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> FLD Conventional  
> Business Class  
> FLC 112 Conventional

> Century Class Conventional  
> Argosy  
> Cargo  
> Columbia

> Coronado  
> Business Class M2  
> Cascadia  
> New Cascadia

Freightliner  
Service Bulletin

**Description of Revisions:** *This bulletin replaces the version dated 09/01/2010. The model list has been revised to include NewCascadia.*

## General Information

**NOTE:** This service bulletin does not apply to 23,000/46,000-lb capacity Airliner rear suspensions. On vehicles equipped with 20,000/40,000-lb tandem axles, this service bulletin applies to both rear axle suspensions.

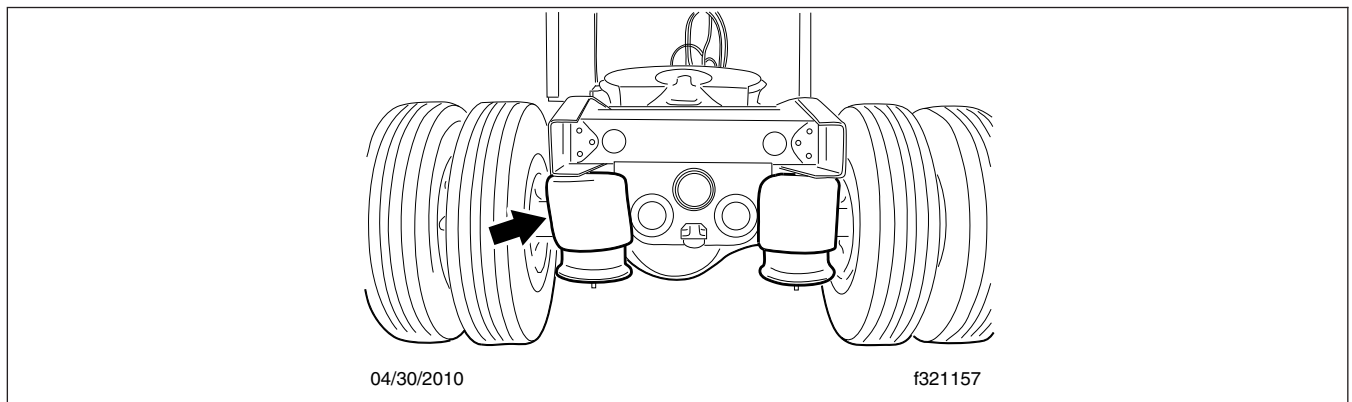
**IMPORTANT:** A leaning or tilted air-spring bag **does not** affect the operation of the Freightliner AirLiner rear suspension. This is an aesthetic issue only.

Freightliner AirLiner rear suspensions with 10,000/12,000/15,000/18,000-lb and 20,000/40,000-lb capacities are equipped with air springs that are supported at the bottom by single- or dual-leaf springs. These leaf springs, with a 30 degree bend (as viewed from above) at the rear, are used in place of the crossbar used on the 23,000/46,000-lb capacity suspensions.

The most common air-spring bag alignment complaints are a leaning or tilted air-spring bag or different air-spring bag heights between left and right sides. See [Fig. 1](#).

The critical leaf spring dimensions that directly affect these complaints are:

- kick-twist angle
- air-spring mounting hole location
- rear-end camber



**Fig. 1, Rear of Vehicle with Misaligned Air Bags**

## General Troubleshooting Procedure

If a vehicle air-spring bag is misaligned, perform the following general checks before proceeding to the more specific checks.

1. Park the vehicle on a level surface, shut down the engine, and set the parking brake. Chock the tires.

**IMPORTANT:** Repeat the air-spring-angle check after each adjustment procedure.

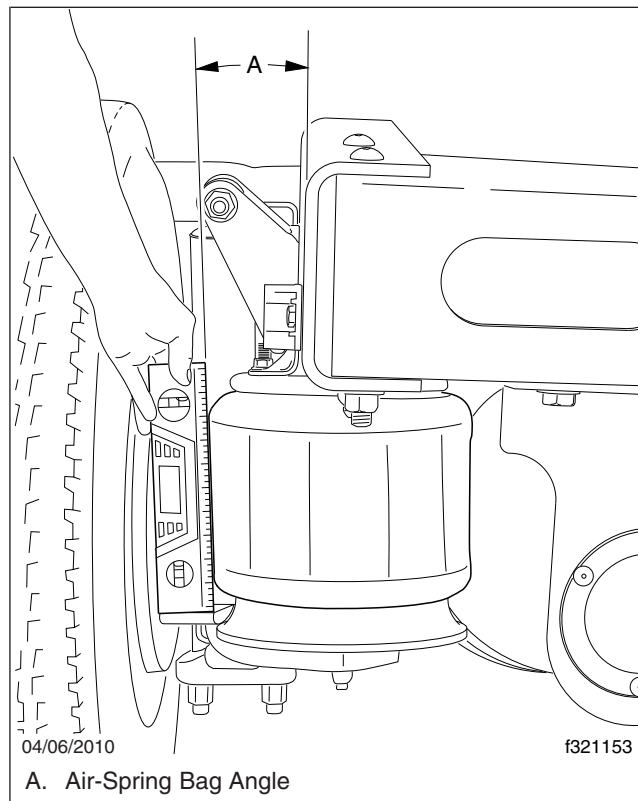
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2. Using a digital level tool, check the angle of the air-spring bag, relative to the frame rail.
  - 2.1 Fully inflate the rear suspension, then place a digital level tool vertically against the outside of the frame rail web and set it to zero.
  - 2.2 Place the level tool vertically against the outside of the air-spring bag as shown in **Fig. 2**. If the angle is less than 6.0 degrees the air-spring bag angle is within specifications and no further action is required. If the angle is more than 6.0 degrees from vertical, proceed to the next step.



**Fig. 2, Checking the Air-Spring Bag Angle**

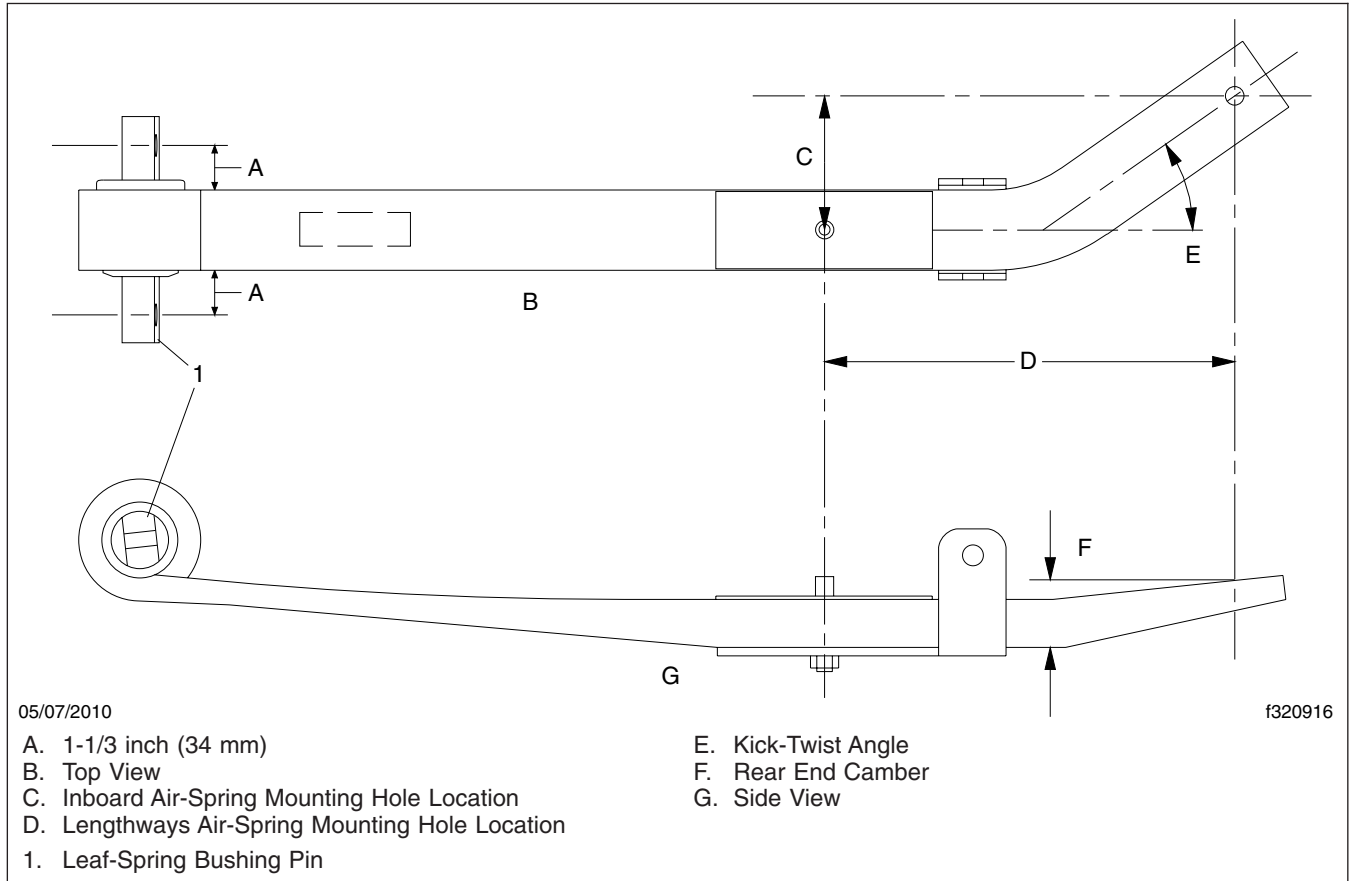
3. Perform a ride height check, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.
4. Check the AirLiner leaf-spring bushing pins for wear or walk-out (off-center placement). The centerlines of the holes in the pins should be 1-1/3 inch (34 mm) from each outside edge of the leaf spring. See **Fig. 3**. Correct as necessary, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

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**Fig. 3, AirLiner Leaf Spring Critical Dimensions**

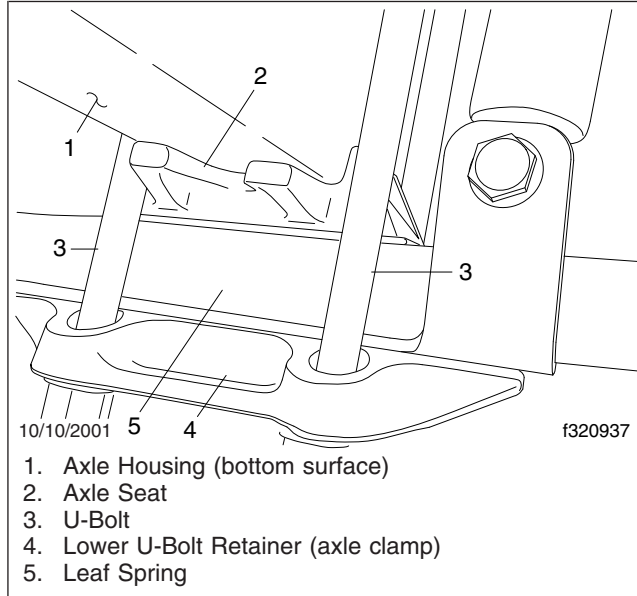
5. Check that the axle seats are installed correctly. See [Fig. 4](#). An axle seat installed backwards can cause a pronounced right-to-left air-spring bag height difference. Use PartsPro® module 431, EZWiring to see the engineering installation drawing of the axle seat.

If an axle seat is found to be installed backwards, remove it then install it correctly, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

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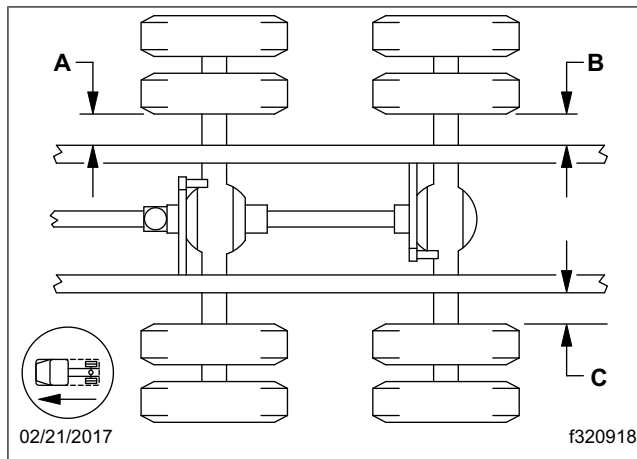
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**Fig. 4, Axle Seat Installation**

6. Check the rear axle(s) tracking. See **Fig. 5**.



**Fig. 5, Axle Tracking Measurements**

- 6.1 Measure from the inner side of the rear tire, to the outer side of the frame rail, at the right side of the forward-rear drive axle.
- 6.2 Measure the same distance at both sides of the rearmost drive axle.  
 Dimensions "B" and "C" must not vary from dimension "A" by more than 1/4 inch (6 mm).
- 6.3 If dimensions "B" and "C" vary from dimension "A" by more than 1/4 inch (6 mm), loosen the lateral torque rods at the frame rail and add or subtract shims as necessary, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

# AirLiner™ Suspension Air-Spring Bag Misalignment Troubleshooting

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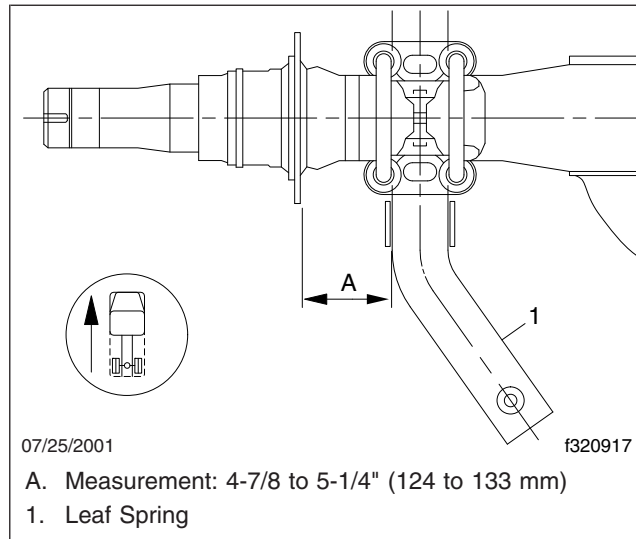
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- Check that the axle clamps are correctly aligned on the axle housing and not shifted inboard or outboard. See **Fig. 6**. The distance from the brake spider flange to the outside surface of the leaf spring should be 4-7/8 to 5-1/4 inches (124 to 133 mm). The upper axle clamps should align with the dowels on the top surface of the axle housing.

If the axle clamps are not correctly aligned, raise the vehicle and support the frame rails with safety stands. With the axle supported, loosen the U-bolts then install the axle clamps correctly.

- Check the axle U-bolts, and tighten them to the torque value in **Table 1**.



**Fig. 6, Axle Clamp/Axle Alignment Measurement**

| U-Bolt Torque Specifications |                              |
|------------------------------|------------------------------|
| U-Bolt Size                  | Torque Value<br>lbf-ft (N·m) |
| 5/8"-18 UNF                  | 180 to 230 (244 to 311)      |
| 3/4"-16 UNF                  | 270 to 330 (366 to 447)      |
| 7/8"-14 UNF                  | 420 to 500 (569 to 678)      |
| 1"-14 UNF                    | 520 to 600 (705 to 813)      |

**Table 1, U-Bolt Torque Specifications**

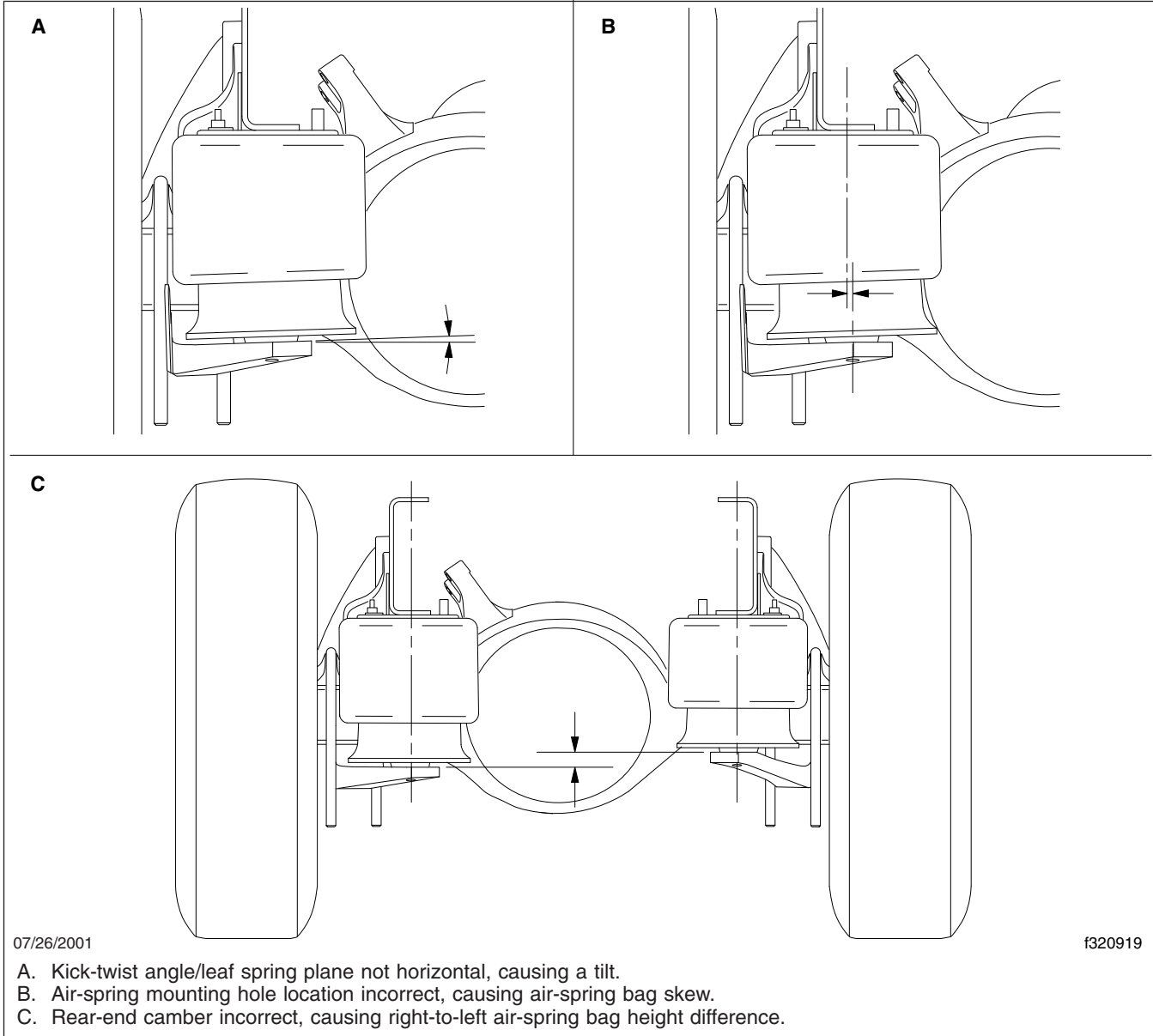
- Confirm that the leveling valve(s) is (are) plumbed correctly. Use PartsPro® module 910, EZWiring to view the plumbing schematic.
- If the air-spring bag still appears to be out of alignment after completing the steps in "General Troubleshooting," determine the nature of the misalignment. See **Fig. 7**.

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- A. Kick-twist angle/leaf spring plane not horizontal, causing a tilt.
- B. Air-spring mounting hole location incorrect, causing air-spring bag skew.
- C. Rear-end camber incorrect, causing right-to-left air-spring bag height difference.

**Fig. 7, Most Common Airbag Misalignment Complaints**

## Checking the Leaf Spring Kick-Twist Angle

The leaf spring kick angle is designed to be slightly upward when the spring is unladen, then settle level when the spring is laden.

The plane of the leaf spring kick should be 0.0 degrees to + 4.0 degrees from the horizontal with the spring unladen, or  $\pm 2.0$  degrees from the horizontal when fully laden. Do the following procedure to determine if the kick-twist angle is within specification.

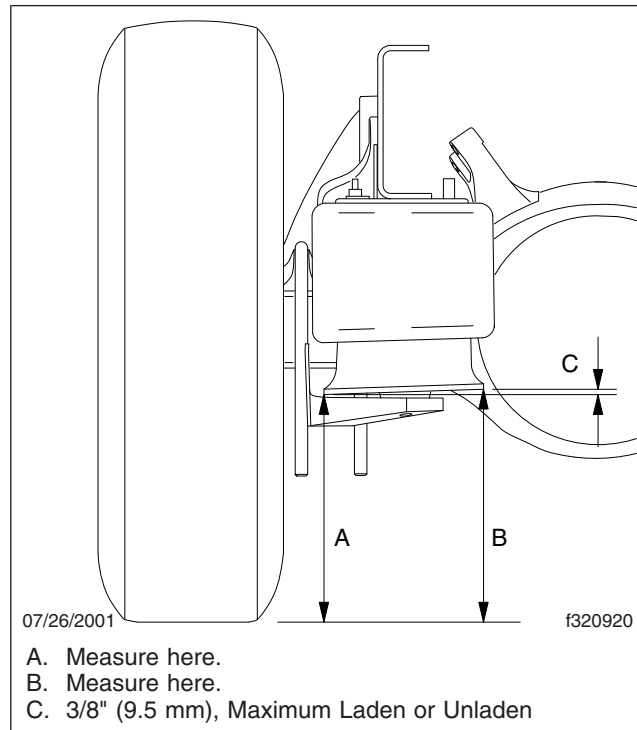
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1. From the rear of the vehicle, measure the distance from each end of the air-spring piston to the ground. See **Fig. 8**. Repeat each measurement three times to ensure accuracy.



**Fig. 8, AirLiner Leaf Spring Kick-Twist Angle Measurement**

2. If the difference between the two measurements in the previous step is less than 3/8 inch (9.5 mm), no further modification is necessary.

If the difference between these two measurements is more than 3/8 inch (9.5 mm), the leaf spring is out of tolerance. Replace it following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

## Checking the Air-Spring Mounting Hole Location

Do the following procedure to determine if the air-spring mounting holes are located correctly on the leaf spring.

1. Drill two holes exactly 16 inches (406 mm) apart on a piece of wood or metal at least 18 inches (450 mm) long.
2. Install a bolt into each hole and secure with a nut and washers if needed. Select a bolt size that will protrude from the edge of the wood or metal by at least 4 inches (100 mm).
3. Measure the distance between the center of the bolts to ensure that they are exactly 16 inches (406 mm). Correct as necessary until this distance is accurate. See **Fig. 9**.

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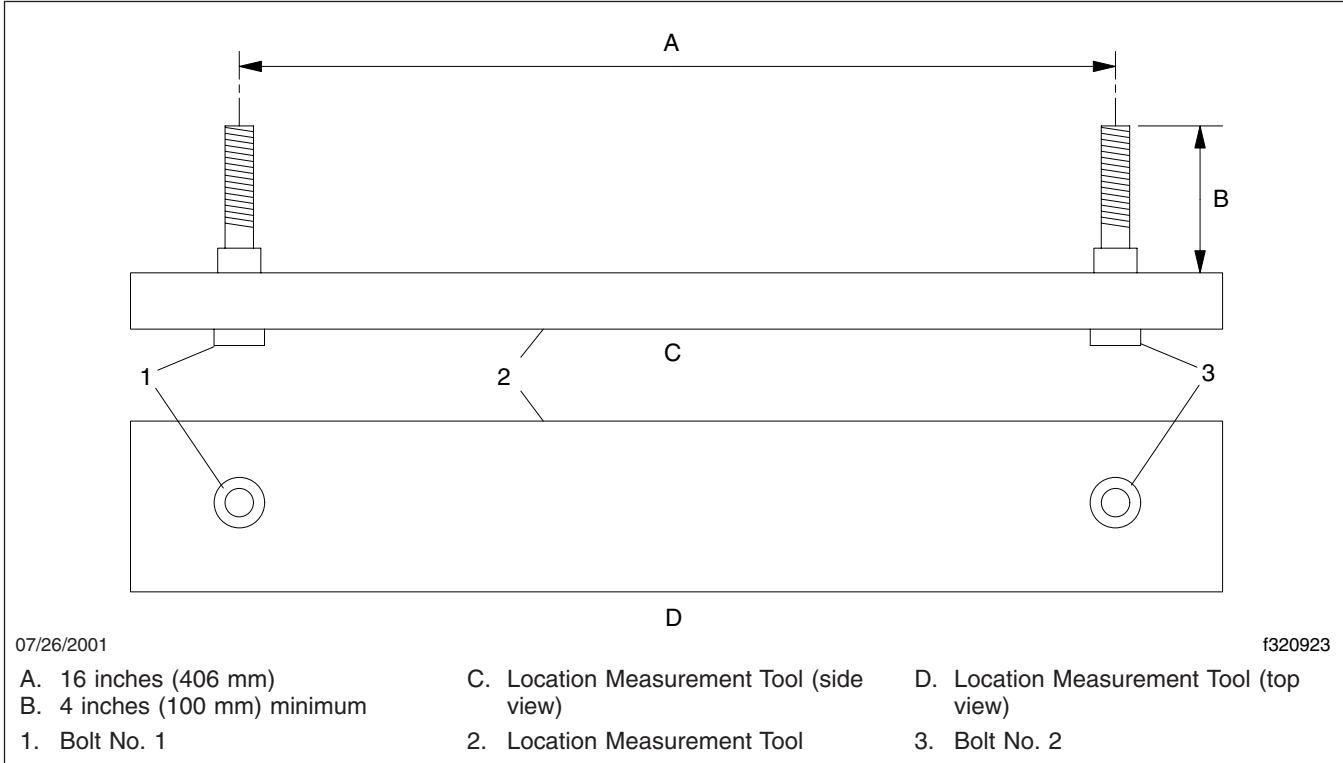
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**Fig. 9, Air-Spring Mounting Hole Location Measurement Tool**

4. From under the vehicle, align the center of one of the bolts on the measurement tool with the center-bolt in the lower U-bolt retainer. See [Fig. 10](#).

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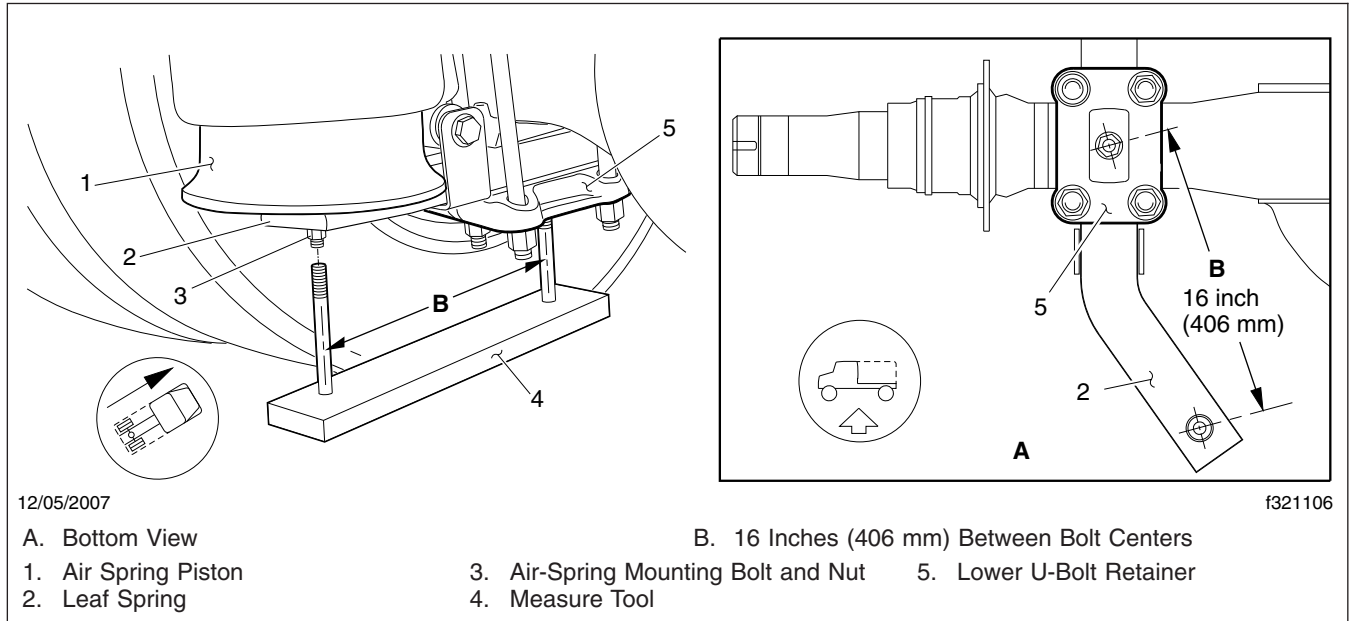
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**Fig. 10, Measuring the Air-Spring Mounting Hole Location**

5. Pivot the measurement tool around to align the second bolt on the measurement tool with the air-spring mounting bolt and nut. Make sure the first bolt is still aligned with the center-bolt in the lower U-bolt retainer. See **Fig. 10**.
6. If the second bolt aligns with the air-spring mounting bolt and nut, the leaf spring is within this tolerance. No further modification is necessary.

If the second bolt does not align with the air-spring mounting bolt and nut, the leaf spring is out of tolerance. Replace it, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

## Checking the Rear-End Camber

Do the following procedure to check if the rear-end camber of the leaf springs is within specification.

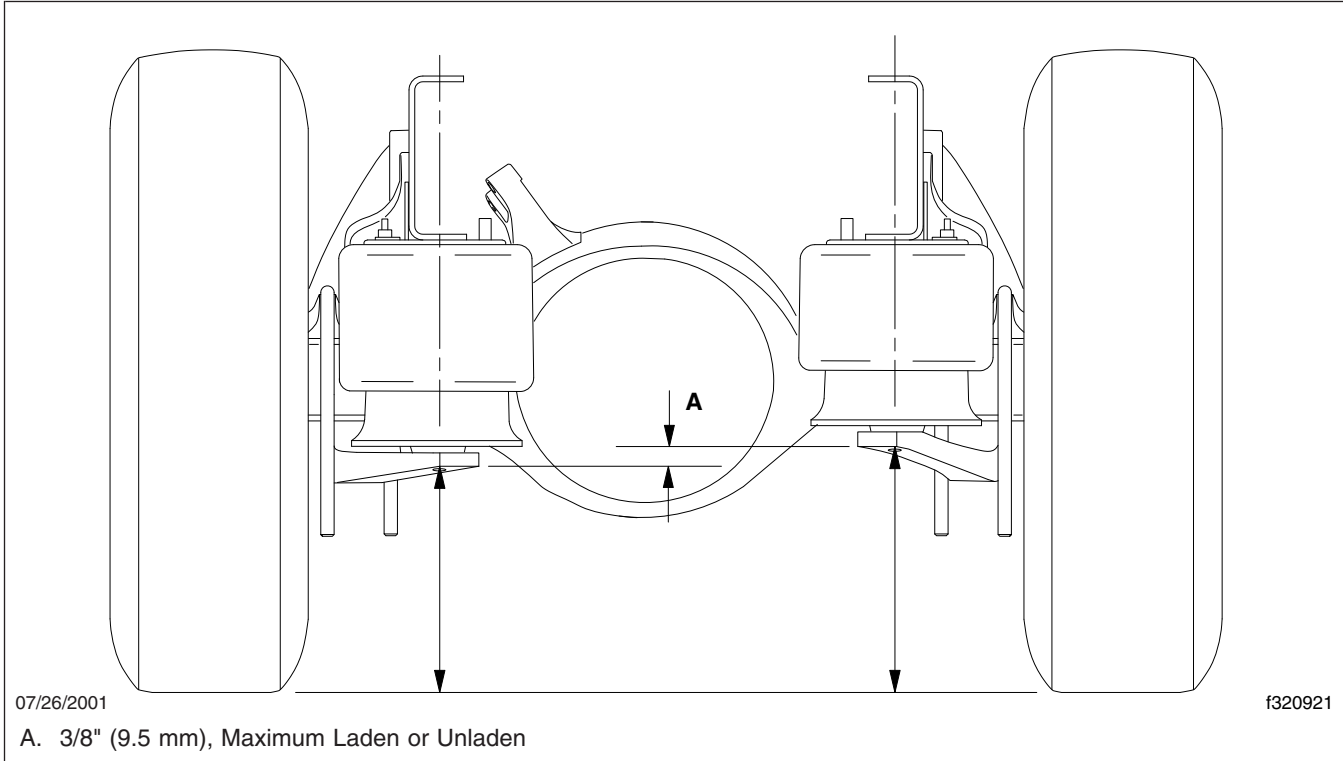
1. Measure the distance from the bottom of each leaf spring to the ground. Measure at the air-spring mounting hole. See **Fig. 11**. Repeat each measurement three times to ensure accuracy.

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**Fig. 11, AirLiner Leaf Spring Rear-End Camber Measurement**

2. If the difference between the two leaf-spring measurements is less than 3/8 inch (9.5 mm), no further modification is necessary.  
 If the difference between the two measurements is more than 3/8 inch (9.5 mm), one or both of the leaf springs is out of tolerance. Go to the next step.
3. With the leaf springs installed on the vehicle, using a straight edge, measure the rear-end camber at the air-spring mounting hole on the leaf spring. See [Fig. 12](#). Repeat each measurement three times to ensure accuracy.
4. Compare the measured values to the camber specification shown in [Table 2](#).

| Leaf Spring Rear End Camber Specifications |              |   |   |
|--|--------------|---|---|
| Leaf Spring Capacity/Type                  | Part Number  | Camber Specifications, Laden inches (mm)        | Camber Specifications, Unladen inches (mm)      |
| 10, 12, or 15,000 lb/Single Leaf           | 16-15468-XXX | 2-1/8 to 2-3/8 (54 to 60)<br>Target: 2-1/4 (57) | 2-1/4 to 2-1/2 (57 to 63)<br>Target: 2-3/8 (60) |
| 20 or 40,000 lb/Single Leaf                | 16-14862-XXX | 2-5/8 to 3 (70 to 76)<br>Target: 2-7/8 (73)     | 2-7/8 to 3-1/8 (73 to 79)<br>Target: 3 (76)     |

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| Leaf Spring Rear End Camber Specifications |               |  |  |
|--|---------------|--|--|
| Leaf Spring Capacity/Type                  | Part Number   | Camber Specifications, Laden inches (mm)     | Camber Specifications, Unladen inches (mm)     |
| 20 or 40,000 lb/Dual Leaf                  | A16-13999-XXX | 3-5/8 to 4 (95 to 101)<br>Target: 3-7/8 (98) | 4 to 4-1/4 (102 to 108)<br>Target: 4-1/8 (105) |

Table 2, Leaf Spring Rear End Camber Specifications

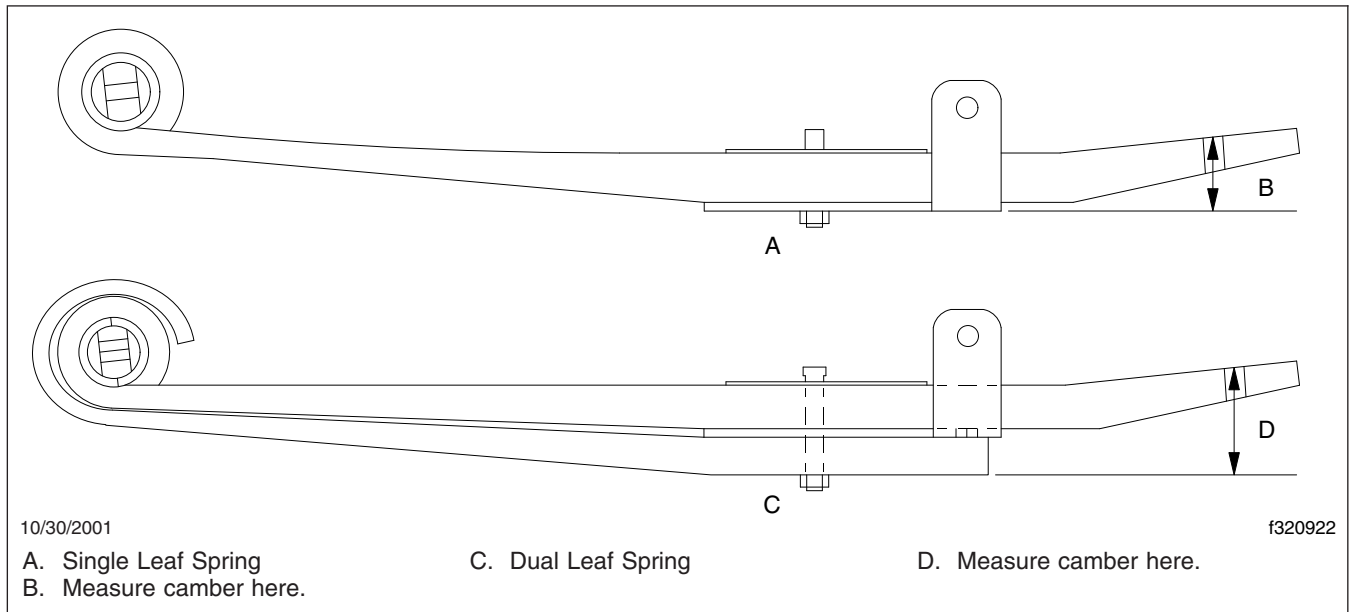


Fig. 12, AirLiner Leaf Spring Rear End Camber Measurements

- If a leaf spring is out of tolerance, remove it from the vehicle and repeat the rear-end camber measurement with the leaf spring lying on a flat surface.
- If the leaf spring is still out of tolerance replace it, following the instructions in the section titled Freightliner Airliner Rear Suspension, in **Group 32**, of the applicable workshop/service manual.

## Warranty

*General Troubleshooting Procedure:* This is an informational procedure only; warranty does not apply for this procedure.

*Checking Air-Spring Bag Misalignment Causes:* Normal warranty applies; however, you must obtain approval from your District Service Manager before making any repairs. When submitting claims, reference this service bulletin by number in the story of the claim, and include the part number of any component replaced. Use the damage code and time guide information in [Table 3](#) and [Table 4](#).

**IMPORTANT:** Warranty claims for this bulletin require a pre-authorized warranty Field Service Authorization (FSA).

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| QuickClaim Damage Code and Labor Allowance |           |   |              |
|--|-----------|---|--------------|
| Damage Code                                | SRT Code  | Description   | Time (hours) |
| 622-000550647                              | 622-5005B | Kick-Twist Angle Check and 1 Leaf Spring R/R  | 2.0          |
| 622-000550647                              | 622-5005C | Kick-Twist Angle Check and 2 Leaf Springs R/R   | 3.4          |
| 622-000550647                              | 622-5005E | Kick-Twist Angle Check and Mounting Hole Location Check, 1 Leaf Spring R/R                          | 2.3          |
| 622-000550647                              | 622-5005F | Kick-Twist Angle Check and Mounting Hole Location Check, 2 Leaf Springs R/R                         | 3.6          |
| 622-000550647                              | 622-5005H | Kick-Twist Angle Check, Mounting Hole Location Check, and Rear-End Camber Check; 1 Leaf Spring R/R  | 2.5          |
| 622-000550647                              | 622-5005I | Kick-Twist Angle Check, Mounting Hole Location Check, and Rear-End Camber Check; 2 Leaf Springs R/R | 3.8          |

**Table 3, QuickClaim Damage Code and Labor Allowance**

| OWL VMRS Codes and Labor Allowance |            |           |   |             |
|------------------------------------|------------|-----------|---|-------------|
| Component Code                     | Cause Code | SRT Code  | Description   | Time: Hours |
| 016-002-001                        | 22         | 622-5005B | Kick-Twist Angle Check and 1 Leaf Spring R/R  | 2.0         |
| 016-002-001                        | 22         | 622-5005C | Kick-Twist Angle Check and 2 Leaf Springs R/R   | 3.4         |
| 016-002-001                        | 22         | 622-5005E | Kick-Twist Angle Check and Mounting Hole Location Check, 1 Leaf Spring R/R                          | 2.3         |
| 016-002-001                        | 22         | 622-5005F | Kick-Twist Angle Check and Mounting Hole Location Check, 2 Leaf Springs R/R                         | 3.6         |
| 016-002-001                        | 22         | 622-5005H | Kick-Twist Angle Check, Mounting Hole Location Check, and Rear-End Camber Check; 1 Leaf Spring R/R  | 2.5         |
| 016-002-001                        | 22         | 622-5005I | Kick-Twist Angle Check, Mounting Hole Location Check, and Rear-End Camber Check; 2 Leaf Springs R/R | 3.8         |

**Table 4, OWL VMRS Codes and Labor Allowance**