MERITOR®

Technical Bulletin

DiscPlus™ DX195 and DX225 Air Disc Brakes

Inspection, Installation and Diagnostics

Air Disc Brake Inspection Intervals and Procedures

⚠ ASBESTOS AND NON-ASBESTOS FIBERS 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.

⚠ WARNING

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

Park the vehicle on a level surface. 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 and damage to components can result.

Intervals

Periodically inspect the brakes. Check the stroke length and inspect the brake components for signs of wear and damage.

Use the schedule below that gives the most frequent inspections.

- Fleet chassis lubrication schedule
- Chassis manufacturer lubrication schedule
- At least four times during lining life
- At tire replacement

Check the Push Rod Travel or Adjusted Chamber Stroke Length

Use the following procedure to check the in-service push rod travel or adjusted chamber stroke.

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. The engine must be OFF. Check the gauges in the cab to verify that the air pressure in the tanks is 90-100 psi (620-689 kPa).
3. Release the parking brake.
4. Measure the distance from the bottom of the air chamber to the center of the clevis pin while the brakes are released. This distance should be approximately 1.46-inches (37 mm). Figure 1.
   - **If the distance is greater than 1.62-inches (41 mm):** Refer to the diagnostics table in this bulletin to determine the cause and correct the condition.

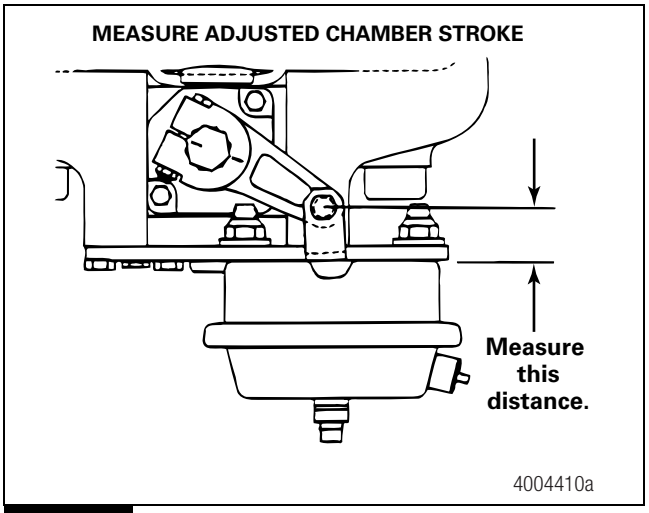

Figure 1

5. Have another person apply and hold the brakes one full application. Measure the distance from the bottom of the air chamber to the center of the clevis pin while the brakes are applied.
6. Subtract the measurement you obtained in Step 4 from the measurement you obtained in Step 5. The difference is the push rod travel or adjusted chamber stroke.
   - **If push rod travel or adjusted chamber stroke is greater than two-inches (51 mm):** Refer to the diagnostics table in this bulletin.
   - **If push rod travel or adjusted chamber stroke is less than 0.88-inches (22 mm):** Readjust the brake. Refer to the initial brake adjustment procedure in this bulletin.

Caliper Assembly Inspection

1. Remove the adjuster plug and washer. Figure 2.

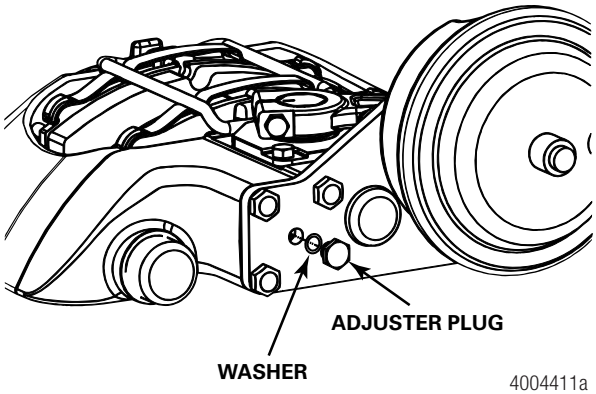

Figure 2

⚠ CAUTION

Always use a 6 mm Allen wrench to manually adjust and de-adjust the brake. Do not use air or power tools. Damage to components can result.

2. Use a 6 mm Allen wrench to de-adjust the brake. Stop turning the Allen wrench when you feel resistance. When you feel resistance, adjust the brake 1/4 turn to ensure that automatic adjustment will occur. Figure 3. Note the location of the air chamber with respect to the adjustment direction.

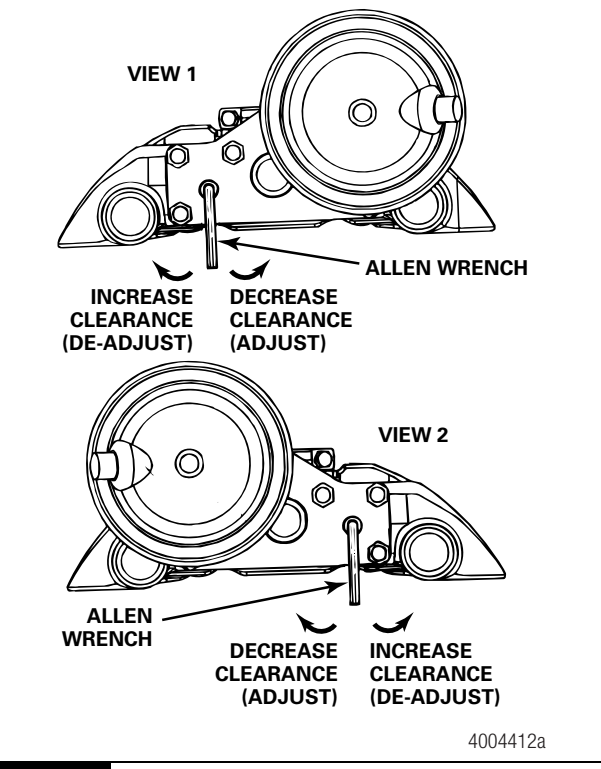

Figure 3

3. Remove the stabilizer bar retainer and cotter pin. Open the bar so that it is out of the way. Figure 4.

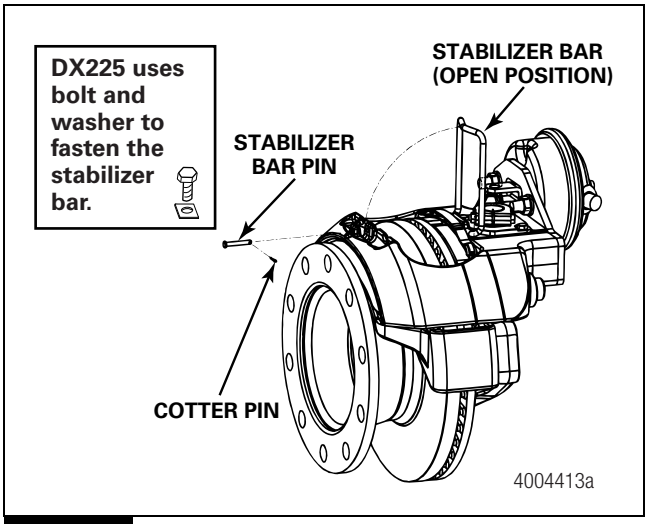

Figure 4

4. Lift the INBOARD brake pad out of the caliper assembly. Mark the brake pad INBOARD. Figure 5.

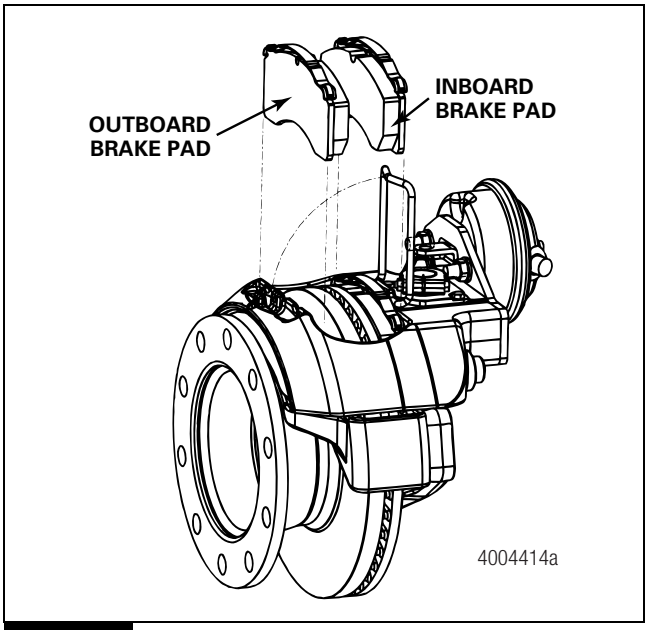

Figure 5

5. Slide the caliper OUTWARD and remove the OUTBOARD brake pad. Mark the brake pad OUTBOARD. Figure 5.

6. Inspect the brake pads for cracked friction material (lining). Check if the friction material is loose or detached from the backing plate. Inspect the anti-rattle springs attached to the brake pad. Replace bent, cracked or broken springs. Figure 6.

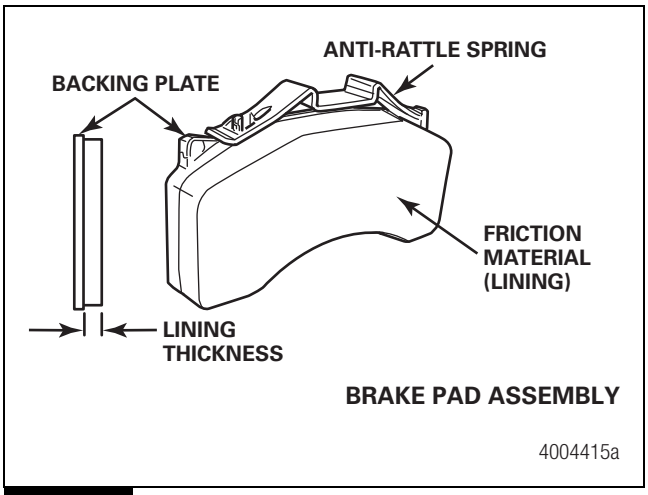

Figure 6

7. Measure the friction material (lining) thickness. Replace the brake pad assembly before the lining thickness reaches 0.200-inch (5.1 mm). Figure 6.
8. Remove dirt or dust from the brake pad contact surfaces of the saddle abutments.
9. Verify that the caliper slides freely on the slide pins. Figure 7.

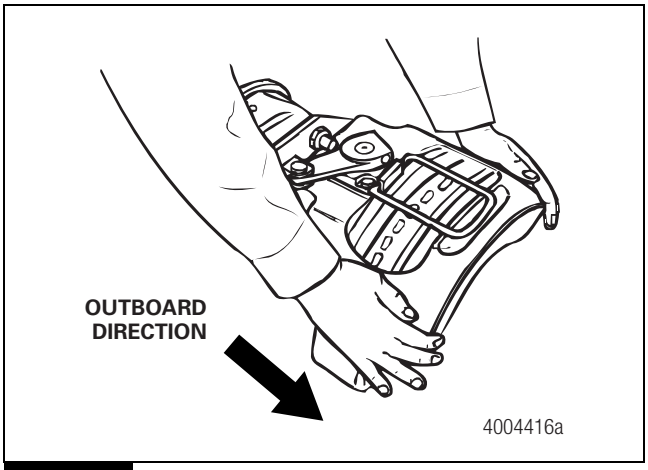

Figure 7

10. Inspect the caliper boots. If the boots are damaged, replace the caliper. Figure 8.
    - **If you are replacing the calipers:** Refer to the caliper assembly removal and installation procedures in this bulletin.

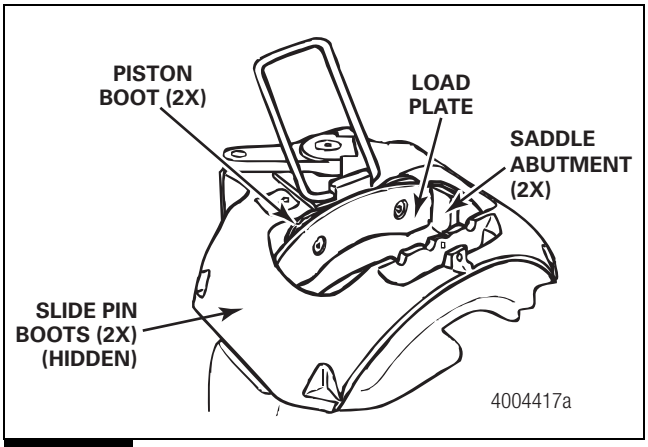

Figure 8

Disc or Rotor Inspection

With the pads removed, rotate the wheel and inspect the rotor. Inspect both sides of the rotor for cracks and heat checks. Replace the rotor, if necessary.

Cracks

⚠ WARNING

Always replace a cracked rotor to avoid serious personal injury and damage to components.

When the crack extends through a section of the rotor, replace the rotor. Figure 9.

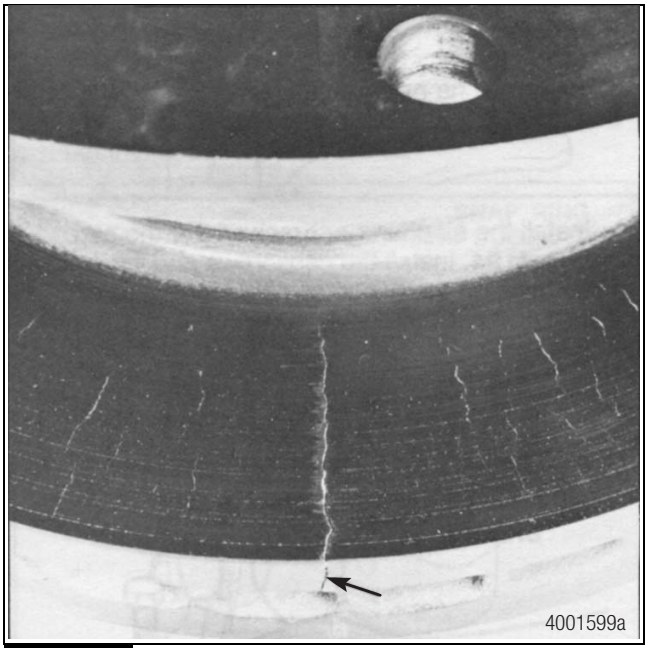

Figure 9

Heat Checking

Heat checks are short, thin, sometimes numerous, radial interruptions of the rotor braking surfaces. They are the result of disc brake operation. They are caused by the heating and cooling that occurs as the brakes are applied time after time. Heat checks will frequently wear away and reform, or they may become braking surface cracks, depending on such factors as the lining and rotor wear rate, brake balance, and how hard the brakes are used. There are two kinds of heat checking: light and heavy.

Light Heat Checking

Cracks on the surface of the rotor that result from light heat checking are small and fine and do not require rotor replacement.

Heavy Heat Checking

Heavy heat checking is surface cracks that have width and depth. Figure 10. If you find heavy heat checking, replace the rotor.

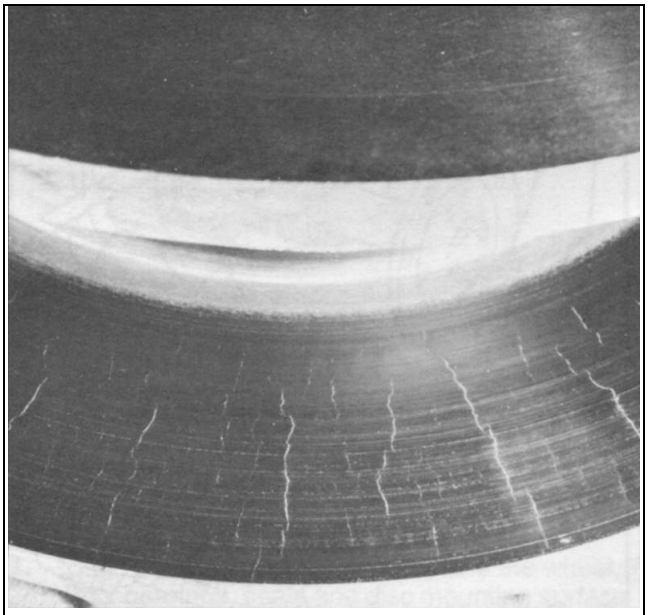

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Figure 10

Deep Grooves or Scores

Inspect both sides of the rotor. If you find deep grooves or scores, replace the rotor. Figure 11. If the grooves or scores are not too deep, you may continue to use the rotor.

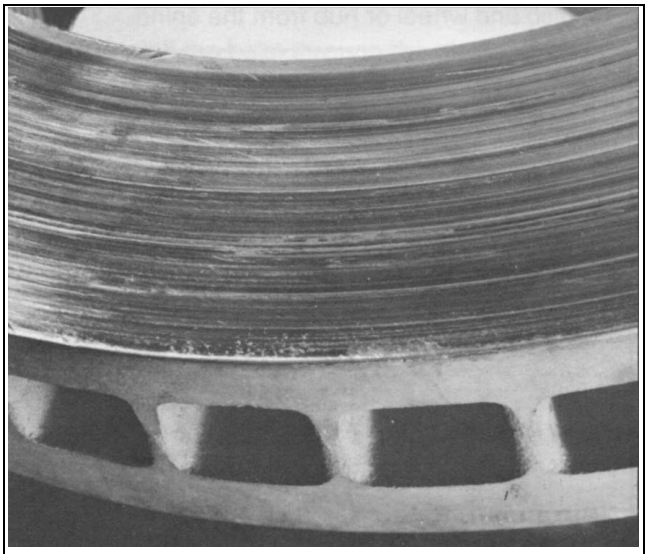

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Figure 11

Blue Marks or Bands

Blue marks or bands indicate that the rotor was very hot. Refer to the diagnostics table in this bulletin to determine the cause and correct the condition. Figure 12.

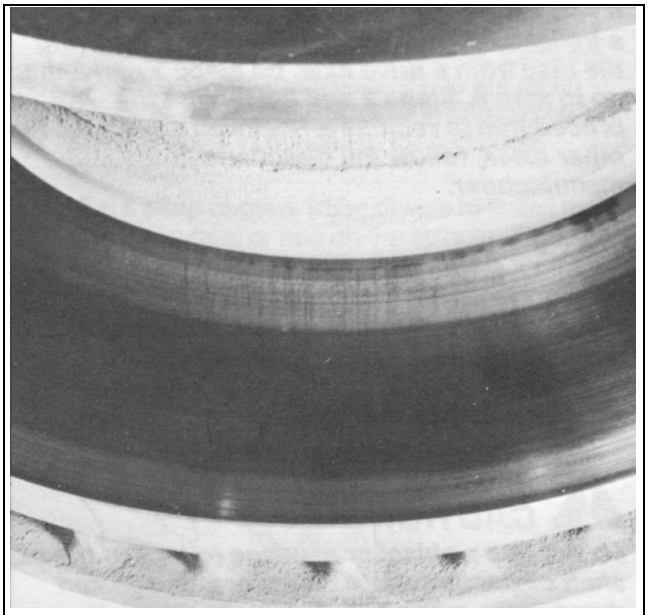

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Figure 12

Measure the Rotor Thickness

Use a micrometer to measure the rotor thickness. The rotor must be at least 1.626-inches (41.3 mm). Figure 13.

- **If the rotor thickness is less than the specification:** Replace the rotor.

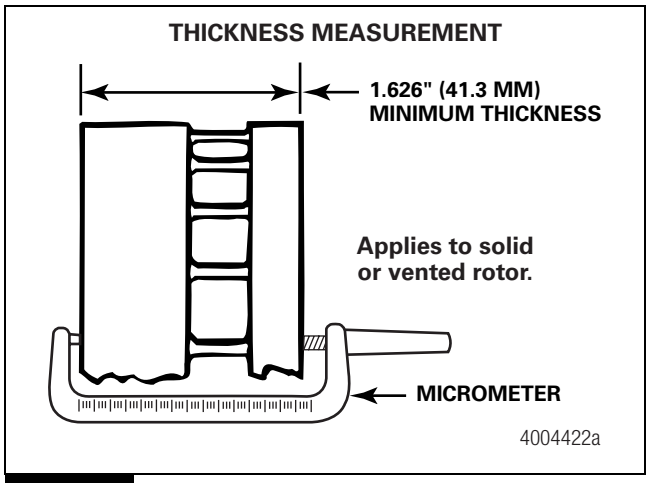

Figure 13

Install the Brake Pads

⚠ CAUTION

Replace the pads on both brakes of a single axle or on all four brakes of a tandem axle at the same time. If you do not replace all the pads at the same time, poor brake performance can occur.

1. Slide the caliper OUTWARD. Install the OUTBOARD pad and spring assembly into the OUTBOARD side of the caliper. Confirm that the load plate is correctly located between the saddle abutments. Figure 8.
2. Slide the caliper INWARD. Install the INBOARD pad and spring assembly into the INBOARD side of the caliper.
3. Close the stabilizer bar. Install the stabilizer bar pin and cotter pin or tighten the hex-head bolt to 23-29 lb-ft (30-40 N•m).

Initial Brake Adjustment

⚠ CAUTION

You must adjust the initial brake pad-to-rotor clearance or an inefficient, dragging brake can occur. Damage to components can result.

1. Use the following procedure to adjust the initial brake pad-to-rotor clearance. The air chamber must be installed and attached to the lever with the clevis pin before you proceed with the initial brake adjustment procedure.
   A. Use a 6 mm Allen wrench to adjust the caliper by reducing the brake pad-to-rotor clearance to ZERO. Figure 3.
   B. Verify that the load plate is in full contact with the brake pad backing plate. Figure 6 and Figure 8.
   C. Increase the brake pad-to-rotor clearance 10 clicks or 3/4 turn (de-adjust) to set the initial clearance. Figure 3.
2. Install the adjuster plug and washer. Tighten to 8-12 lb-ft (11-17 N•m). Figure 2.
3. Have another person make 10 or more brake applications to set the brake pad-to-rotor running clearance. Verify that all air chambers and calipers correctly apply and release during the brake applications.

Remove the Caliper Assembly

⚠ CAUTION

Do not use the stabilizer bar to lift the caliper onto or off of the axle. Damage to the stabilizer bar can result.

1. Remove the clevis pin from the lever.
2. Remove the air chamber.
3. Remove the four saddle bolts. Figure 14.

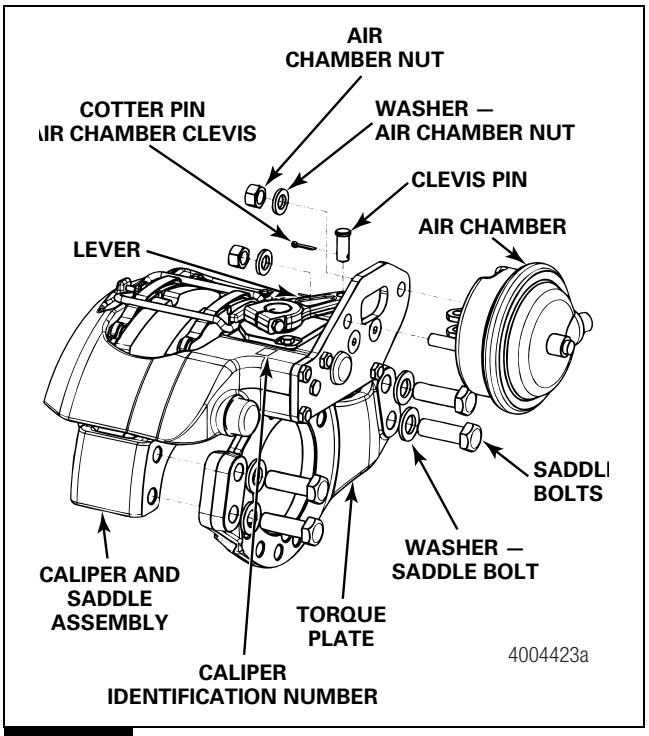

Figure 14

4. Lift the caliper and saddle assembly away from the rotor.

Replace the Rotor

1. Remove the caliper assembly. Refer to the procedure in this bulletin.
2. Remove the hub and rotor assembly. Refer to the axle manufacturer's service manual.

⚠ WARNING

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

3. Detach the rotor from the hub. Use one of the following procedures.
   - **For stud-mounted rotors:** Use a brass or synthetic mallet to remove the hub-to-rotor studs. Figure 15. Be careful not to damage the studs during this process.
   - **For bolt-mounted rotors:** Unscrew the hub-to-rotor bolts. Figure 16.

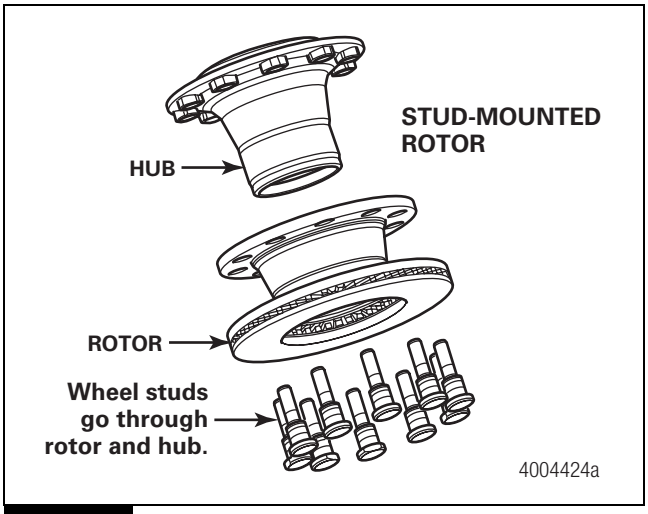

Figure 15

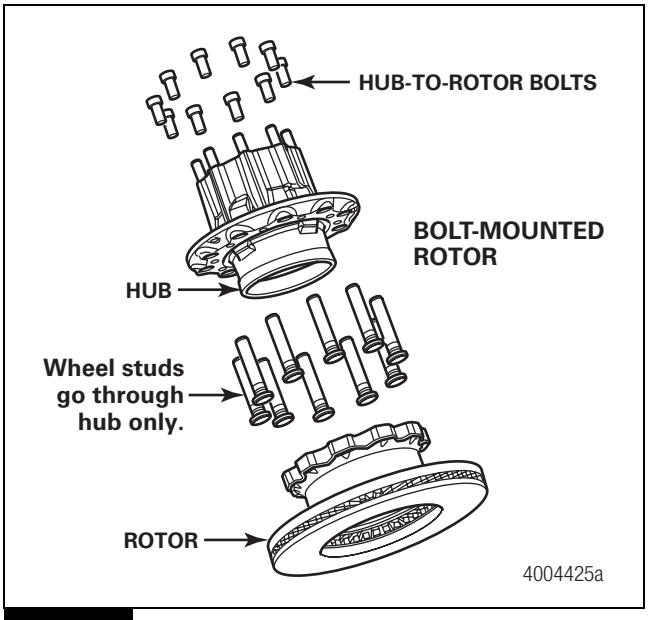

Figure 16

4. Attach a new rotor to the hub.
   - **For stud-mounted rotors:** Press or pull the wheel studs through the rotor into the hub. Figure 15.
   - **For bolt-mounted rotors**: Tighten the hub-to-rotor bolts to 175-195 lb-ft (238-265 N•m). Figure 16. ❶
5. Install the hub and rotor assembly. Refer to the axle manufacturer's service manual.
6. Install the caliper assembly. Refer to the procedure in this bulletin.

Install the Caliper Assembly

1. Place the caliper assembly over the rotor.
2. Align the caliper saddle bolt holes and assemble to the torque plate using saddle bolts and washers.
3. Tighten the saddle bolts to 400-500 lb-ft (544-680 N•m). ❶
4. Mount the air chamber to the caliper assembly. Tighten the air chamber nuts and washers to 133-155 lb-ft (180-210 N•m). ❶
5. Apply a coating of anti-seize compound to the clevis pin. Install the clevis pin and cotter pin.
6. Install the brake pads. Refer to the procedure in this bulletin.

Air Disc Brake Troubleshooting

Diagnostics

DX195 and DX225 Air Disc Brakes

Conditions	Possible Causes	Check For	Corrections
Air chamber exceeds 2″ (51 mm) at 90-100 psi (620-689 kPa) in cab.	Incorrect initial adjustment or inoperative automatic adjuster	Recheck chamber stroke after 20 brake applications.	If the air chamber still overstrokes, then replace the caliper and saddle assembly.
Brake drag	Incorrect initial adjustment	Correct pad-to-rotor clearance	Readjust to set the correct rotor-to-pad clearance.
	Incorrect pad-to-rotor clearance		
	Spring or service brake not releasing	Correct operation of air system or air chamber	Refer to the vehicle manufacturer's instructions. Repair or replace parts as required.
	Vehicle air system malfunction		
	Brake not releasing	Damaged slide pin boots, caliper should move back and forth by hand with linings removed	Replace the caliper assembly.
		Corroded pin in chamber clevis and lever	Clean or replace the clevis pin (apply anti-seize compound before reassembly).
		Incorrect position of load plate between saddle abutments	Remove the brake pads and reinstall. Refer to the procedure in this bulletin.
		Water entry or seized operation shaft, internal	Replace the caliper assembly and air chamber.
	Air line too short	Correct air line length	Replace the air line. Refer to the vehicle manufacturer's instructions.
Short brake pad lining life	Refer to Brake drag.	Refer to Brake drag.	Refer to Brake drag.
	Caliper seized or sticking on slide pins	Damaged slide pin boots, caliper should move back and forth by hand with linings removed	Replace the caliper assembly.
	Damaged rotor surface	Cracks or heavy heat checking	Replace the rotor.
	Vehicle overload	Refer to the weight limitations on the vehicle identification plate.	Observe the vehicle manufacturer's load recommendations.
	Companion brakes do not work correctly	Inspect the companion vehicle brakes and air system.	Adjust or repair as required.
Smoking brakes	High brake temperature	Refer to Brake drag and Short brake pad lining life.	Refer to Brake drag and Short brake pad lining life. Can be a temporary situation with new or low mileage pads.
	Contamination on the linings or rotor	Grease, oil, undercoating, paint, etc., on the linings or rotor	• Inspect the hub seal. Replace as required. • Clean the rotor and caliper assembly. • Replace the pads.

Conditions	Possible Causes	Check For	Corrections
Poor stopping power • **Long stopping distances** • **Poor driver feel** • **High brake pressures** • **Vehicle pulls to one side**	Vehicle air system malfunction	Correct air pressure at the chamber inlet	Have the air system evaluated by a qualified brake system specialist.
	Contamination on the linings or rotor	Grease, oil, undercoating, paint, etc., on the linings or rotor	• Inspect the hub seal. Replace as required. • Clean the rotor and caliper assembly. • Replace the pads.
	Brakes out-of-adjustment	Excessive pad-to-rotor clearance	Readjust to set the correct pad-to-rotor clearance.
	Vehicle overload	Refer to the weight limitations on the vehicle identification plate.	Observe the vehicle manufacturer's load recommendations.
	Companion brakes not working correctly	Inspect the companion vehicle brakes and air system.	Adjust or repair as required.
	Incorrect pads installed	Refer to the vehicle manufacturer for the correct pads.	Replace the pads.
Brake noise	Incorrect pad installation	Friction material facing the rotor surface	Correct the pad installation. Replace the pads and rotor, if necessary.
	Brake pads not free to move in the caliper	Corrosion or debris on the pads or carrier abutments	Clean or replace the pads, if necessary. Clean the pad abutments on the carrier.
	Worn brake pads	Lining thickness	Replace the pads, if necessary.
	Brake component attachments are not installed to specification	Check for loose connections and fasteners.	Tighten the connections and fasteners to the specified torque.
	Rotor cracks or excessive runout	Excessive cracking, heat checking or runout	Replace the rotor.
	Pad spring damaged or not installed	Correct pad spring installation	Install the pad springs.
	Incorrect pads installed	Refer to the vehicle manufacturer for the correct pads.	Replace the pads.
	Bent or loose pad retainer	Bent pad retainer or loose pad retainer bolt	Replace or tighten the pad retainer.

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