Bendix® ADB22X™ Air Disc Brake Troubleshooting on MCI® J4500 Buses

All foundation brakes are designed to convert kinetic energy (energy of motion) into heat and work to stop the vehicle. Air disc brakes work the same way and in everyday operation – compared to drum brakes – will produce higher braking temperatures and cool off faster. Also, air disc brakes will often have differences in temperatures at the wheel ends on the same axle. The actual temperatures reached will depend on the vehicle configuration, vocation, and brake usage.

This document is intended to help technicians identify instances where an individual wheel end has evidence of overheated individual wheel ends, and check for potential causes. Be sure to read and follow the Safety Guidelines on page 4 of this document before performing any inspection procedures.

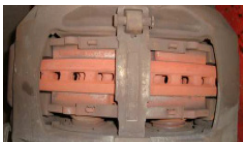
Start Here

SECTION ONE: Inspect the Vehicle

Question One:

Do any of the rotors have bright orange or red colored edges? *Check the box(es) on page 5 for any found.*


Normal


Overheated

Question Two:

Are any of the calipers coated with bright orange or red colored dust? *Check the box(es) on page 5 for any found.*


Normal


Overheated

Question Three:

Are any tapets and/ or guide pin boots heat damaged? *Check the box(es) on page 5 for any found.*


Normal

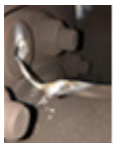

Overheated


Overheated

Question Four:

Are any wheel speed sensors melted? *Check the box(es) on page 5 for any found.*


Normal



Overheated

Are any boxes checked?

NO → **Go to Section Two *(next page)***

YES

Are both boxes on a single axle checked?

YES → **This is not an Overheated Individual Wheel End event. When both ends of an axle are affected, a thorough brake system diagnosis is needed, as other factors – such as brake balance, overloaded vehicles, or extreme use – are more likely the source.**

NO

Only one box has a check mark?

YES → **Go to Section Two *(next page)***

NO

In cases where more than one wheel end is affected – but on different axles – complete the Overheated Individual Wheel End Checklist for each brake being examined.

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SECTION TWO: Investigate Other Potential External Causes
- Follow all Safe Maintenance Practices *(see page 4)*
- Record Results on pages 5 & 6

For multiple vehicle inspections copy pages 5 & 6 of this document prior to use.

On level ground, with the wheels chocked, elevate the axle of the wheel end that is under inspection via jacks/lifts. Cage the spring brake chamber.

Inspect the air hoses ("jounce lines").
- *Is air trapped in the hose?**
- *Do the hose(s) pull or push on the caliper? (It is important that the hoses permit the lateral motion of the caliper, the vertical motion of the suspension, and – for steering axles – the full turn of the wheels).*
- *Are there any kinks or restrictions?*
- *Are the hoses in good condition?*

*Take full safety precautions during the inspection for trapped air, to avoid the air hose whipping if air pressure is found to be trapped. Conditions that might cause trapped air include kinked lines, or when an ABS modulator is malfunctioning and not exhausting service air.

Are any of these conditions found?

YES → **Service as needed. Perform all Section Two inspections (Not an Overheated Individual Wheel End condition).**

NO

Does the wheel move freely?

NO → **Inspect the actuator**
On level ground, with the wheels chocked, cage the spring brake actuator (if equipped) per the manufacturer's guidelines, remove and inspect the actuator.
- Is there visible damage?
- Is the seal in poor condition/damaged?
- Does the pushrod extend further than .59 in. (15 mm) from the mounting face?
- Does the wheel move freely after the actuator is removed?

YES

Are any of these conditions found?

YES → **Service the actuator. (Not an Overheated Individual Wheel End condition).**

NO

Inspect the Lever
Inspect the caliper lever through the actuator pushrod opening. Is the lever seized or depressed even though the pushrod is present?

Inspect the running clearance of the brake pads
- Measure the running clearance of the inner brake pad using a feeler gauge, both above and below the pad retention bar
- Use Service Data sheet SD-23-7541 for instructions on how to measure the running clearance**
- Note: Be sure to use long feeler gauges per the SD sheet

**Service Data sheet SD-23-7541 is available in the document library on Bendix.com.

Go to the next page...

Bendix® ADB22X™ Air Disc Brake Troubleshooting on MCI® J4500 Buses

SECTION TWO *continued*

Is the measured running clearance between .024 -.043 in. (0.6-1.1 mm)?

YES

Inspect the brake pads.
Remove the pad retention bar and then the brake pads (New pads have .827 in. (21 mm) of brake pad, plus a .354 in. (9 mm) backing plate).

NO

Is there .079 in. (2 mm)* or less, of brake pad friction material?

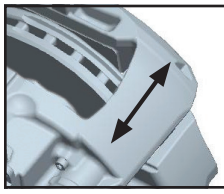
YES

Replace the pads (axle set recommended) after performing all Section Two inspections. (Not an Overheated Individual Wheel End condition).

*.079 in. (2 mm) of friction material, plus a .354 in. (9 mm) backing plate, for a total thickness of .433 in. (11 mm).

NO

Inspect the caliper



Push/pull by hand to check the caliper movement [at least 0.75 in. (20 mm) with the pads removed]

CAUTION
Complete this step on level ground, with the wheels chocked and the parking brake temporarily released!

Does the brake caliper have restricted movement in the inboard/outboard direction?

YES

Service the guide pins.
Perform all Section Two inspections. Again verify no hoses restrict movement. (Not an Overheated Individual Wheel End condition).

NO

With the actuator, pad retention bar, and brake pads removed, inspect the internal caliper surfaces through the actuator pushrod opening.

- Inspect for visible damage, rust, or water.
- With the pads removed, use a screwdriver to depress the lever. Inspect the lever for a restricted range of motion. (The lever must return to touch the caliper body when fully retracted).

Are any of these conditions found?

YES

Replace the caliper. Inspect the rotor. (Not an Overheated Individual Wheel End condition).

NO

Fill out and return pages 5-6 to your Bendix Account Rep for the next steps.

GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following guidelines should be observed AT ALL TIMES:

- ▲Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si® air dryer, be sure to drain the purge reservoir.
- ▲Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲Never exceed manufacturer's recommended pressures.
- ▲Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲The power MUST be temporarily disconnected from the radar sensor whenever any tests USING A DYNAMOMETER are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

⚠ WARNING: Not all wheels and valve stems are compatible with Bendix Air Disc Brakes. Use only wheels and valve stems approved by the vehicle manufacturer to avoid the risk of valve stem shear and other compatibility issues.

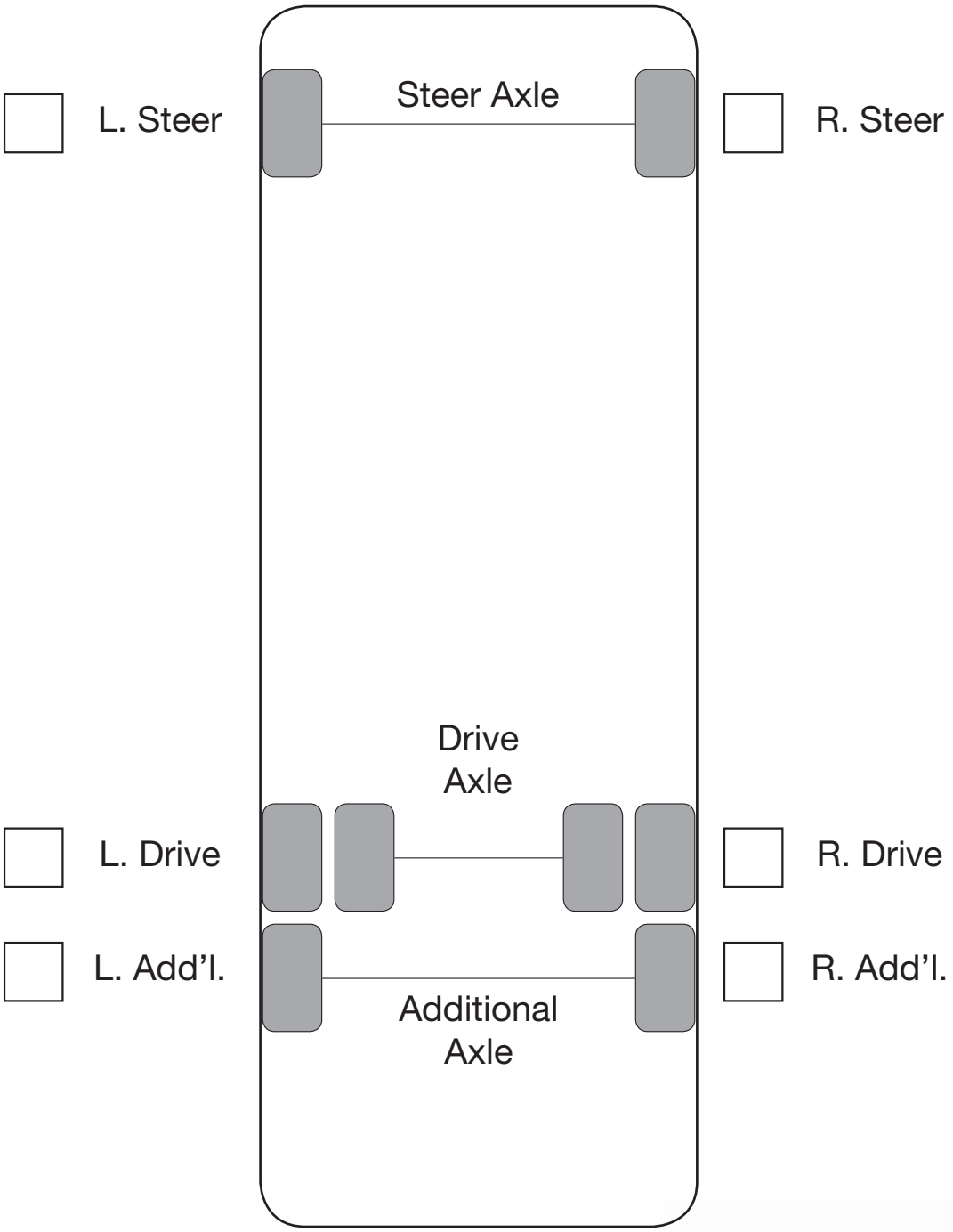
⚠ WARNING: AVOID CREATING DUST. POSSIBLE CANCER AND LUNG DISEASE HAZARD.

While Bendix Spicer Foundation Brake LLC does not offer asbestos brake linings, the long-term affects of some non-asbestos fibers have not been determined. Current OSHA Regulations cover exposure levels to some components of non-asbestos linings, but not all. The following precautions must be used when handling these materials.

- **Avoid creating dust. Compressed air or dry brushing must never be used for cleaning brake assemblies or the work area.**
- **Bendix recommends that workers doing brake work must take steps to minimize exposure to airborne brake lining particles. Proper procedures to reduce exposure include working in a well-ventilated area, segregation of areas where brake work is done, use of local filtered ventilation systems or use of enclosed cells with filtered vacuums. Respirators approved by the Mine Safety and Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) should be worn at all times during brake servicing.**
- **Workers must wash before eating, drinking or smoking; shower after working, and should not wear work clothes home. Work clothes should be vacuumed and laundered separately without shaking.**
- **OSHA Regulations regarding testing, disposal of waste and methods of reducing exposure for asbestos are set forth in 29 Code of Federal Regulations §1910.001. These Regulations provide valuable information which can be utilized to reduce exposure to airborne particles.**
- **Material Safety Data Sheets on this product, as required by OSHA, are available from Bendix. Call 1-800-247-2725 and speak to the Tech Team or e-mail techteam@bendix.com.**

Findings Sheet please print clearly	
Company Name:	Contact Name:
Telephone:	Email:
Vehicle:	VIN:

For multiple vehicle inspections copy pages 5 & 6 of this document prior to use.



Continued on the next page

Fill out and return pages 5-6 to your Bendix Account Rep for the next steps.

Overheated Individual Wheel End Checklist

please print clearly

Company Name:	Contact Name:
Telephone:	Email:

Questions	Yes	No
Does the wheel move freely after the vehicle is elevated off of the ground, the spring brakes are caged, and all service pressure is released? *(Check before the actuator is removed if there is one on the wheel end).*		
Do any hoses pull or push on the caliper? *(It is important that the hoses permit the lateral motion of the caliper, the vertical motion of the suspension, and – for steering axles – the full turn of the wheels).*		
Are there any kinks or restrictions on the hose(s)?		
Are the hoses in good condition?		
Is there visible damage on the actuator?		
Is the actuator seal in poor condition/damaged?		
Does the actuator pushrod extend further than .59 in. (15 mm) from the mounting face?		
Does the wheel move freely after the actuator is removed?		
Is the caliper lever stuck in the applied position without an actuator present?		
Is the caliper movement at least 0.75 in. (20 mm) with the pads removed?		
Is there any visible damage, rust, or water on the internal caliper surfaces through the actuator pushrod opening?		
Is the wheel speed sensor intact/functional?		

What is the running clearance of the brake? Refer to Bendix SD sheet SD-23-7541:
Adjuster Side Tappet: _____in. *or* _____mm
Opposite Tappet: _____in. *or* _____mm

What is the thickness of the brake pads? Refer to Bendix SD sheet SD-23-7541:

Suspect Wheel End:	**Opposite Side Wheel End:**
Inboard Pad: _____in. *or* _____mm	Inboard Pad: _____in. *or* _____mm
Outboard Pad: _____in. *or* _____mm	Outboard Pad: _____in. *or* _____mm

Vehicle Make: **MCI**	Vehicle Model: **J4500**	Vehicle Year:
Vehicle VIN:	Vehicle In-Service Date:	Vehicle Mileage:
Mileage Between Brake Pads: (If known)	Vehicle Engine Platform:	Exhaust Brake/Retarder Present?
Mileage Between Rotors: (If known)	Mileage/Days since last service:	Application Type: (Commuter, Intercity, Tour, etc.)
Route Type: (Local, Regional, National)	Off Road usage?	Location:
Additional Information:		

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