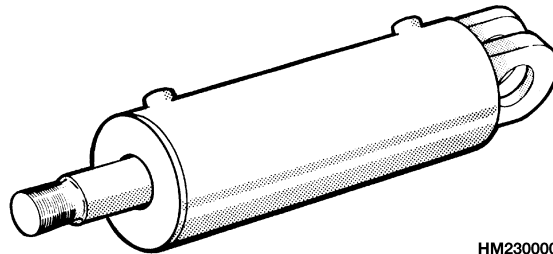


# TILT CYLINDERS

ALL MODELS EXCEPT  
H3.50-5.50XM (H70-120XM) [K005, L005]  
S3.50-5.50XM (S70-120XM) [E004, F004]



HM230000

# **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:

All Models except  
 H3.50-5.50XM (H70-120XM) [K005, L005]  
 S3.50-5.50XM (S70-120XM) [E004, F004]

**"THE  
QUALITY  
KEEPERS"**

**HYSTER  
APPROVED  
PARTS**

## General

This section has a description and the repair procedures for several different types of tilt cylinders. The

number and the design of the parts can be different, but the operation of the tilt cylinders is the same.

## Description

The tilt cylinders (Figure 2, Figure 3, Figure 4, and Figure 5) are used to move the mast forward and backward. To extend the cylinder rod (tilt forward), oil enters the tilt cylinder port behind the piston. The oil pressure pushes the cylinder rod out of the cylinder. Oil in front of the piston returns to the hydraulic

tank. To retract the cylinder rod (tilt backward), the oil enters the port in front of the piston. The oil pressure pushes the cylinder rod into the tilt cylinder. The oil behind the piston returns to the hydraulic tank.

## Tilt Cylinder Repair

### REMOVE



#### WARNING

**Before removing the tilt cylinder(s), tilt the mast forward. Use a chain to hold the mast to the frame, and prevent the mast from moving forward.**

1. Disconnect the hydraulic lines at the tilt cylinder. Install caps on the hydraulic lines and ports.



#### WARNING

**Do not push the anchor pins out of the rod end with your fingers. Do not permit the tilt cylinders to drop and cause damage.**

2. Remove the retainers for the anchor pins. Push the anchor pins out of the rod end with a tool.
3. Use a lifting device to move large tilt cylinders. Remove the anchor pins from the frame anchors. Remove the tilt cylinder from the frame.

### DISASSEMBLE

1. Put the tilt cylinder in a vise with soft jaws. Remove the rod end from the rod.

2. Remove the retainer from the tilt cylinder. Remove the rod and piston from the cylinder.
3. Disassemble the tilt cylinder as necessary. See Figure 2, Figure 3, Figure 4, and Figure 5.

### CLEAN



#### WARNING

**Cleaning solvents can be flammable and toxic and can cause skin irritation. When using cleaning solvents, always follow the solvent manufacturer's recommended safety procedures.**

**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.**

Clean all parts in solvent and dry with compressed air.

## ASSEMBLE

### Tilt Cylinders With O-Ring or Single-Lip Seals

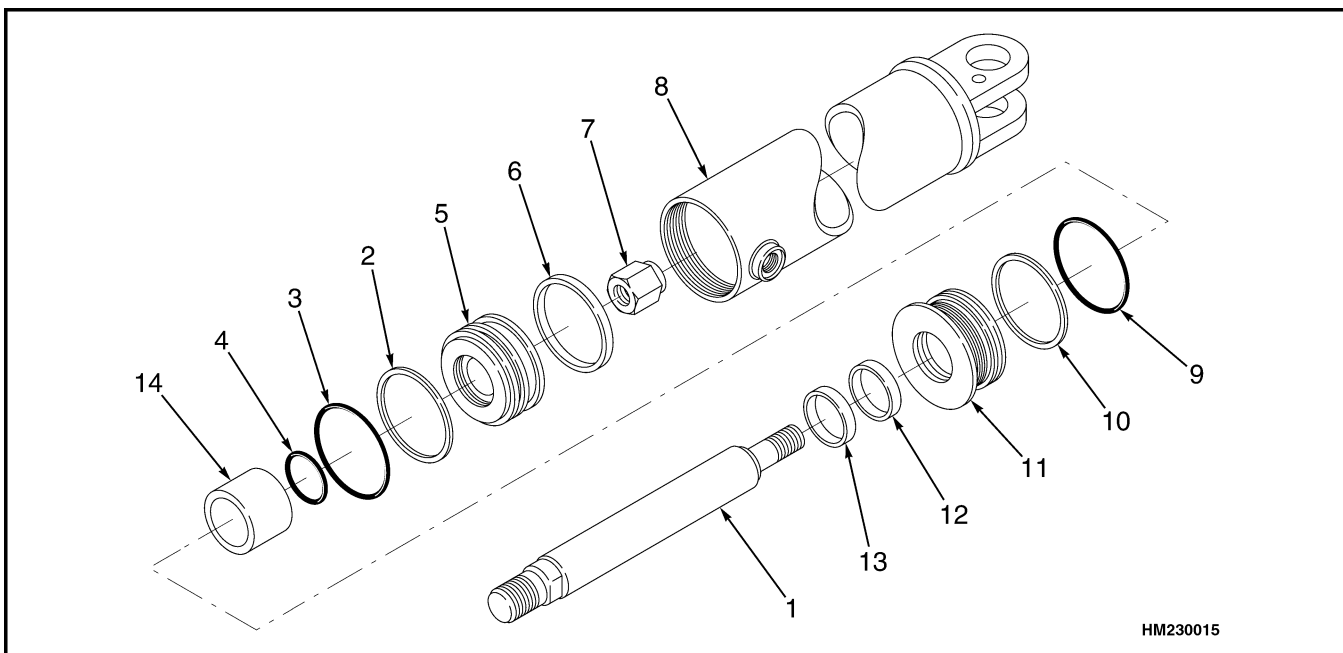
**NOTE:** Always use new seals and O-rings. Make sure all parts are clean. Lubricate all parts with clean hydraulic oil.

**NOTE:** During 1980 and 1981, a change was made in the tilt cylinders used in most lift trucks. The O-ring seal between the retainer and the cylinder shell was moved from above the threads to the area below the threads. A backup ring was added to increase the strength of the O-ring. The assembly of the tilt cylinders is the same, but caution must be used so that the O-ring seal is not damaged by the threads.

1. Install the O-ring inside the piston bore. See Figure 1. Install the piston on the piston rod. Make sure the O-ring is not damaged. Tighten the nut on the piston rod to the specifications given in Torque Specifications.

2. Install the O-ring, seal ring, and guide ring on the piston. The seal ring must be heated before installation. After heating, it must be pushed into its groove using a ring compressor. Let the seal ring cool and return to its normal shape.
3. If used, install the O-ring and the backup ring in the groove of the outer retainer. Install the rod seal (O-ring toward the piston) and wiper seal in the inner retainer.
4. Install the retainer on the piston rod. Install the piston and rod assembly and the retainer in the cylinder. If used, install the O-ring on the retainer. Tighten the retainer to specifications given in Torque Specifications.

**NOTE:** After assembly is complete, install the rod end on the piston rod. Tighten the capscrew on the rod end as specified in **Mast** section for your specific lift truck.



- |                |                          |
|----------------|--------------------------|
| 1. PISTON ROD  | 8. CYLINDER SHELL        |
| 2. PISTON RING | 9. O-RING                |
| 3. O-RING      | 10. BACKUP RING          |
| 4. O-RING      | 11. RETAINER             |
| 5. PISTON      | 12. SEAL RING            |
| 6. GUIDE RING  | 13. WIPER RING           |
| 7. NUT         | 14. SPACER (SOME MODELS) |

**Figure 1. Tilt Cylinders With O-Ring or Single-Lip Seals**

### Tilt Cylinders for XM and XMS Models

**NOTE:** The following procedure is for these models: S/H/E/2.00-3.00XM (S/H/E/40-65XM), J2.00-3.00XM (J40-60XM, J40-60XM<sub>2</sub>) (A216), J2.00-3.00XM (J40-60Z) (A416), J1.60-2.00XMT (J30-40XM) H/S/E1.25-1.75XM, H/S/E2.00XMS (S/H/E25-35XM, S/H/E40XMS).

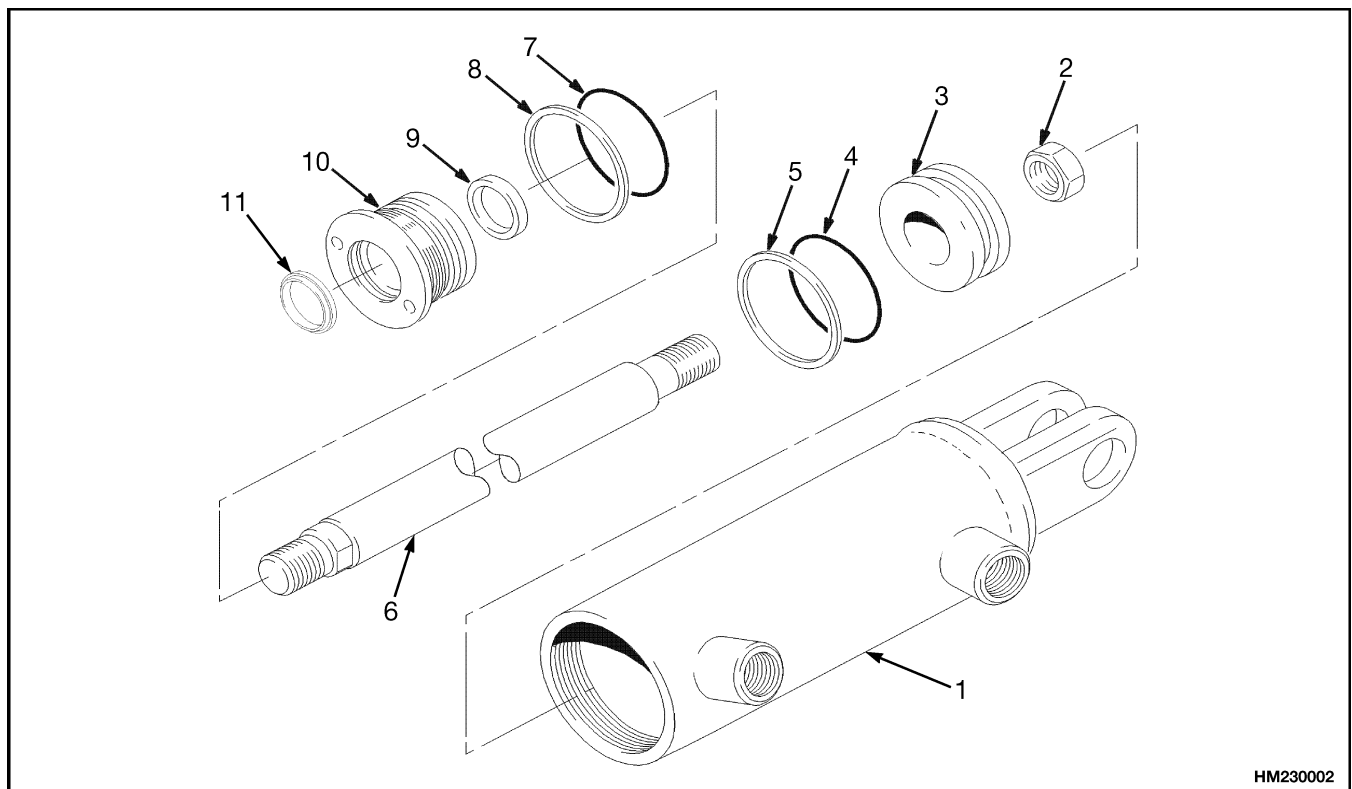
**NOTE:** Always use new seals and O-rings. Make sure all parts are clean. Lubricate all parts with clean hydraulic oil.

1. Install the piston seal and O-ring(s) onto the piston. See Figure 2 and Figure 3. Install the piston onto the cylinder rod. Make sure the piston seal

is not damaged. Tighten the nut on the piston rod to the value shown in Torque Specifications.

2. Install a new wiper and rod seal. Install the O-ring and backup ring onto the retainer.
3. Install the retainer assembly onto the rod.
4. Install the piston and rod assembly into the cylinder. Tighten the retainer to the value shown in Torque Specifications.

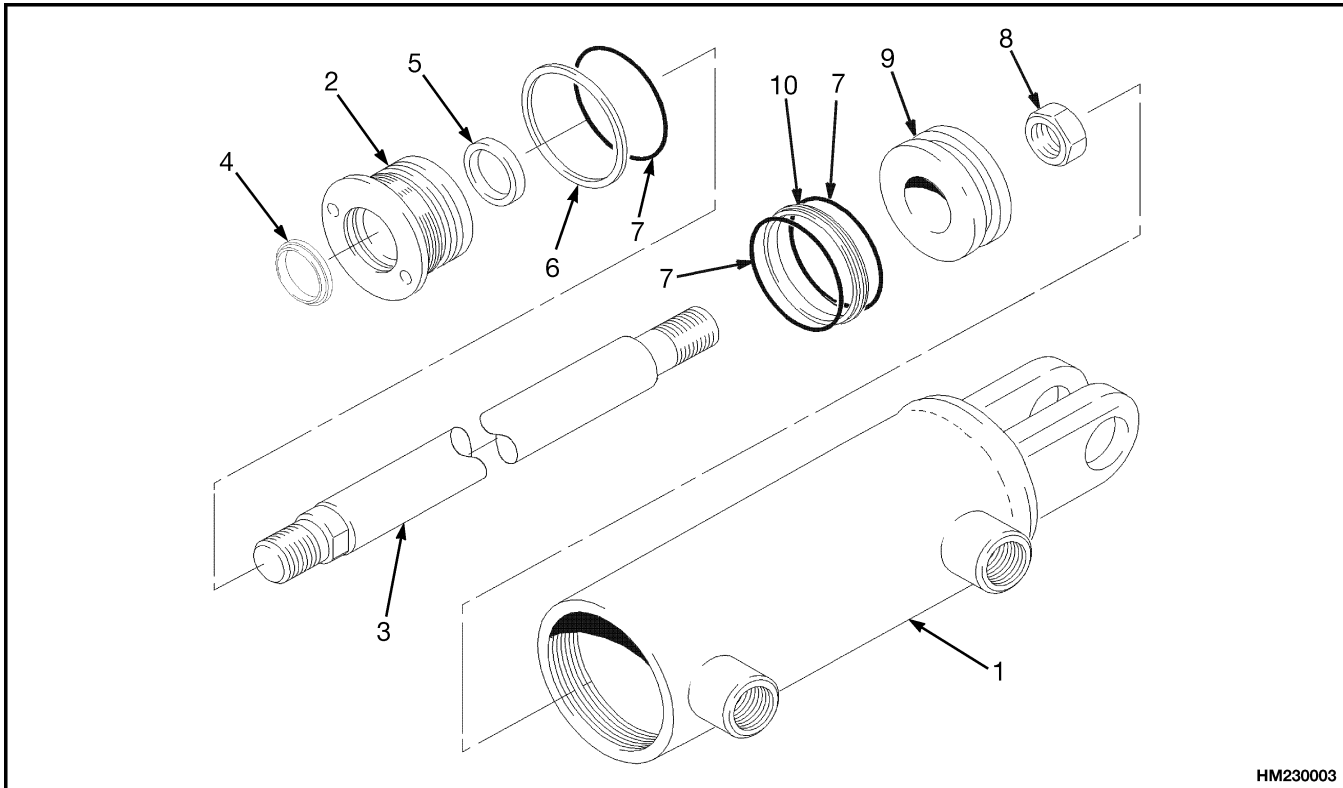
**NOTE:** After assembly is complete, install the rod end on the cylinder rod. Tighten the capscrew on the rod end as specified in **Mast** section for your specific lift truck.



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- |                   |                |
|-------------------|----------------|
| 1. CYLINDER SHELL | 7. O-RING      |
| 2. NUT            | 8. BACKUP RING |
| 3. PISTON         | 9. SEAL RING   |
| 4. O-RING         | 10. RETAINER   |
| 5. SEAL RING      | 11. WIPER RING |
| 6. PISTON ROD     |                |

**Figure 2. Tilt Cylinders for S/H/E/2.00-3.20XM (S/H/E/40-65XM), J2.00-3.00XM (J40-60XM, J40-60XM<sub>2</sub>) (A216), J2.00-3.20XM (J40-60Z) (A416)**



HM230003

- |                   |                 |
|-------------------|-----------------|
| 1. CYLINDER SHELL | 6. BACKUP RING  |
| 2. RETAINER       | 7. O-RING       |
| 3. ROD            | 8. NUT          |
| 4. WIPER RING     | 9. PISTON       |
| 5. ROD SEAL       | 10. PISTON SEAL |

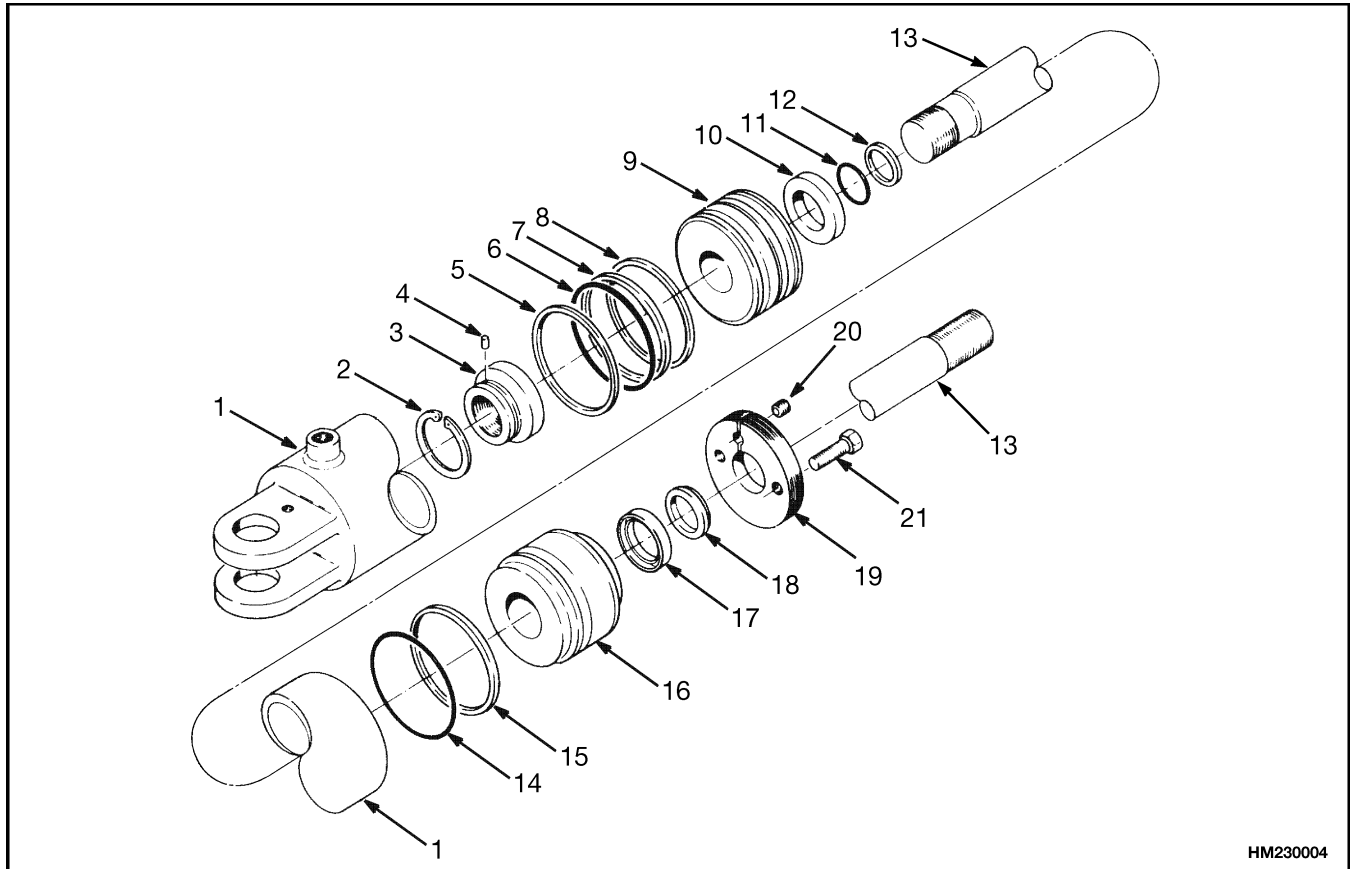
**Figure 3. Tilt Cylinders for H/S/E/J1.25-1.75XM, XMS, XMT (H/S/E/J25-40XM, XMS, XMT)**

### Tilt Cylinders for H700-800A and Early Model H700-920B

**NOTE:** Always use new seals and O-rings. Make sure all parts are clean. Lubricate all parts with clean hydraulic oil.

1. Install the thrust plate on the rod. Install the backup ring and O-ring on the rod. Install the piston on the rod. Install the piston rings and seals on the piston. See Figure 4.
2. Install the lock nut on the rod. Tighten the lock nut until the thrust plate is tight against the rod. Install the pin in the lock nut and rod if necessary, drill a hole in the rod for the pin. Install the snap ring to hold the pin in position.
3. Install the piston and rod assembly in the shell. Install the seals on the retainer. Install the retainer in the shell.
4. Install the lock ring in the shell, but do not tighten it. Install the capscrews in the lock ring. Turn the lock ring until it is even with the end of the shell. Install the pipe plug in the lock ring and tighten the plug to 34 to 48 N•m (25 to 35 lbf ft). Tighten the capscrews in the lock ring to 14 to 20 N•m (10 to 15 lbf ft).
5. Install the rod end on the rod. Tighten the capscrews on the rod end to 610 N•m (450 lbf ft).





- |                   |                   |
|-------------------|-------------------|
| 1. CYLINDER SHELL | 12. BACKUP RING   |
| 2. SNAP RING      | 13. PISTON ROD    |
| 3. LOCK NUT       | 14. O-RING        |
| 4. DOWEL          | 15. BACKUP RING   |
| 5. PISTON RING    | 16. RETAINER      |
| 6. O-RING         | 17. SEAL RING     |
| 7. SEAL RING      | 18. WIPER RING    |
| 8. PISTON RING    | 19. RETAINER RING |
| 9. PISTON         | 20. PLUG          |
| 10. THRUST PLATE  | 21. CAPSCREW      |
| 11. O-RING        |                   |

**Figure 4. Tilt Cylinders for H700-800A, Early Model H700-920B**

## INSTALL

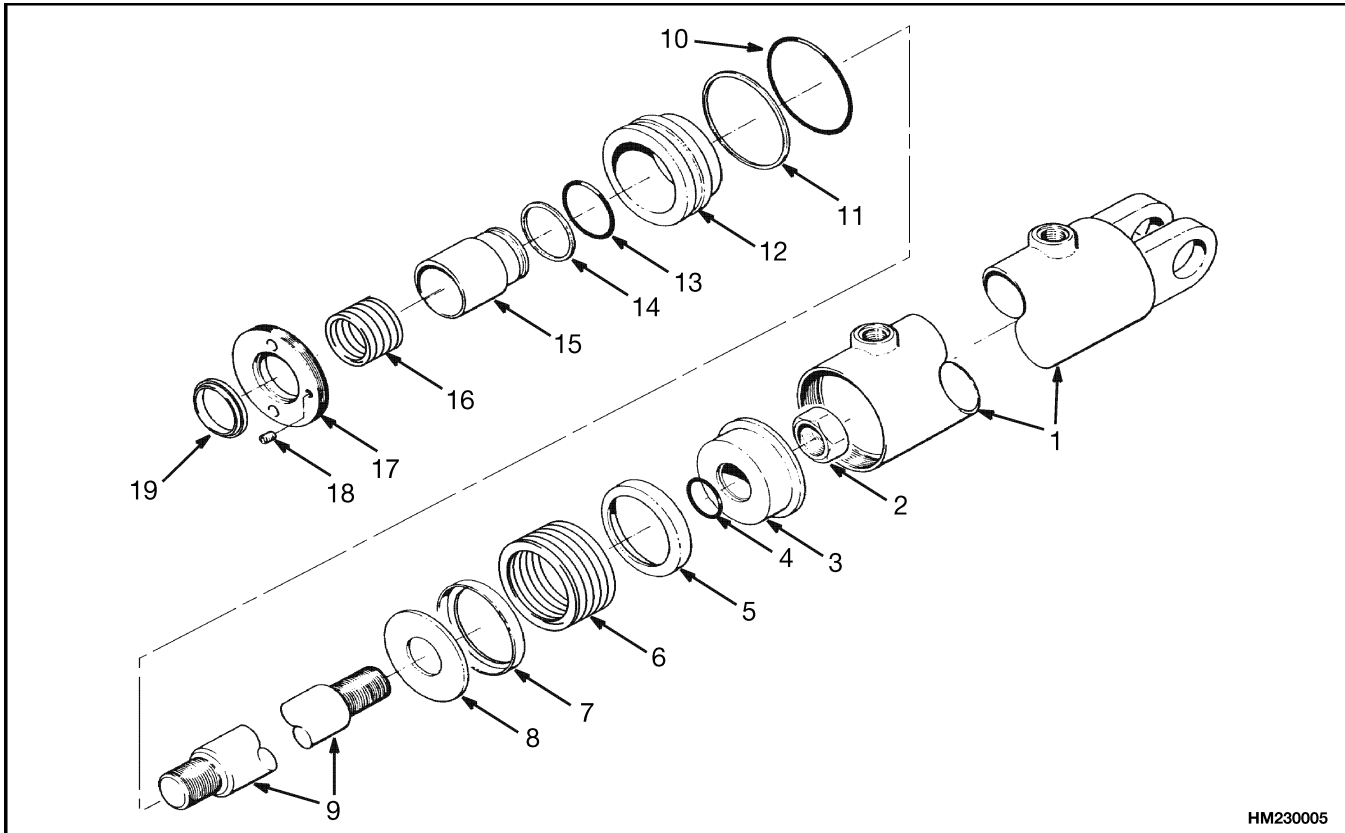
1. Use a lifting device to move large tilt cylinders. Put the cylinder in the lift truck. Install the anchor pin in the frame. Install the retainer pin or cotter pin.
2. Install the anchor pin at the mast mount. Install the retainer pin or cotter pin for the anchor pin. Tighten the capscrews for the retainer pins.
3. Connect the hydraulic lines to the tilt cylinder.
4. Operate the tilt cylinders. Check for correct operation and leakage. Adjust the tilt cylinders as described in Tilt Cylinder Leak Check and Tilt Cylinder Stroke and Mast Tilt Angle Adjustment.

**Tilt Cylinders Using Chevron Packing**

**NOTE:** Always use new seals and O-rings. Make sure all parts are clean. Lubricate all parts with clean hydraulic oil.

**NOTE:** After assembly is complete, install the rod end on the cylinder rod. Tighten the capscrew on the rod end as specified in **Mast** section for your specific lift truck.

**NOTE:** The following procedure is for the H360-650C (early model). See Figure 5.



HM230005

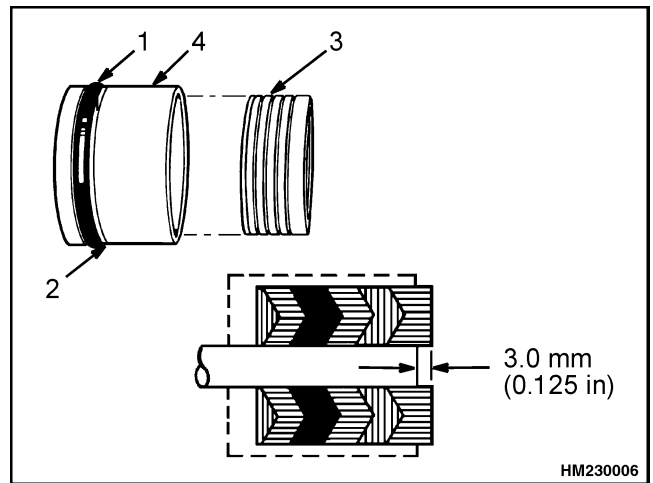
- |                       |                   |
|-----------------------|-------------------|
| 1. CYLINDER SHELL     | 11. BACKUP RING   |
| 2. NUT                | 12. RETAINER      |
| 3. PISTON HEAD        | 13. O-RING        |
| 4. O-RING             | 14. BACKUP RING   |
| 5. NYLON RING         | 15. BUSHING       |
| 6. PACKING            | 16. PACKING       |
| 7. NYLON RING         | 17. RETAINER RING |
| 8. PISTON HALF (FLAT) | 18. SETSCREW      |
| 9. PISTON ROD         | 19. WIPER RING    |
| 10. O-RING            |                   |

**Figure 5. Tilt Cylinders With Chevron Packing (Early Model H360-650C)**

**Install**

**STEP 1.**

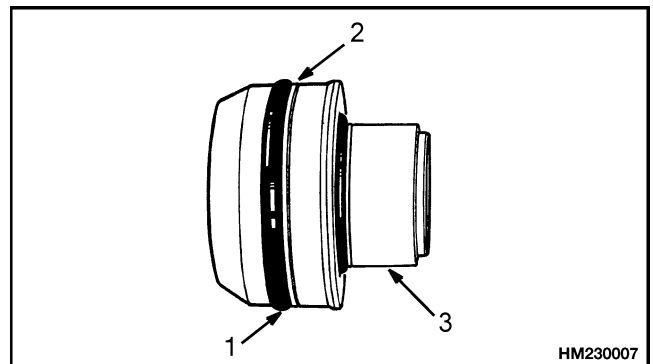
Install the O-ring and the backup ring on the bushing. Install the packing in the bushing. The end of the packing must extend 3 mm (0.125 in.) beyond the end of the bushing.



- 1. O-RING
- 2. BACKUP RING
- 3. PACKING
- 4. BUSHING

**STEP 2.**

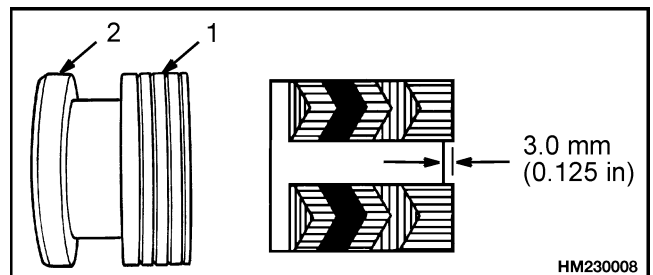
Install the O-ring and the backup ring on the retainer. Use your hand to push the bushing into the retainer. Make sure the O-ring is not damaged during installation. Install the retainer and bushing assembly on the cylinder rod.



- 1. O-RING
- 2. BACKUP RING
- 3. BUSHING

**STEP 3.**

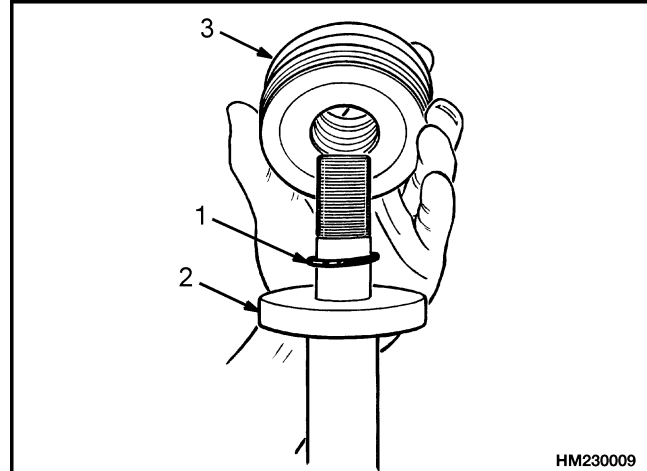
Install the flat piston half on the cylinder rod. Put the O-ring on the rod halfway between the threads and the piston half.



- 1. PACKING
- 2. PISTON HALF

**STEP 4.**

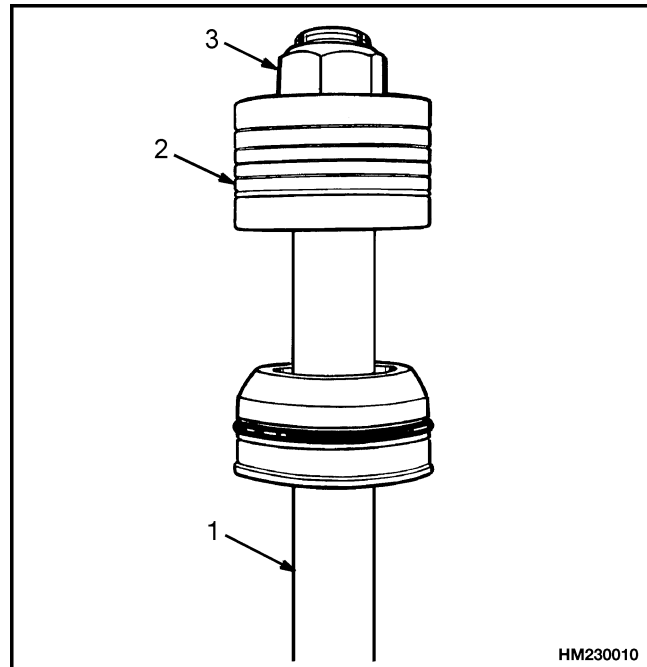
Install the piston half with the packing on the cylinder rod. Make sure the O-ring fits into the piston groove when the piston half is installed. Install the piston rod nut. Tighten to the specifications given in Torque Specifications.



1. O-RING
2. PISTON HALF
3. PISTON HALF WITH PACKING

**STEP 5.**

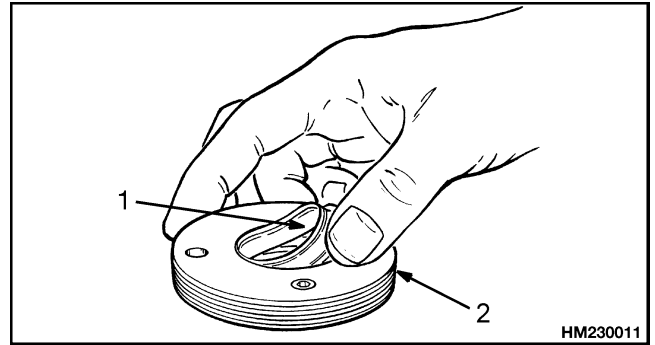
Push the piston into the cylinder bore. Push the retainer into the bore. Make sure the O-ring is not damaged.



1. CYLINDER ROD
2. PISTON AND PACKING
3. ROD NUT

**STEP 6.**

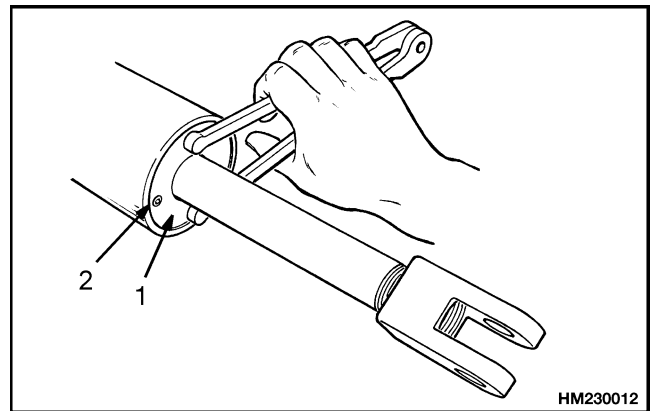
Install a new wiper seal in the retainer. Turn the retainer into the cylinder shell until the threads have started. Push the piston in and out several times to make sure the alignment is correct.



1. WIPER SEAL
2. RETAINER

**STEP 7.**

Tighten the retainer to the specifications given in Torque Specifications. Tighten the setscrew.



1. RETAINER
2. SETSCREW

---

## Tilt Cylinder Leak Check

**WARNING**

**Never allow anyone under a raised carriage. Do not put any part of your body in or through the lift mechanism unless all parts of the mast are completely lowered and the engine is STOPPED.**

**Do not try to find hydraulic leaks by putting your hand on hydraulic components under pressure. Hydraulic oil can be injected into the body by the pressure.**

1. Put a capacity load on the forks. Use a safety chain to hold the load to the carriage. Raise the load approximately 2.5 m (8 ft). Put the mast in a vertical position.

2. Measure the distance that the rod for tilt cylinder extends from the shell. Check the distance the rod moves in five or ten minutes. Multiply the rate in Table 1 by the time of the test and compare the numbers.
3. If the tilt rate is greater than the specifications, lower the mast and remove the load from the forks. Install a valve between the port at the front of the tilt cylinder and the hydraulic line. Put the load on the forks again. Close the valve. Tilt the mast forward just past the vertical position. If the mast continues to tilt slowly forward, the seals on the piston are leaking.

4. If the mast does not move, open the gate valve and check the movement again. If the mast moves forward when the gate valve is open, check for leaks in the hydraulic lines and fittings. If no leaks are found, the main control

valve can be worn or damaged. Remove the load from the forks when the checks are complete.

*Table 1. Movement Rates (Maximum) for Tilt Cylinders*

LIFT TRUCK MODEL	HYDRAULIC OIL TEMPERATURE/MAST TILT RATE			
	20°C (68°F)		60°C (140°F)	
	mm/min	in./min	mm/min	in./min
A1.00-1.50XL (A20-30XL)	1.3	0.05	9.1	0.50
E1.25-5.50XL, XM (E25-120XL)	0.8	0.03	5.0	0.20
J1.60-2.00XMT (J30-40XM)	0.8	0.03	5.0	0.20
E2.00-3.20XM (E40-65XM)	0.8	0.03	5.0	0.20
J2.00-3.20XM (J40-60XM, J40-60XM <sub>2</sub> ) (A216)	0.8	0.03	5.0	0.20
J2.00-3.20XM (J40-60Z) (A416)	0.8	0.03	5.0	0.20
H1.25-1.75XL (H25-35XL)	0.8	0.03	5.0	0.20
S/H1.50-1.75XM, S/H2.00XMS (S/H25-35XM, S/H40XMS)	0.8	0.03	5.0	0.20
H2.00-3.00XL (H40-60XL)	1.1	0.04	7.3	0.30
S/H2.00-3.20XM (S/H40-65XM)	1.0	0.04	6.8	0.30
H3.50-7.00XL (H70-155XL)	1.3	0.05	8.9	0.34
H8.00-16.00XL (H165-360XL)	1.8	0.07	11.7	0.05
H8.00-16.00XM (H170-360HD)	1.8	0.07	11.7	0.05
H20.00-32.00F (H440-700F/FS)	1.3	0.05	3.8	0.15
H36.00-48.00C (H800-1050C)	1.3	0.05	3.8	0.15
J2.00-3.00XL (J40-60XL)	0.8	0.03	5.0	0.20
J25-35A,B	1.3	0.05	3.8	0.15
S1.25-5.50XL (S25-120XL)	0.8	0.03	5.0	0.20
S6.00-7.00XL (S135-155XL)	1.2	0.05	8.2	0.32

## Tilt Cylinder Stroke and Mast Tilt Angle Adjustment

Adjust the tilt cylinders as described in the section **Mast**.

## Torque Specifications

### PISTON ROD NUT

#### **E1.25-1.75XL (E25-35XL)**

163 to 190 N•m (120 to 140 lbf ft)

#### **J1.60-2.00XMT (J30-40XM)**

163 to 190 N•m (120 to 140 lbf ft)

#### **E2.00-3.00XL (E40-60XL)**

320 to 400 N•m (236 to 295 lbf ft)

#### **E2.00-3.20XM (E40-65XM)**

150 N•m (110 lbf ft)

#### **J2.00-3.20XM (J40-60XM, J40-60XM<sub>2</sub>) (A216)**

150 N•m (110 lbf ft)

#### **J2.00-3.20XM (J40-60Z) (A416)**

150 N•m (110 lbf ft)

#### **E20-30B**

244 to 271 N•m (180 to 200 lbf ft)

#### **E30-60B, E30-60AC**

407 to 475 N•m (300 to 350 lbf ft)

#### **E3.50-5.50XL (E70-120XL)**

400 to 440 N•m (295 to 325 lbf ft)

#### **E60-100B**

407 to 440 N•m (300 to 325 lbf ft)

#### **H1.25-1.75XL (H25-35XL)**

163 to 190 N•m (120 to 140 lbf ft)

#### **H/E1.50-1.75XM, H/E2.00XMS (H/E25-35XM, H/E40XMS)**

163 to 190 N•m (120 to 140 lbf ft)

#### **H20-30E**

136 to 170 N•m (100 to 125 lbf ft)

#### **H2.00-3.00XL (H40-60XL)**

163 to 190 N•m (120 to 140 lbf ft)

#### **S/H2.00-3.20XM (S/H40-65XM)**

150 N•m (110 lbf ft)

#### **H30-60H, H40-60J**

244 to 271 N•m (180 to 200 lbf ft)

#### **H3.50-5.00XL (H70-110XL)**

400 to 440 N•m (295 to 325 lbf ft)

#### **H6.00-7.00XL (H135-155XL)**

407 to 440 N•m (300 to 325 lbf ft)

#### **H7.00-12.50H (H150-275H)**

447 to 475 N•m (330 to 350 lbf ft)

#### **H8.00-12.00XL (H165-280XL)**

950 to 985 N•m (700 to 725 lbf ft)

#### **H13.00-16.00XL (H300-360XL)**

1105 to 1140 N•m (815 to 840 lbf ft)

#### **H16.00-30.00C (H360-650C) - Early**

1356 to 1492 N•m (1000 to 1100 lbf ft)

#### **H16.00-30.00C (H360-650C) - Late**

1500 to 1600 N•m (1107 to 1181 lbf ft)

#### **H17.00-32.00C (H370-700C)**

1500 to 1600 N•m (1107 to 1181 lbf ft)

#### **H20.00-32.00F (H440-700F/FS)**

1500 to 1600 N•m (1107 to 1181 lbf ft)

#### **H32.00-44.00B (H700-920B) - Late**

1500 to 1600 N•m (1107 to 1181 lbf ft)

#### **H36.00-48.00C (H800-1050C)**

1500 to 1600 N•m (1107 to 1181 lbf ft)

#### **H60-90C**

407 to 447 N•m (300 to 330 lbf ft)

#### **H60-110E**

400 to 440 N•m (295 to 325 lbf ft)

#### **H110-150F**

678 to 746 N•m (500 to 550 lbf ft)

#### **H300A**

678 to 746 N•m (500 to 550 lbf ft)

#### **H300-350B**

447 to 475 N•m (330 to 350 lbf ft)

#### **H360-620B**

1356 to 1492 N•m (1000 to 1100 lbf ft)

#### **H700-800A, H700-920B - Early See Text**

#### **J2.00-3.00XL (J40-60XL)**

320 to 400 N•m (236 to 295 lbf ft)

#### **J25-35A**

244 to 271 N•m (180 to 200 lbf ft)

#### **J25-35B**

320 to 400 N•m (236 to 295 lbf ft)

**J40-60A, J50-60AS**

407 to 475 N•m (300 to 350 lbf ft)

**P40-50A, P60-80A**

407 to 447 N•m (300 to 330 lbf ft)

**P7.00-8.00B (P150-200B)**

447 to 475 N•m (330 to 350 lbf ft)

**S20-30A**

136 to 170 N•m (100 to 125 lbf ft)

**S30-60E, S40-50F**

407 to 475 N•m (300 to 350 lbf ft)

**S40-50C**

224 to 271 N•m (165 to 200 lbf ft)

**S1.25-1.75XL (S25-35XL)**

163 to 190 N•m (120 to 140 lbf ft)

**S25-35XM, S40XMS**

163 to 190 N•m (120 to 140 lbf ft)

**S2.00-3.00XL (S40-60XL)**

320 to 400 N•m (236 to 295 lbf ft)

**S3.00-5.50E (S60-120E)**

407 to 440 N•m (300 to 325 lbf ft)

**S3.50-5.50XL (S70-120XL)**

400 to 440 N•m (295 to 325 lbf ft)

**S5.50-7.00A (S125-150A)**

542 to 610 N•m (400 to 450 lbf ft)

**S6.00-7.00XL (S135-155XL)**

407 to 440 N•m (300 to 325 lbf ft)

**RETAINER****E1.25-1.75XL (E25-35XL)**

169 to 237 N•m (125 to 175 lbf ft)

**J1.60-2.00XMT (J30-40XM)**

163 to 176 N•m (120 to 130 lbf ft)

**E2.00-3.00XL (E40-60XL)**

400 to 500 N•m (295 to 369 lbf ft)

**E2.00-3.20XM (E40-65XM)**

170 to 237 N•m (125 to 175 lbf ft)

**J2.00-3.20XM (J40-60XM, J40-60XM<sub>2</sub>) (A216)**

170 to 237 N•m (125 to 175 lbf ft)

**J2.00-3.20XM (J40-60Z) (A416)**

170 to 237 N•m (125 to 175 lbf ft)

**E20-30B**

407 to 475 N•m (300 to 350 lbf ft)

**E30-60B, E30-60AC**

475 to 542 N•m (350 to 400 lbf ft)

**E3.50-5.50XL (E70-120XL)**

400 to 500 N•m (295 to 370 lbf ft)

**E60-100B**

576 to 644 N•m (425 to 475 lbf ft)

**H1.25-1.75XL (H25-35XL)**

169 to 237 N•m (125 to 175 lbf ft)

**H/E1.50-1.75XM, H/E2.00XMS****(H/E25-35XM, H/E40XMS)**

163 to 176 N•m (120 to 130 lbf ft)

**H20-30E**

203 to 271 N•m (150 to 200 lbf ft)

**H2.00-3.00XL (H40-60XL)**

169 to 237 N•m (125 to 175 lbf ft)

**S/H2.00-3.20XM (S/H40-65XM)**

170 to 237 N•m (125 to 175 lbf ft)

**H30-60H, H40-60J**

407 to 475 N•m (300 to 350 lbf ft)

**H3.50-5.00XL (H70-110XL)**

400 to 500 N•m (295 to 369 lbf ft)

**H6.00-7.00XL (H135-155XL)**

542 to 610 N•m (400 to 450 lbf ft)

**H7.00-12.50H (H150-275H)**

475 to 542 N•m (350 to 400 lbf ft)

**H8.00-12.00XL (H165-280XL)**

542 to 610 N•m (400 to 450 lbf ft)

**H13.00-16.00XL (H300-360XL)**

610 to 675 N•m (450 to 500 lbf ft)

**H16.00-30.00C (H360-650C) - Early**

542 to 610 N•m (400 to 450 lbf ft)

**H16.00-30.00C (H360-650C) - Late**

450 to 550 N•m (332 to 406 lbf ft)

**H17.00-32.00C (H370-700C)**

450 to 550 N•m (332 to 406 lbf ft)

**H20.00-32.00F (H440-700F/FS)**

450 to 550 N•m (332 to 406 lbf ft)



**H32.00-44.00B (H700-920B) - Late**  
450 to 550 N•m (332 to 406 lbf ft)

**H36.00-48.00C (H800-1050C)**  
450 to 550 N•m (332 to 406 lbf ft)

**H60-90C**  
475 to 542 N•m (350 to 400 lbf ft)

**H60-110E**  
542 to 610 N•m (400 to 450 lbf ft)

**H110-150F**  
271 to 305 N•m (200 to 225 lbf ft)

**H300A**

**H300-350B**  
475 to 542 N•m (350 to 400 lbf ft)

**H360-620B**  
542 to 610 N•m (400 to 450 lbf ft)

**H700-800A, H700-920B - Early** See text

**J2.00-3.00XL (J40-60XL)**  
400 to 500 N•m (295 to 369 lbf ft)

**J25-35A**  
407 to 475 N•m (300 to 350 lbf ft)

**J25-35B**  
400 to 500 N•m (295 to 369 lbf ft)

**J40-60A, J50-60AS**  
475 to 542 N•m (350 to 400 lbf ft)

**P40-50A, P60-80A**  
475 to 542 N•m (350 to 400 lbf ft)

**P7.00-8.00B (P150-200B)**  
475 to 542 N•m (350 to 400 lbf ft)

**S20-30A**  
203 to 271 N•m (150 to 200 lbf ft)

**S30-60E, S40-50F**  
475 to 542 N•m (350 to 400 lbf ft)

**S40-50C**  
407 to 475 N•m (300 to 350 lbf ft)

**S1.25-1.75XL (S25-35XL)**  
169 to 237 N•m (125 to 175 lbf ft)

**S25-35XM, S40XMS**  
163 to 176 N•m (120 to 130 lbf ft)

**S2.00-3.00XL (S40-60XL)**  
400 to 500 N•m (295 to 370 lbf ft)

**S3.00-5.50E (S60-120E)**  
576 to 644 N•m (425 to 475 lbf ft)

**S3.50-5.50XL (S70-120XL)**  
400 to 500 N•m (295 to 370 lbf ft)

**S5.50-7.00A (S125-150A)**  
176 to 244 N•m (130 to 180 lbf ft)

**S6.00-7.00XL (S135-155XL)**  
542 to 610 N•m (400 to 450 lbf ft)

## Troubleshooting

PROBLEM	POSSIBLE CAUSE	PROCEDURE OR ACTION
Tilt cylinder movement is slow or not smooth.	Air is in the hydraulic system.	Remove air from hydraulic system.
	The hydraulic pump is worn or damaged.	Repair or replace hydraulic pump.
	Restriction in the hydraulic lines.	Repair hydraulic lines.
	Seals in tilt cylinder are damaged.	Replace seals and inspect cylinder bore for damage.
	Tilt cylinders have internal damage.	Repair or replace cylinder.
	Load is greater than capacity.	Reduce load.
	Pressure relief valve(s) is not adjusted correctly or is damaged.	Repair or adjust relief valve(s).
	Large leaks between spool and bore.	Replace valve section.
	Spool is not fully extended or retracted.	Adjust linkage to spool.
Tilt control spool is damaged.	Repair control valve.	
The tilt cylinders permit the mast to move when the Tilt control lever is in the Neutral position.	There are leaks in the hydraulic lines.	Tighten fittings or repair leaks.
	Seals in tilt cylinder are damaged.	Replace seals and inspect cylinder bore for damage.
	Tilt cylinders have internal damage.	Repair or replace cylinder.
	Tilt control spool is damaged.	Repair control valve.



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