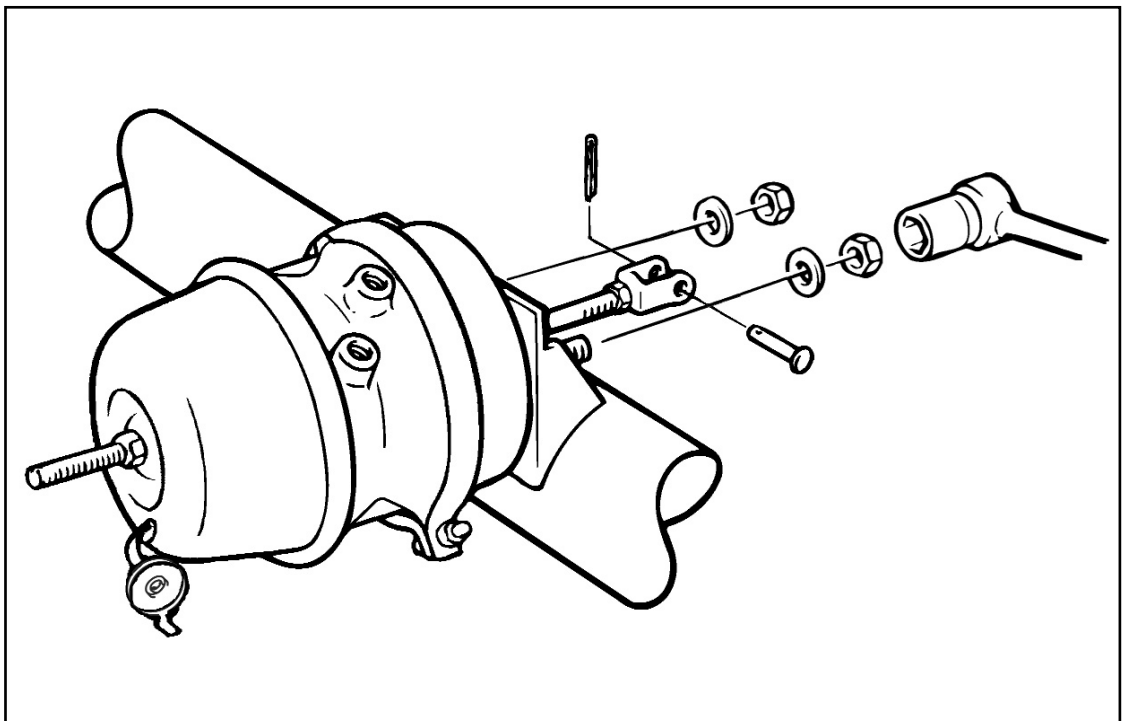


**L31171**  
**Rev. 09/12**




**Life Seal® and Gold Seal® Spring Brake  
Actuator Installation Instructions**

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## General Safety Precautions

Throughout this manual, you will notice the terms **“NOTE”**, **“IMPORTANT”**, **“WARNING”**, and **“DANGER”** followed by important product information. So that you may better understand the manual, those terms are defined below. The  warns of the possibility of personal injury or death.

### **NOTE:**

*Is used as a reminder of an instruction where the concern deals with product integrity and has to do with installation, operation, maintenance or service and care of the product.*

### **IMPORTANT:**

*Used without the safety alert symbol, is used as a reminder of an instruction where the concerns deal with product integrity and have to do with installation, operation, maintenance or service and care of the product. It is intended to show that vehicle breakdown and/or expensive repair could result if the instruction is not followed.*

### **WARNING:**

*Is used with an instruction for the purpose of showing that a safe practice must be adhered to or that an unsafe practice must be avoided, and that if proper precautions are not taken, personal injury could result.*

### **DANGER:**

*Indicates a potentially hazardous situation which, if not avoided, may result in serious injury or death.*

## General Safety Precautions (Continued)

**⚠ DANGER:** A spring brake contains a very powerful compression spring. Failure to comply with all of the following instructions may result in forceful release of the piggyback or spring 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.

**⚠ DANGER:** Haldex DOES NOT recommend the rebuilding of any of its air brake actuator products. Nor does Haldex recommend the use of rebuilt Haldex air brake actuators.

- If spring brake shows structural damage DO NOT cage the spring and DO NOT attempt to service it. Replace the complete unit. To prevent severe personal injury when removing an uncaged spring brake from a vehicle, cut the service push rod making sure to relieve all force on it. After cutting the push rod, remove the spring brake from the vehicle, then disarm the spring brake using a suitable safety chamber (See Page 17- Figure 27).
- Never strike any part of the spring brake with a hammer or any other heavy object; structural damage may result.
- Do not drop spring brake, as power spring may forcefully release.
- If air pressure is used to aid in the caging process, do not tighten the release tool more than finger tight. The air pressure must always be exhausted after the spring has been mechanically caged prior to any disassembly.
- On all Haldex Life Seal and Gold Seal the emergency diaphragm cannot be replaced. Replace the complete piggyback. (Follow instructions listed under "Mechanical release" on Page 6 for Gold Seal brakes. Page 9 for Life Seal brakes. And "Piggyback Installation Instructions" on Page 14).

**IMPORTANT:** It is recommended that a new service brake diaphragm be used when installing a new piggyback.

FIG 1 - Gold Seal Spring Brake

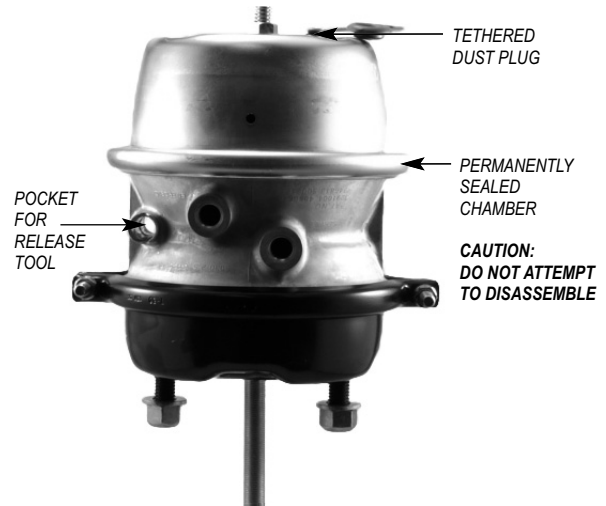
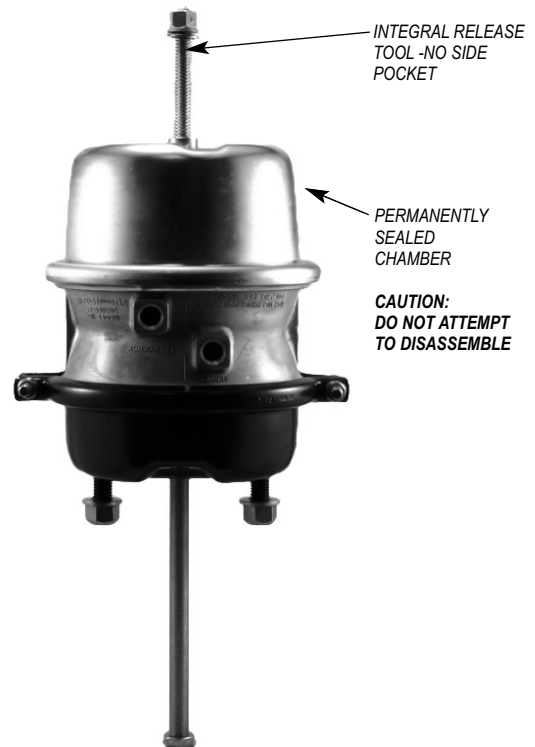


FIG 2 - Life Seal Spring Brake



Continued on next page

## General Safety Precautions (Continued)

- Haldex manufactures a complete line of 3.0" (76mm) stroke brake actuators. In some cases these are referred to as "Long Stroke" (L). In other cases they are referred to as "Extra Long Stroke" (XL). To avoid confusion, please refer to Table 1 below.

TABLE 1: LONG STROKE MODELS			
2.5" (64mm) STROKE PART NUMBERS		3" (76mm) STROKE PART NUMBERS	
COMBINATION	PIGGYBACK	COMBINATION	PIGGYBACK
GC2424L	GP2424L	GC2430XL	GP2430XL
GC2430L	GP2430L	LC2430L	LP2430L
LC2430	LP2430	GC3030L	GP3030L
		LC3030L	LP3030L
		GC3036L	GP3036L

**⚠ WARNING: NEVER interchange 3.0" (76mm) stroke actuator components with 2.25" (57mm) or 2.5" (64mm) stroke components. Performance and stroke may be seriously affected.**

**⚠ WARNING: NEVER interchange spring brake manufacturers components. Performance and stroke may be seriously affected. Although spring brake manufacturers components look similar, they should never be interchanged.**

- When servicing 3.0" stroke actuators, it is imperative that strict attention is paid to the components. These air brake actuators have push rod stroke capabilities in excess of the standard 2.25" (57mm)\* or 2.5" (64mm) design. The serviceable components for these actuators are unique. They include the following:

\*2.5" stroke T-24 diaphragm may be used in 2.25" stroke T-24 service brake applications.

- 1) Service Diaphragm
- 2) Service Housing
- 3) Service Pushrod
- 4) Complete Piggyback

- These components are uniquely identified as "Long Stroke", "LS", or "3.0" (76mm) Stroke" on each component. The unique square bosses on the air inlet ports on the aluminum center body easily identify the spring brake as 3.0" (76mm) stroke (Figure 3).

FIG 3

### Standard Stroke brake chambers generally have:



- ROUND ports
- No special tags or embossed service instructions

**Always replace like for like; standard stroke for standard stroke and long stroke for long stroke**

### Long Stroke brake chambers are required to have at least one of the following features:



3.07" STROKE  
78mm

- SQUARE ports for 3" stroke 2430, 3030 and 3036 only
- Embossed or "cast-in" service instructions like "USE ONLY 3 INCH STROKE DIAPHRAGM"
- Trapezoidal shaped tag with stroke information

## Recommended Preventative Maintenance

- Preventative maintenance for Haldex Life Seal and Gold Seal combination spring brake models is recommended every three months or every 50,000 miles (90,000 km).

**IMPORTANT: ALWAYS BLOCK WHEELS to prevent vehicle rollaway when performing any brake maintenance.**

1. Check the conditions of the foundation brakes, including drums, shoes and linings, rollers, bushings, etc.
2. Check for structural damage of the Spring Brake, Brake Adjuster and S-Cam. Replace if necessary.
- 3a. Gold Seal Models:  
Apply the parking brake. Remove the Dust Plug from the rear of the chamber (Figure 4) and physically inspect the condition of the parking spring. If the parking spring is broken, replace the Spring Brake with either a new piggyback unit or an entire unit. Please refer to Pages 14 for specific piggyback installation instructions or to Pages 10 thru 13 for combination installation instructions.

**IMPORTANT: ALWAYS replace dust plug after inspection. (Figure 5)**

- 3b. Life Seal Models:  
Mechanically release the parking brake and follow the procedure listed on Page 9.
4. Apply the Service Brakes. Check the air lines and fittings for leaks. Check for proper torque according to Table 5, Page 12.

FIG 4 - Gold Seal Models

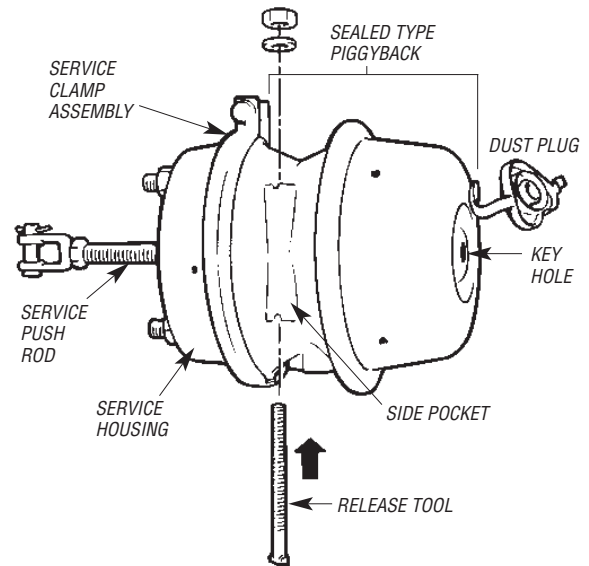
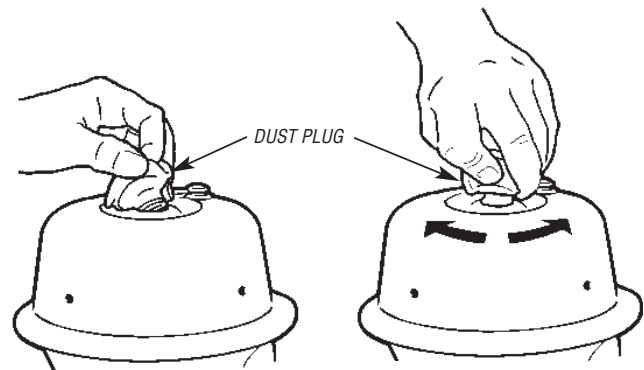


FIG 5 - Gold Seal Models



INSERT DUST PLUG AND TURN BACK AND FORTH UNTIL FULLY SEATED

# Gold Seal - Mechanical Release of Spring Brake

**⚠ DANGER:** Read Pages 2-4 carefully. Do not attempt to mechanically release (cage) the spring on a spring brake if it shows structural damage. Caging the spring or disassembly of the 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 spring brake and replace with new unit.

**⚠ DANGER:** DISARM spring chamber before discarding old brake. To disarm, use a suitable Safety Chamber (see Page 17). Failure to disarm assembly prior to disposal may, in time, result in spontaneous release of the spring chamber and its contents, which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

## TO CAGE PARK BRAKE COMPRESSION SPRING (RELEASE PARK BRAKE)

**IMPORTANT:** ALWAYS BLOCK WHEELS to prevent vehicle rollaway when performing any brake maintenance.

1. Remove dust plug from release tool key hole in center of spring chamber (Figure 6).
2. Remove release tool assembly from side pocket of center body (Figure 6).
3. Insert release tool through key hole in chamber into the spring piston (Figure 7 Arrow A).
4. Turn release tool 1/4 turn clockwise (Figure 7 Arrow B).
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 7).

Continued on next page

FIG 6

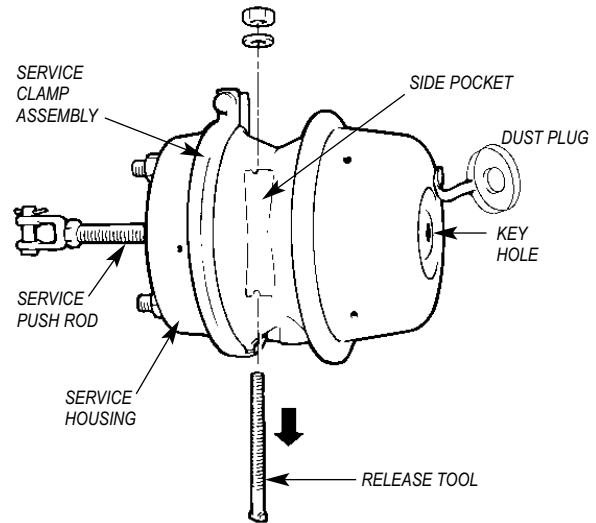
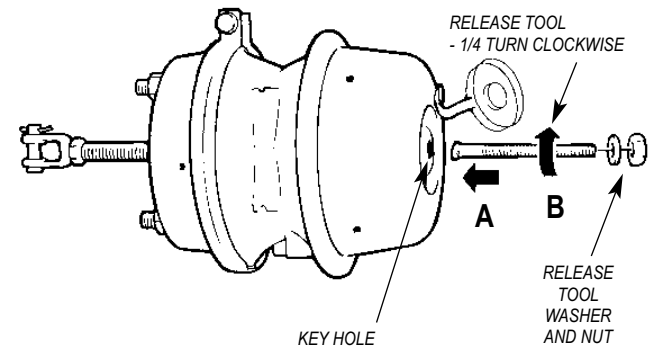


FIG 7



# Gold Seal - Mechanical Release of Spring Brake

## (Continued)

**⚠ DANGER:** The below listed instructions only apply when spring brake 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 spring brake is pressurized can cause spring piston damage resulting in sudden release of the spring which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE. Air pressure must be released after caging, prior to any disassembly.

7. a). Turn release tool nut clockwise with hand wrench (DO NOT USE HIGH SPEED AND/OR POWER DRIVEN IMPACT WRENCH) and make certain push rod is retracting (Figure 8).
7. b). This procedure will be made much 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.

**IMPORTANT:** To insure the power spring is fully caged, the release tool length (X dimension) (Figure 8) should measure as shown in Table 2.

FIG 8

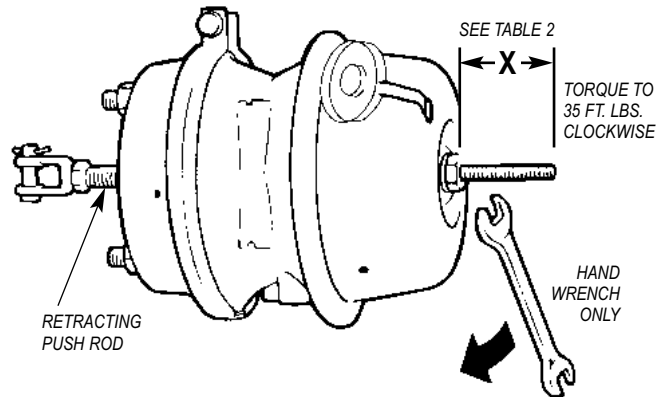


TABLE 2

MODEL	STROKE	X - MINIMUM
1624	2 1/4" (57mm)	2.9" (74mm)
2024	2 1/4" (57mm)	2.9" (74mm)
2424	2 1/4" (57mm)	2.9" (74mm)
2424	2 1/2" (64mm)	2.9" (74mm)
2430	2 1/4" (57mm)	2.9" (74mm)
2430	2 1/2" (64mm)	2.9" (74mm)
2430	3" (76mm)	3.4" (86mm)
3030	2 1/2" (64mm)	2.9" (74mm)
3030	3" (76mm)	3.4" (86mm)
3636	2 1/2" (64mm)	3.6" (91mm)
3636	3" (76mm)	2.4" (61mm)
3636	3" (76mm)	3.6" (91mm)

**NOTE:** If dimension of release tool (X dimension) length is less than the minimum measurement, then spring brake unit must be replaced.

Continued on next page

# Gold Seal - Mechanical Release of Spring Brake

## (Continued)

### TO UNCAGE PARK BRAKE COMPRESSION SPRING (APPLY PARK BRAKE)

1. Turn release stud nut counter clockwise with hand wrench (**DO NOT USE HIGH SPEED OR POWER DRIVEN IMPACT WRENCH**). This procedure will be made much easier if air pressure (100-120 PSIG; 6.6-8.0 BAR) is used to collapse the spring (Figure 9).
2. Remove caging tool nut and washer.
3. Push caging tool in, turn 1/4 turn counter clockwise and remove.
4. Place caging tool in pocket with T-head down and washer and nut up (this allows the washer to protect the pocket from corrosive elements while allowing the pocket to drain around the T-head (Figure 10).
5. Torque the nut to 5-8 ft. lb. (6.8-10.8 Nm).
6. Install dust plug in key hole. Insert the plug into the keyhole in the housing and push firmly until the plug is securely in place (Fig 5).
7. Lift edge of tethered plug to be sure the plug is firmly in place.

**IMPORTANT:** Always re-install tethered dust plug in caging tool key hole. Failure to do so will result in corrosion and foreign particle ingestion through the key hole which will void the warranty. Do not use excessive force when installing the plug. Excessive force may damage the plug and make it unusable.

Replacement dust plugs can be purchased from your local Haldex Distributor.

FIG 9

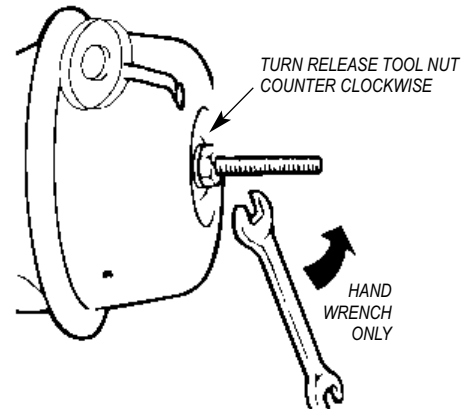


FIG 10

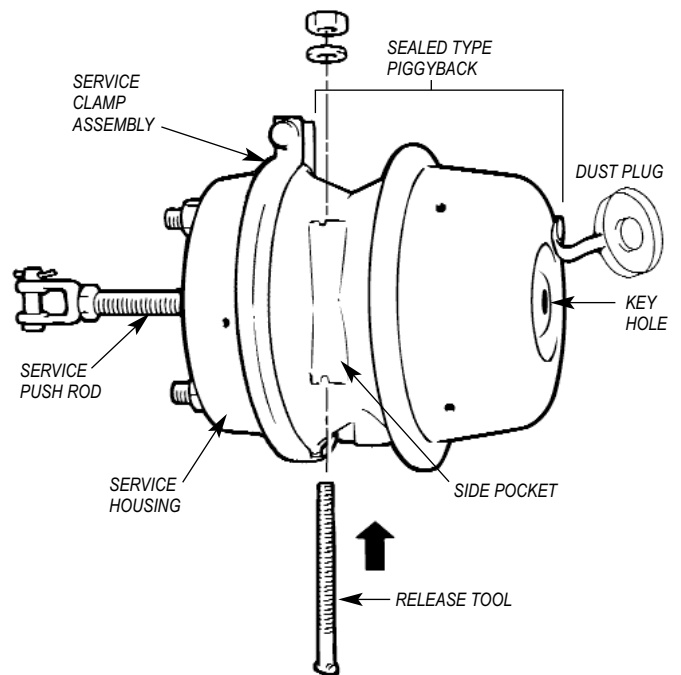
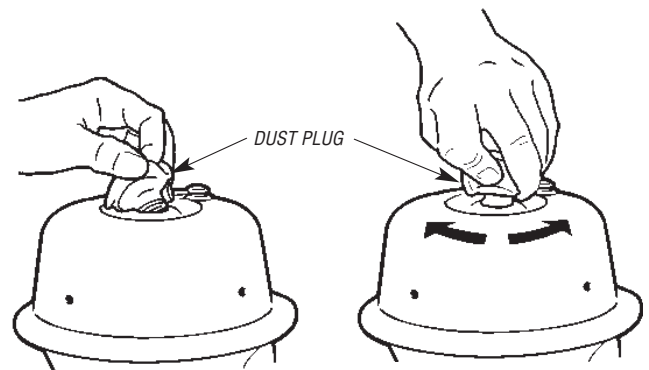


FIG 5 - Gold Seal Models



INSERT DUST PLUG AND TURN BACK AND FORTH UNTIL FULLY SEATED



# Life Seal - Mechanical Release of Spring Brake

**⚠ DANGER:** The below listed instructions only apply when spring brake 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 spring brake is pressurized can cause spring piston damage resulting in sudden release of the spring which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE. Air pressure must be released after caging, prior to any disassembly.

**⚠ DANGER:** DISARM spring chamber before discarding old brake. To disarm, use a suitable Safety Chamber (see Page 17). Failure to disarm assembly prior to disposal may, in time, result in spontaneous release of the spring chamber and its contents, which COULD CAUSE DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE.

## TO CAGE PARK BRAKE COMPRESSION SPRING (RELEASE PARK BRAKE)

**IMPORTANT:** ALWAYS BLOCK WHEELS to prevent vehicle rollaway when performing any brake maintenance.

**IMPORTANT:** Do not over torque release tool assembly. Over torquing release tool can cause spring piston damage. Life Seal S-Cam type 55 ft. lb. (74Nm) Maximum, Counter Clockwise.

1. a). Turn release tool nut counter clockwise with hand wrench (**DO NOT USE HIGH SPEED AND/OR POWER DRIVEN IMPACT WRENCH**) and make certain push rod is retracting (Figure 11).
1. b). This procedure will be made much easier if air pressure (100-120 PSIG; 6.6-8.0 BAR) is used to collapse the compression 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:** To ensure the power spring is fully caged, the release tool length (X dimension) (Figure 11) should measure as shown in Table 3.

## TO UNCAGE PARK BRAKE COMPRESSION SPRING (APPLY PARK BRAKE)

1. Turn release tool nut clockwise with hand wrench (**DO NOT USE HIGH SPEED OR POWER DRIVEN IMPACT WRENCH**). This procedure will be made much easier if air pressure (100-120 PSIG; 6.6-8.0 BAR) is used to collapse the compression spring before turning the release tool nut with a hand wrench.
2. Turn release tool nut until contact is made with the chamber. Torque to 55 ft. lb. (74 Nm). Torque value is stamped on the chamber (Figure 12).

FIG 11

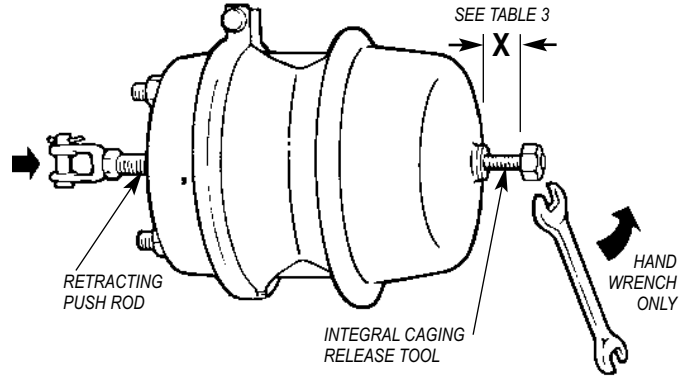
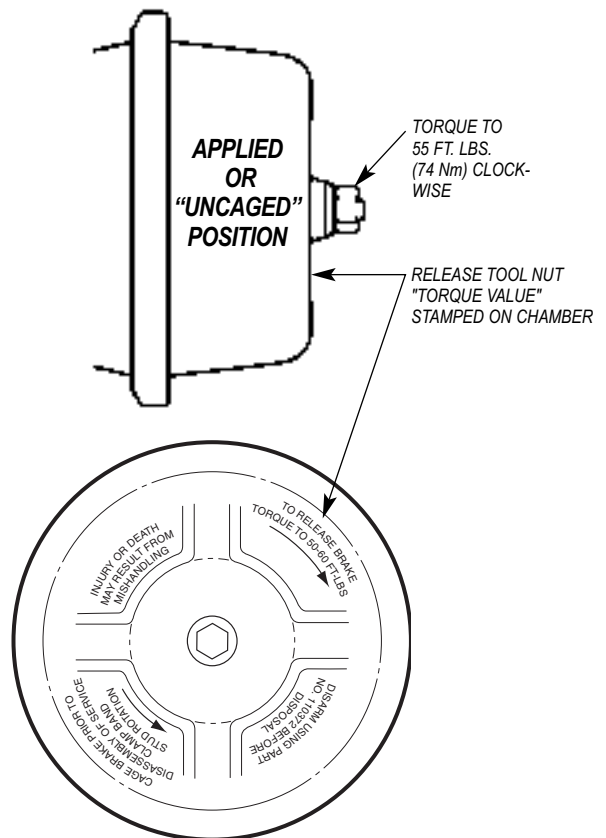


TABLE 3

CHAMBER TYPE	STROKE	X - MINIMUM	X - MAXIMUM
LC2430	2 1/2" (64mm)	2.40" (61mm)	2.56" (65mm)
LC3030	2 1/2" (64mm)	2.40" (61mm)	2.56" (65mm)
LC2430L	3" (76mm)	2.90" (74mm)	3.06" (78mm)
LC3030L	3" (76mm)	2.90" (74mm)	3.06" (78mm)

**NOTE:** If dimension of release tool (X dimension) length is less than the minimum measurement, then spring brake unit must be replaced.

FIG 12



# Combination Spring Brake Installation Instructions

## INSTALLATION PREPARATION

**IMPORTANT:** Spring brake must be caged prior to performing installation procedures. If brake is not caged, follow steps on Pages 7-10 for safety instructions and mechanical release of spring brake.

**NOTE:** In an effort to maximize the life of Haldex spring brakes, Haldex recommends the following brake mounting guidelines when installing spring brakes on your vehicle(s).

A. When preparing to install a spring brake chamber, ensure that the unit is fully released (power spring caged) and the service brake push-rod is fully retracted to zero stroke position. Thread the clevis jam nut onto the push-rod.

B. Place the brake chamber into the appropriate brake assembly bracket. Tighten the holding nuts to the bracket studs (100 - 140 lb. ft.).

C. Measure the distance from the centerline of the S-Cam to the centerline of the push-rod (See Figure 14 - Dimension A). This measurement should be equal to the length of the brake adjuster being used (See Figure 15 - Dimension A).

**NOTE:** If Dimension A - Figure 14 and Dimension A - Figure 15 are not identical, the chamber mounting bracket is either bent and must be straightened or replaced, the chamber has been mounted improperly in the bracket or the length of the adjuster installed is incorrect. Make any necessary corrections before going to Step D.

D. Measure and record the length of clevis to be used. This measurement should be taken from the center of the clevis pin hole, to the bottom of the yoke assembly (See Figure 13).

E. Using a square, mark the push-rod at the 90° setting (See Figure 14 - Mark #1). From this mark, subtract the measurement recorded in Step D and make a second mark on the push-rod (moving toward the brake chamber mounting surface). (See Figure 14 - Mark #2).

F. From Mark #2, measure toward the brake chamber mounting surface the distance listed in Table 4 - Column "D" (on page 11) for the brake chamber type being installed. Mark and cut the push-rod.

G. Install the clevis onto the push-rod and secure the jam nut (33 - 90 lb. ft.) Connect the clevis to the brake adjuster using the clevis pin and cotter pins (See Figure 13).

**Uncage the spring brake.**

H. Release spring brakes and adjust the brake adjuster to the manufacturers recommendation.

**Important Note: Some automatic brake adjusters require a slightly different rod length. Always refer to the original manufacturers installation guidelines.**

FIG 13

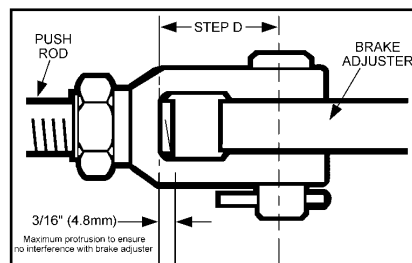


FIG 14

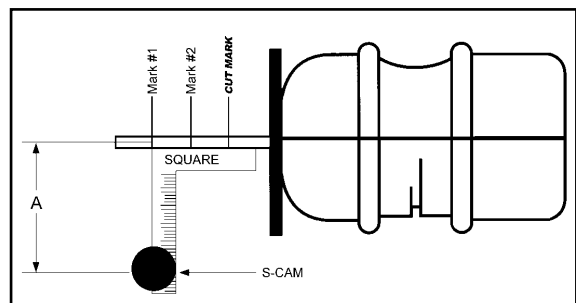
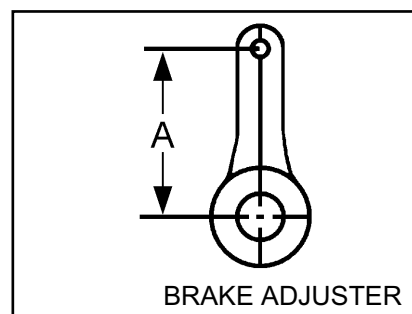


FIG 15



## Combination Spring Brake Installation Instructions (Cont'd)

**Table 4  
Stroke Values**

<b>Column A</b>	<b>Column B</b>	<b>Column C</b>	<b>Column D</b>
<b>Chamber Type</b>	<b>Available Stroke</b>	<b>“Maximum” Readjustable Stroke</b>	<b>Set-Up Stroke</b>
09	1 3/4”	1 3/8”	<b>1 3/8”</b>
12	1 3/4”	1 3/8”	<b>1 3/8”</b>
16	2 1/4”	1 3/4”	<b>1 3/8”</b>
20	2 1/4”	1 3/4”	<b>1 3/8”</b>
20L*	2 1/2”	2”	<b>1 1/2”</b>
24	2 1/4”	1 3/4”	<b>1 3/8”</b>
24L*	2 1/2”	2”	<b>1 1/2”</b>
24XL**	3”	2 1/2”	<b>1 3/4”</b>
30	2 1/2”	2”	<b>1 1/2”</b>
30L*	3”	2 1/2”	<b>1 3/4”</b>
36	3”	2 1/4”	<b>1 3/4”</b>
* Long Stroke ** Extra-Long Stroke			



**DANGER A spring brake or combination service/spring brake must be disarmed before disposal, or forceful release of the compression spring may occur in the future without warning.**

**WARNING:** Haldex strongly recommends routine visual checks be performed at EACH maintenance service interval. Foundation brake operational checks utilizing CVSA Level 1 applied stroke criteria should always be utilized. Manual adjustments of automatic adjusters can disguise hidden problems within the foundation brake. Installation of brake components (return springs, actuators, drums and adjusters) MUST be within manufacture’s specifications. Adjuster control arms, wear bushings or attaching hardware that demonstrate visual damage or which fail the operational checks, MUST be replaced immediately. Automatic Adjusters should NEVER be operated as manual adjusters except as may be necessary to get the vehicle off the road for service.

# Combination Spring Brake Installation Instructions (Cont'd)

## MOUNTING SPRING BRAKE TO MOUNTING BRACKET

When attaching spring brakes to mounting brackets the following checks and instructions should be performed:

1. Mounting brackets must be inspected to assure that bracket surface is free from debris, burrs, cracks, weld spatter and is flat within 1/64" (.4mm) (Figure 16).
2. Attach spring brake directly to mounting bracket on axle. Fasten with mounting hardware (Figure 16). Torque to specifications listed in Table 5 below.

**IMPORTANT:** When mounting a spring brake to a horizontal axle bracket, as shown in Figure 16, the bracket must meet the minimum contact area (Figure 16A).

When the spring brake mounting bracket requires the studs to be in the vertical position (rotated 90° from horizontal), the contact area can be slightly less than the minimum contact area for horizontal mount.

**IMPORTANT:** Always mount brake chamber directly to bracket. **DO NOT** insert spacers, washers or shims between mounting bracket and brake housing. (Figure 16) Consult the bracket manufacturer for your application to determine if a reinforcement plate is necessary.

**DO NOT** mount spring brake in a vertical position. The spring brake must be mounted within 45° of horizontal (Figure 17).

**NOTE:** In some cases it may be necessary to rotate air ports and/or clamp bands for proper clearance and installation on vehicle. (See Page 15 for rotation instructions.)

**TABLE 5 INSTALLATION TORQUE VALUES**

	TORQUE
Mounting Hardware	130-150 lb. ft. (177-203 Nm)
Jam Nut	15-25 lb. ft. (20-34 Nm)
Port Plug or Reducer	15-20 lb. ft. (20-27 Nm)
Air Fittings	25-30 lb. ft. (34-40 Nm)
LIFE SEAL - Release Tool Nut	55 lb. ft. (74 Nm)
GOLD SEAL - Release Tool Nut	25-35 lb. ft. (34-47 Nm)
GOLD SEAL - Release Tool Nut (in side pocket)	5-8 lb. ft. (7-11 Nm)
Carriage Bolt Nuts (for clamps)	20-30 lb. ft. (27-40 Nm)

FIG 16

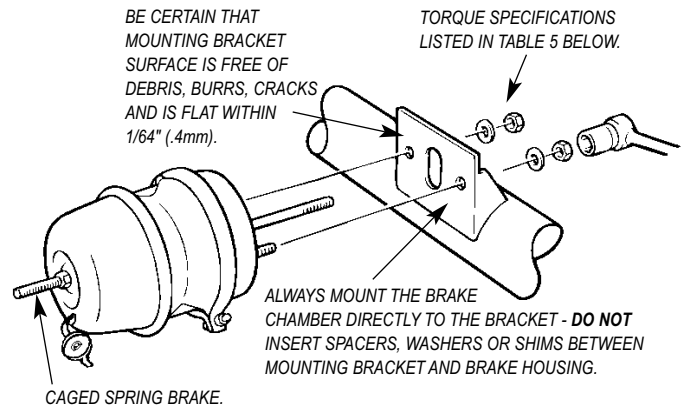


FIG 16A

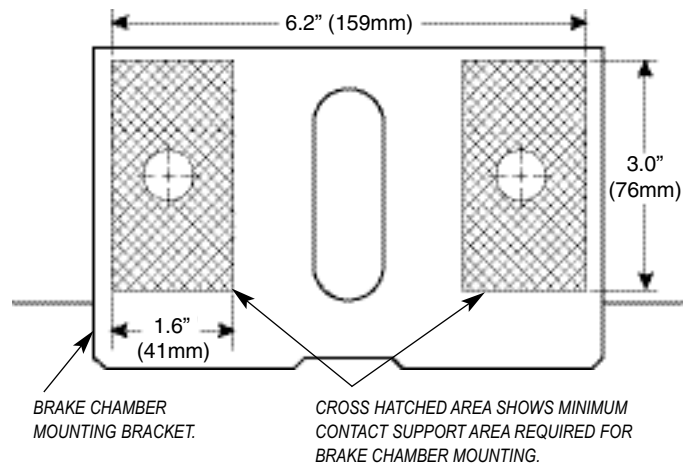
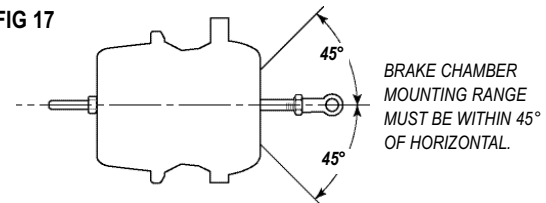


FIG 17



# Combination Spring Brake Installation Instructions (Cont'd)

## ATTACH CLEVIS AND AIR LINES

1. Thread jam nut back onto the push rod a sufficient length to allow assembly of the clevis.
2. Thread clevis onto the push rod. Clevis from removed unit may be reused provided clevis pin hole is not worn. Adjust clevis to the same "K" dimension as measured from the removed unit (Figure 13, Page 10).
3. Hold clevis to prevent it from turning and tighten jam nut against clevis to torque specifications. (See Table 5, Page 12 for Installation Torque Values). The clevis must be adjusted so that it has full thread engagement on the push rod (from flush to 3/16" (4.8mm) protrusion). (Figure 13, Page 10).
4. Connect the service and emergency air line to the proper air ports. Torque to specifications listed in Table 5, Page 12.
5. Connect clevis to the slack adjuster using clevis and cotter pins, and uncage the spring brake. Refer to uncaging procedures: Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**IMPORTANT:** If push rod is not long enough to reach brake adjuster mounting hole, DO NOT physically pull push rod out to reach mounting hole.

## VERIFY PROPER INSTALLATION

1. Tighten the brake adjuster until the shoe contacts the drum then back off 1/2 turn.
2. With the actuator FULLY released, measure and record the pushrod length from the face of the actuator housing to the center of the clevis pin (Figure 19).
3. Verify that there is no interference condition present and that the pushrod is fully retracted into the actuator.
4. Set the angle of the pushrod-to-ABA-centerline at 90° by EITHER slowly un-caging the parking brake spring OR by slowly applying service air pressure (60 psi min/ 90 psi max with the parking brake caged). NOTE: If you cannot achieve the 90° angle readjust the clevis yoke position by threading the pushrod in or out (flush to 3/16" maximum pushrod protrusion into the clevis yoke).
5. Once 90° is obtained, verify that no interference condition exists between ABA and or any subcomponent of the vehicle.
6. Check the angle between the face of actuator housing and pushrod. This should also be 90° ± 5°.
7. Measure the pushrod length again. Subtract the pushrod stroke length measurement from step #2 from the pushrod stroke measurement from this step (Figure 20)
8. The difference MUST be within ±1/4" of the valve provided in Column D of Table 4 page 11.
9. The angle between the pushrod and the centerline of the brake adjuster need not be exactly 90° with the brake applied. The angle can be anywhere between 85°-110° for proper brake performance.

FIG 18

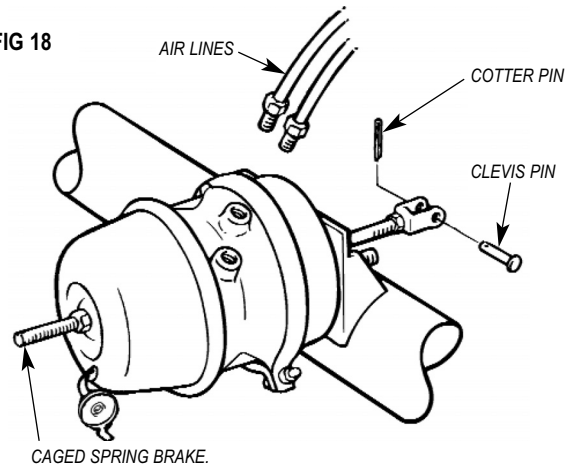


FIG 19

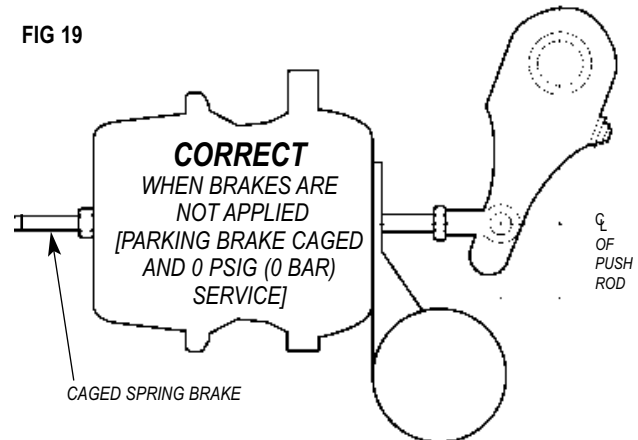
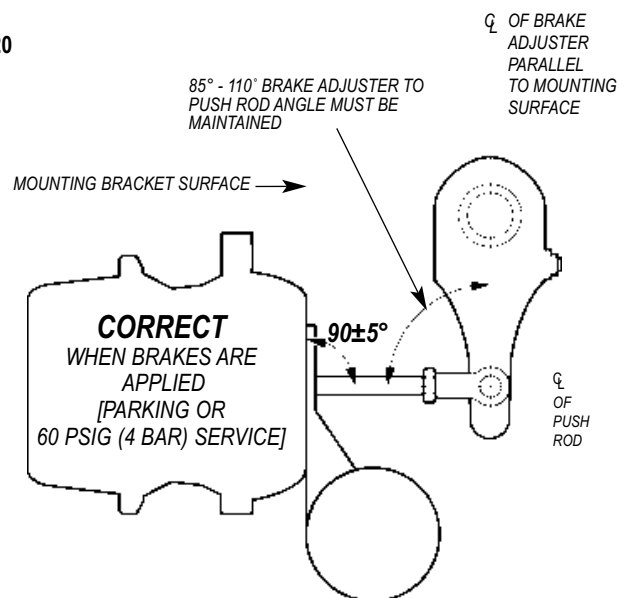


FIG 20



# Piggyback Installation Instructions

## TO REMOVE PIGGYBACK FROM SERVICE HOUSING

1. Refer to mechanical release instructions: Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**⚠ WARNING: Failure to comply with all instructions for mechanical release may result in the forceful release of the spring which COULD CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

2. If vehicle air pressure was used to aid in the caging process, exhaust the air pressure.
3. To prevent sudden release of service housing assembly and to facilitate rotation of air ports or mounting studs, the service push rod should be prevented from retracting by clamping the service push rod in place with vise grip pliers as shown (Figure 21).
4. Disconnect the airlines from the air ports on the center body.
5. Remove service clamp assembly (Figure 21).

**IMPORTANT: DO NOT bend the clamp assembly when removing.**

## TO INSTALL PIGGYBACK ON SERVICE HOUSING

1. If piggyback is not caged, follow steps on Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**⚠ WARNING: Failure to comply with all instructions for mechanical release may result in the forceful release of the spring which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

2. Before installing piggyback on existing non-pressure housing, inspect the clamp assembly, the service return spring, the service push rod and non-pressure housing. If any structural damage is noted, replace with new parts.
3. Wipe the surface of the service push rod clean of any oil, grease or dirt. Check to see that the bottom most vent holes in the housing are not plugged.

**IMPORTANT: It is recommended that a new service brake diaphragm be used when installing a new piggyback. DO NOT use a piloted diaphragm on the service side (a piloted "protrusion" diaphragm is designed to be used in the emergency spring chamber only). Use of a piloted diaphragm results in a reduction of stroke length.**

4. Place the new service diaphragm in center body (as shown) and center the housing over the diaphragm and adapter lip (Figure 22).
5. Ensure that diaphragm is properly seated between the center body and housing lip and that the air ports are in the desired positions. Position clamp assembly as shown (Figure 22) then tighten each nut equally, alternating every other turn. Torque each carriage nut to specifications listed in Table 5, Page 12. **DO NOT strike clamp or unit with a hammer.**
6. Check carriage bolts and clamp assembly for proper seating around the center body and housing lip, and remove vise grip pliers previously clamped around the service pushrod.

FIG 21

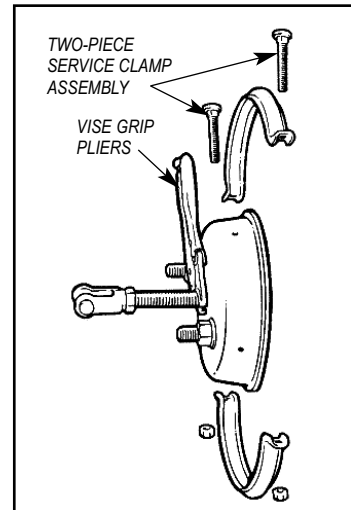
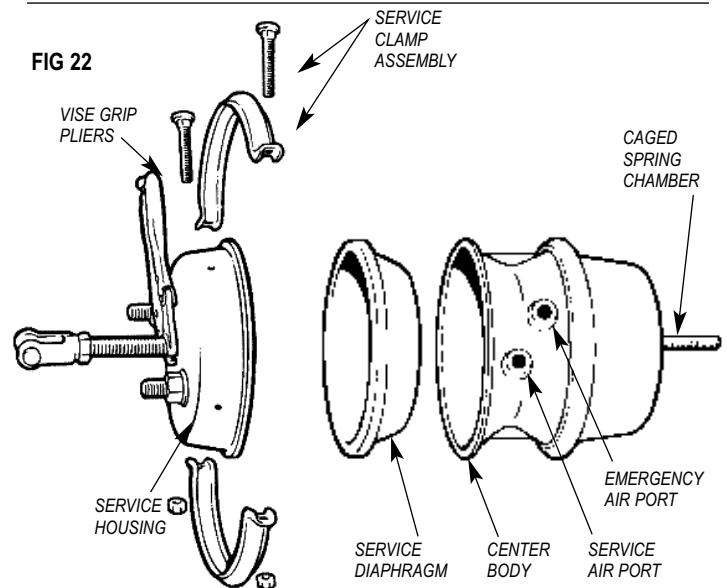


FIG 22



7. Reconnect the air lines to the air ports on the center body, making sure to connect the proper lines to the service and emergency ports (Figure 22). Torque to specifications listed in Table 5, Page 12.
8. Apply a maximum of 120 PSIG (8 BAR) air to the service port and check diaphragm seal for leakage by applying a water and soap solution to the service clamp area. (No leakage allowed).
9. Uncage park brake power spring. Refer to uncaging instructions: Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**IMPORTANT: After reassembly, check for proper emergency and service brake operation. For brake adjustment, follow vehicle manufacturer's instructions.**

# Rotating Mounting Bolts, Clamps and/or Air Inlet Ports

## TO ROTATE SERVICE HOUSING MOUNTING STUDS

1. For Mechanical Release of Spring Brake see Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**⚠ DANGER:** Failure to comply with all instructions for mechanical release may result in the forceful release of the spring which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

2. If vehicle air pressure was used to aid in the caging process, exhaust the air pressure.
3. To prevent sudden release of service housing assembly and to facilitate rotation of air ports or mounting studs, the service push rod should be prevented from retracting by clamping the service push rod in place with vise grip pliers as shown (Figure 23).
4. Remove service clamp/carriage bolt and rotate service housing (Figure 23) or center body (Figure 24) to desired position.
5. Ensure that diaphragm is properly seated between the center body and housing lip and that the air ports are in the desired positions. Position the two-piece service clamp assembly (Figure 23), tighten each nut equally, alternating every other turn. Torque each carriage nut to specifications listed in Table 5, Page 12. **DO NOT strike clamp or unit with a hammer.**
6. Check carriage bolts and clamp assembly for proper seating around the center body and housing lip, and remove vise grip pliers previously clamped around the service push rod.
7. Apply a maximum of 120 PSIG (8 BAR) air pressure to the service port and check seal for leakage by applying a water and soap solution to the service clamp area (No leakage is allowed).
8. Uncage park brake power spring. Refer to uncaging instructions: Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**⚠ WARNING:** After reassembly, check for proper emergency and service brake operation. For brake adjustment, follow vehicle manufacturer's instructions.

FIG 23

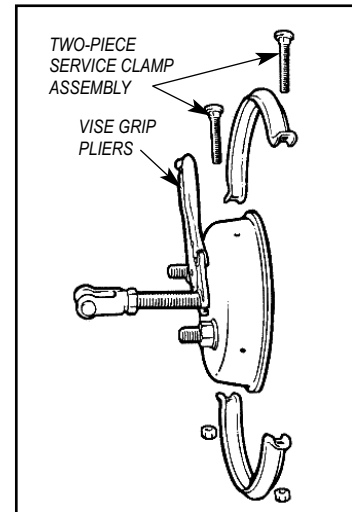
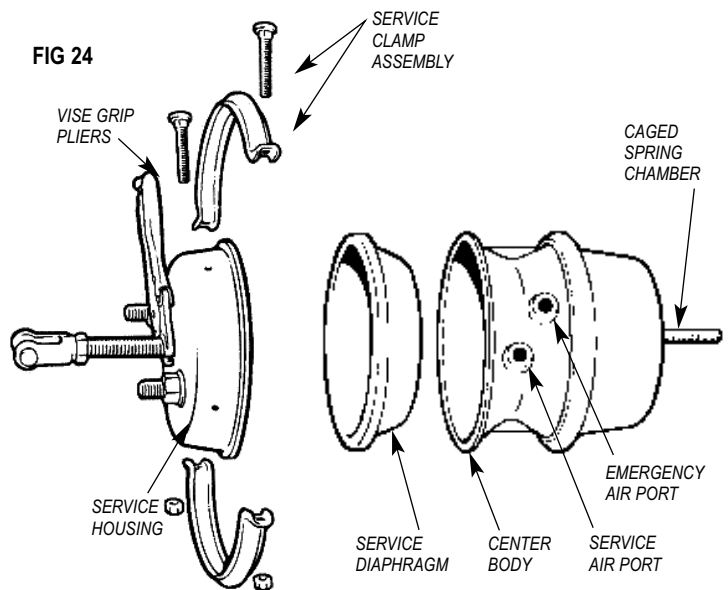


FIG 24



# Service Diaphragm Replacement

1. For Mechanical Release of Spring Brake see Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.

**⚠ DANGER:** Failure to comply with all instructions for mechanical release may result in the forceful release of the spring which could CAUSE DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

2. If vehicle air pressure was used to aid in the caging process, exhaust the air pressure.
3. To prevent sudden release of the piggyback or service push rod assembly and to facilitate the installation of the new diaphragm, the service push rod should be prevented from retracting by clamping the service push rod in place with vise grip pliers as shown (Figure 25).
4. Remove service clamp assembly and discard old diaphragm.
5. Inspect the service clamp assembly, the center body wall and lip, the housing, the service return spring and service push rod. If any structural damage is noted, replace with new part.
6. Wipe the surface push rod plate clean of any oil, grease or dirt.
7. Place the new service diaphragm in center body and center the housing over the diaphragm and center body (Figure 26).

**IMPORTANT:** It is recommended that a new service brake diaphragm be used when installing a new piggyback. DO NOT use a piloted diaphragm on the service side (a piloted "protrusion" diaphragm is designed to be used in the emergency spring chamber only). Use of a piloted diaphragm results in a reduction of stroke length.

8. Ensure that diaphragm is properly seated between the center body and housing lip and that the air ports are in the desired positions. Position the two-piece service clamp assembly as shown, tighten each nut equally, alternating every other turn. Torque each carriage nut to specifications listed in Table 5, Page 12. **DO NOT strike clamp or unit with a hammer.**
9. Check carriage bolts and clamp assembly for proper seating around the center body and housing lip, and remove vise grip pliers previously clamped around the service push rod.
10. Apply a maximum of 120 PSIG (8 BAR) air pressure to the service port and check diaphragm seal for leakage by applying a water and soap solution to the service clamp area (no leakage is allowed).
11. Uncage park brake power spring (See instructions on Pages 6-8 for Gold Seal. Page 9 for Life Seal brakes.).

FIG 25

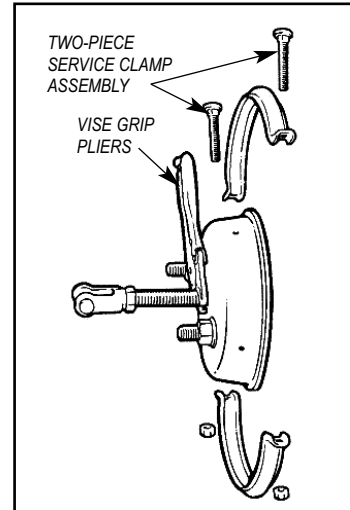
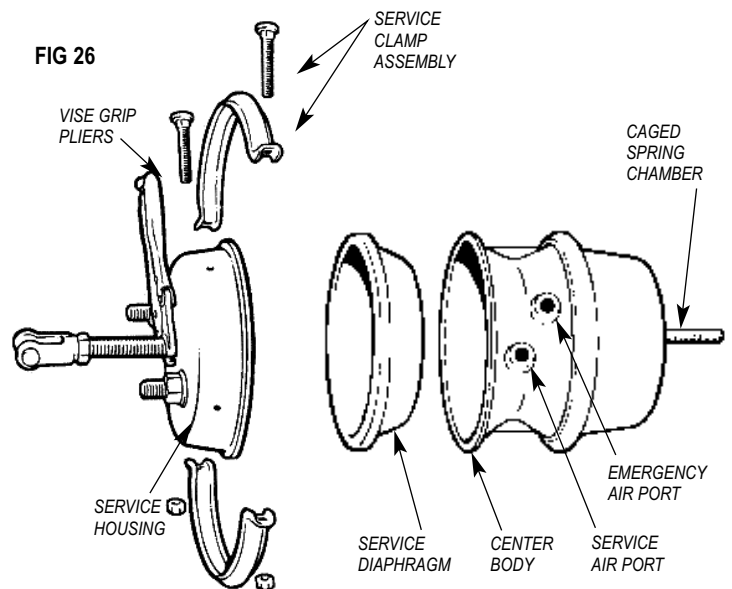


FIG 26



**IMPORTANT:** After reassembly, check for proper emergency and service brake operation. If installed on vehicle, check brake adjustment by following vehicle manufacturer's instructions.



## Disarming Procedures: Piggyback and Combination Service/Spring Brakes

**⚠ DANGER:** A Piggyback or Combination Service/Spring Brake must be disarmed before disposal, or forceful release of the power spring may occur in the future without warning.

**NOTE:** A detailed drawing of the Safety Chamber is available free of charge upon request. Contact Haldex Engineering Department at 800-643-2374. (Drawing #110372 also on the web in Products/Literature/ Actuators)

1. Remove the caged Piggyback or Combination Service/Spring Brake from vehicle, after removal uncage the parking brake power spring.
2. Open the lid of the Safety Chamber and place the uncaged Piggyback or Combination Service/Spring Brake inside the chamber, close lid and lock hinges in place with bolts as shown (Figure 27).

**NOTE:** Service push rod may need to be cut in order to fit a Combination Service/Spring Brake into the Safety Chamber (Figure 27).

3. While wearing safety glasses, use an acetylene cutting torch and cut a 3" (76mm) diameter hole (Figure 28) out of the Spring Brake chamber wall through one of the openings in the Safety Chamber (Figure 28).
4. Once the power spring is exposed, use the acetylene cutting torch to cut the exposed spring in one or more places until the power spring pieces can be moved around inside the Spring Brake chamber with a long screwdriver or similar tool through the disarming chamber openings.
5. Once the power spring pieces can be moved around inside the Spring Brake chamber, the disarming process is complete and the piggyback can be removed from the Safety Chamber after it has cooled down. The unit can be submersed in water to cool it quickly.

**⚠ WARNING:** Cutting of the Spring Brake Chamber with an acetylene torch can result in harmful fumes. Do not breathe these fumes. All cutting should be done outside or in a well ventilated area. After cutting the chamber, submerge it in water to cool. If the disarmed unit is not cooled, it will emit additional fumes and it could start a fire if stored near combustible material.

FIG 27

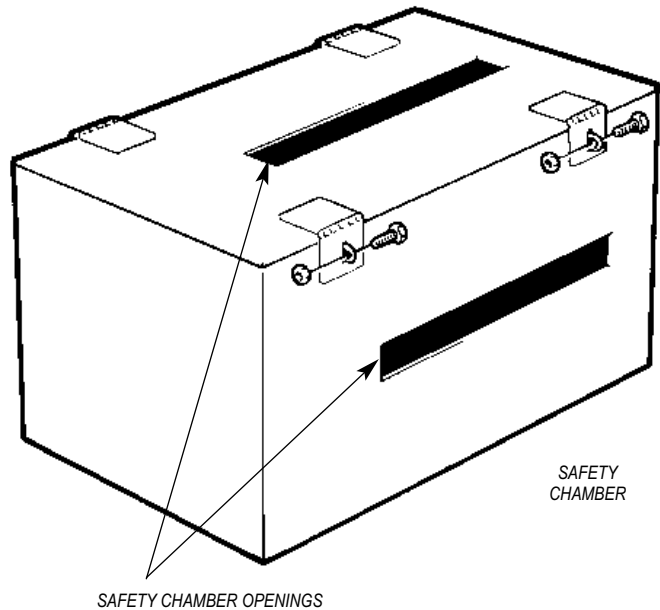
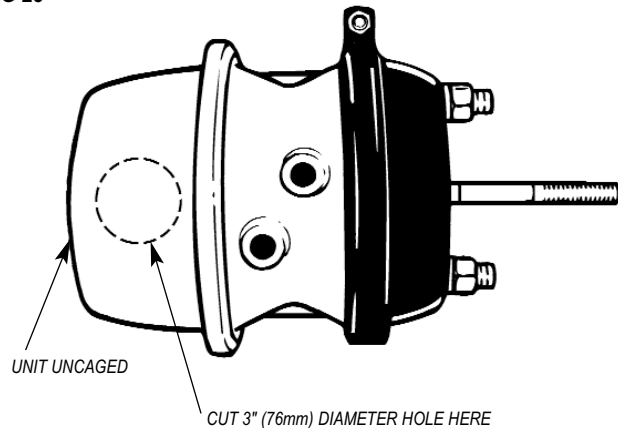


FIG 28



# Orange Alert Stroke Indicator Operation

**IMPORTANT:** All Haldex brake chambers are equipped with a stroke indicator which meets October 1994 FMVSS-121 requirements. Please read the following information carefully and familiarize yourself with the operation of this feature.

## WHAT IS A STROKE INDICATOR?

A Haldex Orange Alert stroke indicator is an orange knurled band located on the service push rod. This band is permanently embossed on the push rod and painted (Figure 29).

The orange band (stroke indicator) is normally inside the brake chamber (Figure 29) and will only start to protrude outside of the mounting face of the service housing when the spring brake or service chamber has only 20% of stroke remaining (Figure 30).

## HOW TO USE A STROKE INDICATOR

**IMPORTANT:** A stroke indicator is not intended to be used as the only indicator of when to adjust the brakes on a vehicle. For brake adjustment, follow vehicle manufacturer's instructions.

At the point where the leading edge of the stroke indicator is level with the mounting face of the service housing, as shown (Figure 30), the combination spring brake or service chamber has only 20% of available stroke remaining. (See Table 6 below).

When the stroke indicator becomes visible, maintenance is required. The brake may need adjustment, or it may require component replacement.

**IMPORTANT:** Depending on the location and type of mounting bracket used, it may be difficult to observe the stroke indicator's protrusion once the spring brake or service chamber has been mounted to the vehicle.

FIG 29

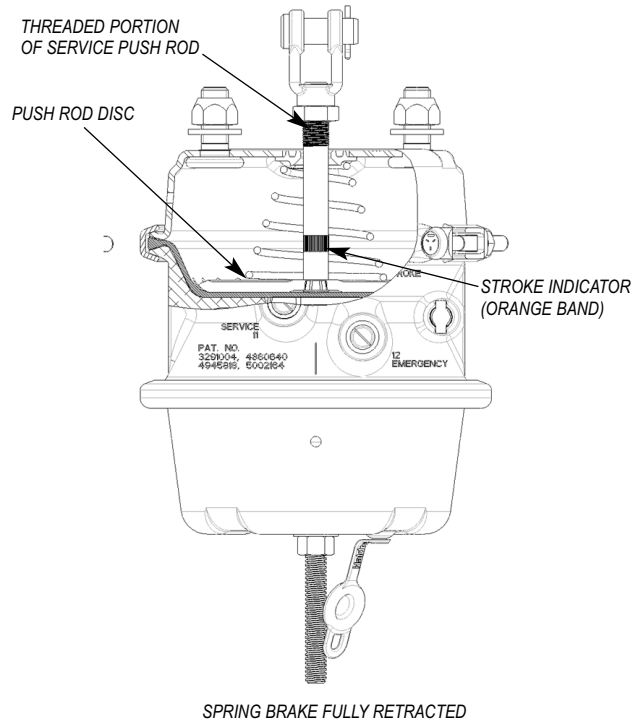


FIG 30

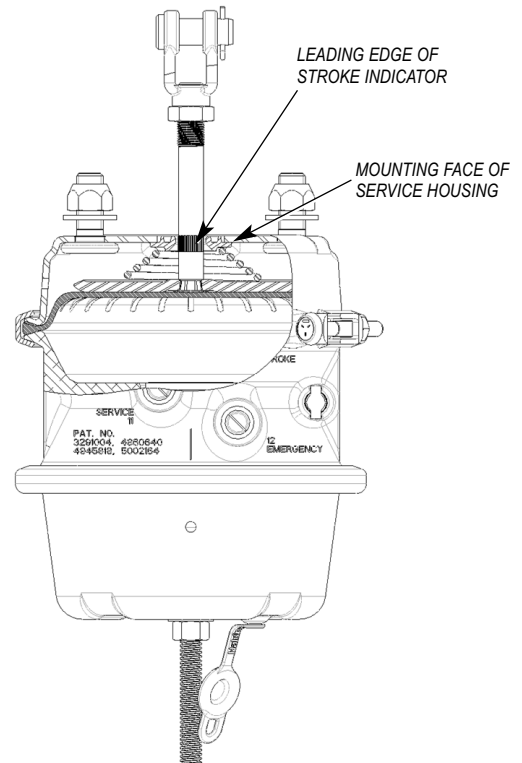


TABLE 6 RECOMMENDED BRAKE RE-ADJUSTMENT STROKE

TYPE (SIZE)	RATED STROKE		RE-ADJUST STROKE	
	INCHES	MILLIMETERS	INCHES	MILLIMETERS
9	1.75	44	1.38	35
12	1.75	44	1.38	35
16	2.25	57	1.75	44
16	2.50	64	2.00	51
20	2.25	57	1.75	44
20	2.50	64	2.00	51
20	3.00	76	2.50	64
24	2.25	57	1.75	44
24	2.50	64	2.00	51
24	3.00	76	2.50	64
30	2.50	64	2.00	51
30	3.00	76	2.50	64
36	3.00	76	2.25	57

## Determining Warranty Status

### Actuator Date Code Change

For standardization and consistency, Haldex is modifying the date code format on all brake actuators produced after November 1, 2004. The date code will remain in the same location on all actuators.

The new date codes can be interpreted using the following information:

<b>Day of Year</b>	<b>Shift</b>	<b>Year</b>	<b>Location</b>
DDD Days running of the year	S A = First Shift B = Second Shift C = Third Shift	YY Two Digit Year	L A = Apodaca (Monterrey), Mexico K = Iola, Kansas

For example, a date code of 307A04A would translate to Tuesday, November 2, 2004, First Shift, Apodaca (Monterrey), Mexico.

Date codes on actuators built in Apodaca (Monterrey), Mexico (formerly Anchorlok) between June 1, 1990 and October 31, 2004, can be interpreted using the following information.

<b>Market</b>	<b>Day of Year</b>	<b>Year</b>	<b>Run No.</b>
O O = OEM D = Distributor	DDD Days running of the year	YY Two Digit Year	XX Production run

Date codes on actuators built in Iola, Kansas (formerly Midland) prior to November 1, 2004 can be interpreted using the following information.

<b>Day of Year</b>	<b>Shift</b>	<b>Year</b>	<b>Location</b>
DDD Days running of the year	S A = First Shift B = Second Shift C = Third Shift	Y Single Digit Year	L K = Iola, Kansas

If you have questions about this date code change or other Haldex Actuator technical issues, please contact your local Haldex Sales Professional.

Haldex develops and provides reliable and innovative solutions that improve safety, vehicle dynamics and environmental sustainability in the global commercial vehicle industry. Listed on the Stockholm Stock Exchange, Haldex had net sales of approximately 4 billion SEK in 2011 and employs 2,350 people.

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