

MODEL:	TYPE:	SECTION/GROUP:	DATE:
E/J	Field Change Program	02 – Rear Axle Steering	March 6, 2019

Ref. MCI NHTSA Recall No.: 19V-027

Ref. MCI Transport Canada Recall No.: 2019-006

Customer Complaint:

MCI has received reports of five (5) incidents occurring during 2015 – 2018 involving four (4) MCI E4500 model coaches that experienced a front steering lockup at highway speed. All of the vehicles have a hydraulic rear axle steering system (RAS). While the drivers of those vehicles were able to bring the coaches to a stop without injury or damage, the sudden loss of steering control creates the risk of a crash that could cause injury or property damage.

Affected Vehicles:

The vehicles that may exhibit this problem are the 1997 – 2013 MCI 102EL3 / 4500 and 2001 – 2015 MCI J4500 model coaches that have the hydraulic rear axle steering system (see the list of affected vehicles in the appendix to this service bulletin).

Cause:

MCI's investigation continues, but MCI believes that the loss of steering control may occur if the vehicle does not have positive caster for the tag axle, and the vehicle has low hydraulic pressure in the RAS. The combination of these two circumstances may allow the tag axle to go into a shimmy under certain road inputs, which may result in the vehicle's steering system to lock until the vehicle is stopped. MCI's investigation to date indicates that the above vehicle conditions (improper caster angle and low hydraulic pressure) are due to the failure to perform proper maintenance on the trailing axle alignment and rear axle steering system.

Corrective Action:

IMMEDIATE ACTION REQUIRED:

- A. As noted above, MCI believes that one of the conditions necessary to cause the loss of steering control is if the vehicle does not have the proper caster for the trailing axle.

ACCORDINGLY, MCI STRONGLY RECOMMENDS THAT OWNERS OF THE AFFECTED VEHICLES IMMEDIATELY CHECK AND VERIFY THAT THE TRAILING AXLE CASTER ADJUSTMENT IS WITHIN SPECIFICATION AS SET FORTH IN

SECTION 3 OF THIS BULLETIN, AND MAKE ANY NECESSARY ADJUSTMENTS, PRIOR TO USING THE VEHICLES.

- B. Also, as noted above, MCI believes that one of the conditions necessary to cause the loss of steering control is low hydraulic pressure in the rear axle steering system.

ACCORDINGLY, MCI ALSO STRONGLY RECOMMENDS THAT OWNERS OF THE AFFECTED VEHICLES IMMEDIATELY CHECK AND VERIFY THAT THE TRAILING AXLE STEERING FAULT TELLTALE IS PROPERLY WORKING, AS SET FORTH IN SECTION 4 OF THIS BULLETIN, AND MAKE ANY NECESSARY ADJUSTMENTS, PRIOR TO USING THE VEHICLES.



Read this entire procedure before beginning work.

Use Safe Shop Practices At All Times.

To avoid personal injury:

- a. Turn the main battery disconnect switch to the OFF position.***
- b. Ensure that both the front and the rear wheels are chocked.***
- c. Position the ENGINE RUN and ENGINE START switches on the engine compartment remote control box to the OFF position.***
- d. Allow enough time for components to cool down prior to working in the engine compartment.***

1. **Special Tools:**

T19-1155 Gauge Adapter

T20-1255 Gauge, Accumulator

2. **Reference Documents:**

MCI Maintenance Manual

3. **Tag Axle Caster Adjustment Procedure:**

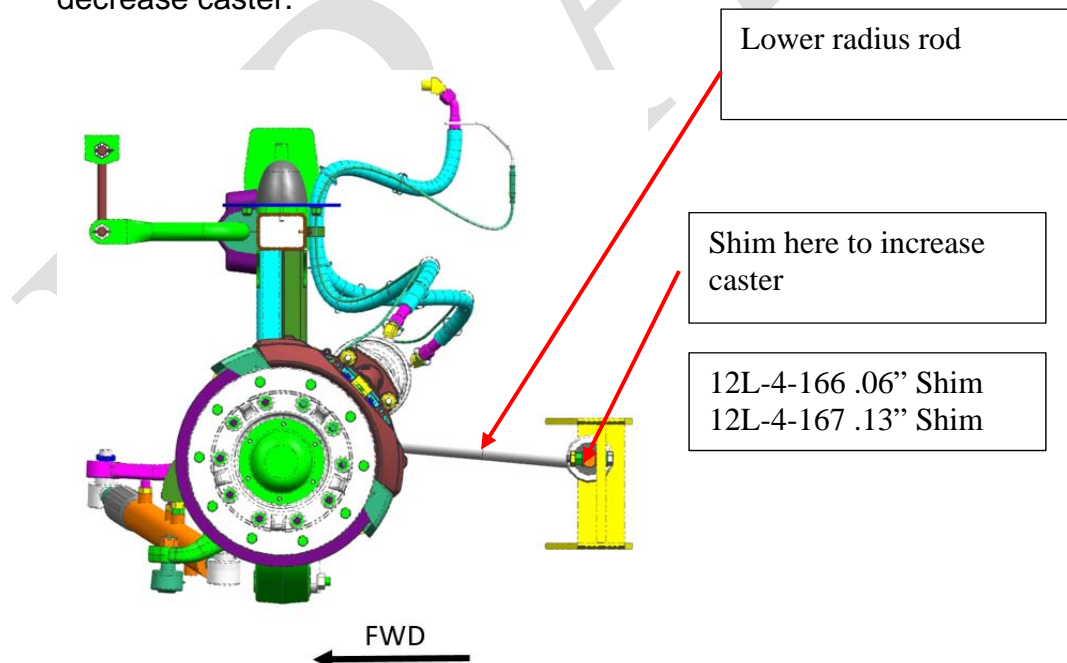
3.1 Measure the caster using a Hunter Engineering bus alignment machine or equivalent.

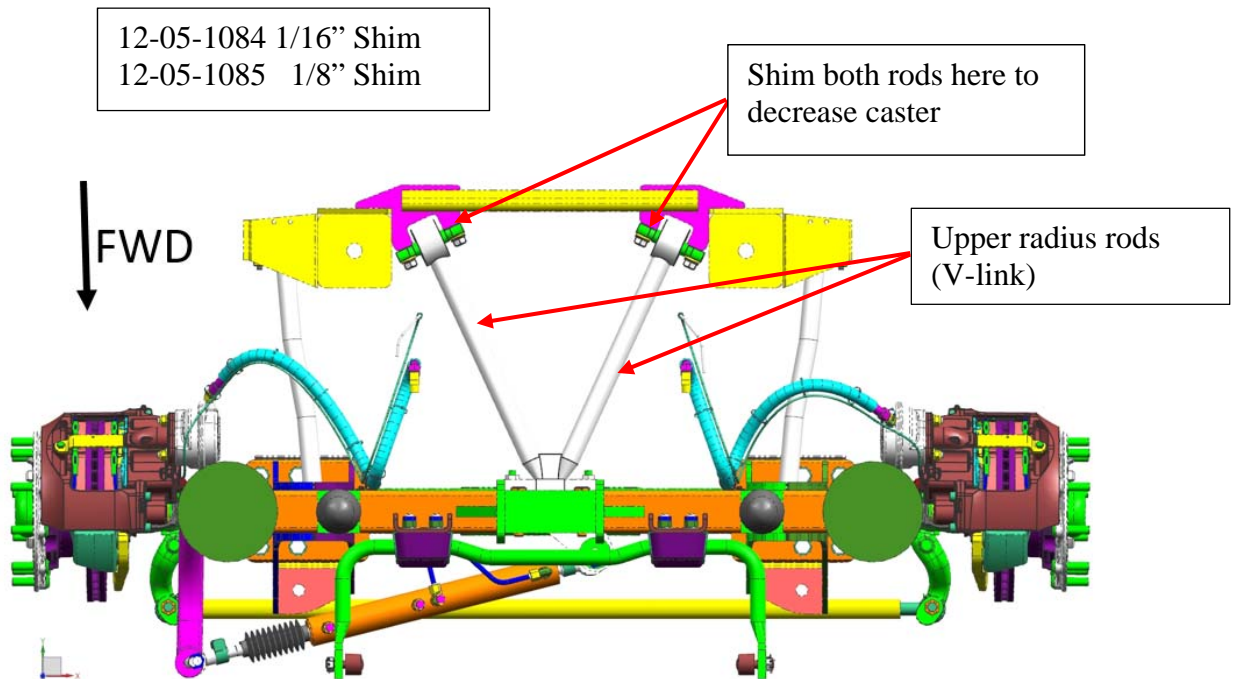
Tag axle caster should be nominally set at a positive 3 degrees. Acceptable range is positive 2 to 3.5 degrees.

3.2 Adjustment

If necessary, shim the radius rods to bring the caster readings within tolerance.

Shim the lower radius rods to increase the caster. Shim the upper radius rods to decrease caster.





4. Rear Axle Steering Maintenance Procedure:

WARNING

The following safety precautions must be obeyed whenever working on or near the RAS system. Personal injury may result from not following these and other normal safety precautions. Certain aspects of this system require special training and expertise, and people without the proper knowledge and training should not be allowed to work on these areas.

- a. The RAS system is pressurized at all times, whether the coach is running or not. DO NOT open any RAS or accumulator connections without first releasing the system pressure.***
- b. Always open valves, connections and bleeders slowly to prevent injury due to spraying or escaping fluid.***
- c. Never operate the front steering system when any RAS fluid connection is loose or removed, as high pressures can be generated, with the potential for personal injury.***
- d. Only technicians with gas charging system experience should work on the gas side of the RAS accumulator.***
- e. Always set the parking brake when working on or around the coach.***
- f. Whenever working under the coach, the coach should be securely set on stands and the ECAS system disabled by turning off the main battery disconnect switch.***

4.1 System Maintenance

The RAS system does not require any regular or special maintenance. However, visual inspections should be performed at every service interval. Investigate driver complaints at the earliest opportunity to avoid larger problems later on.

4.2 Visual Inspection

These inspections should include checking for leaks at all hoses and connections at the cylinders, power steering gear, tunnel lines, accumulator, and manifold. No visible leakage is permitted at any hose or connection.

Any leakage must be repaired, or the performance of the RAS will be compromised. A thin film of oil is allowed on the cylinder rods, as this is the method of lubricating the rods, but if droplets are present, the cylinder is damaged. Also check the bellow on the centering cylinder for any cracks or tears, and check that the bellow is properly seated and positioned (not twisted).



The RAS system is pressurized at all times, whether the coach is running or not. DO NOT open any RAS connections without first releasing the system pressure.

Oil level in the RAS cannot be checked, as the RAS is a closed system. This should be unnecessary, as during normal operation, oil cannot be lost from the system.

Oil level in the power steering system can be checked. If the oil level is higher than normal, this can indicate an internal leak in the master cylinder, which is causing RAS fluid to enter the power steering system. Pressure check the RAS system to confirm this fault.

Check hoses for cracks, abrasions and leaks. Also check to ensure that any clamps used to route the hoses away from other components are secure and that the proper routing is maintained. Repair leaks immediately. Keep the hoses clean to ensure long life.

4.3 Operational Checks

This procedure is a quick visual check to see that the RAS system is performing properly. It is not intended to replace the proper test procedures but can be performed regularly to indicate if further investigation is warranted.

- a. Perform the visual inspections as given above.
- b. Start the coach and verify that the RAS low pressure tell-tale is not lit.

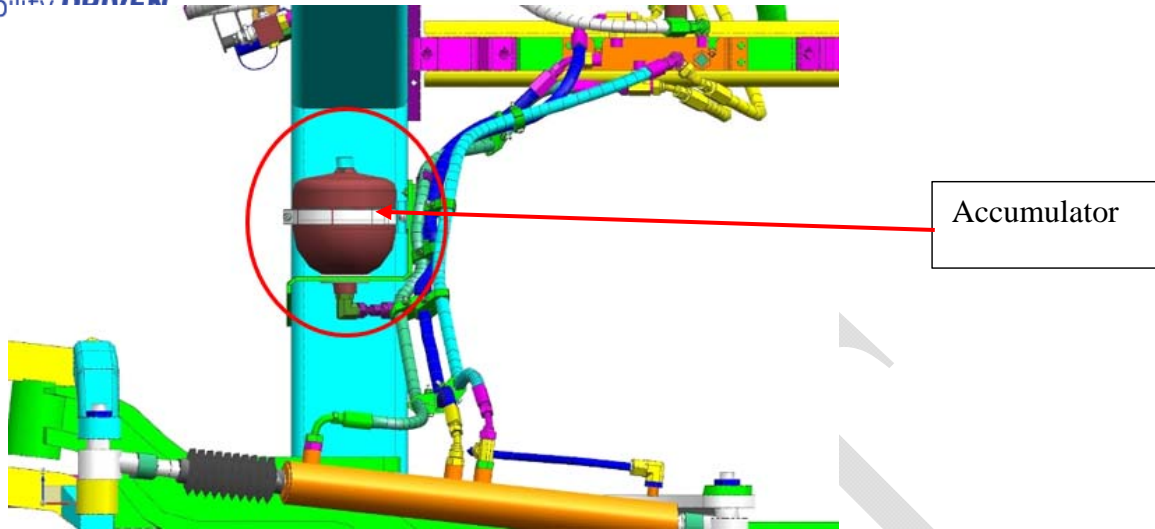
- c. Have a helper turn the steering wheel smoothly from lock to lock while watching the trailing wheels from outside the coach. The trailing wheels should turn smoothly in the opposite direction to the front wheels, without shuddering or hesitation, except at the center position. When the front wheels approach the straight-ahead position, the trailing wheels should stop at the center position and remain there until the front wheels pass through center and go slightly beyond center in the opposite direction. At this point they should begin to turn smoothly in the other direction.
- d. Conduct a road test while following the coach with a chase vehicle. Watch for the trailing wheels to be stable while the coach travels in a straight-ahead position and verify that the coach is tracking straight.
- e. If these conditions are met, the system is functioning properly. If not, refer to the troubleshooting guide later in this section.

4.4 RAS Accumulator Pressure Measurement

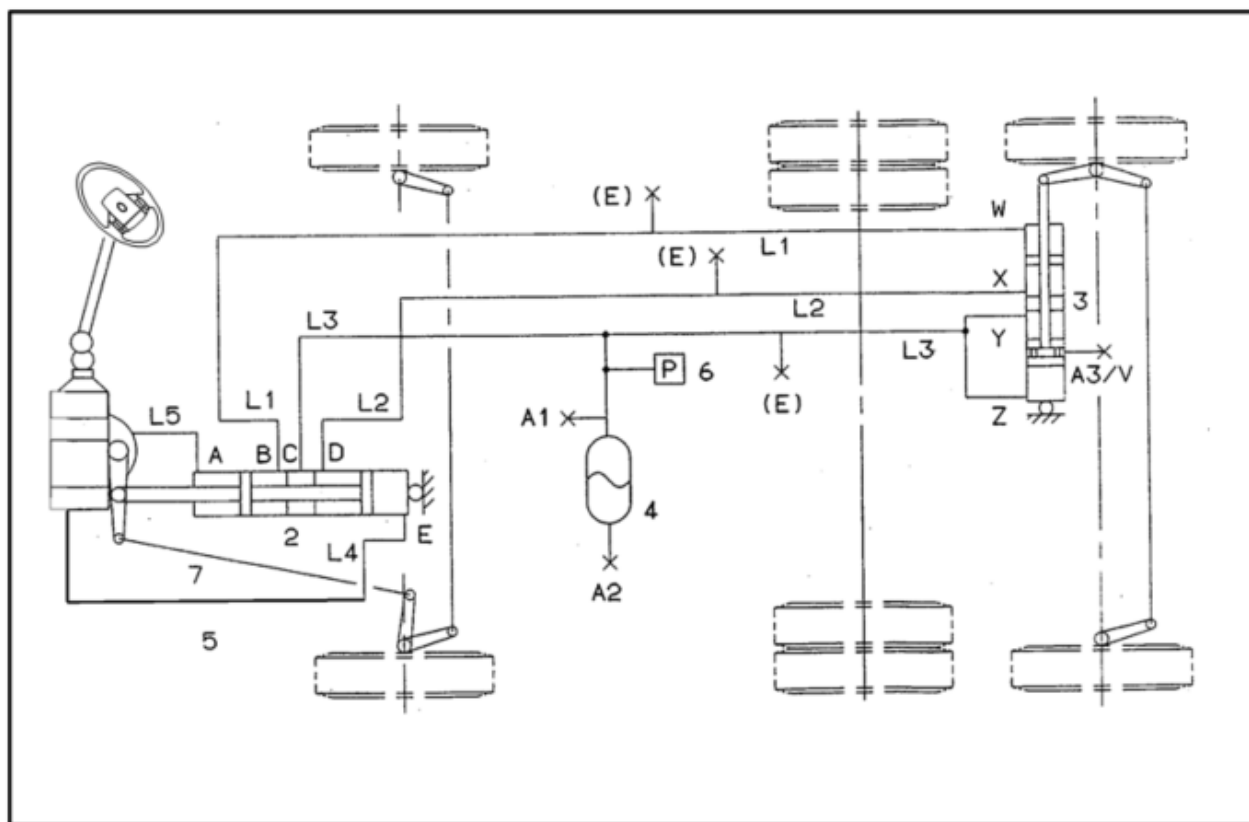
It is required to first check the RAS accumulator for proper function.



The RAS accumulator is charged with nitrogen. Allow only those with knowledge of gas charging systems and procedures to work on the accumulator. Use extreme caution to avoid injury.



- a. To check the RAS system accumulator, the RAS system pressure must first be lowered to approximately zero by connecting to L1, L2 and L3 ports and draining the fluid.
- b. Then, remove the cap on top of the accumulator and loosen slightly the hexagon socket head plug that is under the cap previously removed. Connect the accumulator pressure measurement, tool part number T20-1255 using adapter fitting T19-1155, to the top of the accumulator. Using the tool connection to the accumulator, slightly loosen the hexagon socket head screw until the accumulator pressure is being read by the gage on the pressure measurement tool.
- c. If the pressure reading is less than 20 psi, replace the accumulator. If the pressure in the accumulator is above 20 psi, charge the accumulator using the tool previously attached to accumulator with dry nitrogen to 145 to 160 psi.
- d. Allow 5 minutes for the gas temperature to equalize and recheck the accumulator pressure and adjust the pressure if necessary. Again wait 5 minutes and check the accumulator pressure. If the accumulator pressure is dropping, replace the accumulator since it has an internal leak. If the accumulator pressure is holding pressure, tighten the hexagon socket plug using the accumulator tool and then remove the accumulator tool. Torque the hexagon socket plug to 18 ft-lbs(25 nm)



RAS System Overview

4.5 RAS System Recharging

Recharge the system as indicated in the maintenance manual. After recharging, check for leaks in the RAS hydraulic system and do not remove the pump. After 5 minutes, check if the RAS pressure and adjust if necessary.