Subject: J4500 Coach wheel Alignment			
Field Change Program: Procedure	**Procedure Number:** 15-04	**Revision:** A	**Date:** 11/26/2019
Coach Section: 15- wheels	**P/N:** 15-01-1459, 15-01-1354		**Type:** Product Improvement

Application:

Coach Model	Model Year	VIN
J4500	2014 -	66579, 66595, 66596, 66609, 66638, 66640, 66649, 66650, 66747, 66796, 66826, 66953, 69700 -

WARNING

Read this entire procedure before beginning work.

Use Safe Shop Practices at All Times.

To avoid personal injury:

a. ***Proper Personal Protective Equipment (PPE) must be worn. Safety glasses and protective gloves are required for working with DEF Fluid.***
b. ***Turn the main battery disconnect switch to the OFF position.***
c. ***Ensure that both the front and the rear wheels are chocked.***
d. ***Positioning the ENGINE RUN and ENGINE START switches on the engine compartment remote control box to the OFF position.***
e. ***Allow enough time for components to cool down prior to working in the engine compartment.***

1.0 Description

This procedure is to inspect the alignment on J4500 coaches and correct if needed. This procedure is designed to be used at the Servicer Centers equipped with Hunter Alignment Machine, WT470.

2.0 Material requirements

No material required.

3.0 Special Tools

Hunter Alignment Machine WT470.

Steering Knuckle lock tool (MCI P/N: 39761).

4.0 Procedure

Make sure the coach ride height/ ground clearance are set to specification as per procedure 12-24.

4.1 Coach Preparation

4.1.1 Locking tag axle

Line the Coach up with the pit in the parking lot. Turn the “Tag Lock “on.

Press the switch

Tag Axle light should be illuminated on dash.

Tag lock telltale

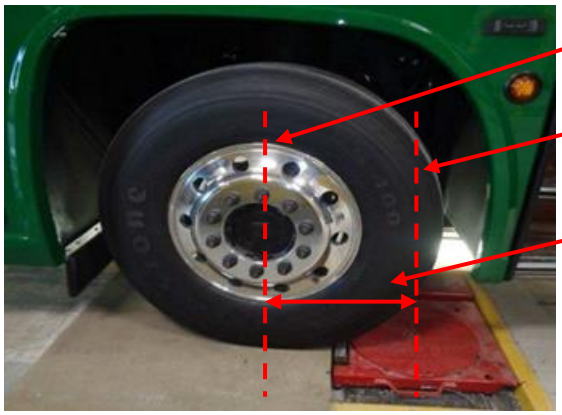
Pull the Coach forward and backward outside the shop 3 times in a straight line to ensure the tag is locked and the suspension is relaxed.

4.1.2 Locking turn tables

Lock all turn plates so plate will not move when driving over them.

Turn the knob to lock

Drive the coach over the pit or on the alignment rack and position front axle wheels 24.00” behind the centerline of the front turn plate.



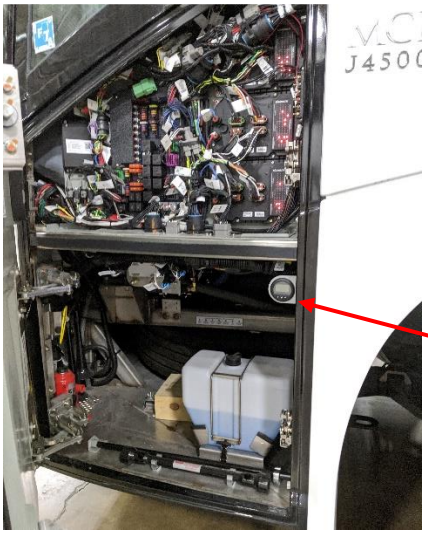
Center of the wheel

Center of the turn plate

24”

4.1.3 Verify tire pressure

Check the smart wave gauge under the Front Junction box for air pressure and verify if they are set to the manufacturer specifications on the decal next to the driver seat. If they are not set to the specifications inflate the tires to the manufacturer specified values.



Open the RH rear service door and install an external air supply to the fitting on the remote junction box. Set the pressure to 125 PSI.

4.2 Alignment machine setup

4.2.1 Setting up the program

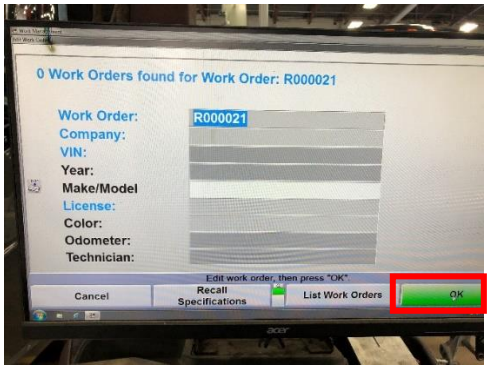
Turn the Hunter Alignment machine on by pressing the power switch button of the console central processing unit located inside the hardware storage cabinet. When the logo screen appears click on the 'WinAlign' icon, if necessary.

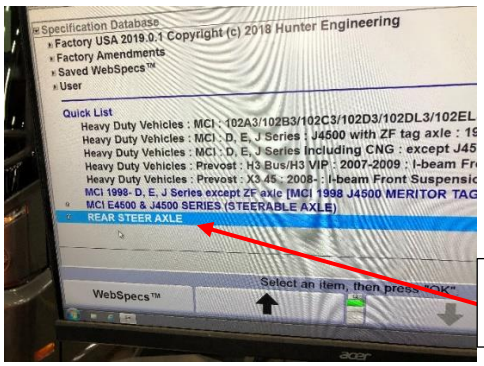
WinAlign Icon

Click on 'Begin' to start the alignment program.

Click on 'Begin'

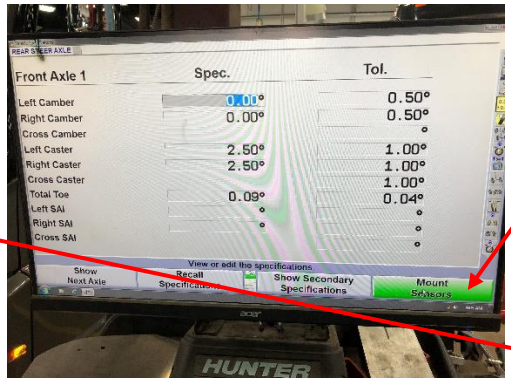
Input the coach and Technician information and click on 'OK'. Then choose Rear Steer Axle and click on 'OK'.





Rear Steer Axle

Open all baggage bay doors to avoid miscommunication between the sensors and then click on ‘Mount Sensors’.



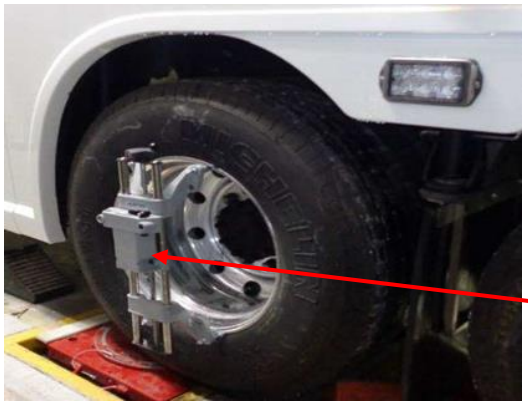
Click on ‘Mount Sensors’

Baggage bay doors

4.2.2 Setting up sensors

Install the alignment fixtures on the driver and curbside of front wheels and then install the sensors on the fixtures.

Repeat the process for the drive and tag wheels.



Sensor

Fixture

Note: **Read the labels on the sensors as to which wheel, they should be installed on.**

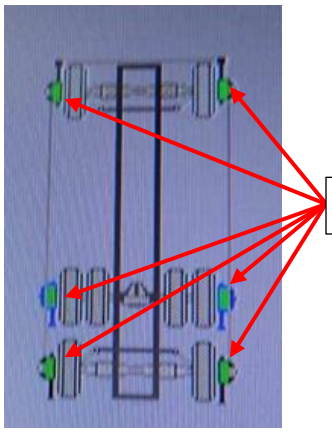
Front wheel highlighted on the label

Press the power button ‘ON’ on the sensor and turn the knob to unlock it.

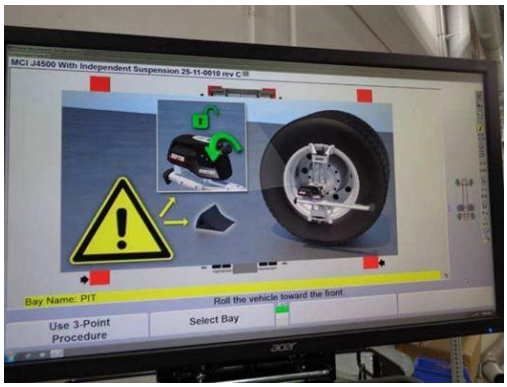
Knob

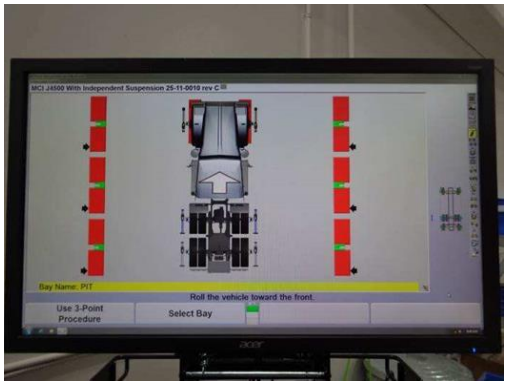
Power button

Check the screen to ensure all the sensors are in green color. If any of the sensors is in red color refer to Hunter manual for troubleshooting instructions.

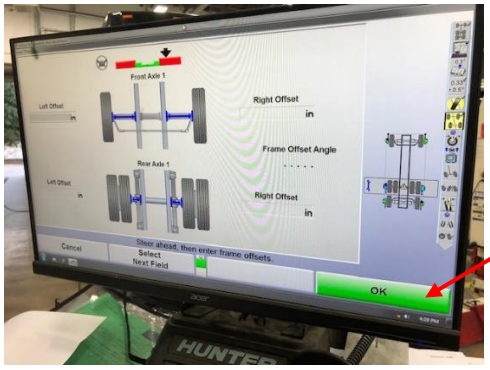


Once all sensors are communicating follow instruction on the screen.



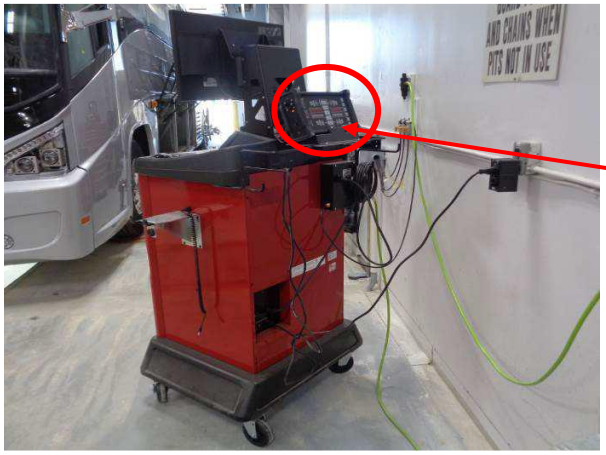


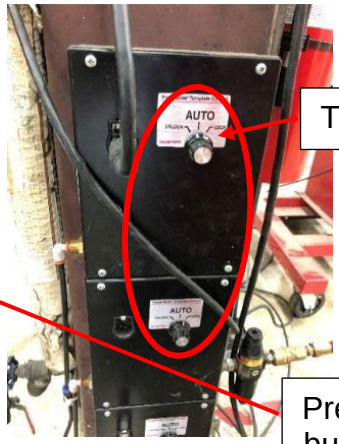
Do not enter values in the frame offset. Just leave then blank and click on ‘OK’. This will let the machine set the centerline for the alignment.



Click on ‘OK’

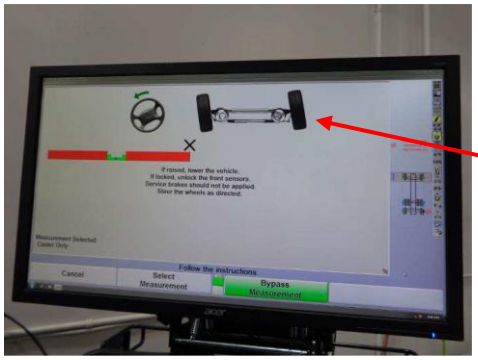
Obtain the remote box and press the power button to turn it “on”. Make sure turntables are unlocked.



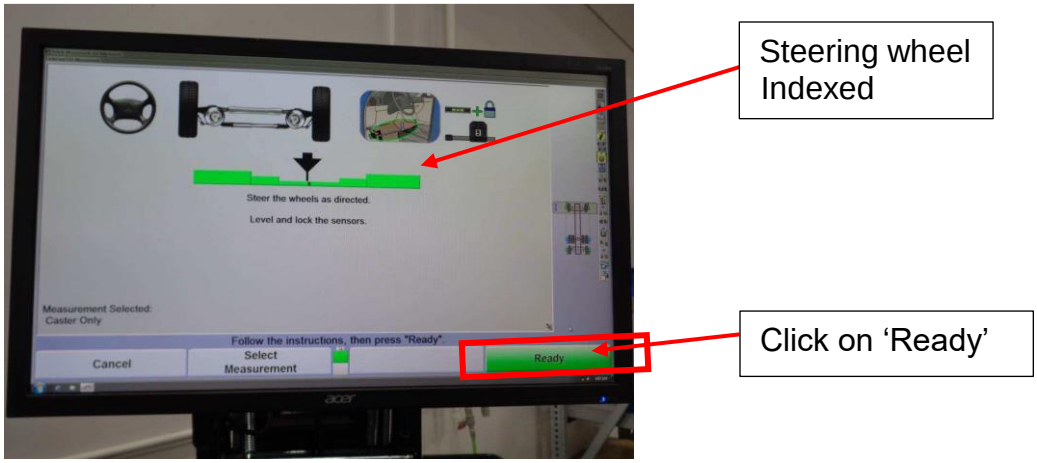


4.3 Front Axle Camber Adjustment

Click on “Measure Caster” on the screen. Ensure the service brakes in the coach are locked and follow instructions on Hunter screen to turn the wheel.

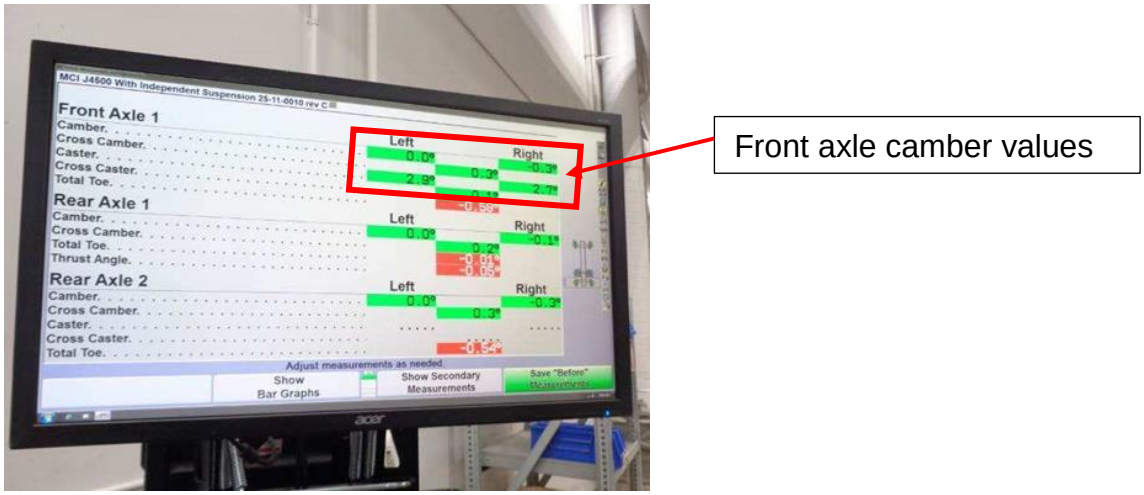


Follow instructions on Hunter screen to complete the caster measurement. Once the steering is centered exit the coach and click on “Ready”.

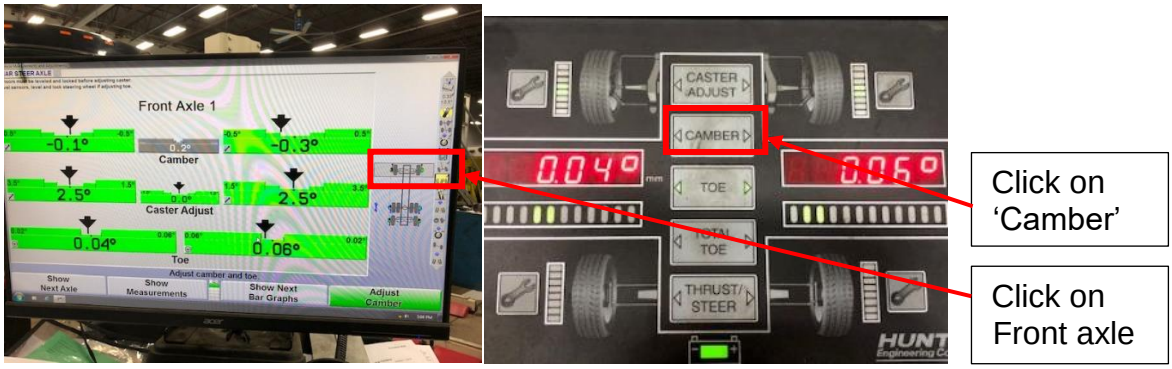


If the camber values on the front axle are all green (within the specs) continue to **Section 4.4**.

If any of the front axle camber values are in red continue this section.



Click on the front axle on the screen and then click on camber on remote box.

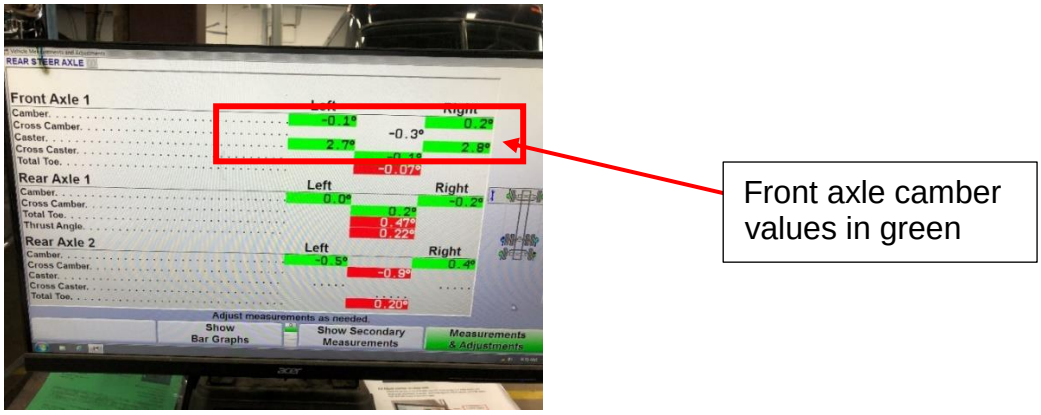


Adjust camber by installing shims (MCI P/N: 12-05-1310,1/32” thick; 12-05-1311, 1/16” thick; 12-05-1312, 1/8” thick) in between control arms and frame as follows:

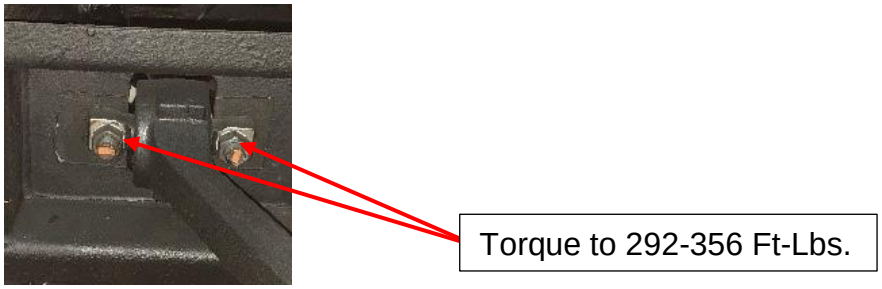
- If the camber is positive install shims on the lower control arm or remove them from the top control arm.
- If the camber is negative install shims on the upper control arms or remove shims from the lower control arm.

To install the shims, use a jack under the lower control arm to release pressure on the control arms. Once pressure is released, pry control arm back and install shim. Start with the smallest shim and remove and replace it with larger shim as needed.

Lower jack down, hand tighten bolts and check reading on hunter screen. Repeat until all the camber readings are green.



Once the adjustment is complete, torque bolts to 292 - 356 Ft. Lbs and apply torque seal.



Remove all fixtures, sensors on all wheels and drive coach.

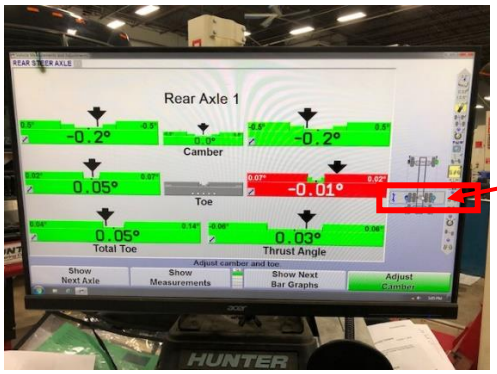
Repeat **Section 4.1** and **Section 4.2**.

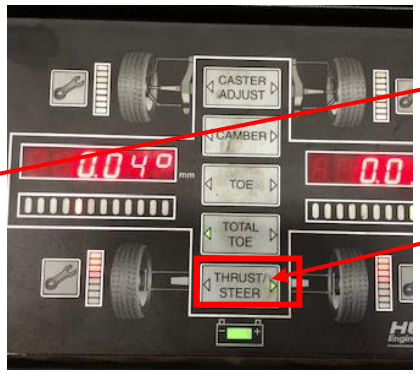
4.4 Thrust Angle Adjustment

Click on “Ready” to display Measurement and Adjustment. This is the current vehicle measurement. Click Save “Before” measurements.

Save “Before” Measurements

Click on the drive axle. Then click on ‘thrust/steer’ on the remote box.





Drive axle

Thrust/Steer

If the value is observed in green (within spec) continue to **Section 4.5** if not continue performing the next steps.

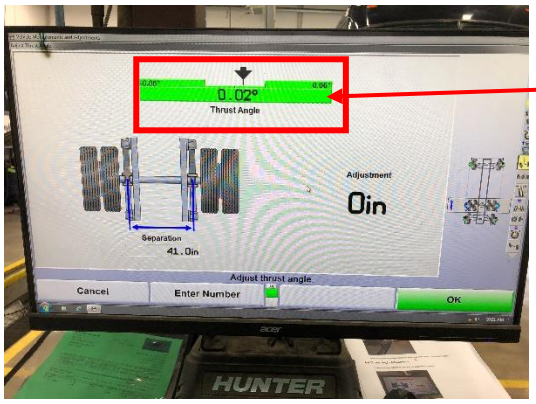
Install shims (MCI P/N: 12-05-1310,1/32” thick; 12-05-1311, 1/16” thick; 12-05-1312, 1/8” thick) on the suspension as shown on the Hunter screen. Use the shims as required based on the adjustment value shown on the screen.

Initial thrust angle

Adjustment value

Loosen the bolts on the suspension and using a pry bar create a gap to install the shim shown below. Hand tighten bolts.

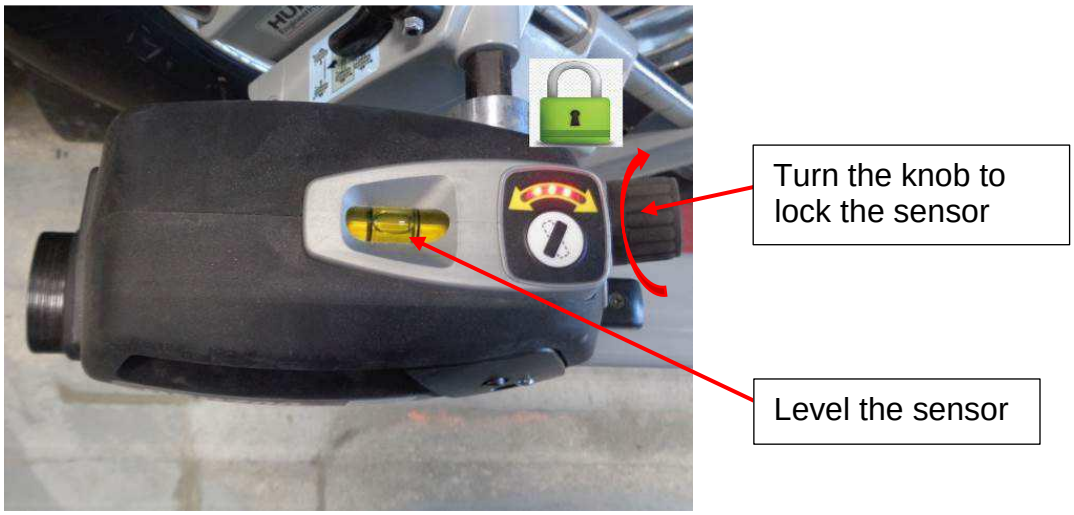
Repeat the step until the thrust angle value turns green.



Once the adjustment is complete, torque the bolts to 292 - 356 Ft. Lbs and apply torque seal.

4.5 Tag Axle Camber Adjustment

Relevel the sensors and turn the knob to lock them.



Click on “Show Next Axle” on the screen to display the Rear Axle 2 (tag axle values). If the camber values are in green (within spec) continue to **Section 4.6** if not continue performing the next steps.

Click on “Show Next Axle”

Rear Axle 2 values

Camber values

Click on camber on the remote box.

Click on “Camber”

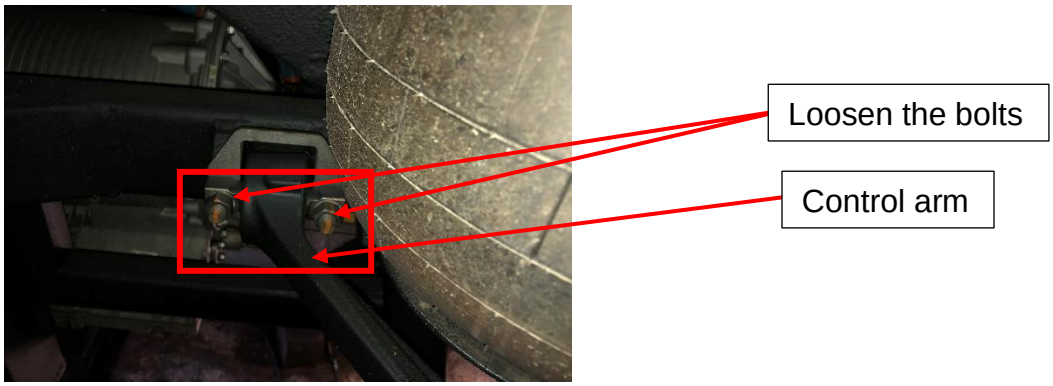
Use a jack under the upper control arm to release pressure on the control arms. Once pressure is released, pry control arm back.

Pry bar

Jack

Adjust camber by installing shims (MCI P/N: 12-05-1310,1/32” thick; 12-05-1311, 1/16” thick; 12-05-1312, 1/8” thick) in between control arms and frame as follows:

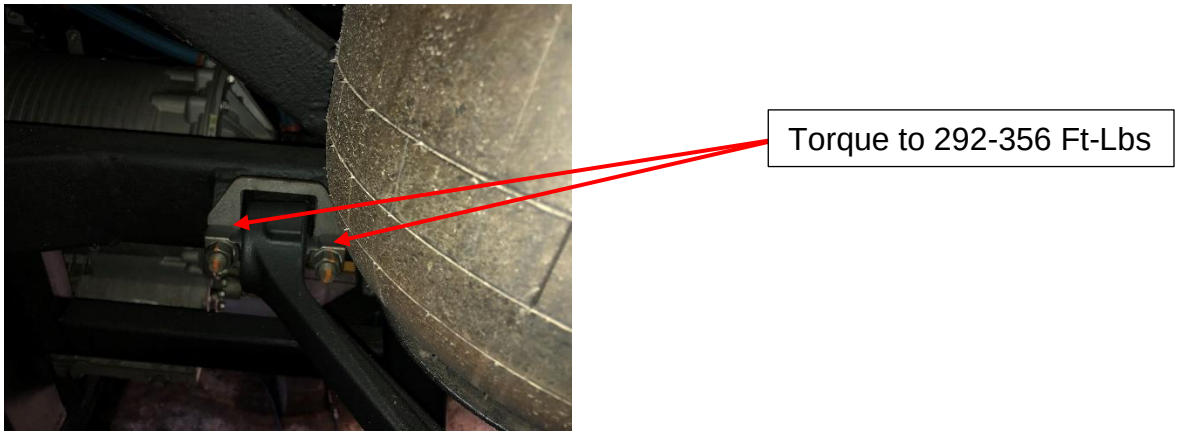
- If the camber is positive install shims on the lower control arm or remove them from the top control arm.
- If the camber is negative install shims on the upper control arms or remove shims from the lower control arm.



Once shims are installed, lower the jack and hand tighten bolts.

Repeat the step until the camber values are green.

Once the adjustment is complete, torque bolts to 292 - 356 Ft. Lbs. Mark to torque seal.



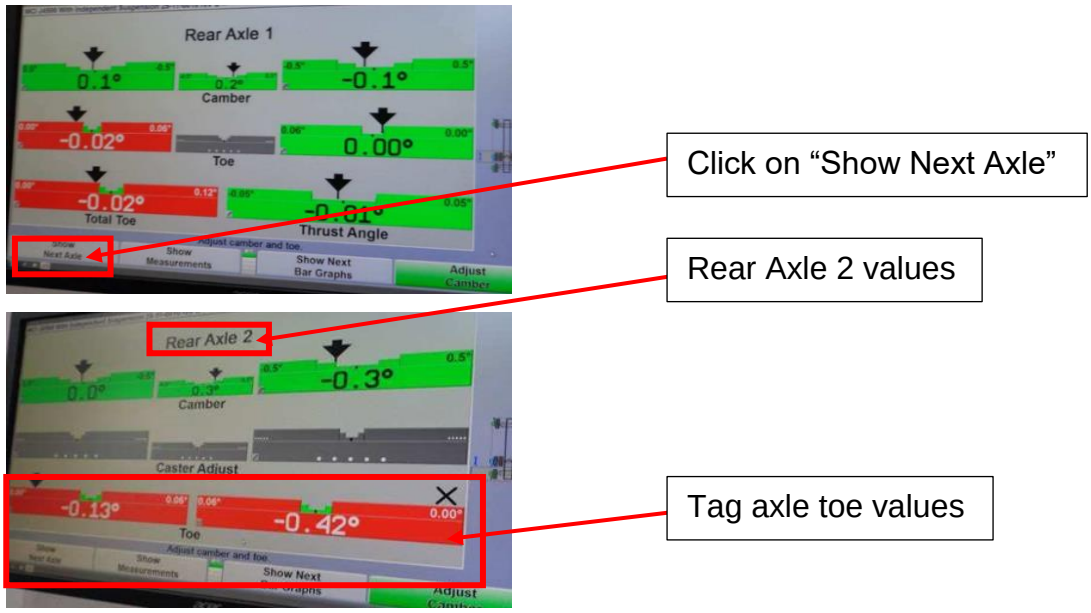
Remove all fixtures, sensors on all wheels and drive coach.

Repeat **Section 4.1** and **Section 4.2**

4.6 Toe Adjustment

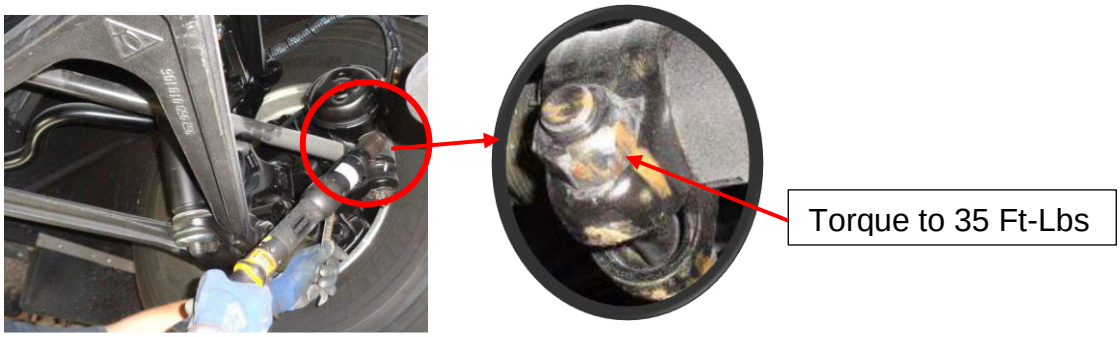
4.6.1 Tag Axle Toe Adjustment

Click on “Show Next Axle” on the screen to display the Rear Axle 2 (tag axle values). If the toe values are in green (within spec) continue to **Section 4.6.2** if not continue performing the next steps.



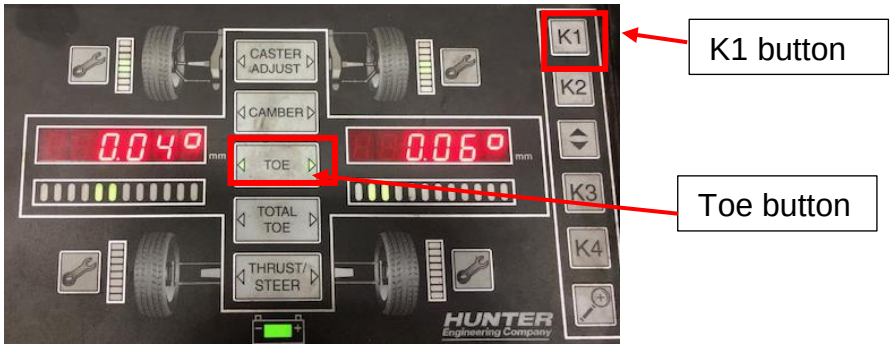
Click on the toe on the remote box to switch to toe settings. Loosen the toe rod clamps and turn tie rods clockwise or counter clock wise until toe values are observed to be in green.

Torque tie rod clamps nut to 35 Ft.-Lbs. and mark torque seal.

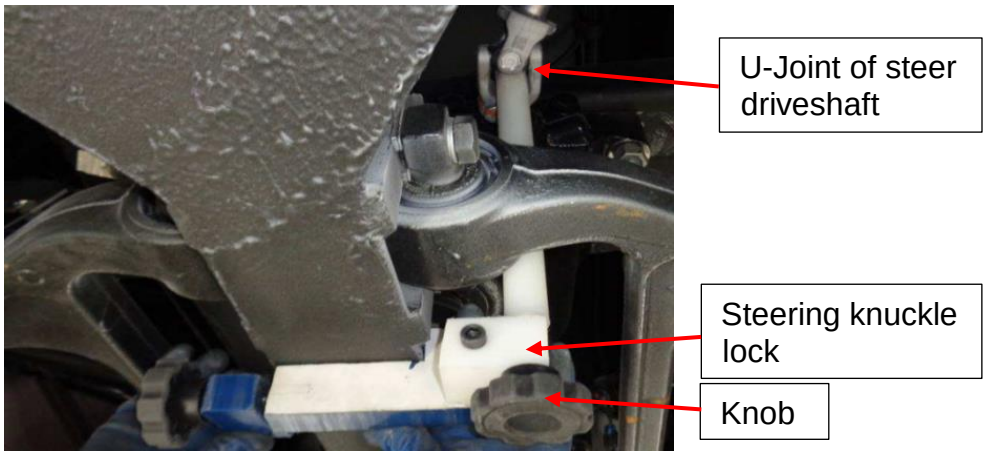


4.6.2 Front Axle Toe Adjustment

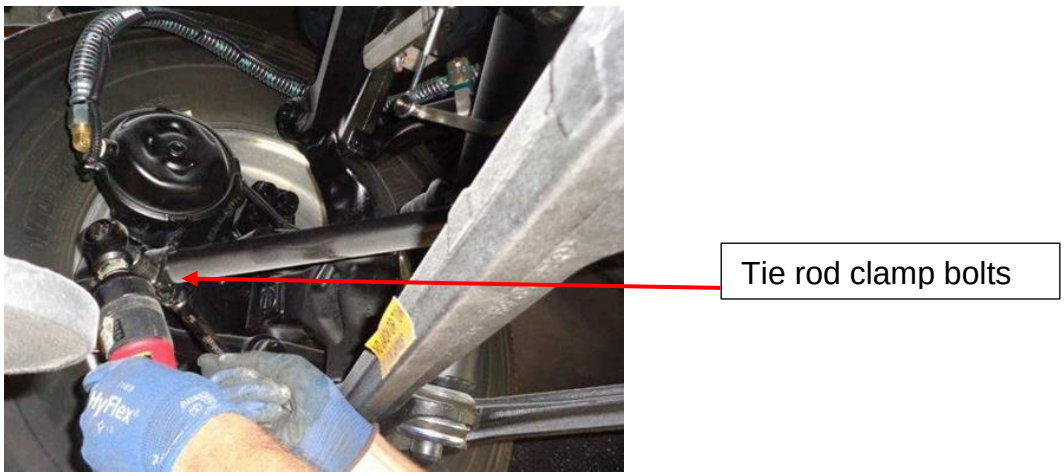
Press the button “K1” on the remote box and then press “Thrust/Steer” button. If the values on the left and right on the remote box are within the range 0.02-0.06 continue to **Section 5.0**, if not continue performing the next steps.



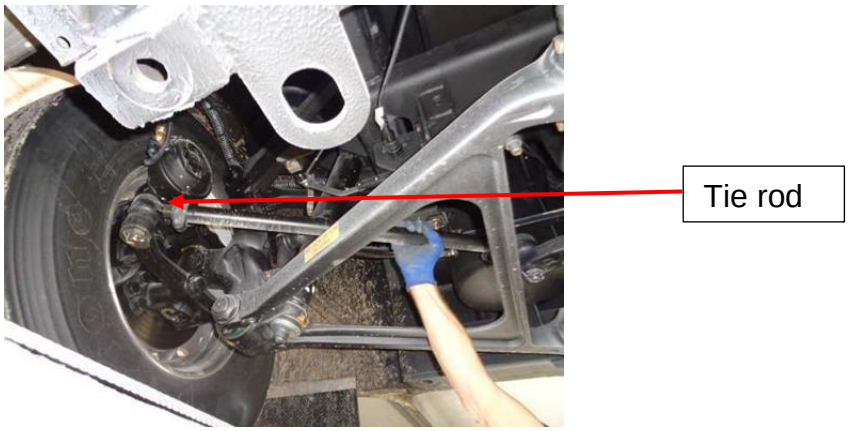
Install the steering knuckle lock tool into the U-joint of steer driveshaft and center frame member of front bogie. Lock knob of the tool to keep steer driveshaft U-joint in the center and to ensure it does not move when both tie rods are turned to adjust the toe.



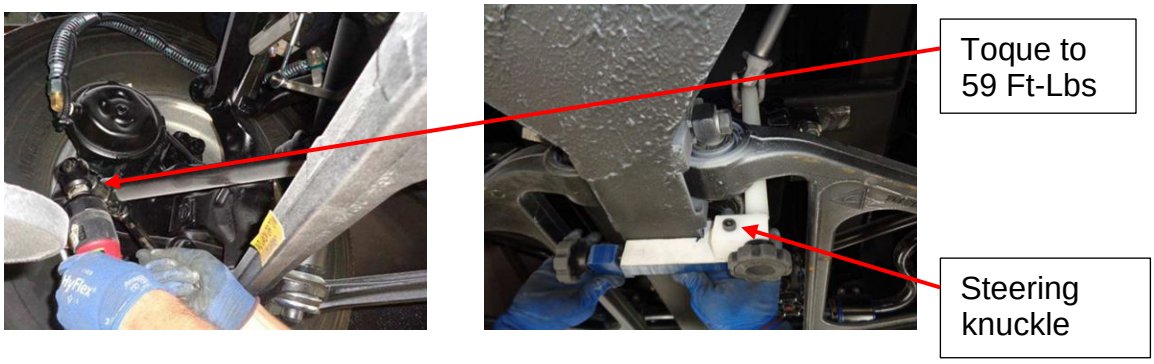
Loosen tie rod clamp bolts.



Turn the tie rod clockwise or counterclockwise on both driver side and curbside to adjust the toe as required.



Once the toe is adjusted tighten the tie rod clamp bolts. Torque tie rod clamp nut to 59 Ft. Lb. and mark to torque seal. Remove steering knuckle tool.



5.0 Verification

Print out before and after readings and attach to RO.

Remove the alignment fixtures and sensors. Put them in the correct position on the rack.

Remove the batteries and install batteries in the charger.

Drive coach down a level road to ensure coach drives straight.

6.0 Appendix

ALIGNMENT SPECIFICATIONS

	Left		Total		Right		Nominal	Comments
	Min.	Max.	Min.	Max.	Min.	Max.		
FRONT AXLE								
Camber (Degrees)	-0.50	0.50			-0.50	0.50	0.00	
Caster (Degrees)	1.50	3.50			1.50	3.50	2.50	Cannot be adjusted
Cross Caster (Degrees)	0.50 MAX							
Cross Camber (Degrees)	0.50 MAX							
Individual Toe (Degrees)	0.02	0.06			0.02	0.06		Unloaded max. difference 0.01
Individual Toe (Inches)	0.015	0.046			0.015	0.046		Unloaded max. difference 0.0075
Total Toe (Degrees)			0.04	0.13			0.085	
Total Toe (Inches)			0.031	0.093			0.062	
Set Back (Degrees)			-0.060	0.060				
Steer Angle (Degrees)	52.0	53.0			52.0	53.0		LH wheel measured on LH turn; RH wheel measured on RH turn
Steering Symmetry Check (Degrees)	17.0	19.0			17.0	19.0	18.0	Measured on outboard wheel with inboard wheel turned to 20 degrees
Air Spring Height (Inches)	12.25	12.75			12.25	12.75	12.50	
DRIVE AXLE								
Thrust Angle (Degrees)			-0.06	0.06				
Air Spring Height (Inches)	11.75	12.25			11.75	12.25	12.00	
Air Spring Height Difference (Inches)	0.39 MAX							Between any two air springs
TAG AXLE								
Camber (Degrees)	-0.50	0.50			-0.50	0.50	0.00	
Caster (Degrees)	2.00	3.00			2.00	3.00	2.50	Cannot be adjusted
Cross Caster (Degrees)	0.50 MAX							
Cross Camber (Degrees)	0.50 MAX							
Individual Toe (Degrees)	0.02	0.06			0.02	0.06		Unloaded max. difference 0.01
Individual Toe (Inches)	0.015	0.046			0.015	0.046		Unloaded max. difference 0.0075
Total Toe (Degrees)			0.04	0.13			0.085	
Total Toe (Inches)			0.031	0.093			0.062	
Scrub Angle (Degrees)			-0.060	0.060				
Steer Angle (Degrees)	9.0	10.0			9.0	10.0		LH wheel measured on LH turn; RH wheel measured on RH turn

For additional maintenance information, please visit the following vendor website: www.zf.com

End of the procedure