

SERVICE REPAIR

MANUAL

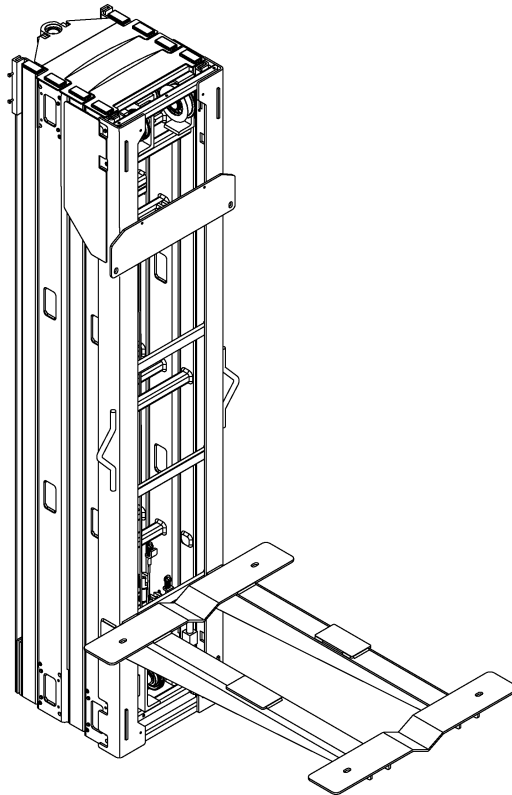
Hyster A254 (AP20Z) Forklift

HYSTER

MAST REPAIR

(S/N A615)

AP20Z [A254]



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.
- Batteries generate flammable gas when they are being charged. Keep fire and sparks away from the area. Make sure the area is well ventilated.
- DISCONNECT THE BATTERIES, if required, before doing any maintenance or repair on aerial work platforms.
- Always use correct blocks to prevent the unit from rolling or falling. See HOW TO PUT THE LIFT ON BLOCKS in the **Operating Manual** for your lift.
- 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 read and follow safety and inspection instructions on labels attached to lift.
- Be sure to follow the **DANGER**, **WARNING**, and **CAUTION** notes in the instructions.

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



DANGER

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



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, the **DANGER** symbol and word are on red background. The **WARNING** symbol and word are on orange background. The **CAUTION** symbol and word are on yellow background.

**Thanks very much for your reading,
Want to get more information,
Please click here, Then get the complete
manual**

JustClickHere 

NOTE:

**If there is no response to click on the link above,
please download the PDF document first, and then
click on it.**

**Have any questions please write to me:
admin@servicemanualperfect.com**

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This section is for the following models:

(AP20Z) [A254]

**"THE
QUALITY
KEEPERS"**

**HYSTER
APPROVED
PARTS**

General



WARNING

DO NOT operate an aerial work platform that needs repairs. If a repair is necessary, put a DO NOT OPERATE tag on the control handle. Remove the key from the key switch.



WARNING

Always disconnect and separate the battery connector so that the connector is completely free before performing any service or repairs. If the connector is not completely free, it can reconnect. Tag the connector saying DO NOT CONNECT.



WARNING

The mast and carriage assemblies, and their components, are heavy. To help prevent damage or an injury, a lifting device must be used during all service procedures. The mast and carriage weighs approximately 318 kg (700 lb).

This section has the repair procedures for the mast with serial number A615 used on the aerial work platform covered in this manual. Procedures to repair the carriage and adjust the lift chains, carriage, and mast are also covered in this manual.

Additional information concerning the mast may be included in other sections when the information is more closely related to other systems. Sections that may contain related information include:

Periodic Maintenance 8000SRM1918

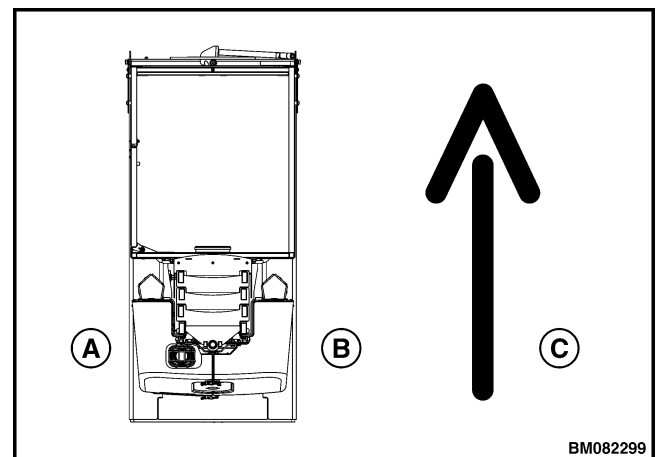
Operator Compartment 0100SRM1915

Lift Cylinders 2100SRM1914

Electrical System 2200SRM1913

Hydraulic System 1900SRM1911

Throughout this section, forward will refer to travel in the direction of the aerial work platform and left and right will be determined by the point of view of an operator situated in the operator compartment and facing the aerial work platform. See Figure 1.



- A. LEFT SIDE
- B. RIGHT SIDE
- C. FORWARD TRAVEL

Figure 1. Aerial Work Platform Orientation

WORKING NEAR POWER LINES

 **DANGER**

The lift is NOT insulated for use near electrical power lines and DOES NOT provide protection from contact with or close proximity to any electrically charged conductor. Operator must maintain a safe distance at all times. See Table 1 for minimum safe approach distances between electrical power lines and lift. Always allow for operator compartment movement due to gusty winds. Always contact local power company before working near power lines. Assume all powerlines are live.

 **WARNING**

Failure to observe the following rules can cause serious injury or death! Authorized and trained operator only!

Table 1. Minimum Safety Approach Distance (MSAD)

Approach Distances For Qualified Employees - Alternating Current	
Voltage Range (Phase to Phase)	Minimum Approach Distance
300V And Less	Avoid Contact
Over 300V, Not Over 750V	30.5 cm (1.0 ft)
Over 750V, Not Over 2kV	46.0 cm (1.6 ft)
Over 2kV, Not Over 15kV	61.0 cm (2.0 ft)
Over 15kV, Not Over 37kV	91.0 cm (3.0 ft)
Over 37kV, Not Over 87.5kV	107.0 cm (3.6 ft)
Over 87.5kV, Not Over 121kV	122.0 cm (4.0 ft)
Over 121kV, Not Over 140kV	137.0 cm (4.6 ft)

Special Precautions

DISCHARGING THE CAPACITORS

 **WARNING**

DO NOT make repairs or adjustments unless you have been properly trained and authorized to do so. Improper repairs and adjustments can create dangerous operating conditions. DO NOT operate an aerial work platform that needs repairs. Report the need for repairs to your supervisor immediately. If repair is necessary, attach a DO NOT OPERATE tag to the control handle and disconnect the battery. DO NOT place tools on top of the battery. If a tool causes a short circuit, the high current flow from the battery can cause personal injury or property damage.

Some checks and adjustment are performed with the battery connected. DO NOT connect the battery until the procedure instructs you to do so. Never wear any metallic items on your fingers, arms, or neck. Metal items can accidentally make an electrical connection and cause injury.

Before performing any tests or adjustment, block the aerial work platform to prevent unexpected movement.

The capacitor in the transistor controller(s) can hold an electrical charge after the battery is disconnected.

To avoid injury and prevent electrical shock, perform the following steps before doing any troubleshooting, adjustments, connecting, or disconnecting a handset or PC:

1. Block the platform so that the drive wheels are off the floor. See the Operator's Manual.
2. Turn the key switch to the OFF position.
3. Discharge the capacitors in the controllers. DO NOT short across the motor controller terminals with a screwdriver or jumper wire. Remove the 200-ohm, 2-watt resistor before reconnecting the battery.

**CAUTION**

To avoid controller damage:

1. **ALWAYS** disconnect the battery when servicing the controllers.
2. **ALWAYS** discharge the capacitors using the proper procedure before performing any service.
3. **NEVER** put power to the controller with any power wire disconnected or loose.
4. **NEVER** short any controller terminal or motor terminal to battery (+), battery (-), or the frame.

**CAUTION**

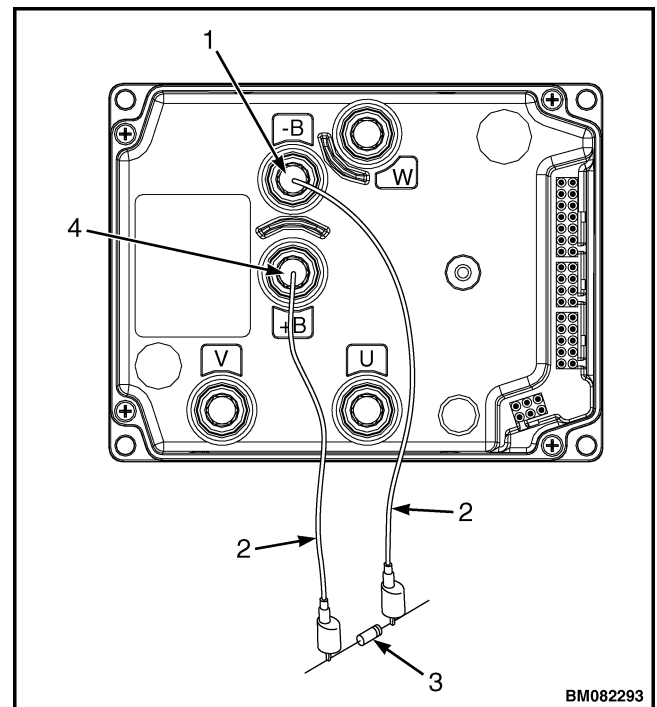
Correct meter polarity is necessary for some checks. Meter correct positive is indicated as (+). Meter correct negative is indicated as (-).

NOTE: Use a digital meter with a minimum rating of 20,000 ohms per volt to make accurate measurements.

1. To avoid injury and prevent electrical shock, perform the following steps (Step 2 through Step 7 below) to discharge the capacitors before troubleshooting, making adjustments or repairs, or connecting or disconnecting a PC service tool:
2. Turn the key switch to the OFF position and **DISCONNECT THE BATTERY**.
3. Block the aerial work platform so the drive wheels are off the floor to prevent aerial work platform from moving.
4. Remove the electrical compartment cover to access the combination and traction controller. See the **Frame** manual listed in the General section of this manual for procedures.

NOTE: The combination and traction controllers are wired parallel. Connecting the resistor across the combination controller will also discharge capacitors in the traction controller if they are properly connected.

5. Discharge the capacitors in the controllers by connecting a 200-ohm, 2-watt resistor across the lift controller's negative (B-) and positive (B+) terminals. Wait at least 20 seconds to be sure that the capacitors are fully discharged. See Figure 2.
6. If necessary to discharge the traction controller separately from the combination controller, perform Step 5. See Figure 3.
7. Remove the resistor from the controller(s) and reinstall the covers (see the **Frame** manual listed in the General section of this manual for procedures) before returning the aerial work platform to service.



1. B- TERMINAL
2. JUMPER LEADS
3. 200-OHM, 2-WATT RESISTOR
4. B+ TERMINAL

Figure 2. Combination Controller

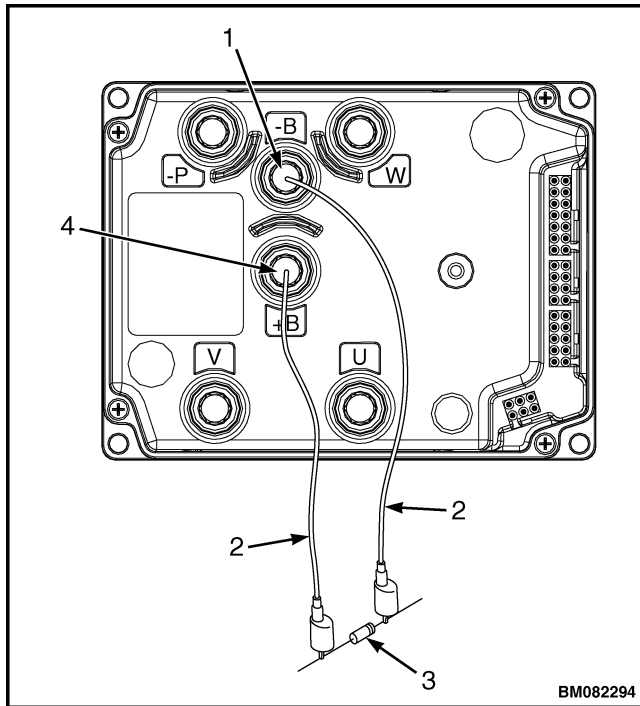


Figure 3. Traction Controller

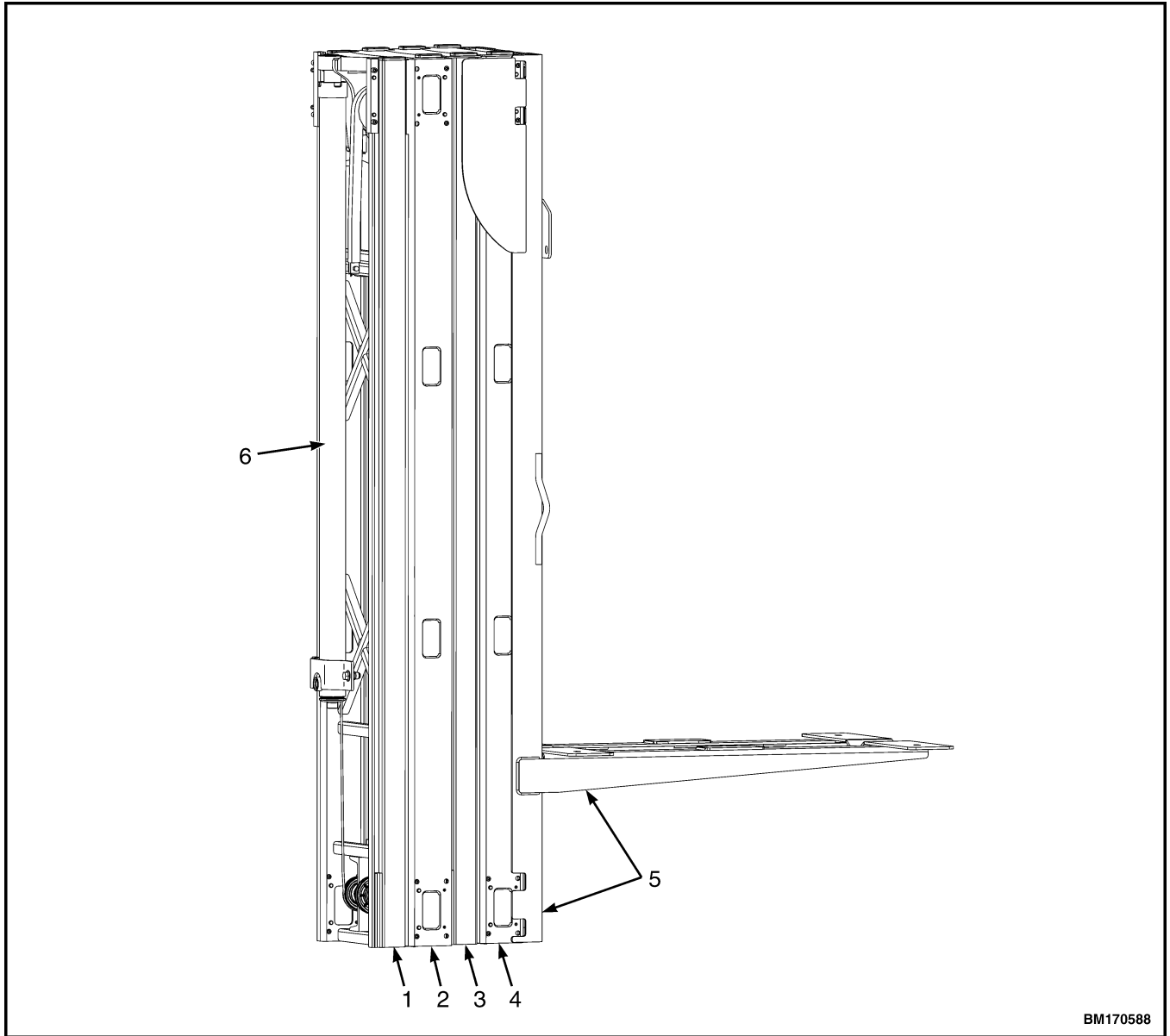
Legend for Figure 3

1. B- TERMINAL
2. JUMPER LEADS
3. 200-OHM, 2-WATT RESISTOR
4. B+ TERMINAL

Description

The mast used on the aerial work platform covered in this manual is a five stage mast with four mast weldments and a carriage weldment. There is a first intermediate mast weldment, second intermediate mast weldment, third intermediate mast weldment, fourth intermediate mast weldment, and a carriage weldment (fifth intermediate mast weld-

ment). See Figure 4. One main lift cylinder is used to raise and lower the aerial work platform. The lift cylinder is installed on a cylinder mounting plate behind the first intermediate mast weldment. In addition to the lift cylinder, chains, cables, and slider blocks are also used to raise and lower the mast.



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- | | |
|--------------------------------------|--------------------------------------|
| 1. FIRST INTERMEDIATE MAST WELDMENT | 4. FOURTH INTERMEDIATE MAST WELDMENT |
| 2. SECOND INTERMEDIATE MAST WELDMENT | 5. CARRIAGE WELDMENT |
| 3. THIRD INTERMEDIATE MAST WELDMENT | 6. LIFT CYLINDER |

Figure 4. Mast Weldments

Mast Repair

REMOVE



WARNING

The mast and carriage assemblies, and their components, are heavy. To help prevent damage or an injury, a lifting device must be used during all service procedures. The mast weighs approximately 318 kg (700 lb).

1. Block the mast in the service position. See the **Operating Manual** or the **Periodic Maintenance** manual listed in the General section of this manual for procedures to block the mast.
2. Remove nut, spring, and washer from first phasing cable. See Figure 5.
3. Remove first phasing cable from bracket on second intermediate mast weldment. See Figure 5.
4. Using lower control panel, lift aerial work platform and remove the pipe. Return mast to fully lowered position.
5. Remove dust covers from top of mast channels. See Figure 6.



WARNING

Be careful when removing or installing snap rings. These snap rings can come loose during removal or installation with enough force to cause an injury. Always use the correct snap ring pliers, and wear eye and face protection during removal or installation.

6. Remove snap ring from lift cylinder. See Figure 6.



WARNING

The mast and carriage assemblies, and their components, are heavy. To help prevent damage or an injury, use a lifting device with a minimum capacity of 318 kg (700 lb).

7. Place a sling strap under the top cross bars of all five mast channels. See Figure 6.

8. Turn off all power to aerial work platform by disconnecting the battery and discharging the capacitors. See the Special Precautions section for procedures to discharge the capacitors.
9. Zip tie lift cylinder to frame before removing mast from aerial work platform.
10. Remove operator compartment. See **Operator Compartment** manual listed in the General section of this manual for procedures.
11. Open service doors for access to electrical connections and components.
12. Remove mast cable tensioning system by unhooking spring and pulling spring and wire harness cable off of round belt pulley. Set mast cable tensioning system off to side. See Figure 7.

NOTE: Be sure to tag all electrical connections prior to disconnecting them to help in reconnecting them during installation.

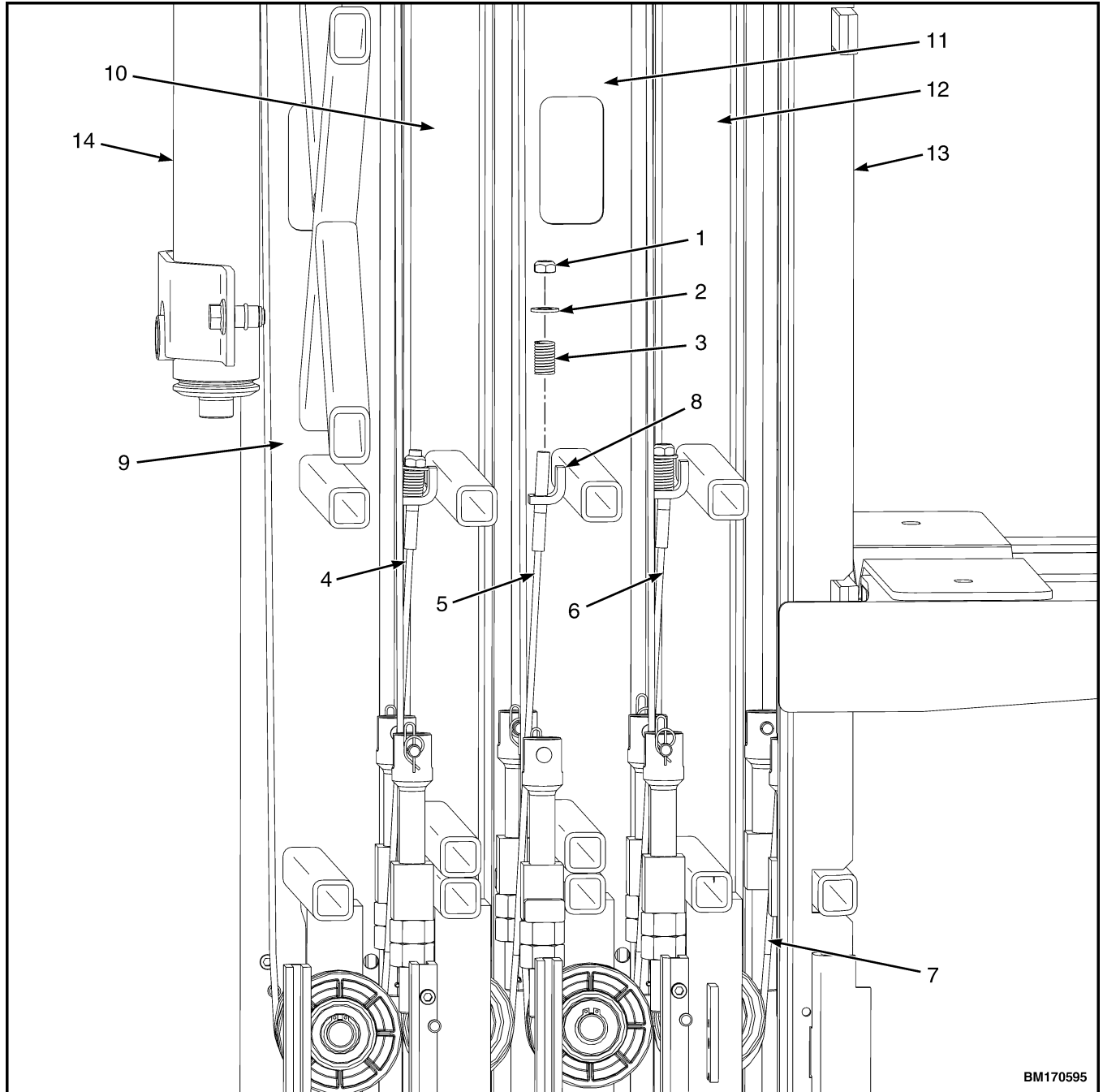
13. Disconnect mast signal cable from lower control panel. See Figure 7.



CAUTION

Frame slider blocks do not need to be removed from mast frame after removing threaded screws. When mast is raised with lifting device during removal from aerial work platform frame, slider blocks will come off. Be sure slider blocks do come off when removing mast from frame. If they do not fall off, the mast will pull slider blocks out of frame and cause damage to mast and slider blocks.

14. Remove threaded screws from frame slider blocks. See Figure 6.
15. Raise mast 102 to 152 mm (4 to 6 in.) with lifting device attached to sling strap. This will provide slack to first set of lift chains that connect frame to second intermediate mast weldment channel.

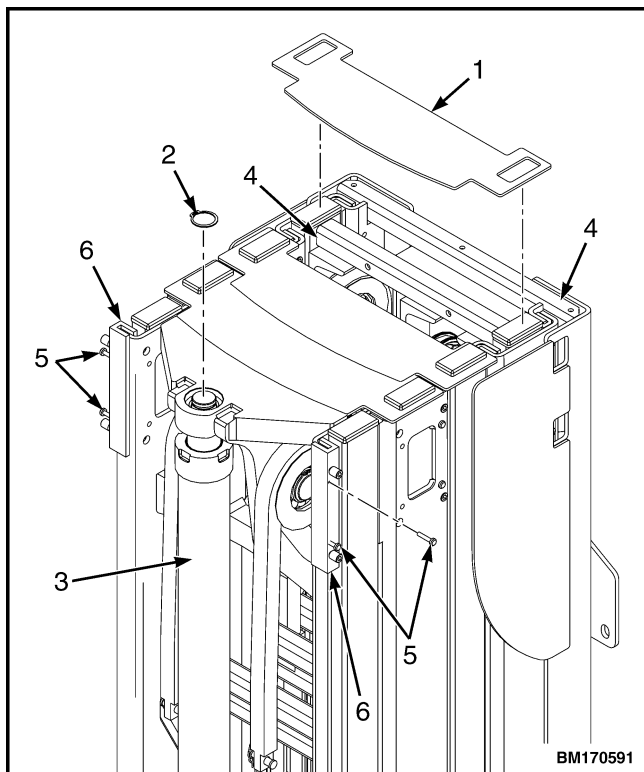


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NOTE: PARTS OF MAST OMITTED FOR CLARITY.

- | | |
|-----------------------|---------------------------------------|
| 1. NUT | 8. BRACKET |
| 2. WASHER | 9. FIRST INTERMEDIATE MAST WELDMENT |
| 3. SPRING | 10. SECOND INTERMEDIATE MAST WELDMENT |
| 4. FIRST PHASE CABLE | 11. THIRD INTERMEDIATE MAST WELDMENT |
| 5. SECOND PHASE CABLE | 12. FOURTH INTERMEDIATE MAST WELDMENT |
| 6. THIRD PHASE CABLE | 13. CARRIAGE WELDMENT |
| 7. FOURTH PHASE CABLE | 14. LIFT CYLINDER |

Figure 5. Phasing Cable, Remove



1. DUST COVER
2. SNAP RING
3. LIFT CYLINDER
4. TOP CROSS BAR
5. THREADED SCREW
6. FRAME SLIDER BLOCKS

Figure 6. Snap Ring, Dust Cover, and Frame Slider Blocks, Remove

NOTE: Access to cotter and chain anchor pins is from behind sail weldment, where lift cylinder is mounted.

16. Disconnect first set of lift chains by removing two cotter pins and chain anchor pins from bottom of second intermediate mast weldment. See Figure 8.
17. Remove two cotter pins and chain anchor pins from chain anchors mounted on sail cover bracket. Remove first set of lift chains from mast. See Figure 8.
18. Using lifting device, lift mast from aerial work platform frame. Grab frame slider blocks so that they do not fall out. See Figure 6.
19. Lower mast and place in a horizontal position.

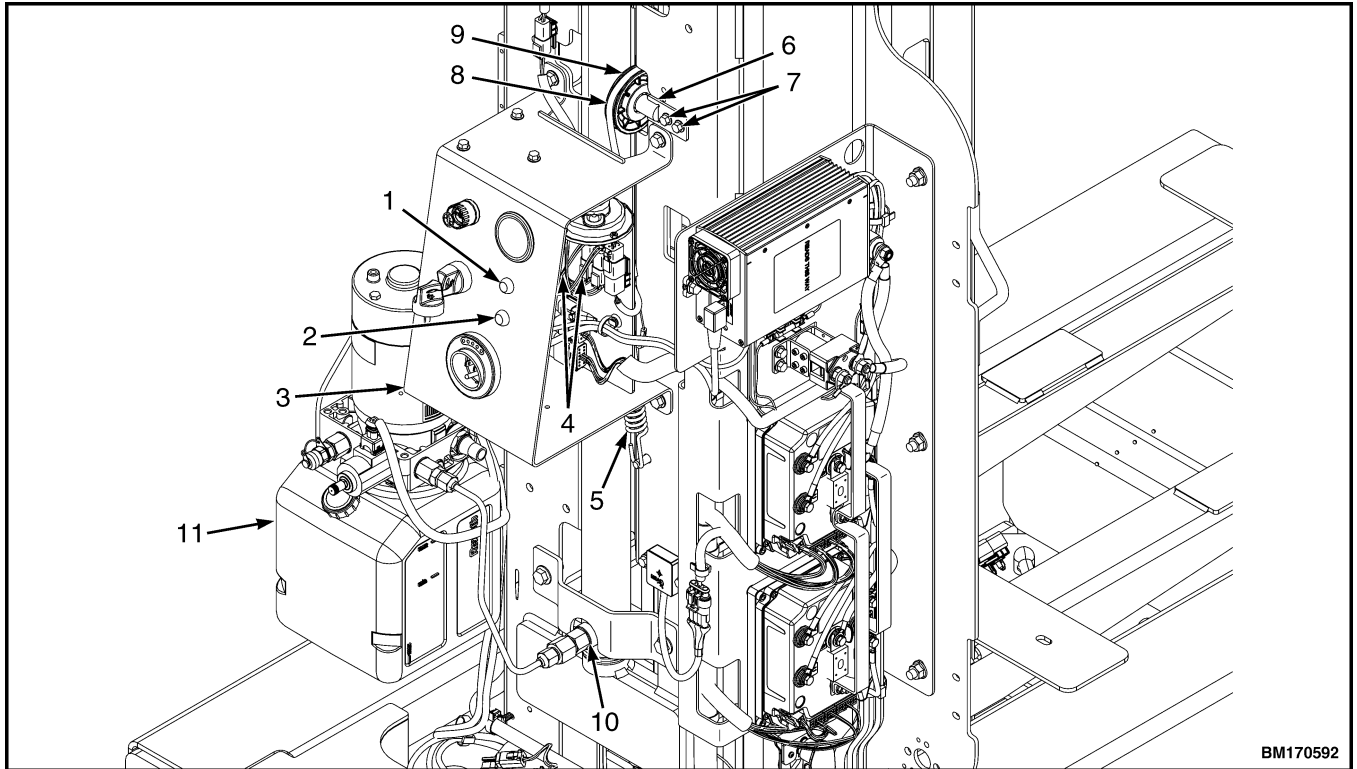
DISASSEMBLE

NOTE: Remove self-tapping screws with hand tools and not power tools. The use of power tools can strip the self-tapping screws and damage them.

1. Remove threaded end of fourth phasing cable from bracket on carriage weldment. See Figure 5.

NOTE: If thread is stripped out of slider block, replace with new slider block. See **Parts Manual**.

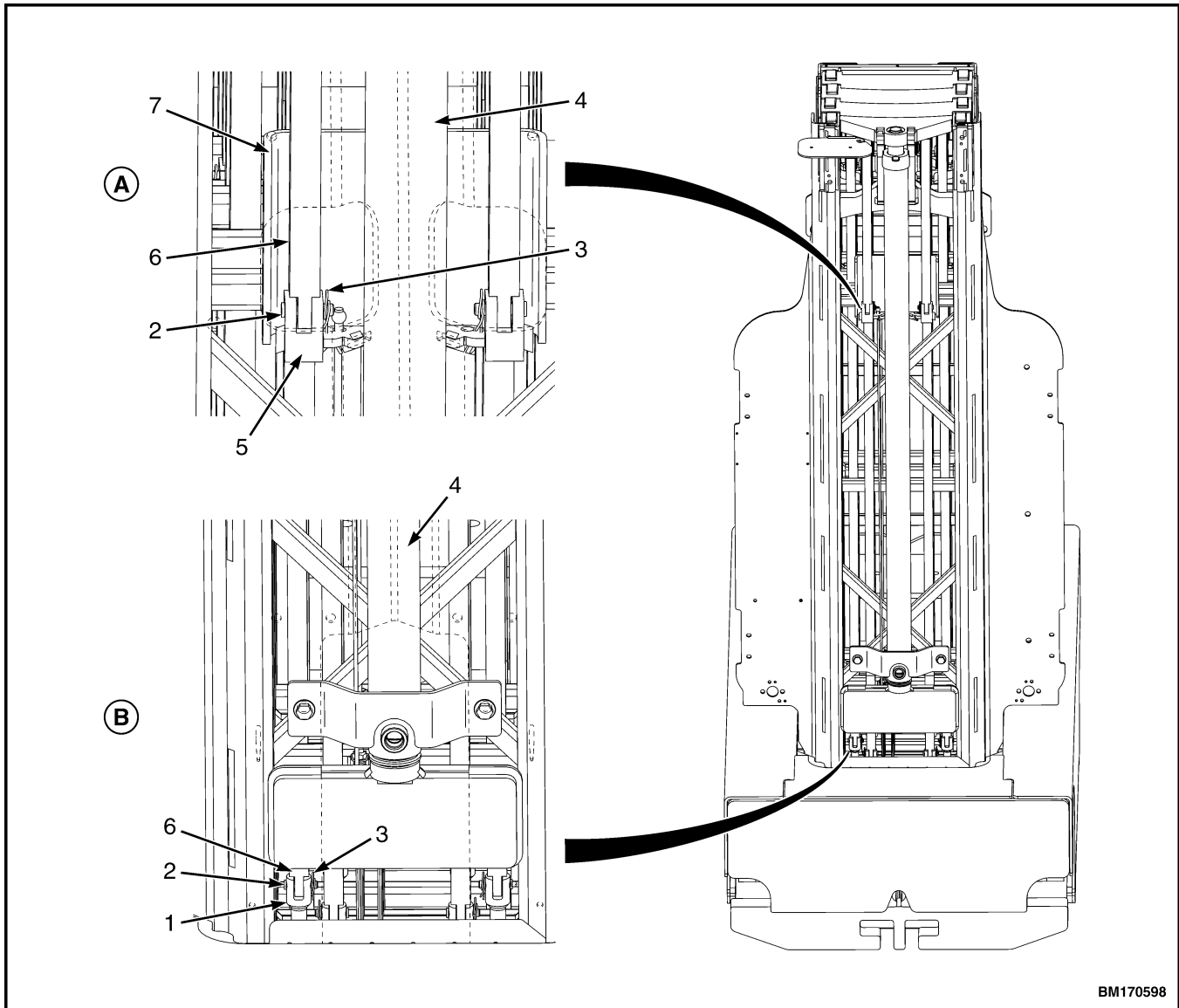
2. Remove self-tapping screws, setscrews, and mast slider blocks from top and bottom of carriage weldment. See Figure 9.
3. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from bottom of carriage weldment. See Figure 10.
4. Remove two pins and four nuts from bottom of chain anchors. Remove chain anchors from chain retainer blocks and carriage weldment. See Figure 10.
5. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from chain retainer block at top of carriage weldment. See Figure 10.
6. Using lifting device, lift carriage weldment up and slide it off of fourth intermediate mast weldment.
7. Remove nut, spring, and washer from third phasing cables. See Figure 5.
8. Remove third phasing cable from bracket on fourth intermediate mast weldment. See Figure 5.
9. Remove self-tapping screws, setscrews, and mast slider blocks from top and bottom of fourth intermediate mast weldment. See Figure 9.
10. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from bottom of fourth intermediate mast weldment. See Figure 10.
11. Remove two pins and four nuts from bottom of chain anchors. Remove chain anchors from chain retainer blocks on fourth intermediate mast weldment.



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- | | |
|------------------------|---|
| 1. LIFT BUTTON | 7. CAPSCREWS |
| 2. LOWER BUTTON | 8. WIRE HARNESS CABLE |
| 3. LOWER CONTROL PANEL | 9. ROUND BELT PULLEY |
| 4. MAST SIGNAL CABLE | 10. HYDRAULIC TUBE CONNECTION (EXCESS FLOW PROTECTOR) |
| 5. SPRING | 11. HYDRAULIC TANK |
| 6. BRACKET | |

Figure 7. Mast Tensioning System and Signal Cable



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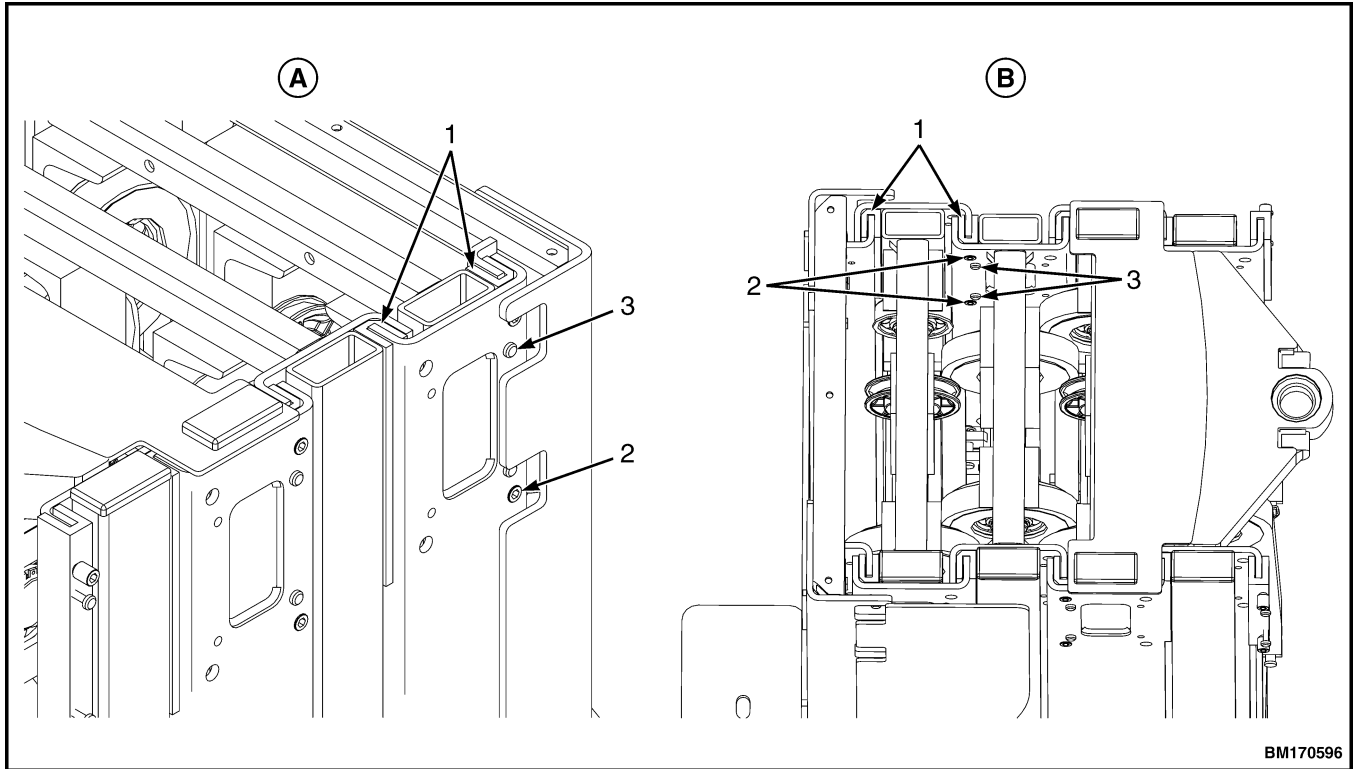
A. TOP OF MAST

- 1. CHAIN ANCHOR
- 2. CHAIN ANCHOR PIN
- 3. COTTER PIN
- 4. LIFT CYLINDER

B. BOTTOM OF MAST

- 5. CHAIN RETAINER BLOCK
- 6. LIFT CHAIN
- 7. SAIL COVER BRACKET

Figure 8. Disconnecting First Set of Lift Chains



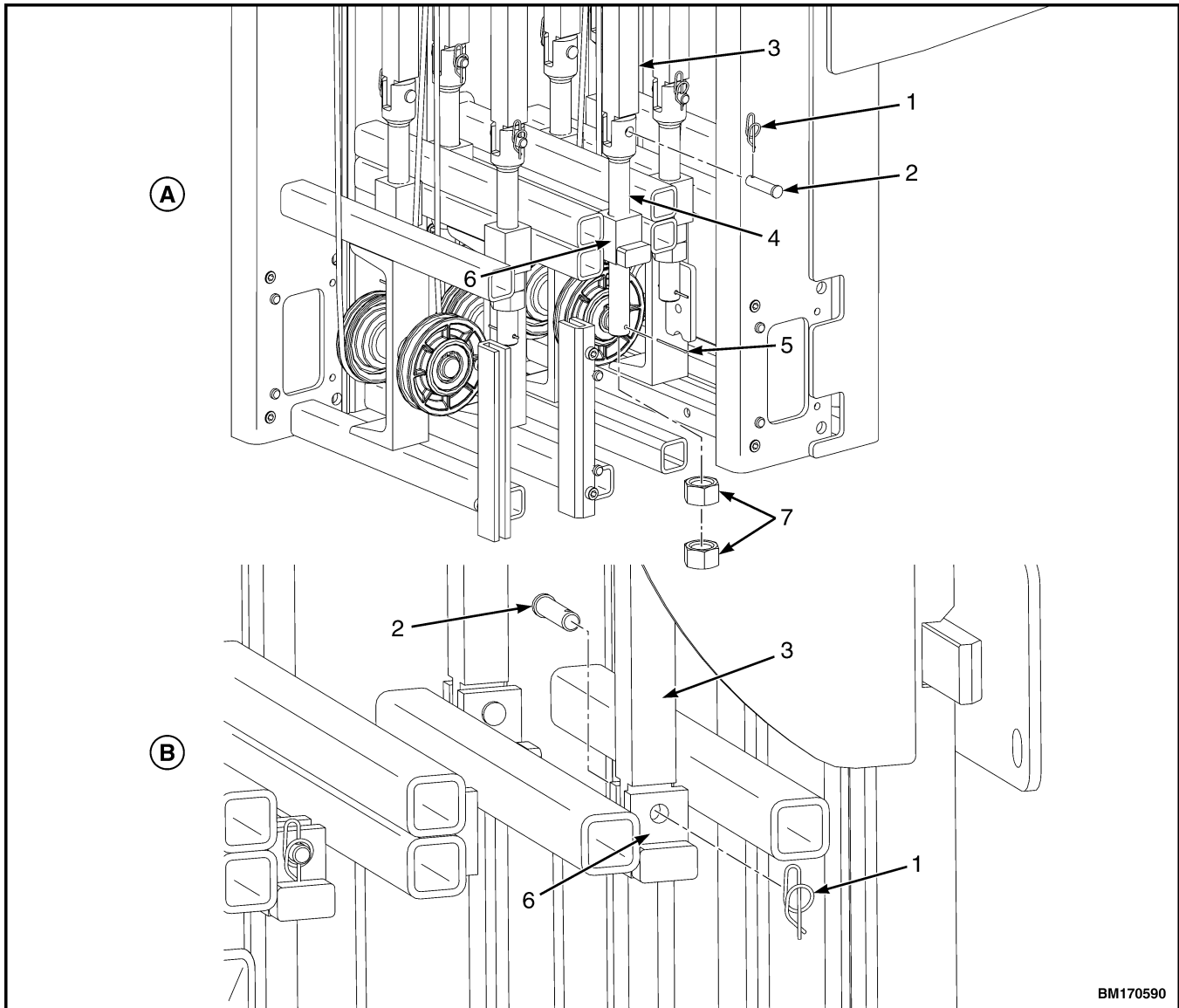
A. OUTSIDE VIEW

- 1. MAST SLIDER BLOCKS
- 2. SETSCREWS

B. INSIDE VIEW

- 3. SELF-TAPPING SCREWS

Figure 9. Mast Slider Blocks Removal



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NOTE: SOME COMPONENTS OF MAST OMITTED FOR CLARITY.

NOTE: IN ILLUSTRATION B, TOP VIEW OF MAST, CHAIN ANCHOR PINS MUST FACE OUTBOARD SIDE OF MAST DURING INSTALLATION, AS SHOWN ABOVE.

A. BOTTOM VIEW OF MAST

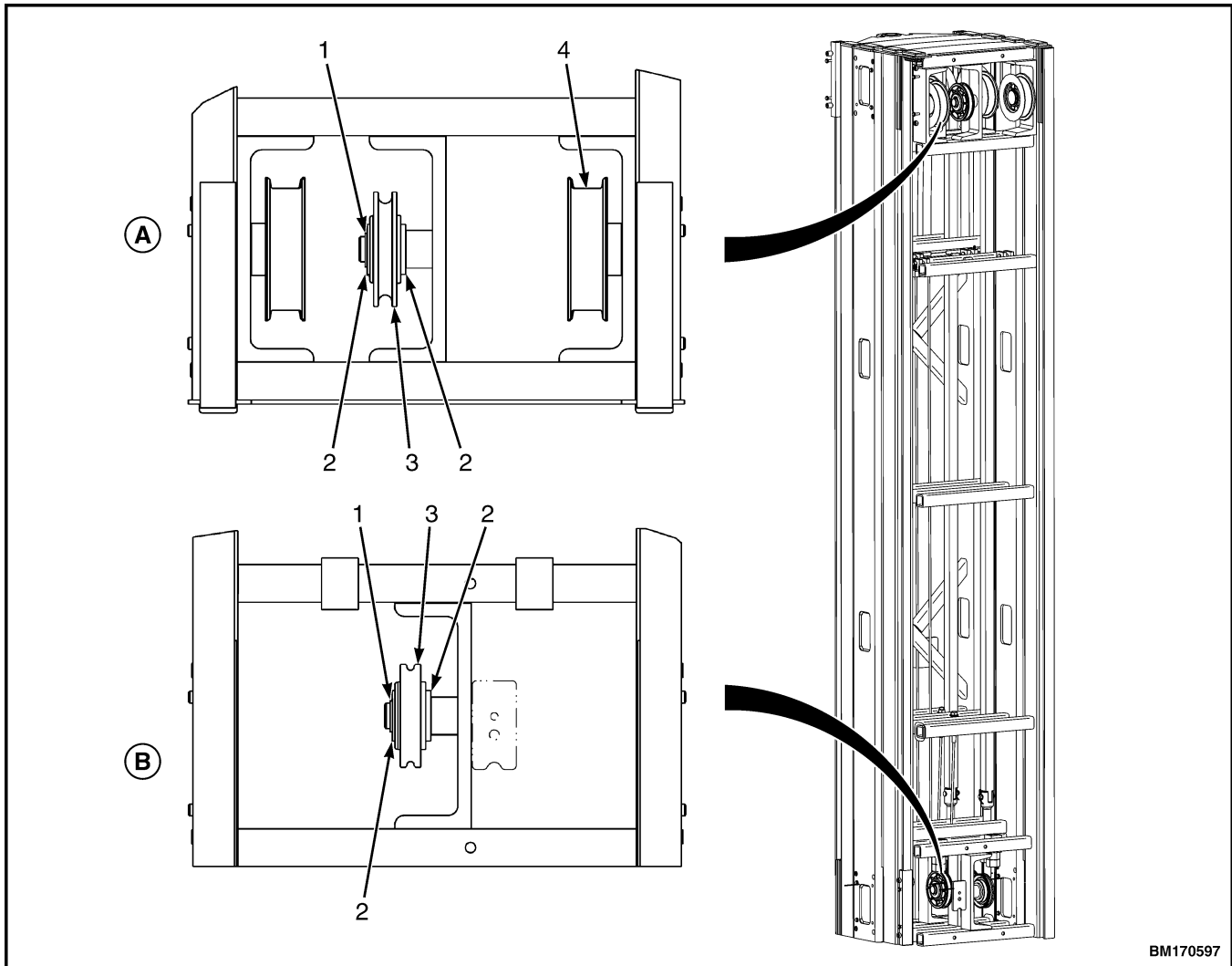
B. TOP VIEW OF MAST

- 1. COTTER PIN
- 2. CHAIN ANCHOR PIN
- 3. LIFT CHAIN
- 4. CHAIN ANCHOR

- 5. PIN
- 6. CHAIN RETAINER BLOCK
- 7. NUTS

Figure 10. Remove Cotter and Chain Anchor Pins and Disconnect Lift Chains

12. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from chain retainer block at top of fourth intermediate mast weldment. See Figure 10.
13. Remove snap rings, washers, and bearings from cable pulley and chain sheaves on top of fourth intermediate mast weldment. Remove cable pulley and chain sheaves from stubshafts. See Figure 11.
14. Remove snap ring, two washers and cable pulley from bottom of fourth intermediate mast weldment. See Figure 11.
15. Using lifting device, lift fourth intermediate mast weldment up and slide it off of third intermediate mast weldment.
16. Remove nut, spring, and washer from second phasing cables. See Figure 5.
17. Remove second phasing cable from bracket on third intermediate mast weldment. See Figure 5.
18. Remove self-tapping screws, setscrews, and mast slider blocks from top and bottom of third intermediate mast weldment. See Figure 9.
19. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from bottom of third intermediate mast weldment. See Figure 10.
20. Remove two pins and four nuts from bottom of chain anchors. Remove chain anchors from chain retainer blocks on third intermediate mast weldment. See Figure 10.
21. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from chain retainer block at top of third intermediate mast weldment. See Figure 10.
22. Remove snap rings, washers, and bearings from cable pulley and chain sheaves on top of third intermediate mast weldment. Remove cable pulley and chain sheaves from stubshafts. See Figure 11.
23. Remove snap ring, two washers and cable pulley from bottom of third intermediate mast weldment. See Figure 11.
24. Using lifting device, lift third intermediate mast weldment up and slide it off of second intermediate mast weldment.
25. Remove self-tapping screws, setscrews, and mast slider blocks from top and bottom of second intermediate mast weldment. See Figure 9
26. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from bottom of second intermediate mast weldment. See Figure 10.
27. Remove two pins and four nuts from bottom of chain anchors. Remove chain anchors from chain retainer blocks on second intermediate mast weldment. See Figure 10.
28. Remove two cotter pins and two chain anchor pins, and disconnect lift chains from chain retainer block at top of second intermediate mast weldment. See Figure 10.
29. Remove snap rings, washers, and bearings from cable pulley and chain sheaves on top of second intermediate mast weldment. Remove cable pulley and chain sheaves from stubshafts. See Figure 11.
30. Remove snap ring, two washers and cable pulley from bottom of second intermediate mast weldment. See Figure 11.
31. Using lifting device, lift second intermediate mast weldment up and slide it off of first intermediate mast weldment.
32. Remove snap rings, washers, and bearings from cable pulley and chain sheaves on top of first intermediate mast weldment. Remove cable pulley and chain sheaves from stubshafts. See Figure 11.
33. Remove snap rings, washers and cable pulleys from bottom of first intermediate mast weldment. See Figure 11
34. Remove self-tapping screws, setscrews, and slider blocks from top and bottom of carriage weldment. See Figure 9.
35. If lift cylinder needs to be removed from first intermediate mast weldment for repair, see the **Lift Cylinder Repair** manual listed in the General section of this manual.



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NOTE: CHAIN SHEAVES AND CABLE PULLEY ON FOURTH INTERMEDIATE MAST WELDMENT SHOWN. CHAIN SHEAVES AND CABLE PULLEYS ON ALL OTHER INTERMEDIATE MAST WELDMENTS ARE SIMILAR.

A. TOP OF MAST

- 1. SNAP RING
- 2. WASHER

B. BOTTOM OF MAST

- 3. CABLE PULLEY
- 4. CHAIN SHEAVE ASSEMBLY (SHEAVE, SNAP RING, AND BEARING)

Figure 11. Chain Sheaves and Cable Pulleys, Remove

CLEAN AND INSPECT



WARNING

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



CAUTION

DO NOT use steam to clean the lift chains, lift chain sheaves, or cable pulleys. The lift chain sheaves and cable pulleys are sealed and permanently lubricated. Do not use compressed air on the bearings. The air can force the lubricant out of the bearings.

1. Clean the mast weldments with steam or solvent.



WARNING

Some parts may be damaged by welding. To prevent an injury, always get authorization from your dealer for Hyster aerial work platforms before welding on the mast or mast components.

2. Inspect the sliding and rolling surfaces of the channels for damage (dents) and wear (grooves). Inspect all welds for cracks.
3. If lift chains need to be cleaned, see procedures in the **Periodic Maintenance** manual listed in the General section of this manual.
4. Inspect all chain anchors, chain anchor pins, cotter pins, and cable pulleys to ensure they are not worn or damaged. See the **Parts Manual** to replace any parts that are damaged or worn.

ASSEMBLE

NOTE: Install self-tapping screws with hand tools and not power tools. The use of power tools can strip the self-tapping screws and damage them.

1. If lift cylinder was removed, see the **Lift Cylinder Repair** manual listed in the General section of this manual for procedures to install lift cylinder to mast.

NOTE: Do not adjust setscrews at this moment. Start the thread and do not apply pressure to mast slider block.

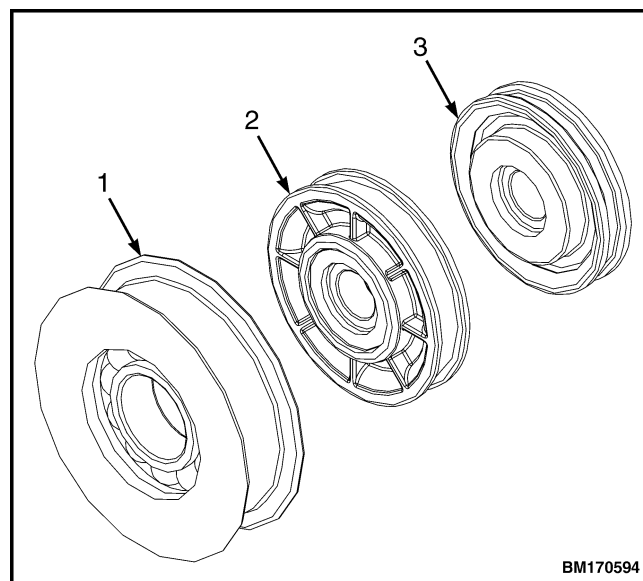
NOTE: Apply Loctite® Blue 242 Threadlocker to setscrew threads prior to installation.

NOTE: Tighten self-tapping screws slowly to required torque. If slider block threads are stripped, replace with new slider block. See **Parts Manual** for replacement parts.

2. Install mast slider blocks on top and bottom outside of first intermediate mast weldment using self-tapping screws and setscrews. See Figure 6. Tighten self-tapping screws to 2.1 N·m (18.6 lbf in).

NOTE: See Figure 1 for aerial work platform orientation.

3. Install one washer on left stubshaft and three washers on right stubshaft at the bottom of first intermediate mast weldment. See Figure 11.
4. Install phasing cable pulley on left stubshaft and round belt pulley on right stubshaft. See Figure 12.
5. Install washer on outside of cable pulley only.
6. Install snap rings to secure pulleys on stubshafts.



1. CHAIN SHEAVE
2. ROUND BELT PULLEY
3. PHASING CABLE PULLEY

Figure 12. Chain Sheave and Pulley Types

WARNING

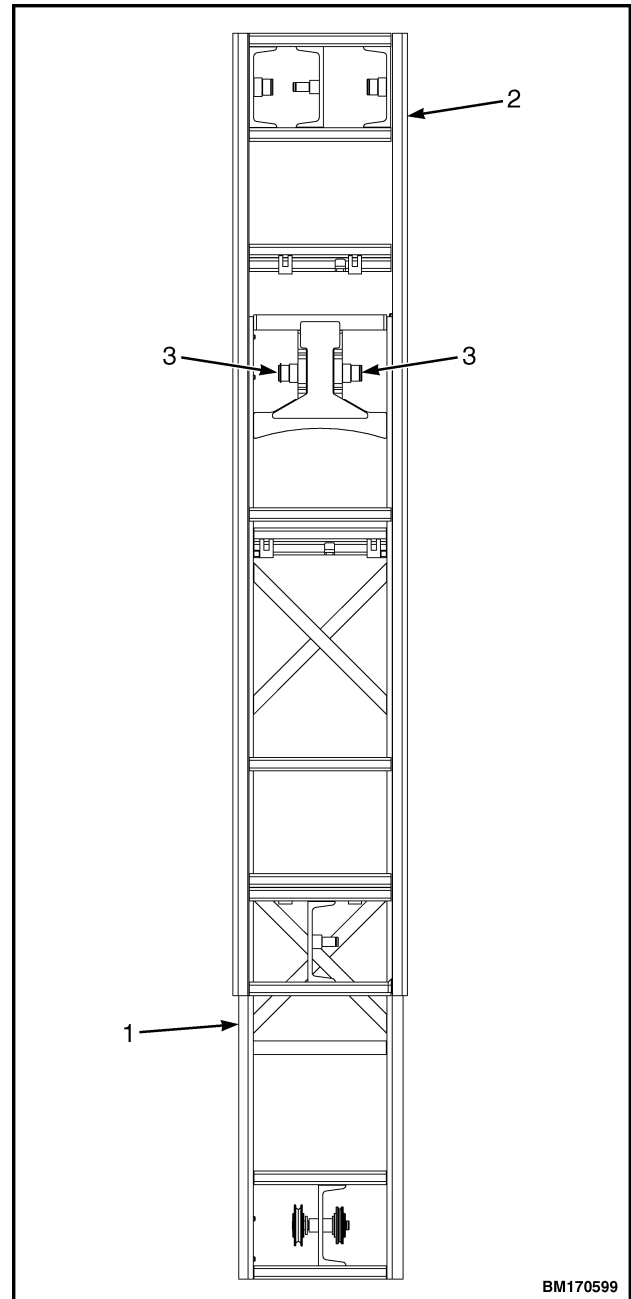
Use a lifting device to move mast weldments to prevent serious injury. Each mast weldment weighs approximately 68 kg (150 lb).

7. Using a lifting device, lift second intermediate mast weldment and slide it through mast slider blocks on top of first intermediate mast weldment to the position shown in Figure 13. This provides access to chain sheave stubshafts.
8. Install two chain sheaves and snap rings onto stubshafts of first intermediate mast weldment. See Figure 11.
9. Install two lift chains, with a length of 1924.05 mm (75 3/4 in.), to two chains anchors to top of first intermediate mast weldment using two chain anchor pins and two cotter pins. See Figure 8.
10. Install lift chains to chain anchor mounts on the bottom of second intermediate mast weldment using chain anchor pins and cotter pins. See Figure 8.
11. Route lift chains over upper chain sheaves on first intermediate mast weldment and let them hang below the assembly.
12. Collapse the mast weldments so that the second intermediate mast weldment is flush with the first intermediate mast weldment.

NOTE: Do not adjust setscrews at this moment. Start the thread and do not apply pressure to mast slider block.

NOTE: Apply Loctite® Blue 242 Threadlocker to setscrew threads prior to installation.

13. Install four setscrews (two on each slider block) on the inside mast slider block on the top of first intermediate mast weldment. See Figure 9.
14. Loosen self-tapping screws and tighten setscrews to close gap between the mast slider block and edge of channel on second intermediate mast weldment.
15. Tighten both self-tapping and setscrews to 2.1 N·m (18.6 lbf in) and ensure a gap of 0.50 to 4.0 mm (0.02 to 0.16 in.) is achieved. See Figure 14.



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NOTE: FIRST AND SECOND INTERMEDIATE MAST WELDMENTS SHOWN. POSITION IS SIMILAR FOR THIRD AND FOURTH MAST WELDMENT ASSEMBLIES. SEE FIGURE 15 TO ASSEMBLE CARRIAGE WELDMENT TO FOURTH INTERMEDIATE MAST WELDMENT.

1. FIRST INTERMEDIATE MAST WELDMENT
2. SECOND INTERMEDIATE MAST WELDMENT
3. CHAIN SHEAVE STUBSHAFTS

Figure 13. Assembling Intermediate Mast Weldment Sections

16. Install mast slider blocks with self-tapping screws into the top and bottom of second intermediate mast weldment. Tighten self-tapping screws to 2.1 N·m (18.6 lbf in).
17. Install phasing cable pulley to lower stubshaft on second intermediate mast weldment using two washers and snap ring. See Figure 11.

**WARNING**

Use a lifting device to move mast weldments to prevent serious injury. Each mast weldment weighs approximately 68 kg (150 lb).

18. Using a lifting device, lift third intermediate mast weldment and slide it through mast slider blocks on top of second intermediate mast weldment to the position shown in Figure 13. This provides access to chain sheave stubshafts on second intermediate mast weldment.
19. Install two chain sheaves onto upper stubshafts of second intermediate mast weldment using two snap rings. See Figure 11 and Figure 12.
20. Install washer, round belt pulley, another washer (one washer on each side of pulley) and snap ring onto upper stubshaft of second intermediate mast weldment. See Figure 11 and Figure 12.
21. Install two lift chains, with a length of 1924.05 mm (75 3/4 in.), to chain anchors using two chain anchor pins and two cotter pins.

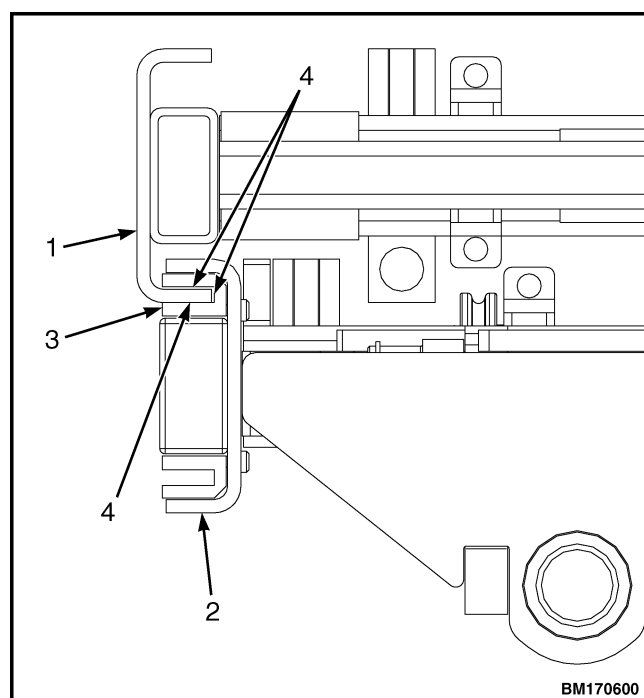
NOTE: During installation, chain anchor pins must face outboard side of mast. See Figure 10.

22. Install free end of lift chain (no chain anchor attached) to chain retainer blocks at top of first intermediate mast weldment with chain anchor pins and cotter pins. See Figure 10.
23. Route lift chains over chain sheaves on top of second intermediate mast weldment.
24. Install two mast slider blocks onto bottom of third intermediate mast weldment using four self-tapping screws. Tighten screws to 2.1 N·m (18.6 lbf in). See Figure 9.

NOTE: Do not adjust setscrews at this moment. Start the thread and do not apply pressure to slider block.

NOTE: Apply Loctite® Blue 242 Threadlocker to setscrew threads prior to installation.

25. Install four setscrews (two on each slider block) onto slider blocks on bottom of third intermediate mast weldment.
26. Loosen self-tapping screws and tighten setscrews to close gap between mast slider block and edge of channel on fourth intermediate mast weldment. See Figure 14 for gap requirements.
27. After correct gap is achieved, tighten self-tapping and setscrews to 2.1 N·m (18.6 lbf in).




1. SECOND INTERMEDIATE MAST WELDMENT
2. FIRST INTERMEDIATE MAST WELDMENT
3. SLIDER BLOCK
4. CONTROL GAP*

*CONTROL GAP IS:

FRAME SLIDER BLOCKS 0.50 TO 4.0 mm (0.02 TO 0.16 in.)

MAST SLIDER BLOCKS 0.50 TO 3.0 mm (0.02 TO 0.12 in.)

Figure 14. Slider Block and Mast Weldment Gaps

28. Install two chain anchors to chain retainer blocks in the bottom of third intermediate mast weldment with four nuts and two pins. See Figure 10.
 29. Pull third intermediate mast weldment flush with first and second intermediate mast weldments.
 30. Install two mast slider blocks into top of third intermediate mast weldment with four self-tapping screws. Tighten self-tapping screws to 2.1 N·m (18.6 lbf in). See Figure 9.
 31. Install second phasing cable by routing threaded end through bracket on top of first intermediate mast weldments crossmember, around phasing cable pulley on bottom of second intermediate mast weldment and up to bracket on lower crossmember of third intermediate mast weldment. See Figure 5.
 32. Attach phasing cable to bracket on top of third intermediate mast weldment with spring, washer, and nut. See Figure 5.
 33. Install two washers (one on each side) to bottom stubshafts on third intermediate mast weldment. See Figure 11.
 34. Install phasing cable pulley to right side of stubshaft and round belt pulley on left side of stubshaft on bottom of third intermediate mast weldment. See Figure 11 and Figure 12.
 35. Install washers and snap rings on outside of pulleys.
-  **WARNING**
Use a lifting device to move mast weldments to prevent serious injury. Each mast weldment weighs approximately 68 kg (150 lb).
36. Using a lifting device, lift fourth intermediate mast weldment and slide it through slider blocks on top of third intermediate mast weldment to the position shown in Figure 13. This provides access to chain sheave stubshafts on third intermediate mast weldment.
 37. Install two chain sheaves onto top stubshafts of third intermediate mast weldment using snap rings. See Figure 11.
 38. Install two lift chains, with a length of 1924.05 mm (75 3/4 in.), to two chain anchors with two chain anchor pins and two cotter pins. See Figure 10.
- NOTE:** During installation, chain anchor pins must face outboard side of mast. See Figure 10.
39. Install free end of lift chain (no chain anchor attached) to chain retainer blocks at top of second intermediate mast weldment with chain anchor pins and cotter pins. See Figure 10.
 40. Route chains over chain sheaves on third intermediate mast weldment.
 41. Install two chain anchors to chain retainer blocks on bottom of fourth intermediate mast weldment with four nuts and two pins. See Figure 10.
 42. Pull fourth intermediate mast weldment flush with the first, second, and third intermediate mast weldments.
 43. Install two mast slider blocks with four self-tapping screws into the bottom of fourth intermediate mast weldment. Tighten self-tapping screws to 2.1 N·m (18.6 lbf in). See Figure 9.
 44. Install two mast slider blocks with four self-tapping screws into the top of fourth intermediate mast weldment. Tighten self-tapping screws to 2.1 N·m (18.6 lbf in). See Figure 9.
 45. Install third phasing cable by routing threaded end through bracket on top of second intermediate mast weldments crossmember, around phasing cable pulley on bottom of third intermediate mast weldment and up to bracket on lower crossmember of fourth intermediate mast weldment. See Figure 5.
 46. Install phasing cable to fourth intermediate mast weldment bracket with spring, washer, and nut. See Figure 5.
 47. Install washers to top and bottom stubshafts on fourth intermediate mast weldment. See Figure 11.
 48. Install round belt pulley to stubshaft on top of fourth intermediate mast weldment. Install washer on outside of pulley. See Figure 11 and Figure 12.

49. Install phasing cable pulley to stubshaft on bottom of fourth intermediate mast weldment. Install washer on outside of pulley.

50. Install snap rings to outside of both round belt pulley and phasing cable pulley. See Figure 11.

NOTE: Do not adjust setscrews at this moment. Start the thread and do not apply pressure to slider block.

NOTE: Apply Loctite® Blue 242 Threadlocker to setscrew threads prior to installation.

51. Install two setscrews on each mast slider block, on top inside of third intermediate mast weldment. See Figure 9.

52. Loosen self-tapping screws and tighten setscrews to 2.1 N·m (18.6 lbf in) to close gap between mast slider blocks and the edge of channel on the fourth intermediate mast weldment. See Figure 14 for gap dimensions.



WARNING

Use a lifting device to move mast weldments to prevent serious injury. Each mast weldment weighs approximately 68 kg (150 lb).

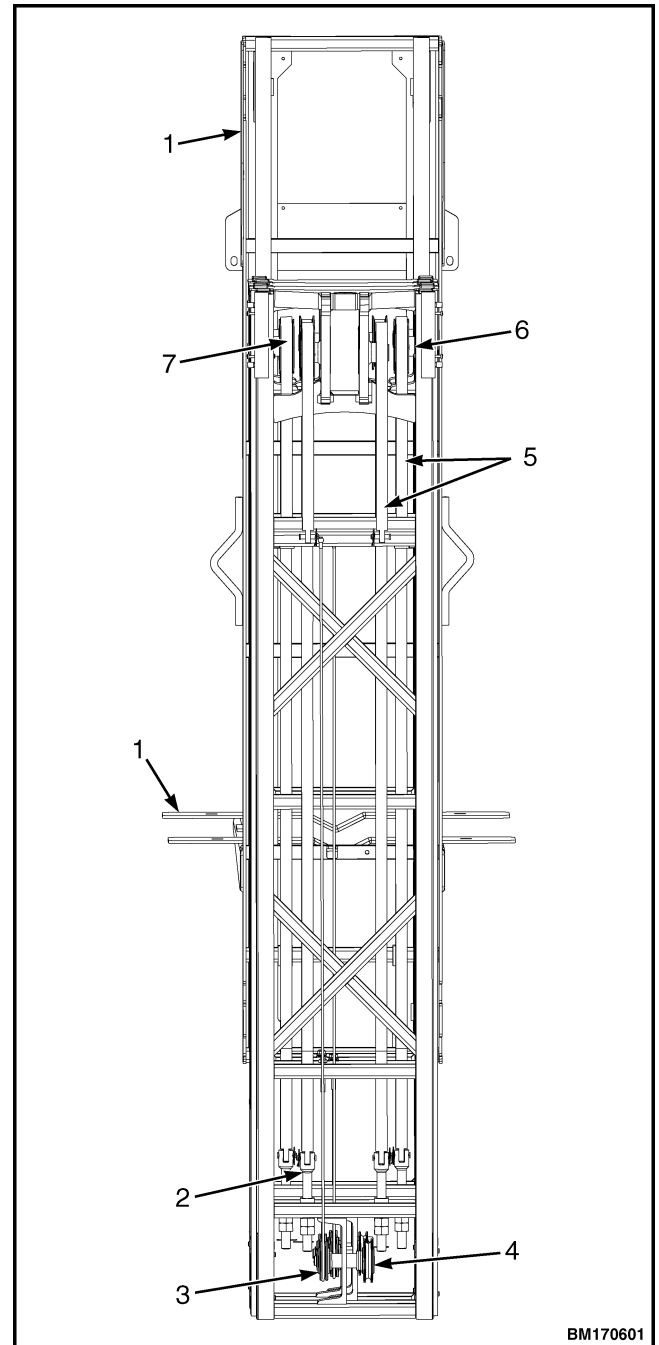
53. Using a lifting device, lift carriage weldment and slide it through mast slider blocks on top of fourth intermediate mast weldment to the position shown in Figure 15. This provides access to chain sheave stubshafts on fourth intermediate mast weldment.

54. Install two chain sheaves onto top stubshaft of fourth intermediate mast weldment using two snap rings. See Figure 11.

55. Install two lift chains, with a length of 2000.25 mm (78 3/4 in.), to two chains anchors using two chain anchor pins and two cotter pins. See Figure 10.

NOTE: During installation, chain anchor pins must face outboard side of mast. See Figure 10.

56. Install free end of lift chain (no chain anchor attached) to chain retainer blocks at top of third intermediate mast weldment with chain anchor pins and cotter pins. See Figure 10.



1. CARRIAGE WELDMENT
2. CHAIN ANCHOR
3. PHASING CABLE PULLEY
4. ROUND BELT PULLEY
5. LIFT CHAINS
6. CHAIN SHEAVE STUBSHAFT
7. CHAIN SHEAVE

Figure 15. Assembling Carriage Weldment to Fourth Intermediate Mast Weldment