



MODEL: E/J	TYPE: Field Change Program	SECTION/GROUP: 02 – Rear Axle Steering	DATE: January 16, 2019
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Ref. MCI NHTSA Recall No.: 19V-XXX

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 an active hydraulic rear axle steering system. 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 active hydraulic rear axle steering system (see the list of affected vehicles in the appendix to this service bulletin).

Cause:

MCI's investigation to date indicates that a failure to perform proper maintenance on the trailing axle alignment and rear axle steering (RAS) system are the cause of the conditions that may lead to a sudden loss of steering control. The investigation indicates 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 front steering locking up until the vehicle is stopped.

Corrective Actions:

I. IMMEDIATE ACTION REQUIRED BEFORE USING THE AFFECTED VEHICLES:

- 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 EXPLAINED IN THE ORIGINAL MAINTENANCE MANUAL AND 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 PERFORM THE PROCEDURES AS EXPLAINED IN THE ORIGINAL MAINTENANCE MANUAL AND IN SECTIONS 4.1, 4.2, AND 4.3 OF THIS BULLETIN, AND MAKE ANY NECESSARY ADJUSTMENTS, PRIOR TO USING THE VEHICLES. MCI ALSO STRONGLY RECOMMENDS THAT IF A VEHICLE'S TRAILING AXLE STEERING FAULT TELLTALE OR FLASHING RIDE FAULT LIGHT BECOMES ILLUMINATED WHILE THE VEHICLE IS BEING OPERATED, THE DRIVER SHOULD STOP THE VEHICLE AS SOON AS THE DRIVER CAN SAFELY DO SO, AND NECESSARY REPAIRS SHOULD BE MADE BEFORE THE VEHICLE IS PUT BACK IN SERVICE.

II. FURTHER ACTION REQUIRED AS SOON AS POSSIBLE:

After performing the necessary verifications and any necessary adjustments as set forth above in Section I, MCI recommends that owners of affected vehicles have the procedures set forth in Sections 4.4 and 4.5 (which require specialized tools) performed as soon as possible.



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 Required For Sections 4.4 and 4.5:

T19-1155 Gauge Adapter
T20-1255 Gauge, Accumulator
T25-1015 Pump, RAS (a/r)
23-01-0004, Oil, Pentosin CHF-11s (a/r)

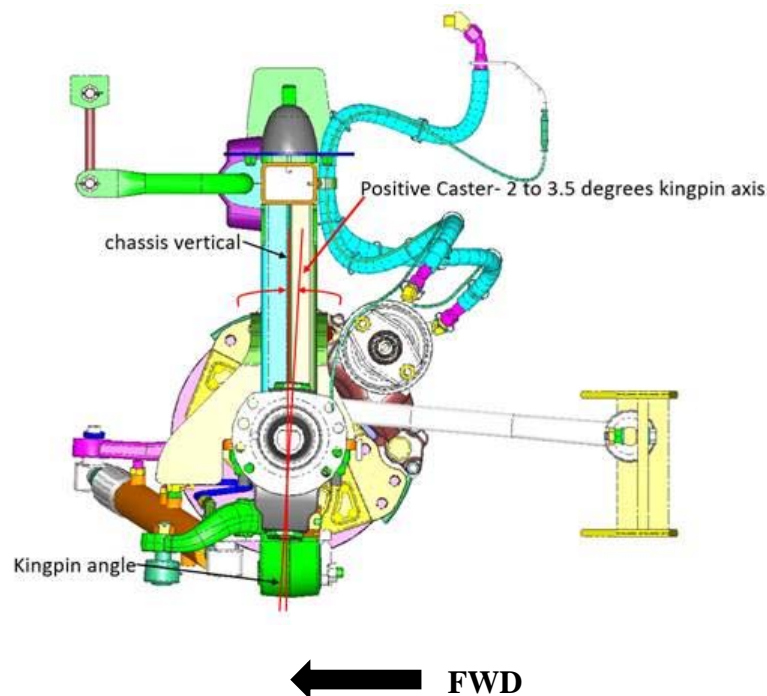
2. Reference Documents:

MCI Maintenance Manual Section 11e (RAS)

3. Tag Axle Caster Adjustment Procedure:

3.1 Measure the caster using a Hunter Engineering bus alignment machine or equivalent. Reference MCI Maintenance Manual Section 2C.

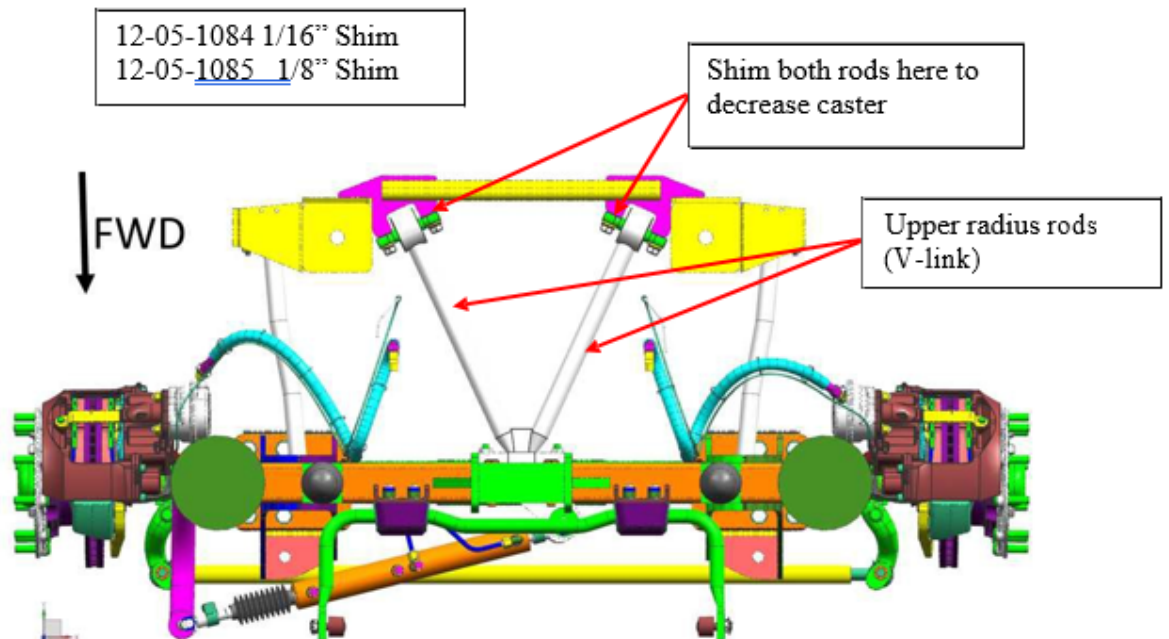
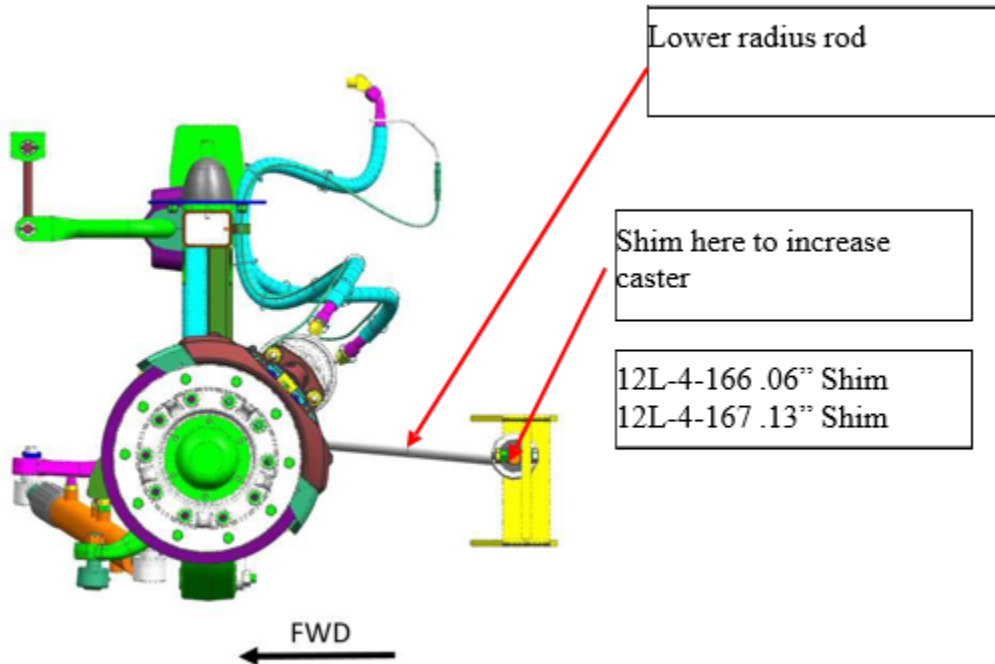
Tag axle caster should be nominally set at a positive 3 degrees. Acceptable range is positive 2 to 3.5 degrees as shown in the picture below.



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 scheduled special maintenance. However, visual inspections should be performed at every service interval, and any issues observed during the inspections should be repaired prior to further use of the coach. 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).

 **WARNING**

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 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.

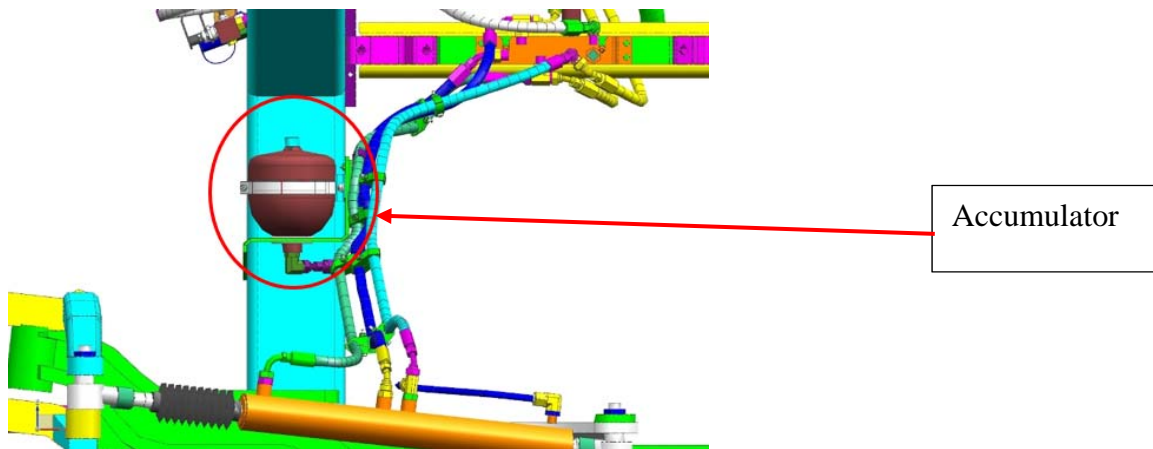
- a. Perform the visual inspections as described above.
- b. Start the coach and verify that the RAS low pressure tell-tale is not illuminated, but also verify that the tell-tale is properly connected and functioning.
- c. Have a helper turn the steering wheel smoothly from lock to lock while watching 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. (refer to section 11e of the MCI Maintenance Manual.)

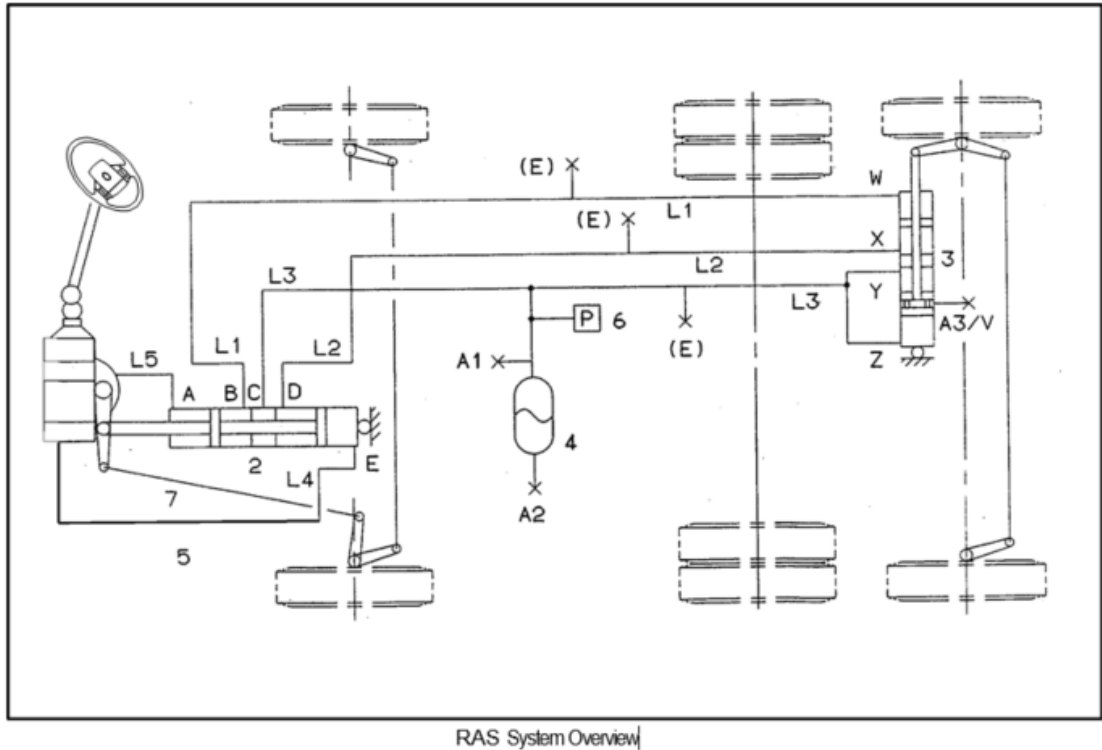
WARNING

The RAS accumulator is charged with dry 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 (located just behind the curbside tag tire), the RAS system pressure must first be lowered to approximately zero by connecting to L1, L2 and L3 ports (located in the curbside rear engine access panel) 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 gauge 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, 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). Reinstall the cap at the top of the accumulator.



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 the RAS pressure and adjust if necessary.

Contact the MCI Fleet Support Technical Center at 1-800-241-2947 for any further information.

APPENDIX

60001-60008	60010-60013	60015-60029	60033-60074
60076-60018	60120-60132	60134-60138	60140-60160
60162-60170	60172-60237	60239-60277	60282-60283
60286	60288-60289	60291-60293	60295-60354
60356-60362	60364	60366-60835	60837-60851
60853-60859	60861-60932	60934-60943	60945-60958
60960	60962-61011	61013-61069	61071-61073
61075-61165	61167-61253	61255-61609	61611-61638
61640	61642	61644	61646
61667-61673	61687-61689	61700	61703-61706
61712-61724	61726-61727	61730	61745-61755
61764-67168	61778-61782	61791-61794	61797-61800
61804-61805	61811-61816	61827-61828	61845-61848
61854	61859	61863-61865	61873
61878-61882	61896-61897	61903	61921-61922
61942-61948	61970	61978-61985	61987
61990	61992-61993	61995-61996	61998
62004-62008	62032-62048	62060-62065	62074-62075
62100-62101	62118-62129	62160-62172	62226
62246	62248-62253	62263	62278
62286-62289	62291-62292	62347-62351	62360-62361
62363	62366	62415-62419	62425-62426
62454-62464	62467	62473-62481	62513-62514
62523-62524	62562-62563	62661	62758-62759
62845-62854	62878-62885	62902-62905	62963
63060	63089	63094-63102	63129-63130
63136	63205	63242-63243	63248
63313	63328	63352	63356
63362	63380-63384	63400-63401	63430-63433
63435-63437	63473	63571	63575
63584	63601-63602	63615-63618	63636-63638
63651	63686-63690	63711-63712	63776-63777
63790	63821	63865	63874-63875
63877-63878	63928	63964-63967	63969
63986-63988	64005-64006	64008	64011
64028-64034	64037	64045-64046	64133-64134
64148-64153	64190	64195	64198
64240	64266	64318	64333-64334
64561-64565	64605-64609	64848	64850
64852	64854	64856	64858
64877	64879	64881	64883
64916	64951-64952	64965	64967



64969	64971	64973	64975
64977	64989	65005	65007-65010
65012	65083-65085	65099-65105	65107
65109	65111	65119	65121
65123	65148	65150	65171
65173	65175	65177	65179
65181	65183	65815	65189
65203	65335	65337	65339
65341	65385	65387	65453-65454
65501-65503	65505	65511	65516-65519
65643-65645	65710	65716-65717	65730-65731
65765-65766	65780-65782	65784-65785	65801-65806
65877	65914	65917	65957-65958
65965-65968	65974-65976	65977-65985	65991
66045-66046	66052-66059	66100-66101	66134-66137
66140-66146	66174	66201	66209-66210
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66272	66278-66283	66342-66348	66363-66367
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66526-66529	66540-66541	66555-66556	66567
66579	66589-66590	66595-66596	66609-66610
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66704	66728	66747	66773
66775	66789-66792	66805-66807	66814-66815
66828	66830	66835-66839	66850-66851
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66930-66933	66978		