



# M-TEC DRIVE SHAFT VIBRATION RECALL

## RECALL #18E-007

## LABOR FLAT RATE: 8 HOURS

### Purpose

This repair procedure describes how to address the drive shaft vibration on a motorized coach.

The individual components of the Forest River M-Tec Drive Shaft Recall Kit (720134) are listed in the kit parts list in the Resources Required section.

### Labor Allowance

Eight man-hours per recall kit (two technicians at four hours each).

### Safety

#### **WARNING**

The “WARNING” symbol above is a sign that an installation procedure has a safety risk involved and may cause death, serious personal injury and severe product or property damage if not performed safely and within the parameters set forth in this manual. Always wear eye protection when performing this installation procedure. Other safety equipment to consider would be hearing protection, gloves, and possibly a full face shield, depending on the nature of the installation procedure.

#### **WARNING**

The coach **MUST** be supported per manufacturer's recommendations before working underneath. Failure to do so may result in death or serious personal injury.

#### **CAUTION**

The welding process can produce fumes, excessive heat, extreme light and sparks that can cause lung, eye and skin irritations and abrasions. Use appropriate personal protective equipment as necessary to prevent welding related injuries. Observe all state, local and industry welding standards.

#### **CAUTION**

Moving parts can pinch, crush or cut. Keep clear and use caution.



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## Resources Required

- 2 people
- Four snap clamps/C-clamps
- Impact wrench
- 3/8" drive impact socket
- 3/4" deep socket
- 3/8" wrench (8"-10" long)
- 3/4" wrench (8"-10" long)
- 12mm, 12-point deep socket
- 3/8", 12-point shallow socket
- 3/8" drive extension wobble
- Torch
- Die grinder
- Hammer
- Tape measure
- Digital protractor with absolute zero capability
- Adjustable (screw) jack stands
- Welder unit
- Non-permanent white marker
- Four 12 mm, 12-pt external wrenching bolts (transmission drive shaft end yoke)
- Four 3/8" - 24, 12-pt external wrenching bolts (two differential drive shaft bearing straps)

Part #	Description	Qty
720134	Forest River M-Tec Drive Shaft Recall Kit	
720135	Tube, 2" x 3" (0.179 Nominal) cut to 33 5/8"	1
720142	Tube, 2" x 3" (0.179 Nominal) cut to 33 7/16"	1
722046	Tube, Spacer, 1 1/2" x 2 x 2 5/8" (0.179 Nominal)	2
290453	Plate, 9.0" x 2.0" x 1/4" thick	6
386062	Plate, 9.0" x 2.0" x 3/16" thick	4
386064	Plate, 9.0" x 2.0" x 11 Ga	4
717868	Drive Shaft Recall Kit	1
719282	Angle, 2.250" x 5.938" x 0.224" x 9.375"	2
720136	Plate, 1/2" thick x 3" x 9.5"	1
722211	Bar, Flat, 1" thick x 3" x 9.5" (as needed)	1
251486	Lock Nut, 1/2" - 13, Grade 8	4
720137	Flange Bolts, 1/2" - 13 x 2", Grade 8	4
720140	M-Tec Drive Shaft Vibration Recall (CCD-0001198)	1



## Preparation

Check chassis for OEM cross-members. If there are two front cross-members, check to see if they are welded in-place. If OEM cross-members are welded, then modify cross-member in accordance with instructions in the Old Drive Shaft section.

## Old Drive Shaft

Removal of the old drive shaft, any welded-on OEM carrier bearing hangers and other modifications **MUST** be done before installing the new drive shaft. If the OEM bearing hanger is welded on, cut off and discard.

1. Support old drive shaft with adjustable jack stands.
2. Remove 12 mm, 12-point external wrenching bolts from transmission drive shaft end yoke (Fig. 1A).
3. Discard bolts. Do **NOT** reuse.

Fig. 1





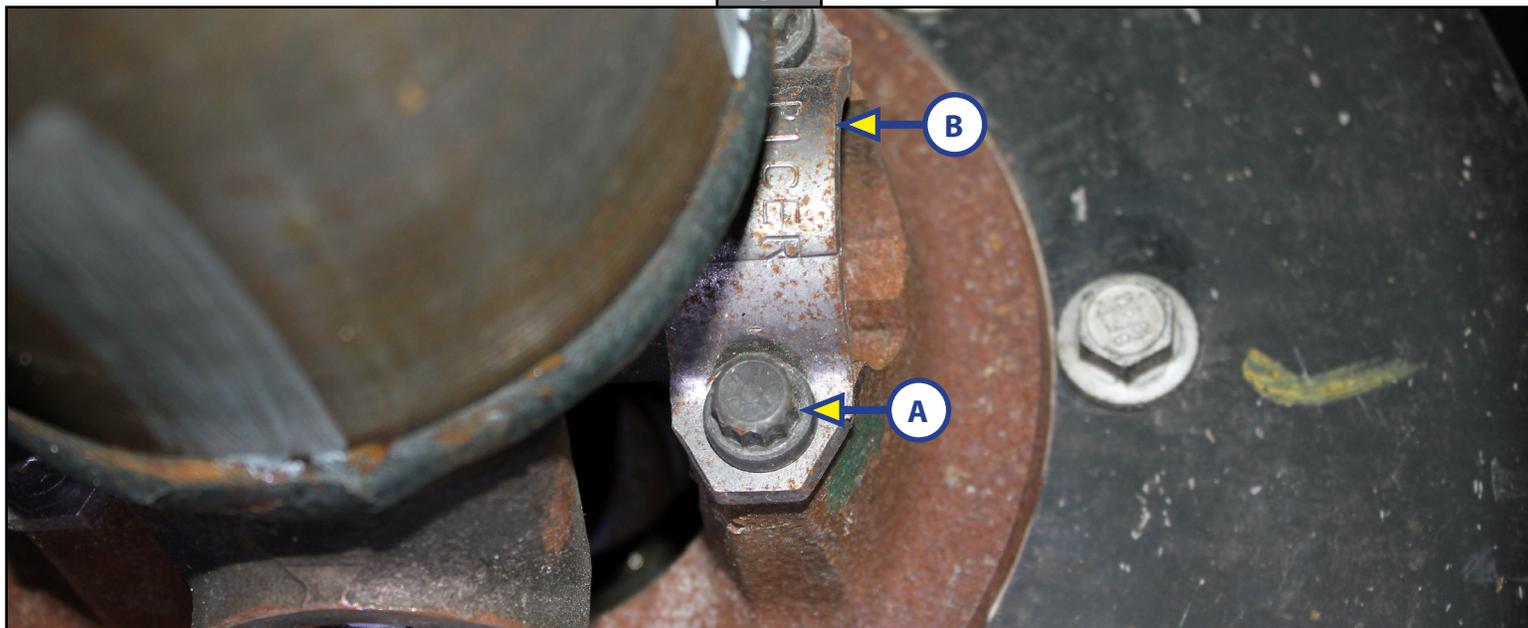
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4. Remove 3/8" - 24, 12-point external wrenching bolts (Fig. 2A) from differential drive shaft bearing straps (Fig. 2B).
5. Discard bolts. Do **NOT** reuse.
6. Remove bearing straps and set aside for later use.

Fig. 2



7. Remove old drive shaft.
8. Cut off flange of exhaust hanger at front side of muffler, leaving a 1/32" minimum gap.
9. Remove manufacturer's carrier bearing hanger. If welded on, cut off and discard.
10. Clean top of chassis frame in front of roadside wheel-well to ensure an accurate digital protractor reading.
11. Calculate transmission and pinion angles as follows:
  - A. With the digital protractor placed on top of the frame rail, zero-out the protractor.
  - B. Place digital protractor on top of chassis frame in front of roadside wheel-well.
  - C. Record calculation.
  - D. Press ABS/ZERO button (Fig. 3A) so the frame becomes the zero reference point.

Fig. 3





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### Installation

**NOTE:** Blue lines indicate the centerline of an object or area. Enclosed green lines indicate a designated area, while non-enclosed green lines indicate a separator between designated areas.

### Cross-Members

1. Front cross-member is 33 5/8".
  - A. Bevel the top corners to fit the radius inside the top of the frame rail.
    - I. Check for fit.
    - II. If cross-member is too long, trim each end to fit and to keep cross-member centered, if necessary.
  - B. With the cross-member clamped in-place, measure from inside driver's side frame rail.
  - C. Make a mark at 13 1/2".
  - D. Clamp a hanger bracket with the open end of the angle bracket facing towards the rear and with the driver's side of the bracket lined up with the 13 1/2" mark.
2. Rear cross-member is 33 7/16".
  - A. Place cross-member on bottom of inside frame rail.
    - I. Raise cross-member with supplied 1 1/2" x 2" x 2 5/8" spacer tubes.

**NOTE:** Spacer tubes shall be positioned on the C-channel with a 2" height.

- II. If cross-member is too long, trim each end to fit and to keep cross-member centered, if necessary.
- B. After fit, remove the cross-member.
- C. Cut exhaust hanger bracket flange to allow clearance for the cross-member.
- D. Place rear cross-member back inside frame rails on top of supplied 1 1/2" x 2" x 2 5/8" spacer tubes as far to the rear as possible.

**NOTE:** Spacer tubes shall be positioned on the C-channel with a 2" height.

- E. On rear side of cross-member, measure from driver's inside frame rail to driver's side of 1/2" x 3" x 9 1/2" plate 13 3/8".
- F. Weld on 1/2" plate at 13 3/8" location.
- G. With the open end of the hanger bracket facing towards the rear, clamp hanger bracket from inside driver's side frame rail to side of bracket 13 1/2".

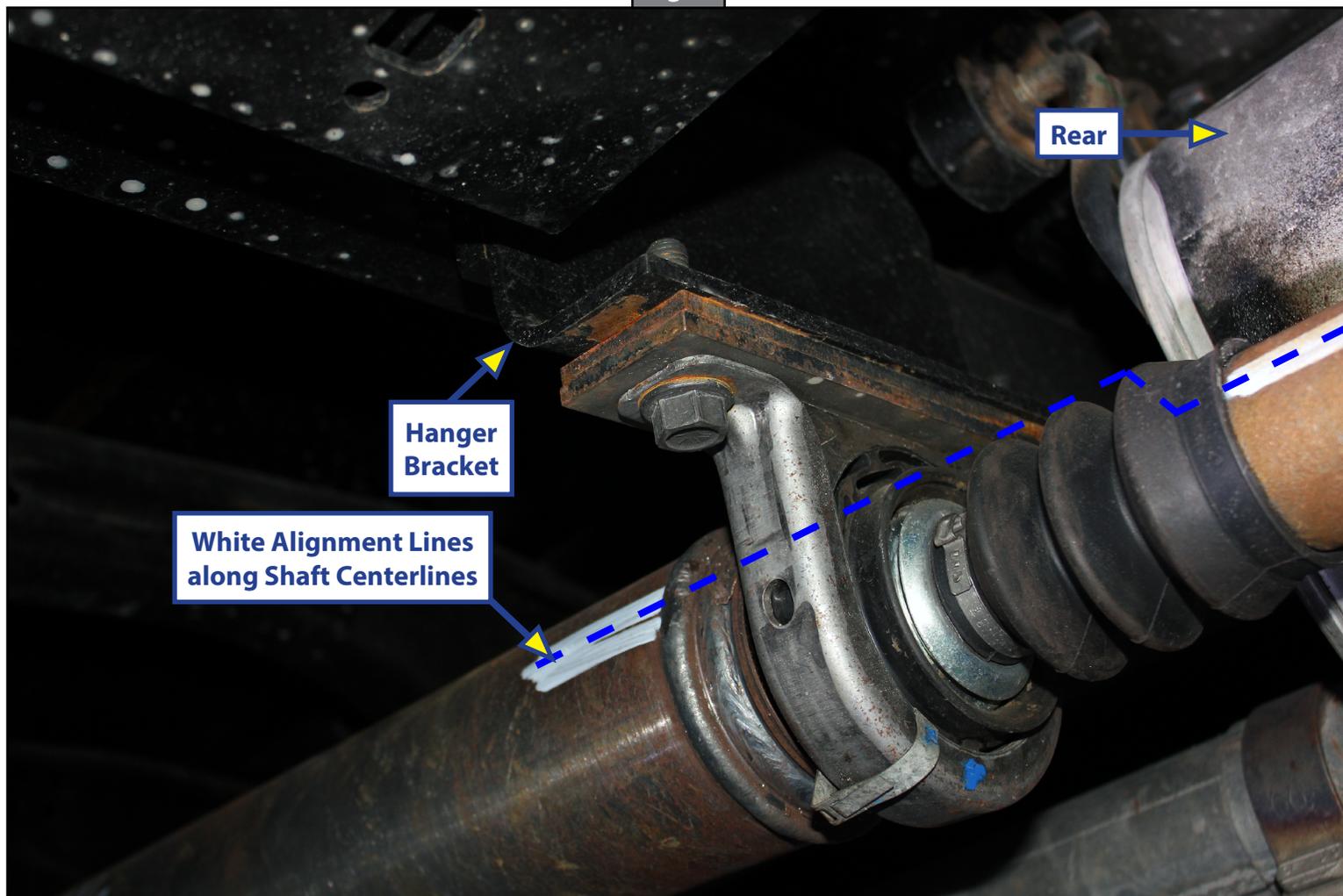
### New Drive Shaft Assembly

1. Assemble the supplied 3-piece drive shaft (Drive Shaft Recall Kit 717868), making sure the shaft alignment marks (Fig. 4) line up.
  - A. Support each drive shaft section with an adjustable jack.
  - B. Bolt front shaft to transmission with new 12 mm, 12-point bolts. Bolts **NOT** supplied.
  - C. Bolt rear shaft to pinion with new 3/8" - 24, 12-point bolts. Bolts **NOT** supplied.

**NOTE:** Use previously remove bearing straps—Old Drive Shaft section, step 6.

- D. Make sure the center support bearings line up with the hanger brackets.
  - E. Keep hanger brackets at 13 1/2" from inside driver's side frame rail.
2. Set shaft angles and hanger brackets so there is enough room to shim shafts to make angle adjustments, if necessary.
3. After all fit adjustments are made, weld all cross-members and brackets in-place.

**Fig. 4**



**⚠ WARNING**

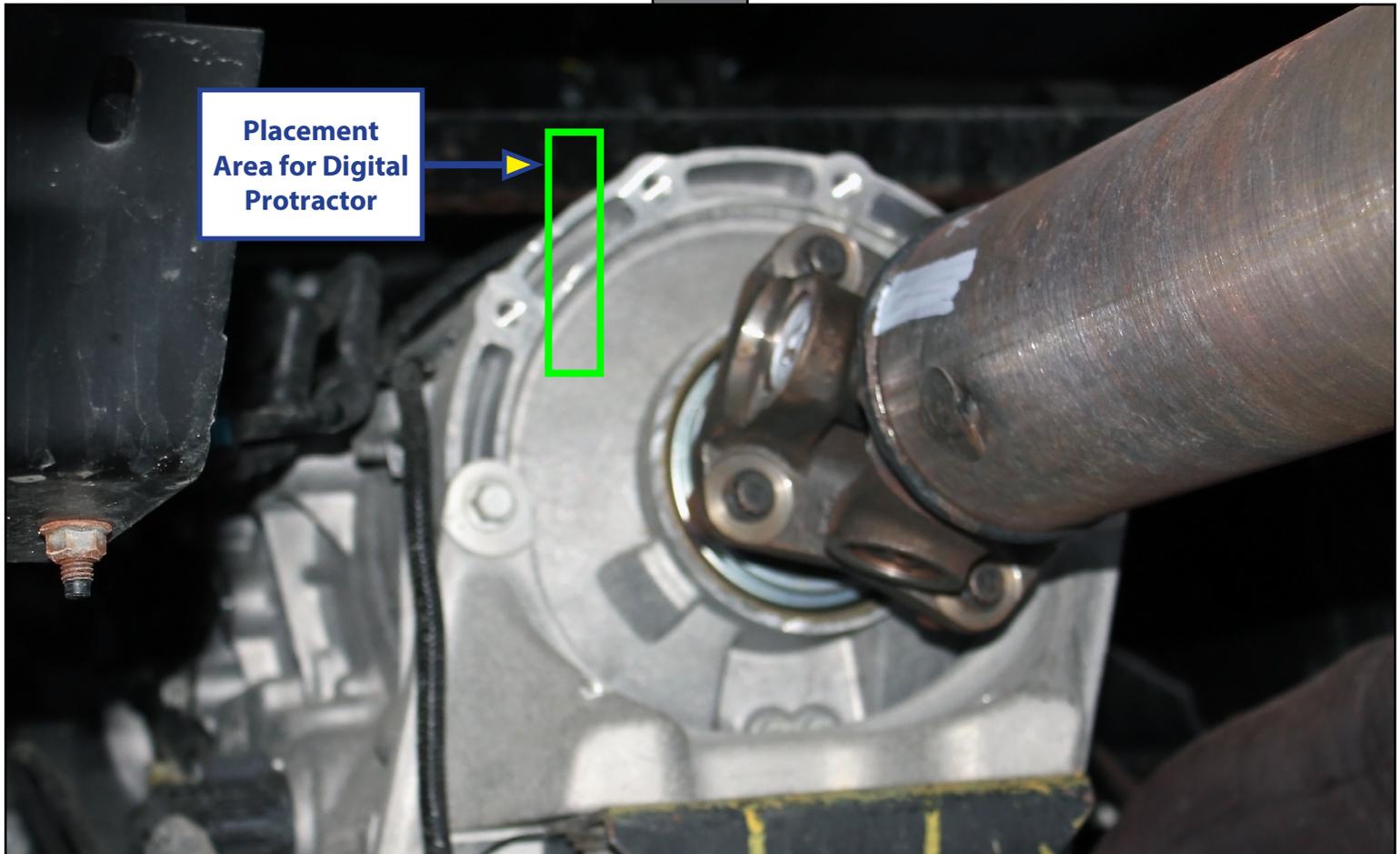
**Excessive heat and sparks generated during welding can ignite sensitive, flammable materials, which can result in serious personal injury or severe product and property damage. Remove or relocate welding-sensitive material. If only relocating, shield weld-sensitive materials. Wear appropriate personal protective equipment during the welding operation.**

Taking Vertical Angle of Slope Readings

1. After welds have cooled, use a hammer to tap the spacer tubes loose from the C-channel frame.
2. Remove shielding from wire harnesses, brake lines, fuel lines and any other elements shielded during welding.
3. Set wire harnesses, brake lines, fuel lines, and any other relocated elements, back to their normal locations.
4. With the bottom of the digital protractor resting on a flat, horizontal surface, zero-out the digital protractor by pressing the ABS/ZERO button (Fig. 3A).

5. Carefully place a short, vertical edge (Fig. 3) of the digital protractor across the flat surfaces of the transmission cover within the indicated area in figure 5.

Fig. 5



- A. The protractor's reading will provide the slope angle of the transmission.
- B. Record the reading in the Vertical Angle of Slope Chart.

**⚠ CAUTION**

**Misaligned drive shafts can cause excessive vibration and wear that can result in damage to the transmission and differential. Make sure drive shaft alignment markings remain aligned to one another throughout assembly and installation to ensure proper drive shaft tolerances and operation.**

6. With the new drive shaft still held in-place, carefully set the digital protractor's grooved flat bottom on top of the front shaft, taking care to make sure it is aligned with the centerline of the shaft (Fig. 6).

**NOTE:** If the digital protractor is not aligned properly on the drive shaft, a false reading may be given, resulting in misalignment of the entire drive shaft.

7. Let digital protractor rest for at least six seconds before recording the reading.
8. Record the slope angle of the front drive shaft (Front Shaft) in the Vertical Angle of Slope Chart.
9. Repeat steps 6-8 for the middle and rear drive shafts (Middle Shaft, Rear Shaft).

**NOTE: DO NOT** zero-out the digital protractor between shaft readings. Shaft readings are relative to the transmission's angle of slope (step 5).

**Fig. 6**



**Slope Adjustments**

Referring to the Vertical Angle of Slope Chart, if any component's measured slope is not within  $\pm 0.2$  degrees of its required slope, adjustment is required.

Vertical Angle of Slope Chart		
Component	Required Vertical Slope (Deg.)	Measured Vertical Slope (Deg.)
Transmission	3.5	
Front Shaft	5.0	
Middle Shaft	3.6	
Rear Shaft	5.2	
Axle	3.6	

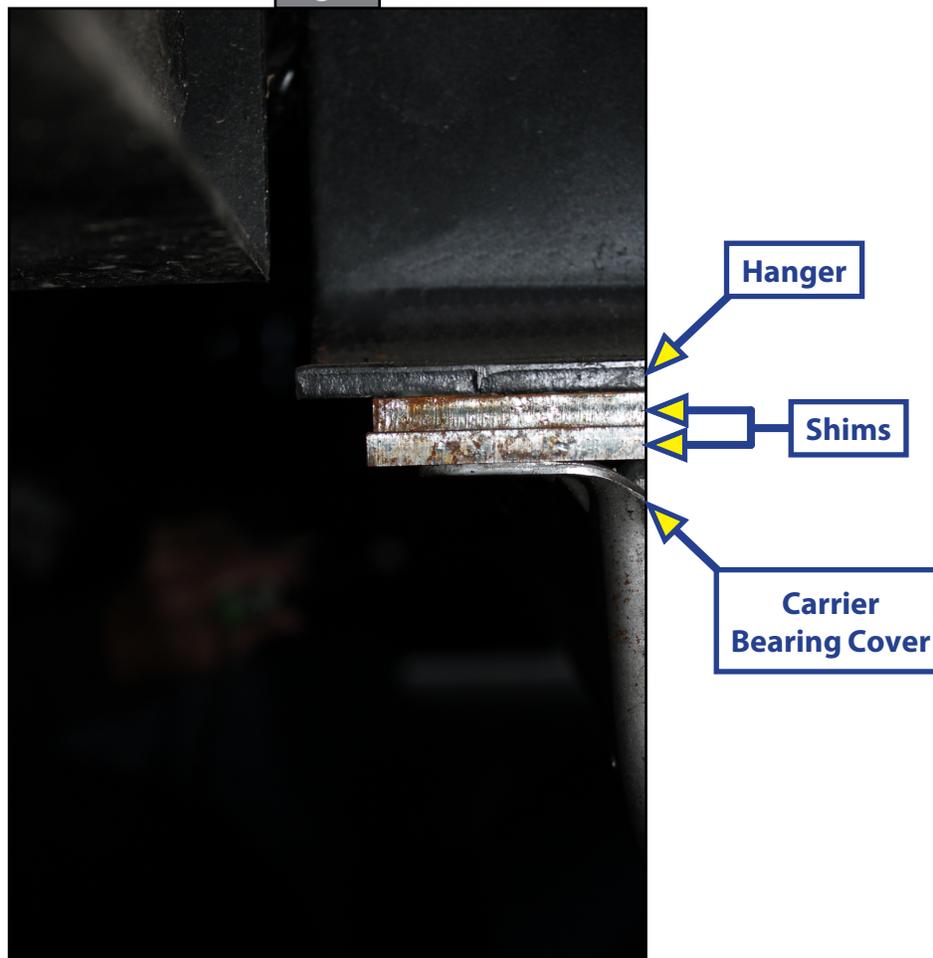
Incremental adjustments of component vertical slope angles to reach required limits may require operation of adjustable jacks to allow for the insertion of shims and the reuse of the digital protractor to verify the slope reading.

To adjust a measured slope, use a single or combination of shims to bring the slope in-line with the required limit,  $\pm 0.2$  degree (Fig. 7).

Beginning with the front shaft, do as follows:

1. Lower adjustable jack to create a gap between the bearing hanger and the carrier bearing.
2. Place one or more shims into the gap.
3. Raise adjustable jack until spacers are compressed.

Fig. 7



4. Set digital protractor on top of shaft and note the reading.

**NOTE: DO NOT** zero-out the digital protractor between shaft readings. Shaft readings are relative to the transmission's angle of slope (Taking Vertical Angle of Slope Readings section, step 5).

- A. Compare measured reading to required reading. Refer to Vertical Angle of Slope Chart.
- B. If necessary, repeat shimming procedure until measured reading meets required reading within  $\pm 0.2$  degree.



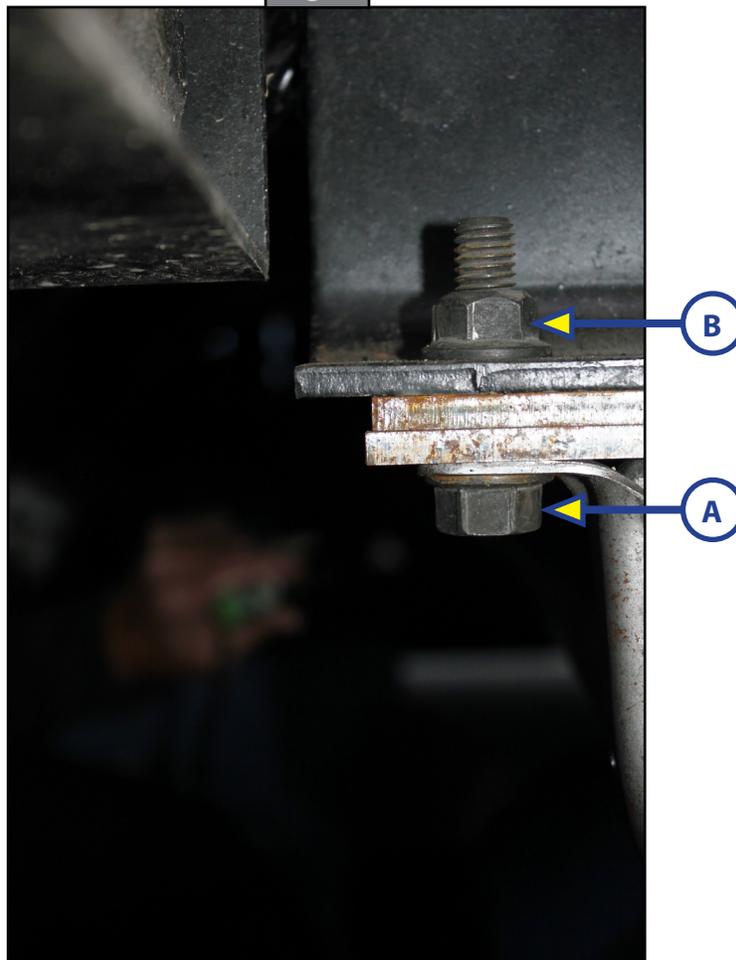
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5. After each required vertical slope angle has been met, insert 1/2" - 13 UNC x 2" hex flange bolts (Fig. 8A) through carrier bearing mounting holes and slots of shims and hangers.
6. Secure bolts with 1/2" - 13 UNC hex, all metal prevailing torque type, flange nuts (Fig. 8B).
7. Use a 3/4" wrench, 8"-10" long, to tighten nuts.
8. Repeat steps 1-7 for middle and rear shafts.

Fig. 8



### Post-installation

Remove all adjustable jacks from underneath the coach.

As a supplier of components to the RV industry, safety, education and customer satisfaction are our primary concerns. Should you have any questions, please do not hesitate to contact us at (574) 537-8900 or by email at [customerservice@lci1.com](mailto:customerservice@lci1.com). Self-help tips, technical documents, product videos and a training class schedule are available at [lci1.com](http://lci1.com) or by downloading the MyLCI app.