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MERITOR™

A Heritage of Rockwell Technology

Hydraulic and Mechanical Drum Brakes

Maintenance Manual No. 4H Revised 4-96

Hydraulic Brakes

- DLH
- DSH
- DH
- FSH
- H

Mechanical Brakes

- DCM
- DLM
- DM

Service Notes



This maintenance manual describes the correct service and repair procedures for Meritor hydraulic and mechanical brakes. Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change.

You must follow your company procedures when you service or repair equipment or components. You must understand all procedures and instructions before you begin to work on a unit. Some procedures require the use of special tools for safe and correct service. Failure to use special tools when required can cause serious personal injury to service personnel, as well as damage to equipment and components.

Meritor uses the following notations to warn the user of possible safety problems and to provide information that will prevent damage to equipment and components.



WARNING

A WARNING indicates a procedure that you must follow exactly to avoid serious personal injury.



CAUTION

A CAUTION indicates a procedure that you must follow exactly to avoid damaging equipment or components. Serious personal injury can also occur.

NOTE: A NOTE indicates an operation, procedure or instruction that is important for proper service. A NOTE can also supply information that can help to make service quicker and easier.



This symbol indicates that fasteners must be tightened to a specific torque value.

How to Order

Order items from Meritor Literature Distribution Center, c/o Vispac, Inc., 35000 Industrial Road, Livonia, MI 48150. For videos, include a purchase order or check for \$20 payable to Meritor International for each video.

Phone orders are also accepted by calling Meritor's Customer Service Center at 800-535-5560.

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ASBESTOS FIBER WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

**DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.
3. **Procedures for Servicing Brakes.**
 - a) Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b) As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c) If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
 - d) Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e) **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.



NON-ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a potential cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some medical experts believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust. Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposures levels may exceed OSHA or manufacturer's recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.
3. **Procedures for Servicing Brakes.**
 - a) Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b) As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c) If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - d) Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e) **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Section 1 Introduction



Meritor supplies a complete line of brakes for heavy-duty vehicle applications. This Maintenance Manual covers the hydraulic and mechanical brakes shown below.

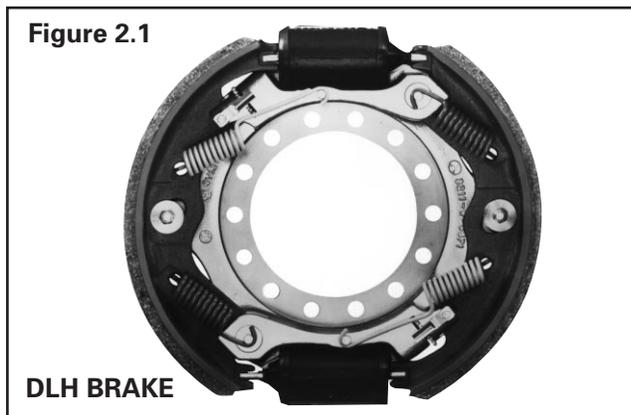
Hydraulic Brake Model	Sizes
DLH (Dual Leading Hydraulic)	17" x 4" (431.8 mm x 101.6 mm)
DSH (Duo Servo Hydraulic)	12.5" x 2.5" (317.5 mm x 63.5 mm)
DH (Duplex Hydraulic)	16.5" x 4", 5", 6" (419.1 mm x 101.6 mm, 127 mm, 152.4 mm)
FSH (Floating Shoe Hydraulic)	8" x 1.75" (203.2 mm x 44.4 mm) 10.5" x 1.5", 2.25" (266.7 mm x 38.1 mm, 57.1 mm) 12.5" x 2.25" (317.5 mm x 57.1 mm)
H (Hydraulic Brake)	7.125" x 2" (180.9 mm x 50.8 mm) 10.5" x 2.25" (266.7 mm x 57.1 mm) 15" x 3" (381 mm x 76.2 mm) 16" x 2.25" (406.4 mm x 57.1 mm) 16" x 3.5" (406.4 mm x 88.9 mm) 16.25" x 3.5" (412.7 x 88.9) 16.5" x 5.5" (419.1 mm x 139.7 mm) 17" x 4" (431.8 mm x 101.6 mm) 17.25" x 4" (438.1 mm x 101.6 mm)

Mechanical Brake Model	Sizes
DCM (Duplex Cam Mechanical)	10" x 3" (254 mm x 76.2 mm) 12" x 3", 4", 5" (304.8 mm x 76.2 mm, 101.6 mm, 127 mm)
DLM (Duplex Lever Mechanical)	7.25" x 1.5" (184.1 mm x 38.1 mm) 10" x 1.5" (254 mm x 38.1 mm) 13.375" x 2" (339.7 mm x 50.8 mm)
DM (Duplex Mechanical)	7.125" x 2" (180.9 mm x 50.8 mm)

DLH Brake (Dual Leading Hydraulic)

Description

The DLH brake is a 17" x 4", (431.8 mm x 101.6 mm) two cylinder hydraulic actuated brake. The dual leading shoe design permits balanced, equal torque action in both forward and reverse directions. Each shoe transfers its force into an anchor pin during forward direction stops and into an adjustment bolt during reverse direction stops. The two wheel cylinders balance the forces within the brake. The DLH brake has manual brake adjustment. Figures 2.1 and 2.2.



WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble DLH Brake

WARNING

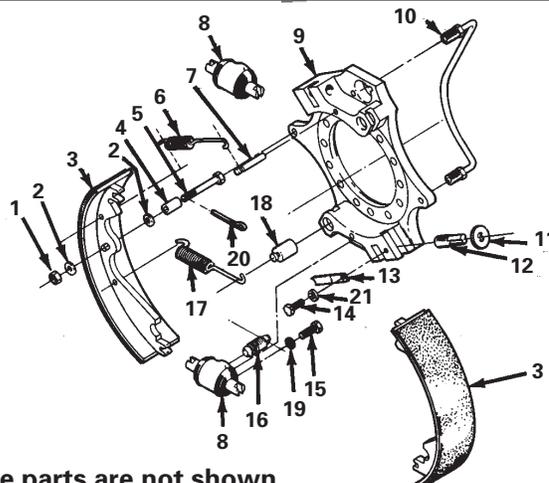
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheels and brake drums from the axle. If necessary, manually retract the brake shoes by rotating the adjustment bolt star wheel so that the brake drums will clear the linings.
5. Remove the four brake shoe return springs from their pins on the spider.
6. Support each shoe with one hand and remove the two shoe guide nuts and washers from their bolts.
7. Disassemble the shoes, anchor pins, star wheel clips and adjustment bolts.
8. If complete disassembly is necessary, disconnect the hydraulic brake tube and hydraulic brake lines. Remove the wheel cylinder capscrews and the cylinders.

Figure 2.2



1. Nut
2. Washer
3. Shoe and Lining Assy.
4. Shoe Guide Bolt Spacer
5. Shoe Guide Bolt
6. Shoe Return Spring
7. Brake Spring Pin
8. Wheel Cylinder Assy.
9. Spider
10. Hydraulic Tube
11. Adjuster Starwheel
12. Adjuster Bolt
13. Starwheel Clip
14. Capscrew
15. Capscrew
16. Hydraulic Fitting
17. Shoe Return Spring
18. Anchor Pin
19. Lock Washer
20. Cotter Pin
21. Washer

NOTE: Some duplicate parts are not shown.

Section 2 Hydraulic Brakes



9. Clean and inspect all parts. Refer to Section 4.

Assemble DLH Brake

CAUTION

Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

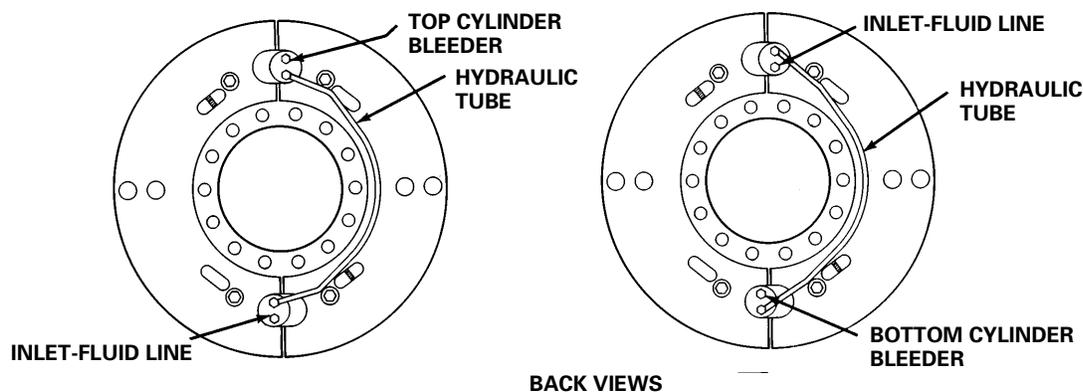
1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Adjustment bolt assemblies.
 - b. Anchor pins, anchor pin holes and anchor pin slots.
 - c. Push rod ends of the wheel cylinders.
 - d. The surfaces of the guide washers that slide against the brake shoes.
2. Install the wheel cylinder to the spider. Tighten the wheel cylinder capscrews to 15-20 lb. ft. (20-27 N•m). 
3. Install the two adjustment bolt and star wheel assemblies into their threaded holes. The end of each adjustment bolt must extend into the slot for the shoe approximately 0.125 inch (3.175 mm). Install each star wheel clip with its screw and lock washer.

4. Install the two anchor pins, with their slots in position to engage the shoes, in the anchor pin holes.
5. Install both shoe guide bolts into their holes from the back of the spider and assemble one spacer and one washer on each bolt.
6. Place one shoe in position to engage the anchor pin slot, the adjustment bolt slot and the wheel cylinder push rod. Install a shoe guide washer and nut to the shoe guide bolt.
7. Put the other shoe in position to engage the opposite anchor pin slot, adjustment bolt and wheel cylinder push rod. Install a shoe guide washer and nut to the shoe guide bolt.
8. Tighten the shoe guide nut on each shoe guide bolt until there is no clearance between the washer and the shoe. Loosen the nut 1/2 turn and install the cotter pins.
9. Install the four shoe return springs.

NOTE: The bleeder cylinder can be installed at either the top or bottom positions on the brake. In either installation the bleeder outlet **MUST** be installed at the top of the cylinder. **Figure 2.3.**

10. Install the hydraulic brake tube assembly to the two wheel cylinders.
11. Connect the hydraulic line and install the brake drum and wheel.
12. Bleed the hydraulic system after all brakes are assembled and adjusted. (See page 19.)

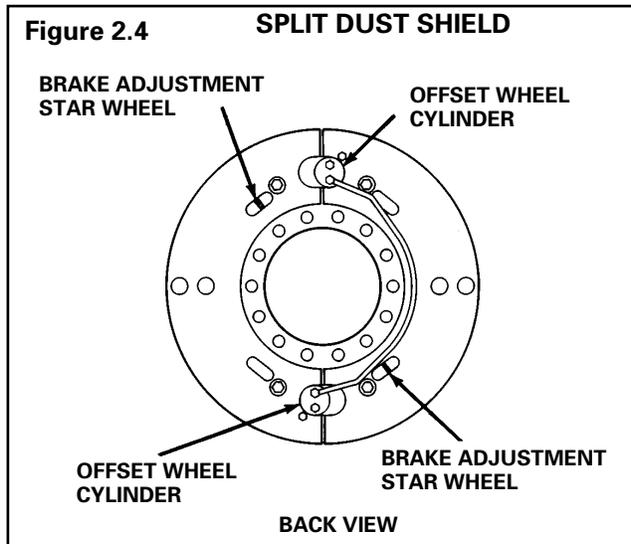
Figure 2.3



Adjust DLH Brake

NOTE: Each brake shoe must be adjusted separately.

1. The DLH brake is adjusted manually by rotating the adjustment bolt star wheels from the back of the brake. **Figure 2.4.**



2. The adjustment wheels are located opposite the wheel cylinder offset.
3. Adjust one shoe by rotating its star wheel with a brake adjusting spoon until a small resistance can be felt when the brake drum is rotated. Then adjust in the other direction until the brake drum can rotate freely.

NOTE: The adjusting tool pivots against the dust shield hole (or against the brake spider if no dust shield is used) and rotates the star wheel in the direction opposite to the handle movement. Move the handle of the adjusting tool toward the axle housing while the spoon of the tool is engaged in the star wheel to adjust the shoes closer to the brake drum. Move the handle away from the axle housing to adjust the shoes away from the brake drum.

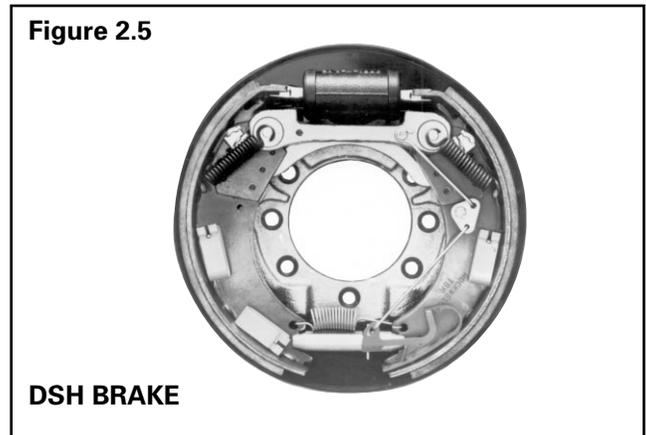
4. Adjust the other shoe after you complete the first shoe adjustment.

DSH Brake

(Duo Servo Hydraulic)

Description

The DSH brake is a 12.50" x 2.50" (317.5 mm x 63.5 mm) hydraulic actuated brake. The duo servo design permits the leading shoe to transfer all of its force through the adjusting bolt to the trailing shoe. This increases the braking action, because the force from both shoes is transmitted into the anchor of the trailing shoe. The brake has automatic adjustment and can be supplied with an optional cable operated lever for parking brake linkage. **Figures 2.5 and 2.6.**



WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble DSH Brake

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

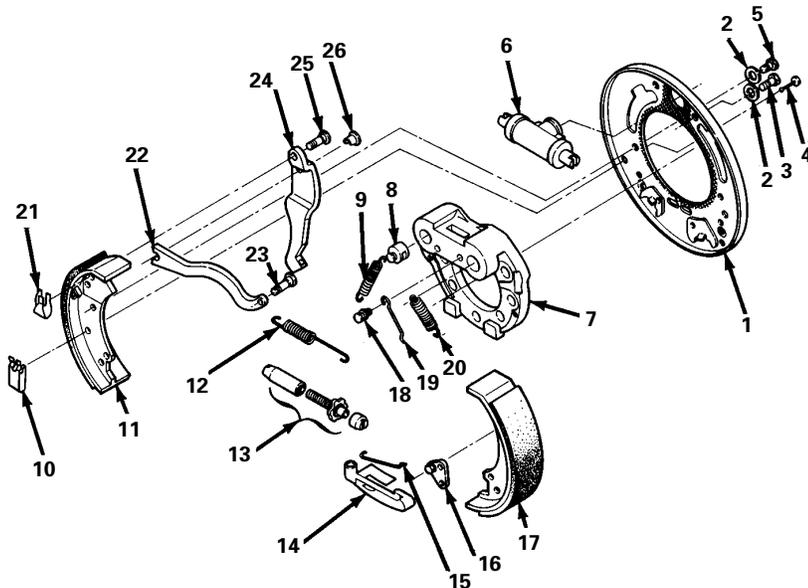
Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.

Section 2 Hydraulic Brakes



Figure 2.6



ITEM	DESCRIPTION
1	Backing Plate
2	Lock Washer
3	Capscrew
4	Hold Down Retainer Pin
5	Capscrew
6	Wheel Cylinder Assy.
7	Spider
8	Anchor Pin
9	Shoe Return Spring (Black)
10	Shoe Hold Down Clip
11	Shoe Lining Assy. (Trailing)
12	Shoe Spring
13	Adjuster Bolt Assy.
14	Automatic Adjuster Stamped Spring
15	Automatic Adjuster Wire (Long)
16	Automatic Adjuster Pivot
17	Shoe and Lining Assy.(Leading)
18	Adjuster Wire Pin
19	Automatic Adjuster Wire (Short)
20	Shoe Return Spring (Green)
21	Parking Lever Spring Clip
22	Link
23	Pivot Pin - Link
24	Parking Lever
25	Pivot Pin - Parking Lever
26	Slide Pin - Link

NOTE: Some duplicate parts are not shown.

3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheels and brake drums from the axle. If necessary, manually retract the brake shoes through the forward adjustment slot so that the brake drums will clear the linings. Insert a stiff wire or pick through the adjustment slot to push the automatic adjustment stamped spring away from the star wheel while using an adjusting tool to rotate the adjustment bolt star wheel.
5. Remove the fastener that attaches the automatic adjusting wires and the pivot to the leading shoe.
6. Remove the two brake shoe return springs from the anchor pins.
7. Support the leading shoe with one hand and remove the shoe hold-down spring clip. Lift and rotate the spring clip until it is released from the retainer pin.
8. Remove the shoe spring and the adjustment bolt at the bottom of the brake.
9. Support the trailing shoe with one hand and remove the two shoe hold-down spring clips. Lift and rotate each spring clip until it is released from the retainer pin.
10. If the brake has a parking brake lever, disassemble the link from the leading shoe by removing the spring clip. To disassemble the parking lever from the trailing shoe, remove its spring clip.
11. Remove the anchor pins from holes.
12. If complete disassembly is necessary, disconnect the hydraulic line and remove the wheel cylinder capscrews and the wheel cylinder.
13. Clean and inspect all parts. Refer to Section 4.

Assemble DSH Brake

CAUTION

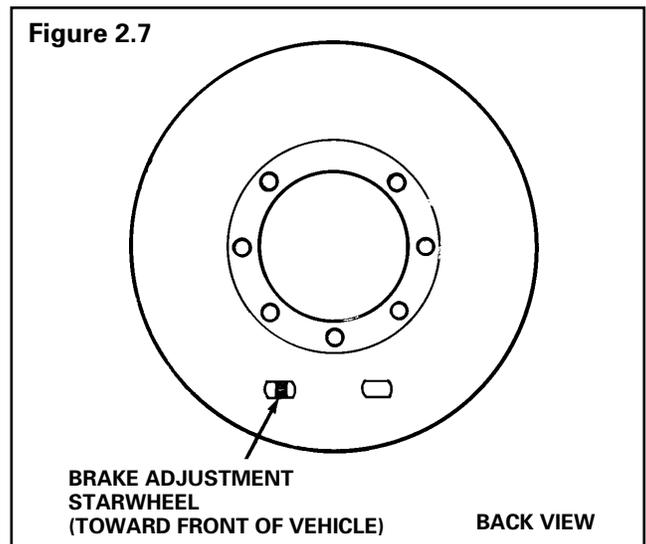
Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Adjustment bolt assemblies.
 - b. All edges of brake levers and shoes that slide against each other.

- c. Push rod ends of the wheel cylinder.
- d. Anchor pins, anchor pin holes and anchor pin slots.
2. Install the wheel cylinder to the backing plate. Tighten the wheel cylinder capscrews to 15-20 lb. ft. (20-27 N•m). 
3. If used, install the parking brake lever on the trailing shoe and the parking brake link on the leading shoe.
4. Install the two anchor pins in the holes in the backing plate.
5. Put the trailing shoe in position into the anchor pin slot and engage it with the wheel cylinder push rod.
6. To install the two shoe retainer clips, engage the clip on to the retainer pin and rotate the clip down until it sets flat on the shoe.
7. If used, install the parking cable through the backing plate and engage the cable in the parking brake lever. Install a cable retainer bracket (not supplied by Meritor) where the cable enters through the backing plate.
8. Install the stamped automatic adjustment spring on the leading shoe.
9. Assemble a star wheel adjustment bolt and shoe spring on both shoes while you put the leading shoe in position into the anchor pin slot and engage it with the wheel cylinder push rod.
10. If used, install the parking link to engage with the parking lever slide pin.
11. Hold the shoe in its correct position and install the shoe hold-down spring clip on to the retainer pin.
12. Install the green shoe return spring on to the leading shoe for right hand brake and onto trailing shoe for left hand brake.
13. Install the short automatic adjustment wire to connect the pivot to the pin near the anchor location. Install the long automatic adjustment wire to connect the pivot to the stamped automatic adjustment spring.
14. Install the automatic adjustment pivot and spacer to the leading shoe on its shoulder bolt fastener. Be careful that the pivot is not pinched under the edge of the shoulder.
15. Rotate the star wheel on the adjustment bolt to see that it can easily rotate with a “click” in one direction and cannot easily rotate in the other direction.
16. Connect the hydraulic line and install the brake drum and wheel.
17. Bleed the hydraulic system after all brakes are assembled. (See page 20).

Adjust DSH Brake

1. Adjust the DSH brake through the forward adjustment slot (toward the front of the vehicle) at the bottom of the backing plate. **Figure 2.7.**



2. Insert an adjusting tool through the forward slot of the backing plate to engage the star wheel on the adjustment bolt. To move the shoes closer to the brake drum, move the tool handle down. The adjusting tool pivots against the backing plate slot and rotates the star wheel in the direction opposite to the handle movement.
3. Adjust the linings until a light resistance can be felt when the brake drum is rotated. Then adjust in the other direction until the brake drum can just rotate freely.
4. If the brake has a parking brake lever, adjust the parking cable until a light resistance can be felt when the brake drum is rotated. Then adjust the cable in the opposite direction until the brake drum can rotate freely. Apply and release the parking brake to see that it operates correctly.

Section 2 Hydraulic Brakes



DH Brake (Duplex Hydraulic)

Description

The DH brake is a dual primary shoe, hydraulic actuated brake and it is available in 16.50" x 4", 5" and 6" (419.1 mm x 101.6 mm, 127 mm, 152.4 mm) sizes. The brake has manual adjustment. Figures 2.8 and 2.9.

Figure 2.8



DH BRAKE

WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble DH Brake

WARNING

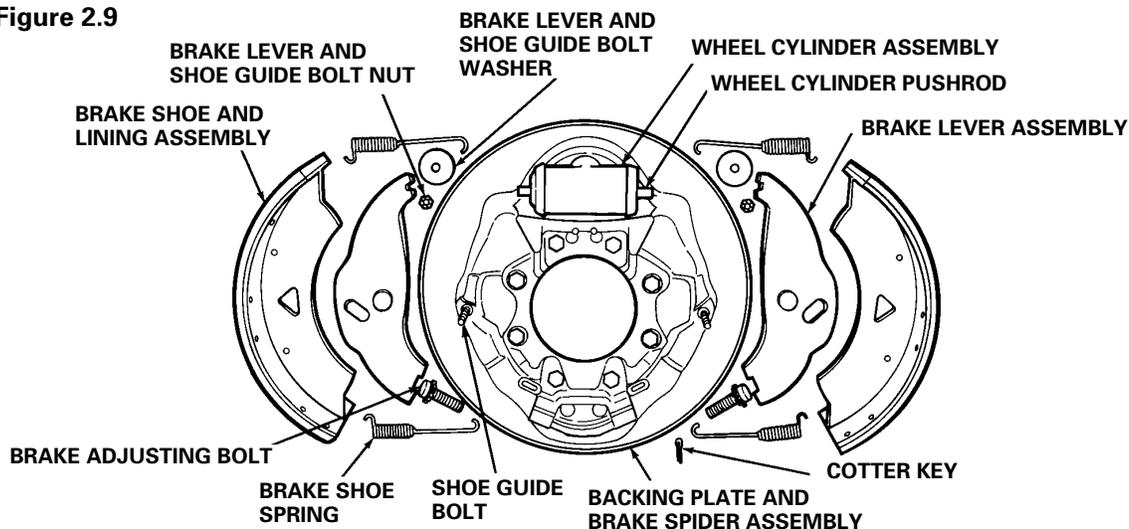
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheels and brake drums from the axle. If necessary, manually retract the brake shoes by rotating the adjustment bolts so that the brake drums will clear the linings.
5. Remove the cotter keys from the two shoe guide bolts.
6. Install a wheel cylinder clamp to hold the pistons in the wheel cylinder.
7. Push one shoe against the backing plate with one hand and remove the shoe guide bolt nut and washer with the other hand.

Figure 2.9



NOTE: Some duplicate parts are not shown.

8. Allow the shoe to rotate about the abutment ends until the return spring tension is relaxed. Remove the return springs, brake shoe and the brake lever assembly.
9. Use the same procedure (Steps 6 and 7) to disassemble the other brake shoe and lever.
10. Remove the brake shoe adjusting bolts.
11. If complete disassembly is necessary, disconnect the hydraulic line, and remove the wheel cylinder capscrews and the wheel cylinder.
12. Clean and inspect all parts. Refer to Section 4.

Assemble DH Brake

CAUTION

Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Brake shoe adjustment bolts.
 - b. The edges of the brake levers and shoes that slide against each other.
 - c. Push rod ends of the brake levers and cylinder.
2. Install the wheel cylinder to the backing plate. Tighten the wheel cylinder capscrews to 25-35 lb. ft. (34-47 N•m). 
3. Install the two brake shoe adjusting bolts until the bolts are fully retracted.
4. Install the brake levers in position so that the ends match with the push rod at the top and the adjusting bolts at the bottom.

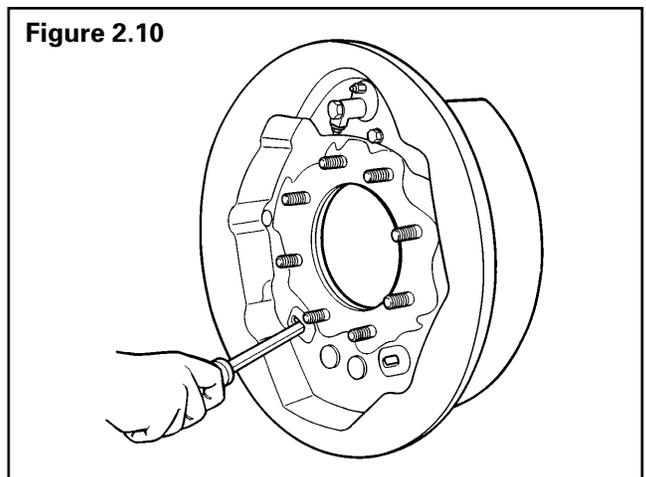
NOTE: There are right and left hand brake levers. Make sure that the levers are installed in the correct positions.

5. Attach the short ends of the shoe return springs into the brake shoe web holes of one brake shoe.
6. Attach the long end of the upper shoe return spring to the pin on the spider.
7. Attach the long end of the lower shoe return spring into the end of the adjusting bolt.
8. Lift the shoe and lining assembly over the shoe guide bolt and into position on the brake lever, pivoting about the abutments.
9. Assemble the washer and nut on the shoe guide bolt. Tighten the nut until the cotter key can be put into its hole in the guide bolt. The shoe and lever must be able to move freely.
10. Lock the guide bolt nut with the cotter key.
11. Use the same procedure (Step 5 -10) to install the other shoe.
12. Connect the hydraulic line.
13. Bleed the hydraulic system after all brakes are assembled. (See page 19).

Adjust DH Brake

NOTE: Each brake shoe must be adjusted separately.

1. The DH brakes are adjusted through the slots in the rear of the backing plate. **Figure 2.10.**



Section 2 Hydraulic Brakes



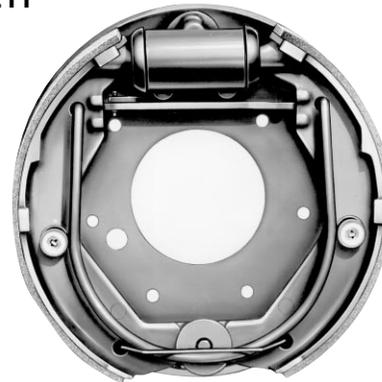
2. Put an adjusting tool through the slots to engage the lugs on the adjusting bolts. To expand the shoes, move the handle of the tool down when in the left hand slot and move the handle up when in the right hand slot.
3. Adjust one shoe until a slight resistance can be felt when the brake drum is rotated. Then adjust in the other direction until the brake drum can rotate freely.
4. Adjust the other shoe after you complete the first shoe adjustment.

FSH Brake (Floating Shoe Hydraulic)

Description

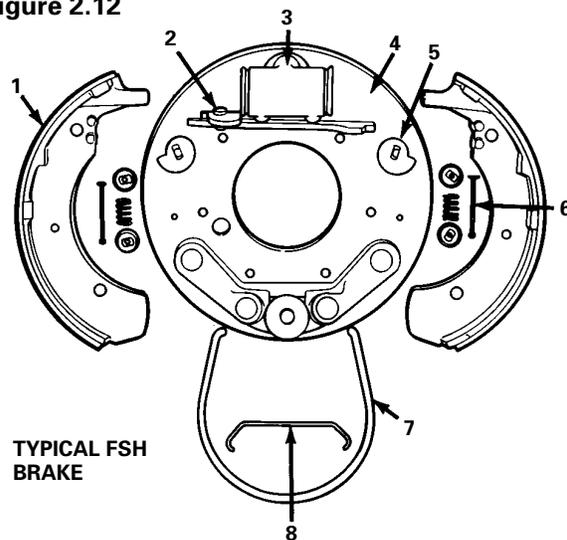
The FSH brakes are floating shoe, hydraulic actuated brakes. They are available in 8" x 1.75" (203.2 mm x 44.4 mm), 10.5" x 1.5", 2.25" (266.7 mm x 38.1 mm, 57.1 mm), 12.5" x 2.25" (317.5 mm x 57.1 mm) and 14" x 2.25" (355.6 mm x 57.1 mm) sizes. The brakes can be supplied with an optional mechanical parking brake and automatic or manual brake adjustments. **Figures 2.11, 2.12, and 2.13.**

Figure 2.11



FSH BRAKE

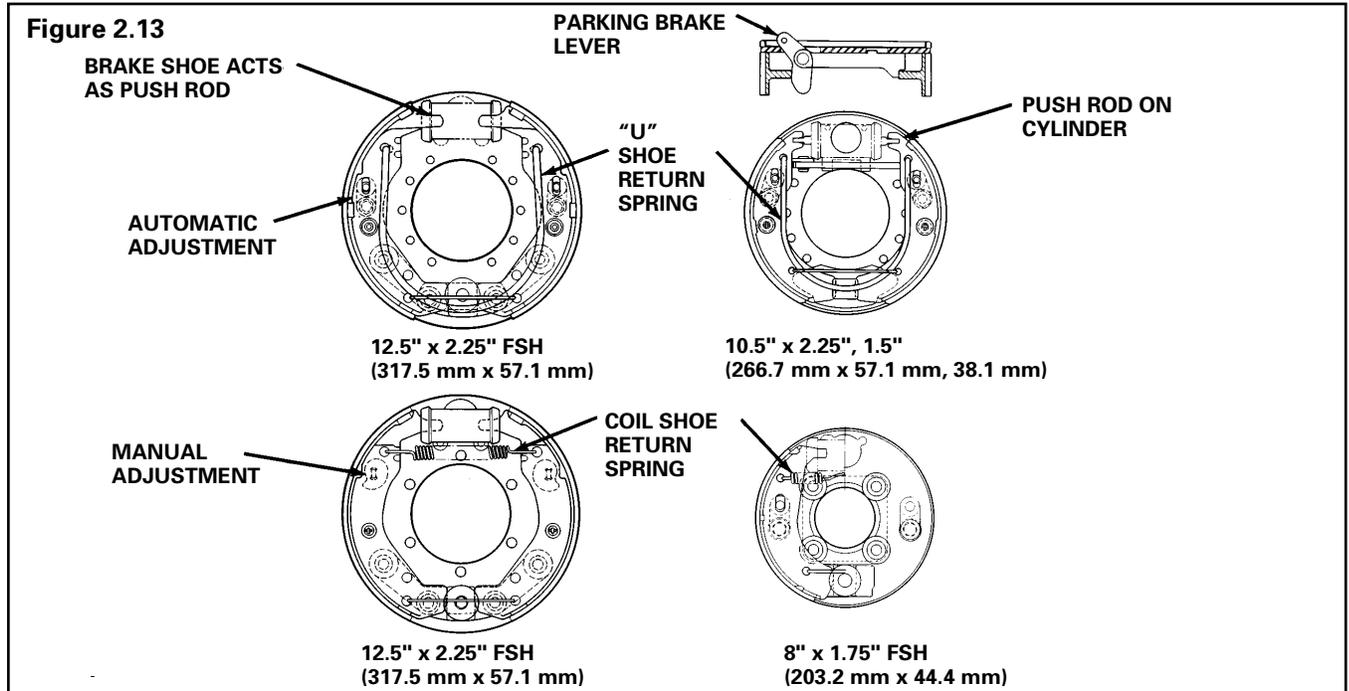
Figure 2.12



TYPICAL FSH
BRAKE

- | | |
|------------------------------|---------------------------------|
| 1. Shoe and Lining Assy. | 5. Manual Shoe Adjustment Shown |
| 2. Parking Brake Lever Assy. | 6. Shoe Hold Down Spring Assy. |
| 3. Wheel Cylinder Assy. | 7. "U" Return Spring |
| 4. Backing Plate Assy. | 8. Retainer Spring Clip |

Some of the designs of the FSH brake are shown in **Figure 2.13**.



WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble FSH Brake

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

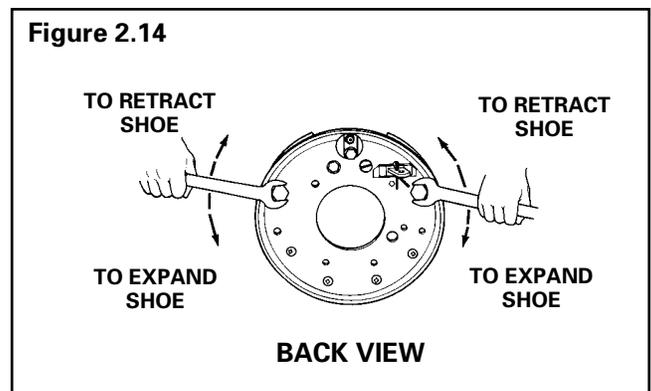
Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.

CAUTION

Do NOT apply more than 20 lb. ft. (27 N·m) torque to the heads of the adjustment bolts in step 4. More torque can damage the automatic adjustment assemblies. Do NOT use a power wrench on the adjustment bolts.

4. Remove the wheels and brake drums from the axle. If necessary, manually retract the brake shoes by rotating the adjustment bolts so that the brake drums will clear the linings. To retract each brake shoe rotate the adjustment bolt heads 1/8 of a turn. **Figure 2.14**.
5. Remove the retainer spring clip from over the "U" spring.



Section 2 Hydraulic Brakes



NOTE: Some FSH brakes, which do not have an optional parking brake, have an upper coil shoe return spring in place of the "U" spring.

6. Release and remove the shoe return spring.
7. Push down on the shoe retainers so that the retainer nails can be reached with pliers. Hold the retainers so that they do not twist while you rotate the nails 1/4 turn. Remove the retainers, springs and retainer nails.
8. Remove the brake shoes.
9. On brakes with the mechanical parking brake, remove the cotter key, spacer, spring clip and lever assembly.
10. If complete disassembly is necessary, disconnect the hydraulic line and remove the wheel cylinder attaching capscrews and wheel cylinder.
11. Clean and inspect all parts. Refer to Section 4.

Assemble FSH Brake

CAUTION

Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Push rod ends of shoes and cylinder.
 - b. Surfaces of the adjusting cams and the matching surfaces of the brake shoes.
 - c. Surfaces of the shoe support pads on the backing plate assembly and the ends of the shoe webs that slide against the anchor bracket.
2. Install the wheel cylinder to the backing plate. Tighten the wheel cylinder attaching screw and capscrew to 25-35 lb. ft. (34-47 N•m). 
3. Connect the hydraulic line.
4. If a mechanical parking brake is used, install the lever assembly, spring clip, spacer and cotter key.

5. Install the brake shoes in position so that the push rod ends of the shoes are engaged with the wheel cylinder or push rods.
6. Assemble the retainer nails, springs and retainers. Lock the nails in position by pushing down on the retainers while you twist the nails 1/4 turn with pliers.
7. To assemble the shoe return spring, put one hook in position in a brake shoe. Pull the spring open to install the opposite hook in the other shoe.
8. Assemble the retainer spring clip into the brake shoes.
9. On brakes with automatic adjustment, you must tap the shoes with a soft mallet until the brake assembly will fit into the brake drum.
10. Bleed the hydraulic system after all the brakes are assembled. (See page 19)

Adjust FSH Brake

1. FSH brakes with automatic adjustment will adjust to the correct lining to brake drum clearance when you pump down on the brake pedal to set the adjuster. These brakes have 9/16 inch or 3/4 inch adjustment bolt heads.

NOTE: Each brake shoe must be adjusted separately.

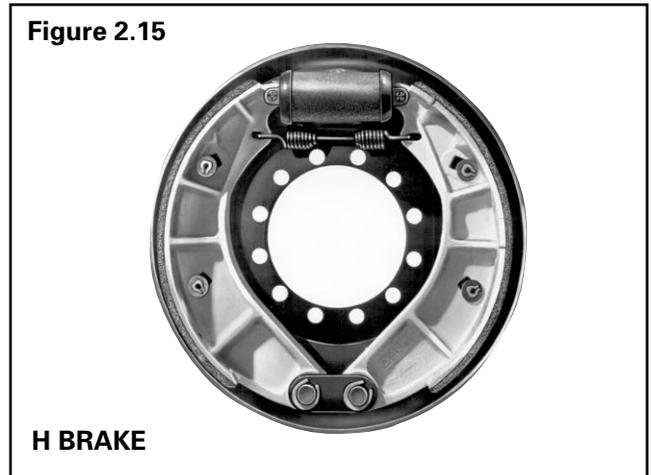
2. The manual adjustment FSH brakes have two eccentric cams that can be adjusted with either an 11/16 inch or a 15/16 inch open end wrench on the two adjustment bolt heads.
 - a. Position the wrench handle horizontally, away from the brake, then rotate the handle down to move the lining closer to the brake drum. Adjust the shoes until a slight resistance can be felt when the brake drum is rotated by hand. **Figure 2.14.**
 - b. Turn the adjustment bolt head in the opposite direction until the brake drum can just rotate freely.
 - c. Adjust the other shoe after you complete the first shoe adjustment.

H Brake (Hydraulic)

Description

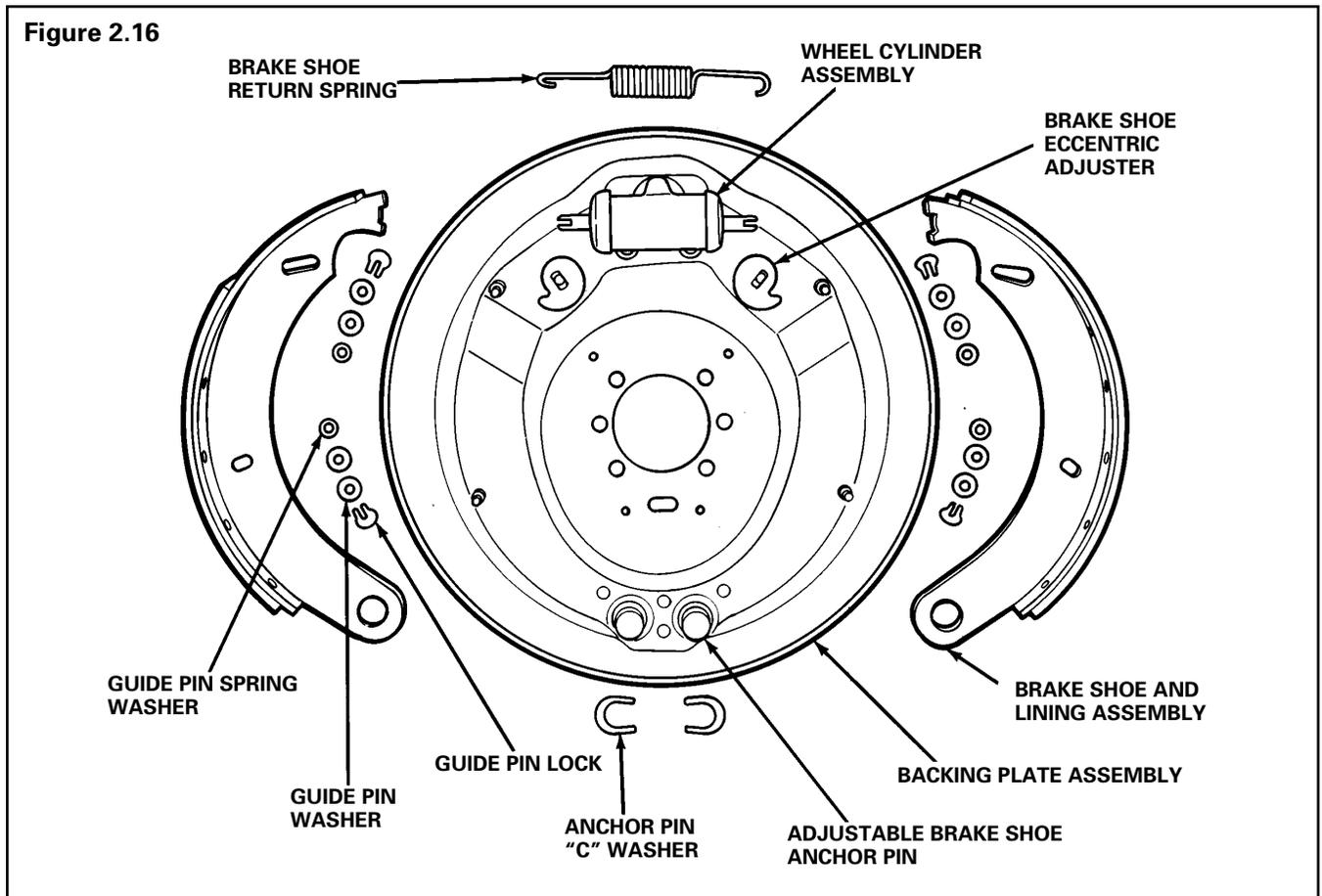
The H brakes are two shoe hydraulic brakes mounted on backing plates or on planetary axle housings. Many of the H brakes have adjustable anchor pins to permit the centering of the brake shoe arc with the drum and eccentric cams for secondary brake shoe adjustment. H brakes are available in nine different sizes from 7.125" x 2" to 17.25" x 4" (180.9 mm x 50.8 mm to 438.1 mm x 101.6 mm). **Figures 2.15 and 2.16.**

Figure 2.15



H BRAKE

Figure 2.16



Section 2 Hydraulic Brakes



There are several design variations within the nine models of H brakes. Several of the designs are shown in **Figure 2.17**.

WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble H Brake

WARNING

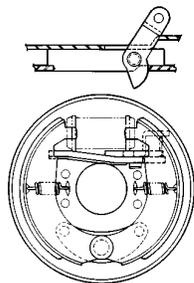
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

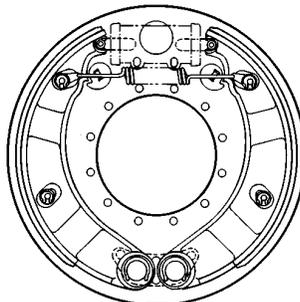
Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheels and brake drums from the axle. If necessary, manually retract the brake shoes by rotating the adjustment cams from the back of the brake so that the brake drums will clear the linings.

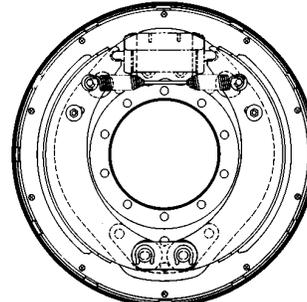
Figure 2.17



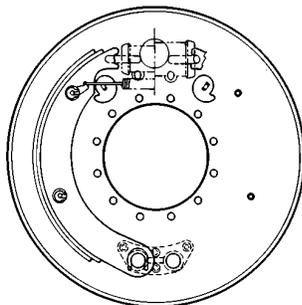
7-1/2" x 2" H



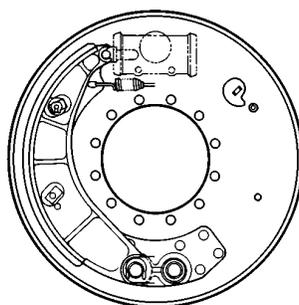
16" x 3-1/2" H



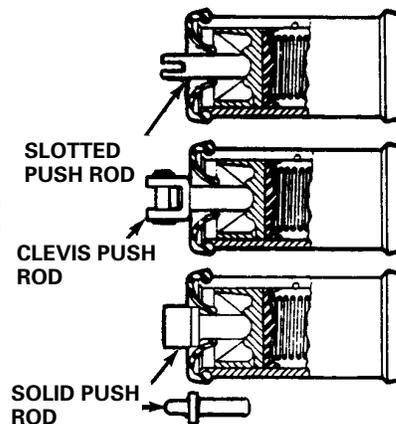
16-1/2" x 5-1/2" H



16" x 3-1/2" H



17" x 4" H



5. Disconnect the brake shoe return spring or springs.
6. Remove the anchor pin "C" washers and the guide pin locks and washers.
7. Remove the brake shoe and lining assemblies.
8. Remove the anchor pin lock nuts, lock washers and anchor pins.
9. If complete disassembly is necessary, remove the capscrews, washers and wheel cylinder assembly. Disconnect the hydraulic lines.
10. Clean and inspect all parts. Refer to Section 4.

Assemble H Brake

CAUTION

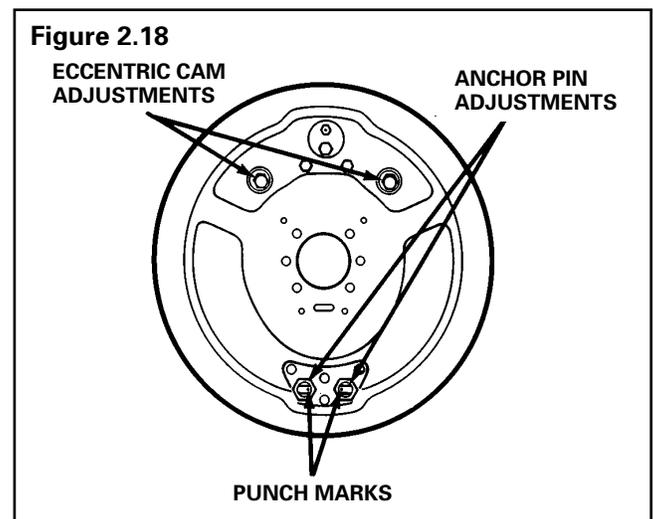
Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Surfaces of the adjusting cams and the matching surfaces of the shoe webs.
 - b. Push rod ends of shoes and cylinder.
 - c. Surfaces of anchor pins and matching surfaces of shoe webs.

2. Install the wheel cylinder to the backing plate. Tighten the capscrews and lock washers to 25-35 lb-ft (34-47 N•m). 
3. Connect the hydraulic lines.
4. Assemble the anchor pins to the backing plate with the washers and lock nuts.

NOTE: The punch marks on the base of the adjustable anchor pins must meet and the flat sides of the anchor pins must be aligned.

Figure 2.18.



5. Put the shoe and lining assemblies in correct position over the guide pins. Install the guide pin washers, lock rings and the anchor pin "C" washers.
6. Turn the adjusting cams so that the push rod ends of the shoes are engaged with the wheel cylinder push rods.
7. To assemble the shoe return spring, put one hook in position in the brake shoe. Pull the spring open to install the opposite hook in the other shoe.
8. Bleed the hydraulic system after all the brakes are assembled. (See page 19).

Section 2 Hydraulic Brakes



Adjust H Brake

NOTE: Each brake shoe must be adjusted separately.

NOTE: If adjustable anchor pins are not used, omit Brake Adjustment Steps 2 and 3.

The first adjustment after assembly must be carefully made to put the shoes in the correct position in the brake drum.

1. Turn the eccentric cam adjustment so that the lining touches the brake drum. **Figure 2.18.**
2. Turn the anchor pin adjustment, if used, until the brake drum just rotates freely. **Figure 2.18.**
3. Repeat Steps one and two until additional rotation of the anchor pin no longer decreases the brake drum resistance.
4. Tighten the anchor pin lock nut to the torque shown below: 
 - **0.750-16 Thread Size:**
Tighten to 85-115 lb-ft (115-156 N•m) when using a 13X-13 jam nut.

Tighten to 100-145 lb-ft (136-197 N•m) when using a standard height nut.
 - **0.875-14 Thread Size:**
Tighten to 150-190 lb-ft (203-258 N•m).
 - **0.875-11 Thread Size:**
Tighten to 180-230 lb-ft (244-312 N•m).
5. Turn the adjusting cam in the opposite direction until the brake can rotate freely.
6. Use the same procedure (Steps 1 - 5) to adjust the other shoe.
7. Further adjustment for lining wear must be made with the adjustment cams only. Adjust the lining until a slight resistance can be felt when the brake drum is rotated.
8. Turn the cams in the opposite direction until the brake drum just can rotate freely.

Wheel Cylinder Maintenance

WARNING

- ***These hydraulic brakes are all internal wheel cylinder brakes. If master cylinders and/or power units are being serviced, it is required that they be able to maintain 12-20 PSI (0.8-1.3 bar) residual line pressure. Otherwise these internal wheel cylinder brakes will not perform properly and can cause serious personal injury.***
- ***Leaks that coat the outside of the boot and cylinder with fluid can cause a decreased fluid level in the reservoir or dampen and stain the brake linings. Any leaks must be immediately corrected. Contaminated linings must be replaced to prevent serious personal injury.***
- ***Some hydraulic brake systems use a non-petroleum hydraulic brake fluid (SAE-J-1703 or SAE-J-1702f) some systems use petroleum base brake fluids. Make sure that you use the correct brake fluid and seals as required in the vehicle brake system specifications. Do not mix different types of brake fluid. The use of the wrong brake fluid can damage the cup seals of the wheel cylinder, cause loss of braking and serious personal injury.***

Check to determine if wheel cylinders need overhauling or replacing:

- when you replace the brake shoes and
- when a cylinder leaks.

Wheel Cylinder Diagnostics

There are two types of wheel cylinder problems:

1. Leaks

Cylinder leaks can be caused by:

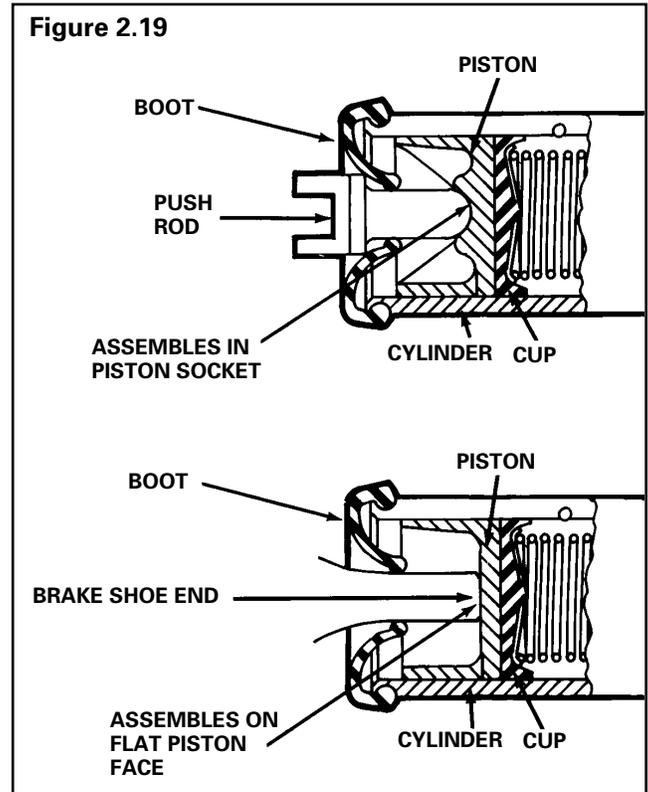
- a. using the incorrect type of brake fluid causing the seals to leak,
- b. corrosion or damage on the surface of the cylinder bore,
- c. worn or oversize cylinder bore, and
- d. damaged seal cups.

To find leaks that are not immediately visible, pull back the cylinder boot. A small amount of fluid on the inside of the boot is normal. Unless other conditions causing poor brake performance are known, the wheel cylinder must be checked.

2. Poor Cylinder Action

Cylinder binding can be caused by:

- a. Corrosion or deposits in the cylinder bore.
- b. Swollen cups caused by contaminated or wrong type of brake fluid.
- c. Cups wedged into excessive clearance between the piston and the cylinder bore.
- d. Wrong type of pistons for push rods or brake shoe ends. **Figure 2.19.**



Section 2 Hydraulic Brakes



Disassemble Wheel Cylinder

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

CAUTION

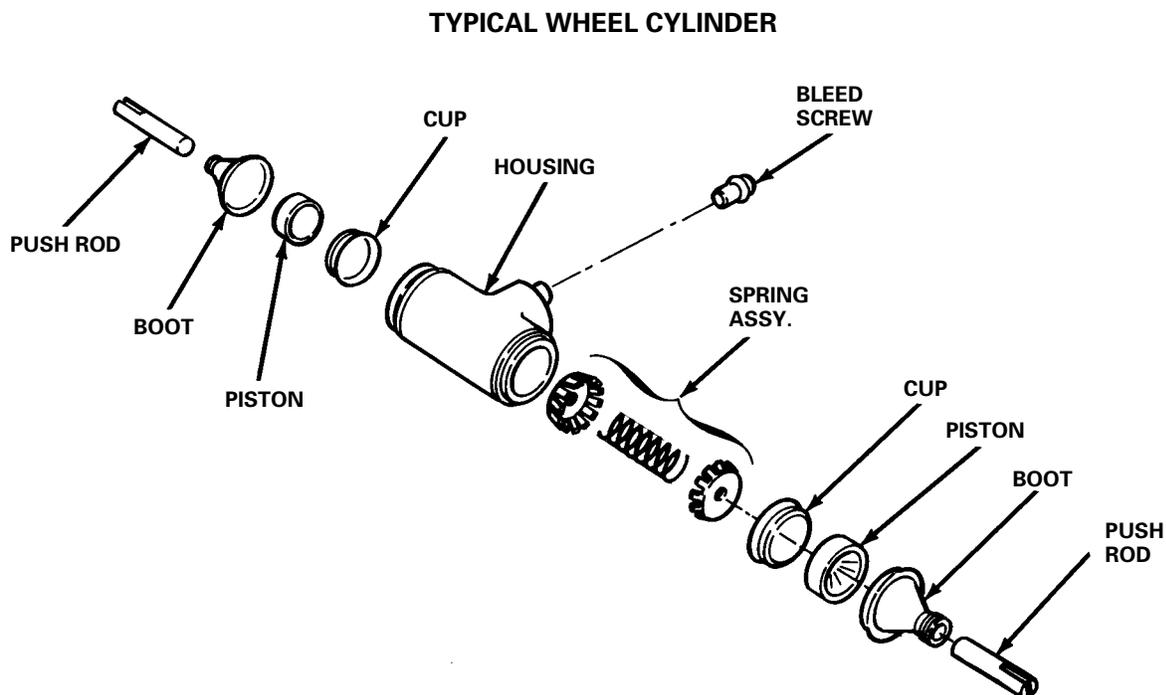
Hydraulic system parts must not contact oil or grease. Even a small amount of a petroleum product from dirty hands is enough to damage the rubber parts. Figure 2.20.

1. Remove dust boots from the cylinder.
2. Remove the internal parts of the cylinder from the housing. If necessary, use a wood dowel driver or apply low pressure compressed air to the fluid inlet port.

NOTE: Parts which cannot be easily removed indicate that they are damaged and the cylinder must be replaced.

3. Clean the cylinder and the parts in the correct brake fluid for the vehicle. Do NOT use gasoline or other petroleum products. Use only lint-free wiping rags.
4. Use a crocus cloth to clean small scratches, rust, corrosion or discoloration from the cylinder bore and pistons. Use the crocus cloth in a circular movement, not a lengthwise movement. A clean-up hone can be used. Remove any burrs at the edge of the fluid intake or bleeder screw ports.
5. After the cylinder is cleaned, check the clearance of the piston in the cylinder. Replace cylinder with more than 0.002 inch (0.05 mm) diameter clearance.

Figure 2.20



Assemble Wheel Cylinder

1. Before the cylinder is assembled, lubricate the **new** cups and the piston with the correct brake fluid.
2. If the boots are deteriorated, or do not fit tightly on the push rods and the cylinder housing, replace the boots.
3. Wash the wheel cylinder with brake fluid.
4. Install the spring in the cylinder.
5. Install the cups in each end of the cylinder with the open ends of the cups toward each other.
6. Install the pistons in each end of the cylinder with the recessed end of the pistons toward the open ends of the cylinder.
7. Install dry boots over each end of the cylinder.

Bleed Hydraulic System

After servicing the brakes it is necessary to bleed all of the components of the hydraulic system. Follow the bleeding instructions in the OEM'S vehicle maintenance manual. If the manual is not available, the following procedures will provide a proper bleed:

Bleeding must start first with the hydrovac, power cluster or master cylinder. The first wheel cylinder to be bled **MUST** be the one that is the greatest distance from the master cylinder.

CAUTION

Some hydraulic brake systems use a non-petroleum hydraulic brake fluid (SAE-J-1703 or SAE-J-1702f) some hydraulic brake systems use petroleum base brake fluids. Make sure that you use the correct brake fluid and seals as required in the vehicle brake system specifications. The use of the wrong brake fluid can damage the cup seals of the wheel cylinder. Different types of brake fluids MUST NOT be mixed.

1. Fill the master cylinder with brake fluid. Connect one end of the bleeder hose to the bleeder screw and hang the other end of the hose in a clean container. **Do not permit fluid to contact brake lining.**
2. Loosen the bleeder screw and slowly push the brake pedal to the floor. Close the bleeder screw before you release the brakes. If the bleeder hose is kept submerged in the container of brake fluid, it is not necessary to close the bleeder screw on each application. Repeat this procedure eight or ten times on each component bleed.
3. Fill the master cylinder or power cluster with the correct hydraulic fluid and check the brake pedal for correct pressure and travel. (The brakes must be in correct adjustment).
 - a. If pressure bleeding equipment is used, connect the outlet hose to the master cylinder or power cluster and bleed the system following the same procedures as above. The flow of the brake fluid must be checked while the bleeder hose is kept submerged in the brake fluid in the container. When the air bubbles are eliminated and the brake fluid runs in a clean, solid flow, the bleeding is complete.
 - b. If vacuum bleeding equipment is used, small air bubbles can be drawn past the cylinder seals into the wheel cylinders. A conventional bleed of each wheel cylinders. A conventional bleed of each wheel cylinder should be performed after a vacuum bleeding.
4. Repeat this procedure at each wheel cylinder. Fill the master cylinder reservoir after each wheel cylinder is bled.
5. When bleeding is complete, check the fluid level of the master cylinder. If necessary, fill to the specified level.

Section 3 Mechanical Brakes



DCM Brake (Duplex Cam Mechanical)

Description

The DCM brake is a two shoe mechanically actuated brake. The brake is available in 10" x 3" (254 mm x 76.2 mm) and 12" x 3", 4" and 5" (304.8 mm x 76.2 mm, 101.6 mm, 127 mm) sizes. Figures 3.1 and 3.2.

Figure 3.1

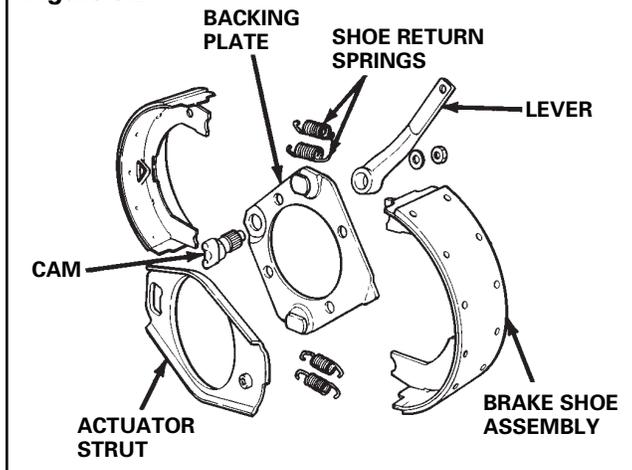


DCM BRAKE

WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Figure 3.2



Disassemble DCM Brake

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Disconnect the drive shaft using standard procedures.
5. Release the brake.
6. Remove the brake drum using standard procedures
7. Remove the nut and washer that hold the cam to the lever.
8. Remove the cam and the lever.
9. Use a brake shoe return spring removal tool to remove the two or four brake shoe return springs from the ends of the brake shoes. Discard the springs and replace them with new springs at assembly.
10. Remove both brake shoes and mark them to identify their original position at assembly.
11. Remove the actuator strut.

NOTE: Make a note of how the brake backing plate is mounted. Use the position of the cam as the reference point.

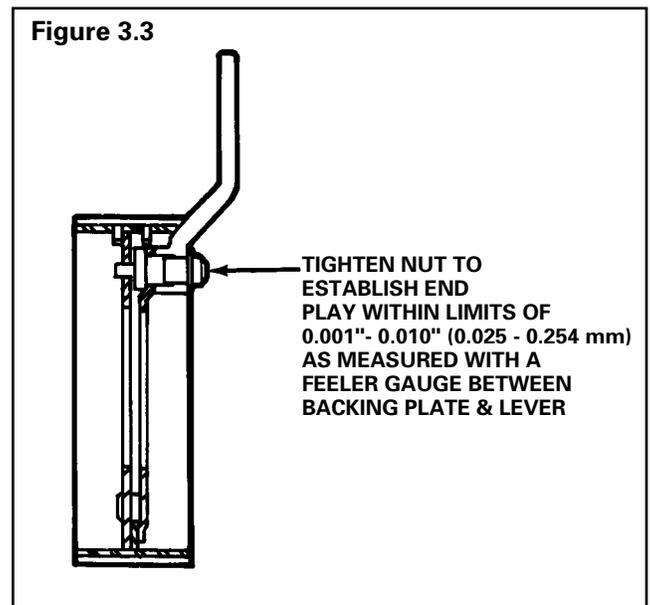
12. If complete disassembly is necessary, remove the four brake backing plate capscrews and washers.
13. Clean and inspect all parts. Refer to Section 4.

Assemble DCM Brake

CAUTION

*Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings **MUST** be replaced.*

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Cam head face and journals.
 - b. The sides of the shoe webs and the actuator strut that slide together.
 - c. Both sides of the backing plate at the cam hole.
2. If it was removed, install the brake backing plate in the same position as marked in Step 10 of the Disassembly Section. Tighten the four capscrews to the specifications set by the OEM.
3. Install the brake shoes in the same position as marked in Step 8 of the Disassembly Section with the web ends in position on the backing plate bosses.
4. Use a brake shoe installation tool to install the **four new** brake shoe return springs at the ends of the brake shoes.
5. Assemble the cam through the backing plate, lever, lock washer and nut. Tighten the nut to give an end play of 0.001" to 0.010" (0.025 - 0.254 mm) as measured with a feeler gauge between the backing plate and the lever.
Figure 3.3.



6. Install the actuator strut with the pressure points against the shoe web pressure points and the cam head in position in the slot of the strut.
7. Assemble the brake drum and drive shaft using standard procedures.

Adjust DCM Brake

Equal adjustment of the brake shoes is controlled by the actuating lever. The only required adjustment is through the connecting linkage to the lever arm. The adjustment can be made after the brake drum and drive shaft are assembled.

Section 3 Mechanical Brakes



DLM Brake (Duplex Lever Mechanical)

Description

The DLM brake is a two-shoe mechanically actuated brake. The brake is available in 7.25" x 1.5", 10" x 1.5" and 13.375" x 2" (184.1 mm x 38.1 mm, 254. mm x 38.1 mm and 339.7 mm x 50.8 mm) sizes. **Figures 3.4 and 3.5.**

Figure 3.4

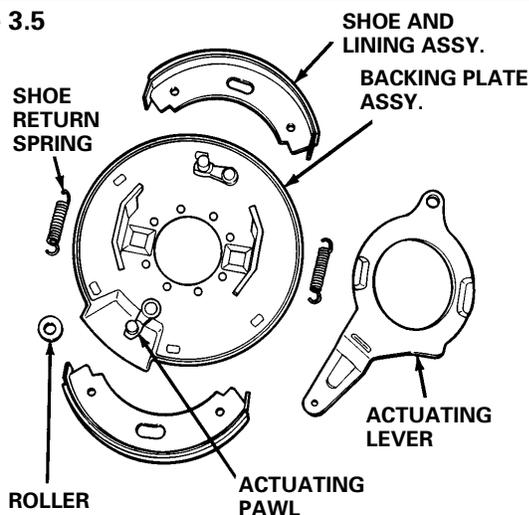


DLM BRAKE

WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Figure 3.5



Disassemble DLM Brake

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
 2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
 3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
 4. Disconnect the drive shaft using standard procedures.
 5. Release the brake.
 6. Remove the brake drum using standard procedures.
 7. Use a brake shoe return spring removal tool to remove the two brake shoe return springs.
 8. Remove both brake shoe and lining assemblies.
 9. Lift the brake actuator lever from the pawls and remove the roller from the actuator pawl pin under the arm of the lever.
- NOTE:** Some smaller DLM brakes use a roller on each pawl.
10. If complete disassembly is necessary, remove the brake backing plate capscrews and washers. Make a note of how the brake backing plate is mounted. Use the position of the actuator lever opening as a reference point.
 11. Clean and inspect all parts. Refer to Section 4.

Assemble DLM Brake

CAUTION

Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings *MUST* be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. The sides of the brake lever and shoes that slide against each other.
 - b. The ends of the shoe webs.
 - c. The surfaces of the wear pads and actuating pawls.
2. If it was removed, install the brake backing plate in the same position as marked in Step 10 of the Disassembly Section. Tighten the capscrews to the specifications set by the vehicle builder.
3. Put the roller(s) in position on the actuator pawl pin at the lever opening on the backing plate.
4. Install the brake actuator lever with the large hole in the tab over the pawl pin that is opposite the actuator pawl. Set the lever arm in the backing plate opening with the outer edge of the lever next to the roller.
5. Install the brake shoes with the webs against the actuator lever and the pawl pins through the web slots.

WARNING

Failure to correctly install spring in slot could pull shoe away from actuating pawl and render brake inoperative. Serious personal injury can occur.

6. Use a brake shoe return spring installation tool to connect the shoe return springs to the brake shoes in the slots nearest the backing plate.
7. Assemble the brake drum and drive shaft using standard procedures.

Adjust DLM Brake

Equal alignment of the brake shoes is controlled by the actuating lever. The only required adjustment is through the connecting linkage to the lever arm. The adjustment can be made after the brake drum and drive shaft are assembled.

Section 3 Mechanical Brakes



DM Brake (Duplex Mechanical)

Description

The DM brake is a two shoe mechanically actuated brake. The brake is available in 7.125" x 2" (180.9 mm x 50.8 mm), sizes. **Figures 3.6 and 3.7.**

Figure 3.6



DM BRAKE

WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

Disassemble DM Brake

WARNING

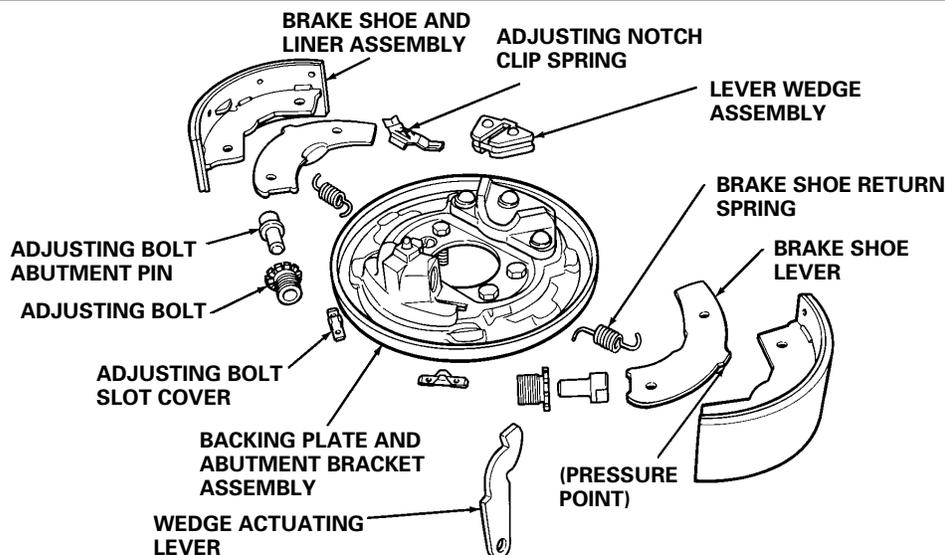
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

WARNING

Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.

1. Make sure the vehicle is on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Disconnect the drive shaft using standard procedures.
5. Release the brake.

Figure 3.7



6. Remove the brake drum using standard procedures.
 7. Disconnect and remove the shoe return springs with a "button hook" type of spring tool.
 8. Remove the shoe and lining assemblies.
 9. Disassemble the actuating lever, both shoe levers and the wedge assembly.
 10. Remove the adjusting bolt spring clip.
 11. Pull the abutment pins from the bores inside the adjusting bolts.
 12. Remove both adjusting bolts.
- NOTE:** Make a note of how the brake backing plate is mounted. Use the position of the slot for the actuator lever as the reference point.
13. If complete disassembly is necessary, remove the four brake backing plate capscrews and washers.
 14. Clean and inspect all parts. Refer to Section 4.

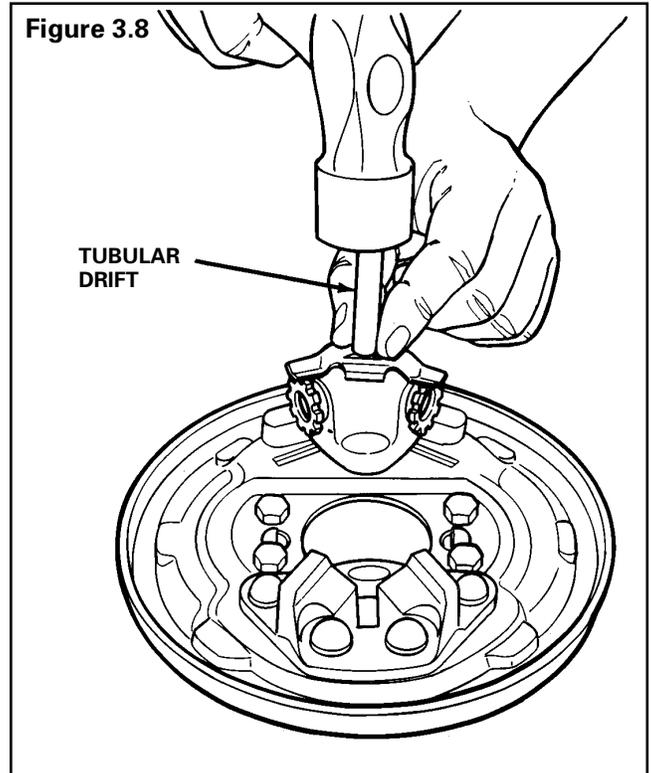
Assemble DM Brake

⚠ CAUTION

Do not permit grease to contact the brake drum or linings. Grease on the linings can cause poor brake performance. Contaminated linings MUST be replaced.

1. Before assembly, apply a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent (listed on page 31) to the following parts:
 - a. Adjusting bolts.
 - b. Side slots and the actuator lever groove in the wedge assembly.
 - c. The sides of the brake levers and shoes that slide against each other.
2. Install both adjusting bolts.
3. Put the abutment pins in the adjusting bolt bores.

4. Install the adjusting bolt spring clip with a tubular drift. **Figure 3.8.**



5. Install shoe and lining assemblies on the backing plate with the web pressure points above the center line.
6. Put the straight ends of the shoe return springs in the shoe webs. Install the round ends in the backing plate slots.
7. Install the brake shoe levers with the pressure points against the pressure points on the webs of the shoes.
8. Put the actuator lever through the slot in the back of the backing plate. Pull apart the shoe and shoe lever assemblies to install the wedge assembly.
9. Assemble the brake drum and drive shaft using standard procedures.

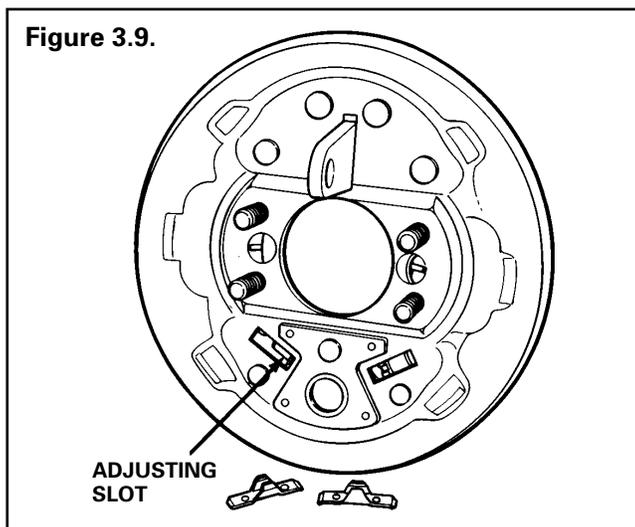
Section 3 Mechanical Brakes



Adjust DM Brake

NOTE: Each brake shoe must be adjusted separately.

1. Insert an adjusting tool through the holes in the backing plate to engage the teeth on the adjusting bolts. To expand the shoes, move the tool handle down when the tool is in the right hand slot, and move the handle up when the tool is in the left hand slot. **Figure 3.9.**



2. Adjust the lining tight against the brake drum, then release the adjustment until the brake drum just can rotate freely.
3. Install the adjusting slot covers.

Clean Ground or Polished Parts

 **WARNING**

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

 **WARNING**

If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent serious personal injury, follow the instructions supplied by the manufacturer of these products. Do NOT use gasoline to clean parts. Gasoline can explode and cause serious personal injury.

 **CAUTION**

- *Do not use cleaning solvents on hydraulic seals, boots or pistons. Cleaning solvents can damage these components. Protect the brake lining from solvents, lubricants, rust inhibitors, or other contaminants that can change the friction properties of the lining. Contaminated linings MUST be replaced.*
- *Use only solvent cleaners to clean ground or polished metal parts. Hot solution tanks or water and alkaline solutions will damage these parts. Isopropyl alcohol, kerosene or diesel fuel can be used for this purpose.*
- *If required, use a sharp knife to remove gasket material from parts. Be careful not to damage the ground or polished surfaces.*
 - a. Use a cleaning solvent to clean ground or polished parts and surfaces. Kerosene or diesel fuel can be used for this purpose. DO NOT USE GASOLINE.
 - b. DO NOT clean ground or polished parts in a hot solution tank or with water, steam or alkaline solutions. These solutions will cause corrosion of the parts.

Clean Parts With Rough Finishes

- a. Rough parts can be cleaned with the ground or polished parts.
- b. Rough parts also can be cleaned in hot solution tanks with a weak alkaline solution.
- c. Parts must remain in the hot solution tanks until they are completely cleaned and heated.

Dry Cleaned Parts

- a. Parts must be dried immediately after they are cleaned.
- b. Dry parts with clean paper or rags, or compressed air.

Prevent Corrosion and Rust on Cleaned Parts

 **CAUTION**

Wheel cylinders and cup seals must only be lubricated with the fluid used in vehicle brake system. Cylinder boots must be kept dry to avoid rust and corrosion.

- a. Apply axle lubricant to the cleaned and dried metal parts that are to be immediately assembled.
- b. If parts are to be stored, apply a special material that prevents rust and corrosion to all surfaces.

Inspect Parts

It is important that you carefully inspect all parts before assembly starts. Check all parts for wear or damage and repair or replace them as required. Replacement of these parts now can prevent problems with the assembly later.

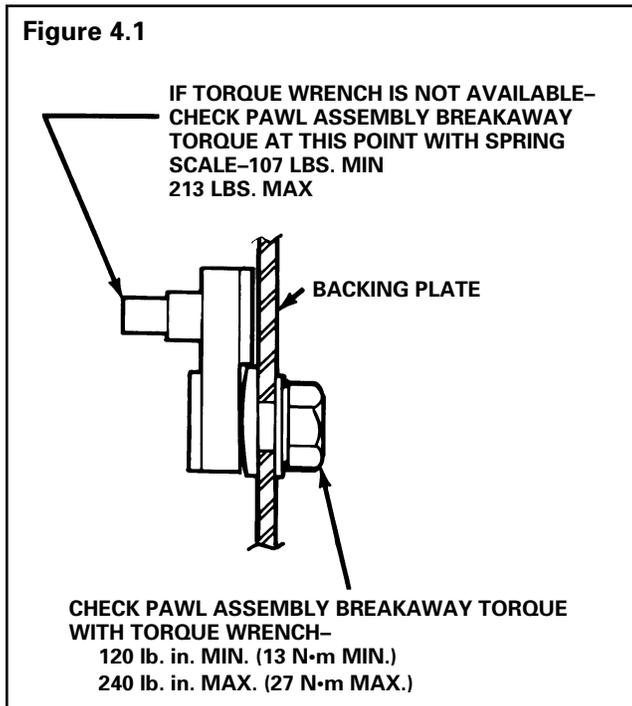
- a. Check all castings and backing plates for cracks, loose rivets and correct alignment. Replace all damaged parts.
- b. Check all adjusting bolts, guide pins and pawl pins for corrosion and wear. Replace or repair damage parts.

Section 4

Prepare Parts for Assembly



- c. If the brake has automatic adjuster pawls, check the pawl breakaway torque with a torque wrench to verify that the torque is between 120-240 lb. in. (13-27 N•m). 
Figure 4.1.



Check brake shoes for rust, expanded rivet holes, broken welds and correct alignment. Replace damaged shoes.

- d. Check anchors, anchor pins and shoe bushings for wear or damage. Replace as necessary.
- e. Replace all shoe return springs at time of brake overhaul.
- f. Check the brake drums for cracks, severe heat checking, heat spotting, scoring, pitting and distortion. Replace damaged brake drums.
- g. Inspect wheel cylinders for leaks and smooth action. (See page 17).

Maintenance Schedules



WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

A schedule for periodic adjustment, cleaning, inspection, and lubricating of the brake equipment must be made according to type of brake and type of vehicle operation. Each operator must establish maintenance schedules based on vehicle applications. Start with inspections every two months and adjust the schedules as necessary. Severe service and high levels of contamination must have more frequent brake adjustments and inspections.

Brakes must be cleaned, inspected, lubricated and adjusted every time the wheel hubs are removed. Do NOT clean or contaminate the linings with fluid.

Minor Inspection: Hydraulic Brakes

1. Check the brake pedal travel with brake drums assembled. Too much travel can indicate the need for brake adjustment.
2. Check the brake adjustment unless the brakes are equipped with automatic adjustment.
3. Check the operation of the parking brake by actuating and releasing the parking brake control and observing the brake actuation and release.
4. Check lining wear:
 - a. Check the wear side-to-side and end-to-end.
 - b. The lining wear must be even on both shoes of the brake and on both sides of the axle.
5. Check the brake lining to brake drum contact pattern. Contact must be the same on both shoes of the brake and on both sides of the axle.
6. Check the operation of the brake by pressing and releasing the brake pedal in the cab and observing the brake actuation and release.

Major Inspection: Hydraulic Brakes

Major inspection must be made at every reline. Severe duty cycles or environmental conditions require more frequent major inspections.

1. Check all of the points described in the minor inspection procedures.
2. Check the anchors and the shoes bushings for wear.
3. Check the levers for rust, bending or seizing.
4. Check the adjustment components for rust, bending or seizing.
5. Check for loose shoe return springs.
6. Check for loose or broken lining rivets.
7. Check for brake fluid, grease or oil on the linings. Do NOT reuse contaminated linings.
8. Check the brake shoes for rust and bending.
9. Check the brake drums for wear or damage.
10. Check the brake lines for cracking, pinching and corrosion.
11. Check the wheel cylinders for leaking and binding. (See page 17).
12. Before assembly, lubricate the sliding parts with a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent listed on page 31.
13. Assemble the brakes.
14. Bleed the hydraulic system. (See page 19.)

Section 5

Recommended Periodic Service



Minor Inspection: Mechanical Brakes

1. Check lining wear. Lining wear must be even on both shoes.
2. Check the lining to brake drum contact pattern. Contact must be the same on both shoes.
3. Check the operation of the brake by actuating and releasing the brake control and observing the actuation and release.
4. Check the brake adjustment.

Major Inspection: Mechanical Brakes

Major inspection must be made at every reline and when there is poor brake performance.

1. Check all the points described in the minor inspection procedures.
2. Check for worn or corroded areas where components contact or slide against each other.
3. Replace all shoe return springs.
4. Check the cam (if used) for wear, rust, bending and seizing.
5. Check the actuator lever for rust, bending, seizing or other damage.
6. Check the spider or backing plate for looseness and elongated mounting holes.
7. Check for loose or broken lining rivets.
8. Check for grease or oil on the lining. Do NOT reuse contaminated linings.
9. Check the brake shoes for bending and rust.
10. Check the actuator pawl, if used, for wear and correct alignment.
11. Check the brake drums for wear and damage.
12. Before assembly, lubricate the sliding parts with a thin layer of Meritor specification 0-616 brake lubricant such as Texaco Thermatex EP-2 grease or equivalent listed on page 31.

Torque Chart

DLH Brake wheel cylinder capscrews	15-20 lb-ft (20-27 N•m)
DSH Brake wheel cylinder capscrews	15-20 lb-ft (20-27 N•m)
DH Brake wheel cylinder capscrews	25-30 lb-ft (34-47 N•m)
FSH Brake wheel cylinder attaching screw and capscrew	25-35 lb-ft (34-47 N•m)
H Brake wheel cylinder lock washers and capscrews	25-35 lb-ft (34-47 N•m)
H Brake anchor pin lock nut: 0.750-16 thread size: <ul style="list-style-type: none"> ● w/13x-13 jam nut ● w/ standard height nut 0.875-14 thread size 0.875-11 thread size	85-115 lb-ft (115-156 N•m) 100-145 lb-ft (136-197 N•m) 150-190 lb-ft (203-258 N•m) 180-230 lb-ft (244-312 N•m)
Adjuster pawl	120-240 lb-in (13-27 N•m)

Lubrication

Meritor Specification 0-616:	
Standard Oil of Ohio	Sohio #101
Warren Refining Co.	Plastilube #2
Fisher Bros. Refining Co.	SA Lubricant
Shell Oil Company	Darina Grease 2 Extrema EP-2 Darina EP-2
Texaco	Thermatex EP-2

Notes





Notes





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