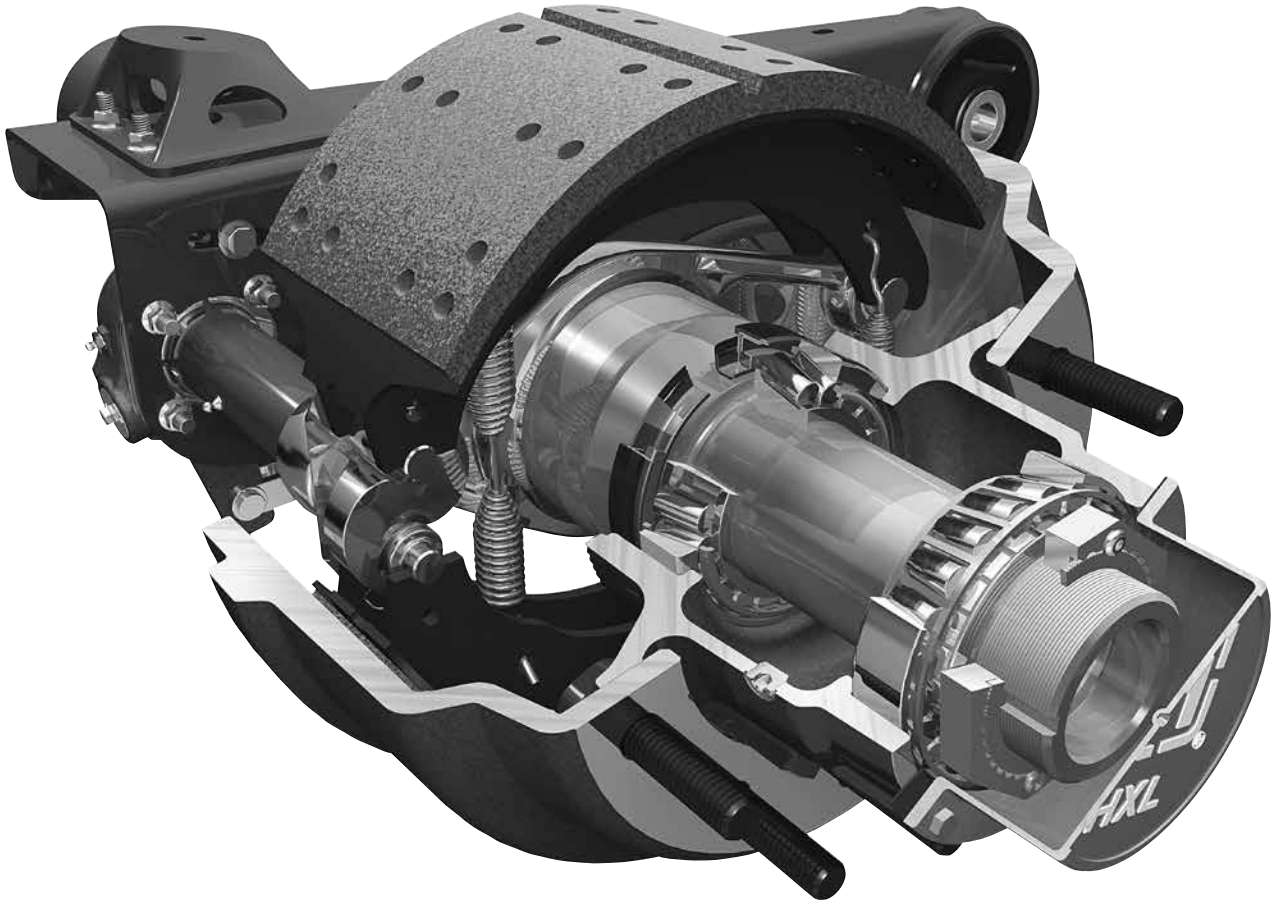
TECHNICAL PROCEDURE

TRAILER SUSPENSION SYSTEMS

SUBJECT: Drum Brake Service Procedures

LIT NO: L974
DATE: November 2023 **REVISION:** E



Information in this document applies to INTRAAX®, VANTRAAX®, ULTRAA-K® suspension systems and TRLAXLE® Non-integrated Trailer Axle equipped with Hendrickson drum brakes.

HENDRICKSON
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TABLE OF CONTENTS

IMPORTANT SAFETY NOTICES

Hendrickson literature number **T12007** *Technical Procedure General Safety Precautions and Information*, available at www.Hendrickson-intl.com/TrailerLit, **includes important preparation, precautionary and safety information** pertaining to the procedures included in this document.

To help prevent personal injury and equipment damage; warnings, cautions and other relative statements included in T12007 are to be read carefully and applied during the performance of the procedures included in this document.

Improper maintenance, service or repair can cause damage to the vehicle and other property, personal injury, unsafe operating conditions and potentially void the manufacturer's warranty.

CONVENTIONS APPLIED IN THIS DOCUMENT

Various techniques are used in this document to convey important information, express safety issues, provide methods for CONTACTING HENDRICKSON and how to identify and apply HYPERLINKS.

EXPLANATION OF SIGNAL WORDS

Hazard signal words (such as DANGER, WARNING or CAUTION) appear in various locations throughout this publication. Information accented by one of these signal words must be observed at all times. Additional notes are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions comply with ANSI Z535.4 and indicate the use of safety signal words as they appear throughout the publication.

⚠DANGER: INDICATES IMMEDIATE HAZARDS WHICH WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH.

⚠WARNING: Indicates hazards or unsafe practices which could result in severe personal injury or death.

⚠CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: Indicates hazards or unsafe practices which could result in damage to machine or equipment.

IMPORTANT: An operating procedure, practice or condition that is essential to emphasize.

⚠ Safety alert symbol used to indicate a condition exists that may result in personal injury or harm to individuals. It must be applied to DANGER, WARNING and CAUTION statements, which emphasize severity.

HYPERLINKS

Hyperlinks are identified by a dark grey line under the linked text. Internal links allow the reader to jump to a heading, step or page in this document. External links open the website or document referenced. While viewing electronically, activate the hyperlink by clicking on the underlined text.

CONTACTING HENDRICKSON

Contact Hendrickson Trailer Technical Services for technical assistance as needed. To do so, several options are available.

NOTE: DO NOT service a suspension or any component that is under warranty without first contacting Hendrickson Technical Services. Refer to CONTACTING HENDRICKSON for details.

Prior to contacting Technical Services, it may be best to have the following information about your Hendrickson suspension available (all that apply):

- Suspension ID Tag information (Refer to Hendrickson Lit. No. L977 *Suspension Identification Guide*, page 2 for tag location and details):
  - Suspension model number
  - Suspension serial number
  - Approximate number of suspension miles
- Vehicle VIN number. Refer to trailer OEM manual for VIN plate location.
  - Trailer Type (van, reefer, flat bed, etc...)
  - Manufacturer
  - VIN (vehicle identification number)
  - In-service date[1]
- If applicable, description of the system problem, part number and/or part description of the reported non-functioning part.
  - Date of failure
  - Where applicable: location of problem on suspension / trailer; e.g., road side, front axle, rear axle, curb side rear, etc.

[1] If the in-service date is unknown or not available, the vehicle date of manufacture can be substituted.

  - Symptoms:
    - » Systems, components or function effected by failure.
    - » When does failure occur?
    - » How often do they occur?
    - » Etc.
- What troubleshooting and/or measurements have been performed?
- What service data literature do you have or need?
- Digital photos of suspension and damaged areas.
- Special application approval documentation (if applicable).

PHONE

Contact Hendrickson directly in United States at 866-RIDEAIR (743-3247) or in Canada at 800-668-5360. From the menu, select:

- Technical Services/Warranty for technical information.
- Other selections include:
  - Aftermarket Sales for replacement parts information and ordering.
  - Original Equipment Sales for parts inquires and ordering for trailer manufactures.

EMAIL

For **H**endrickson **T**railer **T**echnical **S**ervices, use the following e-mail address:

HTTS@hendrickson-intl.com

RELATIVE LITERATURE

If you suspect your version of this or any other Hendrickson manual is not "up-to-date", the most current version is free online at:

www.Hendrickson-intl.com/TrailerLit

Available Hendrickson documentation can be viewed or downloaded from this site.

All Hendrickson online documentation is in PDF format that requires PDF reader software to open. A free application is downloadable from Adobe at http://get.adobe.com/reader/.

Relative literature may include:

NAME	DESCRIPTION
B31	*Torque Specifications*
B77	*HXS® Brakes Package*
B102	*HXS® Extended Service S-cam Conversion Notice*
L583	*Comprehensive Warranty Statement*
L578	*Suspension Preventive Maintenance Guide*
L762	*INTRAAX®/VANTRAAX® Cam Tube Kit Installation*
L977	*Trailer Suspension and Axle Systems Identification Guide*
L809	*Consolidated Certificate of Compliance for Air Actuated Brakes*
L1009	*HCA®/TRLAXLE® S-cam Bracket Repair Procedure*
L1097	*26,000 Pound Brake Specifications*
L1214	*Cam Tube Systems*
T12007	*Technical Procedure General Safety Precautions and Information*
T71002	*TRLAXLE® Clamp-mount Cam Tube Kit Installation*
T71003	*Weld Mount Cam Tube Kit Installation*

Table 1: Relative Literature

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. For the latest version of this manual consult the Hendrickson website www.Hendrickson-intl.com.

INTRODUCTION

Follow the procedures in this document for maintaining Hendrickson drum brake components on Hendrickson's wheel-end systems equipped with drum brakes.

IMPORTANT: Used brake hardware (e.g. brake shoe rollers, roller retaining clips and brake return springs) fatigue during their normal lifespan and may not have the same performance characteristics as new components. Since most of these brake components are supplied new with a brake overhaul kit (if obtained from Hendrickson), the existing components should be discarded and not be reused.

NOTE: Auto lubricating systems are not recommended for use on Hendrickson brake components.

TOOLS AND EQUIPMENT

The following special tools may be required during the performance of applicable maintenance procedures:

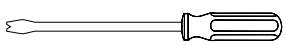
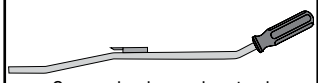
TOOL	WHERE USED
 Notched screw driver	Removal and installation of brake retaining springs. (one or the other, not both)
 S-cam brake spring tool	
 S-cam bushing tool	AA230T REVISION LEVEL "C" (WITHOUT CAM TUBE) on page 13

Table 2: List of required tools

IMPORTANT: A calibrated torque wrench must be used to tighten fasteners to specified values. Refer *B31 Torque Specifications - Trailer*.

BRAKE SHOE REMOVAL - ALL MODELS

To gain access to the brake shoes:

1. **Remove** the tire/wheel assembly.
2. **Remove** the brake drum.

NOTE: In some instances, it may be necessary to slightly retract the brake shoes so the drum can clear the brake shoe/lining assembly. If this is necessary, refer to the RETRACTING BRAKE SHOES OR SLACK ADJUSTER CONTROL ARM on page 28 for complete brake shoe retracting instructions.

⚠WARNING: It is critical that any brake drum reaching maximum wear diameter be considered unsafe and immediately replaced. To avoid serious injury or death, any brake drum exceeding this dimension is considered a safety hazard. If in doubt, contact the brake drum manufacturer.

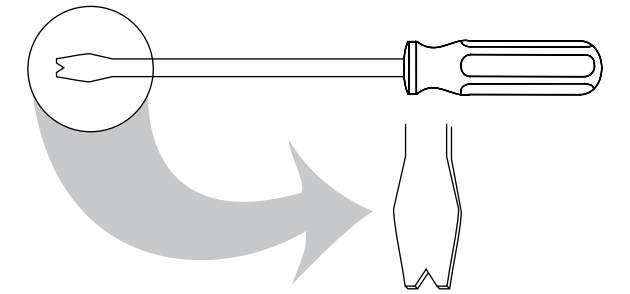
Hendrickson brake service kits, for one wheel-end, are available as follows:

Brake Shoe Kit
Brake shoes only: two shoes with roller and roller retaining clip attached on each.

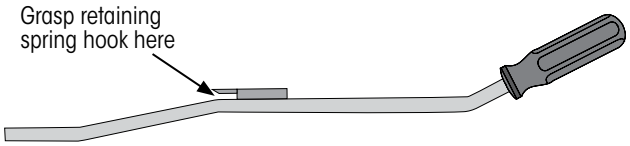
Minor Overhaul Hardware Brake Kit
Brake hardware only: anchor pins and bushings, rollers and roller retaining clips, return and retainer springs.

Major Overhaul Brake Kit
Includes all components in Brake Shoe Kit and Minor Overhaul Hardware Brake Kit.

For more information, refer to L1104 *Brake Kits and S-cam Components*.



Tool A: Notched screwdriver
(Heavy-duty screwdriver with a v-shaped notch cut into the bottom of the blade)



Tool B: S-cam brake spring tool

Figure 1: Alternate method special tools

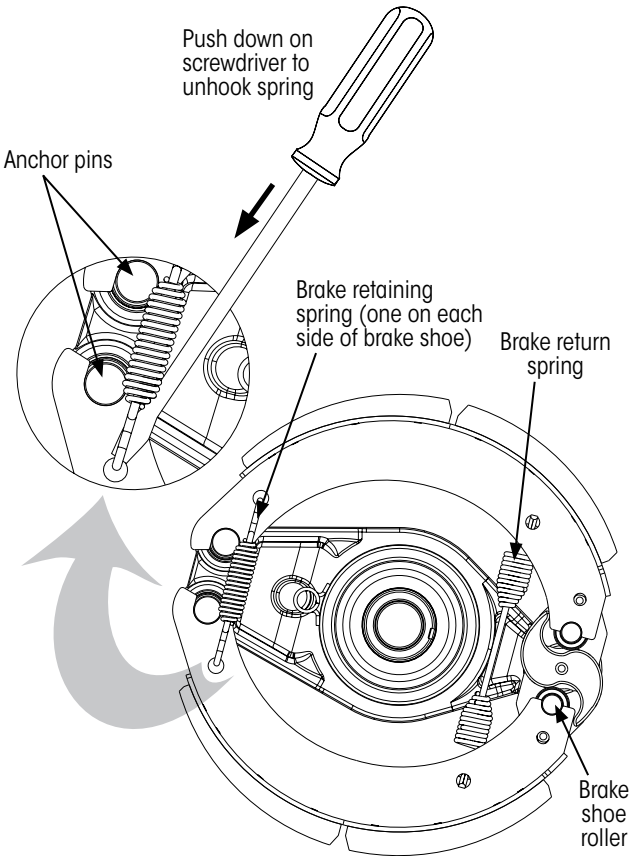


Figure 2: Removing brake retaining spring using **Tool A**

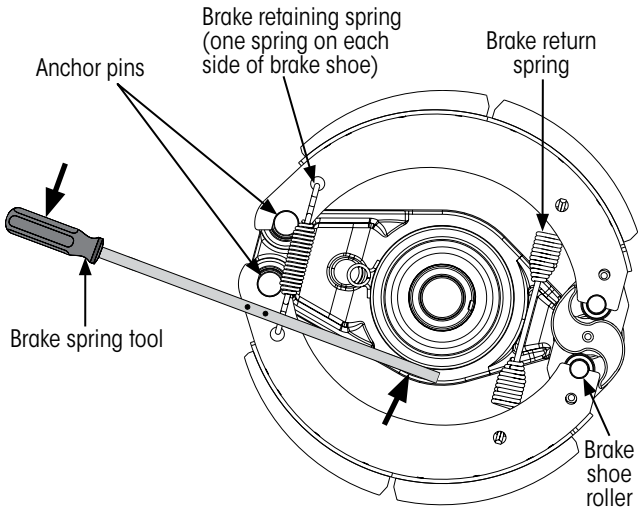


Figure 3: Removing brake retaining spring using **Tool B**

1. **Manually supporting** the lower brake shoe, use Tool A or Tool B to **unhook** both brake retaining springs from the brake shoes (Figure 2 and 3).
2. **Pull** the upper and lower brake shoes off the anchor pins. When free of the anchor pins, carefully pull the brake shoes away from the spider.

   IMPORTANT: The brake return spring, brake shoe rollers and roller retaining clips (Figure 2) will remain on the brake shoes during this procedure.
3. **Discard** the used brake hardware.
4. With the brake shoes off, **inspect** the S-cam and S-cam bushings for wear. Refer to the following S-CAM INSPECTIONS - ALL MODELS on page 7 procedure for complete inspection instructions.

S-CAM INSPECTIONS - ALL MODELS

With the brake shoes off, the S-cam and S-cam bushings (or S-cam and cam tube on Cam Tube System™ models) can be inspected for wear as follows:

CHECKING AXIAL END PLAY

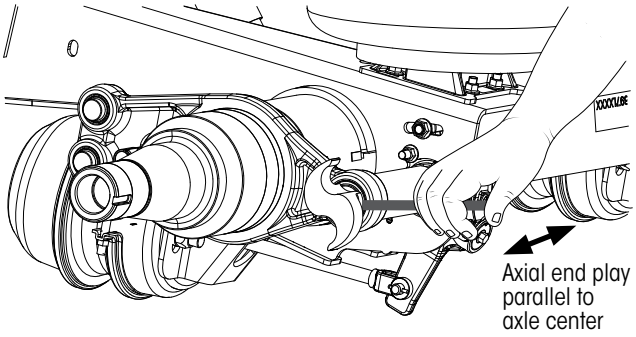


Figure 4: Checking S-cam axial end play (all except Cam Tube System™ models)

NOTE: The following step is not required on Cam Tube System™ models.

On all except Cam Tube System models, **check** the S-cam axial end play (the free movement of the S-cam along its axis, Figure 4). Total movement should not exceed $^{1}/_{8}$ in. (3.18 mm).

CHECKING RADIAL END PLAY

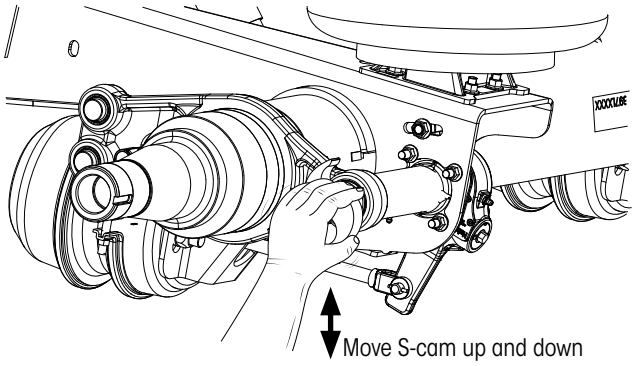


Figure 5: Checking for bushing wear

1. On all models, **check** for radial play between the S-cam and S-cam bushings. Use a dial indicator rigidly secured to the axle or suspension beam to measure the up and down movement of the S-cam (Figure 5).

   If radial end play of more than 0.060 inches (1.5 mm) is found, the bushings (or cam tube assembly on models after May 2001) should be replaced. The S-cam should also be inspected for signs of journal wear, corrosion and cracks.

2. On all except Cam Tube System models, **inspect** the S-cam for cracks, excessive wear and corrosion.

3. On all models, **check** the S-cam head for damage or excessive wear.

4. If S-cam or S-cam bushing passes inspection and **replacement is not necessary**, continue with SUSPENSION SYSTEM REVISION LEVEL IDENTIFICATION, otherwise refer to the section titled S-CAM REPLACEMENT PROCEDURES on page 10.

SUSPENSION SYSTEM REVISION LEVEL IDENTIFICATION

The procedure used to remove and replace the S-cam and S-cam bushings varies by suspension revision level for INTRAAX® suspensions shipped after April 2001, **without a cam tube**. Use the following procedure to identify your particular suspension revision level.

If the **MODEL NUMBER** line looks something like this:	Then you have this revision level:
AA230TAA… or AA230TAB…	"A"
AA230TBA… or AA230TBB…	"B"
AA230TC…	"C"
AA250TAA… or AA250TAB…	"A"
AA250TBA… or AA250TBB…	"B"
AA250TC…	"C"
AA300T…	"C"
AA300EDT…	"C"
AA230L…	"C"
AA250L…	"C"
AA300L…	"C"
AA300EDL…	"C"
HIK200…	"B"
HIK230…	"B"
HIK250…	"B"
HIS230…	"B"
HIS250…	"B"
HKA180…	"C"
HKA200C…	"C"
HKA250…	"C"

Table 3: Non-cam tube suspension revision levels

1. If the INTRAAX®, VANTRAAX® or ULTRAA-K® suspension is **equipped with a cam tube** (item 4, Figure 19 on page 18), **refer** to INTRAAX® CAM TUBE SYSTEM™ MODELS on page 19.

2. **Locate** the suspension identification tag. This tag can be found:

   A. Typically on the inside of the curbside suspension beam for INTRAAX (non-slider) suspensions.

   B. On the slider box roadside rail above the front frame bracket.

   C. On the HS slider box front crossmember.

   NOTE: This tag contains three lines of important information: model number, model description and serial number.

3. **Read** the model number line on the identification tag. Then refer to Table 3 on page 7 for revision level identification.

   A. **Revision levels "A" and "B" with 1 7/8 inch S-cam bore in the spider** — In order to remove and replace the camshaft and camshaft bushings on suspension revision levels "A" or "B", the hub must first be removed:

      i. **Refer** to hub removal procedures found in the appropriate Hendrickson or OEM wheel-end maintenance manual.

      ii. **Refer** to the AA230T REVISION LEVELS "A" AND "B" (WITHOUT CAM TUBE) on page 10 for complete camshaft and camshaft bushing removal and replacement instructions.

   B. **Revision level "C" with 2.0 inch S-cam bore in the spider** — All revision level "C" suspensions allow you to remove and replace the camshaft and camshaft bushings without removing the hub. To remove and replace the camshaft and camshaft bushings on a revision level "C" suspension, use the AA230T REVISION LEVEL "C" (WITHOUT CAM TUBE) on page 13.

If you cannot determine the suspension revision level from the information on the identification tag, refer to CONTACTING HENDRICKSON on page 3 for assistance.

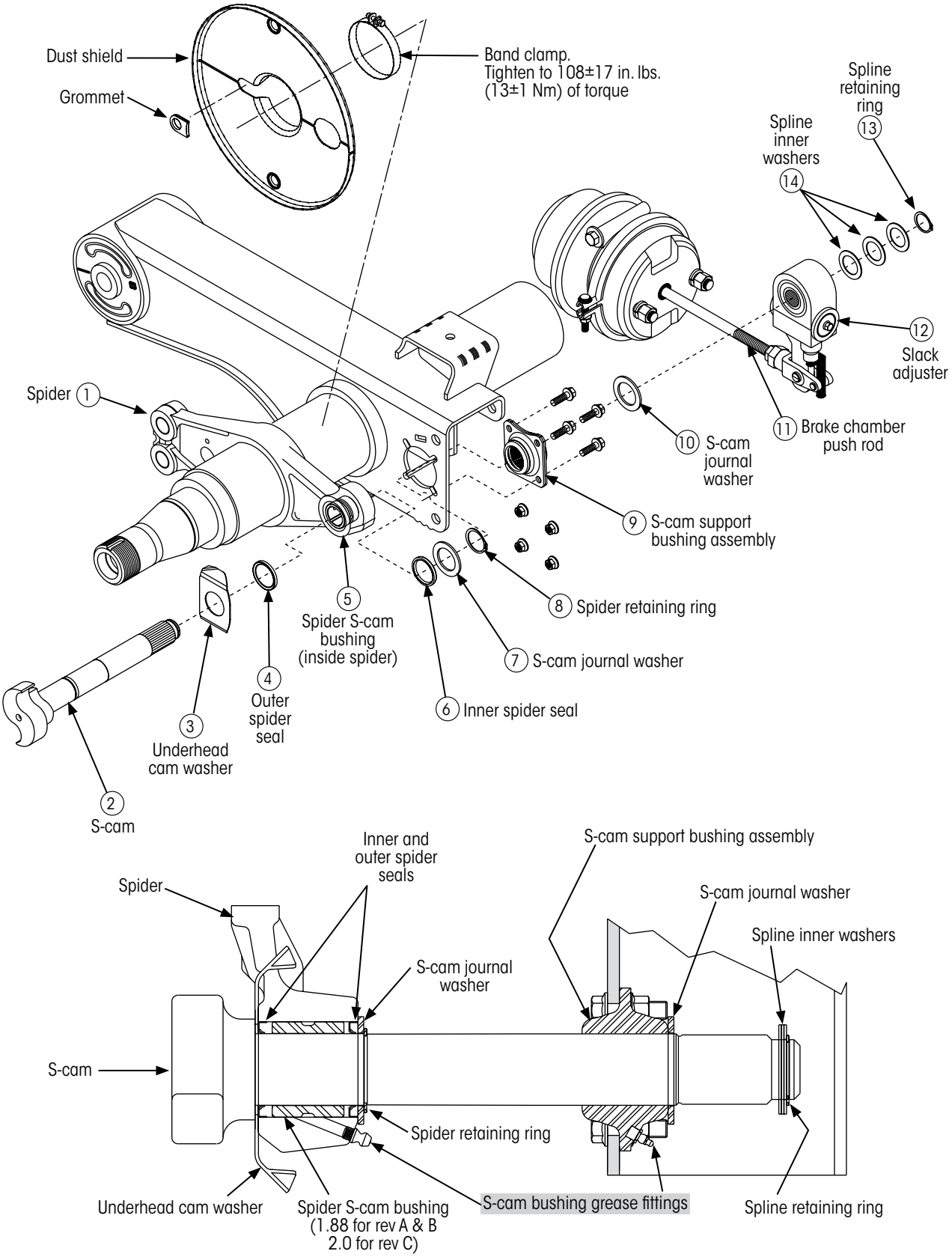


Figure 6: AA230T revision levels A, B and C parts identification

S-CAM REPLACEMENT PROCEDURES

Refer to these procedures for servicing S-cam and S-cam components on Hendrickson suspensions and non-integrated trailer axles. Procedures may also be included with applicable brake service kits.

AA230T REVISION LEVELS "A" AND "B" (WITHOUT CAM TUBE)

These procedures apply to legacy suspension models with axle/beam weldments (Table 3 on page 7). These procedures can also apply to Hendrickson's TRLAXLE® Non-integrated Trailer Axle configured without a cam tube.

REMOVING S-CAM

Refer to Figure 6 on page 9 for parts identification.

1. **Remove** the tire/wheel assembly, the brake drum and the hub assembly.
2. Using retaining ring pliers, **remove** the spline retaining ring (item 13, Figure 6 on page 9).
3. **Remove** the spline inner washers (item 14, Figure 6 on page 9).
4. **Disconnect** the brake chamber push rod (item 11, Figure 6 on page 9) from the slack adjuster (item 12, Figure 6 on page 9) by removing the cotter pin(s) and clevis pin(s) from the slack adjuster clevis. **DO NOT** adjust or remove the push rod jam nut at this time.
5. **Retract** the slack adjuster control arm(s) from the clevis. Refer to the section titled RETRACTING BRAKE SHOES OR SLACK ADJUSTER CONTROL ARM on page 28 for complete slack retracting details.
6. With the slack adjuster control arm(s) retracted from the clevis, **remove** the slack adjuster from the S-cam.
7. **Remove** the S-cam journal washer (item 10, Figure 6 on page 9).
8. **Inspect** the S-cam for contamination (dirt, rust, scale, etc.). If any contamination exists, remove it from the S-cam at this time.

IMPORTANT: Removing contamination from the S-cam at this time will make the S-cam easier to remove in the following steps.

9. **Support** the S-cam to remove tension from the spider retaining ring. Using retaining ring pliers, **spread open** the spider retaining ring (item 8, Figure 6 on page 9) and **remove** it from the groove in the S-cam (item 2, Figure 6 on page 9).
10. **Partially remove** the S-cam by pulling on the S-cam head. **Pull** the S-cam far enough out of the S-cam support bushing (item 9, Figure 6 on page 9) so the spider retaining ring (item 8, Figure 6 on page 9) and the S-cam journal washer (item 7, Figure 6 on page 9) can be slid off the spline end of the S-cam. When the spider retaining ring and the S-cam journal washer are removed, finish removing the S-cam and the underhead cam washer (item 3, Figure 6 on page 9).
11. **Loosen and remove** the four bolts that secure the S-cam support bushing assembly (item 9, Figure 6 on page 9) to the suspension beam.
12. **Discard** the used S-cam support bushing assembly.
13. Using a small screwdriver, **carefully remove** the inner spider seal (item 6, Figure 6 on page 9) from the spider.

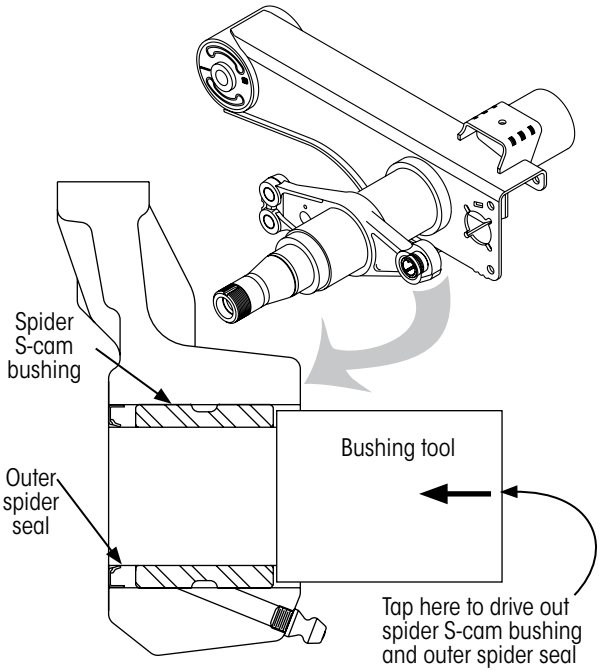


Figure 7: Spider S-cam bushing and outer seal removal

NOTICE: Use caution to not damage the inside diameter of the spider bore when removing the bushing.

IMPORTANT: The tool or driver used to remove the bushing and outer spider seal must have a diameter small enough to fit inside the spider but large enough to drive out the spider S-cam bushing.

14. Using a bushing tool (Figure 7 on page 10) or seal driver, **tap** the spider S-cam bushing (item 5, Figure 6 on page 9) and outer spider seal (item 4, Figure 6 on page 9) out of the spider bore.

15. **Discard and replace** all worn parts with new.

INSTALLING S-CAM BUSHINGS

NOTE When instructed to apply grease to a component in the following procedure, use Extreme Pressure NLGI #2 grease.

1. **Thoroughly clean** spindle and spider assembly to remove all dirt and grease.

⚠WARNING: DO NOT use gasoline or other flammable cleaning solvents to clean the spindle and spider assembly. These solvents can explode, burn or disperse harmful vapors.

2. **Thoroughly dry** the spindle and spider immediately after cleaning to prevent rusting or pitting of the machined areas. Use rags, paper towels or low pressure air to dry the parts.

⚠CAUTION: Protect eyes and skin from particle penetration when using low pressure air.

3. **Inspect** the spindle:
   A. **Inspect** the machined areas on the spindle for nicks, scratches, burrs or marks. If needed, use crocus cloth or emery cloth to repair any damaged areas.
   B. **Inspect** the spindle nut threads. Use a correctly sized die to repair any damaged threads.
   C. If any cracks are found in the spindle, replace the axle/beam weldment with a HALFTRAAX™ assembly. Refer to Hendrickson publication L533 *HALFTRAAX Axle and Beam Removal/ Replacement Procedure*, for complete HALFTRAAX replacement instructions.

4. **Lightly coat** the inside diameter of a new S-cam support bushing (item 9, Figure 6 on page 9) with fresh grease (EP NLGI #2 grease).

5. **Install** the new S-cam support bushing assembly (item 9, Figure 6 on page 9) with four new attaching nuts and bolts. Only **hand tighten** the four attaching nuts and bolts at this time.

IMPORTANT: Hendrickson recommends using only Hendrickson S-cam overhaul kits. These kits contain OEM quality parts designed to give maximum S-cam and S-cam bushing life.

6. Using a bushing tool (the same one used in Step 14 of REMOVING S-CAM), **carefully tap** a new spider S-cam bushing into the spider.

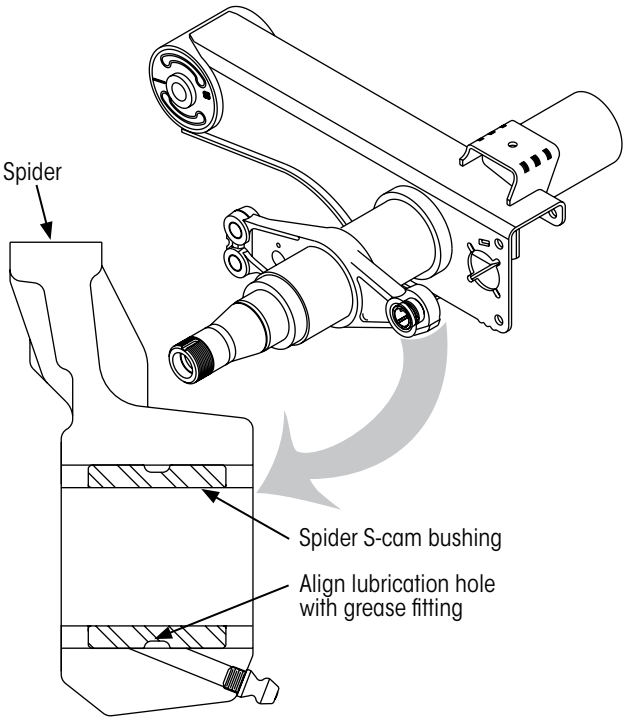


Figure 8: Spider S-cam bushing installation details

7. **Orient** the new bushing so its lubrication hole aligns with the grease fitting in the spider (Figure 8).

NOTICE: Failure to align the bushing lubrication hole with the spider grease fitting may result in a lack of lubrication that could cause premature bushing failure.

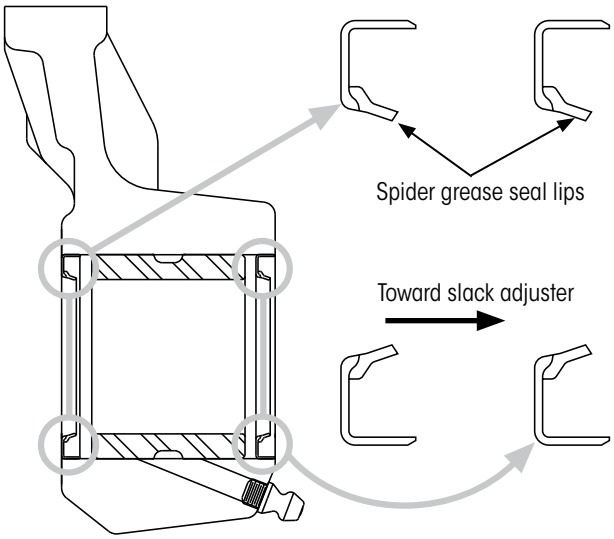


Figure 9: Spider grease seal orientation

8. **Install** new inner and outer spider grease seals (items 4 and 6, Figure 6 on page 9) on each side of the spider S-cam bushing.

   NOTICE: The lips of both seals must face inward toward the brake chamber (Figure 9). This seal orientation directs any excess grease away from the brake shoes.

9. **Lightly coat** the grease seal lips with fresh grease (EP NLGI #2 grease) to aid S-cam installation.

INSTALLING S-CAM

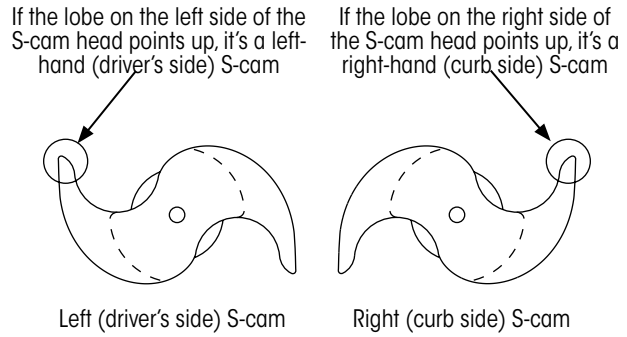


Figure 10: Identifying S-cam orientation

IMPORTANT: S-cams have left-hand (driver's side) and right-hand (curb side) orientations. Ensure you install the proper S-cam for this wheel position so that the brake shoe rollers can properly engage the S-cam lobes.

To differentiate, hold the S-cam horizontally with the splines facing away from you and look at the S-cam head. With the S-cam in this position (Figure 10), the upward pointing S-cam lobe is on the same side as the S-cam orientation left or right.

1. **Slide** the underhead cam washer on as shown in Figure 6 on page 9, onto the new S-cam until it contacts the S-cam head.

   NOTICE: Use care when installing the S-cam in the following step to prevent damage to the spider grease seals.

2. **Install** the new S-cam (splines first) through the spider S-cam bushing. Stop before the splines reach the S-cam support bushing assembly (item 9, Figure 6 on page 9) so the S-cam journal washer (item 7, Figure 6 on page 9) and the spider retaining ring (item 8, Figure 6 on page 9) can be installed on the end of the S-cam.

3. **Slide** the S-cam journal washer (item 7, Figure 6 on page 9) onto the S-cam and seat it against the spider.

4. Using retaining ring pliers, **hold open** the spider retaining ring (item 8, Figure 6 on page 9) and **slide** it on the end of the S-cam.

5. **Push** the S-cam all the way through the S-cam support bushing (item 9, Figure 6 on page 9) until it stops against the spider.

6. **Lock** the spider retaining ring (item 8, Figure 6 on page 9) into the groove on the S-cam.

7. **Rotate** the S-cam to see if it turns freely. If the S-cam is bound, adjust the S-cam support bushing assembly (use the four bolts) until the S-cam turns freely.

8. **Tighten** the four S-cam support bushing bolts to 40±5 ft. lbs. (55±6 Nm) of torque.

9. **Install** the S-cam journal washer (item 10, Figure 6 on page 9).

10. **Lubricate** the splines of the new S-cam with an anti-seize lubricating compound.

11. **Refer to** INSTALLING SLACK ADJUSTER ON S-CAM on page 27 to install the slack adjuster (item 12, Figure 6 on page 9). **Refer to** Figure 6 on page 9 for locating spline inner washer (item 14, Figure 6 on page 9) and spline retaining ring (item 13, Figure 6 on page 9).

12. **Lubricate** the spider S-cam bushing, the S-cam support bushing assembly and the slack adjuster with EP NLGI #2 grease as follows:

    A. **Wipe** off all grease fittings before lubricating. This will help prevent contaminants from being injected into the grease fitting along with the grease.

    B. **Apply grease** to the spider S-cam bushing and the S-cam support bushing assembly until new grease purges from the inboard seals. When the seals are correctly installed, grease will purge from the inboard side of the bushing, away from the brakes and toward the slack adjuster (Figure 9 on page 12).

    C. **Apply grease** to the slack adjuster per manufacturer's recommendations.

    D. **Wipe** away excess grease purged from joints. This will help prevent contaminants from being attracted to the lube points and grease from getting on the brake linings.

13. **Install** the hub assembly. Refer to applicable Wheel-end Maintenance Procedures for complete hub installation details.

14. **Continue** brake service. Refer to the section titled SUSPENSION SYSTEM REVISION LEVEL IDENTIFICATION Table 3 on page 7 for complete details.

AA230T REVISION LEVELS "A" AND "B" LUBRICATION INTERVALS

Lubricate the spider S-cam and S-cam support bushing (items 5 and 9, Figure 6 on page 9) grease fittings monthly. Use EP NLGI #2 grease. Refer to L578 *Preventative Maintenance Guide* for more details.

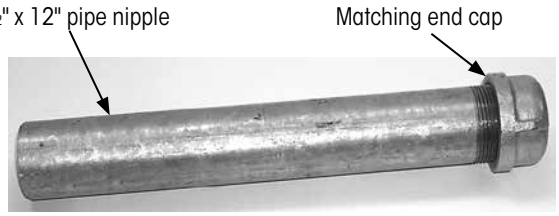
NOTICE: Purging grease removes any collected moisture, contaminants or degraded lubricant. Continue to add grease until clean grease is visible.

AA230T REVISION LEVEL "C" (WITHOUT CAM TUBE)

These procedures apply to AA230T revision level "C" Similar to current versions of INTRAAX®, but without a cam tube.

REMOVING S-CAM

Figure 10 parts identification also applies.



Readily available in the plumbing section of most hardware stores (grind off threads on the uncapped end)

Figure 11: Bushing tool specifications

NOTE: On revision level "C" suspensions, it is not necessary to remove the hub assembly in order to remove the S-cam and spider S-cam bushing. However, the removal procedure does require a bushing tool with a hollow interior. The tool must be able to simultaneously fit over the brake S-cam and inside the spider. One such tool can easily be made following the specifications i Figure 11. If a pipe nipple is used, the threads on the uncapped end must be ground off to prevent the inside diameter of the spider from being damaged.

1. **Remove** the tire/wheel assembly and the brake drum.

2. Using retaining ring pliers, **remove** the spline retaining ring (item 13, Figure 6 on page 9).

3. **Remove** the spline inner washers (item 14, Figure 10).

4. **Disconnect** the brake chamber push rod (item 11, Figure 6 on page 9) from the slack adjuster (item 12, Figure 6 on page 9) by removing the cotter pin(s) and clevis pin(s) from the slack adjuster clevis. **DO NOT** adjust or remove the push rod jam nut at this time.

5. **Retract** the slack adjuster control arm(s) from the clevis. Refer to the section titled RETRACTING BRAKE SHOES OR SLACK ADJUSTER CONTROL ARM on page 28 for complete slack retracting details. With the slack adjuster control arm(s) retracted from the clevis, remove the slack adjuster from the S-cam.

6. **Remove** the S-cam journal washer (item 10, Figure 6 on page 9).

7. **Inspect** the S-cam for contamination (dirt, rust, scale, etc.). If any contamination exists, remove it from the S-cam at this time.

IMPORTANT: Removing contamination from the S-cam at this time will make the S-cam easier to remove in the following steps.

REMOVING S-CAM BUSHINGS

1. **Support** the S-cam to remove tension from the spider retaining ring. Using retaining ring pliers, carefully **spread open** the spider retaining ring (item 8, Figure 6 on page 9) and **remove** it from the groove in the S-cam (item 2, Figure 6 on page 9).

2. **Partially remove** the S-cam by pulling on the S-cam head. **Pull** the S-cam far enough out of the S-cam support bushing (item 9, Figure 6 on page 9) so the spider retaining ring (item 8, Figure 6 on page 9) and the S-cam journal washer (item 7, Figure 6 on page 9) can be slid off the spline end of the S-cam.

3. **Loosen** and remove the four bolts that secure the S-cam support bushing assembly (item 9, Figure 6 on page 9) to the suspension beam.

4. **Discard** the used S-cam support bushing assembly.

5. **Slide** the bushing tool (Figure 11 on page 13) over the end of the S-cam, and press it against the inner spider seal (Figure 12).

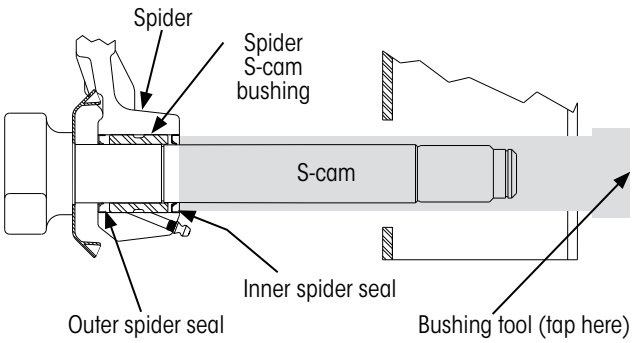


Figure 12: Spider S-cam bushing and outer seal removal

6. **Tap** on the end of the bushing tool to drive the inner spider seal, spider S-cam bushing and the outer spider seal out of the spider (Figure 12).

NOTICE: Use care when removing the inner spider seal, spider S-cam bushing and outer spider seal. If the bushing removal tool is not resting against the inner spider seal when tapping the tool, the inside diameter of the spider can be damaged. If the spider is damaged, the axle/beam weldment (HTRAAX) will have to be replaced.

7. **After** driving the inner spider seal (item 6, Figure 6 on page 9), spider S-cam bushing (item 5, Figure 6 on page 9) and the outer spider seal (item 4, Figure 6 on page 9) out of the spider, **finish removing** the S-cam and the underhead cam washer (item 3, Figure 6 on page 9).

8. **Discard and replace** all worn parts with new.

INSTALLING S-CAM

NOTE: On revision level "C" suspensions, it is not necessary to remove the hub assembly in order to install the S-cam and spider S-cam bushing. However, the installation procedure does require a bushing tool with a hollow interior. Refer to Figure 11 on page 13 for complete bushing tool details.

1. **Thoroughly clean** the spider assembly to remove all dirt and grease.

⚠WARNING: DO NOT use gasoline or other flammable cleaning solvents to clean the spider assembly. These solvents can cause a fire or disperse harmful vapors.

2. **Thoroughly dry** the spider immediately after cleaning to prevent rusting or pitting of the machined areas. Use rags, paper towels or low-pressure air to dry the parts.

⚠CAUTION: Protect eyes and skin from particle penetration when using low pressure air.

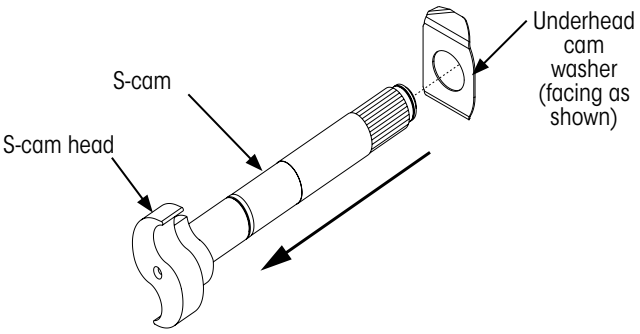


Figure 13: Installing the underhead cam washer

3. **Slide** the underhead cam washer onto the new S-cam until it contacts the S-cam head as shown in Figure 13.

IMPORTANT: S-cams have left-hand (driver's side) and right-hand (curb side) orientations. Ensure the proper S-cam is installed so that the brake shoe rollers can properly engage the S-cam lobes. To differentiate, hold the S-cam horizontally with the splines facing away from you and look at the S-cam head. With the S-cam in this position (refer to Figure 10 on page 12), the S-cam lobe that points upward indicates orientation.

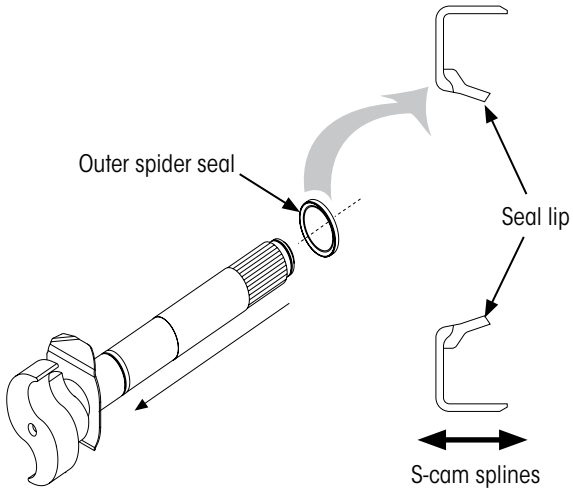


Figure 14: Installing the outer spider seal

4. **Lightly apply** fresh grease (EP NLGI #2 grease) to the lip of a new outer spider seal (item 4, Figure 6 on page 9).

5. **Slide** the spider seal onto the S-cam (Figure 14).

IMPORTANT: The lip of the outer spider seal must face inward, toward the S-cam splines. This seal orientation directs any excess grease away from the brake shoes.

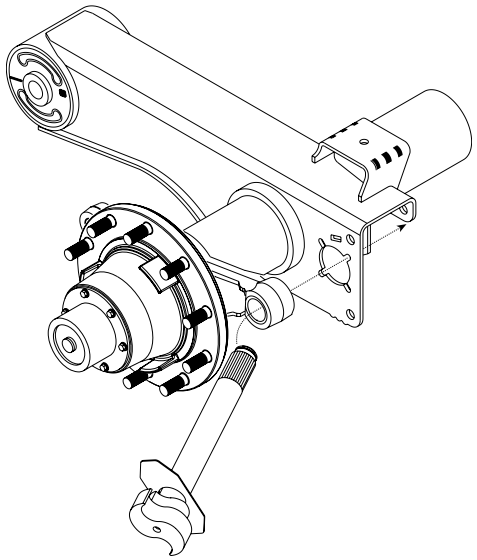


Figure 15: Installing the S-cam assembly

6. **Angle and slide** this S-cam assembly through the spider and beam (Figure 15). Even with the hub in place there is enough clearance to angle and insert the S-cam as long as the spider S-cam bushing has not been installed.

INSTALL SPIDER S-CAM BUSHING

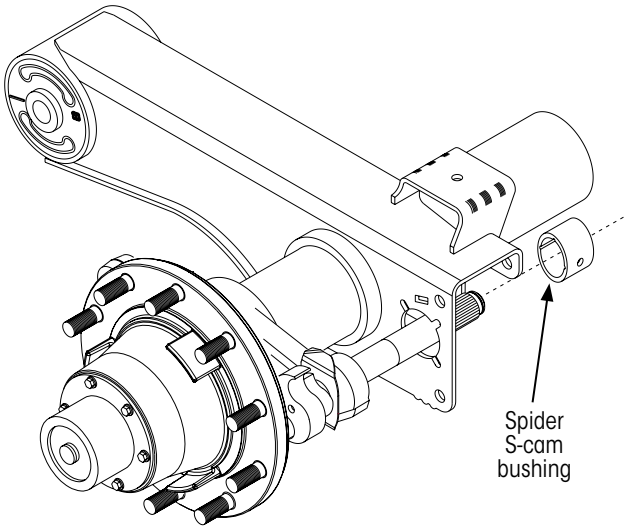


Figure 16: Installing the spider S-cam bushing

1. **Lightly coat** the inside of a new spider S-cam bushing with fresh grease (EP NLGI #2 grease).

2. **Slide** the spider S-cam bushing onto the S-cam (Figure 16).

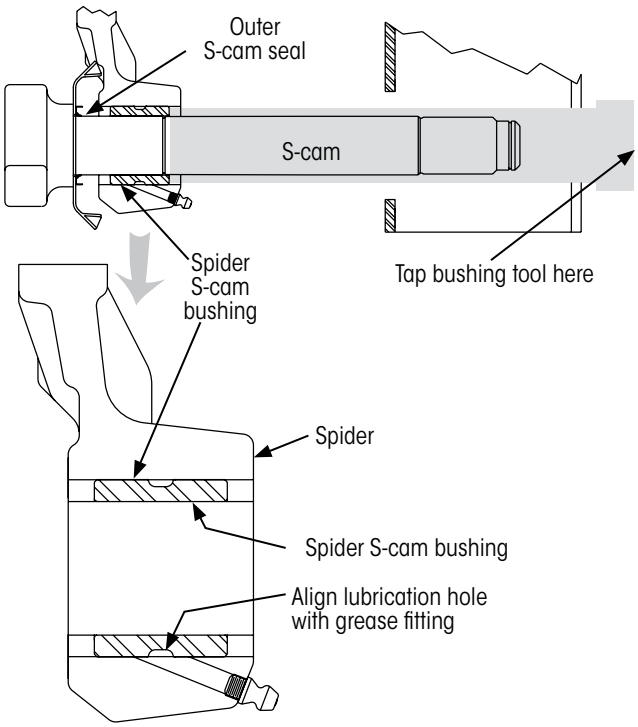


Figure 17: Spider S-cam bushing installation

3. Use the bushing tool (Figure 11 on page 13) to **install** the spider S-cam bushing into the spider (Figure 17).

4. **Tap** on the end cap of the bushing tool with a hammer until the lubrication hole in the bushing aligns with the grease fitting in the spider (Figure 17). When aligned, remove the bushing tool.

NOTICE: Failure to align the bushing lubrication hole with the spider grease fitting may result in a lack of lubrication that can cause premature bushing failure.

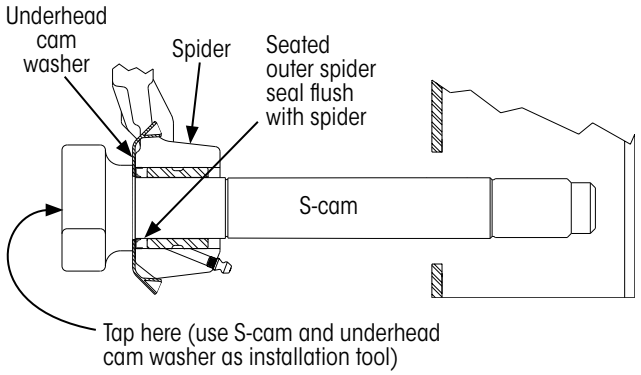


Figure 18: Outer spider seal installation technique

5. **Seat** the outer spider seal (item 4, Figure 6 on page 9) into the spider by tapping on the head of the S-cam with a hammer (Figure 18).

6. **Tap** until seal is flush with spider.

7. **Lightly apply** fresh grease (EP NLGI #2 grease) to the lip of a new inner spider seal (item 6, Figure 6 on page 9).

8. **Slide** the seal onto the S-cam and seat it into the spider.

IMPORTANT: The lip of the inner spider seal must face inward, toward the S-cam splines (refer to Figure 14 on page 15 for seal orientation). This seal orientation directs any excess grease away from the brake shoes.

9. **Slide** the S-cam journal washer (item 7, Figure 6 on page 9) onto the S-cam and seat it against the spider.

10. Using retaining ring pliers, **hold open** the spider retaining ring (item 8, Figure 6 on page 9) and **slide** it on the end of the S-cam.

11. **Lock** the spider retaining ring into the groove on the S-cam.

INSTALL S-CAM SUPPORT BUSHING ASSEMBLY

1. **Lightly coat** the inside diameter of a new S-cam support bushing (item 9, Figure 6 on page 9) with fresh grease (EP NLGI #2 grease).

2. **Slide** the new support bushing onto the S-cam and secure it to the beam assembly with four new attaching nuts and bolts. Only **hand tighten** the four attaching nuts and bolts at this time.

3. **Rotate** the S-cam to see if it turns freely. If the S-cam is bound, adjust the S-cam support bushing assembly (use the four bolts) until the S-cam turns freely.

4. **Tighten** the four S-cam support bushing bolts to 40±5 ft. lbs. (54.23±6.78 Nm) of torque.

5. **Install** the S-cam journal washer (item 10, Figure 6 on page 9).

6. **Lubricate** the splines of the new S-cam with an anti-seize lubricating compound.

7. **Refer to** INSTALLING SLACK ADJUSTER ON S-CAM on page 27 to install the slack adjuster (item 12, Figure 6 on page 9). **Refer to** Figure 6 on page 9 for locating spline inner washer (item 14, Figure 6 on page 9) and spline retaining ring (item 13, Figure 6 on page 9).

8. **Lubricate** the spider S-cam bushing, the S-cam support bushing and the slack adjuster with EP NLGI #2 grease as follows:

   A. **Wipe** off all grease fittings before lubricating. This will help prevent contaminants from being injected into the grease fitting along with the grease.

   B. **Apply grease** to the spider S-cam bushing and the S-cam support bushing assembly until new grease purges from the inboard seals. When the seals are correctly installed, grease will purge from the inboard side of the bushing, away from the brakes and toward the slack adjuster.

   C. **Apply grease** to the slack adjuster per manufacturer's recommendations.

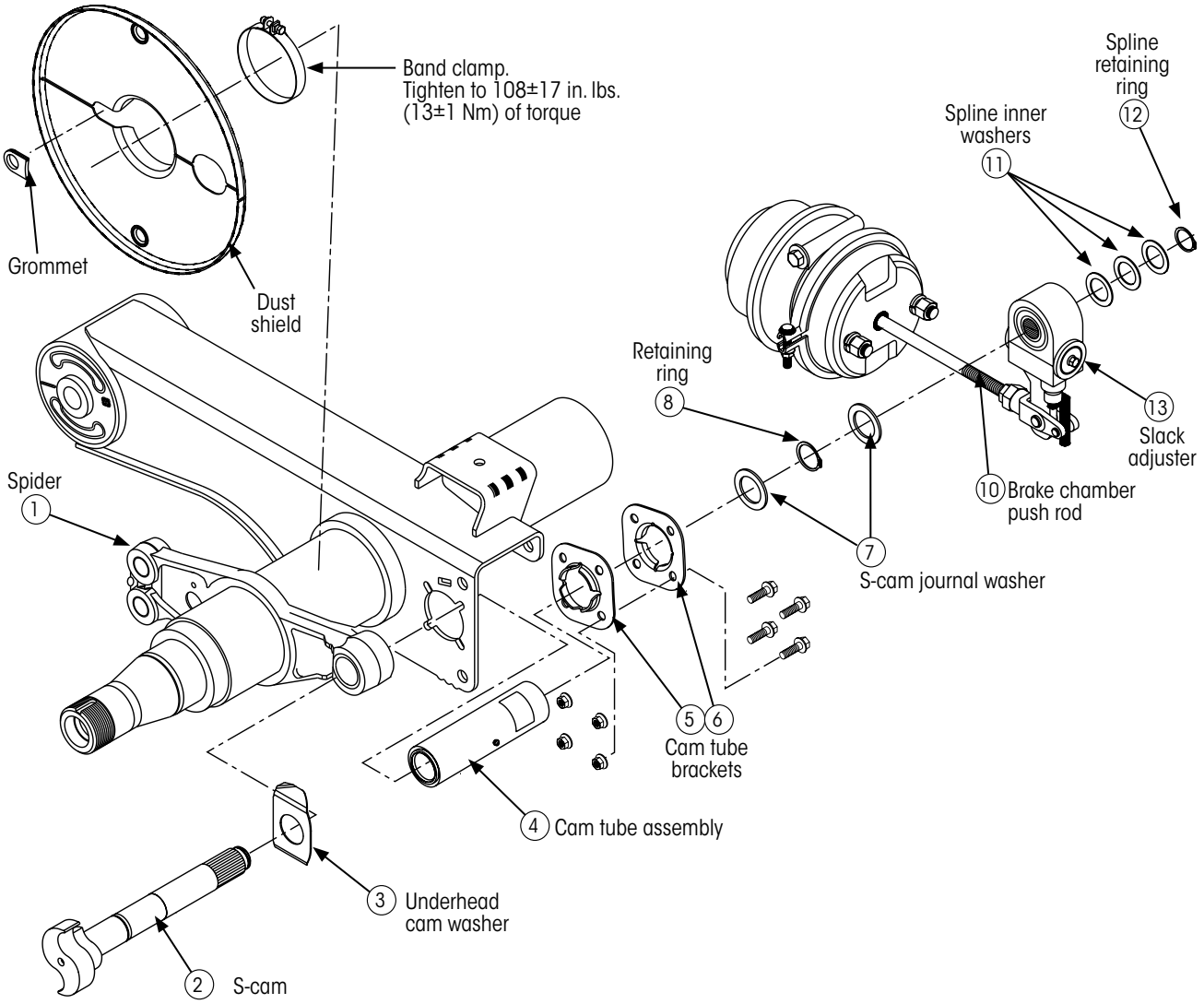
   D. **Wipe** away excess grease purged from joints. This will help prevent contaminants from being attracted to the lube points and grease from getting on the brake linings.

9. **Continue** brake service. Refer to the section titled SUSPENSION SYSTEM REVISION LEVEL IDENTIFICATION on page 7 for complete details.

AA230T REVISION LEVEL "C" LUBRICATION INTERVALS

Lubricate the spider S-cam and S-cam support bushing (items 5 and 9, Figure 6 on page 9) grease fittings monthly. Use EP NLGI #2 grease. Refer to L578 *Preventive Maintenance Guide* for more details.

NOTICE: Purging grease removes any collected moisture, contaminants or degraded lubricant. Continue to add grease until clean grease is visible.



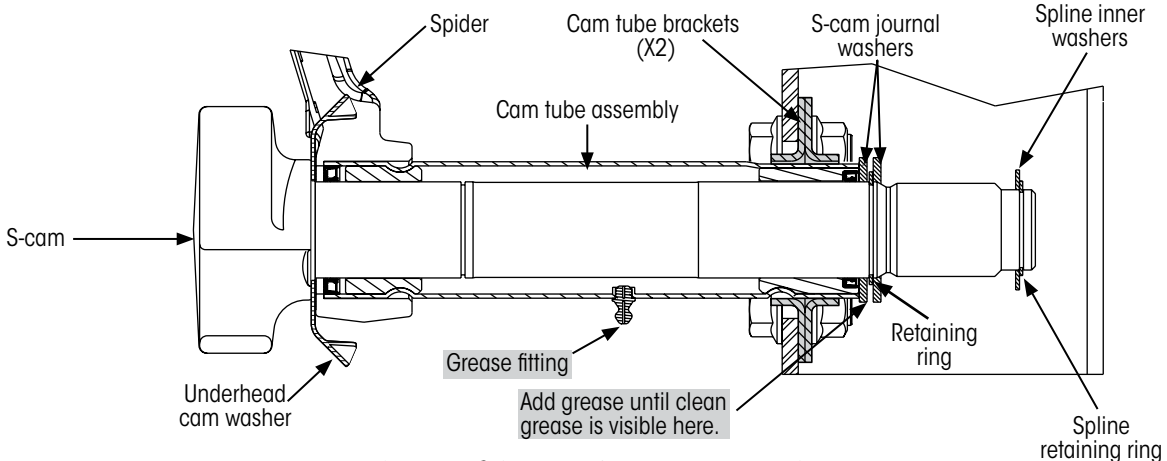


Figure 19: INTRAAX® Cam Tube System™ parts identification

INTRAAX® CAM TUBE SYSTEM™ MODELS

NOTE: These procedures also apply to current INTRAAX-SP®, VANTRAAX® and ULTRAA-K® suspension systems with INTRAAX axle/beam weldments included.

IMPORTANT: On Cam Tube System™ models, it is not necessary to remove the hub assembly to remove the S-cam. Once the cam tube assembly is removed, the S-cam can be slid past the hub.
If only the cam tube assembly (item 4, Figure 19 on page 18) is being removed (not the S-cam), start with Step 2. This can be done on the inboard side of the wheel without removing the hub, tire/wheel assembly or the brake drum.

1. **Remove** the tire/wheel assembly and the brake drum.
2. Using retaining ring pliers, **remove** the spline retaining ring (item 12, Figure 19 on page 18).
3. **Remove** the spline inner washers (item 11, Figure 19 on page 18).
4. **Disconnect** the brake chamber push rod (item 10, Figure 19 on page 18) from the slack adjuster (item 13, Figure 19 on page 18) by removing the cotter pin(s) and clevis pin(s) from the slack adjuster clevis. **DO NOT** adjust or remove the push rod jam nut at this time.
5. **Retract** the slack adjuster control arm(s) from the clevis. Refer to the section titled RETRACTING BRAKE SHOES OR SLACK ADJUSTER CONTROL ARM on page 28 for complete slack retracting details.
6. With the slack adjuster control arm(s) retracted from the clevis, **remove** the slack adjuster from the S-cam.
7. **Remove** the S-cam journal washer (item 7, Figure 19 on page 18).
8. Using retaining ring pliers, **spread open** the retaining ring (item 8, Figure 19 on page 18) and **remove** it from the groove in the S-cam (item 2, Figure 19 on page 18).
9. **Remove** the second S-cam journal washer (item 7, Figure 19 on page 18).
10. **Discard and replace** all worn parts with new.

REMOVING CAM TUBE ASSEMBLY

The cam tube assembly must be removed to remove the S-cam without removing the hub.

NOTE: L762 *INTRAAX®/VANTRAAX® Cam Tube Kit Installation* is included with aftermarket cam tube assemblies. This kit also includes new hardware.

1. **Loosen** and remove bolts that secure the cam tube brackets (items 5 and 6, Figure 19 on page 18) to the suspension beam.
2. **Remove** the cam tube brackets.

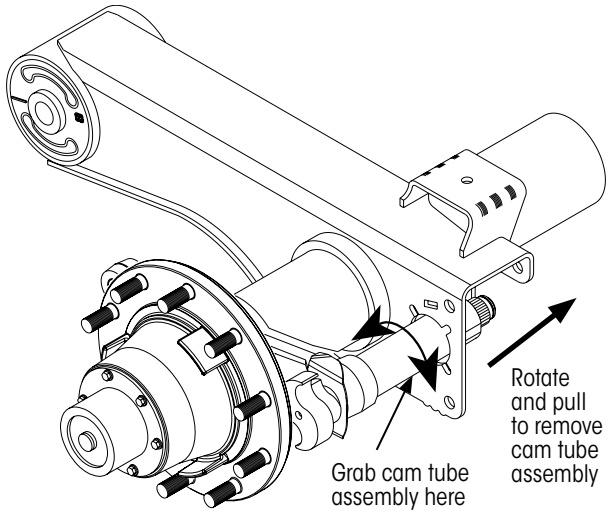


Figure 20: Cam tube assembly removal

3. **Pull** the cam tube assembly free from the spider (use a back-and-forth rotating motion) and **slide** it out through the mounting hole in the suspension beam (Figure 20).

NOTE: Since the cam tube assembly is a modular (one-piece) component, all bushings and seals remain inside and will also be removed and replaced with new.

REMOVING S-CAM

If changing the cam tube only, skip this procedure and go to INSTALLING CAM TUBE ASSEMBLY on page 21. Or *L762 Cam Tube Kit Installation*.

NOTE: On Cam Tube System models, it is not necessary to remove the hub assembly in order to install the S-cam. If only the cam tube assembly (item 4, Figure 19 on page 18) is being installed (not the S-cam), it can be done on the inboard side of the wheel without removing the hub, tire/wheel assembly or the brake drum. New hardware is supplied with a new cam tube assembly.

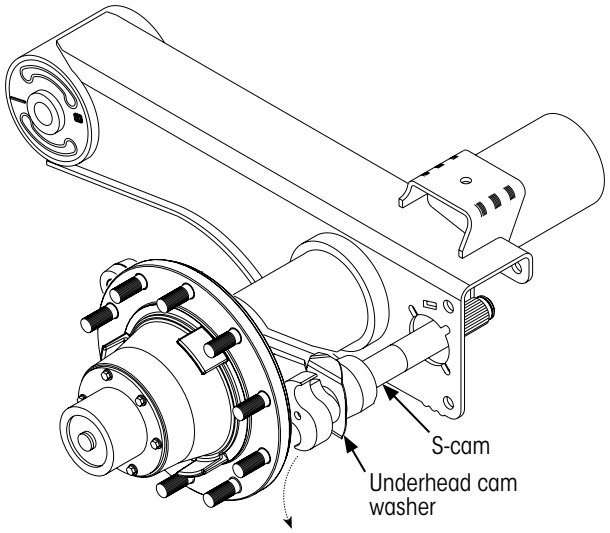


Figure 21: S-cam and underhead cam washer removal

1. **Remove** the S-cam and the underhead cam washer from the outboard side of the spider (Figure 21).
2. **Discard** the worn S-cam (item 2, Figure 19 on page 18), cam tube assembly (item 4, Figure 19 on page 18) and hardware.

INSTALLING S-CAM

1. **Thoroughly clean** the spider assembly to remove heavy amounts of dirt or grease.

⚠WARNING: DO NOT use gasoline or other flammable cleaning solvents to clean the spider assembly. These solvents can cause a fire or disperse harmful vapors.

2. **Thoroughly dry** the spider immediately after cleaning to prevent rusting or pitting of the machined areas. Use rags, paper towels or low-pressure air to dry the parts.

⚠CAUTION: Protect eyes and skin from particle penetration when using low pressure air.

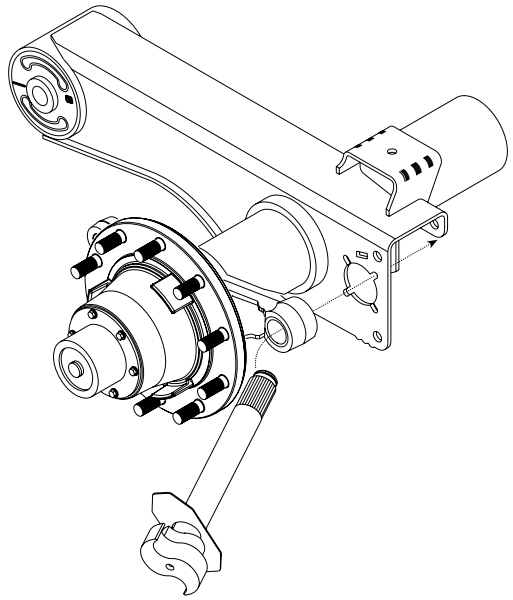


Figure 22: Installing the S-cam on Cam Tube System Models

3. **Slide** the underhead cam washer onto the S-cam until it contacts the S-cam head as shown in Figure 22.

IMPORTANT: S-cams have left-hand (driver's side) and right-hand (curb side) orientations. Ensure you install the proper S-cam for this wheel position so that the brake shoe rollers can properly engage the S-cam lobes.

To differentiate, hold the S-cam horizontally with the splines facing away from you and look at the S-cam head. With the S-cam in this position (refer to Figure 10 on page 12), the S-cam lobe that points upward indicates orientation, left or right side.

4. Angle and slide this S-cam assembly through the spider and beam (Figure 22).

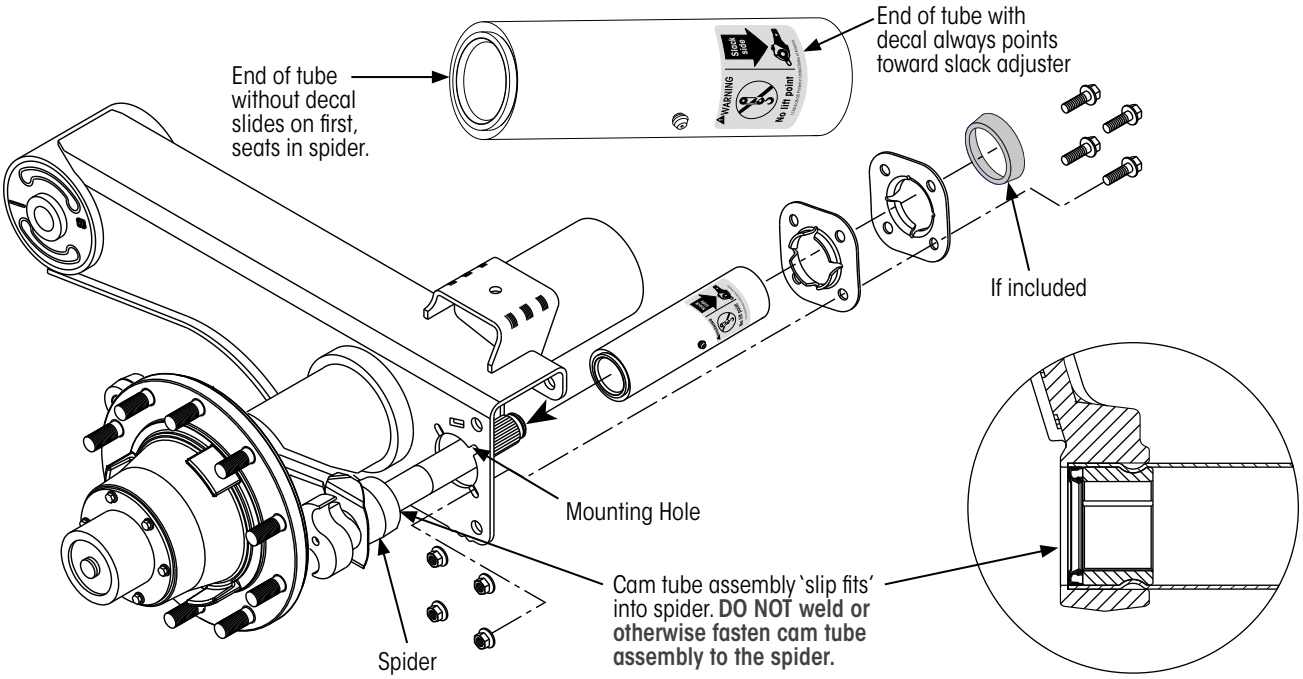


Figure 23: Cam tube assembly orientation and installation details Accessible grease fitting orientation

INSTALLING CAM TUBE ASSEMBLY

1. To aid assembly, **lightly lubricate** the internal seals and bushings on both ends of the new cam tube assembly with EP NLGI #2 grease.
2. **Orient** the end of the cam tube without the decal so that it goes onto the camshaft first (Figure 23). The end of the cam tube with the decal must be closest to the slack adjuster.
3. From the inboard side of the suspension beam, **slide** the new cam tube assembly onto the new S-cam, through the mounting hole in the suspension beam and into the spider as shown in Figure 23.
4. **Rotate** the cam tube so the grease fitting is accessible (either pointing downward or to the rear) when the drums are installed (Figure 24).

IMPORTANT: Do not weld or otherwise fasten the cam tube assembly to the spider. The cam tube assembly 'slip fits' into the spider.

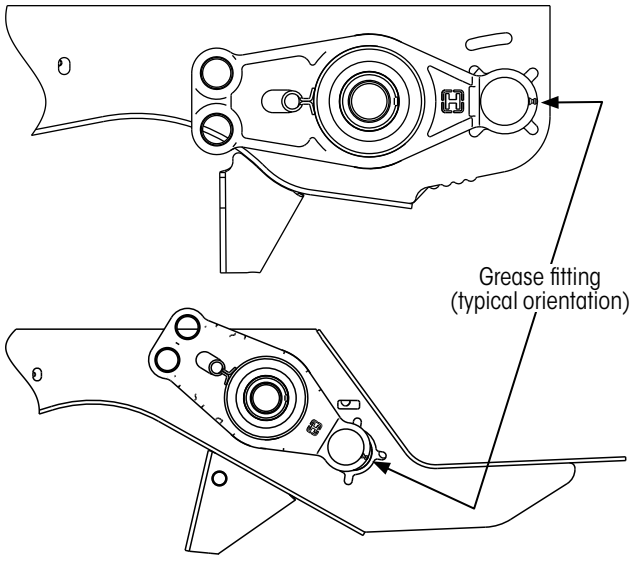


Figure 24: Accessible grease fitting orientation

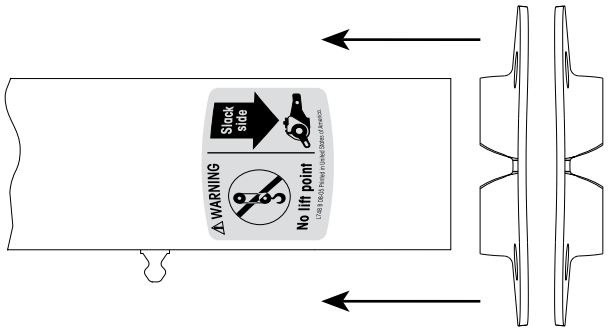


Figure 25: Install brackets back-to-back on cam tube

5. **Arrange** the two cam tube brackets back-to-back (Figure 25) and **slide** them onto the end of the cam tube assembly until they contact the suspension beam.

6. **Rotate** the cam tube brackets so their holes align with the holes (or slots) in the suspension beam. If necessary, **rotate** the cam tube so the grease fitting is accessible (either pointing down or to the rear) when the drums are installed.

7. **Install** the four nuts and bolts. **Tighten** to 40±5 ft. lbs. (55±6 Nm) of torque.

8. **Slide** the S-cam journal washer (item 7, Figure 19 on page 18) onto the S-cam and **seat** it against the cam tube assembly.

9. Using retaining ring pliers, **hold open** the retaining ring (item 8, Figure 19 on page 18), and **slide** it on the end of the S-cam.

10. **Lock** the retaining ring into the groove on the S-cam.

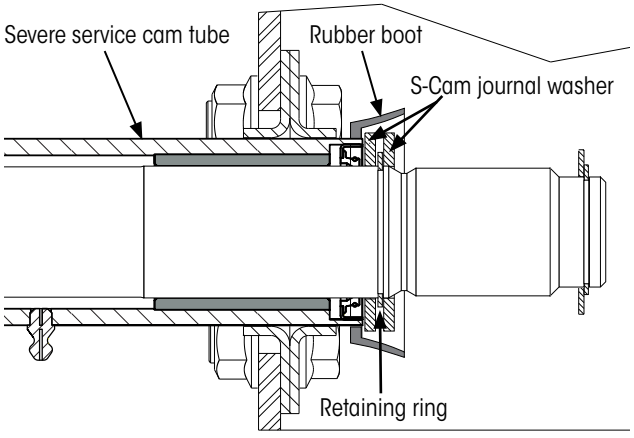


Figure 26: Severe service cam tube assembly

11. (**Severe service cam tube only**) Snap rubber cam tube boot (Figure 26) over and behind S-cam journal washer installed in Step 8.

12. **Slide** the second S-cam journal washer onto the S-cam and seat it against the retaining ring (Figure 26).

13. **Lubricate** the single, centrally-located grease fitting with EP NLGI #2 grease as follows:

    A. **Wipe** off the grease fitting before lubricating. This will help prevent contaminants from being injected into the grease fitting along with the grease.

    B. **Fill** the cam tube assembly with EP NLGI #2 grease until clean grease can be seen purging from the cam tube inboard seal (Figure 19 on page 18).

    C. **Wipe** away excess grease purged from joints. This will help prevent contaminants from being attracted to the lube points and grease from getting on the brake linings.

14. **Lubricate** the splines of the S-cam with an anti-seize lubricating compound.

15. Refer to installing slack adjuster on s-cam on page 27 to install the slack adjuster. **Refer to** Figure 19 on page 18 for locating spline inner washer (item 11) and spline retaining ring (item 12).

16. **Continue** brake service. Refer to the section titled BRAKE SHOE INSTALLATION - ALL MODELS on page 29 for complete details.

CAM TUBE LUBRICATION INTERVALS

Lubricate each of the single, centrally-located grease fittings (two per axle) monthly. Use EP NLGI #2 grease. Refer to L578 *Suspension Inspection and Lubrication* for more details.

NOTICE: Purging grease removes any collected moisture, contaminants or degraded lubricant. Continue to add grease until clean grease is visible.

TRLAXLE® CONNEX® & HSDS AXLE S-CAM MAINTENANCE

The above products can be configured with or without cam tubes. The following illustrations show Hendrickson's TRLAXLE Non-Integrated Trailer axles. Replacement procedures are similar to applicable procedures included in this document. Exploded views of TRLAXLE S-cam assemblies are shown in Figure 27 as well as Figure 28 on page 24. For more details on TRLAXLE

A. For Hendrickson's TRLAXLE without a cam tube, refer to AA230T REVISION LEVELS "A" AND "B" (WITHOUT CAM TUBE) on page 10.

B. T71002 *TRLAXLE Clamp Mount Cam Tube Kit Installation*.

C. T71003 *Weld Mount Cam Tube Kit Installation*.

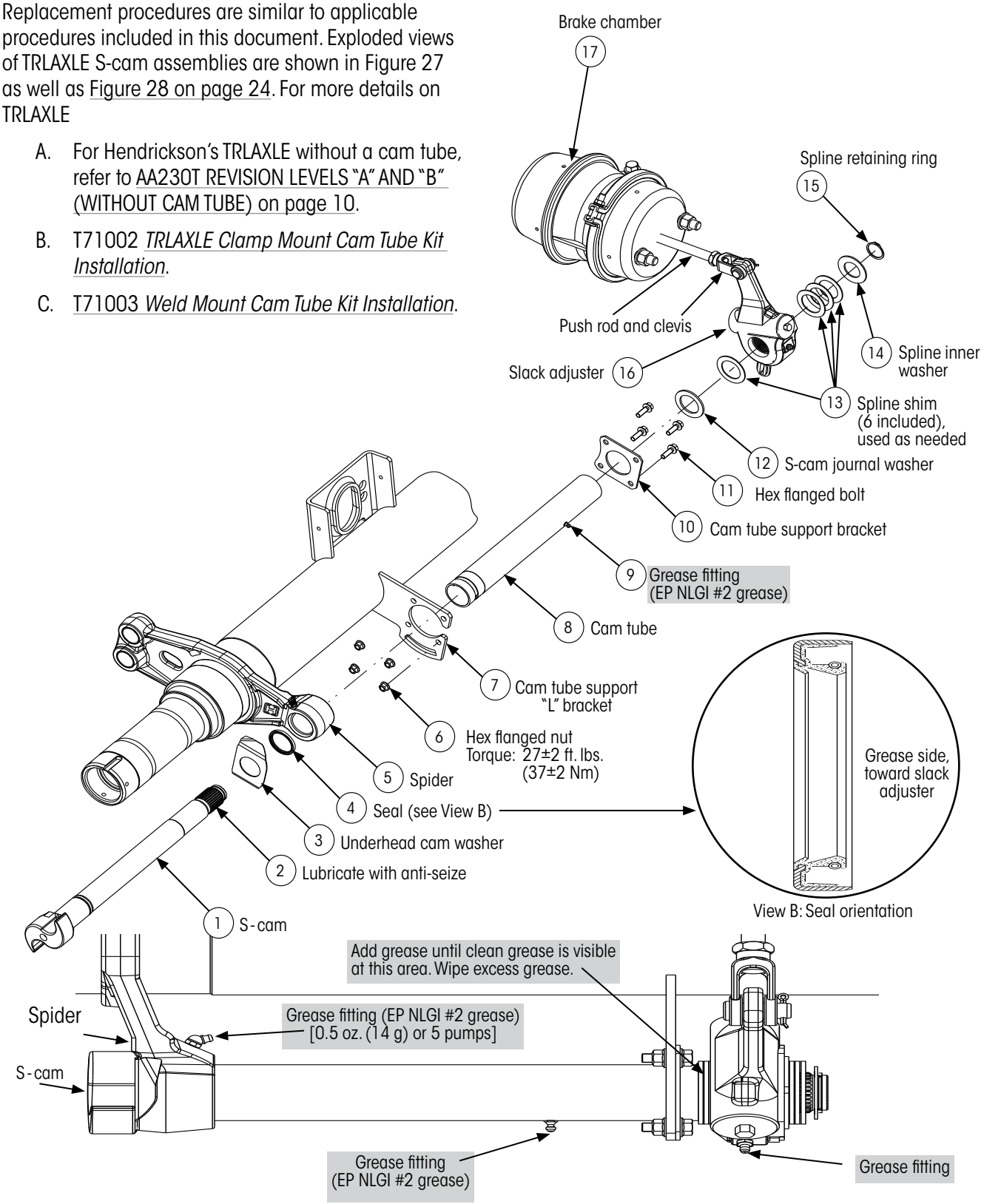


FIGURE 27: Trlaxle® weld-mount cam tube assembly

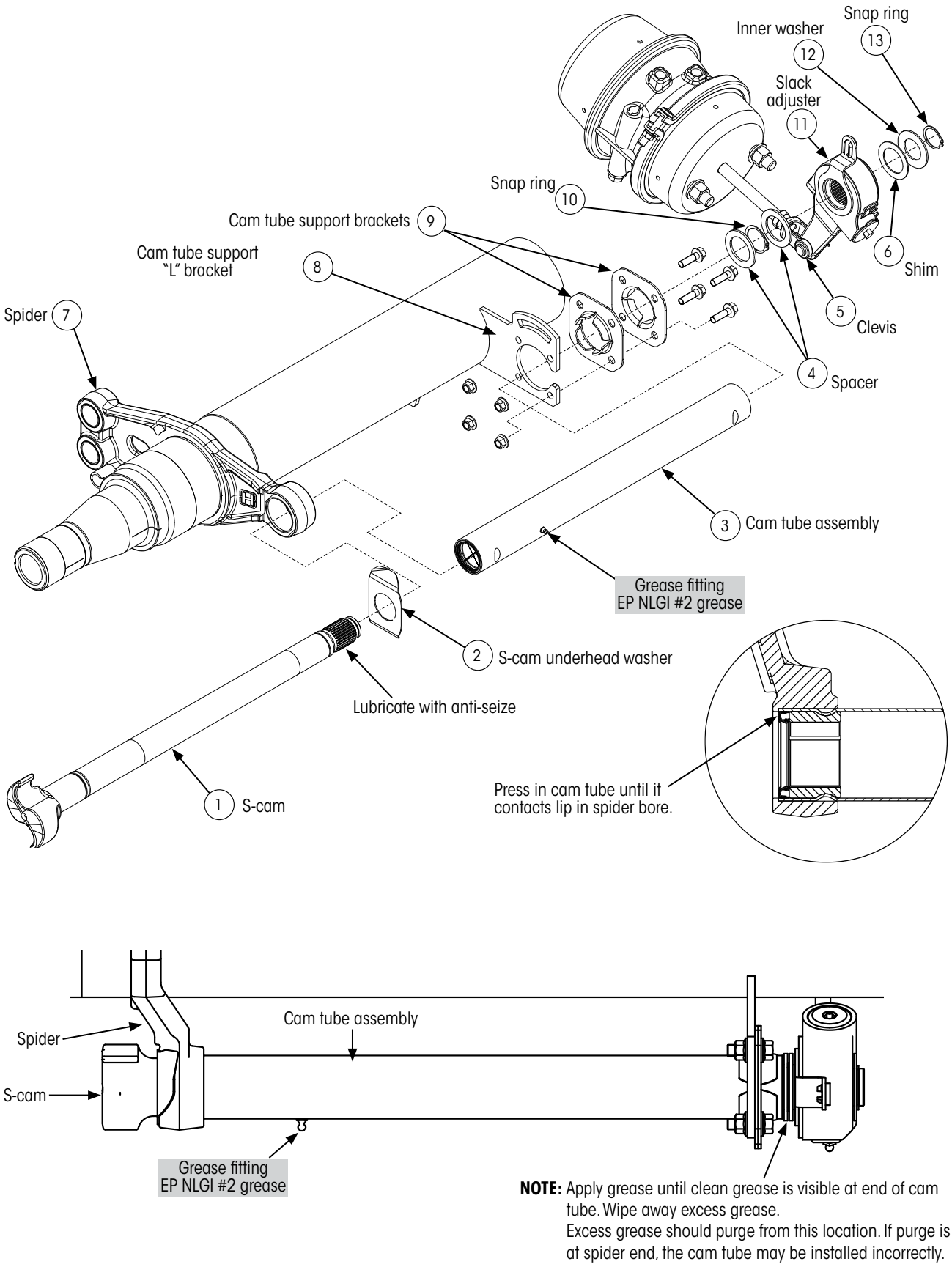
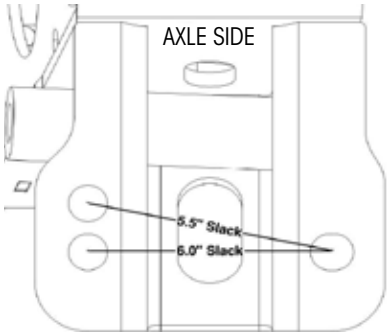


Figure 28: TRLAXLE® cam tube assembly with dual support brackets

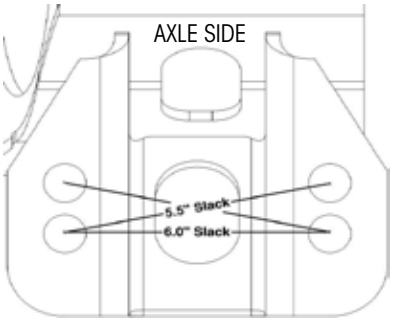
BRAKE CHAMBER REPLACEMENT

Before removing brake chamber, be sure to mark or record the current mounting holes used and brake chamber orientation for air fittings and hoses.

Depending on slack adjuster size, place brake chamber studs in bracket holes as shown in the applicable figures. Refer to Hendrickson literature number B31 Torque Specifications for torque values.

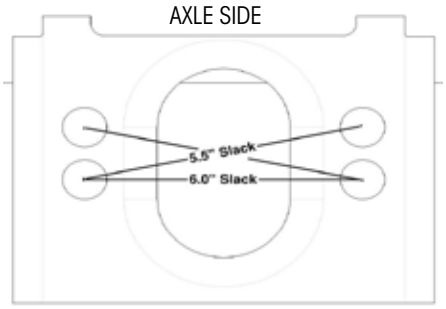


3-Hole brake chamber bracket

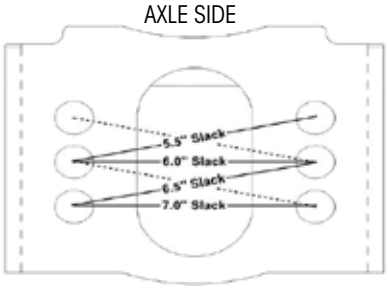


4-Hole brake chamber bracket

Figure 29: INTRAAX® brake chamber mounting stud position

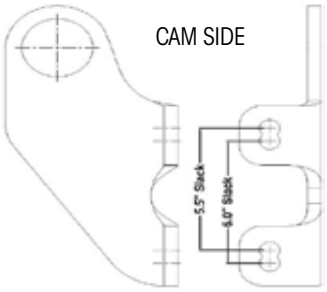


4-Hole brake chamber bracket



6-Hole brake chamber bracket

Figure 30: TRLAXLE® brake chamber mounting stud position



4-Hole brake chamber bracket

Figure 31: CONNEX® ST brake chamber mounting stud position

CAGING BRAKE CHAMBER

⚠DANGER: Do not attempt to mechanically cage the spring on a brake chamber if it shows structural damage. Caging the spring or disassembly of the damaged chamber may result in the forceful release of the spring chamber and its contents which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE. Remove complete brake chamber and replace with new.

⚠DANGER: DISARM brake chamber before discarding old brake chamber. To disarm, follow manufacture's instructions. Failure to disarm assembly prior to disposal may, in time, result in spontaneous release of the brake chamber and its contents, which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

IMPORTANT: Always block wheels to prevent vehicle rollaway when performing any brake maintenance.

1. Remove dust plug from key hole in center of brake chamber Figure 32.

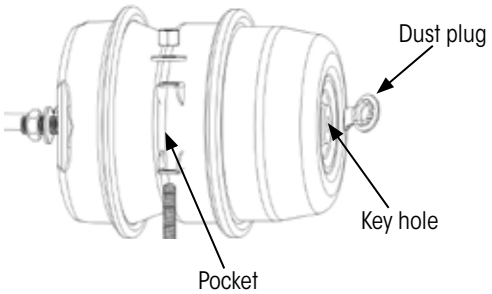


Figure 32: Release tool assembly

2. Remove release tool assembly from side pocket Figure 32.

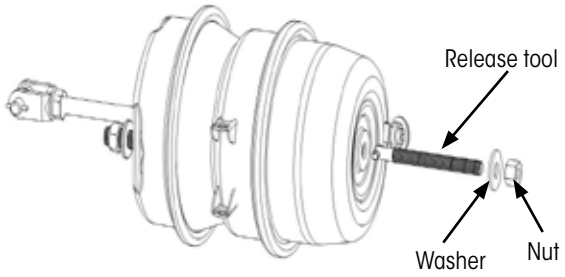


Figure 33: Caging brake chamber

3. **Insert** release tool through key hole in chamber into the spring piston Figure 33.
4. Turn release tool 1/4 turn **clockwise**.
5. **Pull** on release tool to ensure stud crosspin is properly seated in the spring piston.
6. Assemble release tool washer and nut on release stud, **finger tighten** only Figure 33.

⚠DANGER: The below listed instructions only apply when the brake chamber is not pressurized. If air pressure is used to compress the spring, do not tighten release tool more than finger tight. Torquing the release tool nut while the brake chamber is pressurized can cause spring piston damage resulting in sudden release of the brake chamber which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/ OR PROPERTY DAMAGE. Air pressure must be released after caging, prior to any disassembly.

7. Turn release tool nut clockwise with hand wrench and make certain push rod is retracting.
   A. Caging the chamber is easier if air pressure (100-120 PSIG; 6.6-8.0 BAR) is used to collapse the power spring before turning the release tool nut with a hand wrench. Proper caging will be complete when a slight resistance is felt after turning the release tool nut. Release the air pressure after caging prior to any disassembly.

IMPORTANT: Do not over torque release tool assembly. Over torquing release tool can cause spring piston damage.

NOTE: Seat brake chamber dust plug (Figure 32 on page 25) by pressing down and rotating plug back and forth until fully seated. Tug on tether of dust plug to confirm dust plug is seated.

PUSH ROD LENGTH

Hendrickson supplied brake chambers do not require modification. The push rods are precut to length when ordering by model number. Otherwise the pushrod may need to be cut to length as indicated by Figure 34 and Table 4.

IMPORTANT: The **brake chamber must be caged** in the released position when measuring and cutting the push rod. Refer to brake chamber manufacturer's documentation for more details.

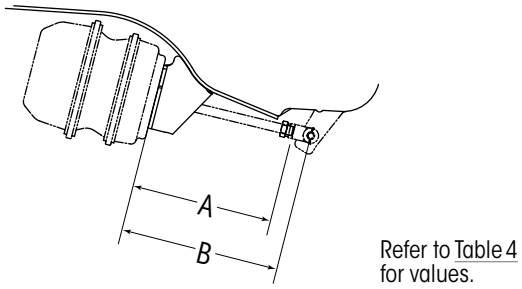


Figure 34: Brake chamber push rod length

SUSPENSION TYPE	A[1]	B[2]
AAT, AANT, HKAT, HKANT	9.8 (249 mm)	11.1 (282 mm)
AAL, AANL, AANLS, AAEDT, AAEDL, CONNEX®, HKAL, HKANL, HKARL, HSDS®	5.6 (142.2 mm)	7.0 (178)

[1] Figure 34, brake chamber face to clevis.
[2] Figure 34, brake chamber face to clevis pin.

Table 4: Brake chamber push rod length dimensions

If necessary, refer to Hendrickson's common components installation drawing D-25266 available at www.Hendrickson-intl.com/TrailerLit. D-25266 also includes push rod length data.

AUTOMATIC BRAKE (SLACK) ADJUSTER INSTALLATION

Although the procedures in this section may be used to replace some slack adjusters, refer to trailer OEM or applicable slack adjuster manufacturer's manual for installation and adjustment procedures.

These procedures assume the brake chamber has not been removed. If necessary, refer to BRAKE CHAMBER REPLACEMENT on page 25.

NOTE: Hendrickson S-cam hardware is not included with aftermarket slack adjusters.

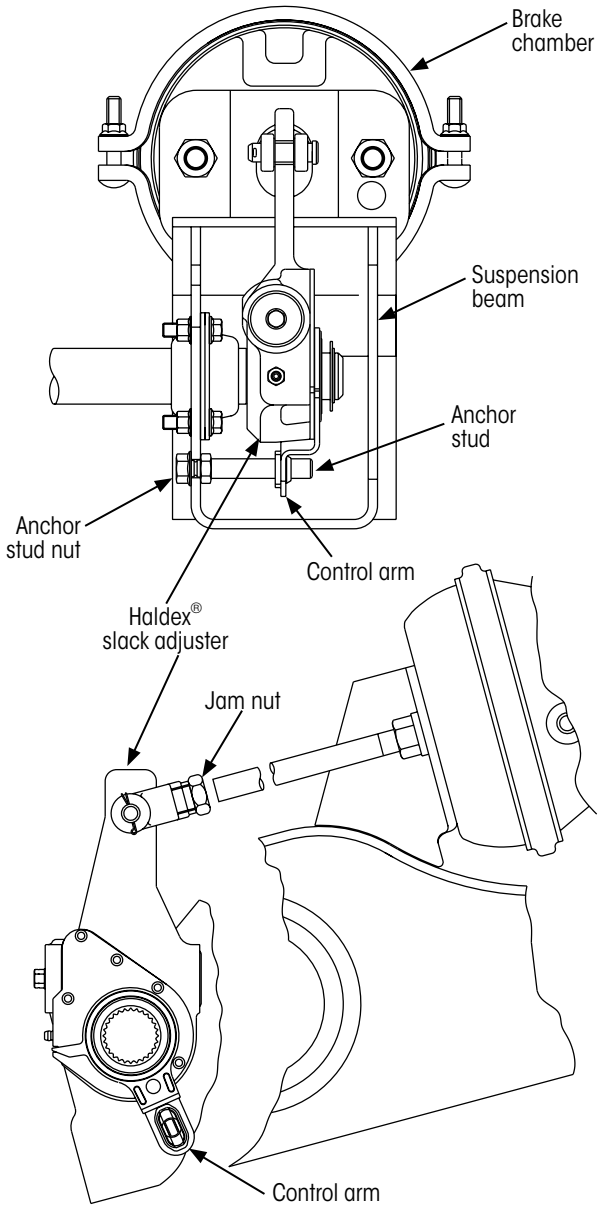


Figure 35: Sample Haldex slack adjuster with the fixed pin reference

INSTALLING SLACK ADJUSTER ON S-CAM

IMPORTANT: Once connected to the brake chamber push rod, the slack adjuster will self-align on the S-cam. The spline inner washers may need to be adjusted to act as shims and minimize play. The play must not exceed 0.060 inches (1.5 mm).

1. If not already done so, **lubricate** the splines of the S-cam with an anti-seize lubricating compound.
2. **Orient** the slack adjuster so the adjusting screw faces away from the brake chamber and **slide** slack adjuster over the spline gear according to manufacturer's instructions.

NOTE: A spline inner washer may be required before the slack adjuster.

3. Using retaining ring pliers, **hold open** the retaining ring, and **slide** it on the end of the S-cam.
4. **Lock** the retaining ring into the groove on the S-cam.

CONNECTING SLACK ADJUSTER TO BRAKE CHAMBER

Refer to the trailer OEM or slack adjuster manufacturer's documentation for more current and complete instructions.

PREPARING ALL BRAKE (SLACK) ADJUSTERS FOR INSTALLATION

1. Ensure the brake chamber push rod is **fully retracted**.
   A. If an air supply is available, apply air to the parking brake to fully retract the brake chamber push rod.
   B. If an air supply is not available, the parking brake must be manually caged to retract the brake chamber push rod. Refer to CAGING BRAKE CHAMBER on page 25.
2. **Check** the operating condition of the foundation brakes including drums, shoes and linings, cams, bushings, rollers, etc. **Replace or repair** as necessary.
3. **Remove** the existing clevis assembly from the push rod. New clevis hardware will be installed with the new slack adjuster. **DO NOT** adjust or remove the push rod jam nut.

SLACK ADJUSTER LUBRICATION INTERVALS

Lubricate the slack adjuster grease fittings every three months. Use EP NLGI #2 grease. Refer to L578 *Suspension Inspection and Lubrication* for more details.

NOTICE: Purging grease removes any collected moisture, contaminants or degraded lubricant. Continue to add grease until clean grease is visible.

RETRACTING BRAKE SHOES OR SLACK ADJUSTER CONTROL ARM

Figure 36: Typical slack adjuster location

In some instances it may be necessary to retract the slack adjuster (Figure 36) and brake shoes during servicing to:

A. Allow the drum to clear the brake shoe/lining assembly when removing.

B. Separate the slack adjuster control arm(s) from the clevis so the slack adjuster can be removed from the S-cam.

In each of these cases, the brake shoes or the slack adjuster control arm(s) are retracted by rotating a manual adjusting nut on the automatic slack adjuster.

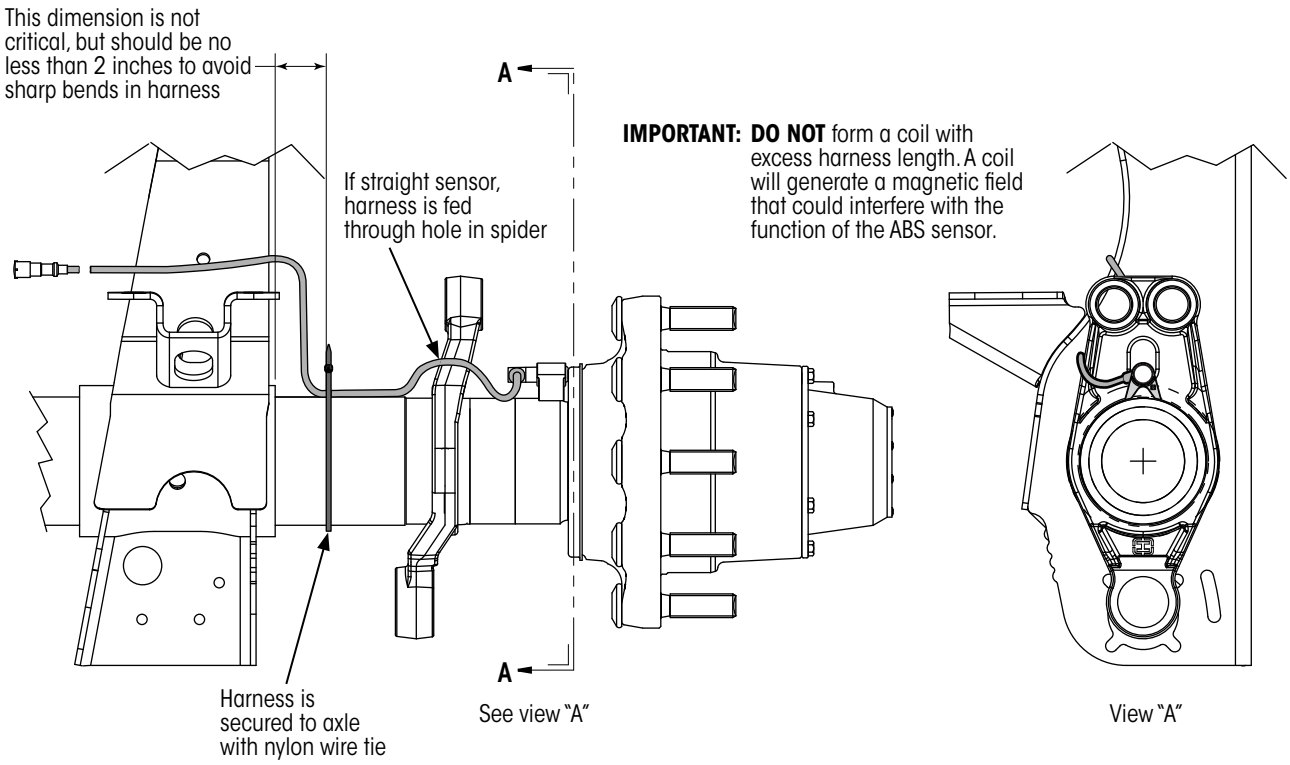


Figure 37: ABS Sensor wiring harness installation details

ABS SENSOR INSTALLATION

It is the original equipment manufacturer's responsibility to secure the ABS sensor wiring harness to the axle when an ABS system is installed on a Hendrickson suspension. When installing an ABS system, ensure the sensor wiring harness is:

A. If 90° sensor, **fed around** spider (Figure 37).

B. If straight sensor, **fed through** the hole in the spider (Figure 37).

C. **Fastened securely** to the axle between the beam and the spider (Figure 37) with a nylon wire tie.

D. **Not in danger** of rubbing or chafing against the brake drum or any other suspension components.

NOTE: If the installation results in excess cable, wrap excess ABS cable around the axle, between the beam and spider, and secure the last two wraps with a small zip tie.

IMPORTANT: DO NOT form a coil with the excess cable. A coil will generate a magnetic field that could interfere with the function of the ABS sensor.

BRAKE SHOE INSTALLATION - ALL MODELS

Hendrickson recommends using only Hendrickson brake shoe and brake overhaul kits. These kits contain OEM quality parts that maximize brake life and optimize brake performance.

⚠ CAUTION: To prevent a possible health hazard, wear approved eye protection and a respirator when working on or near the brakes.

NOTE: Suspensions with standard brakes built prior to March 14, 2000 used the standard S-cam shown below. However, the HXS® Hendrickson Extended Service™ brake S-cam is now used in all current production and for any field replacement.

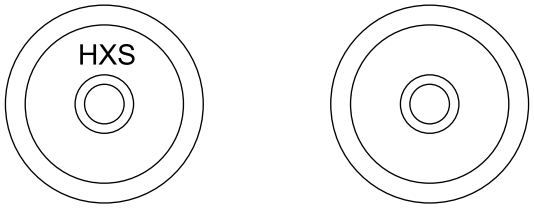


Figure 38: Identifying the type of brake S-cam

IMPORTANT: **DO NOT** install HXS brake shoes in a brake assembly with the standard S-cam. HXS brake shoes must be installed with an HXS brake S-cam. The spline end of the HXS brake S-cam will be engraved with the letters "HXS" to identify it as an HXS brake S-cam (Figure 38 on page 29). The HXS S-cam has a different profile to accommodate the thicker HXS brake shoe linings. If necessary, change the brake S-cam to an HXS model if installing HXS brake shoes.

Nut

For 12.25-inch brakes, only Hendrickson HXS brake shoes will fit properly to the spider and S-cam.

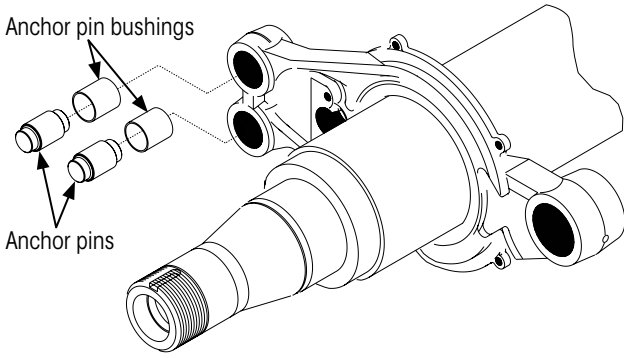


Figure 39: Installing new anchor pins and anchor pin bushings

1. **Inspect** the anchor pin bushings in the spider. Remove and replace if necessary (Figure 39).

   NOTICE: Excessive pounding on anchor pins to remove or install them can damage the pins and cause misalignment of the brake spiders and brake shoes. The use of a soft hammer or brass drift is recommended to remove or install the anchor pins if necessary.

2. **Apply** anti-seize compound to inside surface (ID) of anchor pin bushings.

3. **Install** the anchor pins (Figure 39).

4. Pre-lubricate brake shoes as indicated in Figure 41.

IMPORTANT: Lubricant is only desired on the ends of the brake shoe rollers. Avoid getting lubricant on the middle of the rollers where they contact the S-cam.

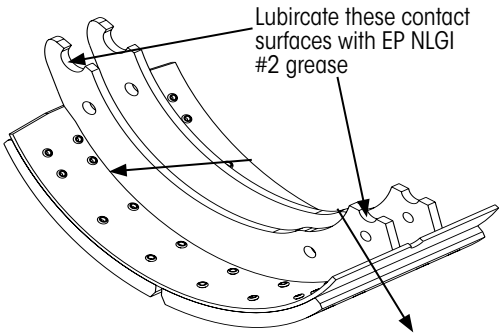


Figure 40: Pre lubricating brake shoe contact surfaces

5. If necessary, **install** a return spring pin (See Figure 42 on page 31) in the replacement upper and lower brake shoes.

6. If necessary, **install** the brake shoe rollers and roller retaining clips on the upper and lower brake shoes.

7. Securely **lock** the roller retaining clip in the brake show web holes (Figure 41).

8. **Put** the upper brake shoe in position, resting the brake shoe webs on the anchor pin.

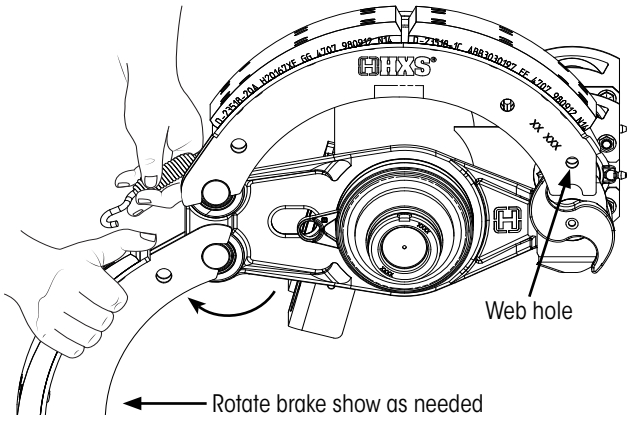


Figure 41: Attaching new brake retaining springs

9. **Hook** the brake return spring to the return spring pin in the upper brake shoe.

10. **Attach** the return spring to the lower brake shoe.

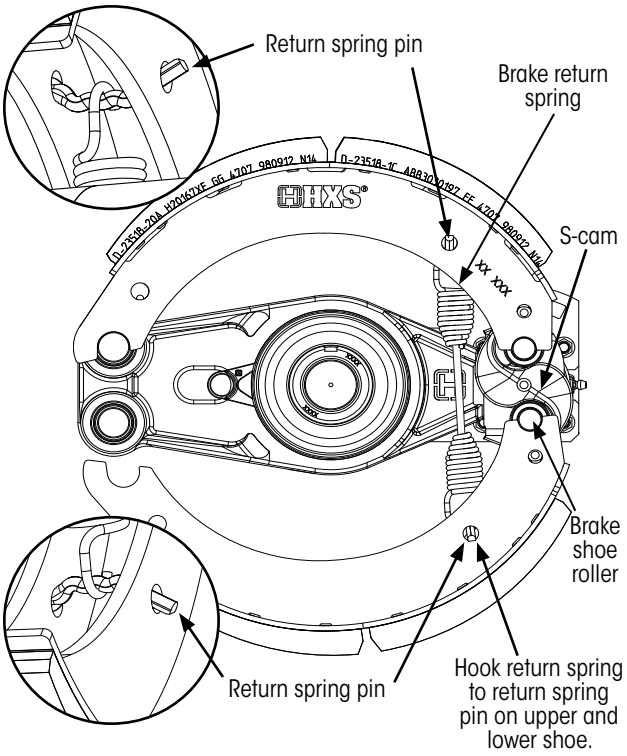


Figure 42: Lower brake shoe on S-cam

11. **Position** the lower brake shoe roller on the S-cam (Figure 42).

12. **Swing** the lower brake shoe into position over the anchor pins using the S-cam-to-roller contact as a pivot point.

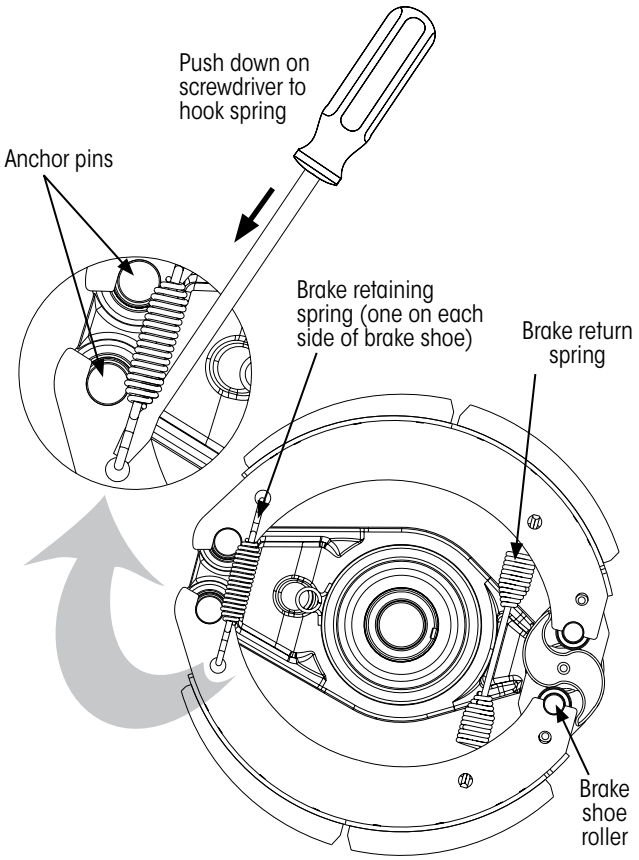


Figure 43: Installing brake retaining spring using **Tool A**

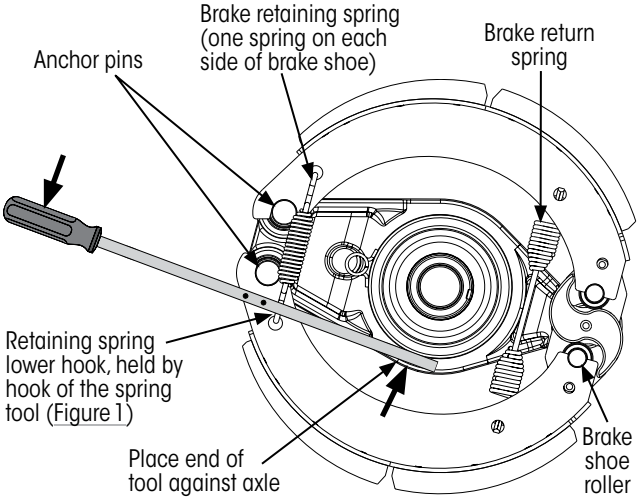


Figure 44: Installing brake retaining spring using **Tool B**

13. While **manually supporting** the lower brake shoe, use Tool A (Figure 43) or Tool B (Figure 44) to **hook** both brake retaining springs onto the anchor end of the brake shoes.

NOTE: Alternatively, **Tool B** can be applied to the top end of the spring for removal or installation. In doing so, the applied force is reversed.

14. **Refer** to INSTALLING BRAKE DRUM AND TIRE/WHEEL ASSEMBLY to **install** the brake drum and the tire/wheel assembly or follow manufacturer's recommended procedure.

15. **Adjust** the brakes following the brake (slack) adjuster manufacturer's recommended procedure.

NOTE: Vendor links to literature and support information can be found on the Hendrickson website at www.Hendrickson-intl.com/TrailerLit, Brake & Wheel-end Components.

INSTALLING BRAKE DRUM AND TIRE/WHEEL ASSEMBLY

Both hub pilot and stud pilot wheel mounting systems can be used on Hendrickson suspensions.

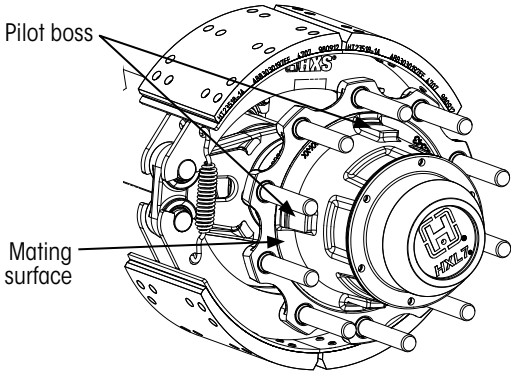


Figure 45: Sample hub piloted wheel-end

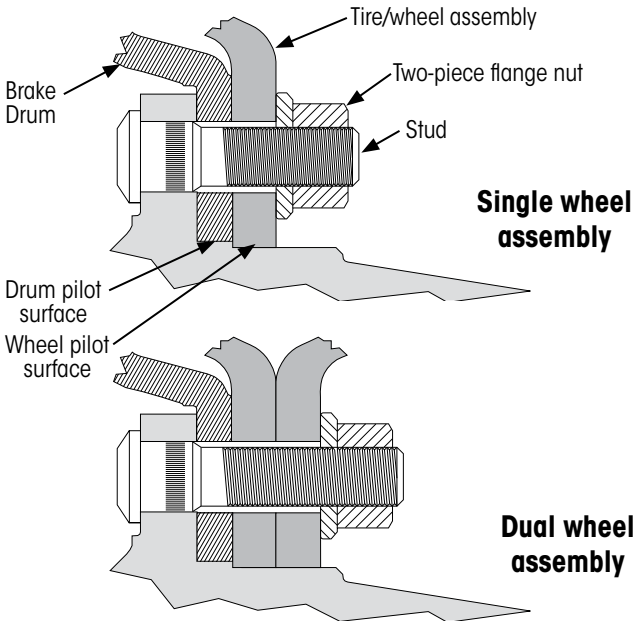


Figure 46: Drum hub piloted wheel mounting system

With the hub pilot system (Figure 45 and Figure 46), pilot bosses, which are machined into the hub, center the brake drum and tire/wheel assembly on the hub. The entire wheel assembly is fastened together by a single flange nut on each wheel stud for both single and dual wheel applications.

With the stud pilot system (Figure 47), also known as the ball seat, ball seat cap nut or double cap nut system), the brake drum is centered on a pilot boss just like the hub pilot system, but a spherical radius contact area between the mounting nut and the wheel centers the wheel on the hub. The entire wheel assembly is fastened together by a single cap nut on each wheel stud (for single wheel applications) or by inner and outer cap nuts on each wheel stud (for dual wheel applications).

The following information is intended to provide basic brake drum and wheel installation instructions. Finer details such as whether or not to use a corrosion inhibitor, whether or not to lubricate the hub pilots, whether to use a wheel dolly or a sling, etc., are left to the reader's discretion. Refer to the hub and/ or wheel manufacturer's installation instructions and your company's maintenance, service and installation practices for complete installation details.

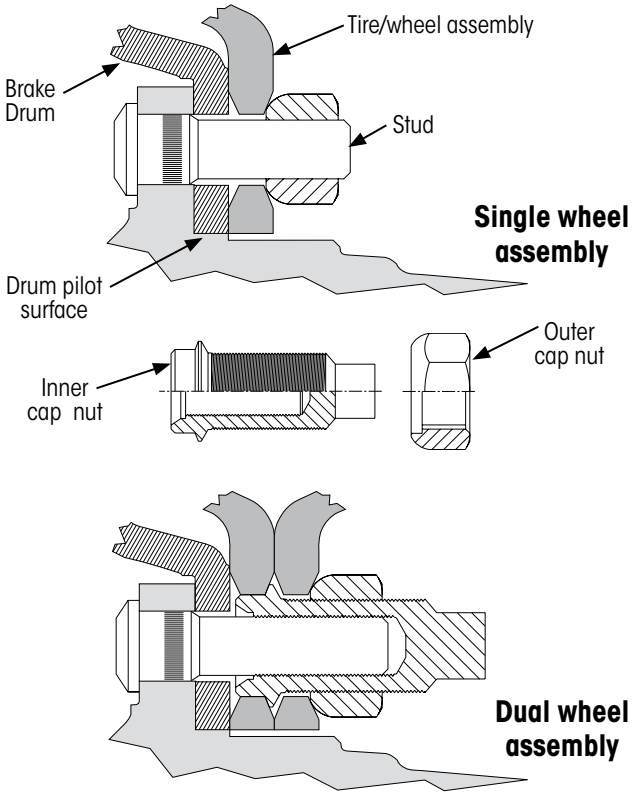


Figure 47: Drum stud piloted wheel mounting system

INSTALLATION PROCEDURES

⚠WARNING: Read and follow the outlined instructions when installing or servicing the hub, improper installation could result in property damage, injury, or death.

1. **Clean** all mating surfaces on hub, drum, wheels and nuts.
2. **Rotate** hub so a pilot boss is at the top (12 o'clock) position.
3. **Mount** brake drum on hub so it seats on drum pilot and against hub face.

If reusing two-piece flange nuts, apply one drop of SAE 30W motor oil on the beginning two or three threads of the stud and apply two drops at the point between the flange and hex of the nut.

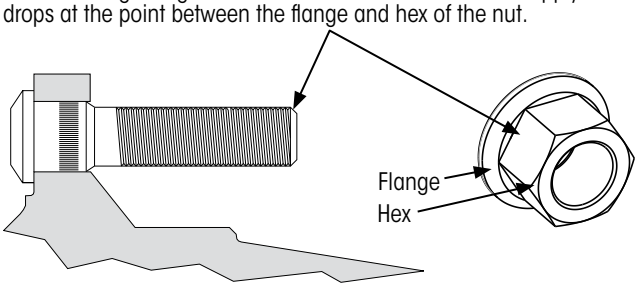


Figure 48: Lubricating stud and two-piece flange nut

4. Before reusing two-piece flange nuts that have already been used in service:
   A. **Inspect** the nut to ensure it is in good condition and the flange continues to rotate freely. If not, discard and replace with new.
   B. **Apply** one drop of SAE 30W motor oil on the beginning two or three threads of the stud.
   C. **Apply** two drops at the point between the flange and hex of the nut (Figure 48).
5. **Mount** wheel(s) on hub. Wheel nuts can be started in order to hold wheel and drum into position.
6. **Snug** top (12 o'clock) and bottom (6 o'clock) wheel nuts and apply 50 ft. lbs. (68 Nm) of torque to draw wheel and brake drum fully against the hub.
7. **Inspect** to ensure proper assembly with wheel and brake drum positioned on pilot bosses before Installing remaining wheel nuts.

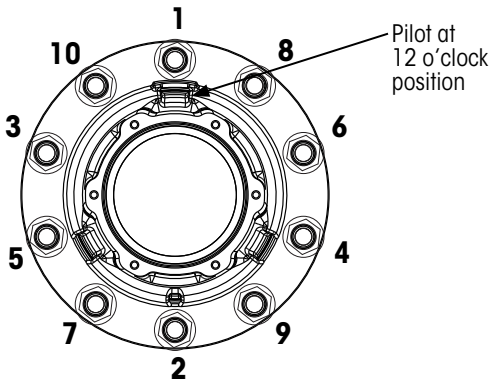


Figure 49: 10 stud tightening sequence

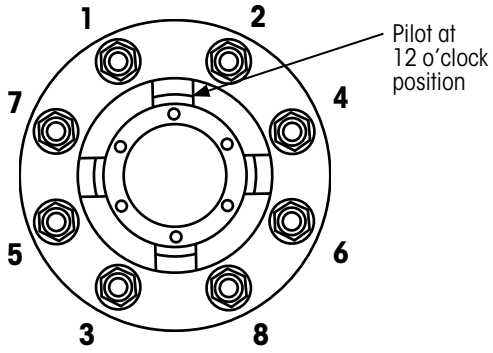


Figure 50: 8 stud tightening sequence

8. Using the applicable sequence (Figure 49 or 50), **tighten** all wheel nuts to 50 ft. lbs. (68 Nm) of torque.
9. Repeating sequence, **retighten** all wheel nuts to a **final torque of 475±25 ft. lbs. (680±30 Nm).**
10. **Check** seating of wheel and brake drum at the pilot bosses. Rotate wheel and check for any rotational irregularity.

⚠CAUTION: Re-torque all wheel nuts after 50 to 100 miles travel. Proper torque is essential for the service, life and integrity of the wheel end.

WHEEL STUD REMOVAL AND Installation PROCEDURE

Refer to Hendrickson literature number T82006 *Stud Replacement Procedures* for detailed instructions for replacing studs.

NOTES:

NOTES:

*Call Hendrickson at **866.RIDEAIR (743.3247)** for additional information.*

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L974 Rev E 11-23 CN 043058 L974 Rev D 08-22 CN039317 Rev C 09-18 ECN 31302 Rev B 11-14 ECN 21150 Rev A 12-10 ECN 19369