

SERVICE MANUAL

B-Series

Integral

Sideshifter

Manual Number 6013089 R-2

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corporation

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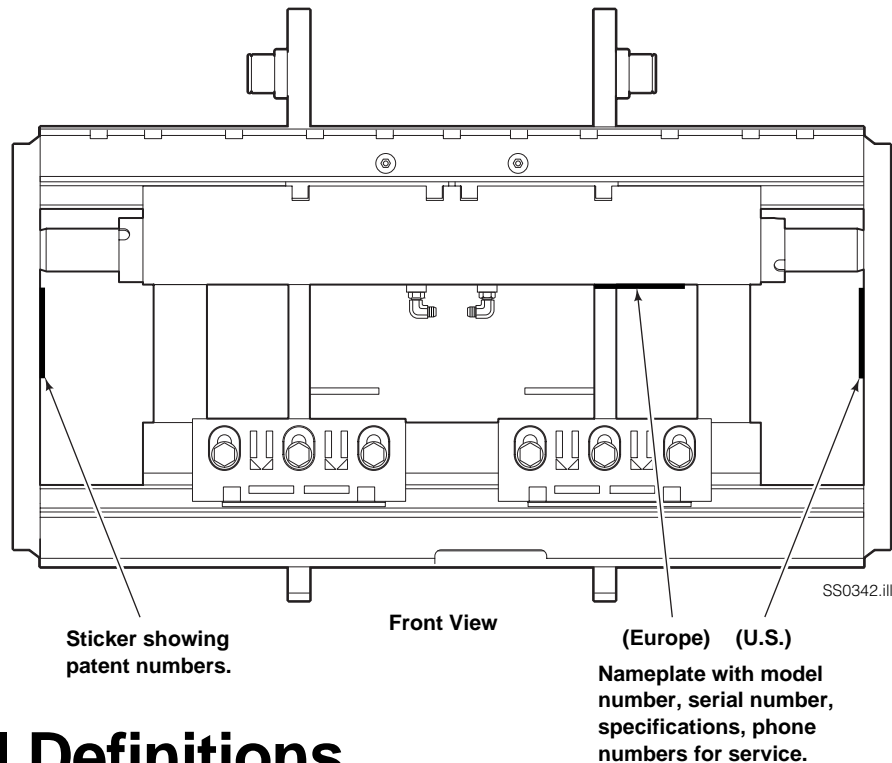
1.1 Introduction

This Manual provides Periodic Maintenance, Troubleshooting, Service and Specifications for B-Series Integral Sideshifters.

In any communication about the Integral Sideshifter, refer to the product I.D. number stamped on the nameplate on the inside surface of the vertical bars (U.S.), or on the underside of the integral cylinder/upper carriage bar (Europe).

IMPORTANT: All hosing and flared fittings on B-Series attachments are JIC as standard, with face seal as an option.

NOTE: Specifications are shown in both U.S. and (Metric) units.



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 the 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 the job easier.



WARNING: After completing any service procedure, always test the Sideshifter through 5 complete cycles. First test empty, then test with a load to make sure the Sideshifter operates correctly before returning it to the job.

2.1

100-Hour Maintenance

Every time the lift truck is serviced or every 100 hours of truck operation, whichever comes first, complete the following Sideshifter maintenance procedures:

- Check for loose or missing bolts, worn or damaged hoses hydraulic leaks, and damaged or missing fork stops.
- Inspect lower hooks for wear and proper clearance. Adjust if necessary (see Section 4.1, Step 6). Tighten lower hook capscrews to 65 ft.-lbs. (88 Nm).

2.2

300-Hour Maintenance

After each 300 hours or 4 weeks of truck operation (whichever occurs first), in addition to the 100-hour maintenance, perform the following procedures:

- Tighten Cascade backrest capscrews to 145 ft.-lbs. (195 Nm). For truck manufacturer's backrest, refer to truck service manual.
- Apply general-purpose lithium-based chassis grease to Sideshifter upper and lower bearings. In contaminated environments lubricate every week or as required.
- Inspect and tighten cylinder retainers if required.

2.3

1000-Hour Maintenance

After each 1000 hours of truck operation, in addition to the 100 and 300-hour maintenance, perform the following procedures.

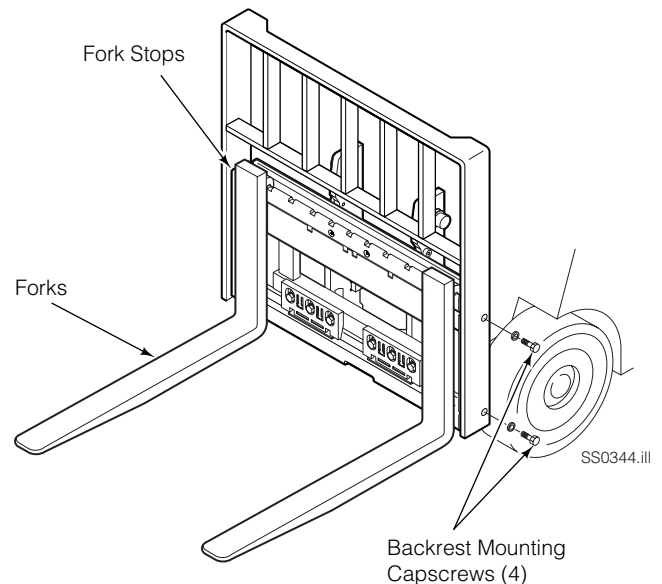
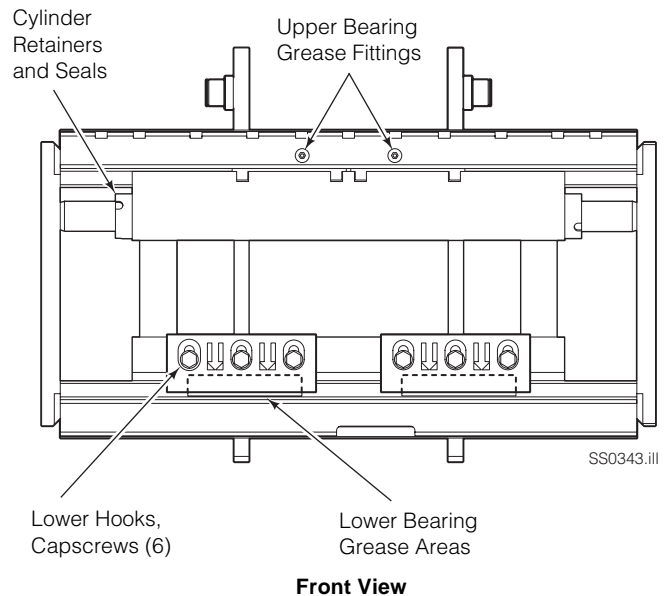
- Inspect thickness of upper and lower bearings. If any bearing in the set is worn to less than 3/32 in. (2.5 mm) thickness, replace entire bearing set (see Section 4.2-2).
- Inspect forks for wear. **NOTE:** Fork Safety Kit 3014162 is available containing wear calipers, inspection sheets and safety poster. Also available is fork hook & carriage wear gauge 209560 (Class II), and 209561 (Class III).

2.4

2000-Hour Maintenance

After each 2000 hours of truck operation, in addition to the 100, 300 and 1000-hour maintenance, perform the following procedures.

- Replace upper and lower bearing sets. See Section 4.2-2.



3.1 General Procedures

3.1-1 Truck System Requirements

- Truck hydraulic pressure should be within the range shown in Specifications, Section 5.1. **PRESSURE TO THE SIDESHIFTER MUST NOT EXCEED 3500 psi (245 bar).**
- Truck hydraulic flow should be within the volume range shown in Specifications, Section 5.1.
- Hydraulic fluid supplied to the Sideshifter must meet the requirements shown in Specifications, Section 5.1.

3.1-2 Tools Required

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

- 20 GPM (80 L/min) inline flow meter. (Cascade Flow Meter Kit, part no. 671477).
- 3000 psi (200 bar) pressure gauge. (Cascade Pressure Gauge Kit, part no. 671212).
- Assorted fittings, lines, drain hoses and quick-couplers as required.

3.1-3 Troubleshooting Chart

Determine All The Facts – It is important to gather all the facts about the problem before beginning any service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction. Guidelines below can then be used as a starting point to begin troubleshooting.

Sideshift Circuit

- Attachment will not sideshift.
- Attachment sideshifts slowly.

To correct these problems, see Section 3.3.

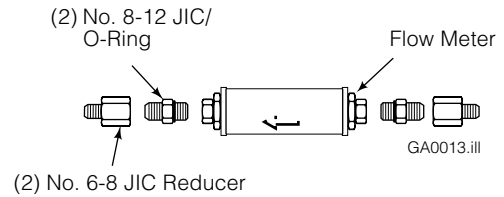


WARNING: Before servicing any hydraulic component, relieve pressure in the Sideshifter system. Turn the truck off and move the truck auxiliary control lever several times in both directions.

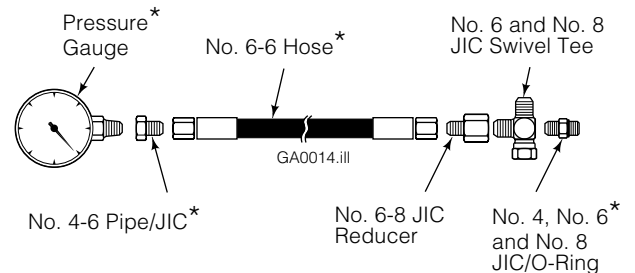
After completing any service procedure, always test the Sideshifter through several cycles. First test empty to bleed any air trapped in the system to the truck tank. Then test with a load to be sure the the unit operates correctly before returning it to the job.

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

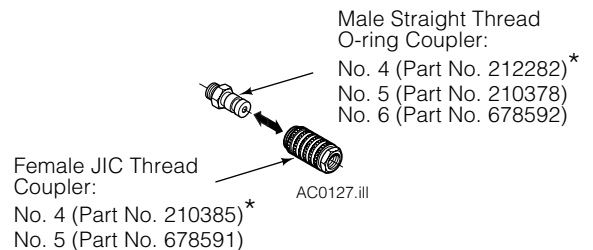
Flow Meter Kit 671477



Pressure Gauge Kit 671212



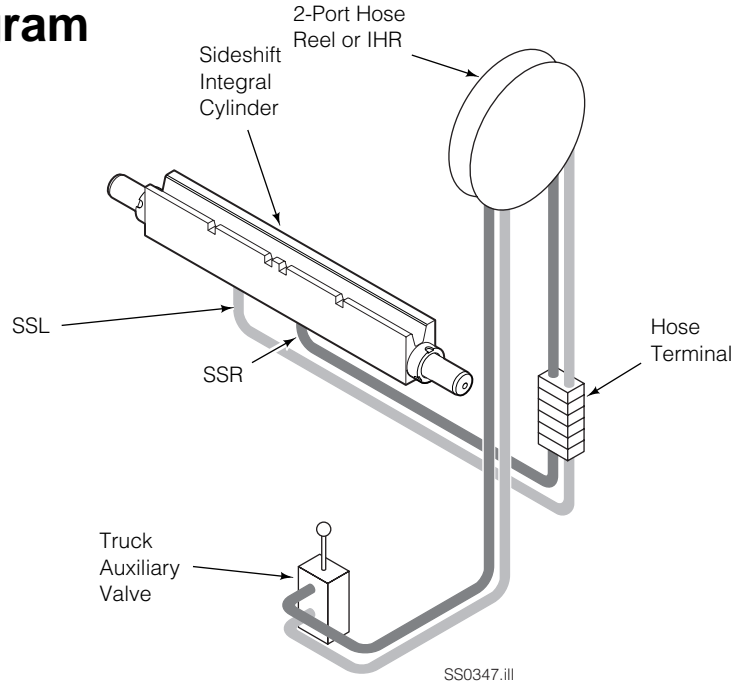
Diagnostic Quick-Disconnects



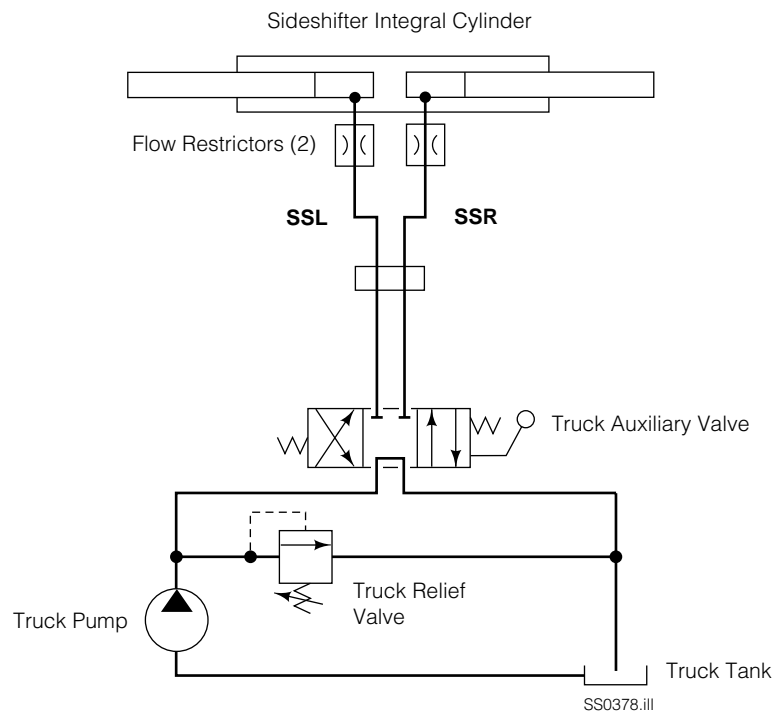
*Included in Diagnostics Kit 394382.

3.2 Plumbing

3.2-1 Hosing Diagram



3.2-2 Hydraulic Schematic



3.3 Sideshift Function

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

- Inadequate bearing lubrication, worn bearings, bent or damaged piston/rods or intergral cylinder/carriage bar (see Section 4.2).
- Incorrect hydraulic pressure or flow from lift truck.
- External leaks.
- Lower mounting hooks installed with incorrect clearance (see Section 4.1 Step 6).
- Worn or defective cylinder seals (see Section 4.3).
- Cylinder fittings or flow restrictors plugged, incorrectly installed, or incorrect type (see Section 4.3).



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.

3.3-2 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 5.1.

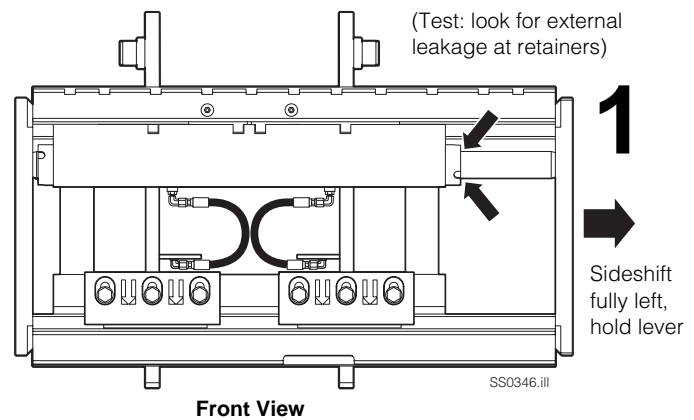
PRESSURE TO THE SIDESHIFTER MUST NOT EXCEED 3500 PSI (245 BAR)

- 2 Check the flow volume at the carriage hose terminal. Flow must be within the range shown in Specifications, Section 5.1.

3.3-3 Cylinder Test


The B-Series Sideshifter uses a combination piston-rod assembly hydraulically sealed at the cylinder retainer. An external leakage check at the retainers is the only hydraulic test required (no internal cylinder seals).

- 1 Sideshift fully to the LEFT and hold the lever for a few seconds. Look for any external leakage at the retainer. Sideshift fully to the RIGHT and repeat the procedure. If any leakage is found, service the piston/rod-retainer assemblies as described in Section 4.
- 2 If no leakage is found, the problem is not hydraulic (see Section 3.3 above)



4.1 Sideshifter Removal

- 1 Remove any attachment or forks from the Sideshifter.
- 2 Backrest may be removed, or left in place to assist in removing frame from carriage. For reassembly tighten the capscrews to 145 ft.-lbs. (195 Nm).



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

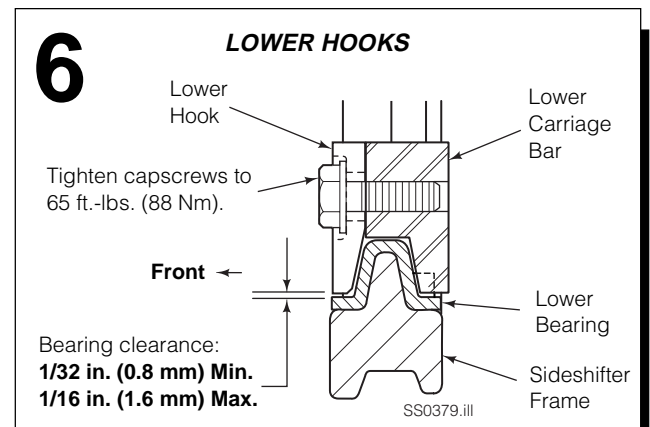
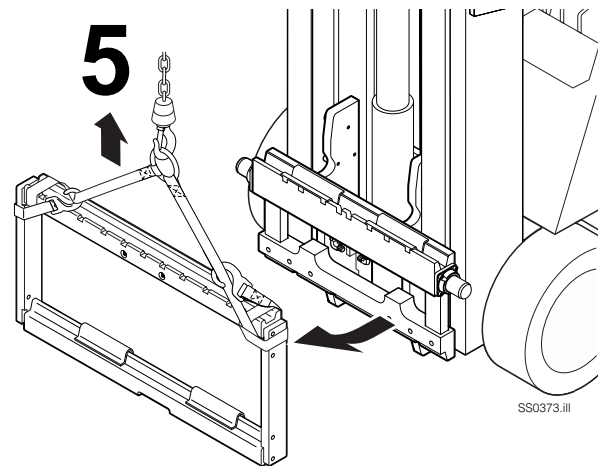
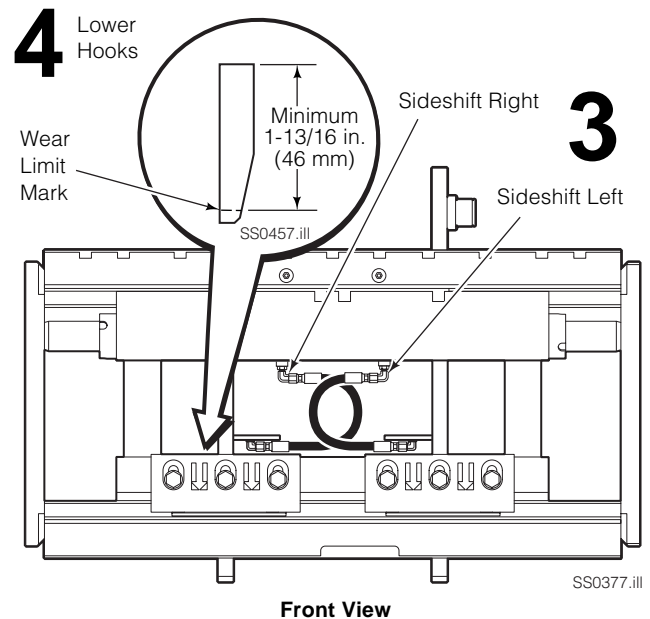
- 3 Disconnect the hoses from the cylinder and tag for reassembly.
- 4 Remove the lower mounting hooks and inspect for wear (see illustration opposite). Replace if beyond wear limit.

- 5 Attach a 1000 lb. (450 kg) capacity overhead hoist and slings to the Sideshifter frame and lift away from the truck carriage.

NOTE: Bearings may remain on the frame or intergral carriage bars.

- 6 For installation, reverse the above procedures with the following exceptions:

- Clean and inspect carriage bars for damage and smoothness. Assure that bars are parallel and that ends are flush. Repair any protruding welds or damaged notches.
- Clean all bearing areas of built-up dirt and grease.
- Inspect Sideshifter bearings for wear and replace if necessary (see Section 4.2-2).
- 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 bearings with general-purpose lithium-based chassis grease.



4.2 Bearings

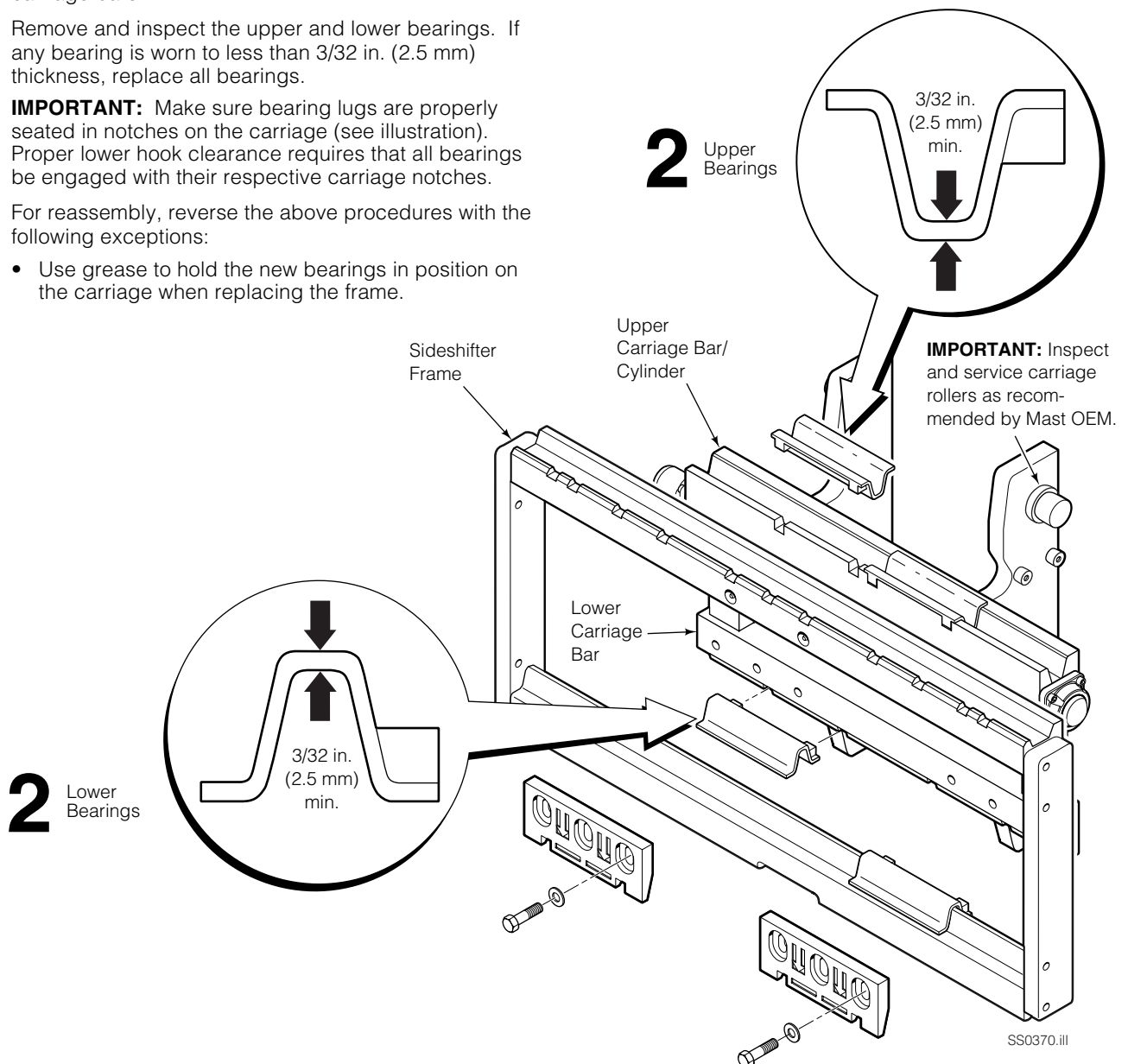
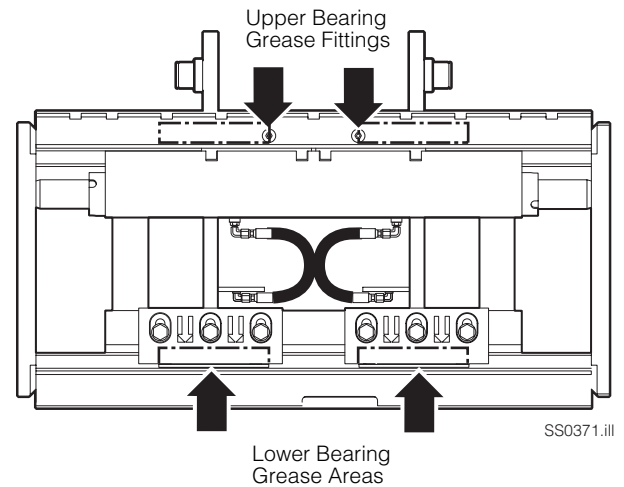
4.2-1 Bearing Lubrication

Lubricate both the upper and lower Sideshifter bearings with chassis grease every 300 hours or 4 weeks of operation (whichever occurs first). In contaminated environments lubricate every week or as required.

4.2-2 Bearing Service

- 1 Remove the Sideshifter frame from the truck carriage as described in Section 4.1. **NOTE:** Sideshifter bearings may remain on the frame or on the intergral carriage bars.
- 2 Remove and inspect the upper and lower bearings. If any bearing is worn to less than 3/32 in. (2.5 mm) thickness, replace all bearings.

IMPORTANT: Make sure bearing lugs are properly seated in notches on the carriage (see illustration). Proper lower hook clearance requires that all bearings be engaged with their respective carriage notches.
- 3 For reassembly, reverse the above procedures with the following exceptions:
 - Use grease to hold the new bearings in position on the carriage when replacing the frame.



4.3 Cylinder

4.3-1 Inspection and Service

IMPORTANT: The B-Series Integral sideshift cylinder is integral with the upper carriage bar. If the cylinder is damaged, the carriage must be removed from the mast and repaired or replaced. Refer to mast manufacturer's Service Manual. The cylinder may be resealed and the piston/rods replaced with the unit on the truck (see Section 4.3-2 below).

4.3-2 Piston/Rod, Seal Replacement

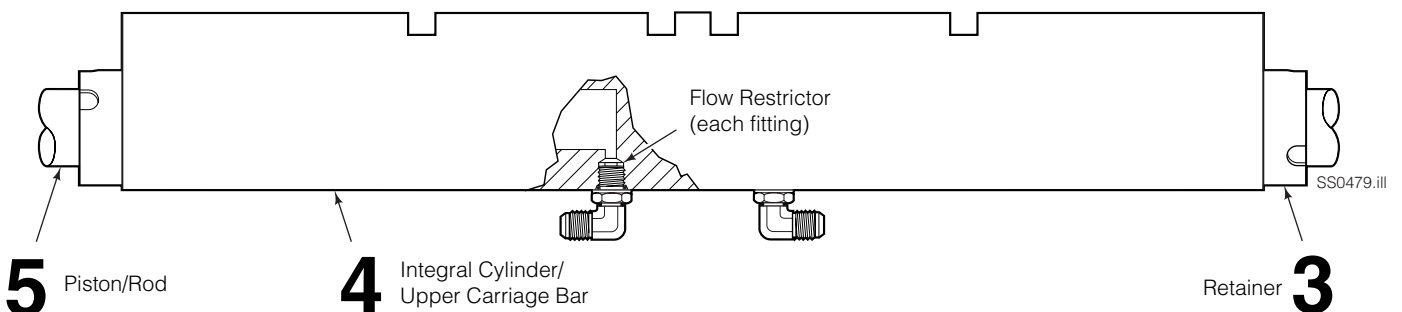
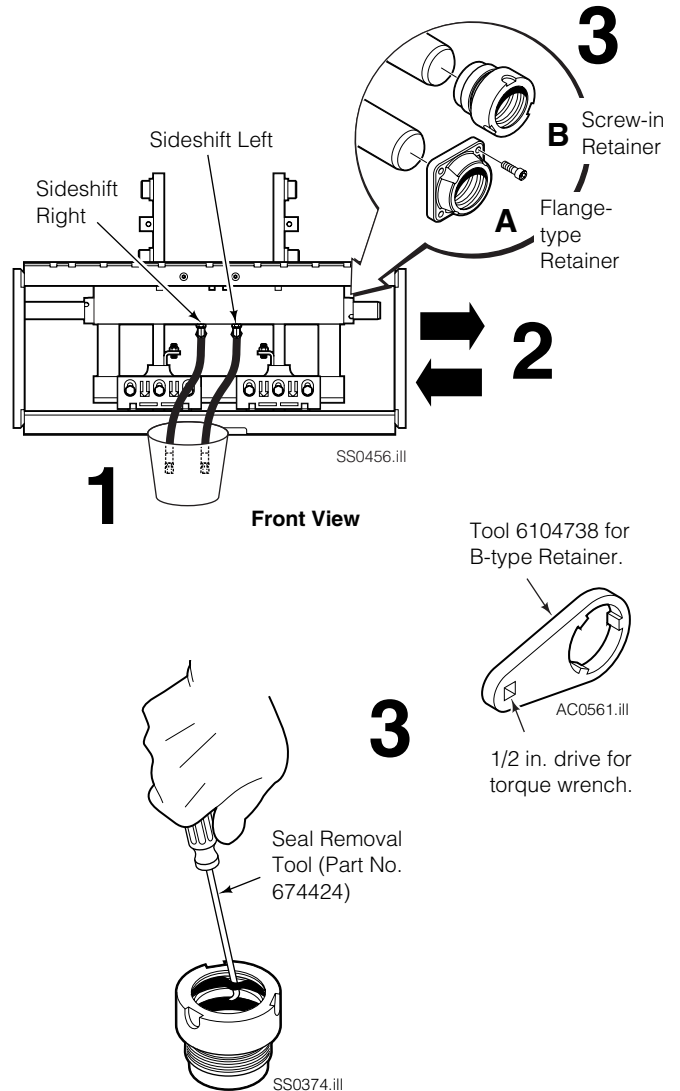
NOTE: The combination piston/rod, seals and piston/rod bearings may be replaced without removing the sideshifter frame. Attachment or fork removal may be necessary for working clearance.

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

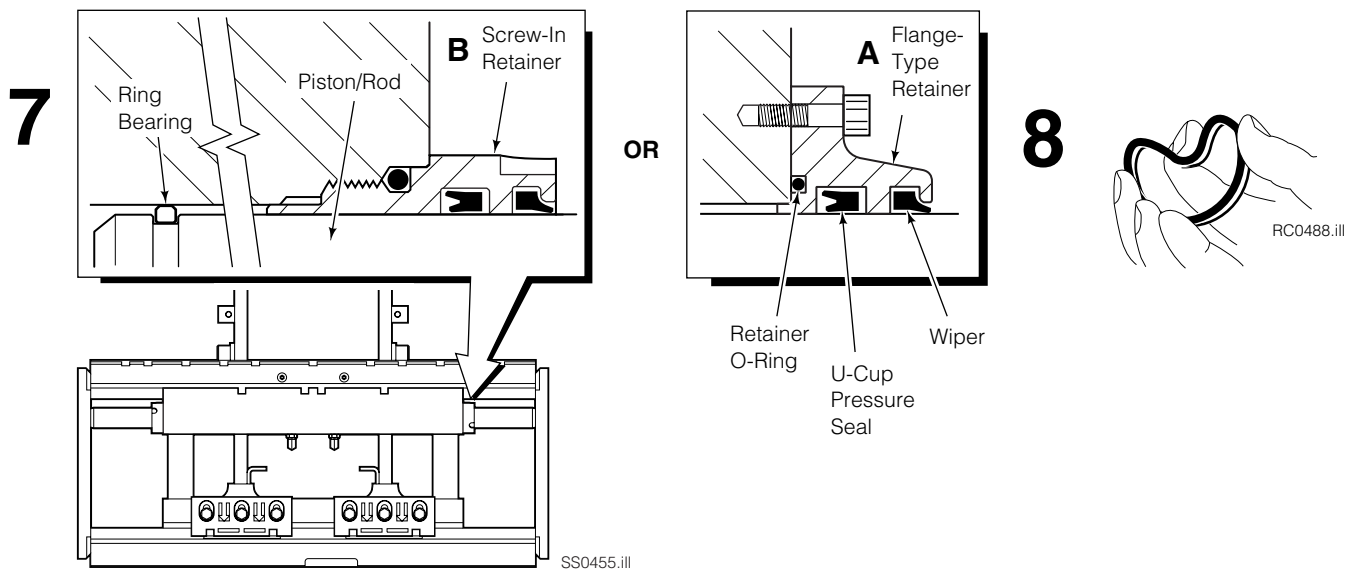
- 1 Disconnect both hoses at the carriage terminal fittings and route into a drain bucket.
- 2 Manually slide the sideshifter frame fully each way to purge the cylinder chambers of hydraulic fluid.
- 3 Remove the retainers, piston/rods and seals.

NOTE: Do not scratch retainer seal grooves.
Special tools available for this procedure include:

 - Retainer Wrench 6104738.
 - Seal Removal 674424.
- 4 Inspect the outside of the cylinder for damage that could impair performance or cause leaks under pressure. If damage is found, the entire carriage assembly must be repaired or replaced (see Mast manufacturer's Service Manual).
- 5 Inspect the piston/rods for scoring or damage and replace as necessary. If the piston/rods have damaged the cylinder, the entire carriage assembly must be repaired or replaced (see Mast manufacturer's Service Manual).



- 6 Clean the retainer and piston/rod with cleaning solvent. Break any sharp edges on the piston/rod end to prevent damage to the seals during installation.
- 7 Install the ring bearing on the piston/rod. Use petroleum jelly to hold the bearings in place and install the piston/rod into the cylinder chamber.
- 8 Lubricate the seals and O-rings with petroleum jelly and install into the retainer. Form the seals into a 'kidney' shape to ease placement into the retainer bore. Note the direction of the U-cup seals: **Pressure seals are installed with the lip toward the pressure side of the cylinder** (see illustration below).



- 9 For reassembly, reverse the above procedures with the following exceptions:
 - Assure retainer O-rings are in place and tighten retainers as follows:
 - Flange-type Retainer (Type A)** – Tighten capscrews to 7.5 in.-lbs. (10 Nm).
 - Screw-in Retainer (Type B)** – Use special tool 6104738 (see illustration) and tighten retainer to 175 ft.-lbs. (235 Nm).

5.1 Specifications

5.1-1 Hydraulics

Truck Relief Setting

2300 psi (160 bar) Recommended
3500 psi (245 bar) Maximum

Truck Flow Volume ^①

	Min. ^②	Recommended	Max. ^③
35B, 50B	1 GPM (4 L/min.)	2 GPM (7.5 L/min.)	3 GPM (12 L/min.)

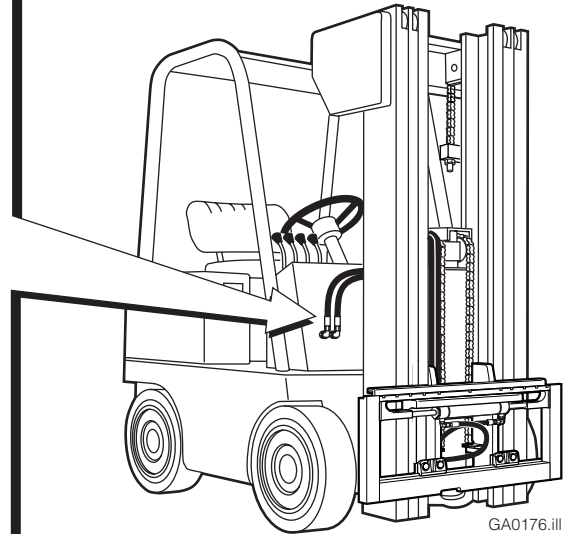
① Cascade Integral Sideshifters are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.

② Flow less than recommended will result in slow sideshift speed.

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

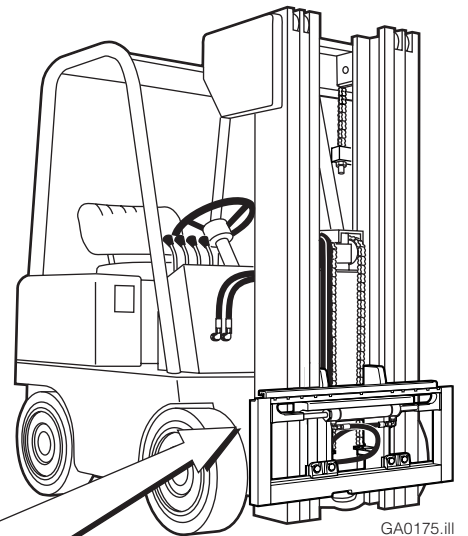
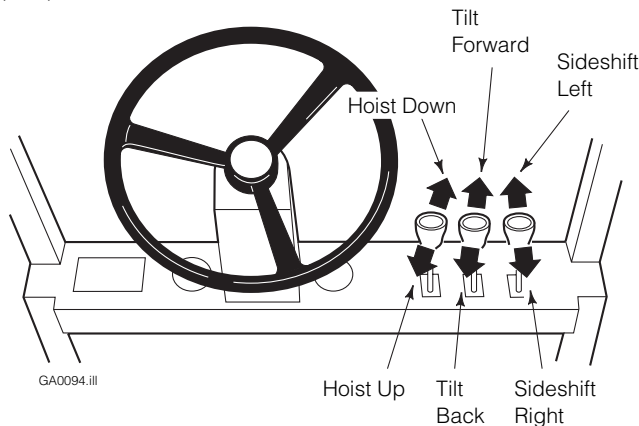
Hoses and Fittings

All supply hoses and fittings should be at least No. 4 with 3/16 in. (5 mm) minimum I.D.



5.1-2 Auxiliary Valve Functions

Check for compliance with ITA (ISO) standards:



5.1-3 Truck Carriage

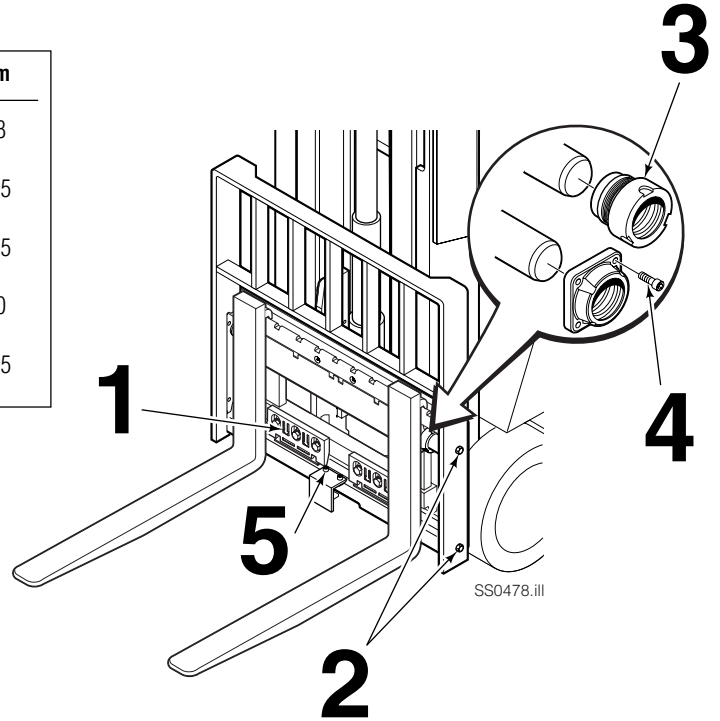
A	Carriage Mount Dimension (A) ITA (ISO)	
	Minimum	Maximum
Class II	14.94 in. (380.0 mm)	15.00 in. (381.0 mm)
Class III	18.68 in. (474.5 mm)	18.74 in. (476.0 mm)

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5.1-4 Torque Values

Fastener torque values for the B-Series Integral Sideshifter are shown in the table below in both U.S. and Metric units. All torque values are also called out in each service section throughout the Manual.

Ref.	Fastener	Size	Ft.-lbs.	Nm
1	Lower hook-to-frame, Class II (6)	M-12	65	88
2	Backrest-to-frame, Class II (4)	M-16	145	195
3	Screw-type Retainer (2)	---	175	235
4	Flange-type Retainer (8)	M6	7.5	10
5	Pallet Guard-to-frame (2)	M-16	145	195



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