



CHAMBER CUSTOMIZATION GUIDE

TSE Brakes, Inc.

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USA Patents:

5,285,716 5,758,564
5,791,232 5,829,339
6,129,004 6,131,501
Other patents pending

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Brake Chamber Clamp Repositioning Instructions

1. Put the unit on a work surface. It is strongly recommended not to unclamp or re-clamp a unit that is attached to the vehicle in place for use. To ensure a leak-free unit, this procedure should be done on a shop bench or similar work area.

2. If the unit is a service chamber, proceed to step 3. If the unit is a combination brake, make sure that the chamber is caged. (See page 4 for instructions regarding caging a spring brake). After the spring brake has been caged, proceed to step 3.

IMPORTANT: In order to unclamp the service side of a spring brake, first cage the power (main) spring. Failure to do so makes disassembly more dangerous and re-assembly very difficult, typically resulting in service side leaks.

3. Place the chamber in a vertical position with the air ports in front of you (Fig. 1). Place a vise grip pliers on the pushrod to prevent sudden separation of the service base from the piggy back. Be careful not to damage the threads.

NOTE: Make sure the vise grip pliers are secured on the pushrod.

See Figure 1

4. With the vise grip pliers in place, you can loosen the clamp nuts. This can be done by hand with a wrench or pneumatic gun. Use a 9/16" socket.

See Figure 2.

5. After loosening both clamp nuts, remove one clamp nut and bolt in order to remove the clamp. Now, the service side housing can be rotated. Adjust the mounting bolts position relative to the air ports.

See Figure 3.

FIGURE 1



FIGURE 2



FIGURE 3





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Brake Chamber Clamp Repositioning Instructions (cont.)

6. Once the components are rotated to the desired position, re-clamp the unit. Pay special attention to the seating of the diaphragm, making sure it is centered and flush to the housing all around. Push the service side housing onto the diaphragm and put the clamps back on. Install clamp hardware, and hand tighten the nuts. Alternately tighten the nuts with a wrench so the distance between the clamp ears are equal on both sides.

See Figure 4.

7. The last step is to remove the vice grip pliers and apply the final torque to the clamp nuts. With a torque wrench, apply a torque of 22-31 ft-lbs (30-42 Nm).

See Figure 5.

NOTE: As final inspection, verify the clamp ears are equally spaced on both sides. Otherwise, it is possible for one side to have too much gap to achieve proper sealing.

Unbalanced clamp ear gaps increase the likelihood of a leak.

FIGURE 4



FIGURE 5





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Mechanical Release of Spring Brake (Caging) All Types

DANGER: Do not attempt to mechanically release (cage) the spring on any spring brake that shows sign of structural damage, significant corrosion or any other damage that the operator or mechanic deems unsafe. Handle damaged spring brakes with extreme caution. Caging the spring or disassembling the chamber may result in a forceful release of the chamber and/or its contents, which could cause death, severe personal injury and/or personal property damage.

CAGING THE SPRING BRAKE

1. Remove the dust plug from the release tool access hole in the center of the spring housing.

See Figure 1.

2. Remove the release tool assembly from its holder on the adapter base (as shown) or from its holder on the spring housing (not shown). *See Figure 1.*

3. Apply vehicle or shop pressure, 120 psi (8.3 bar) or 90 psi (6.2 bar) minimum, to the emergency side of the brake. Maintain vehicle or shop air pressure (if shop or vehicle air is not available, go to step 9)

4. Insert the release tool bolt through the release tool access hole in the center of the spring housing and into the pressure plate that is inside the spring housing.

See Figure 2.

5. Once fully inserted, turn the release tool bolt ¼ turn clockwise.

6. Pull the release tool bolt to ensure the bolt's cross-pin ears are properly seated on the pressure plate.

7. Assemble the release tool washers and nut on the release tool bolt to finger-tight.

8. Release the air pressure. The brake is now caged.

FIGURE 1

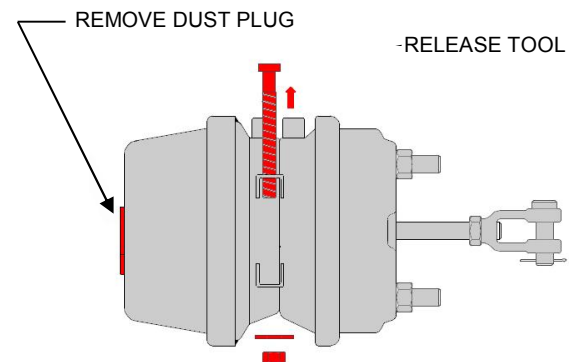
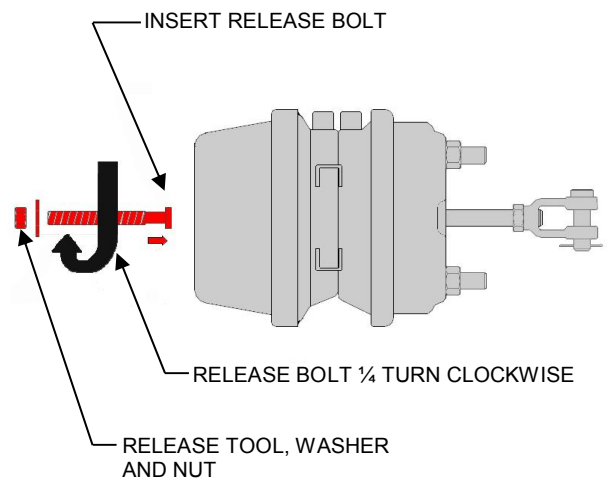


FIGURE 2





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Mechanical Release of Spring Brake (Caging) All Types (cont.)

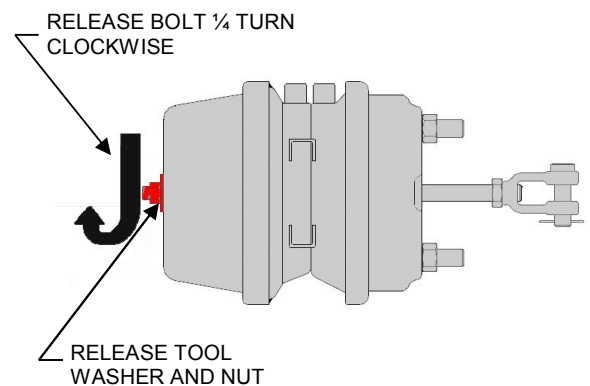
WARNING: Over-torquing the Release Tool Nut can cause pressure plate, washer and/or spring housing damage, resulting in sudden release of the main spring and potentially causing the release tool, washer, nut and/or fragments to become airborne which could cause death, severe personal injury and/or personal property damage.

OPTIONAL METHOD (MECHANICAL CAGING)

IMPORTANT: These instructions apply only when the spring brake is not pressurized.

9. Using a flashlight, look through the access hole for the pressure plate (spring plate). It should be located 2.5-3.0" (64-76 mm) from the access hole.
10. Insert the release tool bolt through the access hole, all the way into the pressure plate that is inside the spring housing.
See Figure 2.
11. Turn the release tool bolt $\frac{1}{4}$ turn clockwise. Pull the release bolt and make sure the bolt's cross-pin ears sit properly on the pressure plate.
12. Assemble the release tool washers and nut on the release tool bolt to finger-tight.
13. To cage the main spring mechanically, tighten the release tool nut with a hand wrench (DO NOT USE AN IMPACT WRENCH) and make certain the service push rod is retracting while tightening.
See Figure 3.
14. When the service push rod stops moving and/or the torque reaches 35 ft-lbs (47 Nm), or the release tool extends beyond the nut more than 3.25" (82.5 mm), stop torquing the release tool bolt assembly. The brake is considered caged.

FIGURE 3





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Mechanical Release of Spring Brake (Caging) All Types (cont.)

WARNING: Do not over-torque the release tool bolt assembly. Over-torquing the release tool bolt nut can cause pressure plate damage.

**Release Tool Bolt Torque:
35 ft-lbs (47 Nm) MAXIMUM**

Inspection of the Alignment of Pressure Plate

Visual Inspection:

This inspection procedure helps to ensure the pressure plate can be caged manually (with-out air) with the universal release bolt. By removing the dust plug and using a flashlight, look through the spring housing access hole to determine if the pressure plate tool access hole is able to accept the release bolt. If there is doubt that the pressure plate is able to accept the release tool bolt, physical inspection may be necessary.

Physical Inspection:

Remove the dust plug from the release tool access hole in the center of the spring housing and remove the release tool assembly from its holder on the adapter base or spring housing. Insert the release tool bolt through the spring housing's access hole and into the pressure plate. Attempt to engage the release tool bolt on the pressure plate by turning the bolt $\frac{1}{4}$ turn clockwise and pulling outward. If the release tool bolt is engaged properly on the pressure plate, it will not turn more than $\frac{1}{4}$ turn clockwise and will not pull outward more than $\frac{3}{4}$ " [19mm].



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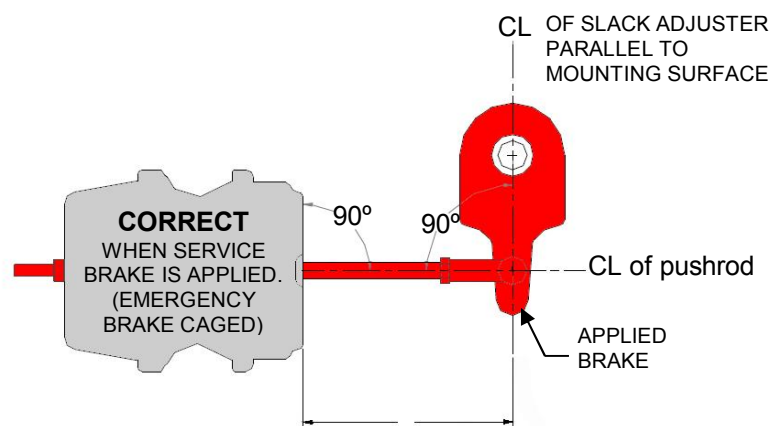
DETERMINING CORRECT PUSH ROD LENGTH

IMPORTANT: Place blocks under wheels to prevent vehicle rollaway before removing air brake actuators.

1. Ensure that the brake is fully caged. If the brake is not caged, see pages 4-6 of this guide.
2. If replacing only one spring brake, it is necessary to verify that the other spring brake(s) is properly adjusted according to steps 3-6.
3. Cage the brake to be checked by following instructions on pages 4-6 of this guide.
4. Apply the brakes (brake linings making contact with the drum) and check that spring brake meets the following conditions:
 - a. 90° angle between the centerline of the slack adjuster and the push rod.
 - b. 90° angle between the push rod and the mounting surface of the spring brake.

See figure 1.

FIGURE 1

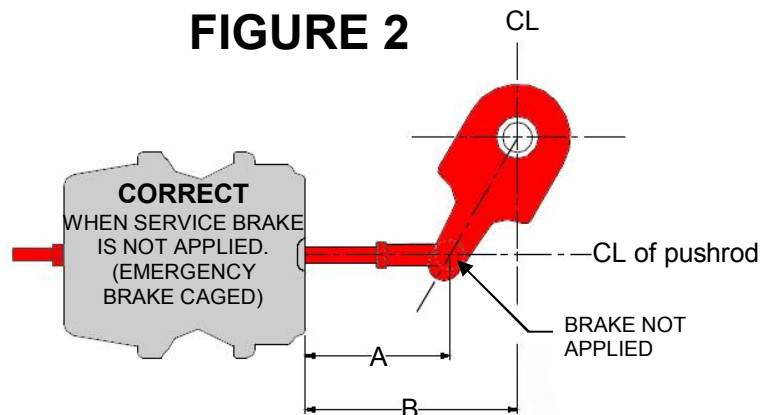


NOTE: If the spring brake meets these conditions, it is properly installed. Failure to meet these conditions will require the replacement of spring brake push rod. For more information regarding push rod lengths consult the vehicle manufacturer.

5. Release the brakes (brakes not applied) and measure length of the push rod from the surface of the service base to the centerline of the clevis pin, dimension "A". Record this dimension.

See figure 2.

FIGURE 2



6. Apply pressure to emergency side and uncage the brake by turning the release bolt nut counterclockwise with finger or a hand wrench, do not use an impact wrench. Turn the release bolt counterclockwise ¼ turn and pull it out.



DETERMINING CORRECT PUSH ROD LENGTH (cont.)

7. Measure the clevis throat on the brake to be installed, dimension "C".

See Figure 3.

8. To determine the correct push rod length, subtract dimension "C" from dimension "A". This will give you the correct push rod length.

EXAMPLE:

Dimension "A" = 5.00" (127.0 mm) push rod with clevis length (old brake installed).

Dimension "C" = 1.25" (31.8 mm) clevis length of the spring brake to be installed.

"A"- "C" = 5.00-1.25" (127.0-31.8 mm) = 3.75" (95.2 mm).

9. Mark the correct length on the push rod. Use the jam nut to facilitate marking the correct length. Cut the push rod using the best cutting device available.

10. Attach the clevis to the push rod. Make sure that no more than 2 threads (approximately 0.12" (3.0 mm)) extend into the clevis throat to insure no interference or no less than 1 thread is recessed into the clevis. Torque jam nut on clevis to 45-50 ft-lbs (61-69 Nm).

Replacing Both Spring Brakes on the Axle

1. To install new brakes on the axle, the correct push rod length will be determined by the following:

- Measure the "B" dimension as shown in Figure 4.
- The brake mounting bracket must be parallel to the Slack Adjuster centerline.

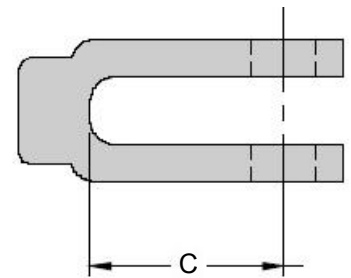
Example: "B" = 5.50" (139.7 mm).

Subtract Set-Up Stroke from "B" Dimension.

You can use a Set-Up Stroke value from 0.50-1.50" (12.7-38.1 mm) depending on the brake response you want.

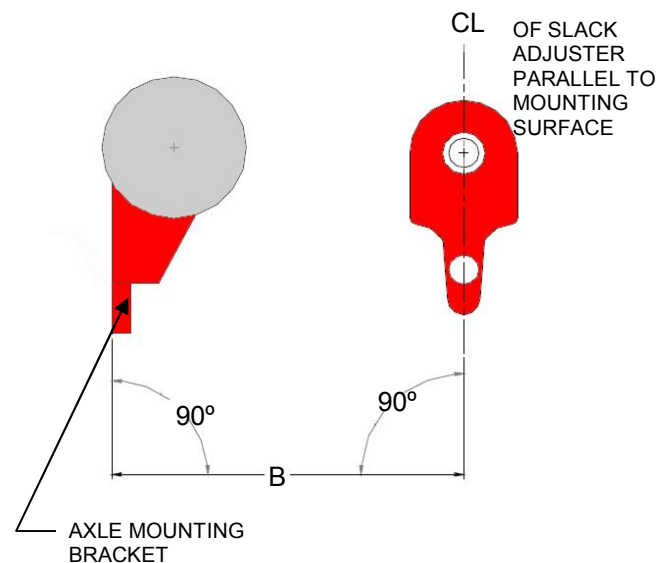
Example: 5.50-1.50" = 4.00" (139.7-38.1 mm = 101.6 mm)

FIGURE 3



CLEVIS THROAT DEPTH

FIGURE 4





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DETERMINING CORRECT PUSH ROD LENGTH (cont.)

Note: The setup stroke is the approximate distance the push rod will travel in a brake application. A shorter set up stroke can be used for a quicker brake response. If a shorter set up stroke is desired, insure brake linings are not dragging. TSE recommendations are provided as:

Chamber Type	Rated Stroke	Set-up Stroke	Chamber Type	Rated Stroke	Set-up Stroke	Chamber Type	Rated Stroke	Set-up Stroke
12	1-3/4" (44.5 mm)	1" (25.4 mm)	20	3" (76.2 mm)	1-3/4" (63.5 mm)	30	3" (76.2 mm)	2" (50.8 mm)
16	2-1/4" (57.2 mm)	1-3/8" (44.5 mm)	24	2-1/2" (63.5 mm)	1-5/8" (41.3 mm)	36	3" (76.2 mm)	2-1/8" (54.0 mm)
20	2-1/4" (57.2 mm)	1-3/8" (34.9 mm)	24	3" (76.2 mm)	1-7/8" (47.6 mm)			
20	2-1/2" (63.5 mm)	1-1/2" (38.1 mm)	30	2-1/2" (63.5 mm)	1-3/4" (44.5 mm)			

2. Measure the clevis throat (see Figure 3) and subtract it from your previous figure. For example, clevis throat measure 1.25" (31.8 mm), you would subtract 1.25" (31.8 mm) from 4.00" (101.6 mm) = 2.75" (69.9 mm). This is the push rod length from the mounting surface of the spring brake to the end of the push rod.

NOTE: When measuring and cutting the push rod to the correct length, the spring brake must be fully caged. If its is not caged, follow the instructions on "MECHANICAL RELEASE OF SPRING BRAKE (CAGING) ALL TYPES"

3. Mark the correct length on the push rod. Use the jam nut to facilitate marking of the correct length. Cut the push rod using the best cutting device available.

4. Attach the clevis to the push rod. Make sure that no more than 2 threads (approximately .12" [3.0 mm]) extend into the clevis throat to insure no interference, or no less than 1 thread is recessed into the clevis. Torque jam nut on clevis to 45-50 ft-lbs. (61-69 Nm).

5. The spring brake is ready to be mounted on the bracket. See "INSTALLATION AND SERVICE GUIDE".

Note: The Set-up Stroke is the approximate distance the push rod will travel in a brake application. A shorter Set-up Stroke can be used for a quicker brake response. If shorter Set-up Stroke is desired, insure brake linings are not dragging.



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History Sheet

Approved by:	Changes:	Approval Date:
Rev 0. Paul Clark	Initial Release	01 Feb 2008
Rev 1. Paul Clark	Revised Clamp torque recommendation from 21-22 ft lbs to 22-33 ft lbs	30 Jul 2008
Rev 2. Juan Chavez	Revised instruction to include metric units and reformat	08 Apr 2011
Rev 3. Kok Ho	Revised Header & Footer, Update document content	06 May 2011