SERVICE MANUAL

E-Series

Sideshifter

Manual Number 205849 R-3

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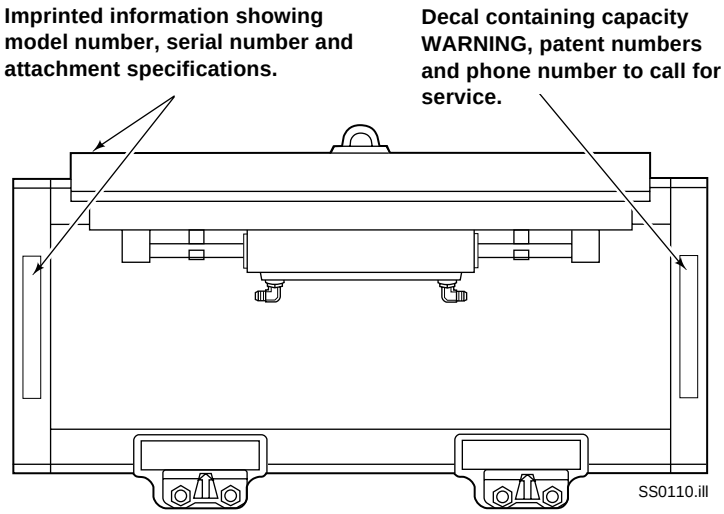
1.1 Introduction

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

In any communication about the Sideshifter, refer to the product I.D. number stamped on the back surface of the left vertical bar (driver's view) as shown.

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

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



Back (Driver's) View

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.

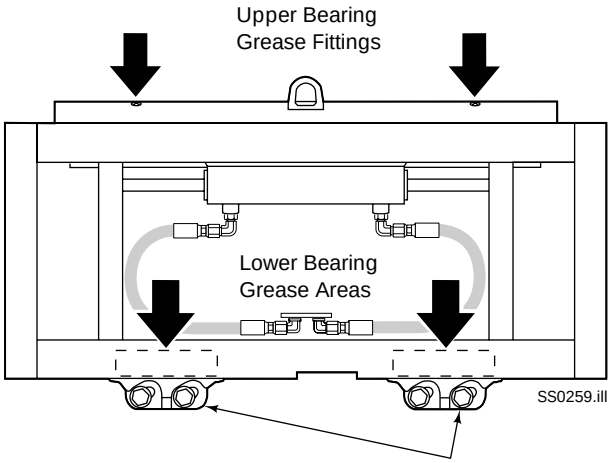
NOTE – A statement preceded by NOTE is information that is handy to know and may make the job easier.

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 attachment 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 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 7). Use a torque wrench and tighten lower hook capscrews to 120 ft.-lbs. (165 Nm).**



Front (Driver's) View

2.2 500-Hour Maintenance

After each 500 hours or 4 weeks of truck operation (whichever occurs first), in addition to the 100-hour maintenance, perform the following procedures:

- Tighten backrest capscrews (Cascade) 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.

2.3 1000-Hour Maintenance

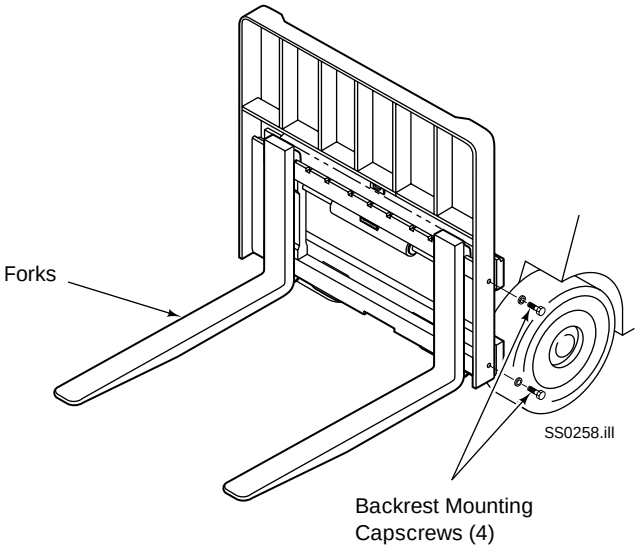
After each 1000 hours of truck operation, in addition to the 100 and 500-hour maintenance, perform the following procedures.

- Inspect thickness of upper and lower bearing. 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 (Use Cascade fork bar wear gauge 209560 and fork wear calipers 686093).

2.4 2000-Hour Maintenance

After each 2000 hours of truck operation, in addition to the 100, 500 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.

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

After completing any service procedure, always 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.

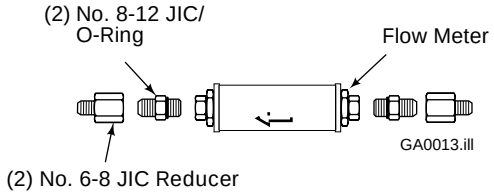
Stay clear of the load while testing. Do not raise the load more than 4 in. (10 cm) off the floor while testing.

3.1-2 Tools Required

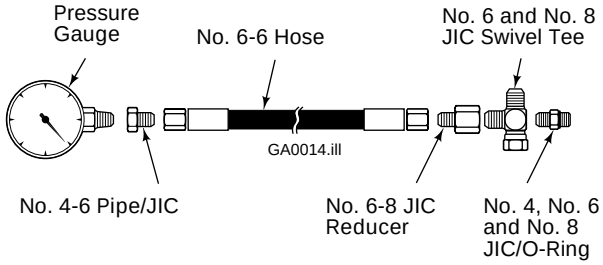
In addition to a normal selection of hand tools, the following are required:

- 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.

Flow Meter Kit 671477



Pressure Gauge Kit 671212



3.1-3 Troubleshooting Chart

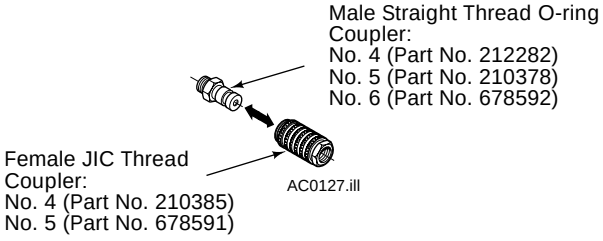
Determine All The Facts – It is important to gather all the facts about the problem before beginning any service procedures. The first step is to talk to the equipment operator. Ask for a complete description of the malfunction. Guidelines below can then be used as a starting point to begin troubleshooting.

Sideshift Circuit

- Attachment will not sideshift.
- Attachment sideshifts slowly.

To correct these problems, see Section 3.3.

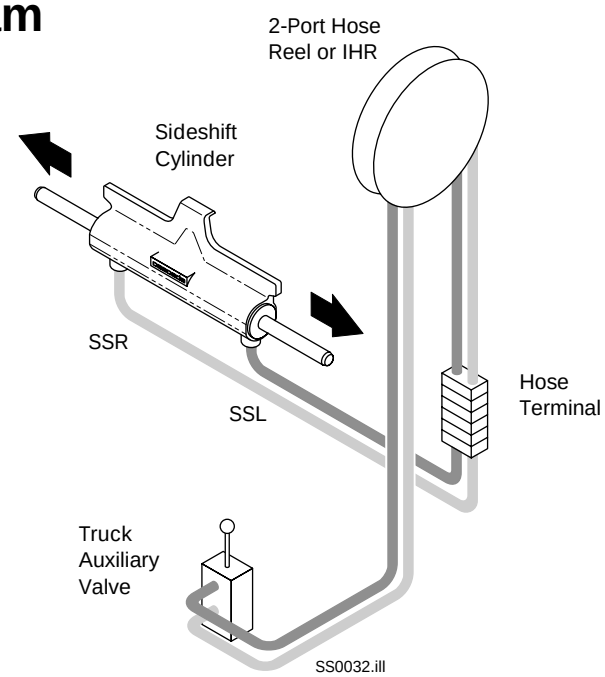
Diagnostic Quick-Disconnects



NOTE: Diagnostics Kit 394382 includes all of the above.

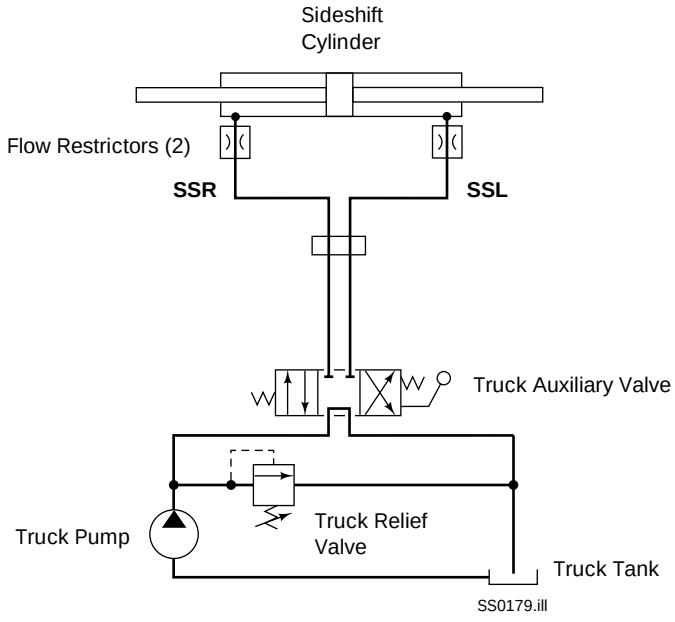
3.2 Plumbing

3.2-1 Hosing Diagram



	SIDESHIFT LEFT	SIDESHIFT RIGHT
Pressure:	▬▬▬	▬▬▬
Return:	▬▬▬	▬▬▬

3.2-2 Hydraulic Schematic



3.3 Sideshift Function

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

- Inadequate upper bearing lubrication or worn bearings (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, incorrect type, or not installed properly (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.

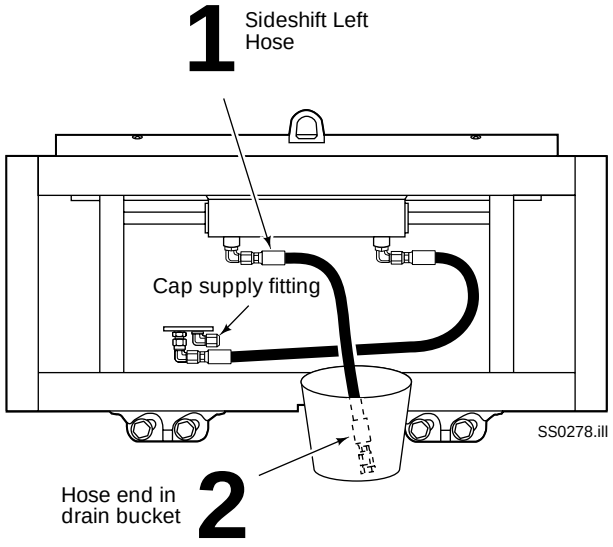
3 Sideshift fully to the left and hold the lever in the SIDESHIFT LEFT position for a few seconds. Release the lever and check for external leaks at fittings, hoses and cylinder rod ends.

3.3-3 Sideshift Circuit Test

1 Sideshift fully to the 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.

2 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 seals are defective and require service. Refer to Section 4.4-2.
- If there is **no hydraulic flow** out of the hose, check for plugged or incorrectly-installed flow restrictor washers and fittings. If there is still no hydraulic flow, the problem is not hydraulic (see Section 3.3)



Front View

4.1 Sideshifter Removal

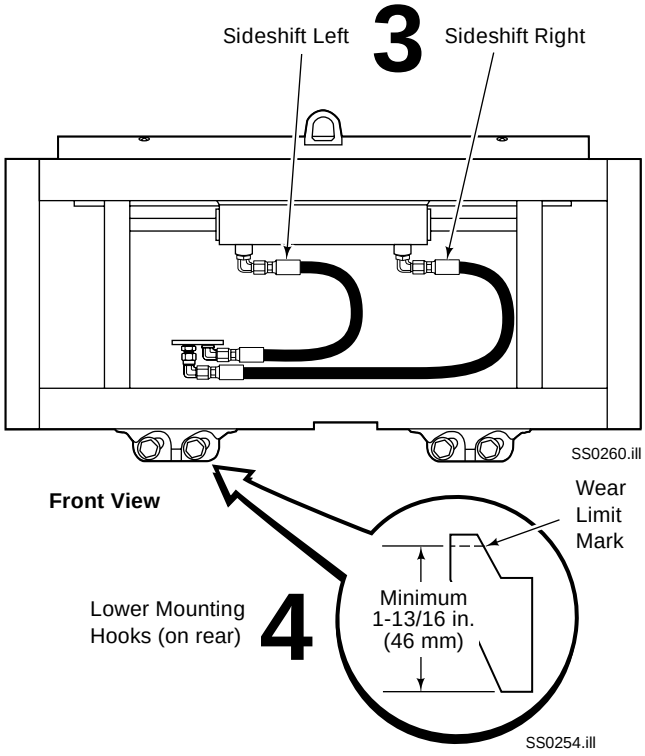
1 Remove the forks from the Sideshifter.

2 Remove the backrest from the Sideshifter. For reassembly (Cascade backrests), tighten the capscrews to 145 ft.-lbs. (195 Nm). 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 the hoses from the cylinder. Tag hoses for reassembly.

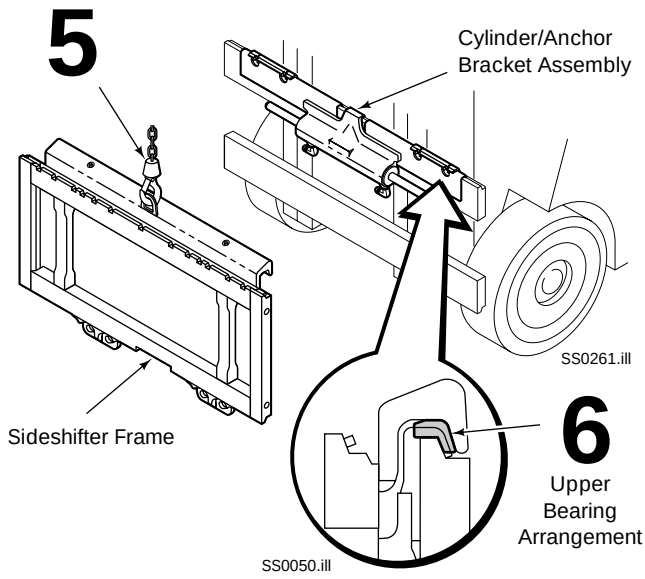
4 Remove the lower mounting hooks and inspect for wear (see illustration opposite). Replace if beyond wear limit.

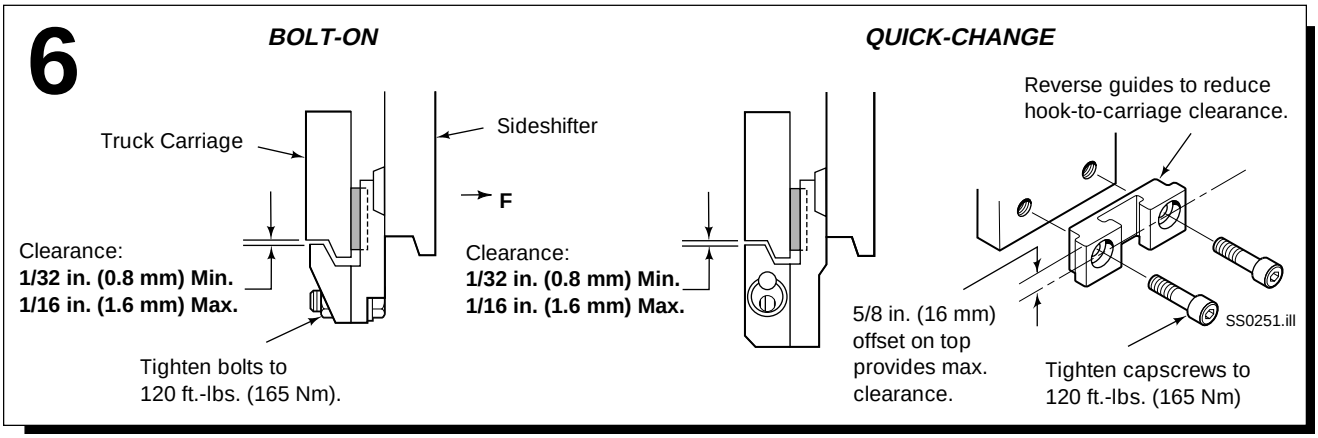


5 Attach a 1000 lb. (450 kg) capacity overhead hoist to the Sideshifter frame and lift away from the truck carriage. The anchor bracket/cylinder assembly will remain on the truck carriage.

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 by grinding, filing or welding.
- Clean all bearing areas of built-up dirt and grease.
- Inspect Sideshifter bearings for wear and replace as necessary (see Section 4.2-2).
- Install and adjust lower hooks as shown below. **CAUTION:** Lower hook clearance must be adjusted as shown for proper sideshifter operation.
- Lubricate both upper and lower Sideshifter bearings with general-purpose lithium-based chassis grease.

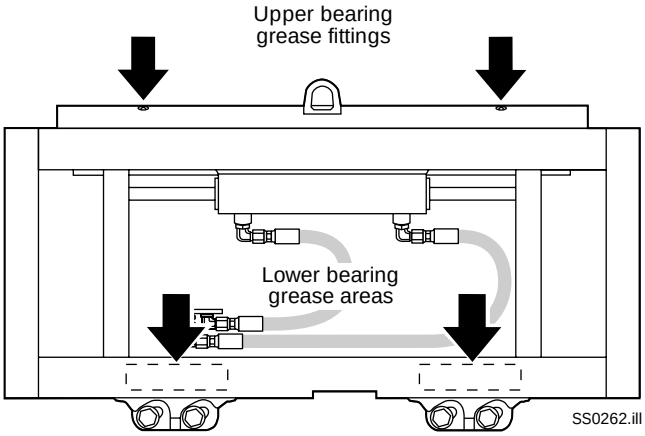




4.2 Bearings

4.2-1 Bearing Lubrication

Lubricate both the upper and lower Sideshifter bearings with general-purpose lithium-based chassis grease every 500 hours of operation. **NOTE:** 60E/100E models must be sideshifted to expose the grease fittings.



4.2-2 Bearing Service

1 Remove the Sideshifter from the truck as described in Section 4.1.

2 Remove and inspect the upper bearings. If either bearing is worn to less than 1/16 in. (1.5 mm) thick on the back surface, replace both bearings.

3 Measure the **exposed thickness** of the lower bearings. If less than 1/16 in. (1.6 mm), replace both bearings.

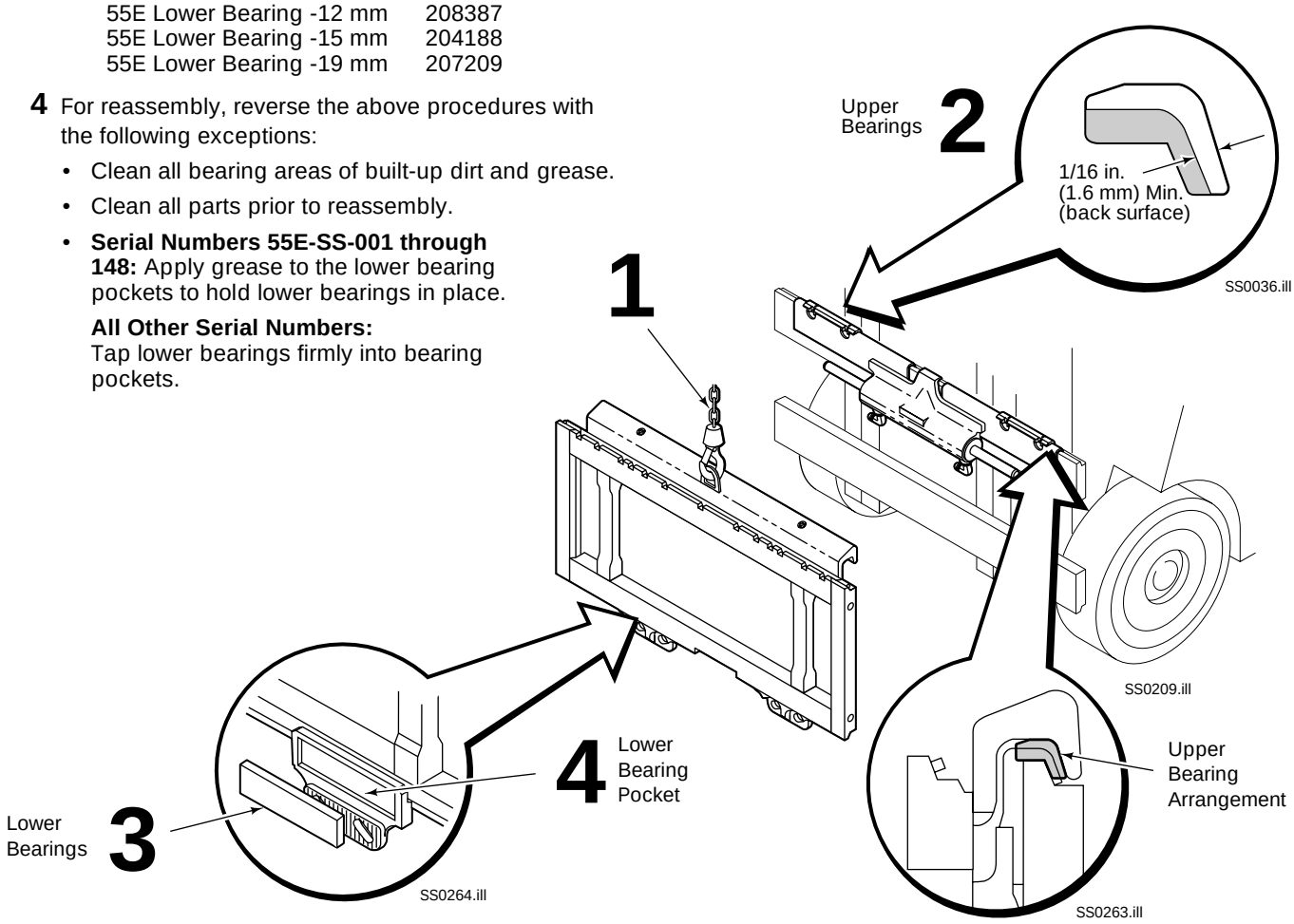
NOTE: Sideshifter serial numbers 55E-SS-001 through 148 use 12 mm-thick lower bearings or optional 15 mm -thick bearings. Serial numbers 55E-SS-149 and higher use 19 mm-thick lower bearings. 55E lower bearing part numbers are listed below.

55E Lower Bearing -12 mm	208387
55E Lower Bearing -15 mm	204188
55E Lower Bearing -19 mm	207209

4 For reassembly, reverse the above procedures with the following exceptions:

- Clean all bearing areas of built-up dirt and grease.
- Clean all parts prior to reassembly.
- **Serial Numbers 55E-SS-001 through 148:** Apply grease to the lower bearing pockets to hold lower bearings in place.

  All Other Serial Numbers:
  Tap lower bearings firmly into bearing pockets.



4.3 Cylinder

4.3-1 Cylinder Removal

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

1 Disconnect the hoses from the cylinder ports.

2 Remove the lower mounting hooks.

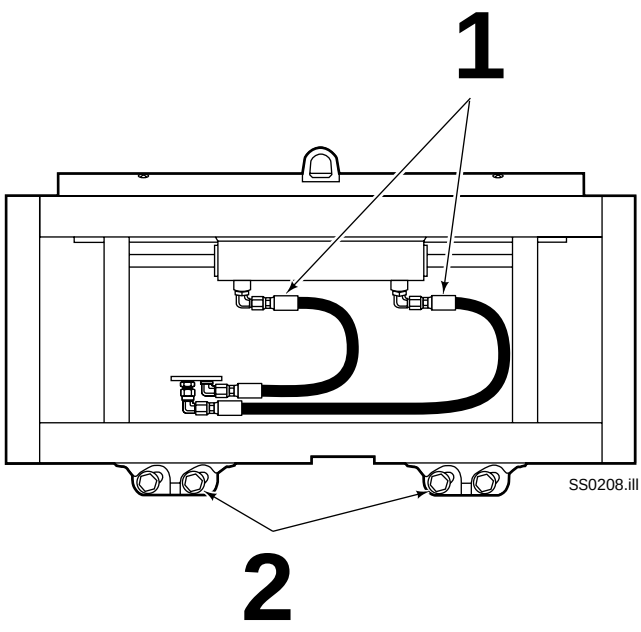
3 Attach a suitable overhead hoist to the sideshifter carriage. Remove the carriage from the truck. The anchor bracket/cylinder assembly will remain on the truck carriage.

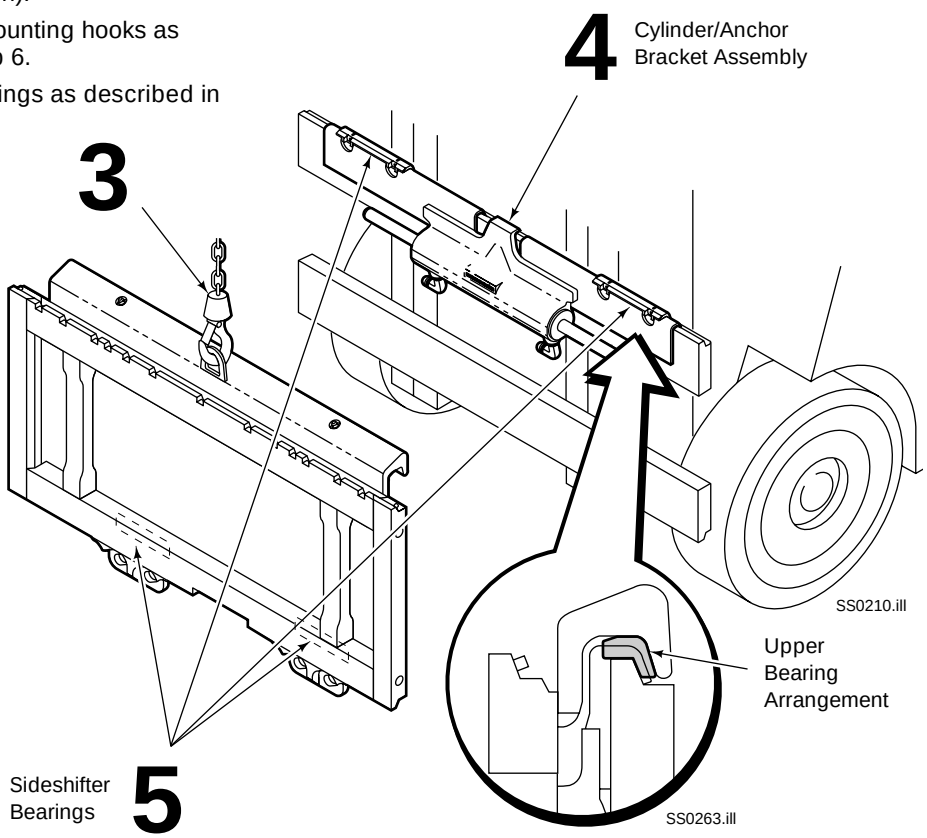
4 Remove the anchor bracket/cylinder assembly from the truck carriage. Service the cylinder as described in Section 4.4.

5 Inspect the sideshifter bearings for wear as described in Section 4.2-2, Steps 2, 3 and 4.

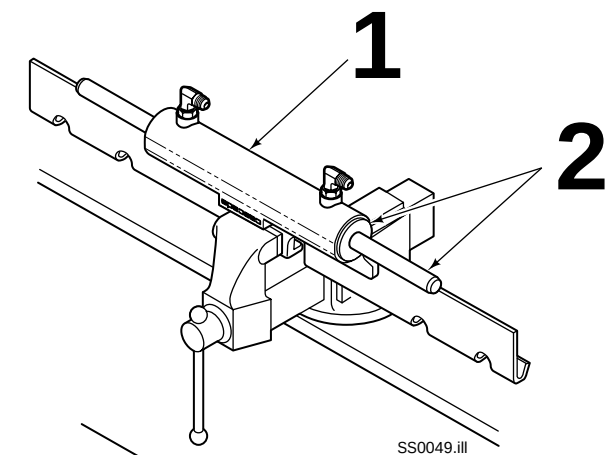
6 For reassembly, reverse the above procedures with the following exceptions:

- Clean the upper hook and lower bearing pockets of any built-up dirt and grease.
- Clean all parts prior to reassembly.
- Locate the upper bearings correctly in the anchor bracket cutouts (see illustration).
- Install and adjust the lower mounting hooks as described in Section 4.1, Step 6.
- Lubricate the Sideshifter bearings as described in Section 4.2-1





4.3-2 Cylinder Disassembly



1 Clamp the cylinder/anchor bracket assembly in a soft-jawed vise. Do not clamp on the cylinder shell.

2 Center the cylinder rod in the cylinder. Remove the spiral snap rings from the retainers (see illustration).

3 Tap the retainers into the shell approximately 2 in. (50 mm). Remove the retaining rings by prying one end up and working the ring out of the groove.

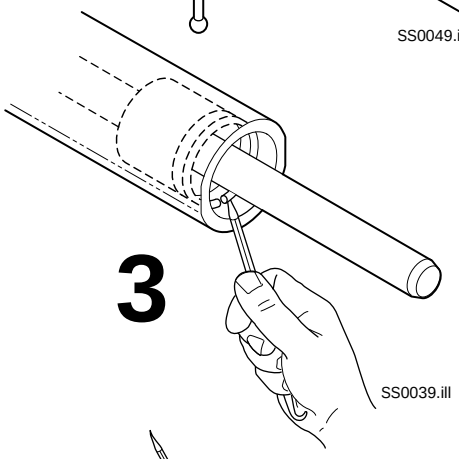
Service Tool Kit 674424 includes two double-ended brass tools that make seal and retaining ring removal easy and won't damage the cylinder components with nicks or scratches.

CAUTION: Do not scratch the cylinder bore.

4 Remove the rod assembly from the cylinder. See the illustration below.

5 Clamp the rod assembly in a soft-jawed vise or between two blocks of wood to remove the seals. Pry the seals up with a brass tool. Cut to remove.

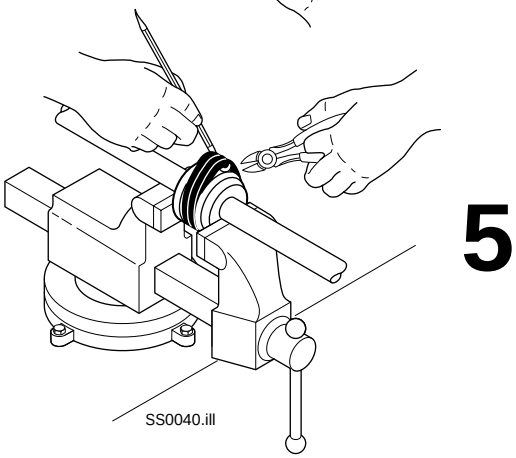
CAUTION: Do not scratch the seal grooves.

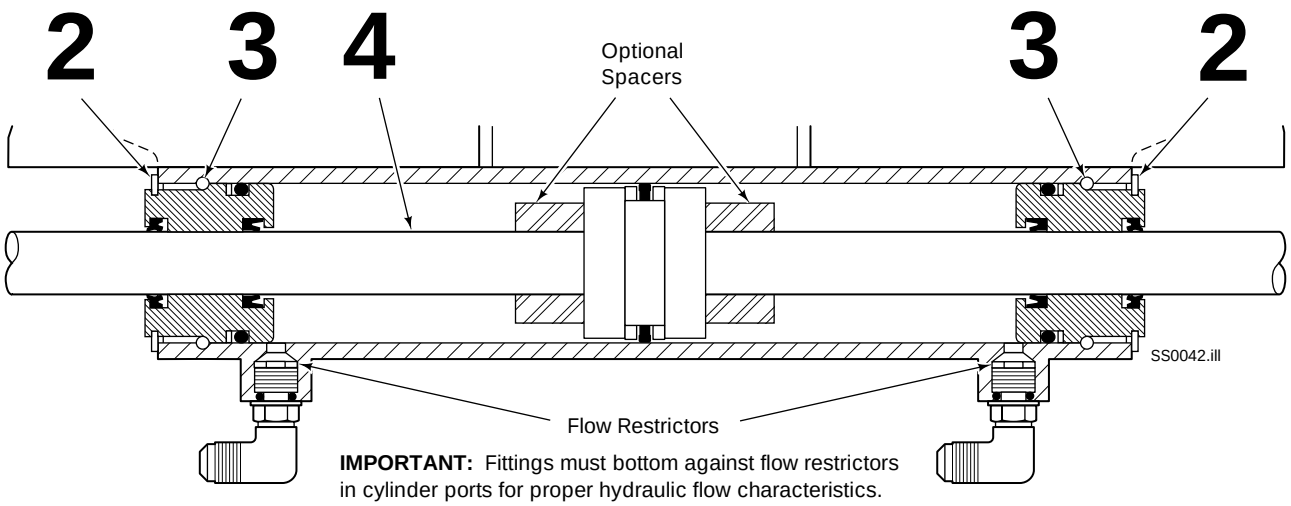


4.3-3 Cylinder Inspection

- Inspect all components for nicks or burrs. Minor nicks or burrs can be removed with 400-grit emery cloth.

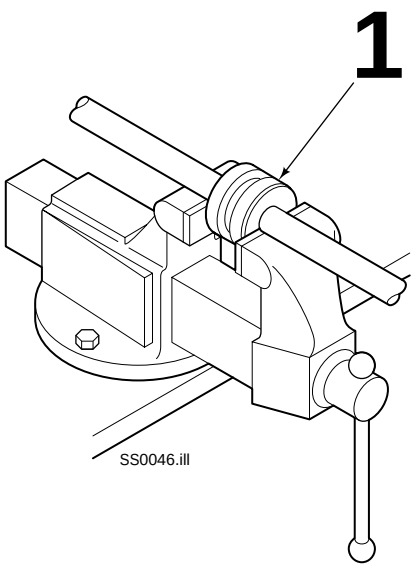
  NOTE: Minor nicks are those that will not bypass oil under pressure. If nicks cannot be removed with emery cloth, replace the part.
- Inspect the outside of the shell for deformities that could weaken the shell's performance when under pressure. Replace if necessary.
- Make sure the cylinder fittings and flow restrictors are the correct type and are installed as shown.





IMPORTANT: Fittings must bottom against flow restrictors in cylinder ports for proper hydraulic flow characteristics.

4.3-4 Cylinder Reassembly



1 Polish the piston and retainer chamfer angle with emery cloth. This allows the seals to slide over the chamfer easier.

2 Wash all components with cleaning solvent. Lubricate all new seals and rings with petroleum jelly or STP.

3 **Note the direction of the U-cup seals**. If the seals are installed backward they will not work properly. For proper seal placement see the illustration below.

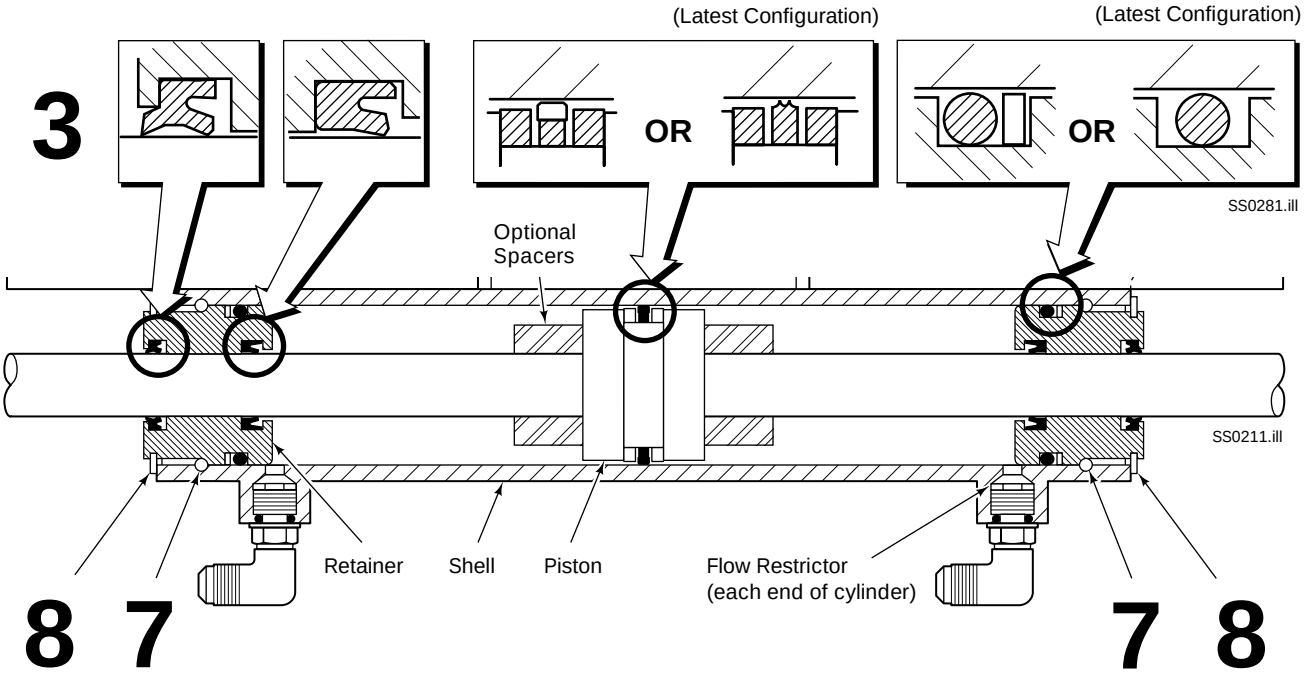
4 Install the new seals on the piston and retainer. Hook one side of the seal in the groove and push it over the piston or retainer.

5 Apply a thick film of petroleum jelly or STP to the inside of the cylinder shell, piston seals and retainers.

6 Insert the rod assembly into the cylinder shell. If resistance is encountered, tap the rod end with a rubber mallet.

7 Tap the retainers into the shell far enough to install the retaining rings in their grooves.

8 Pull the rod out to one side to the fully extended position. This will position the retainer so the spiral snap ring can be installed. Repeat for the retainer on the other end.



5.1 Specifications

5.1-1 Hydraulics

Truck Relief Setting

2300 psi (160 bar) Recommended
3500 psi (240 bar) Maximum

Truck Flow Volume ①

	Min. ②	Recommended	Max. ③
55E, 60E	1 GPM (4 L/min.)	2 GPM (7.5 L/min.)	3 GPM (12 L/min.)
100E	1 GPM (4 L/min.)	4 GPM (15 L/min.)	5 GPM (19 L/min.)

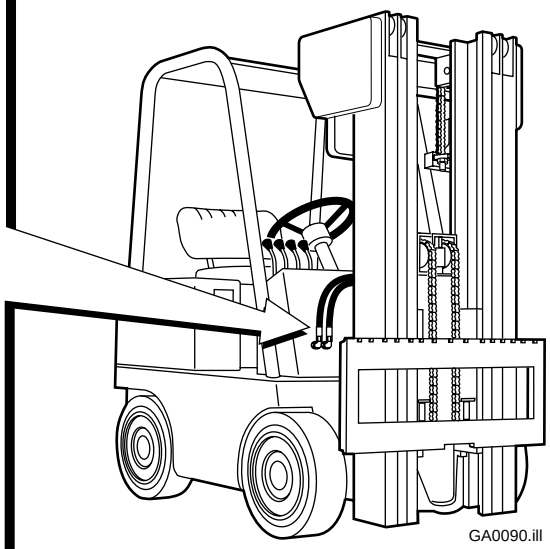
① Cascade E-Series Sideshifters are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals may be required. Contact Cascade.

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.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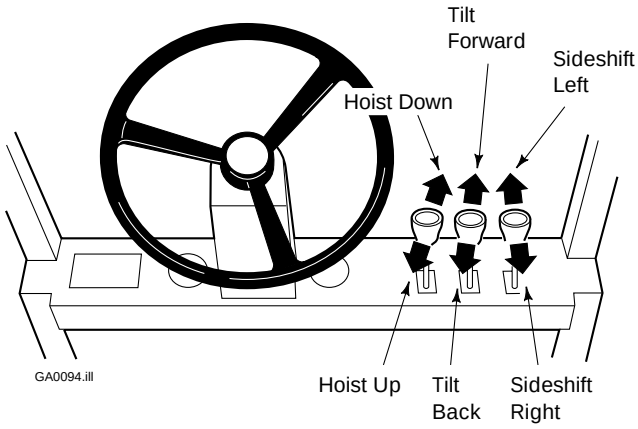
5.1-2 Auxiliary Valve Functions

Check for compliance with ITA (ISO) standards:



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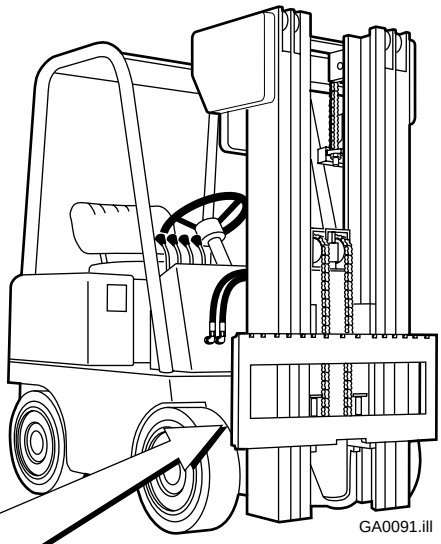
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5.1-3 Truck Carriage

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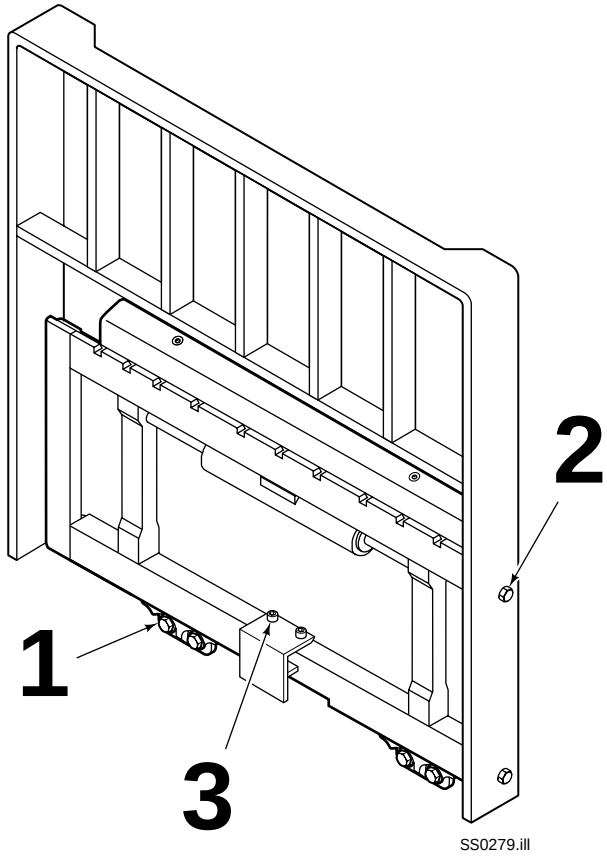
Carriage Mount Dimension (A) ITA (ISO)

	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)

5.1-4 Torque Values

Fastener torque values for the E-Series 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 (4)	M-16 5/8 in.	120	165
2	Backrest-to-frame (4)	M-16	145	195
3	Pallet Guard-to-frame (2)	M-16	145	195



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Do you have questions you need answered right now? Call your nearest Cascade Service Department.

AMERICAS

Cascade Corporation
U.S. Headquarters
2201 NE 201st
Fairview, OR 97024-9718
Tel: 800-CASCADE (227-2233)
Fax: 888-329-8207

Cascade Canada Inc.
5570 Timberlea Blvd.
Mississauga, Ontario
Canada L4W-4M6
Tel: 905-629-7777
Fax: 905-629-7785

Cascade do Brasil
Rua João Guerra, 134
Macuco, Santos - SP
Brasil 11015-130
Tel: 55-13-2105-8800
Fax: 55-13-2105-8899

EUROPE-AFRICA

Cascade Italia S.R.L.
European Headquarters
Via Dell'Artigianato 1
37030 Vago di Lavagno (VR)
Italy
Tel: 39-045-8989111
Fax: 39-045-8989160

Cascade (Africa) Pty. Ltd.
PO Box 625, Isando 1600
60A Steel Road
Sparton, Kempton Park
South Africa
Tel: 27-11-975-9240
Fax: 27-11-394-1147

ASIA-PACIFIC

Cascade Japan Ltd.
2-23, 2-Chome,
Kukuchi Nishimachi
Amagasaki, Hyogo
Japan, 661-0978
Tel: 81-6-6420-9771
Fax: 81-6-6420-9777

Cascade Korea
121B 9L Namdong Ind.
Complex, 691-8 Gojan-Dong
Namdong-Ku
Inchon, Korea
Tel: +82-32-821-2051
Fax: +82-32-821-2055

Cascade-Xiamen
No. 668 Yangguang Rd.
Xinyang Industrial Zone
Haicang, Xiamen City
Fujian Province
P.R. China 361026
Tel: 86-592-651-2500
Fax: 86-592-651-2571

Cascade India Material Handling Private Limited
No 34, Global Trade Centre
1/1 Rambaugh Colony
Lal Bahadur Shastri Road,
Navi Peth, Pune 411 030
(Maharashtra) India
Phone: +91 020 2432 5490
Fax: +91 020 2433 0881

Cascade Australia Pty. Ltd.
1445 Ipswich Road
Rocklea, QLD 4107
Australia
Tel: 1-800-227-223
Fax: +61 7 3373-7333

Cascade New Zealand
15 Ra Ora Drive
East Tamaki, Auckland
New Zealand
Tel: +64-9-273-9136
Fax: +64-9-273-9137

Sunstream Industries Pte. Ltd.
18 Tuas South Street 5
Singapore 637796
Tel: +65-6795-7555
Fax: +65-6863-1368