

INTRODUCTION

GENERAL

This section has the repair instructions for the service and parking brake assembly. These instructions include

the description, removal, disassembly, checks and adjustments, and troubleshooting procedures. The instructions for the master cylinder are in the section for the **MASTER CYLINDER, 1800 SRM 119**.

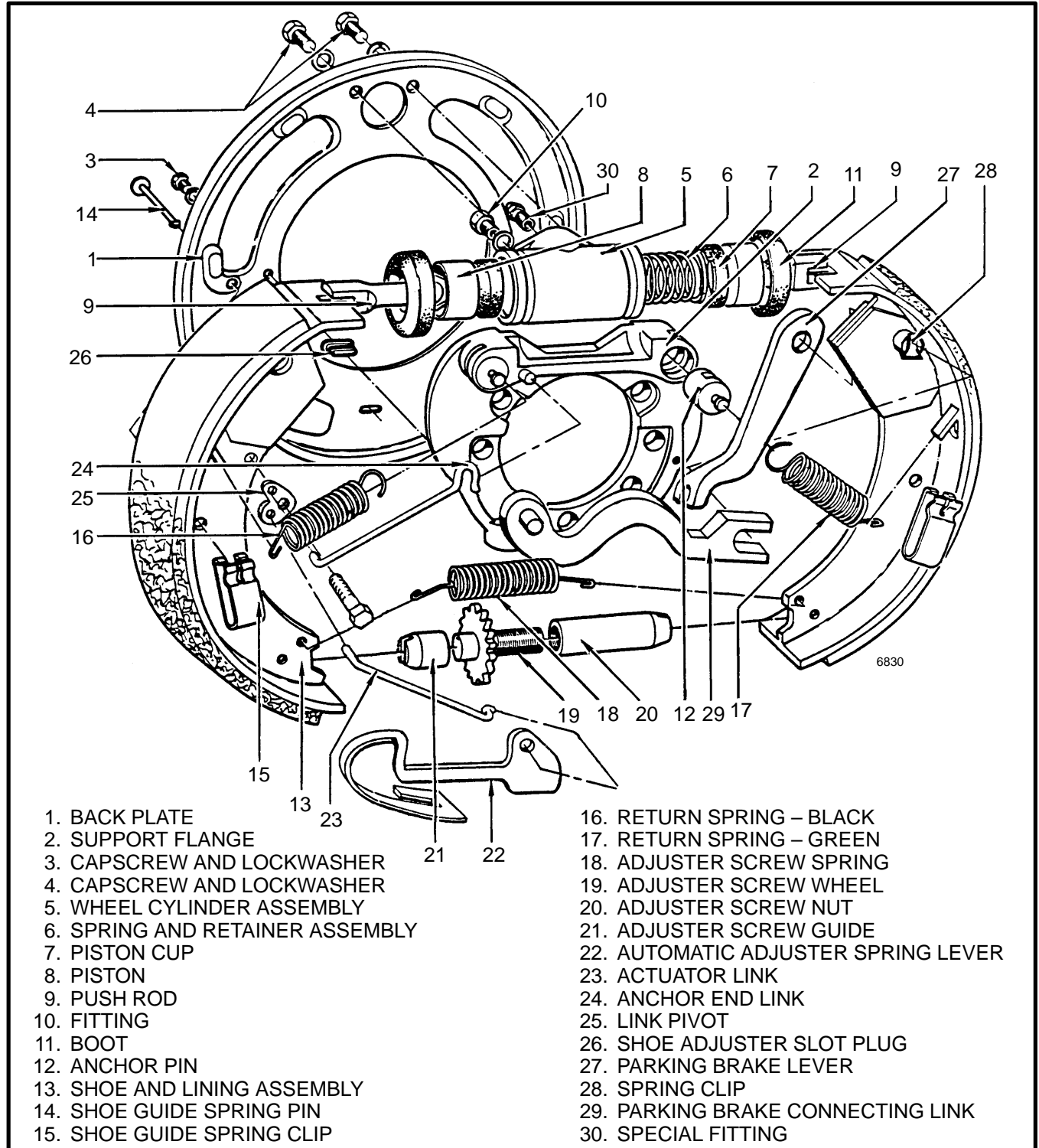


FIGURE 1. BRAKE ASSEMBLY - RIGHT

DESCRIPTION AND OPERATION (See FIGURE 1.)

A service brake assembly is used at each end of the housing for the drive axle housing. Each service brake assembly has a single wheel cylinder at the top of each back plate. The support flange has an anchor for each shoe. When the wheel cylinder is actuated by fluid pressure from the master cylinder, the shoes touch the drum. The primary shoe starts to turn with the drum. This action pushes the secondary shoe tight against the drum and the anchor. This servo action increases the force applied to the brake drums. When the lift truck is traveling in reverse, the primary shoe is pushed against the anchor and the drum by the secondary shoe.

The parking brake uses the service brake shoes. Additional linkage pushes the shoes apart when the hand le-

ver pulls the cables. The electric lift trucks also have an optional seat brake. The seat brake is on the drive motor. The seat brake on the J40A, 50A, 60AS releases automatically when the power steering pump is activated.

NOTE: To manually release the seat brake on the J40-50A, 60AS, loosen the four bolts that hold the mount bracket to the frame. The bolts are between the two pump motors in the pump motor compartment.

The automatic adjusting linkage turns the adjuster screw wheel to adjust the shoe to drum clearance. The secondary shoe and the links move with the drum during a stop when the truck is traveling in reverse. The links permit the adjuster spring lever to rotate the adjuster screw wheel. The adjuster screw wheel can turn only when there is clearance between the lining and the brake drum. The adjuster screw wheel can be turned manually through a slot in the back plate.

REPAIRS

REMOVAL AND DISASSEMBLY (See FIGURE 1. and FIGURE 2.)

NOTE: The axle on the H60-110E lift trucks does not have to be removed to repair the brakes. Access to the

brakes is by removing the drive wheels and brake drums.

1. Remove the nuts for the drive axle. Hit the axle flange with a large hammer to loosen the tapered dowels. Remove the dowels. Remove the axle.

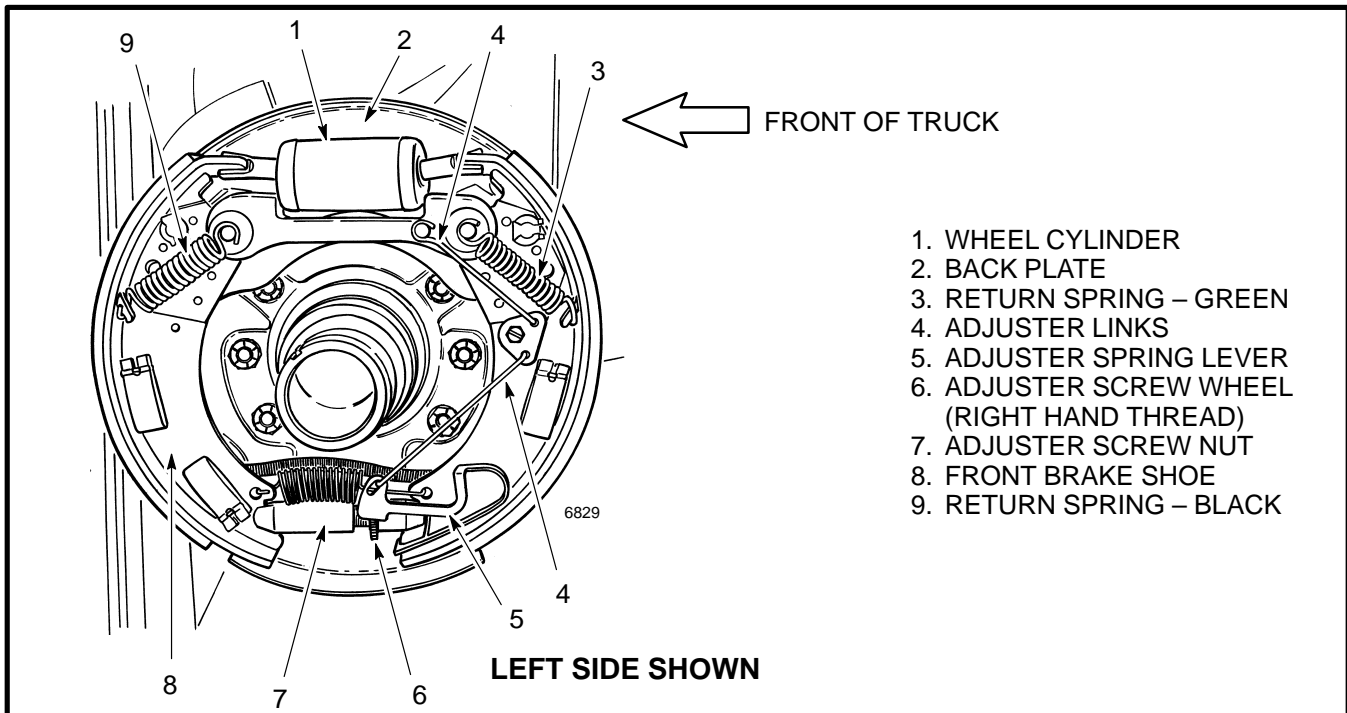


FIGURE 2. BRAKE ASSEMBLY - LEFT

CAUTION

Do not hit the studs.

2. Tilt the mast backward. Put blocks under the mast. Tilt the mast forward to raise the wheels from the ground.
3. Put some grease on the floor under each wheel. Tilt the mast back until the wheels just touch the floor.
4. Remove the oil seal, lock nut and the bearing adjustment nut from the axle housing.
5. To remove the outer bearing cone push on one side of the wheel and then on the other. Remove the bearing and protect it from dirt.
6. Remove the wheel and drum assembly. Raise or lower the truck as needed. To loosen the brake shoes turn the adjuster screw.
7. Disconnect the anchor link and the actuator link. Remove the adjuster spring lever.
8. Use spring pliers to remove the shoe return springs.
9. Remove the three spring clips.

WARNING

When the brake shoes are removed do not create dust in the air. See the cleaning procedure in this section.

10. Pull the shoes from the wheel cylinder rods. Remove the adjuster screw spring. Remove the adjuster screw assembly.
11. Remove the parking cable from the lever. Remove the lever from the primary shoe.
12. Disconnect and put a cap on the line to the wheel cylinder. Remove the support flange and back plate. Remove the two capscrews that hold the wheel cylinder to the back plate. Remove the cable clamp and pull the cable through the back plate.
13. If necessary, disassemble the wheel assembly to remove the brake drum. Remove the oil seals.
14. Repeat steps 4. to 13. for the other wheel assembly.

CLEANING

CAUTION

Do not use an oil solvent to clean the wheel cylinder. Use a solvent approved for cleaning of brake parts. Do not permit oil or grease in the brake fluid or on the brake linings.

WARNING

Cleaning solvents can be flammable and toxic, and can cause skin irritation. When using cleaning solvents, always follow the safety instructions of the solvent manufacturer.

1. Do not release brake lining dust from the brake linings into the air when the brake drum is removed.
2. Use a solvent approved for cleaning of brake parts to wet the brake lining dust. Follow the instructions and cautions of the manufacturer for the use of the solvent. If a solvent spray is used, spray at a distance so that the dust is not released into the air.
3. When the brake lining dust is wet, clean the parts. Put any rags or towels in a plastic bag or an airtight container while they are still wet. Put a “DANGEROUS FIBERS” warning label on the plastic bag or airtight container.
4. Any cleaning rags that will be washed must be cleaned so that fibres are not released into the air.

CAUTION

Do not permit oil or grease on the brake linings. Use a brake cleaning fluid as necessary to clean linings that will not be replaced.

CAUTION

Do not use solvent to clean the wheel cylinder. Do not get oil or grease in the brake fluid or on the linings. Use alcohol to clean the linings and the brake hydraulic parts.

Clean all metal parts except the linings and the wheel cylinder with solvent.

WARNING

Brake linings can contain dangerous fibers. Inhaling the dust from these brake linings is a cancer or lung disease hazard. Do not make dust! Do not clean

brake parts with compressed air or by brushing. Use vacuum equipment approved for brake dust or follow the cleaning procedure in this section. When the brake drums are removed, do not create dust.

Do not sand, grind, chisel, hammer, or change linings in any way that will make dust. Any changes to brake linings must be done in a restricted area with special ventilation. Protective clothing and a respirator must be used.

INSPECTION

1. Check the bore of the wheel cylinder for holes or scratches. Replace the wheel cylinder assembly if there is any damage.
2. Check the return spring for damage. Inspect the back plate for wear where the brake shoes touch the back plate. Grind the back plate if it is not smooth.
3. Inspect the brake shoes for cracks or damage. If the linings are badly worn or damaged or the shoes are damaged, replace the brake shoes. It is recommended that if one brake shoe is replaced, both shoes on the wheel be replaced.

WARNING

The brake shoes on both wheels must be replaced if any shoe is damaged. The brake performance on both ends of an axle must be equal or the lift truck can be difficult to steer when the brakes are applied.

4. Inspect the brake drum for deep grooves or other damage. Use sandpaper on the surface for the brake shoes.

NOTE: If the brake drums require grinding, do not grind more than 1.5 mm (0.060 in) from the diameter. The maximum drum diameter including wear is 320 mm (12.6 in). If the diameter is larger than this measurement, replace the drum.

5. The teeth of the adjuster wheel must not be worn. The adjuster wheel must turn freely. Check the adjuster links for damage.

6. Make sure the parking brake levers move freely.

7. Check the surfaces of the seals for wear or damage.

NOTE: A small amount of metal must be removed from the parking brake connecting link on some H60–110E lift trucks. This additional clearance is needed to remove the primary shoe.

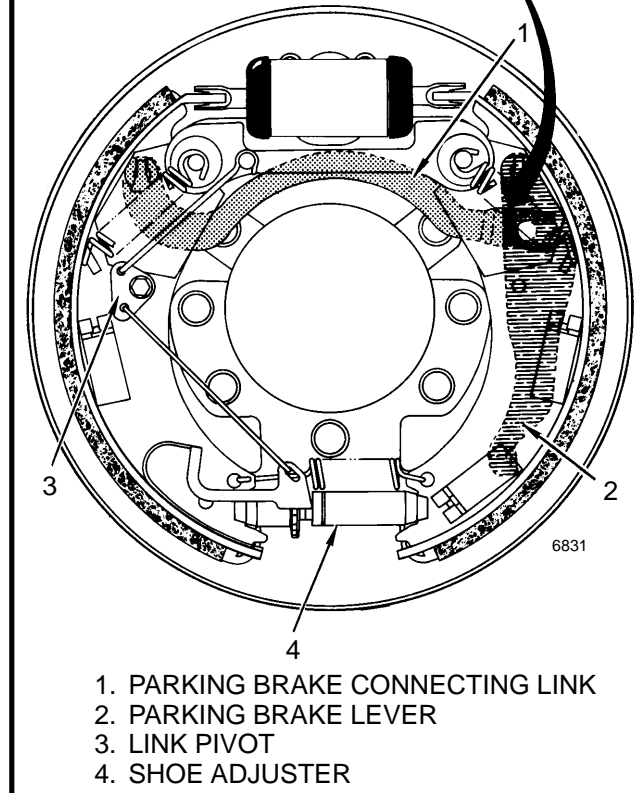
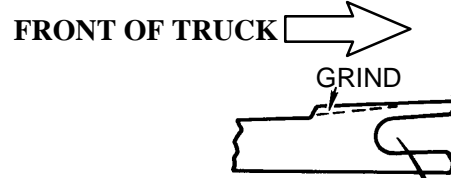


FIGURE 3. BRAKE ASSEMBLY – RIGHT

8. Inspect the bore of the master cylinder for holes or scratches. Replace the master cylinder assembly if there is damage.

ASSEMBLY

1. Install the wheel cylinder on the back plate. Push the parking cable through the back plate and fasten the clamp.

2. Install the back plate and support flange. Install the tapered dowels. Use the sequence shown in FIGURE 4, and tighten the nuts to 54 to 81 N.m (40 to 60 ft lb). Use the same sequence and tighten the nuts to 108 to 131 N.m (80 to 90 ft lb).

3. Connect the brake line to the fitting on the wheel cylinder.
4. Install the link pivot on the secondary shoe. Install the parking brake lever on the primary shoe. Install the anchor pins in the support flange so that they engage the brake shoes.

⚠ CAUTION

The link pivot and shoe adjuster are stamped “L” and “R” for left and right hand thread. The parts marked “L” go on the right side of the lift truck. The parts marked “R” go on the left side of the lift truck.

5. Lubricate the shoe pads of the back plate with molybdenum grease. Put the shoes on the back plate and install the hold down pins and clips. Engage the connecting link with the parking lever. See FIGURE 3.

The shoe return springs are not the same. One spring is green and the other black. The black spring goes to the front and the green spring to the rear on the left brake assembly. The green spring goes to the front and the black spring to the rear on the right brake assembly.

6. Install the shoe return springs. The green spring fits on the rear shoe. Connect the cable for the parking brake to the lever.
7. Lubricate the adjuster screw with Never-Seeze. Turn the adjuster screw in for installation of the drum. Install the adjuster between the shoes. Align the adjuster screw wheel with the slot in the back plate. Install the adjuster spring with the long hook at the rear. Install the adjuster spring lever and the two links.

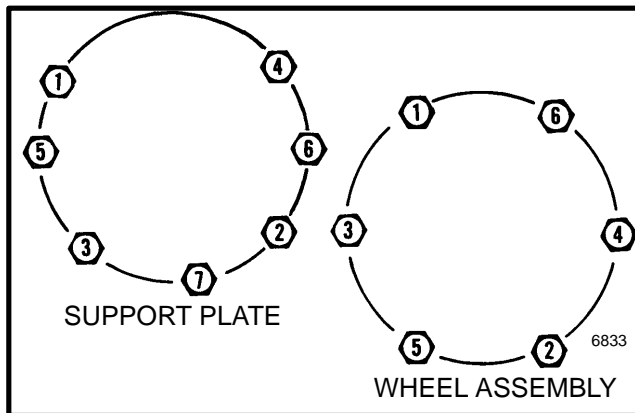


FIGURE 4. TIGHTENING SEQUENCE

8. If the brake drum was removed, install the brake drum on the hub. If the drum fastens to the inside of the hub, tighten the inside nuts to 300 to 325 N.m (220 to 240 ft lb). Use the sequence shown in FIGURE 4. Tighten the nuts that hold the wheel to the hub and brake drum assembly to 610 to 678 N.m (450 to 500 ft lbs). On models with dual wheels, tighten the spacer nuts to 610 to 678 N.m (450 to 500 ft lbs).

9. Install new oil seals and lubricate the inner bearings with grease.

10. Put some grease on the floor and push the wheel assembly on the axle housing.

⚠ CAUTION

Do not damage the seals when installing the hub assembly.

11. To adjust the wheel bearings tighten the adjuster nut to 203 N.m (150 ft lbs) while turning the wheel. Loosen the nut to less than 27 N.m (20 ft lbs). Tighten the nut to 34 N.m (25 ft lbs). Lock the adjuster nut at this position or tighten until the nut aligns with the lock plate. Install the lock nut and tighten it to 135 N.m (100 ft lbs).

12. If the axle has an O-ring, use grease to hold it in position. On other models use silicone sealant to seal the axle flange to the hub. Install the axle and the tapered dowels. Tighten the nuts to 81 N.m (60 ft lbs). If the hub uses tapered capscrews, tighten them to 162 N.m (120 ft lbs).

13. Repeat the installation procedures for the other side.

14. Remove the air from the brake fluid and adjust the brakes as specified in CHECKS AND ADJUSTMENTS in this section.

CHECKS AND ADJUSTMENTS

BRAKE SHOES (See FIGURE 5.)

Put the lift truck on blocks so that the drive wheels do not touch the ground. Use a brake adjuster tool to adjust the brake shoes so that the brake drum will not rotate. Push the automatic adjuster lever away from the adjuster wheel with a small screwdriver. Use the brake adjuster tool to loosen the adjuster wheel 20 to 30 clicks.

Install the drive wheels. Remove the lift truck from the blocks. Operate the lift truck in the Forward and Reverse directions. Stop the lift truck 10 times in each direction.

CAUTION

If there is too much clearance, the automatic adjusters will not operate. If the clearance is too small, the automatic adjuster cannot turn the adjuster wheel to increase the clearance and the adjuster wheel will not turn until the brake shoes wear. If the adjuster wheel does not move for a long operating period, the adjuster link can wear a spot on the adjuster wheel so that it will not turn correctly.

The automatic adjuster lever (1) must be at the center-line or less than 3.0 mm (0.125 in.) above the adjuster screw wheel (2). The wrong adjustment of the lever (1) will cause too much brake pedal travel before the lever (1) can actuate the adjuster screw wheel (2). Bend the actuator link (3) as shown in FIGURE 5, so that the lever (1) is within the tolerance as shown.

NOTE: This adjustment must be made anytime new or different brake shoes are installed.

WARNING

The threads of the adjuster wheel are not the same for each side. If the adjuster assemblies are installed on the wrong side, the brake shoe clearance will increase each time the brakes are applied. The adjuster wheel for the right brake has left-hand threads. The adjuster wheel for the left brake has right-hand threads.

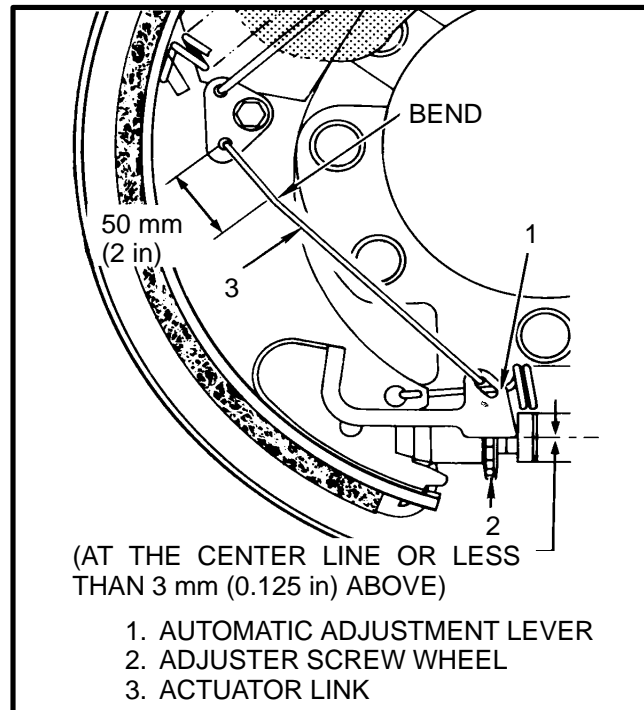


FIGURE 5. ADJUSTER LINK ADJUSTMENT

Parking Brake

Turn the knob on the hand lever to adjust the parking brake. See FIGURE 6. Adjust until a 89 N (20 lbs) pull is needed to apply the lever.

NOTE: Check the park brake after each brake job. The equalizer bar must be level when applying the park brake. If it is not level free up the sticking cable with lube.

Seat Actuated Park Brake J40-60AS (See FIGURE 7.)

1. Adjust bracket (3) so that the outer edge of the caliper pad is within 1.5 mm (0.060 in) of edge of disc. Adjust caliper (5) so that caliper is centered in its bracket.

2. Adjust bracket (8) so rod "B" is centered in the plate "E" when the brake is applied (power steering motor off).

3. Adjust "F" so that the spring height "X" is 83.5 to 86.5 mm (3.29 to 3.41 in) with the power steering motor running (brake released).

4. With power steering motor running, adjust "C" and "D" so that the parking brake caliper is in the release

position. The caliper must be adjusted so they are loose, but close to the disc.

5. With the power steering motor turned off, adjust "C", "D" and/or tighten the castle nut on the caliper assembly so that distance "X" is 101 mm (4.00 in).

6. With the power steering motor running, check to insure that the calipers do not drag. Repeat steps 4. and 5. if required.

7. Tighten the capscrews and screws to the correct torque as shown in FIGURE 6.

- a. Torque to 16 to 18 N.m (10 to 13 ft. lbs.)
- b. Torque to 41 to 43 N.m (30 to 33 ft lbs.)
- c. Torque to 5 to 8 N.m (4 to 6 ft lbs.)
- d. Torque to 136 to 149 N.m (100 to 110 ft lbs.)

8. To manually release the park brake, loosen the screws (11) so that the bracket (8) is loose.

Removing The Air From The Brake System

The air must be removed from the brake fluid. Fill the reservoir of the master cylinder with brake fluid. Put one end of a rubber hose on the special fitting of the wheel cylinder. Put the other end in a container with brake fluid. Loosen the special fitting one turn. Push slowly on the brake pedal. Repeat the procedure until no air bubbles are seen in the container. Check the fluid level in the master cylinder. If necessary close the special fitting and push on the pedal. Quickly release the pedal and repeat until there is resistance. Loosen the special fitting to remove the air bubbles. Repeat the procedure on the other wheel cylinder.

NOTE: On some trucks with Powershift transmission the brake fluid actuates the inching spool. Make sure the seals on the spool are not damaged. Remove the air in the line to the spool.

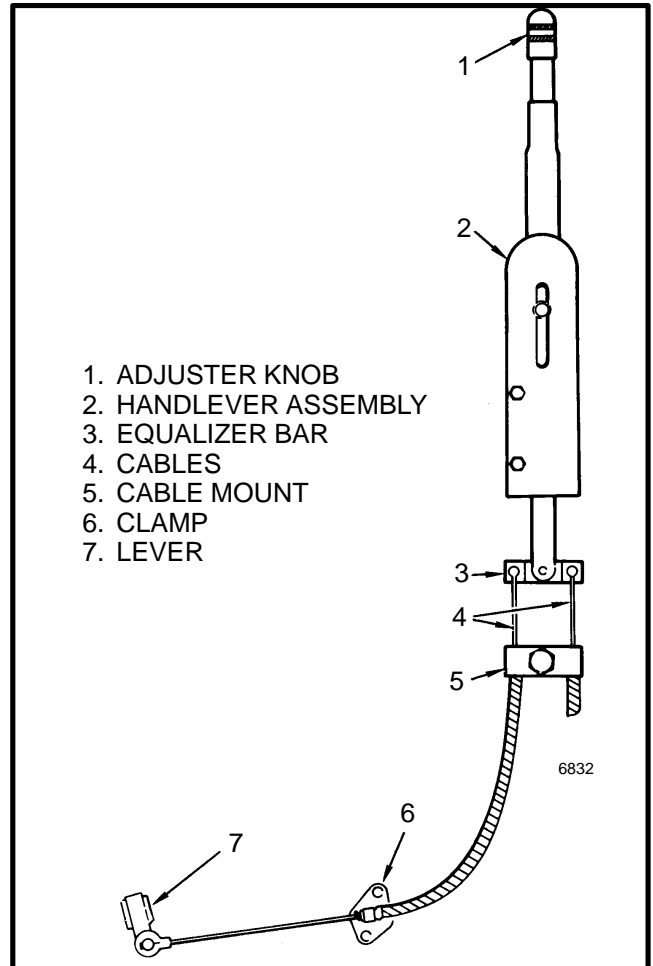


FIGURE 6. PARKING BRAKE LINKAGE

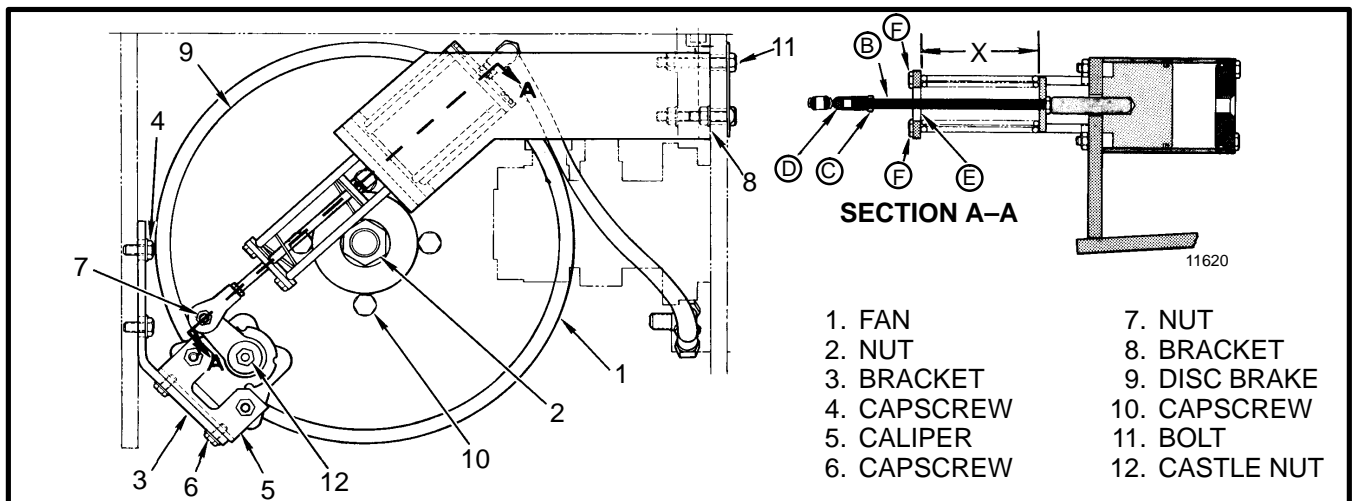


FIGURE 7. SEAT ACTIVATED PARK BRAKE

- | | |
|-------------|----------------|
| 1. FAN | 7. NUT |
| 2. NUT | 8. BRACKET |
| 3. BRACKET | 9. DISC BRAKE |
| 4. CAPSCREW | 10. CAPSCREW |
| 5. CALIPER | 11. BOLT |
| 6. CAPSCREW | 12. CASTLE NUT |

TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROCEDURE OR ACTION
The brakes do not correctly stop the lift truck .	Air in the brake system. The mount for the master cylinder is loose. The brake shoes are worn or damaged. The linings are too hard. A brake drum is cracked. A back plate is damaged. A wheel cylinder is leaking or does not operate correctly. The brake linings do not fit the brake drums. The master cylinder is damaged. Water or oil is on the brake linings.	Repair system to prevent air entering. Remove air from the system. Tighten fasteners. Install new brake shoes. Install new correct lining. Install new part. Install new part. Repair or install new parts. Remove air from the system. Install correct linings. Machine brake drums. Install new master cylinder. Remove air from the system. Clean or install new linings.
One brake does not release.	A brake shoe is damaged. A return spring is wrong. The brake lines have a restriction. A parking brake cable is damaged or needs adjustment. The wheel cylinder is damaged. The back plate is worn or damaged.	Install new parts. Install new correct spring. Remove restriction or Install new lines. Remove air from the system. Adjust cable or install new parts. Repair or install new parts. Remove air from the system. Repair or install new parts.
The brakes make too much noise.	Dirt, oil, water, or brake fluid is on the linings. The brake linings are worn. The brake drum is damaged. A brake shoe is worn or damaged.	Clean or install new linings. Install new linings. Repair or install new brake drum. Install new brake shoe(s).

TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROCEDURE OR ACTION
The brake pedal travels too far.	<p>Air in the brake system.</p> <p>Brake fluid level low. The brake system has a leak.</p> <p>The brake shoes are not adjusted correctly.</p> <p>The brake linings are worn.</p> <p>There is too much clearance at the end of the push rod in the master cylinder.</p> <p>The master cylinder is worn or damaged.</p>	<p>Remove air from the system. Check for leaks.</p> <p>Fill brake fluid reservoir to the correct level. Repair leak. Remove air from the system.</p> <p>Check operation of self-adjusters. Adjust brakes.</p> <p>Install new linings.</p> <p>Adjust the clearance between the push rod and the piston.</p> <p>Repair or install new master cylinder. Remove air from the system.</p>
The brakes do not operate equally.	<p>Oil or brake fluid is on the linings.</p> <p>The lining are worn or hard.</p> <p>A wheel cylinder is leaking.</p> <p>The brake linings are not correctly installed.</p> <p>The brake lines have a restriction.</p> <p>The back plate or brake shoes are damaged.</p> <p>The brake drums are not round.</p> <p>The shoes are adjusted too tight.</p>	<p>Repair leak. Clean or install new linings.</p> <p>Install new linings.</p> <p>Repair or install new parts. Remove air from the system.</p> <p>Install brake linings correctly.</p> <p>Clear restriction from brake lines are install new parts.</p> <p>Repair or install new parts.</p> <p>Check to make sure there is adequate material to allow for machining. Machine brake drums to make them round or install new drums.</p> <p>Adjust brakes. Check self-adjusters.</p>

TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	PROCEDURE OR ACTION
Both brakes do not release.	<p>The parking brake is not released.</p> <p>The parking brake cables need adjustment.</p> <p>There is not enough clearance at the end of the push rod in the master cylinder.</p> <p>The master cylinder is damaged.</p> <p>The brake shoes are adjusted too tight.</p> <p>A return spring is damaged.</p> <p>The brake lines have a restriction.</p> <p>The wheel bearings are adjusted too tightly.</p>	<p>Release parking brake.</p> <p>Adjust or install new cables.</p> <p>Adjust the clearance between the push rod and the piston.</p> <p>Install new master cylinder. Remove air from the system.</p> <p>Check operation of self-adjusters. Adjust brakes.</p> <p>Install new return spring.</p> <p>Clear restriction from brake lines are install new parts.</p> <p>Adjust wheel bearings.</p>
The parking brake will not hold the lift truck.	<p>Parking brake not adjusted correctly.</p> <p>Oil, water, or brake fluid is on the linings.</p> <p>The parking brake cables need adjustment, lubrication, or have damage.</p>	<p>Use adjustment knob on parking brake lever to adjust holding force. See adjustment procedure for correct specifications.</p> <p>Clean or install new linings.</p> <p>Install new parts. Lubricate and adjust cables.</p>
The parking brake will not release.	<p>The parking brake lever is adjusted too tight.</p> <p>The parking brake cables need adjustment, lubrication, or have damage.</p>	<p>Adjust parking brake. See adjustment procedure for correct specifications.</p> <p>Install new parts. Lubricate and adjust cables.</p>
The seat brake will not hold the lift truck.	<p>Seat brake not adjusted properly.</p> <p>Oil, water, or brake fluid is on the linings.</p>	<p>See adjustment procedure for correct specifications.</p> <p>Clean or install new linings.</p>
The seat brake will not release.	<p>Seat brake not adjusted properly.</p> <p>The seat brake linkage needs adjustment, lubrication, or has damage.</p>	<p>See adjustment procedure for correct specifications.</p> <p>Install new parts. Lubricate and adjust the linkage.</p>

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