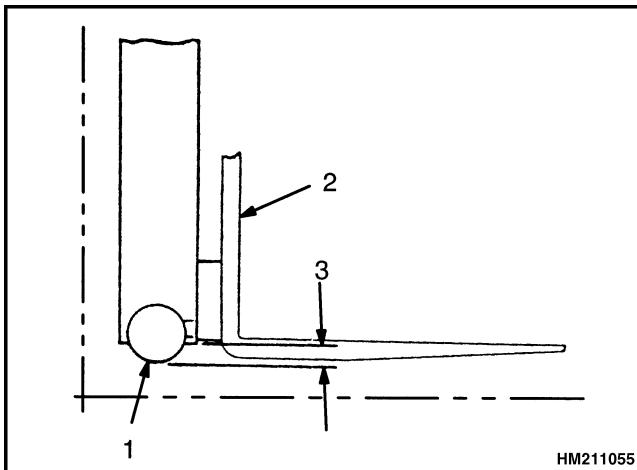
- |                  |           |
|------------------|-----------|
| 1. CARRIAGE BARS | 3. BLOCKS |
| 2. HOOK FORK     |           |

Figure 8. Hook Fork Removal

## Lift Chain Adjustments

When correctly adjusted (see Figure 9):

- The tension will be the same on each chain of the chain set. Check tension by pushing on both chains at the same time.
- The chain length will be correct.
- The chains must travel freely through the complete cycle.



1. CARRIAGE ROLLER
2. FORK
3. CARRIAGE ROLLER MUST NOT EXTEND MORE THAN 34 mm (1.3 in.) BELOW THE MAST CHANNEL

**Figure 9. Lift Chain Adjustments**

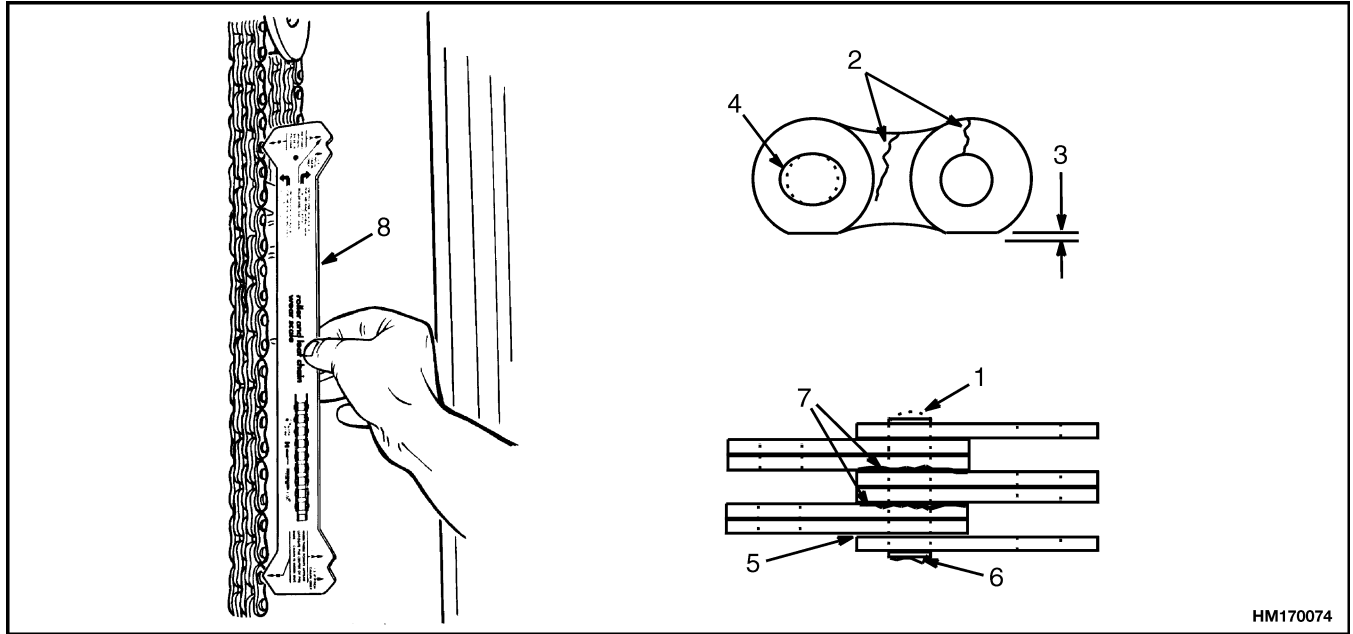
1. Put a load equal to 80 to 90% of the capacity load on the forks. Lower the forks as much as possible.
2. Check the amount that the bottom carriage roller extends below the inner channel of the mast. The carriage roller must not extend more than 1/3 of

the roller diameter below the inner channel. If the adjustment is not correct, adjust the chain anchors. Make sure each chain anchor is adjusted the same amount.

3. Remove the load from the forks. Check the clearance of the carriage when the mast is fully extended. The carriage stops must not touch the stop on the top crossmember of the inner weldment. The chains are too tight if the carriage touches the crossmember. Lower the carriage completely. If the forks do not just touch the surface, the chains are too tight. If the chains are too tight, adjust the chain anchors. Make sure each anchor is adjusted the same amount.


**NOTE:** When the chain adjustments are complete, make sure the threads on the nuts of the chain anchors are completely engaged. Make sure the nuts on the chain anchors are not tight against the mountings. The chain anchors must be free to move in their sockets.

4. Three-stage mast chain adjustment: Adjust the main lift chains so the top of the inner weldment is even with the top of the intermediate weldment within  $\pm 1.5$  mm (0.06 in.). Adjust the free-lift chain as described in Step 3.
5. If a section of chain is 3% longer than a similar section of new chain, the chain is worn and must be replaced. If a chain scale is available, check the lift chains as shown in Figure 10. If a chain scale is not available, measure 20 links of chain. Measure from the center of a pin to the center of another pin 20 pitches away. Compare the length with the chart in Figure 10. Replace the chain if the length of 20 links of the worn section is more than the maximum wear limit.



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**NOTE:** THE INSTRUCTIONS FOR MEASURING CHAIN WEAR ARE SHOWN ON THE CHAIN WEAR SCALE.

<p style="text-align: center;"><b>Pitch</b></p> 	<p style="text-align: center;"><b>Total Length of 20 Links (pitch) of New Chain</b></p>	<p style="text-align: center;"><b>Wear Limit The Maximum Length of 20 Links</b></p>
12.7 mm (0.50 in.)	254.0 mm (10.0 in.)	261.6 mm (10.3 in.)
15.9 mm (0.625 in.)	317.5 mm (12.5 in.)	327.0 mm (12.87 in.)
19.1 mm (0.75 in.)	381.0 mm (15.0 in.)	392.4 mm (15.45 in.)
25.4 mm (1.00 in.)	508.0 mm (20.0 in.)	523.35 mm (20.6 in.)
31.8 mm (1.25 in.)	635.0 mm (25.0 in.)	654.1 mm (25.75 in.)
44.5 mm (1.75 in.)	889.0 mm (35.0 in.)	915.7 mm (36.05 in.)
50.8 mm (2.0 in.)	1016.0 mm (40.0 in.)	1046.5 mm (41.2 in.)

- |              |                     |
|--------------|---------------------|
| 1. WORN PIN  | 5. LOOSE LEAVES     |
| 2. CRACKS    | 6. DAMAGED PIN      |
| 3. EDGE WEAR | 7. CORROSION        |
| 4. HOLE WEAR | 8. CHAIN WEAR SCALE |

**Figure 10. Check Lift Chains**