

# **S**ERVICE MANUAL

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## ***K-Series***

### ***Fork Positioner/Sideshifter***

***Manual Number 6053927-R7***

**cascade<sup>®</sup>  
corporation**

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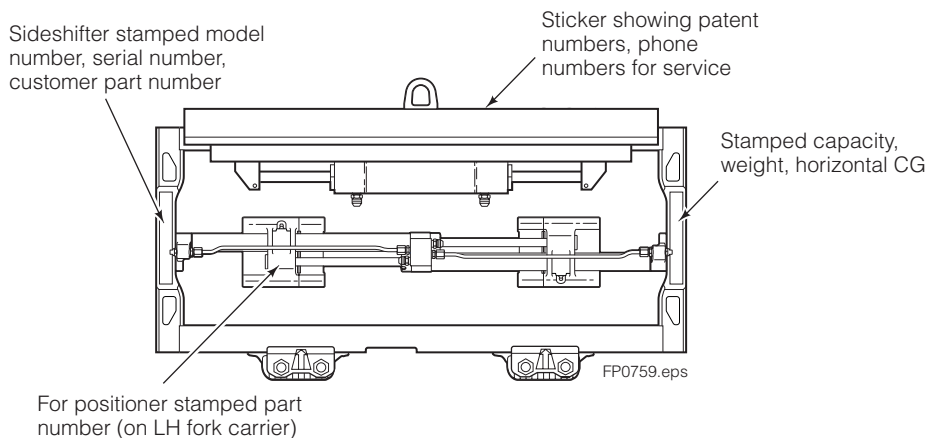
## 1.1 Introduction

This service manual provides Periodic Maintenance, Troubleshooting, Service and Specifications for Cascade K-Series Fork Positioner/Sideshifters.

In any communication about the Fork Positioner/Sideshifter, refer to the product model number and serial number.

**IMPORTANT:** K-Series Fork Positioner/Sideshifters are metric. Supply fittings adapted as required for application.

**NOTE:** Specifications are shown in both US and (Metric) units. All fasteners have a torque value range  $\pm 10\%$  of stated value.



## 1.2 Special Definitions

The statements shown appear throughout this Manual where special emphasis is required. Read all WARNINGS and CAUTIONS before proceeding with any work. Statements labeled IMPORTANT and NOTE are provided as additional information of special significance or to make your job easier.



**WARNING** - A statement preceded by WARNING is information that should be acted upon to prevent **bodily injury**. A **WARNING** is always inside a ruled box.

**CAUTION** - A statement preceded by CAUTION is information that should be acted upon to prevent machine damage.

**IMPORTANT** - A statement preceded by IMPORTANT is information that possesses special significance.

**NOTE** - A statement preceded by NOTE is information that is handy to know and may make your job easier.

## 2.1 Daily

Check items shown each day. Report problems to your supervisor. Refer to Troubleshooting Section for diagnosing problems and Service Section for maintenance and repair procedures.

## 2.2 1000-Hour

Every time the lift truck is serviced or every 1000 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Check for loose or missing capscrews, worn or damaged hoses, and hydraulic leaks.
- Inspect sideshifter lower hooks for wear and proper clearance. Adjust if necessary, refer to Section 5.1-1, Step 7. Tighten lower hook capscrews to:

### Two Capscrew Hooks

**Class II/III** – 120 ft.-lbs. (165 Nm)

**Class IV** – 235 ft.-lbs. (320 Nm)

### Four Capscrew Hooks & Full Width Lower Hook

**Class II** – 65 ft.-lbs. (90 Nm)

- Tighten fork positioner mounting flange capscrews:

**55K, 65K** – 50 ft.-lbs. (65 Nm)

**100K, 120K, 150K, 165K** – 120 ft.-lbs. (165 Nm)

- Tighten fork carrier capscrews:

**55K, 65K** – 25 ft.-lbs. (35 Nm)

**100K, 120K, 150K, 165K** – 50 ft.-lbs. (65 Nm)

- Tighten fork positioner cylinder rod anchor plugs:

**55K, 65K** – 50 ft.-lbs. (65 Nm)

**100K, 120K, 150K, 165K** – 100 ft.-lbs. (135 Nm)

- Tighten backrest capscrews (Cascade) to 145 ft.-lbs. (195 Nm).

- Inspect Sideshifter upper and lower bearings for wear. If any bearing is worn to less than .09 in. (2.5 mm) thickness replace the entire bearing set. Refer to Section 5.1 for service.

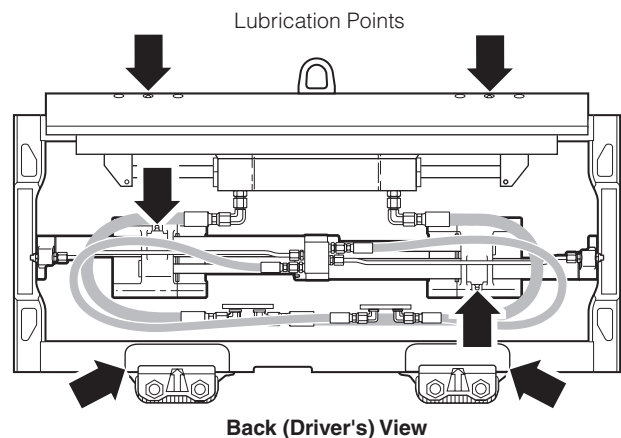
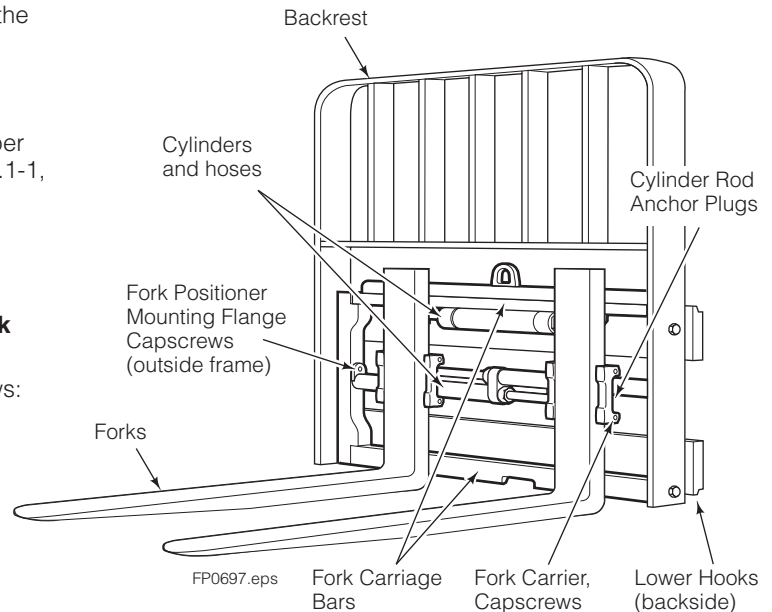
- Apply general-purpose lithium-based chassis grease to the sideshifter upper bearing grease fittings and sideshifter lower bearings. Apply a single pump of grease for the fork carrier grease fittings.

- Apply graphite dry-lube to fork carriage bars as required ('Slip Plate Aerosol', 'GraphoKote' or equivalent).

- Inspect fork carriers for looseness on bearing tubes, and cylinder rod anchors for excessive end play. Refer to Section 4.2 for service. **NOTE:** Cylinder rod anchors operate with a loose clearance.



**WARNING:** After completing any service procedure, always test the Fork Positioner/Sideshifter through five complete cycles to make sure the attachment operates correctly before returning it to the job.



## 2.5 2000-Hour

After 2000 hours of truck operation, in addition to the 1000-hour maintenance, forks in use shall be inspected at intervals of not more than 12 months (for single shift operations) or whenever any defect or permanent deformation is detected. Severe applications will require more frequent inspection.

Fork inspection shall be carried out by trained personnel to detect any damage that might impair safe use. Any fork that is defective shall be removed from service. Reference ANSI B56.1-2005.

Inspect for the following defects:

- Surface cracks
- Straightness of blade and shank
- Fork angle
- Difference in height of fork tips
- Positioning lock
- Wear on fork blade and shank
- Wear on fork hooks
- Legibility of marking

**NOTE:** Fork Safety Kit 3014162 contains wear calipers, inspection sheets and safety poster. Also available is fork hook & carriage wear gauge 209560 (Class II), 209561 (Class III) and 6105257 (Class IV).

## 3.1 General Procedures

### 3.1-1 Truck System Requirements

- Truck hydraulic pressure should be within the range shown in Specifications, Section 6.1. **PRESSURE TO THE ATTACHMENT MUST NOT EXCEED 3500 psi (245 bar).**
- Truck hydraulic flow should be within the range shown in Specifications, Section 6.1.
- Hydraulic fluid supplied to the attachment must meet the requirements shown in Specifications, Section 6.1.



**WARNING:** Before servicing any hydraulic component, relieve pressure in the system. Turn the truck off and move the truck auxiliary control valves several times in both directions.

After completing any service procedure, test the attachment through several cycles. First test the attachment empty to bleed any air trapped in the system to the truck tank. Then test the attachment with a load to be sure it operates correctly before returning to the job.

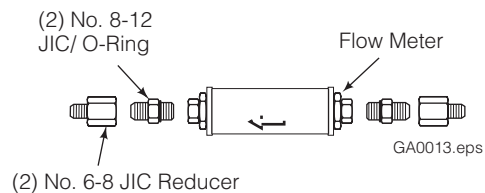
Stay clear of the load while testing. Do not raise the load more than 4 in. (10 cm) off the floor while testing.

**Flow Meter Kits: 671476 – 37 L/min (10 GPM)  
671477 – 75 L/min (20 GPM)**

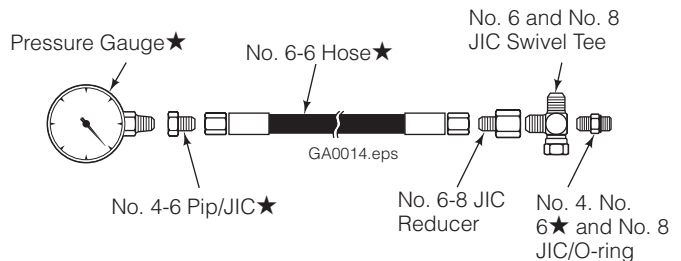
### 3.1-2 Tools Required

In addition to a normal selection of mechanic's hand tools, the following are required:

- In-line Flow Meter Kit:
  - 10 GPM (37 L/min) – Cascade Part No. 671476.
  - OR**
  - 20 GPM (75 L/min) – Cascade Part No. 671477.
- Pressure Gauge Kit:
  - 5000 psi (345 bar) – Cascade Part No. 671212.
- Assorted fittings, hoses, and quick-disconnect couplers as required.



### Pressure Gauge Kit: 671212



### 3.1-3 Troubleshooting Chart

**Determine All The Facts** – It is important that all the facts regarding the problem are gathered before beginning service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction. The following guidelines can then be used as a starting point to begin troubleshooting procedures:

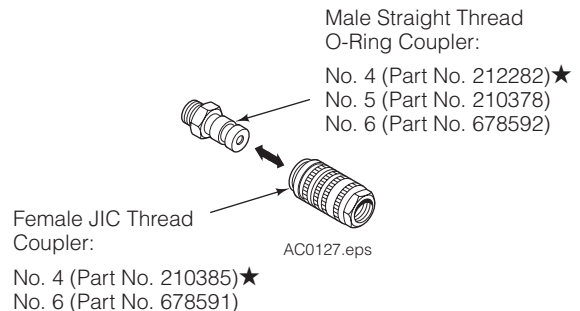
#### Fork Positioning Circuit

- Forks do not move.
  - Forks move slowly or unevenly.
- To correct one of these problems, see Section 3.3.

#### Sideshift Circuit

- Attachment will not sideshift.
  - Attachment sideshifts slowly.
- To correct one of these problems, see Section 3.4.

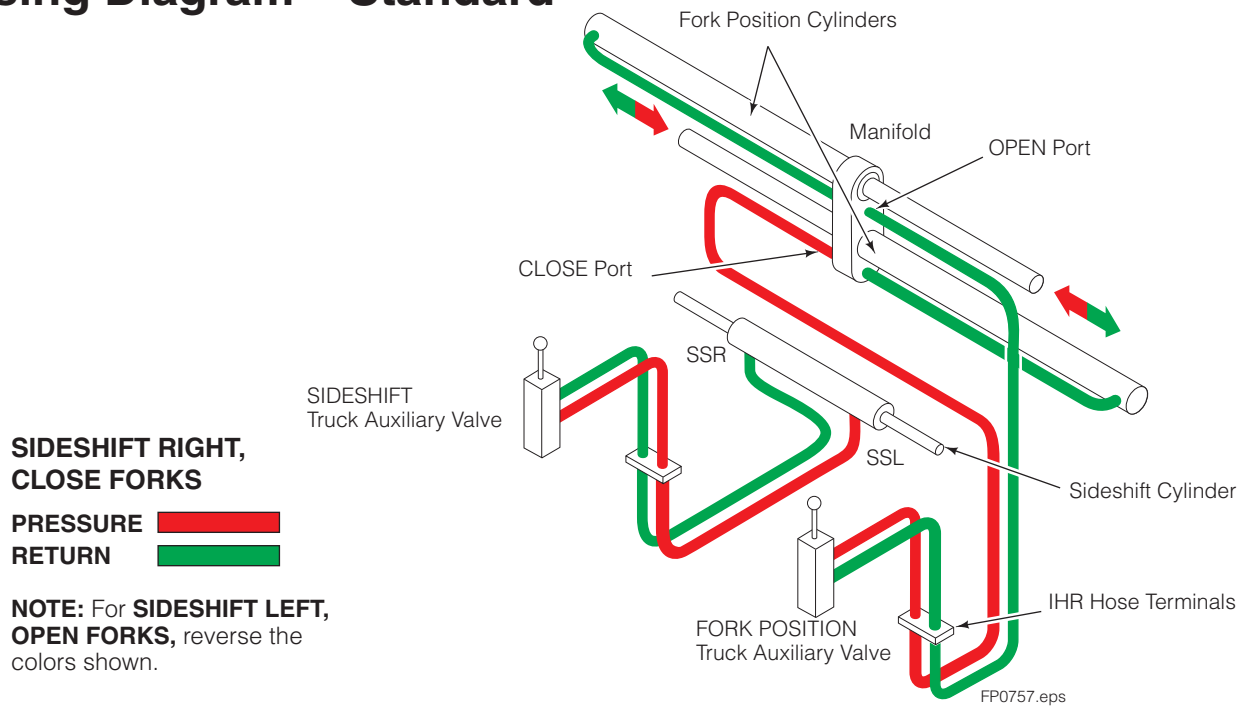
### Quick-Disconnect Couplers



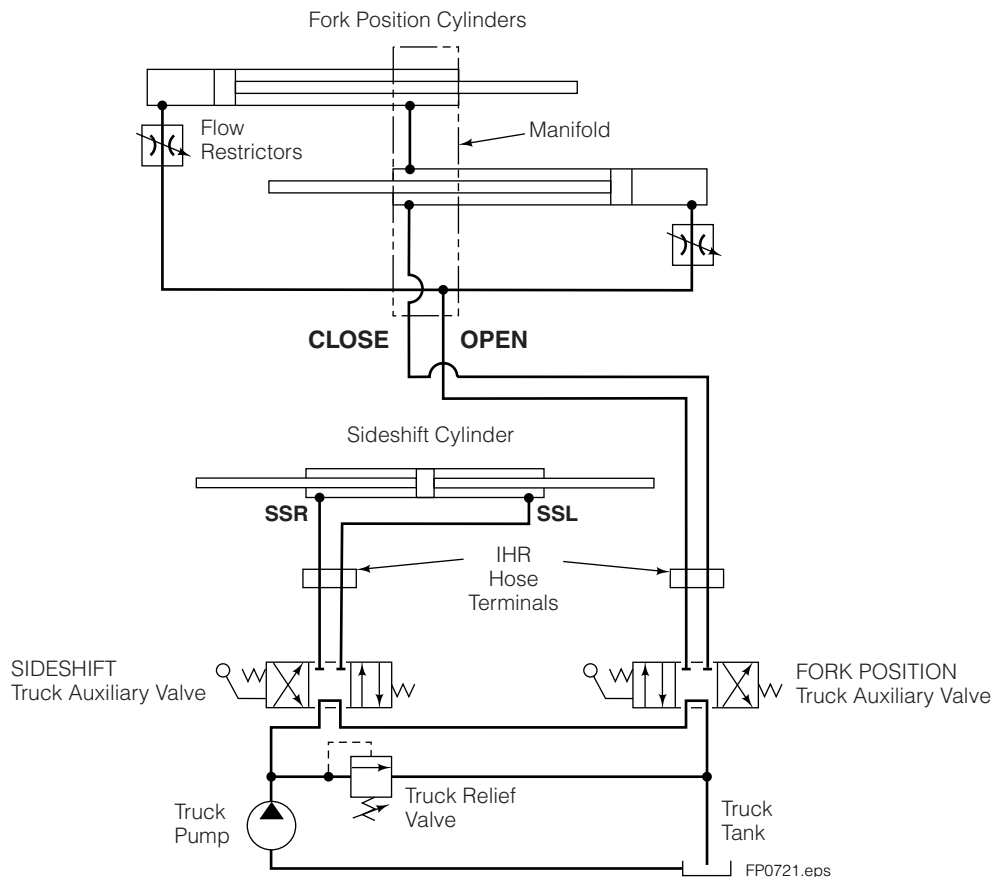
★ **NOTE:** Diagnostics Kit 394382 includes items marked.

## 3.2 Plumbing

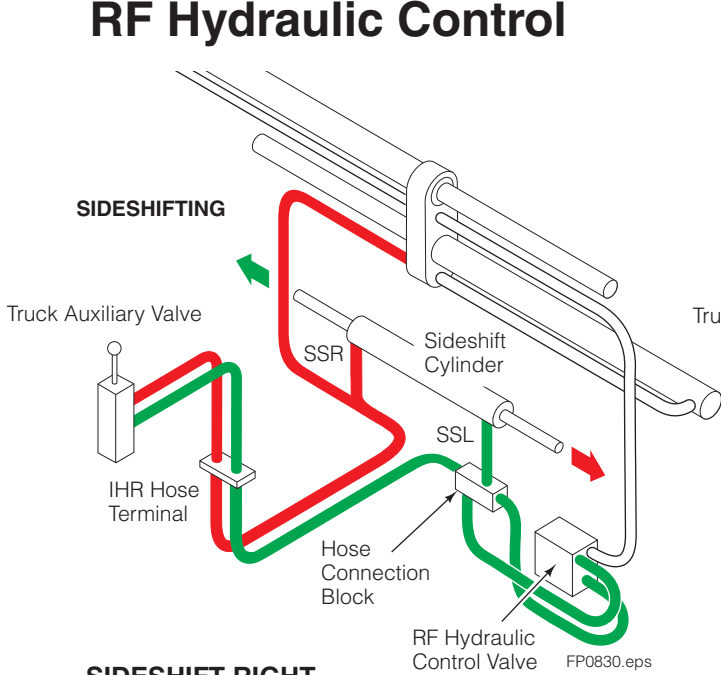
### 3.2-1 Hosing Diagram – Standard



### 3.2-2 Hydraulic Schematic – Standard



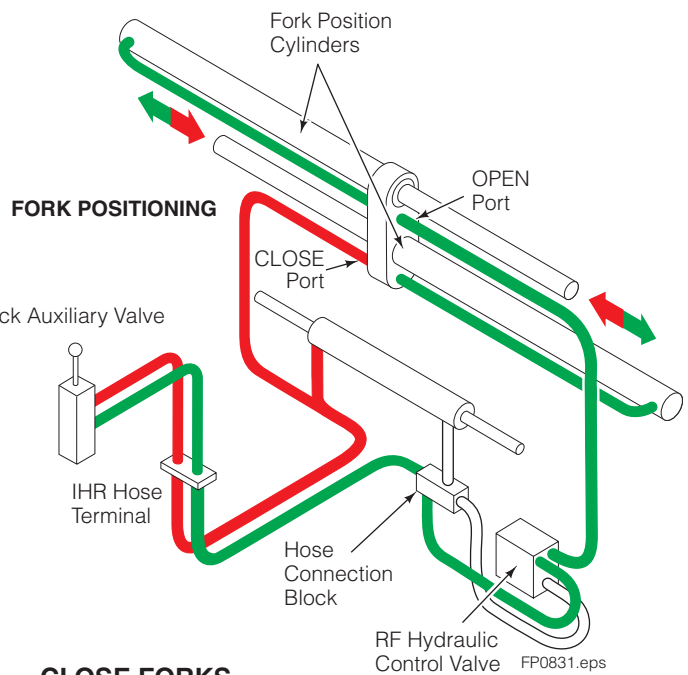
## 3.2-3 Hosing Diagram – RF Hydraulic Control



### SIDESHIFT RIGHT

**PRESSURE** █  
**RETURN** █

**NOTE:** For **SIDESHIFT LEFT**, reverse the colors shown.



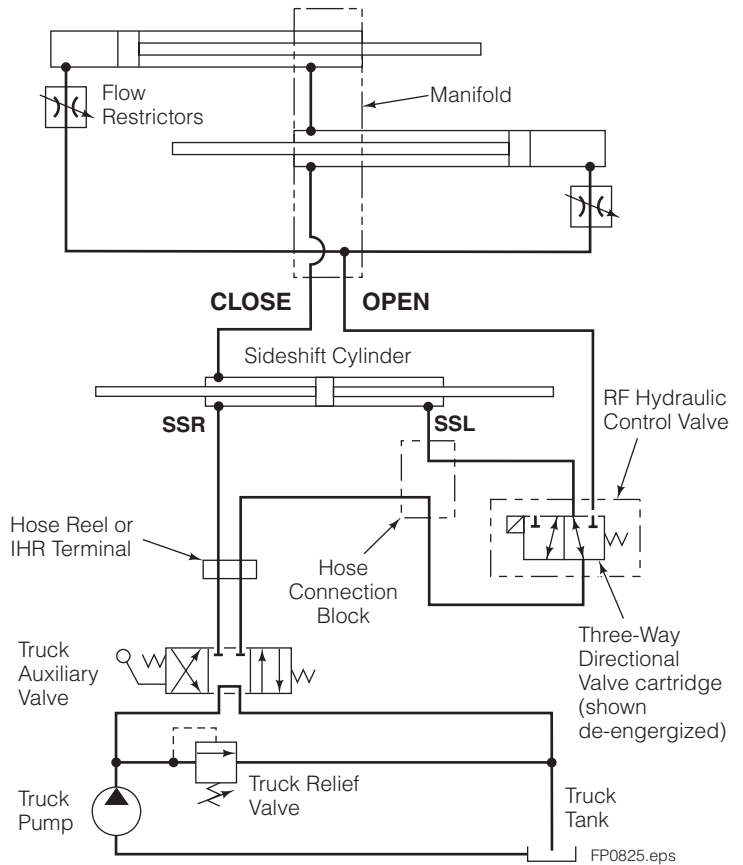
### CLOSE FORKS

**PRESSURE** █  
**RETURN** █

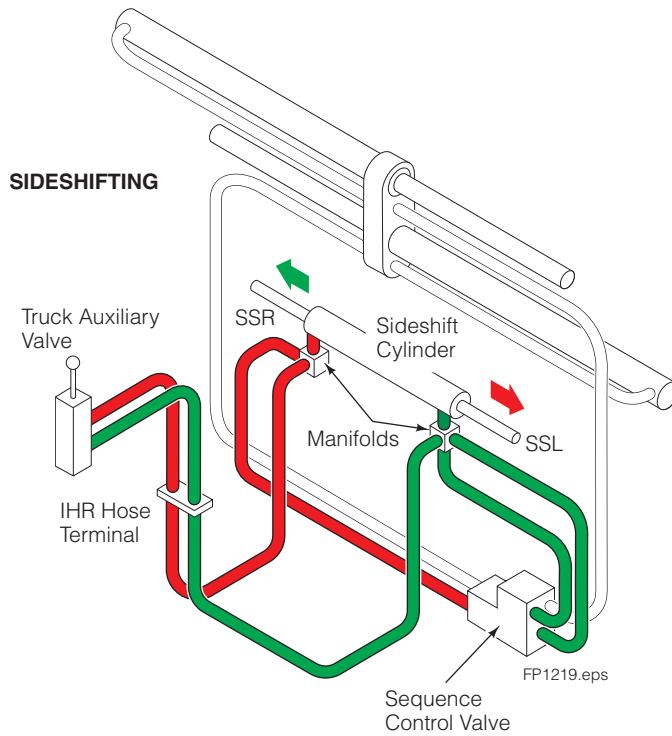
**NOTE:** For **OPEN FORKS**, reverse the colors shown.

## 3.2-4 Hydraulic Schematic – RF Hydraulic Control

**NOTE:** For wired Hydraulic Control Valves, the same hydraulic schematic applies.



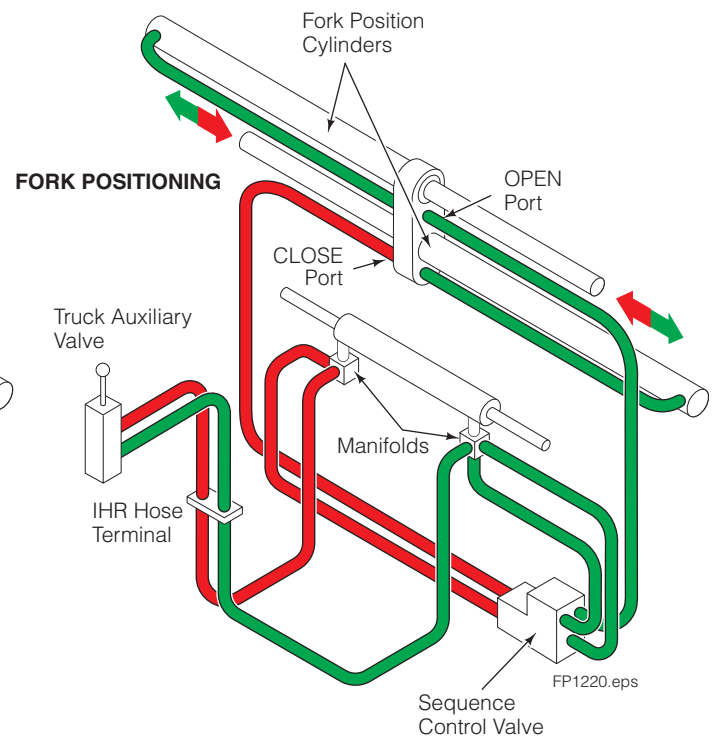
## 3.2-5 Hosing Diagram – Sequence Valve Control



### SIDESHIFT RIGHT

**PRESSURE** █  
**RETURN** █

**NOTE:** For **SIDESHIFT LEFT**, reverse the colors shown.

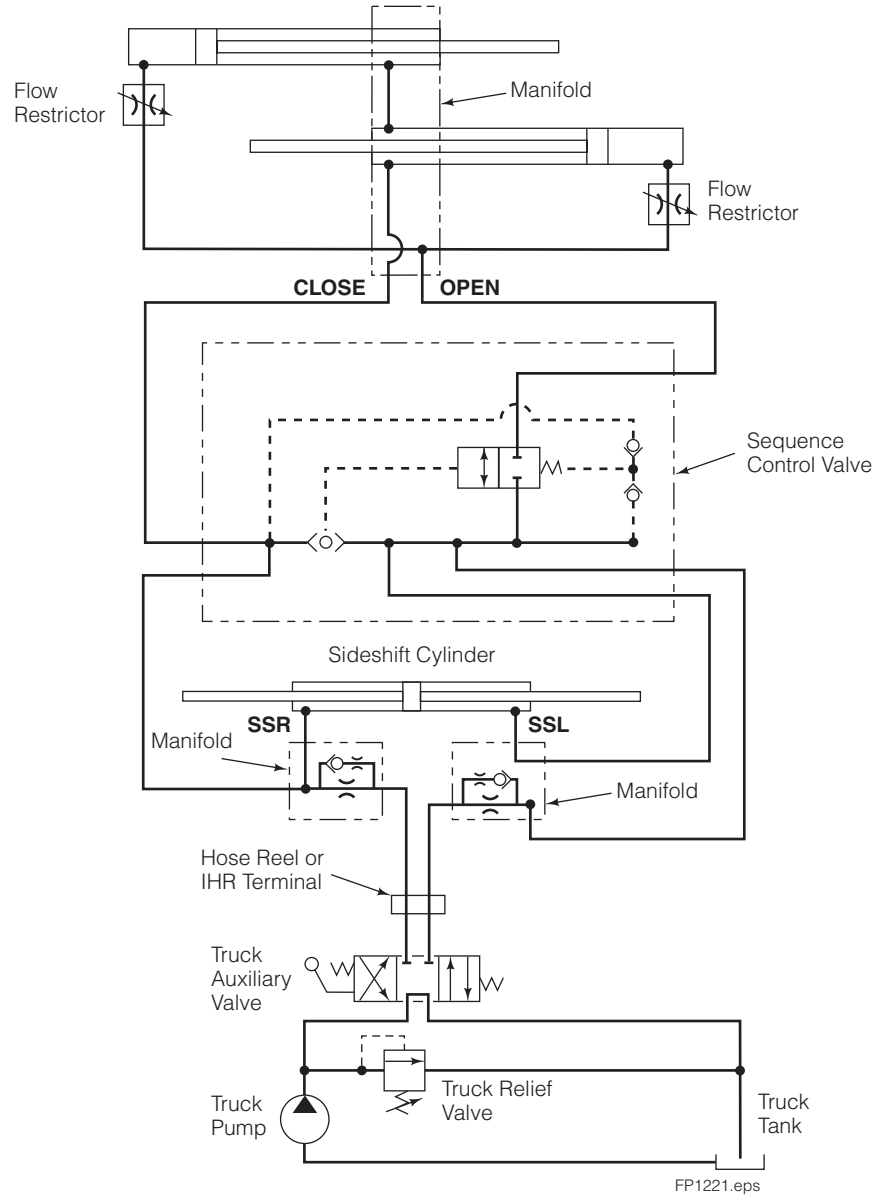


### CLOSE FORKS

**PRESSURE** █  
**RETURN** █

**NOTE:** For **OPEN FORKS**, reverse the colors shown.

## 3.2-6 Hydraulic Schematic – Sequence Valve Control



## 3.3 Fork Position Function

Six potential problems can affect the fork positioning function:

- Binding due to bending damage, wear or lack of lubrication.
- Incorrect hydraulic pressure or flow from truck.
- Flow restrictor fittings plugged or improperly adjusted.
- External leaks.
- **Solenoid equipped** – Electrical circuit faults, defective solenoid coil or valve.
- Worn or defective cylinder seals.



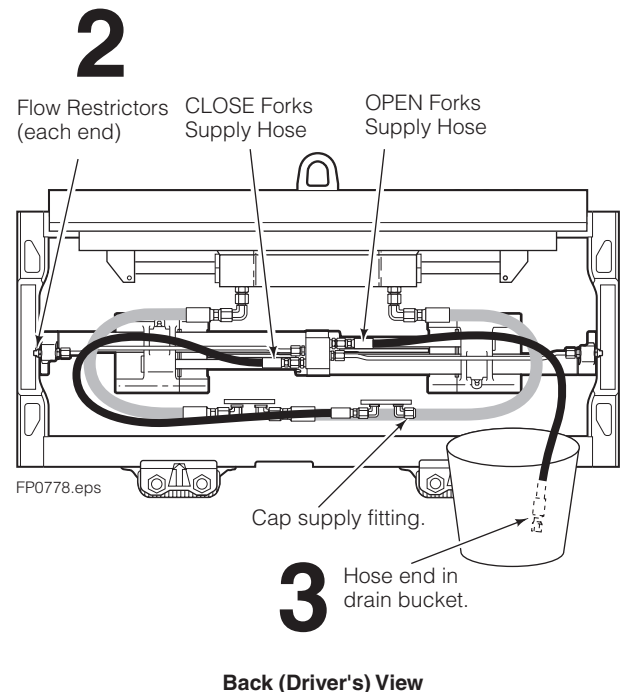
**WARNING:** Before disconnecting hoses, relieve pressure in the attachment hydraulic system. Turn the truck off and move the truck auxiliary control handle several times in both directions.

### 3.3-1 Supply Circuit Test

- 1 Check the pressure supplied by the truck at the carriage hose terminals. Pressure must be within the range shown in Specifications, Section 6.1.  
**PRESSURE TO THE FORK POSITIONER MUST NOT EXCEED 3500 PSI (245 BAR).**
- 2 Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications, Section 6.1.
- 3 Spread the forks fully and hold the lever in the OPEN position for several seconds. Release the lever and check for external leaks at fittings, tubing, hoses, and manifold.

### 3.3-2 Fork Position Circuit Test

- 1 **Solenoid equipped** – Press the solenoid button and listen for a 'click' at the solenoid valve. If no sound is heard, check the fuse, wiring and coil. Repair as necessary.  
**IMPORTANT:** Solenoid-operated valve should be plumbed so that the solenoid is **energized** during the fork positioning function.
- 2 Open or close the forks fully. If the forks move unevenly, slowly or not at all, check the flow restrictors for contamination or improper adjustment. Refer to Section 4.1-1, Step 5. Speed should be 3 in. (75 mm) per second at specified flow rate.
- 3 If forks still do not move correctly, turn the truck off and relieve attachment system pressure. Disconnect the OPEN supply hose from the truck hose terminal and route to a drain bucket. Cap the supply fitting.
- 4 Start the truck and slowly actuate the CLOSE forks lever until forks are fully closed. Hold lever for 5 seconds:
  - If there is **substantial hydraulic flow** out of the drain hose, one of the cylinders has faulty piston seals. Replace the complete unit or service the piston seals. Refer to Section 4.2.
  - If there is **little or no hydraulic flow** out of the hose, the problem is not hydraulic. Refer to Section 3.3, above.



## 3.4 Sideshift Function

There are seven potential problems that could affect the sideshifting function:

- Binding due to bending damage, wear or lack of lubrication.
- Incorrect hydraulic pressure or flow from truck.
- Flow restrictor orifices plugged, incorrect type, or improperly installed.
- External leaks.
- **Solenoid equipped** – Electrical circuit faults, defective solenoid coil or valve.
- Lower mounting hooks installed with incorrect clearance.
- Worn or defective cylinder seals.



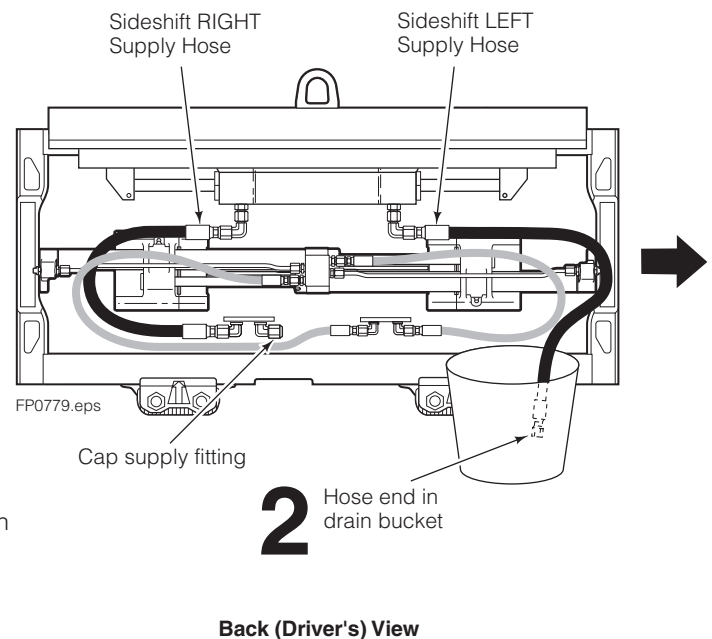
**WARNING:** Before disconnecting hoses, relieve pressure in the attachment hydraulic system. Turn the truck off and move the truck auxiliary control handle several times in both directions.

### 3.4-1 Supply Circuit Test

- 1 Check the pressure supplied by the truck at the carriage hose terminals. Pressure must be within the range shown in Specifications, Section 6.1. **PRESSURE TO THE SIDESHIFTER MUST NOT EXCEED 3500 PSI (245 BAR).**
- 2 Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications, Section 6.1.
- 3 Sideshift fully to the left and hold the lever in the SIDESHIFT LEFT position for a few seconds. Release the lever and check for external leaks at fittings, hoses and cylinder rod ends.

### 3.4-2 Sideshift Circuit Test

- 1 **Solenoid equipped** – Press the solenoid button and listen for a 'click' at the solenoid valve. If no sound is heard, check the fuse, wiring and coil. Repair as necessary.  
**IMPORTANT:** The solenoid operated valve should be plumbed so that the solenoid is **not energized** during the sideshifting function.
- 2 Sideshift fully right. Turn the truck off and relieve Attachment system pressure. Disconnect the SIDESHIFT LEFT supply hose from the truck hose terminal and route to a drain bucket. Cap the supply fitting.
- 3 Start the truck and actuate the SIDESHIFT RIGHT lever for 5 seconds:
  - If there is **substantial hydraulic flow** out of the drain hose, the sideshift cylinder is faulty and requires replacement. Refer to Section 5.1-4.
  - If there is **little or no hydraulic flow** out of the hose, first check for plugged or incorrectly installed flow restrictor washers and fittings. Refer to Section 5.1-4. If there is still no hydraulic flow, the problem is not hydraulic. Refer to Section 3.4, above.



## 4.1 Fork Positioner

### 4.1-1 Removal and Replacement

**NOTE:** Fork positioner assembly may be removed separately or complete with the sideshifter for service.

- 1 Remove capscrews fastening inner fork carriers and remove forks.



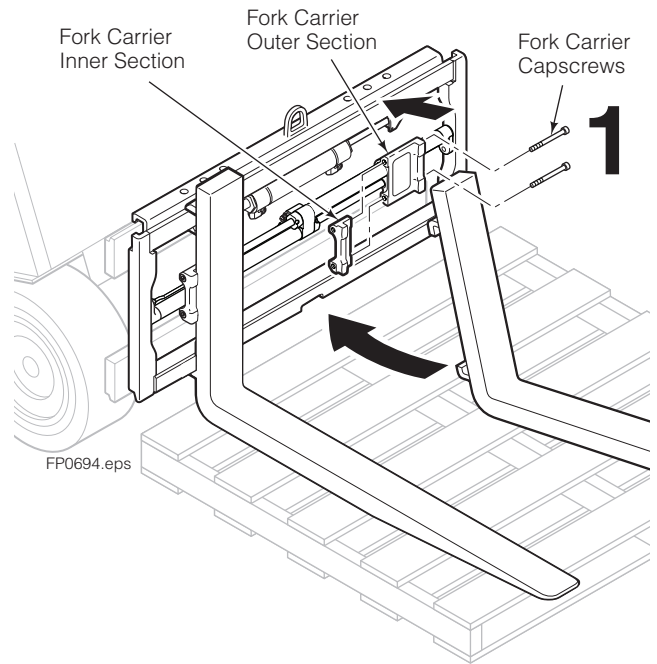
**WARNING:** Make sure locking pins are removed from forks. Forks must slide freely on sideshifter frame or carriage bars.

- 2 Remove backrest. For reassembly, tighten capscrews to 145 ft.-lbs. (195 Nm) for Cascade backrests. Refer to the truck service manual for truck manufacturer's backrest.

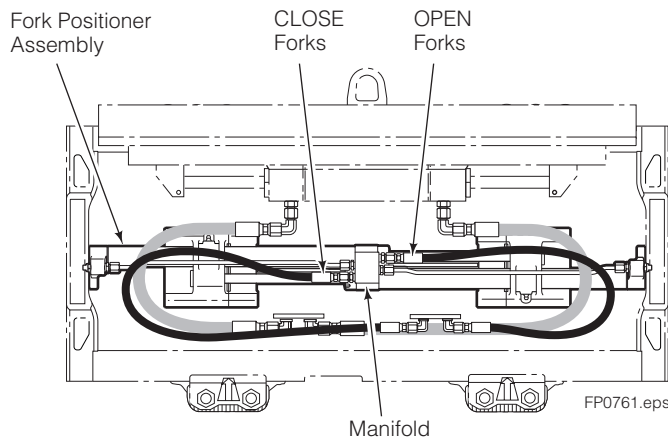


**WARNING:** Before removing any hoses, relieve pressure in the hydraulic system. With the truck off, open the truck auxiliary control valve(s) several times in both directions.

- 3 Disconnect supply hoses from the fork positioner manifold and tag for reassembly.

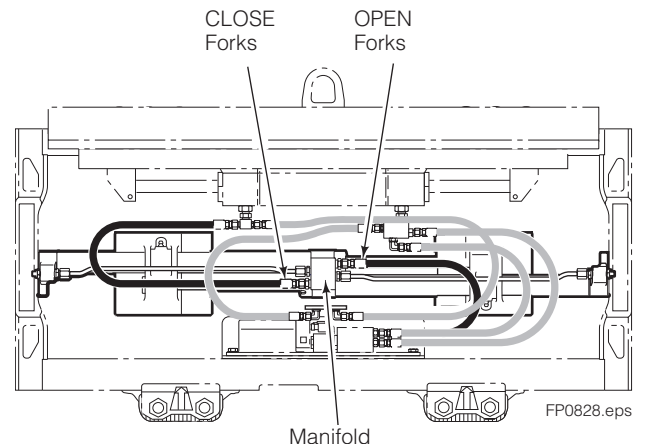


#### DOUBLE INTERNAL REEVING



### 3

#### SINGLE INTERNAL REEVING WITH RF HYDRAULIC CONTROL



Back (Driver's) View

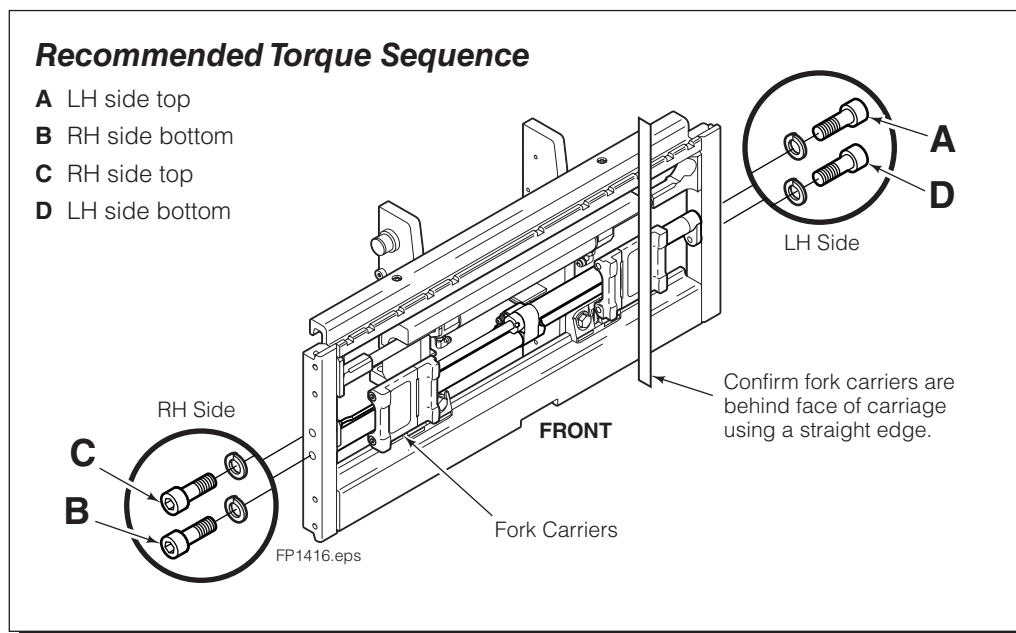
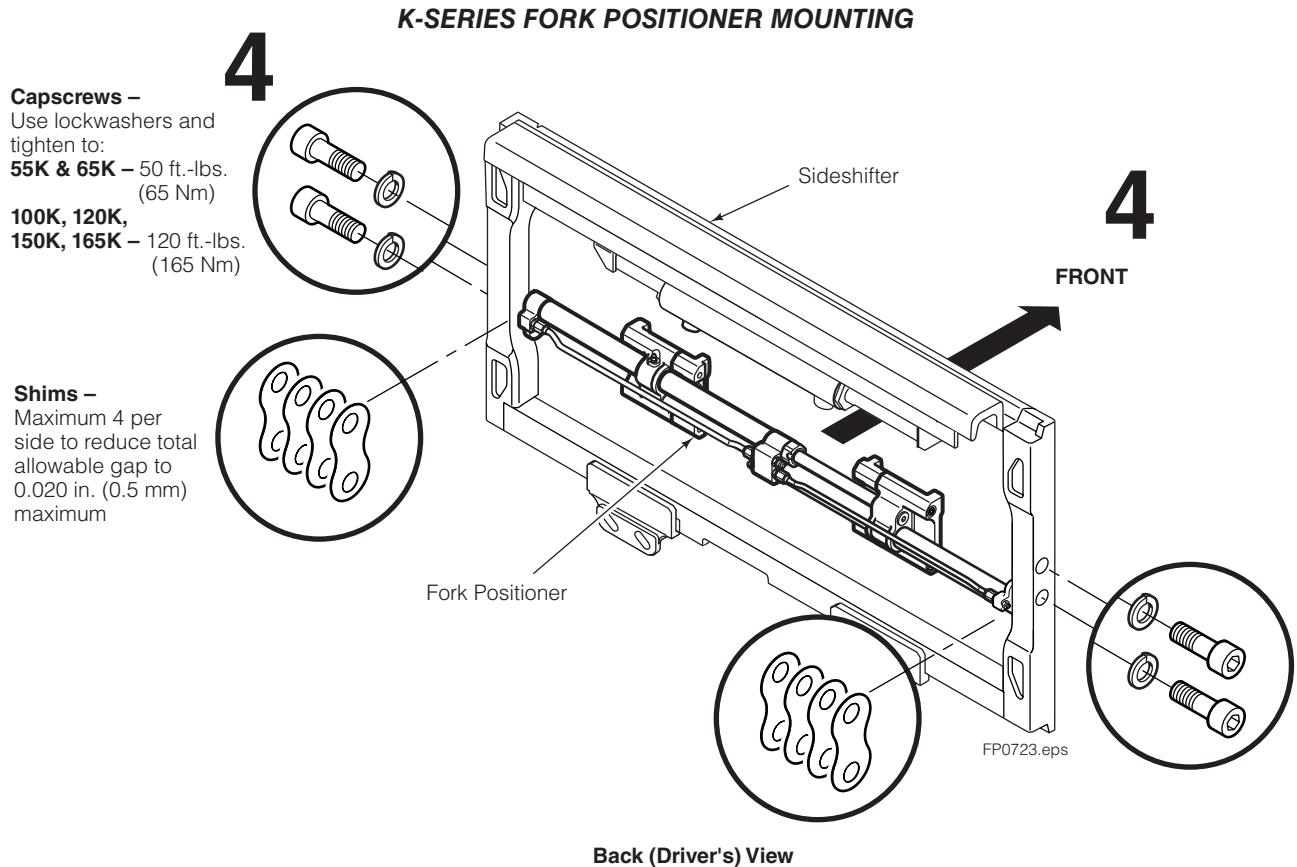
- 4** Remove capscrews fastening fork positioner to sidershifter frame and remove unit through front. Keep track of shims. For reassembly, shim as necessary and tighten mounting capscrews to the following:

**55K & 65K** – 50 ft.-lbs. (65 Nm)

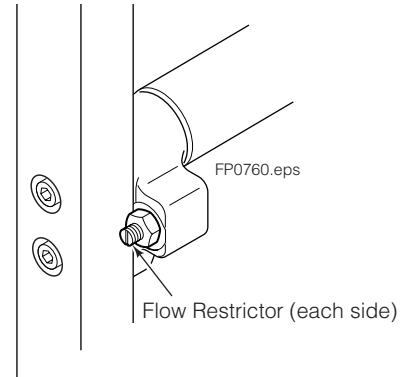
**100K, 120K, 150K, 165K** – 120 ft.-lbs. (165 Nm)

**NOTE:** Maximum 4 shims per side. Maximum difference in number of shims per side is 2.

**CAUTION:** Total allowable gap before tightening capscrews is 0.020 in. (0.5 mm) maximum.



- 5** For installation, reverse the above procedures with the following exceptions:
- Service fork positioner components. Refer to Section 4.2.
  - For fork carrier configurations, refer to Section 4.1-2 (55K & 65K) and 4.1-3 (100K, 120K, 150K, & 165K).
  - If necessary, adjust flow restrictors for equal fork movement as follows:
    - A** Loosen jam nuts and screw both flow restrictors in until they bottom. Screw out (CCW) 1/2 turns.
    - B** Open forks fully, then close. Look for unequal fork movement.
    - C** On faster fork (one that bottoms first), screw flow restrictor in (CW) 1/4 turn and test again.
    - D** Repeat procedure until fork movement is equal. Positioning speed should be approximately 3 in. (75 mm) per second. Tighten jam nuts.

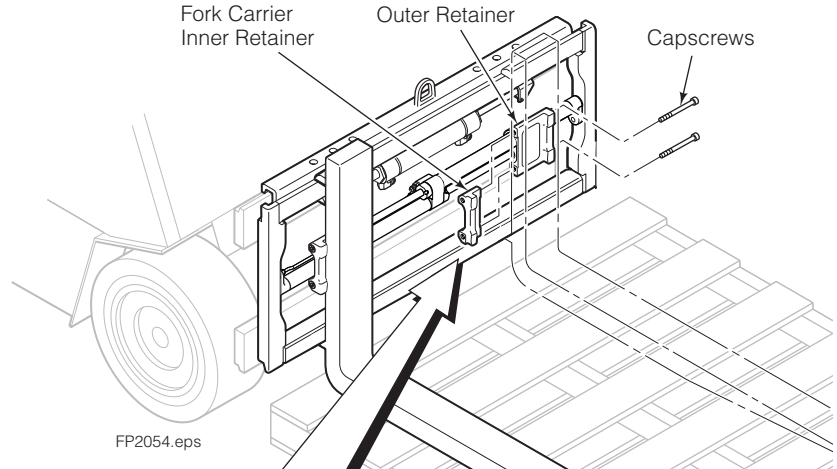


## 4.1-2 Fork Carrier Configuration – 55K & 65K

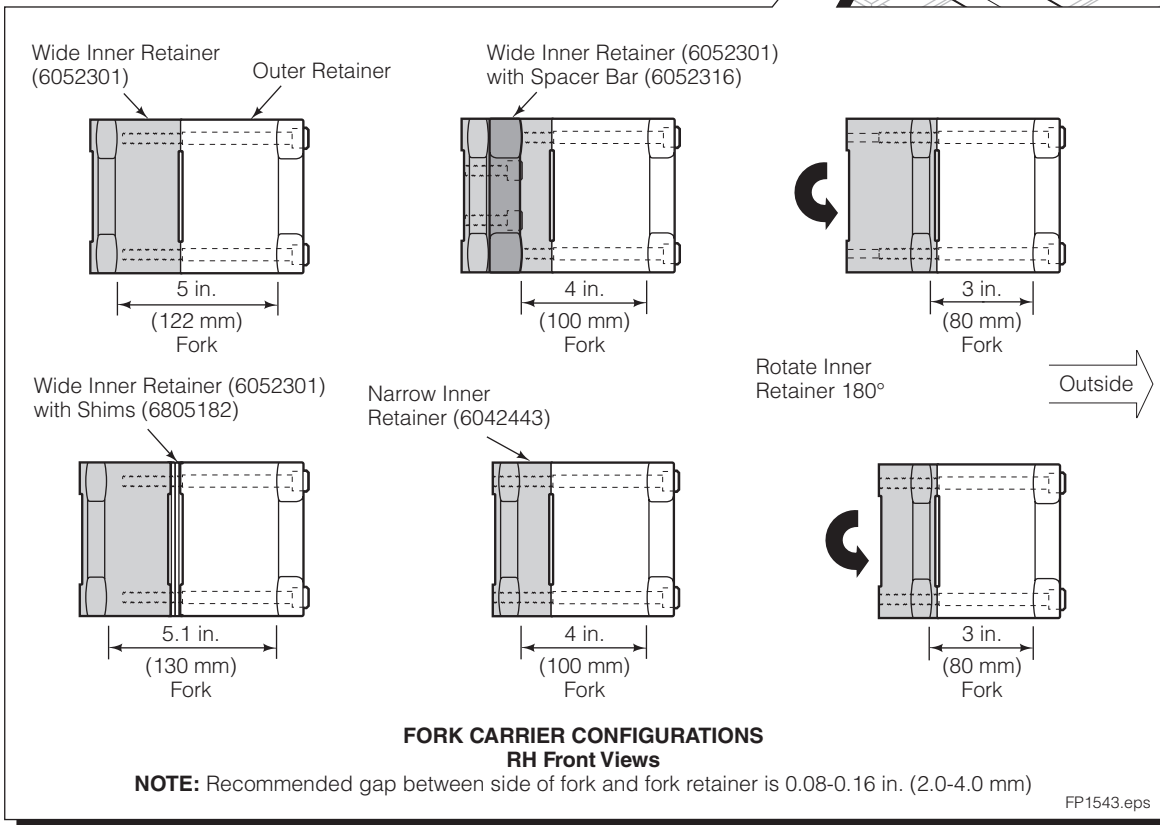
**NOTE:** Refer to the layouts below to position inner retainers for various fork widths. Tighten fork carrier inner retainer capscrews to 25 ft.-lbs. (35 Nm).



**WARNING:** For forks longer than 60 in. (1520 mm) or load centers exceeding 30 in. (760 mm), consult Cascade.



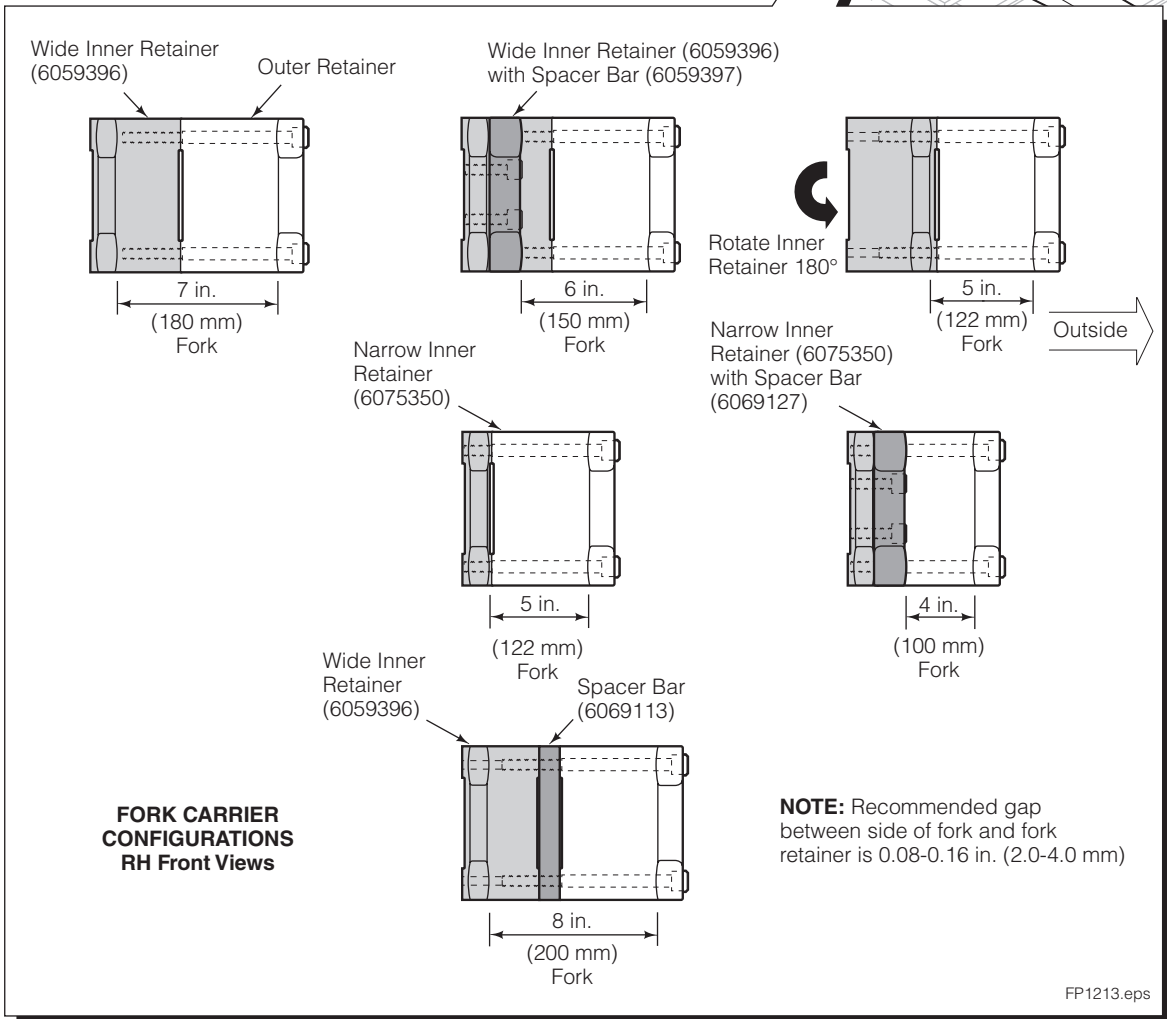
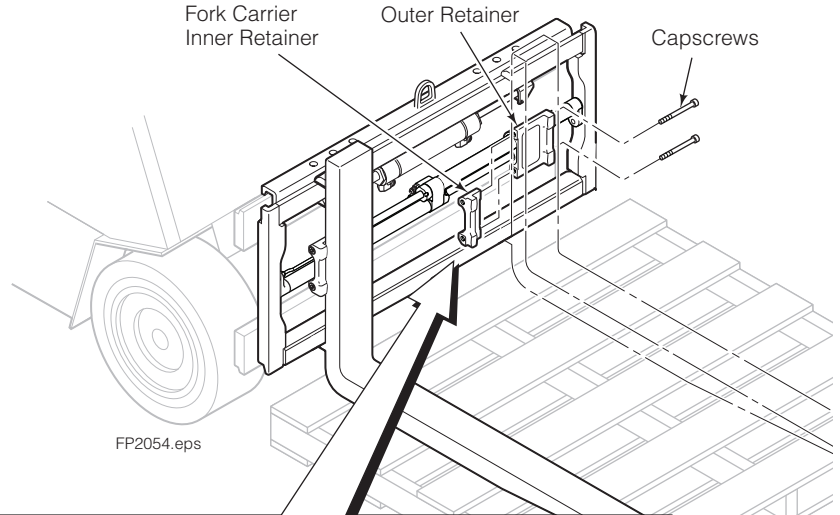
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## 4.1-3 Fork Carrier Configuration – 100K, 120K, 150K & 165K

**NOTE:** Refer to the layouts below to position inner retainers for various fork widths. Tighten fork carrier inner retainer capscrews to 50 ft.-lbs. (65 Nm).

**WARNING:** For forks longer than 60 in. (1520 mm) or load centers exceeding 30 in. (760 mm), consult Cascade.



## 4.2 Fork Positioner Service

### 4.2-1 Disassembly

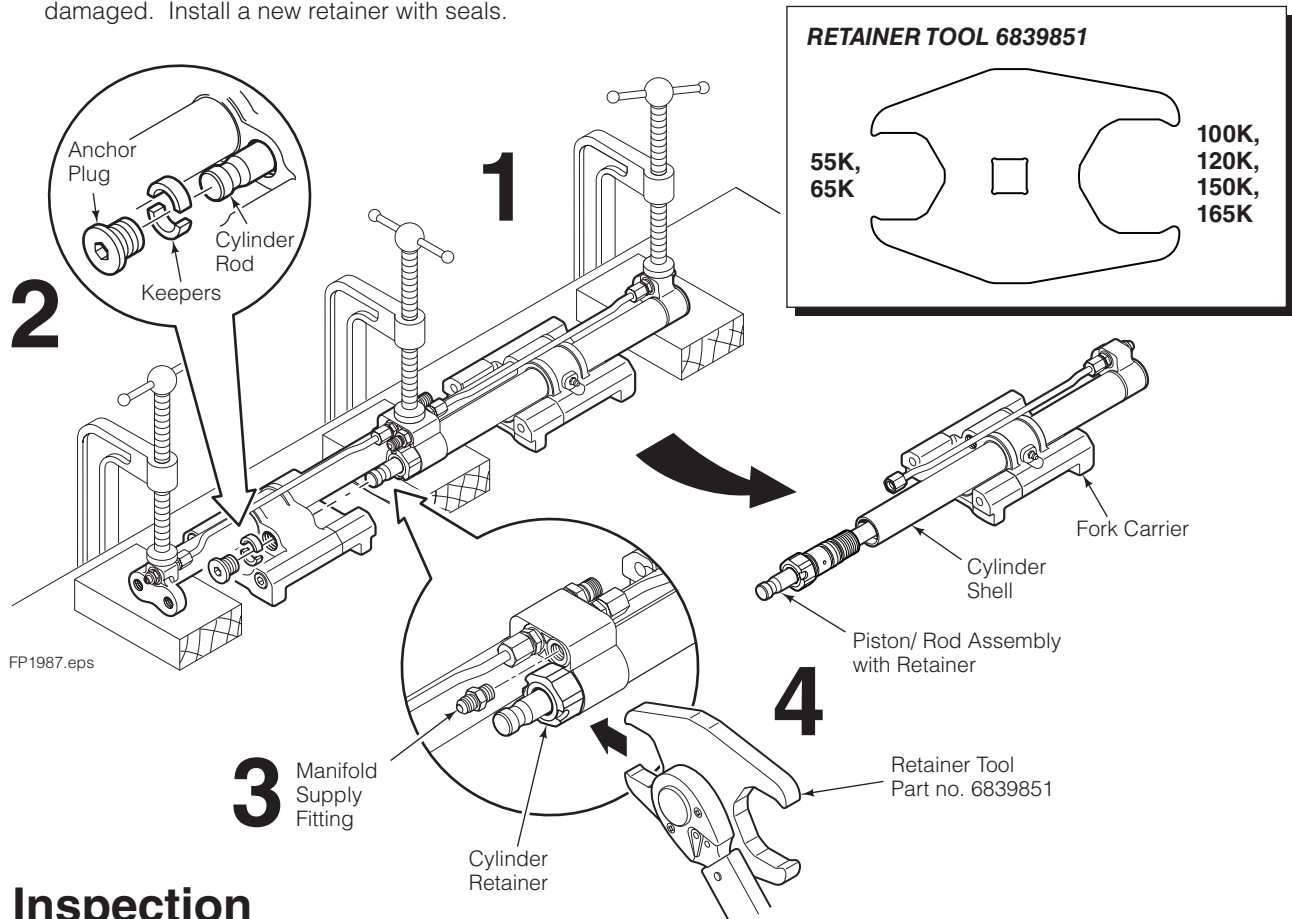
- 1 Use C-clamps to clamp Fork Positioner face down onto a benchtop, as shown. Use 2 x 4 in. (5 x 10 cm) wood blocks for clearance and to keep parts in alignment.
- 2 Remove cylinder rod anchor plug. Move fork carrier toward manifold and remove half-ring keepers. Move cylinder rod to fully retracted position, as shown.
- 3 Remove supply fitting from manifold to gain access to cylinder retainer.
- 4 Unscrew cylinder retainer, using Cascade Retainer Tool 6839851, to remove cylinder assembly from manifold.

**IMPORTANT:** If cylinder retainer is removed from cylinder piston/rod assembly, the seals will be damaged. Install a new retainer with seals.

- 5 Disconnect hydraulic tubes at manifold. Remove C-clamp and remove cylinder/fork carrier assembly.
 

**IMPORTANT:** If tubes are removed from cylinder head end, reinstall prior to installation of cylinder/fork carrier assembly to manifold. Do not bend tubes.
- 6 Slide fork carrier from cylinder shell. Remove piston/rod assembly from cylinder shell.
- 7 Remove all seals, wear rings and bearings from components, as shown on next page.
 

**CAUTION:** Do not scratch seal grooves. Use brass seal removal tools to pry items from grooves.



### 4.2-2 Inspection

**IMPORTANT:** If bending damage is found, Fork Positioner/Sideshifter assembly should be replaced as a complete unit.

- Inspect rod and piston for nicks and burrs. Remove minor imperfections using 400-grit emery cloth.
- Inspect cylinder bore for minor nicks and burrs. Remove minor imperfections with a hone (butterfly).
- Inspect cylinder shells for deformities, cracks that could impair performance or cause leaks under pressure.
- Inspect fork carrier bearings for wear. Refer to 1000-hour inspection criteria. Replace as necessary.

## 4.2-3 Reassembly

### Reassembly with New Retainer:

- 1 If necessary, use 400-grit emery cloth to break any sharp edges from the following to prevent seal damage:
  - Piston and cylinder shell chamfer angles
  - Threads
- 2 Lubricate new seals and wear rings with O-ring lube, hydraulic fluid or petroleum jelly.
- 3 Install new seals, wear rings and fork carrier bearings, as shown below.
 

**NOTE:** Fork carrier bearings snap into their respective grooves. Bronze bearings consist of three separate segments.
- 4 Install piston/rod assembly into cylinder shell. Push rod fully into cylinder.
 

**CAUTION:** Make sure piston seal is not damaged by cylinder shell threads during installation.
- 5 Slide fork carrier onto cylinder shell with the capscrew heads facing outwards.
- 6 Align cylinder assembly to manifold and engage opposite cylinder rod into fork carrier.
 

**NOTE:** Install external spacer on cylinder rod, if required.
- 7 Install new cylinder retainer with seals through opposite side of manifold and screw partially into cylinder shell. New retainer part numbers are as follows:
 

**55K, 65K** – Cascade Part No. 6055787  
**100K, 120K, 150K, 165K** – Cascade Part No. 6081748
- 8 Make sure cylinder is properly oriented with restrictor fittings on backside. Engage tubes and screw retainer fully into shell. Reclamp assembly to bench.
- 9 Tighten retainer to 120 ft.-lbs. (165 Nm). Tighten hydraulic tubes at manifold and cylinder head end.

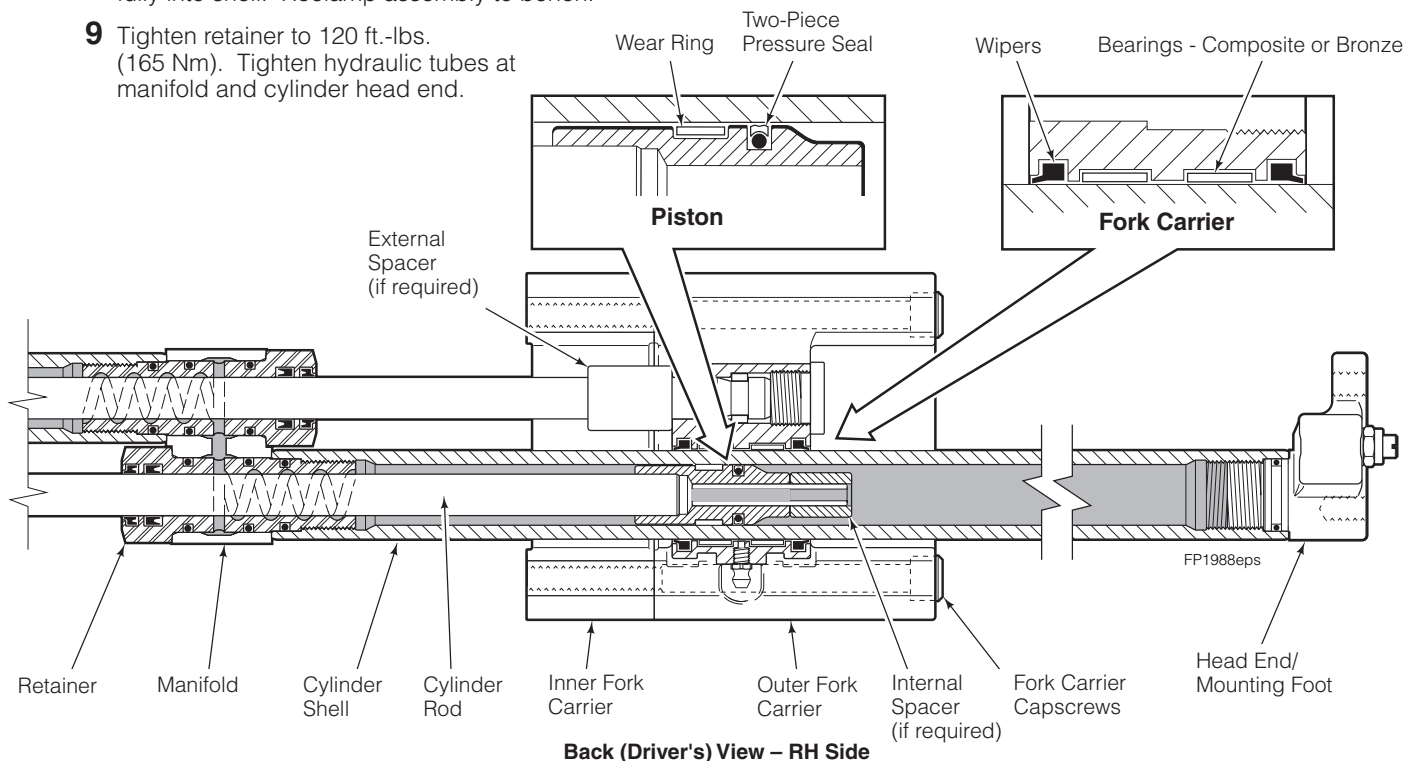
### Reassembly with Original Retainer:

- 1 If necessary, use 400-grit emery cloth to break any sharp edges from the following to prevent seal damage:
  - Piston and cylinder shell chamfer angles
  - Threads
- 2 Lubricate new seals, O-rings and wear rings with O-ring lube, hydraulic fluid or petroleum jelly.
- 3 Install new seals, wear rings and fork carrier bearings, as shown below.
 

**NOTE:** Fork carrier bearings snap into their respective grooves. Bronze bearings consist of three separate segments.
- 4 Slide fork carrier onto cylinder shell with the capscrew heads facing outwards.
- 5 Align cylinder assembly to manifold. Push piston/rod assembly with retainer through opposite side of manifold and into cylinder shell. Screw retainer partially into cylinder shell.
 

**NOTE:** Install external spacer on piston/rod assembly prior to installation.

**CAUTION:** Make sure piston seal is not damaged by cylinder shell threads during installation.
- 6 Make sure cylinder is properly oriented with restrictor fittings on backside. Engage tubes and screw retainer fully into shell. Reclamp assembly to bench.
- 7 Tighten retainer to 120 ft.-lbs. (165 Nm). Tighten hydraulic tubes at manifold and cylinder head end.



## 5.1 Sideshifter

### 5.1-1 Frame Removal

**NOTE:** Fork positioner assembly may be removed prior to sideshifter service or can remain installed on the sideshifter frame. Refer to Section 4.1 for fork positioner removal.

- 1 Remove forks as described in Section 4.1-1, Step 1. Refer to illustration.
- 2 Remove backrest. For reassembly tighten the capscrews to 145 ft.-lbs. (195 Nm) for Cascade backrests. Refer to the truck service manual for truck manufacturer's backrest.



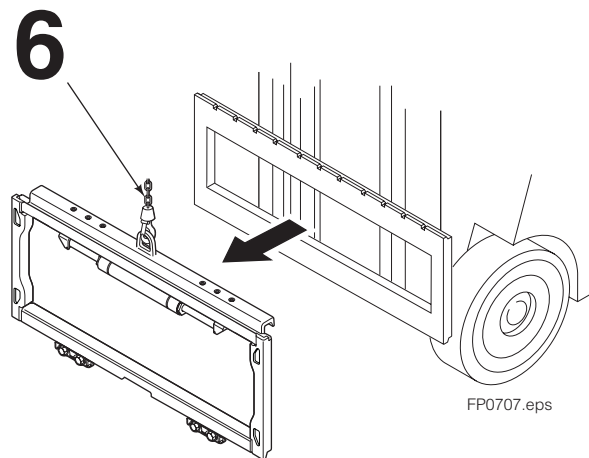
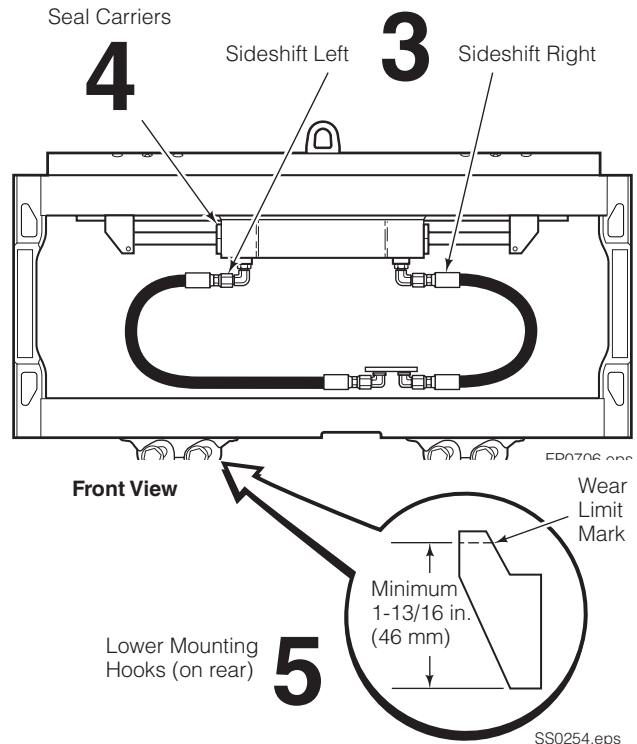
**WARNING:** Before disconnecting hoses, relieve pressure in the Attachment hydraulic system. Turn the truck off and move the truck control handle several times in both directions.

- 3 Disconnect and plug the hoses from the sideshifter cylinder. Tag for reassembly.
- 4 If rod seals are to be serviced, loosen seal carriers before removing sideshifter frame. For reassembly, tighten seal carriers to 170 ft.-lbs. (230 Nm).
- 5 Remove the lower mounting hooks and inspect for wear. Refer to illustration. Replace if beyond wear limit.



**WARNING:** Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.

- 6 Attach an overhead hoist to the sideshifter frame and lift away from the truck carriage.

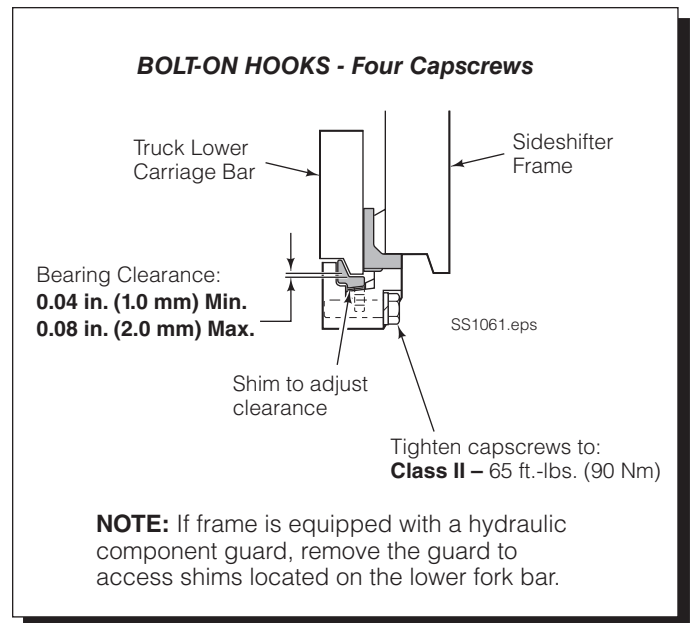
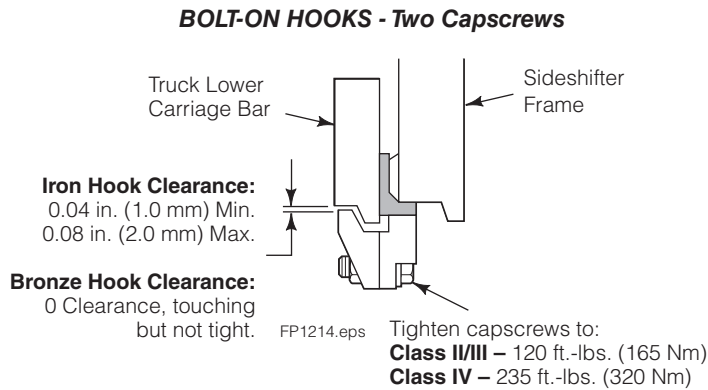


7 For installation, reverse the above procedures with the following exceptions:

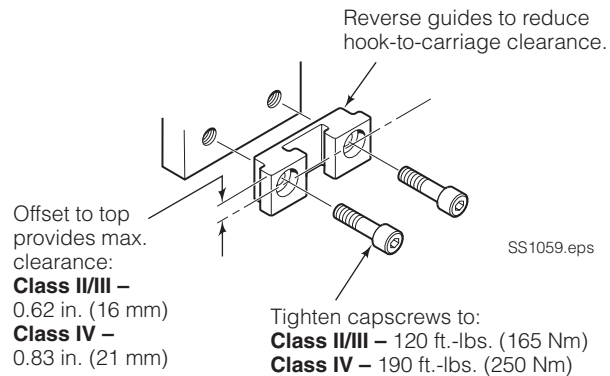
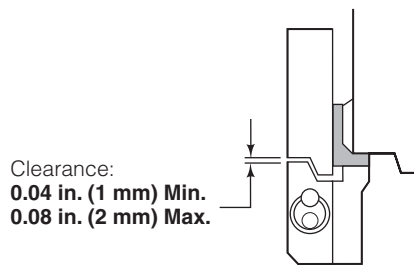
- Clean and inspect carriage bars for damage and smoothness. Make sure that bars are parallel and ends are flush. Repair any protruding welds or damaged notches by grinding, filing or welding.
- Clean all bearing areas of built-up dirt and grease.
- Inspect sideshifter frame bearings for wear and replace as necessary. Refer to Section 5.1-3.
- Install and adjust lower hooks, as shown below.

**CAUTION:** Lower bearing clearance must be adjusted as shown for proper sideshifter operation.

- Lubricate both upper and lower sideshifter frame bearings with general-purpose chassis grease.



**QUICK-DISCONNECT HOOKS**



## 5.1-2 Bearing Lubrication

Lubricate both the upper and lower sideshifter frame bearings with chassis grease every 300 hours or 4 weeks of operation, whichever comes first. In contaminated environments, lubricate every week or as required.

## 5.1-3 Bearing Service

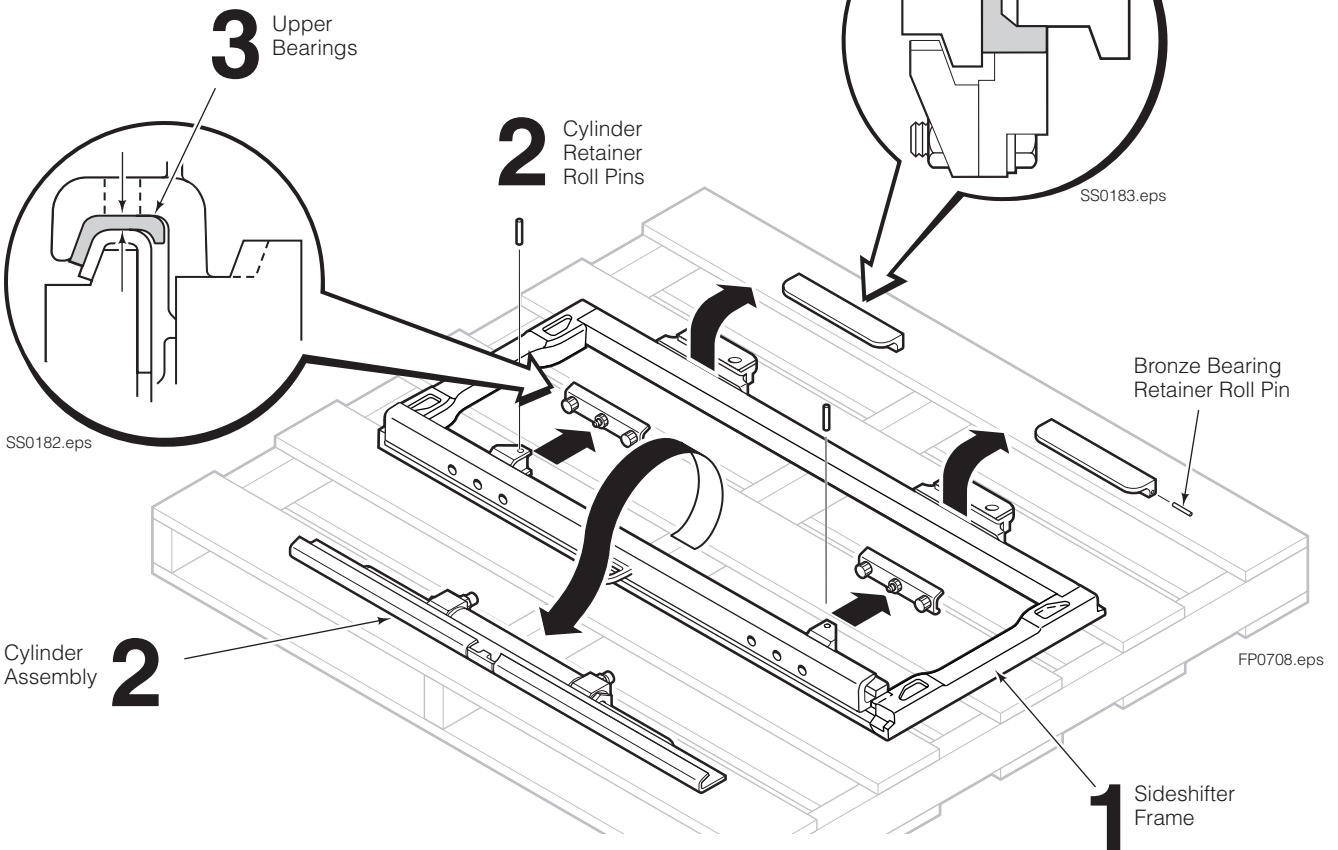
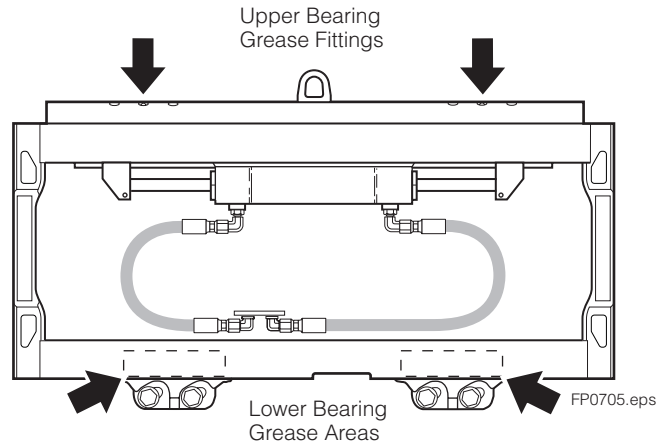
- 1 Remove the sideshifter frame from the truck as described in Section 5.1-1 and lay flat on a pallet or workbench.
- 2 Remove retainer pins and cylinder assembly from the frame.
- 3 Remove the upper bearings by driving out of the frame. If any bearing is worn to less than 3/32 in. (2.5 mm) thickness, replace all the upper bearings.

**IMPORTANT:** Use a wood block or plastic hammer to fully seat new bearings into upper frame, as shown. Proper lower hook clearance requires that upper bearings be fully seated into upper frame.

- 4 Remove the lower bearings by prying them from the lower hook mounts. If any bearing is worn to less than 3/32 in. (2.5 mm) thickness, replace all the lower bearings.

**NOTE:** Bronze lower bearings are retained by a roll pin. Pull or pry the pin out far enough to release the bearing from the frame.

- 5 For reassembly, reverse the above procedures with the following exceptions:
  - Grease upper and lower bearings with general-purpose chassis grease.



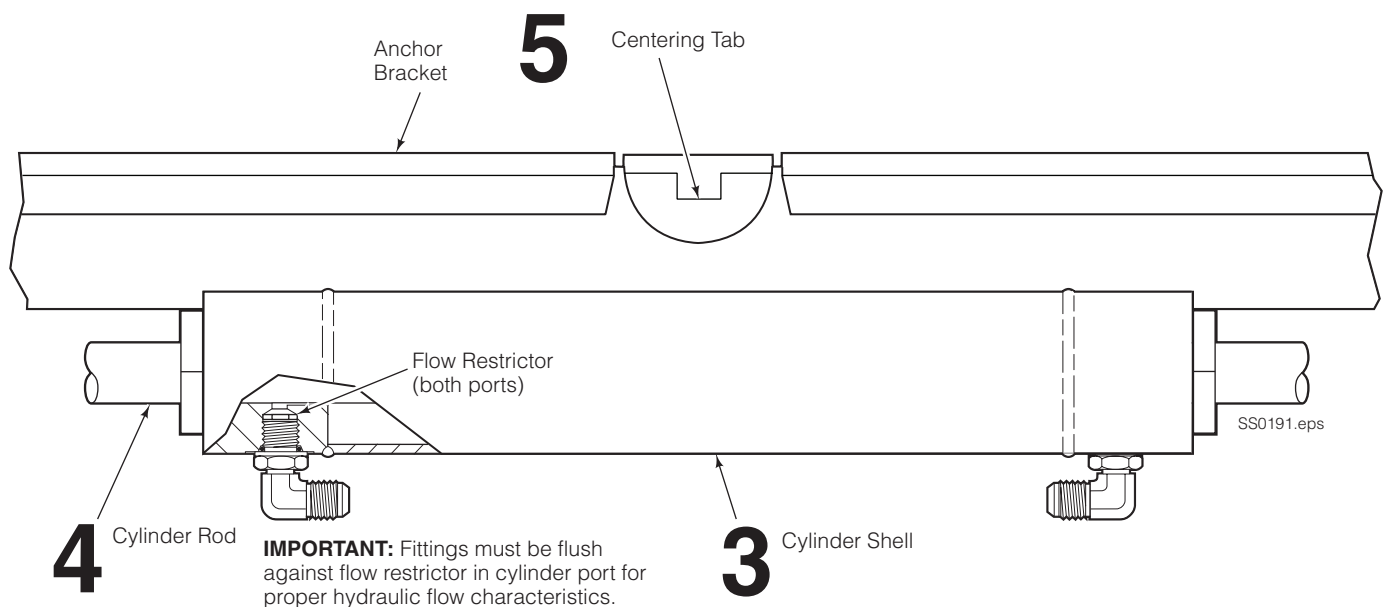
## 5.1-4 Cylinder Assembly Service

**NOTE:** The cylinder rod and shell are not serviceable. If the rod or shell is damaged, replace entire cylinder assembly.



**WARNING:** Before removing hoses or hydraulic components, relieve pressure in the Attachment hydraulic system. Turn the truck off and move the truck control handle several times in both directions.

- 1 Remove the sideshifter frame from the truck as described in Section 5.1-1 and lay flat on a pallet or workbench.
- 2 Remove the retainer pins and remove the cylinder assembly from the frame as shown in Section 5.1-3, Step 2.
- 3 Inspect the outside of the cylinder shell for damage that could impair performance or cause leaks under pressure. If damage is found, replace the complete cylinder assembly.  
**IMPORTANT:** Make sure cylinder fittings and flow restrictors are installed correctly, as shown.
- 4 Inspect the cylinder rods for damage. If bent or scored, replace the complete cylinder assembly.
- 5 Inspect the anchor bracket and centering tab for damage. If damage is found, replace the complete cylinder assembly.
- 6 For reassembly, reverse the above procedures with the following exceptions:
  - Use new cylinder retainer roll pins.



## 5.1-5 Rod Seal Replacement

**NOTE:** The sideshifter frame must be removed from the truck to replace the cylinder rod seals.

- 1 Loosen the seal carriers, then remove the sideshifter frame from the truck as described in Section 5.1-1.
- 2 Remove the cylinder assembly from the sideshifter frame as described in Section 5.1-3.
- 3 In a soft jawed vise, clamp the cylinder assembly on the bracket.

**CAUTION:** Do not clamp on the cylinder shell.

- 4 With the cylinder rod centered, unscrew the seal carriers from each end of the cylinder shell. Slide the seal carriers off the cylinder rod.

**NOTE:** If installing new loaded (seals installed) seal carriers, proceed to Step 8 below.

- 5 Use a brass O-ring tool to remove seals and O-rings, as shown.

**CAUTION:** Do not scratch the seal grooves.

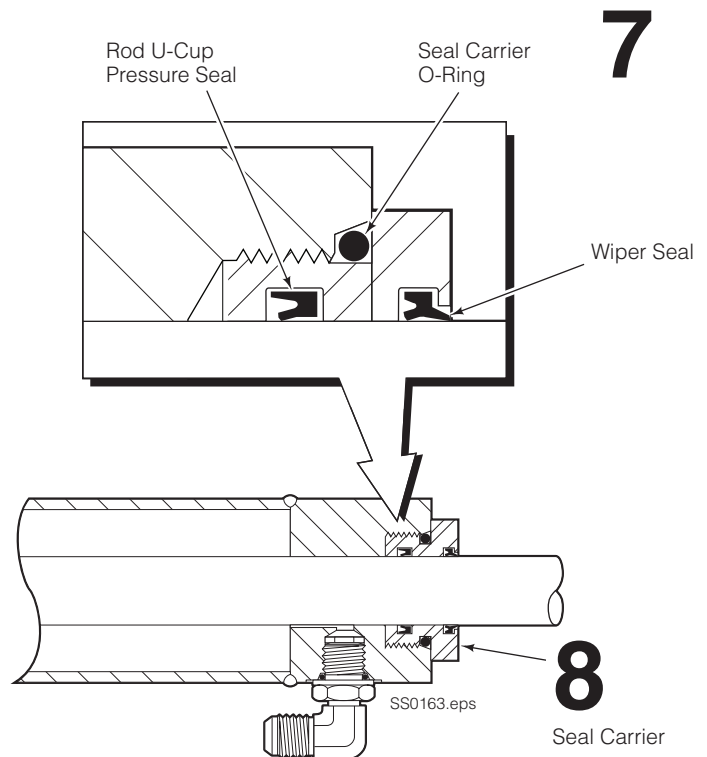
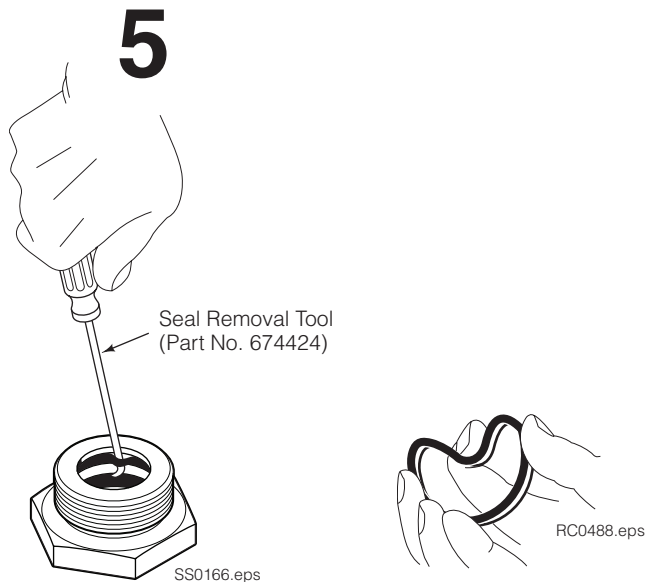
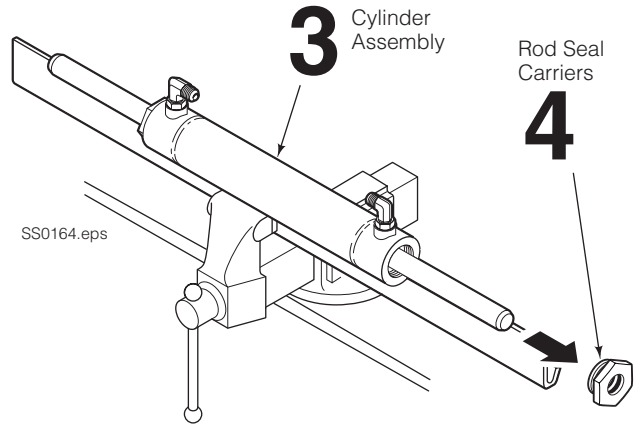
- 6 Clean the seal carrier and cylinder rod with cleaning solvent. Break any sharp edges on the cylinder rod end. Lubricate the new seals and O-rings with petroleum jelly.

- 7 Install the seals into the seal carrier grooves. Form the seals into a 'kidney' shape to ease placement into the bore. Note the direction of the U-cup seals: **Pressure seals are installed with the lip toward the pressure side of the cylinder**, as shown.

- 8 Apply a thick film of petroleum jelly to the inside of the seal carrier and slide onto the cylinder rod. Screw the seal carriers into the cylinder shell.

- 9 For reassembly, reverse the above procedures with the following exceptions:

- After sideshifter frame is mounted on the truck, tighten seal carriers to 170 ft.-lbs. (230 Nm).



## 6.1 Specifications

### 6.1-1 Hydraulics

**Truck Relief Setting**  
 2200 psi (152 bar) Recommended  
 3500 psi (241 bar) Maximum

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**Truck Flow Volume** <sup>①</sup>

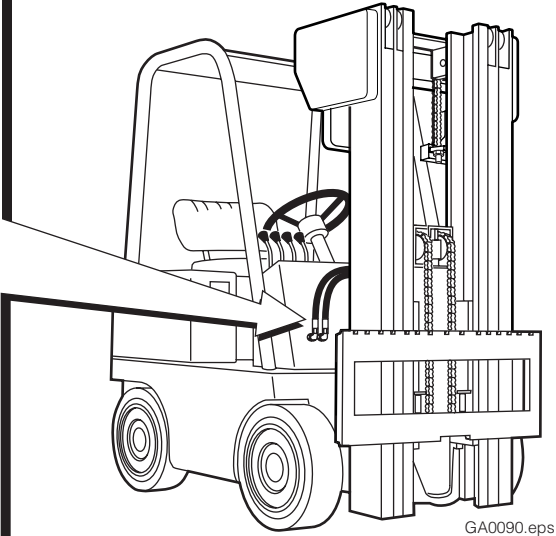
	Min. <sup>②</sup>	Recommended	Max. <sup>③</sup>
<b>55K, 65K</b>	1 GPM (4 L/min.)	2 GPM (7.5 L/min.)	3 GPM (12 L/min.)
<b>100K, 120K, 150K, 165K</b>	1 GPM (4 L/min.)	4 GPM (16L/min.)	5 GPM (20 L/min.)

① Cascade K-Series Fork Positioner/Sideshifters are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.

② Flow less than recommended will result in slow fork positioning speed.

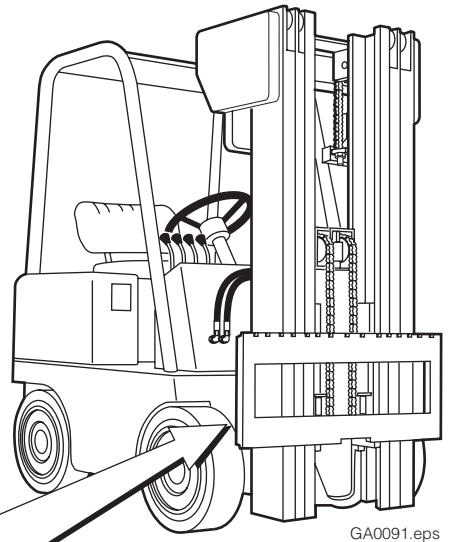
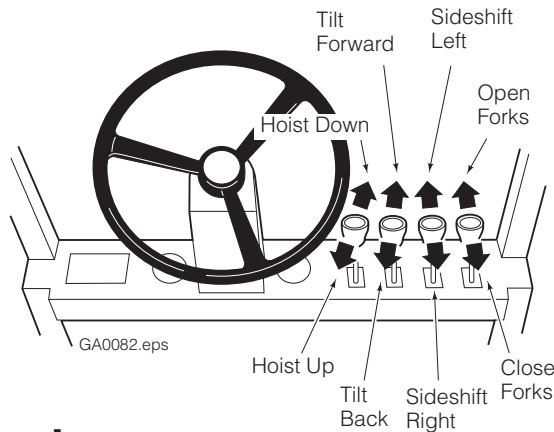
③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

**Supply Hoses and Fittings**  
**Fork Position Function** – No. 4 with 3/16 in. (5 mm) minimum ID  
**Sideshift Function** – No. 6 with 5/16 in. (7 mm) minimum ID



### 6.1-2 Auxiliary Valve Functions

Check for compliance with ANSI (ISO) standards:



### 6.1-2 Truck Carriage

**Carriage Mount Dimension (A) ITA (ISO)**

	Minimum	Maximum
<b>Class II</b>	14.94 in. (380.0 mm)	15.00 in. (381.0 mm)
<b>Class III</b>	18.68 in. (474.5 mm)	18.74 in. (476.0 mm)
<b>Class IV</b>	23.44 in. (595.5 mm)	23.50 in. (597.0 mm)

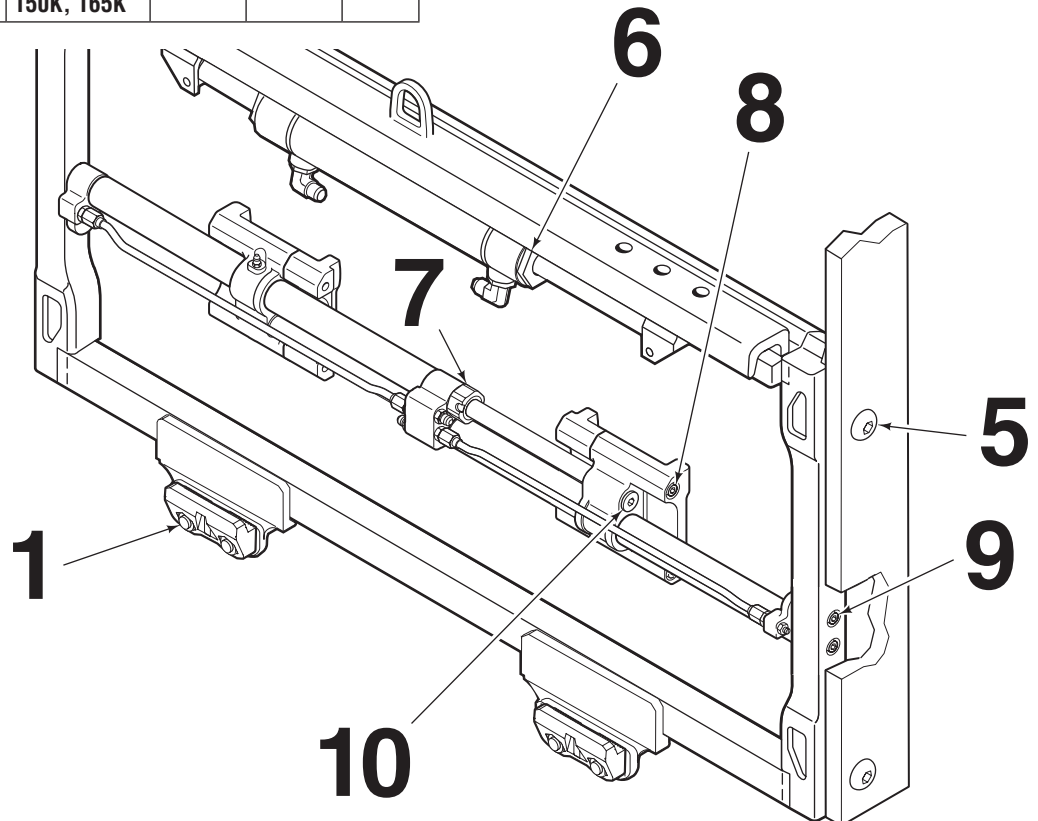
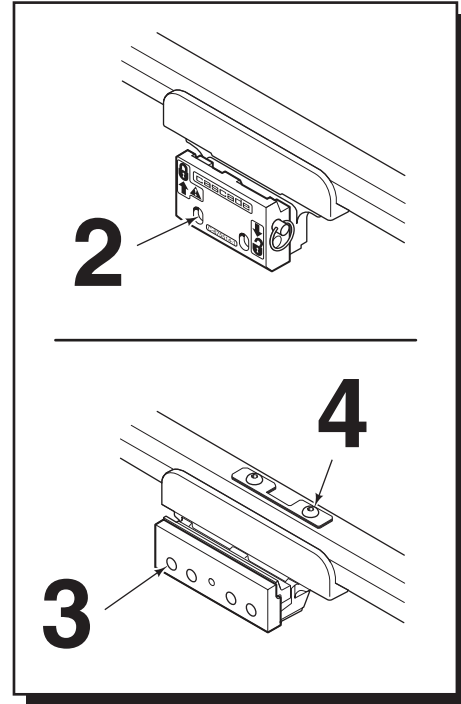
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## 6.1-4 Torque Values

Fastener torque values for the K-Series Fork Positioner/ Sideshifter Assembly are in both US and Metric units shown in the table. All torque values are also called out in each Service Section throughout this manual.

**NOTE:** All fasteners have a torque value range  $\pm 10\%$  of stated value.

Ref.	Fastener Location	Size	Ft.-lbs.	Nm	
1	Bolt-On Lower Hooks with Two Capscrews	Class II/III	M16 5/8 in.	120	165
		Class IV	M20	235	320
2	Quick Disconnect Lower Hook Capscrews	Class II/III	M16	120	165
		Class IV	M20	190	250
3	Bolt-On Lower Hooks with Four Capscrews	M12	65	90	
4	Shim Capscrews	M8	15	20	
5	Backrest Capscrews	M16	145	195	
6	Cylinder Rod Seal Carrier	1-5/16 in.	170	230	
7	Cylinder Retainer	—	120	165	
8	Fork Carrier Capscrews	55K, 65K	M10	25	35
		100K, 120K, 150K, 165K	M12	50	65
9	Mounting Flange Capscrews	55K, 65K	M12	50	65
		100K, 120K, 150K, 165K	M16	120	165
10	Cylinder Rod Anchor Plug	55K, 65K	M20	50	65
		100K, 120K, 150K, 165K	M27	100	135



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**Do you have questions you need answered right now?** Call your nearest Cascade Service Department. Visit us online at [www.cascorp.com](http://www.cascorp.com)

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