

**SERVICE REPAIR**

**MANUAL**

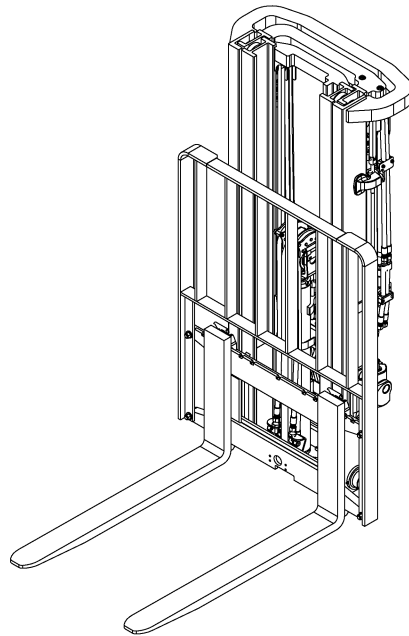
Hyster A935 J1.6-2.0XN (J30-35-40XN) Forklift

***HYSTER***

# **MAST REPAIR (S/N A270, A271, A272)**

**2- AND 3-STAGE HIGH VISIBILITY MASTS**

**J1.6-2.0XN [A935];  
J1.5-2.0XNT [K160];  
E30HSD<sub>3</sub>, E35HSD<sub>3</sub>, E40HSD<sub>3</sub> [C219]**



# ***HYSTER***

# SAFETY PRECAUTIONS

## MAINTENANCE AND REPAIR

- The Service Manuals are updated on a regular basis, but may not reflect recent design changes to the product. Updated technical service information may be available from your local authorized Hyster® dealer. Service Manuals provide general guidelines for maintenance and service and are intended for use by trained and experienced technicians. Failure to properly maintain equipment or to follow instructions contained in the Service Manual could result in damage to the products, personal injury, property damage or death.
- 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 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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This section is for the following models:

J1.6-2.0XN [A935];  
 J1.5-2.0XNT [K160];  
 (E30HSD3, E35HSD3, E40HSD3) [C219]

**Thanks very much for your reading,  
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**"THE  
QUALITY  
KEEPERS"**

**HYSTER  
APPROVED  
PARTS**

## General

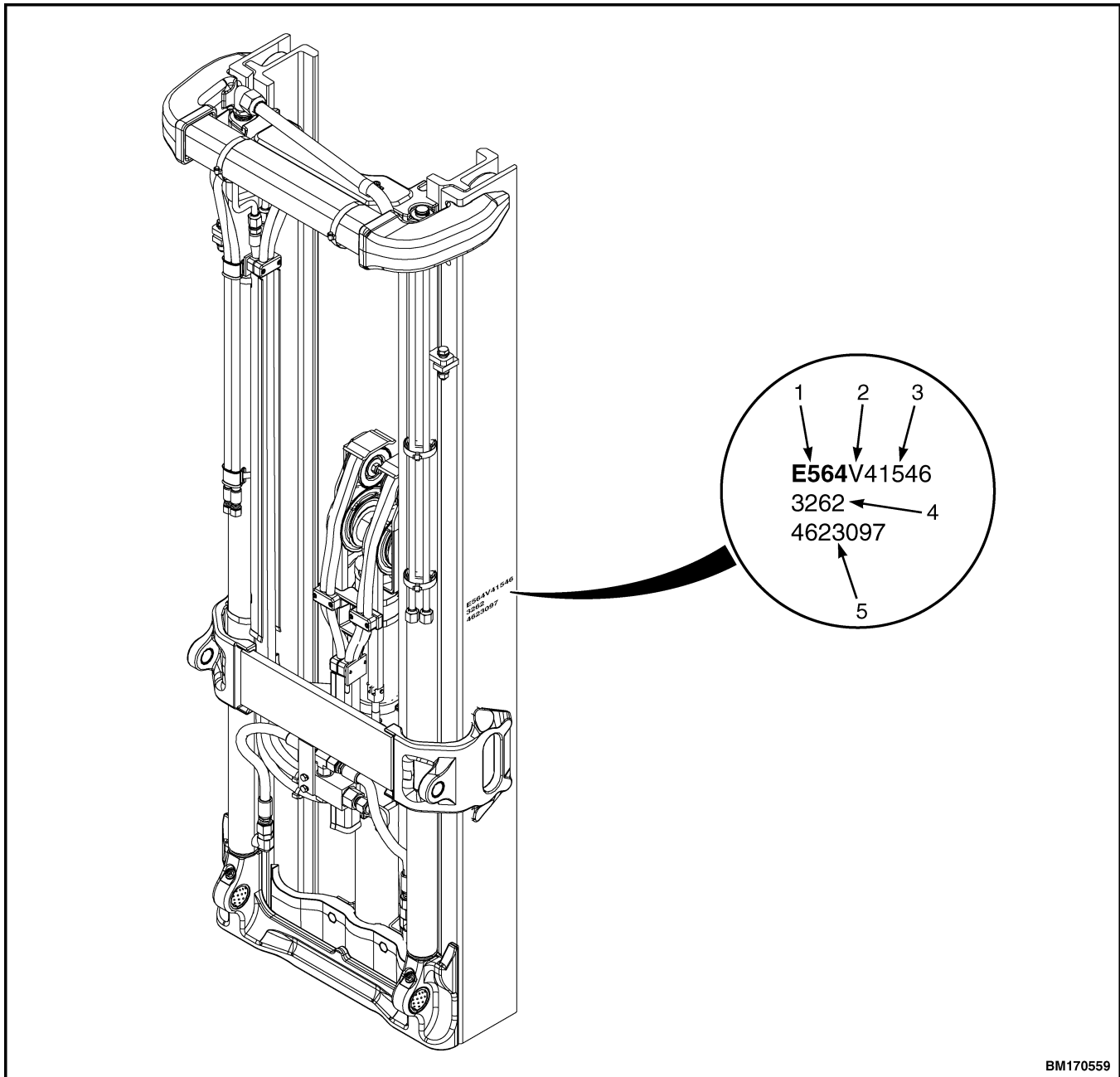


### **WARNING**

**Before working on or near the mast, see the section Safety Procedures When Working Near Mast in this SRM.**

Procedures for adjusting the carriage, lift chains, mast, and tilt cylinders are located at the end of this manual.

**NOTE:** Hoses have a service life that is determined by application and time. Install a new hose if the hose is leaking, worn through, or damaged. A hose has been damaged if the hose cover is cracked, exposing the braiding, or if the hose has been kinked or crushed, or if the hose is no longer flexible. Install a new hose if the hose has been tensioned beyond the adjustment range. If necessary, make a comparison to a new hose that is the correct replacement for the hose you are inspecting.



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**NOTE:** MAST AND SERIAL NUMBER SHOWN ARE NOT COVERED IN THIS MANUAL. ART USED FOR ILLUSTRATIVE PURPOSES. INFORMATION SHOWN IS FOUND IN SAME POSITION ON ALL MASTS COVERED IN THIS MANUAL.

- |                        |                                      |
|------------------------|--------------------------------------|
| 1. MAST SERIAL NUMBER  | 4. MAST LIFT HEIGHT (IN MILLIMETERS) |
| 2. MANUFACTURING PLANT | 5. MAST ASSEMBLY PART NUMBER         |
| 3. PRODUCTION SEQUENCE |                                      |

**Figure 1. Mast Serial Number Location**



## 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 shift. 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.**

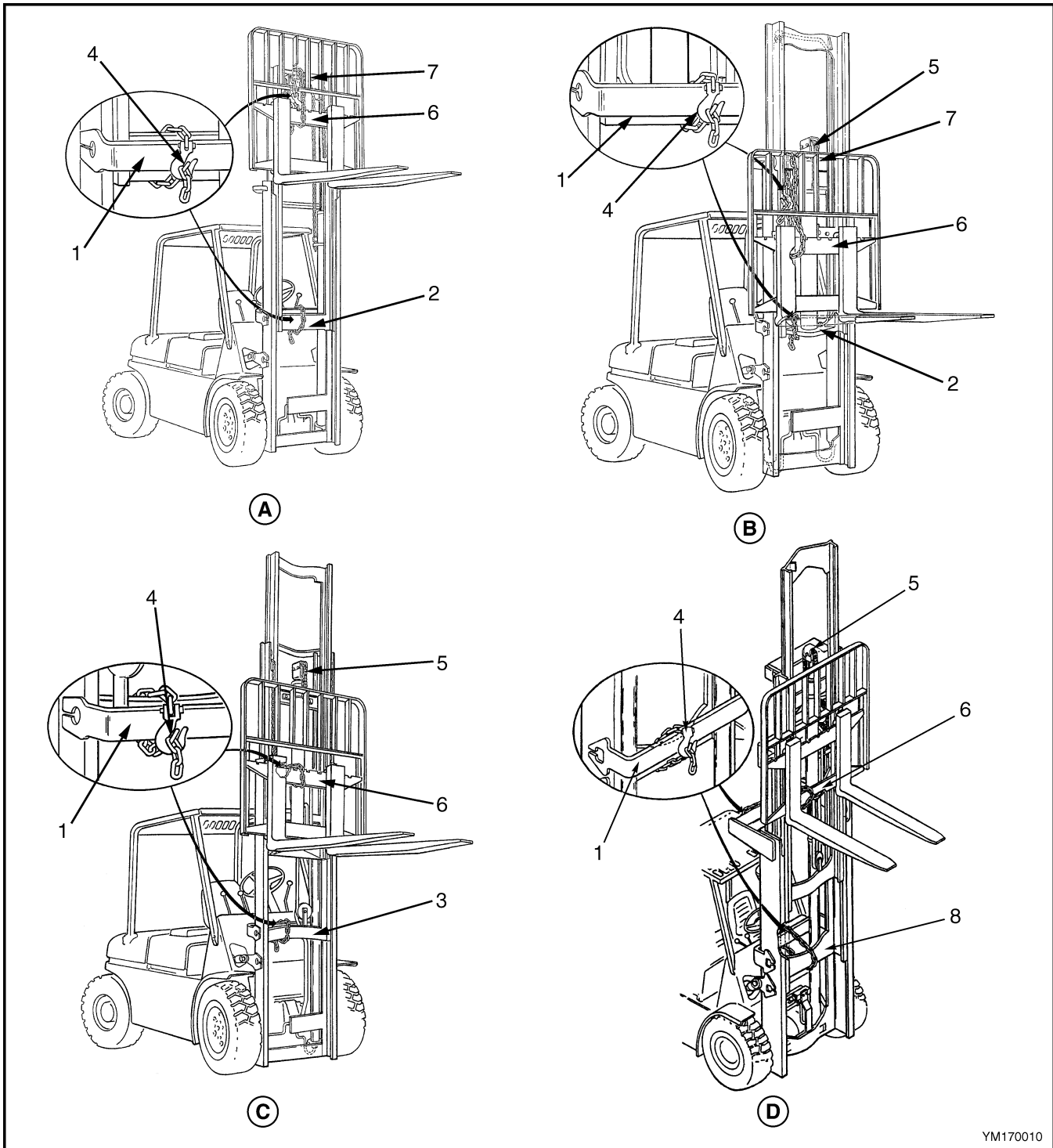
- **Never put any part of the body into or under the mast or carriage unless all parts are completely lowered or a safety chain is installed. Also make sure that the power is OFF and the key is removed. Put a DO NOT OPERATE tag in the operator's compartment. Disconnect the battery and put a tag or lock 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.**
- **Mast repairs require disassembly and removal of parts and can require removal of the mast or carriage. Follow the repair procedures in this section.**

#### WHEN WORKING NEAR THE MAST ALWAYS:

- **Lower the mast and carriage completely: Turn the key switch to the ON position and push the lift/lower control lever forward until there is no movement in the mast. Make sure that all parts of the mast that move are fully lowered.**

OR

- **If parts of the mast must be in a 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:**
    1. Put mast in vertical position.
    2. Raise mast to align bottom crossmember of mast upright that moves in outer mast with crossmember on outer mast. On the two-stage mast, the moving part is the inner mast. On the three-stage mast, it is the intermediate mast. On the four-stage mast, it is the first intermediate mast. See Figure 2 or Figure 3.
    3. Use a 3/8-inch minimum safety chain with a hook to fasten the crossmembers together so the movable member cannot lower. Put hook on back side of mast. Make sure hook is completely engaged with a link in the chain. Make sure safety chain does not touch lift chains or chain sheaves, tubes, hoses, fittings, or other parts on the mast.
    4. Lower mast until there is tension in safety chain and free-lift cylinder (full free-lift models) is completely retracted.
- NOTE:** Apply the parking brake. After lowering or restraining the mast, shut off the power, and remove key. Put a **DO NOT OPERATE** tag in the operator's compartment. Disconnect battery and put a tag or lock on battery connector.
5. Install another safety chain (9.5 mm (3/8 in.) minimum) between the top or bottom bar of the carriage (item 6, Figure 2) and a crossmember on the outer mast as a secondary safety device. Install a **DO NOT REMOVE** tag on the safety chain(s).



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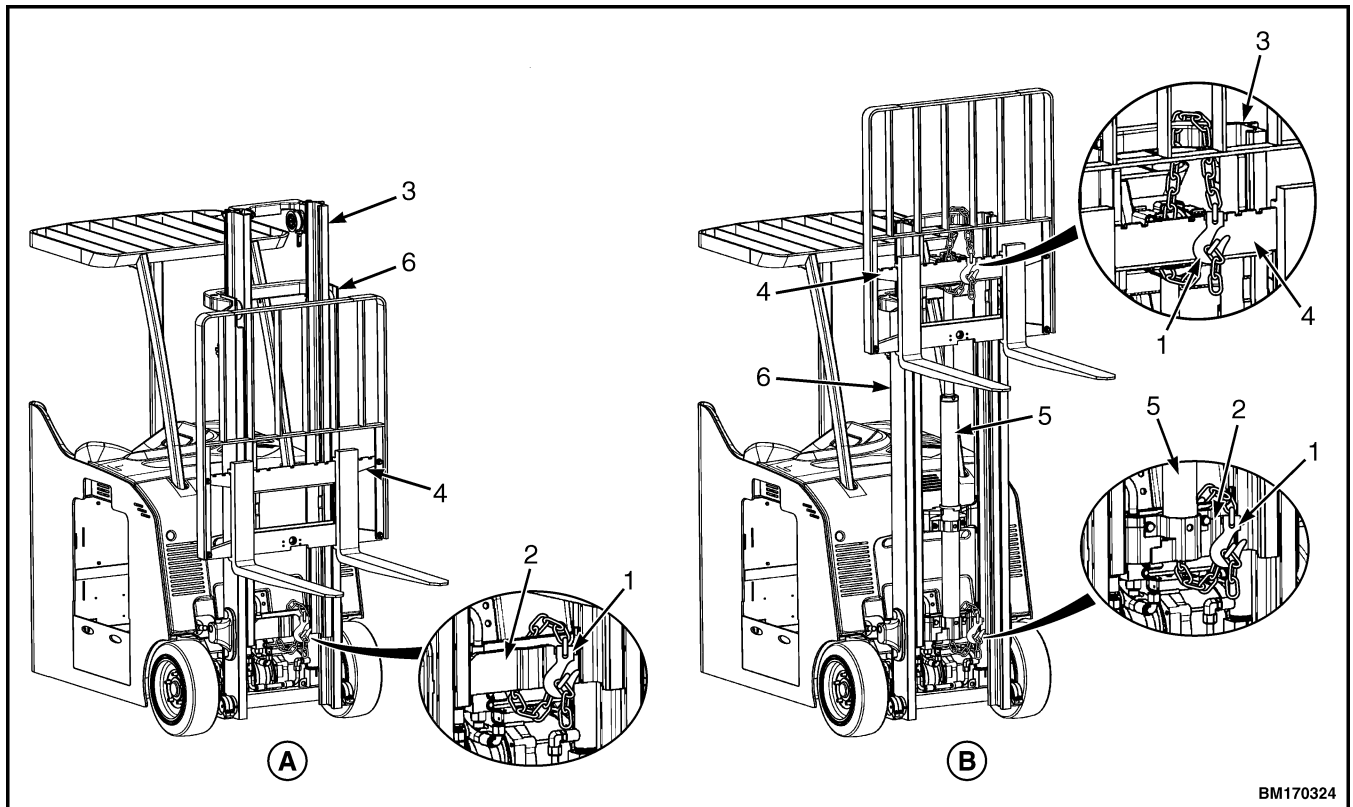
- A. TWO-STAGE LFL MAST
- B. TWO-STAGE FFL MAST

- C. THREE-STAGE FFL MAST
- D. FOUR-STAGE FFL MAST

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

- 5. FREE-LIFT CYLINDER
- 6. CARRIAGE BAR
- 7. CROSSMEMBER
- 8. FIRST INTERMEDIATE MAST

**Figure 2. Safety Chaining the Mast (Sit-Down Lift Trucks)**



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**NOTE:** TWO-STAGE MASTS SHOWN. FOR THREE-STAGE MAST, ALIGN THE CROSSMEMBER OF INTERMEDIATE WELDMENT ALONG WITH INNER AND OUTER WELDMENTS WHEN CHAINING THE MAST.

**A. LIMITED FREE-LIFT MAST**

- 1. SAFETY CHAIN AND HOOK
- 2. MAST CROSSMEMBERS ALIGNED
- 3. INNER WELDMENT

**B. FULL FREE-LIFT MAST**

- 4. CARRIAGE (TOP BAR)
- 5. FREE-LIFT CYLINDER
- 6. OUTER WELDMENT

**Figure 3. Safety Chaining the Mast (Stand-Up Lift Trucks)**

## Fork Replacement



### CAUTION

Remove fork latch pins if adding a fork positioner attachment. Damage to forks and other carriage components can occur if fork latch pins are not removed prior to using attachment.

Forks are held on the carriage by hooks. Forks used on a standard carriage or an integral sideshift carriage not equipped with a fork positioner attachment, are held in position by pins that fit through the top fork hooks and into slots in the top carriage bar. If pin does not remain engaged in carriage slot, replace with new pin. Always check that pins for the forks keep forks in position on carriage. Replace damaged fork pin parts. Forks are removed from carriage by aligning forks with fork removal notch. Fork removal notch is in the bottom bar of carriage. See Figure 5.

Forks used on an integral sideshift carriage equipped with a fork positioner attachment, are held in position with fork carriers (inner and outer) that slide along the fork positioner cylinder. Depending on the size and configuration of forks installed on lift truck, there may be a spacer bar between the inner and outer fork carriers. See Figure 4. Forks are removed from carriage by aligning forks with fork removal notch. Fork removal notch is in the bottom bar of carriage. See Figure 5.

### REMOVE

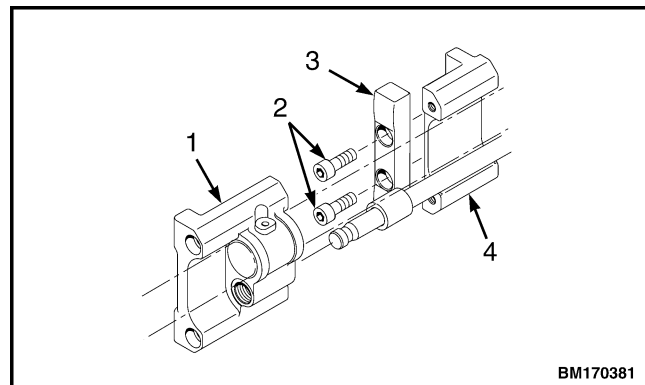
If lift truck is equipped with a fork positioner, see Carriages Repair for procedures to remove the forks.



### WARNING

DO NOT try to remove a fork without a lifting device. Each hook fork for these lift trucks can weigh 45 to 115 kg (99 to 254 lb).

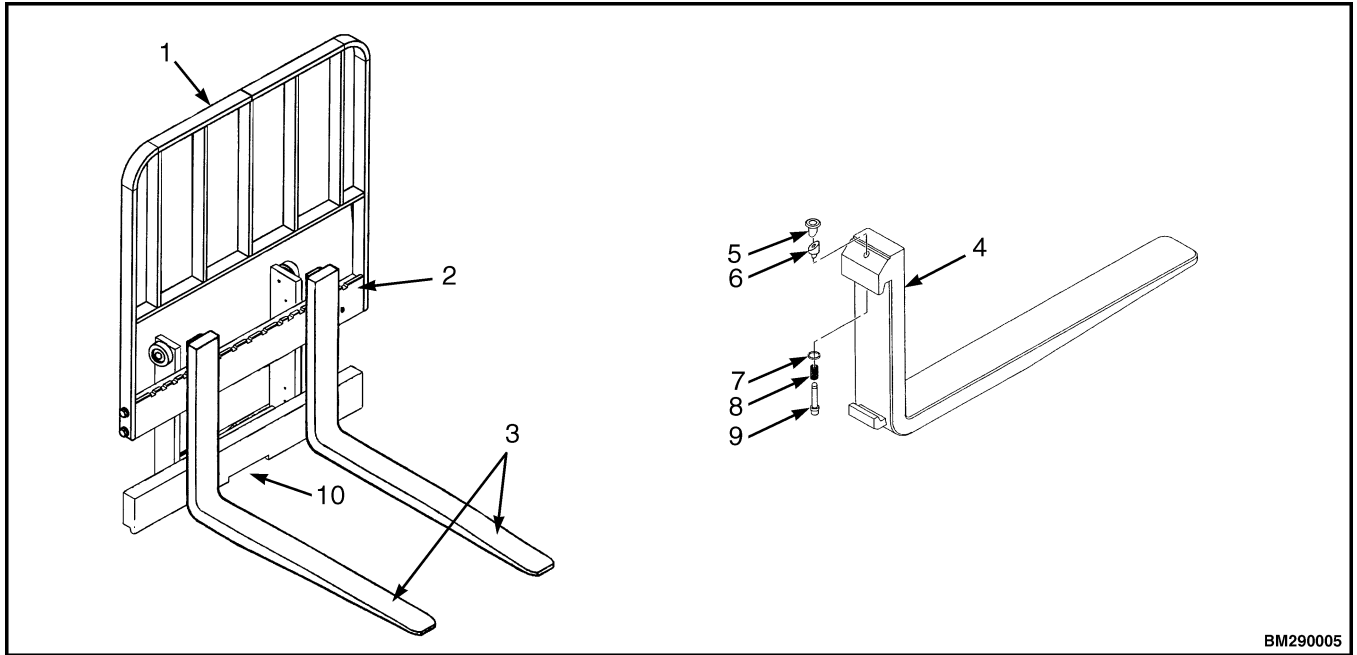
A fork can be removed from the carriage for replacement of the fork or other maintenance. Slide fork to the fork removal notch in bottom bar of the carriage. See Figure 5. Lower fork onto blocks so bottom hook of fork moves through fork removal notch. See Figure 6. Lower carriage further so top hook of fork is disengaged from top carriage bar. Move carriage away from fork or use a lifting device to move the fork away from carriage.



1. OUTER FORK CARRIER
2. CAPSCREW
3. SPACER BAR\*
4. INNER FORK CARRIER

\*SPACER BAR USED ON 977 mm (38.5 in.) AND 1067 mm (42 in.) CLASS II CARRIAGES.

**Figure 4. Fork Carrier Components**

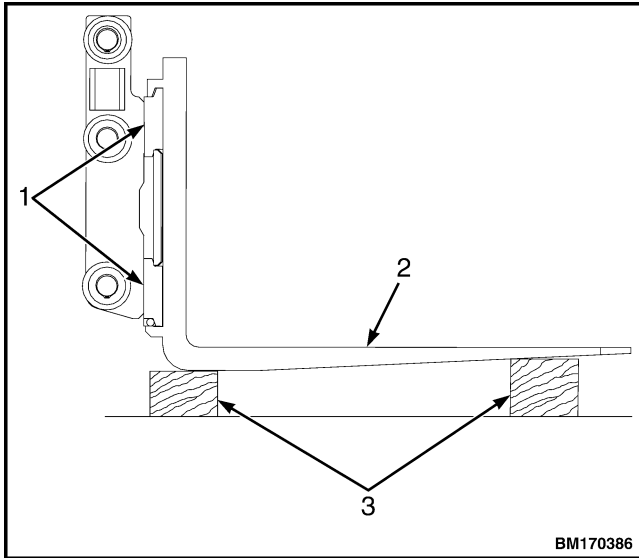


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- 1. LOAD BACKREST
- 2. CARRIAGE
- 3. FORKS
- 4. FORK
- 5. KNOB

- 6. WEDGE
- 7. WASHER
- 8. SPRING
- 9. PIN
- 10. FORK REMOVAL NOTCH

Figure 5. Carriage and Forks



1. CARRIAGE BARS      3. BLOCKS  
2. HOOK FORK

**Figure 6. Hook Fork Removal**

## INSTALL

If lift truck is equipped with a fork positioner, see Carriages Repair for procedures to install the forks.

Move the fork and carriage so the top hook on the fork can engage the upper carriage bar. See Figure 6. 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 bars. Engage the latch pin with a notch in the upper carriage bar.

## CHECKS



### WARNING

**Never repair damaged forks by heating or welding. Forks are made of tempered steel using special procedures. Always replace damaged forks as a pair.**

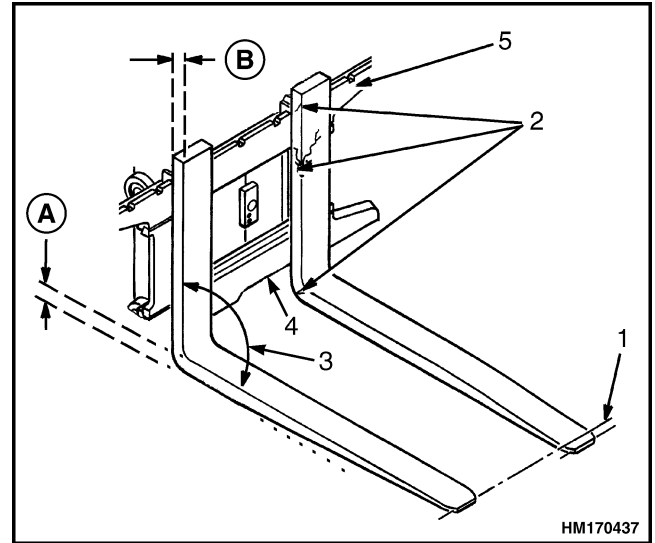
Inspect the forks for cracks and wear. Check the alignment of the fork tips. The difference in height of the fork tips must be less than three percent of the length of the forks. See Table 1 and Figure 7.

**Table 1. Fork Tip Alignment**

Fork Tip Alignment Specifications			
Standard Fork Lengths		Maximum Fork Tip Difference <sub>1</sub>	
mm	(in.)	mm	(in.)
914	(36)	27	(1.08)
1067	(42)	32	(1.26)
1219	(48)	37	(1.44)
1372	(54)	41	(1.62)
1524	(60)	46	(1.80)
1829	(72)	55	(2.16)

<sub>1</sub>Difference of alignment between fork tips must be no more than 3% of the total fork length.

Some applications may require closer alignment. If the forks do not meet specification, they both must be replaced. Check that the bottom of each fork is not excessively worn. Check for smooth and proper operation of the fork lock pins. Repair or replace any damaged or broken fork lock pins or components and lubricate, as necessary. See Figure 5.



- A. HEEL OF FORK (MUST BE 90% OF DIMENSION B)
- B. ORIGINAL FORK THICKNESS (DIMENSION B)
- 1. TIP ALIGNMENT (MUST BE WITHIN 3% OF FORK LENGTH)
- 2. CRACKS
- 3. MAXIMUM ANGLE 93°
- 4. FORK REMOVAL NOTCH
- 5. CARRIAGE

**Figure 7. Fork Check**

## Carriages Repair

### STANDARD CARRIAGE

#### Remove

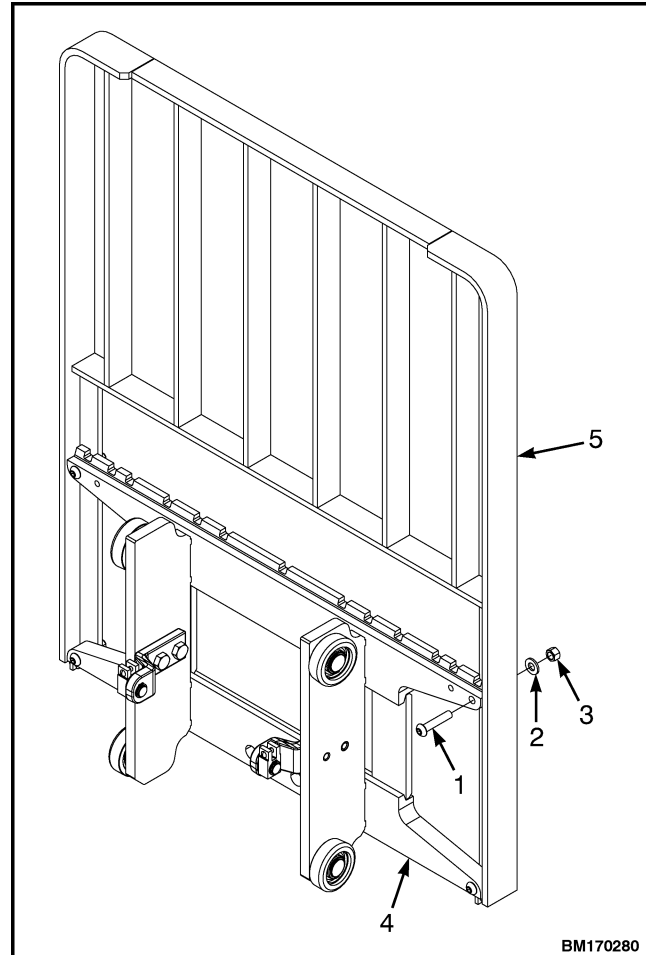
1. Remove the forks. See Fork Replacement.
2. Remove four socket head capscrews and remove the load backrest. See Figure 8.
3. Connect a lifting device to the carriage. Lift the carriage so that the lift chains become loose.



#### WARNING

When disconnecting the lift chains, keep control of the ends. Use wire to temporarily connect the ends of the lift chains to the mast. This procedure will prevent the lift chains from falling and causing an injury or damage.

4. Remove the chain pin from each chain anchor at the carriage. See Figure 9. Disconnect the lift chains from the carriage. Use wire to connect the ends of the lift chains to a part of the mast. Make sure the chains can move freely when the inner mast is raised.

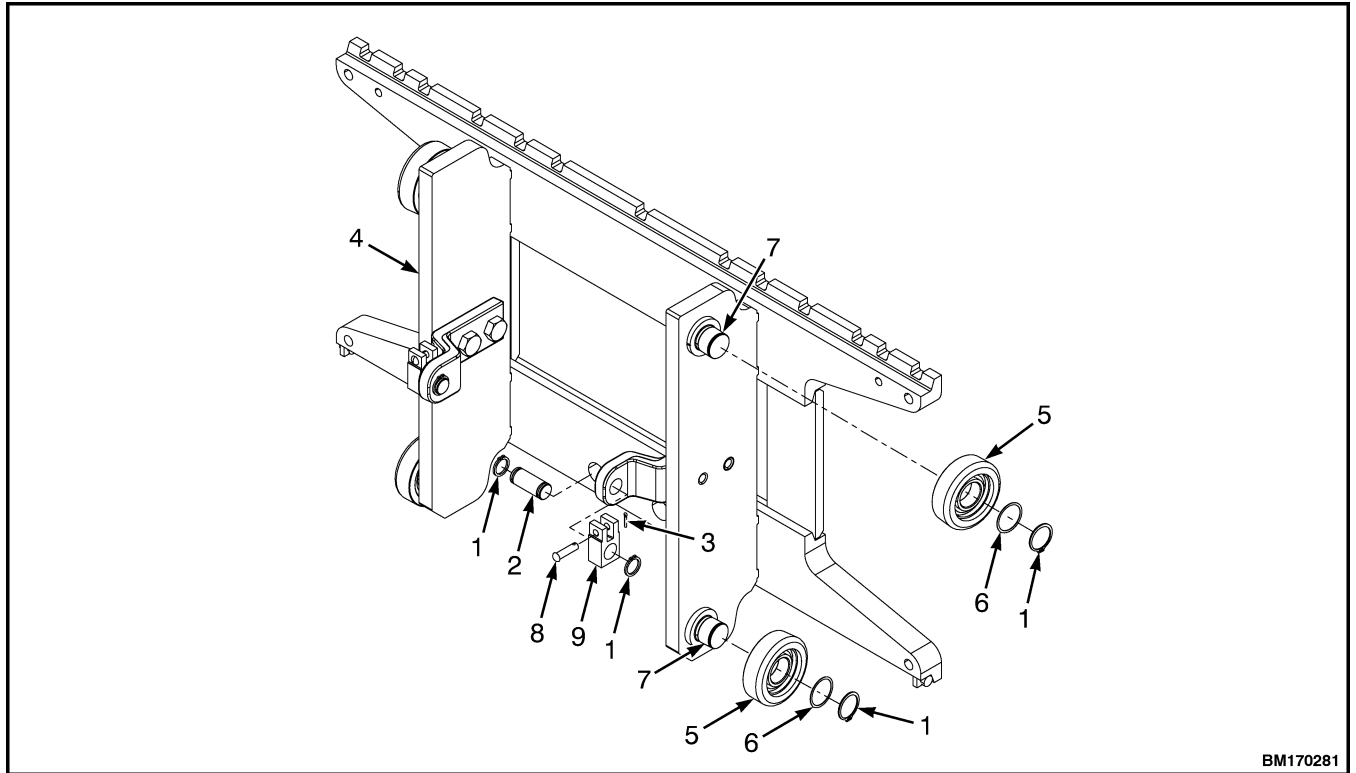


**NOTE:** TWO-STAGE LFL CARRIAGE SHOWN. LOAD BACKREST IS MOUNTED THE SAME WAY ON THREE-STAGE FFL CARRIAGE

1. SOCKET HEAD CAPSCREW
2. WASHER
3. NUT
4. CARRIAGE
5. LOAD BACKREST

**Figure 8. Load Backrest Removal**





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**NOTE:** TWO-STAGE LFL CARRIAGE SHOWN. THREE-STAGE FFL CARRIAGES ARE SIMILAR.

- |                |                 |
|----------------|-----------------|
| 1. SNAP RING   | 6. SHIM         |
| 2. ANCHOR PIN  | 7. STUBSHAFT    |
| 3. COTTER PIN  | 8. CHAIN PIN    |
| 4. CARRIAGE    | 9. CHAIN ANCHOR |
| 5. LOAD ROLLER |                 |

**Figure 9. Standard Carriage**

 **WARNING**

To help prevent possible injury, make sure the carriage is stable and will not fall over when the inner mast is raised above the load rollers of the carriage.

5. Use the lift cylinders to raise the inner or intermediate mast. If the hydraulic system cannot be used, disconnect the lift cylinders from the inner or intermediate mast. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382**. Connect a crane [the capacity of the crane must be at least 681 kg (1501 lb)] to the top of the inner mast. Carefully raise the inner mast until it is above the load rollers of the carriage. Install safety chains to secure the mast in its extended position and disconnect the crane. See **Safety Procedures When Working Near Mast**.
6. Move lift truck away from the carriage. Completely lower the inner mast.

### Clean and Inspect

1. If load rollers must be replaced, make a note of the location and number of the shims. Install the shims, load rollers, and snap rings. See **Carriage Adjustments** for correct adjustment of the load rollers.

 **WARNING**

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

 **WARNING**

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

 **CAUTION**

**DO NOT use cleaning solvent, compressed air, or steam to clean lift chain sheaves or load rollers. The bearings in the lift chain sheaves and load rollers are sealed and lubricated. Cleaning solvent, compressed air, and steam can damage the load roller bearings.**

2. Clean any oil, grease, dirt, and other debris from the carriage frame. Use a cleaning solvent and compressed air to dry.

 **WARNING**

**Improper welding procedures can damage the structure of the mast or cause incorrect function of the mast. Consult your Hyster lift truck dealer for more information before welding on the mast.**

3. If the carriage bars have any protruding welds or damaged notches, repair by grinding, filing, or welding.
4. Clean and inspect the chain anchors and chain anchor pins. See Figure 9. Check chain anchors and anchor pins for wear and serviceability. Discard worn or unserviceable chain anchors and chain anchor pins. Discard cotter pins.

## Install

1. Connect a crane [the capacity of the crane must be at least 681 kg (1501 lb)] to the top of the inner mast. Carefully raise the inner mast until it is above the load rollers of the carriage. Install safety chains to secure the mast in its extended position and disconnect the crane. See Safety Procedures When Working Near Mast.
2. Move the lift truck toward the carriage until the inner mast is aligned with the carriage rollers. If the inner mast has been raised and secured using a crane and safety chains, connect the crane, raise the inner mast, and remove the safety chains. Carefully lower the inner mast until it engages all of the load rollers. Disconnect the crane, if attached, and reconnect the lift cylinders. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382**.
3. Check the clearance of the load rollers. See Carriage Adjustments in this section.

**NOTE:** Use new cotter pins each time the chain pins are removed.

4. Connect the lift chains to the chain anchors at the carriage. Install new cotter pins in the chain pins. Adjust the lift chains as described in Carriage Adjustments in this section.
5. Install the load backrest on the carriage (see Figure 8). Tighten the socket head capscrews to 195 N·m (144 lbf ft).
6. Install the forks. See Fork Replacement.

## INTEGRAL SIDESHIFT CARRIAGE

### Remove

1. Lower the carriage completely. Remove the forks. See Fork Replacement for removal procedures.

2. Remove the four capscrews securing the load backrest to the carriage. See Figure 8. Remove the load backrest.



### WARNING

**Before disconnecting the hydraulic hoses, relieve the pressure in the hydraulic system. Serious injury can occur if pressure is not relieved from hydraulic system prior to disconnecting hydraulic hoses.**

3. Relieve hydraulic pressure to the sideshift cylinder by moving sideshift lever in both directions several times.



### WARNING

**Always wear the proper protective equipment including eye protection and petroleum-resistant gloves when handling hydraulic oil. Thoroughly wash oil from exposed areas of skin as soon as possible.**

**The hydraulic oil is hot at normal operating temperatures. Be careful when draining the oil.**

**Never check for leaks by putting hands on hydraulic lines or components under pressure. Hydraulic oil under pressure can be injected into the skin.**

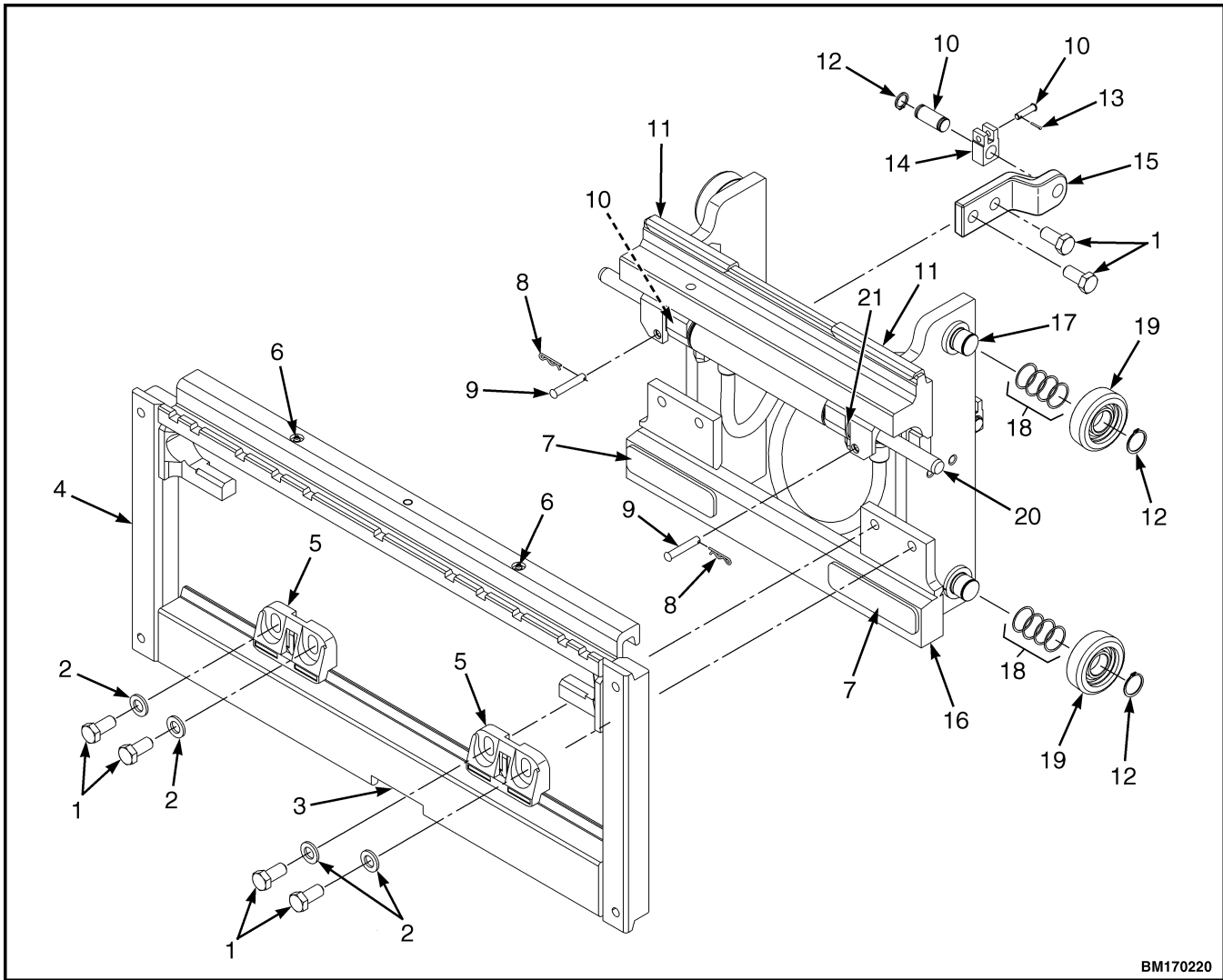


### CAUTION

**Protect the hydraulic system from dirt and contaminants when servicing the hydraulic system.**

**NOTE:** Tag hydraulic lines and fittings prior to disconnecting to aid in connecting during installation.

4. Disconnect hydraulic lines from sideshift cylinder. Put caps and plugs on open lines and cylinder ports.
5. Remove four capscrews securing lower mounting hooks to outer frame. See Figure 10.



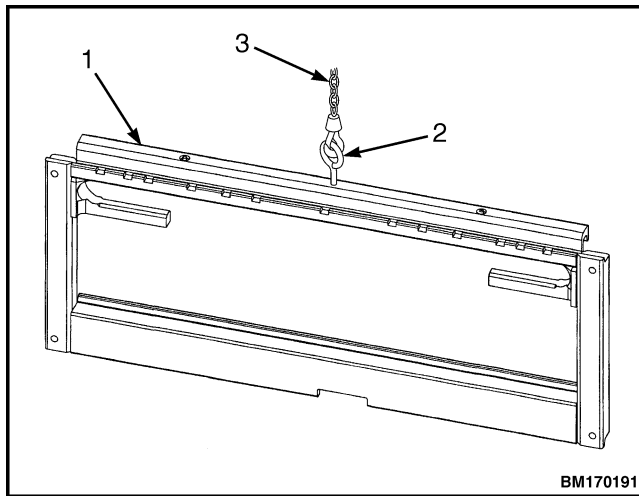
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**NOTE:** TWO-STAGE LFL CARRIAGE SHOWN. INTEGRAL SIDESHIFT CARRIAGE ASSEMBLY FOR THREE-STAGE FFL IS SIMILAR.

- |                       |                                   |
|-----------------------|-----------------------------------|
| 1. CAPSCREW           | 12. SNAP RING                     |
| 2. WASHER             | 13. COTTER PIN                    |
| 3. FORK REMOVAL NOTCH | 14. CHAIN ANCHOR                  |
| 4. OUTER FRAME        | 15. CHAIN ANCHOR MOUNTING BRACKET |
| 5. LOWER HOOK         | 16. INNER FRAME                   |
| 6. LUBE FITTING       | 17. STUBSHAFT                     |
| 7. LOWER BEARING      | 18. SHIMS                         |
| 8. HAIRPIN            | 19. LOAD ROLLER                   |
| 9. CLEVIS PIN         | 20. SIDESHIFT CYLINDER            |
| 10. PIN               | 21. SPACER                        |
| 11. UPPER BEARING     |                                   |

**Figure 10. Integral Sideshift Carriage**

- Use a crane with a capacity of at least 450 kg (992 lb) to lift outer frame away from the inner frame (see Figure 11). Lay the outer frame flat on a pallet or workbench.



- OUTER FRAME
- LIFTING HOOK
- LIFTING DEVICE

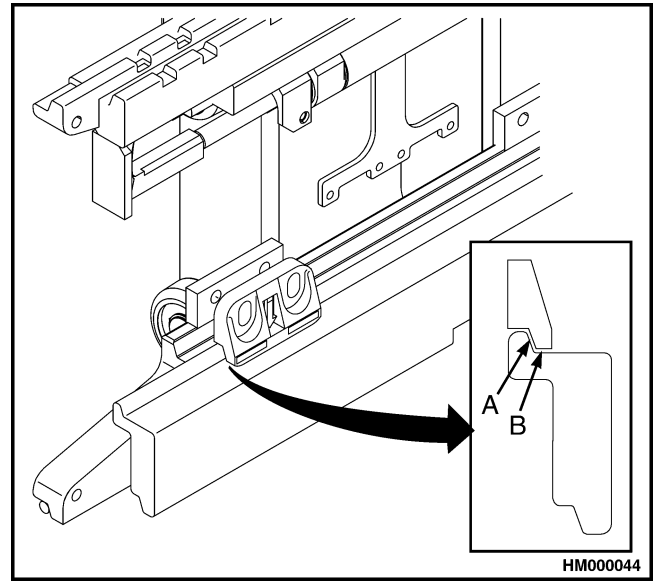
**Figure 11. Remove Outer Frame**

### Disassemble

- Remove the upper and lower bearings from the inner frame. See Figure 10.
- If damaged, remove lube fittings from outer frame.
- Disassemble the sideshift cylinder. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382** for procedures.

### Clean and Inspect

- Inspect the lower mounting hooks for wear. Replace the hooks if they are worn beyond the wear limit. The wear limit clearance range is 0.76 mm (0.03 in.) minimum and 1.52 mm (0.06 in.) maximum. See A in Figure 12.



- WEAR LIMIT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.
- CLEARANCE ADJUSTMENT - 0.76 mm (0.03 in.) MINIMUM AND 1.52 mm (0.06 in.) MAXIMUM.

**Figure 12. Lower Mounting Hooks Wear Limit and Clearance Adjustment**

**WARNING**

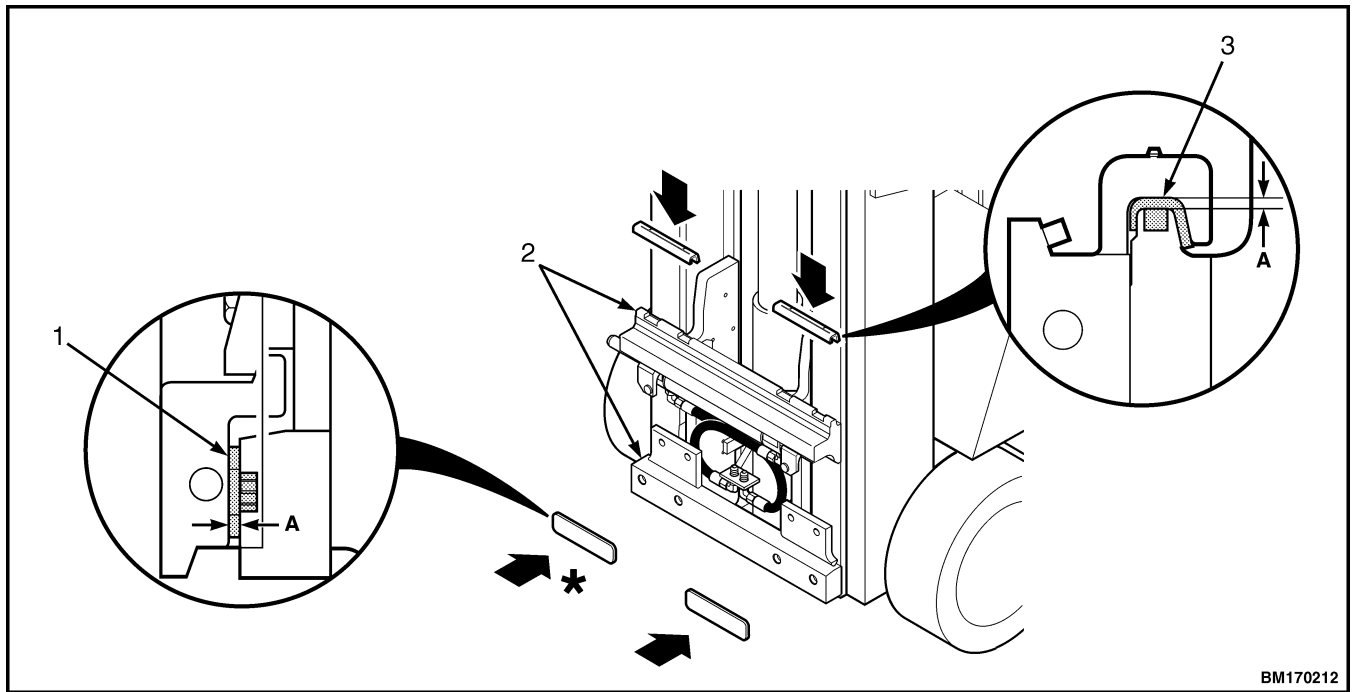
**Improper welding procedures can damage the structure of the mast or cause incorrect function of the mast. Consult your Hyster lift truck dealer for more information before welding on the mast.**

2. Clean and inspect the carriage bars for damage and smoothness. Ensure the carriage bars are parallel and the ends are flush. If carriage bars have any protruding welds or damaged notches, repair by grinding, filing, or welding.
3. Clean the bearing areas. Inspect the sideshift bearings for wear as follows:
  - a. If either upper bearing is worn to less than 2.5 mm (0.1 in.) thickness, replace both upper bearings by driving the upper bearings from the inner frame. See Figure 13.

To install new upper bearing, align the pins on the bottom side of bearing to notches on top carriage bar and slide into place on top carriage. See Figure 13.

- b. If either lower bearing is worn to less than 2.5 mm (0.1 in.) thickness, replace both lower bearings by prying the lower bearings from the inner frame. See Figure 13.

To install new lower bearing, align the circular pins on backside of lower bearing to holes on lower carriage bar and tap bearing into place on lower carriage bar using a rubber or brass hammer. See Figure 13.



**A.** MINIMUM THICKNESS, 2.5 mm (0.1 in.)

- 1. LOWER BEARINGS
- 2. CARRIAGE BARS

- 3. UPPER BEARINGS

\*BOLD ARROWS INDICATE WHICH SIDE TO APPLY GREASE.

**Figure 13. Checking Upper and Lower Bearings**

**WARNING**

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

4. Inspect the sideshift cylinder. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382** for procedures.
5. Inspect load rollers for wear and damage. If load rollers must be replaced, make a note of the location and number of the shims to ensure correct installation.

**Assemble**

1. Assemble the sideshift cylinder. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382** for procedures.
2. If lube fittings were removed, install new lube fittings into outer frame. See Figure 10.

**NOTE:** Use a wood block or a plastic hammer to fully seat the upper bearings onto the inner frame. Proper lower hook clearance requires the upper bearings be fully seated.

3. Apply a 1 mm (0.040 in.) layer of multipurpose grease to upper and lower bearing surfaces. Install the upper and lower bearings onto the inner frame. Bearings snap into place. See Figure 13.

**Install**

1. Use a crane with a capacity of at least 450 kg (992 lb) to install the outer frame on the inner frame.
2. Install the lower mounting hooks using four capscrews. Tighten to  $165 \pm 15$  N·m ( $120 \pm 12$  lbf ft). For proper sideshift operation, make sure there is 0.76 to 1.52 mm (0.03 to 0.06 in.) clearance between the bottom of the hooks and the outer frame. See **B** in Figure 12.
3. Connect the hydraulic lines, as noted during removal, to the sideshift cylinder.
4. Install the backrest on the sideshift carriage. See Figure 8. Tighten the capscrews to 195 N·m (144 lbf ft).
5. Install the forks. See the section **Fork Replacement** for the procedures.



## Two-Stage Mast With Limited Free-Lift Repair

### REMOVE



#### WARNING

The mast is heavy. The mast can weigh approximately 907 kg (2000 lb). Make sure all lifting devices (hoists, cables, chains, slings, etc.) are suitable and of adequate capacity to lift the mast. Serious injury can occur if the mast falls.



#### CAUTION

Make sure all the mast weldments are fastened together. Make sure the safety chains will not damage the sheaves, tubing, or other parts of the mast.

**NOTE:** If the mast needs to be disassembled, remove the forks and carriage. See the sections Fork Replacement and Carriages Repair for procedures. If only the main lift cylinders or tilt cylinders need to be repaired, the mast does not need to be removed from the lift truck. See the section **Cylinder Repair (Mast S/N A270-72, A551, A555, A559, A626, A627, A751-52, B551, B555, B586-91, B749-54, C661-63, C665, D507-09, D515, D562-64, E509, E564) 2100SRM1382** for procedures. For header hose installation and adjustment, see the section Header Hose Installation and Adjustment.

1. Fully lower all mast weldments. Tilt the mast fully forward. Connect a crane or lifting device, with a capacity of at least 907 kg (2000 lb), to all top crossmembers of the mast weldments using chains to support the mast in an upright

position when the tilt cylinders are disconnected. See the section Safety Procedures When Working Near Mast.



#### WARNING

Hydraulic oil is hot after system operation and can cause burns. **DO NOT** disconnect any hydraulic hoses until the oil in the system has cooled.

Completely lower forks to relieve hydraulic pressure before disconnecting any hoses.



#### CAUTION

Protect the hydraulic system from dirt and contaminants when disconnecting hydraulic hoses from the mast. If hydraulic system becomes contaminated, damage to hydraulic system can occur.



#### CAUTION

Disposal of lubricants and fluids must meet local environmental regulations.

2. Position a drip pan with a capacity of 21 liter (22.5 qt) under the area of the hydraulic fittings.
3. Remove the floor mat. Lift the floor plate up enough to disconnect the electrical connectors from the accelerator pedal or pedal, and remove floor plate with accelerator pedal or still attached. See Figure 14.