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Coding Information

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Title: LT & LoneStar vibration at highway speeds

Applies To: LT Series & LoneStar (low miles)

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

07/20/2018- Added 50 durometer Dana carrier
 06/04/2018- Added increased isolation carrier bearing
 05/17/2018- Added template for recording driveline runout in step 8. Added LoneStar.
 04/26/2018- Revised driveline diag. and added worksheet for driveline shop
 04/09/2018- Added link to Shimmy IK
 02/02/2018- Removed carrier bearing info
 01/30/2018- Revised title and "applies to"; removed build dates, added tips
 11/07/2017- Add link to IK0600020 "Determine Wheel Speed or Driveline Vibration using a Smart Phone and Free VibSensor Application"
 10/30/2017 - Reformat to step based. Reordered and steps.
 10/13/2017- Added inspect for driveshaft balance weights present
 10/09/2017- Added sheet for tire shop to use
 10/05/2017- improved links, added tire flat-spot inspection, added torque arm
 09/29/2017 - Initial Article Release

DESCRIPTION

This article applies to LT & LoneStar vehicles that experience an objectionable vibration felt in the seat, floor, or the steering wheel at highway speeds. Many of the diagnostic processes in this article could also apply to other truck models.

As of 7/20/2018

If you have validated a driveline vibration on a new LT or LoneStar (with a sleeper) then change the driveline carrier bearing to the softer "50 durc before trying other solutions.

1. Use the phone App to verify the source of the vibration is the driveline



Cushion id # 5003325
50 durometer "softer"



Cushion id # 10049853
70 durometer "firmer"

- 2.
3. Open a case file if needed to source carrier bearing 5003323 with the 50 durometer cushion. Date code will be D124F or higher

SYMPTOM(s)

An objectionable vibration is felt in the seat, floor, or the steering wheel. Mirror shaking might also occur (at highway speeds)

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Tire runout gauge	4532000		
Tire pressure gauge			
Tire marker / grease pen			
Smartphone or tablet		With Vibration Diagnostic App	IK0600020

[Tools Resource Center](#)

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
KIT U-JT BOLT & RET SPL-250	2500675C91	as needed	
Dana driveline carrier bearing	5003323	as needed	with rubber insert with "5003325"

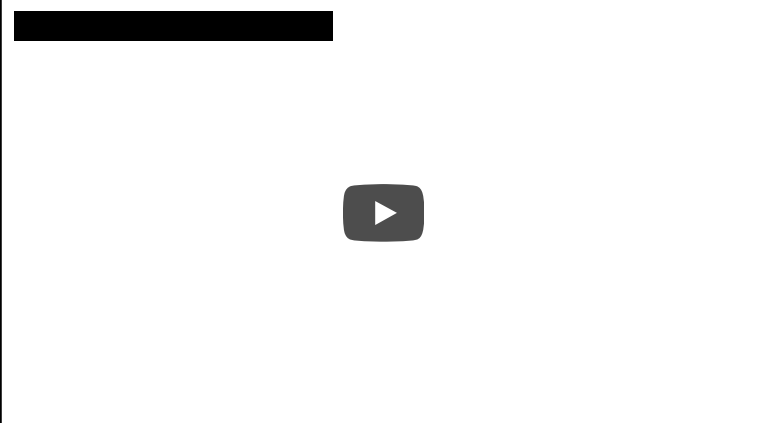
DIAGNOSTICS

Step	Action	Decision
1	DIAGNOSTIC: Does the LT have a validated objectionable highway speed (45 mph+) vibration (and not at lower speeds)? Its highly recommended to interview the driver and drive the unit yourself. Take note if the vibration only occurs under load, or only bobtailing, etc.	Yes. Go to Step 2
		No. Article does not Apply

Step	Action	Decision
2	DIAGNOSTIC: Does the truck have less than 30,000 miles OR has it had the vibration since new? NOTE: If the vibration has been present since the truck was new then its very unlikely that the vibration is caused by something worn or bent. The diagnostic process in this article bypasses some tests and measurements that would be performed on a higher mileage truck that did not have any prior history of vibrations	Yes. Go to Step 3
		No or don't know. Check service and warranty history for prior vibration complaints. Proceed to step 3 but be aware that the truck could have worn parts that are causing or contributing to the vibration complaint. A more thorough inspection may be needed than what is covered in this procedure.

Step	Action	Decision
3	DIAGNOSTIC: Determine the location of the Vibration	A steering wheel "buzz" sensation in your hands (above 45 mph) is often driveline related. Follow IK0600020 (below) and use a smartphone to measure the vibration.
		A steering wheel left-to-right chop or wobble that is severe is often a "shimmy". Go to IK0500038
		A "backslap" sensation in the seat is often rear wheels balance / runout related. Follow IK0600020 (below) and use a smartphone to measure the vibration. If this is not possible then go to Step 4. Smartphones / Tablets with a Vibration Apps have proven very accurate in determining if the vibration source is wheel related or driveline related. See IK0600020 . If unable

to determine the location or source of the vibration go to Step 4

Step	Action	Decision
4	<p>DIAGNOSTIC: Determine the type of vibration</p> <div style="border: 1px solid black; width: 100%; height: 100%; text-align: center; margin: 10px 0;">  </div> <p>Were you able to identify the source of the vibration?</p>	<p>1. Up and down indicates run-out or imbalance or both . If it gets worse as speed increases its often balance related. If vibration <u>changes</u> when vehicle is put in neutral OR clutch is depressed (during the vibration) then accelerate ABOVE the vibration speed so that you can coast down through the speed region of the vibration. Vibrations that change when clutch is depressed (or transmission is in neutral) are likely driveline related. Proceed to step 5.</p> <p>2. Side to side indicates run-out, balance and possibly irregular wear. Steering wheel shimmy often indicates steer tire dynamic imbalance. Up and down indicates run-out or imbalance or both. If it gets worse as speed increases its often balance related. If it occurs at only one speed it is often run-out related. Proceed to step 10.</p> <p>3. Low speed wobble is not a balance problem. A vibration while braking only indicates a brake system problem. Proceed to Other Resources section for additional help.</p>

Step	Action	Decision
5	<p>DIAGNOSTIC: Suspected driveline vibration- <i>see note in red at beginning of the article</i></p> <p>Clearly mark the driveshafts and yokes for phasing purposes (Figure 1) Flip the long shaft (Item 2) 180 degrees so that the slip shaft (bellows) section of the driveline is closer to the rear axle. (see Figure 2). When installing, make sure your phasing marks still line up as in Figure 1 & 2. Test drive. Is the vibration better but still objectionable?</p>	<p>Yes, vibration is better but still objectionable: Go to Step 7</p> <p>No, Vibration is gone: Return unit to customer</p> <p>No change: Proceed to Step 6</p>

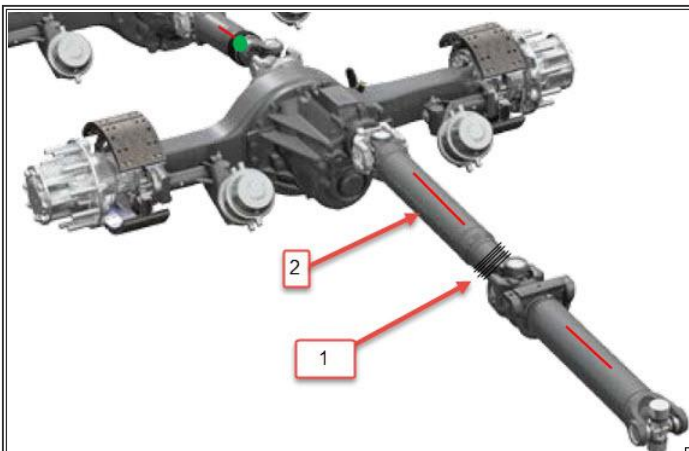


Figure 1

Item 1: Slip joint bellows section of prop shaft.

Item 2: Index marks added by the technician.

NOTE:

It is ok for the bellows to point in either direction.

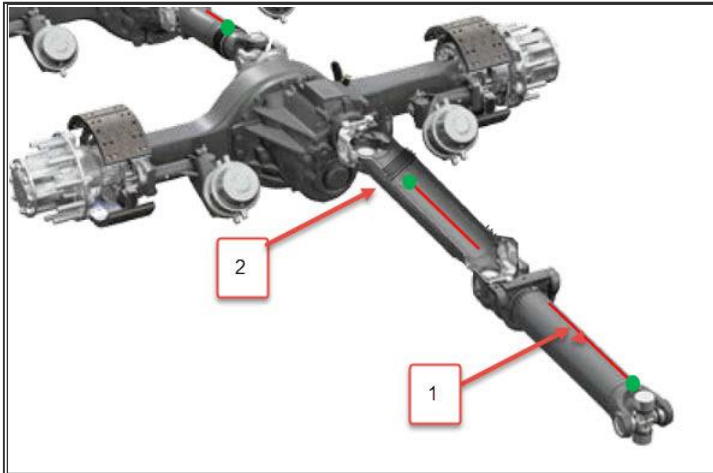


Figure 2: Prop Shaft Flipped

Item 1: Indexing marks added by the technician still aligned

Item 2: Slip joint section of prop shaft.

NOTE:

It is ok for the bellows to point in either direction.

Step	Action	Decision
6	<p>DIAGNOSTIC: Check suspension ride height by measuring on the same axle and side as the leveling valve is located.</p> <p>NOTE:</p> <ul style="list-style-type: none"> Conduct this check with no trailer. Suspension must not be loaded. Ensure there is over 100 psi of air in the tanks Ease the truck into the bay and apply wheel chocks. Do not set the parking brake and do not come to an abrupt stop. Fully deflate the suspension than re-inflate. Verify pressure is still above 100 psi. Measure from the top of the axle to the bottom of the frame rail. This measurement should be 6 1/2" (+ or - 1/8") <p>Is ride height adjusted properly?</p>	<p>Yes. Go to Step 14</p>
		<p>No. Adjust ride height per Technician Manual. Retest to see if vibration is still present. Record the road test with the Smartphone vibration App. If vibration is still present, review the phone data. Go to Step 8 if the phone data indicates a driveline vibration</p> <p>If vibration is resolved and return unit to customer.</p>

Step	Action	Decision
7.	<p>DIAGNOSTIC: Disconnect the long shaft at the rear differential. Rotate shaft assembly 180 degrees at the differential yoke. Re-install and road test. Is the vibration still objectionable?</p>	<p>Yes. Go to Step 8</p> <p>No. End diagnostics and return to service.</p>

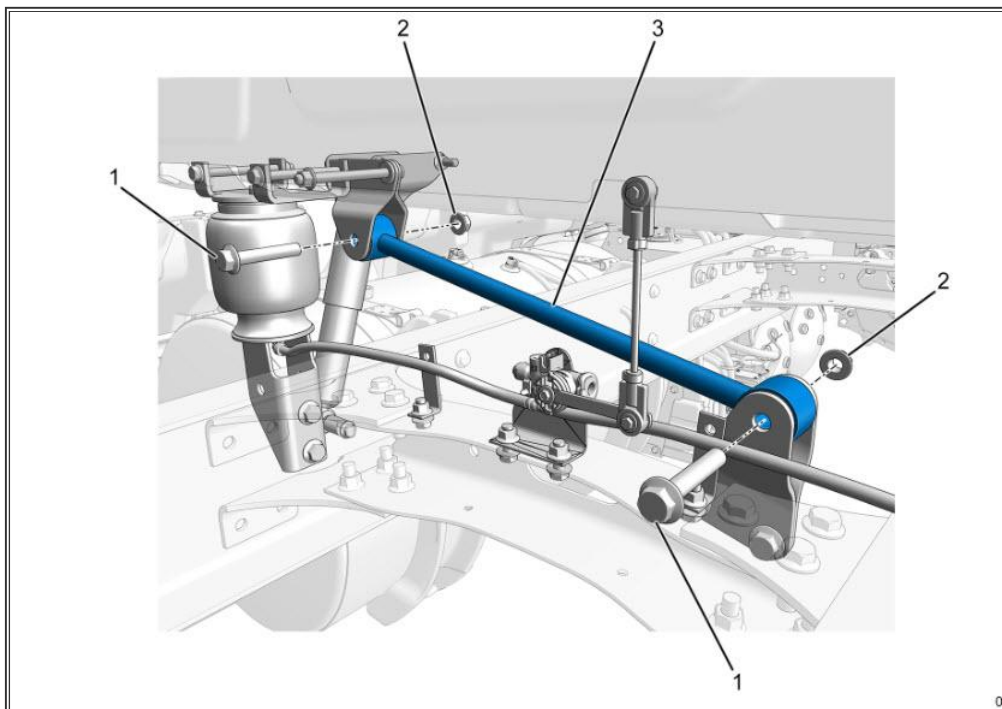
Step	Action	Decision
7.	<p>DIAGNOSTIC: Disconnect the long shaft at the rear differential. Rotate shaft assembly 180 degrees at the differential yoke. Re-install and road test. Is the vibration still objectionable?</p>	<p>Yes. Go to Step 8</p> <p>No. End diagnostics and return to service.</p>

Step	Action	Decision

8	<p>DIAGNOSTIC:</p> <ul style="list-style-type: none"> • Open LT driveline service worksheet. • Email or fax this 2 page document to your local driveline shop and confirm that they can perform this repair. • If you cannot locate a shop that can perform this repair then order new drivelines. A parts Case File may be needed • Send BOTH driveshafts out for repairs with the worksheet • When re-installing the shafts make sure the index paint markings from the driveshaft shop are aligned • After the shafts are installed, road test and confirm the vibration is no longer present 	<p>Vibration is still present. Take another recording with the Smartphone or tablet and review results</p> <p>Proceed to the driveline resource center document in the Other Resources section of this article. If Tech Services requests driveline runout measurements use THIS SHEET</p>
	<p>Vibration is gone Return truck to service.</p>	

Step	Action	Decision
10	<p>DIAGNOSTIC: Check pressures on all tires. Are both steer tires and all drive tires within 5 psi of each other?</p>	<p>Yes. Go to Step 11</p>
		<p>No. Correct the air pressure and test drive. If vibration concern is not resolved, go to Step 11. If resolved, end procedure and return unit to customer.</p>

Step	Action	Decision
11	<p>DIAGNOSTIC: Check the tightness of the torque arm fasteners, See Figure 3. It may be located behind the cab. Are the fasteners tight?</p>	<p>Yes. Go to Step 12</p>
		<p>No. Torque fasteners. Test drive to see if complaint is resolved. If resolved, End Procedure and return unit to customer. If not, go to Step 12</p>



<p>Figure 3: Torque Arm Fastener</p>
<p>Item 1: Torque Rod Bolt</p>
<p>Item 2: Torque Rod Nut</p>
<p>Item 3: Torque Rod</p>
<p>NOTE:</p>

A loose torque rod or cross member can transmit a vibration produced from the driveline or tires and exaggerate the feel in the cab. Always make sure all joints with bolts on the truck are tight and torqued to spec.

Step	Action	Decision
12	DIAGNOSTIC: Inspect each tire for flat spotting caused by a brake lock-up event. Are flat spots present?	Yes. Go to Step 14
		No. Go to Step 13

Step	Action	Decision
13	DIAGNOSTIC: Check suspension ride height by measuring on the same axle and side as the leveling valve is located. NOTE: <ul style="list-style-type: none"> • Conduct this check with no trailer. Suspension must not be loaded. • Ensure there is over 100 psi of air in the tanks • Ease the truck into the bay and apply wheel chocks. Do not set the parking brake and do not come to an abrupt stop. • Fully deflate the suspension than re-inflate. • Verify pressure is still above 100 psi. • Measure from the top of the axle to the bottom of the frame rail. This measurement should be 6 1/2" (+ or - 1/8") Is ride height adjusted properly?	Yes. Go to Step 14
		No. Adjust ride height per Technician Manual. Retest to see if vibration is still present. If still present, go to Step 14. If vibration concern is resolved, end Procedure and return unit to customer.

NOTE:

Prior to performing any type of balance procedure on the vehicle always refer to the lineset ticket and verify how the truck was ordered.

0029TAK - Yellow dot aligned to valve stem

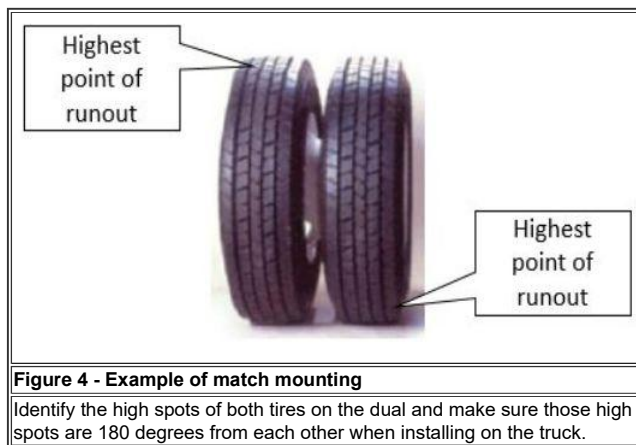
0029TAG - Unidirectional tires

0029TAD - Do Not Balance (contact your CSE for direction on repair)

Step	Action	Decision
14	DIAGNOSTIC: Use Hunter Engineering locator tool http://www.hunter.com/heavy-duty/forcematch-hd/search to see if a ForceMatch HD wheel balancer is in your immediate area. Is this wheel balancer nearby? Note: For run-out problems, the matchmounting procedure is often an effective method to eliminate the concern. Matchmounting isolates the tire, wheel, and bolt circle of the wheel to determine where the problem may be. It can also determine if a combination of variables is responsible because the tolerances "stack" to create an unacceptable condition. .	Yes. Have all wheels rebalanced and check radial runout on Hunter ForceMatch HD Machine. Rotate tire on the rim to achieve .040" or less runout on all wheels. <u>Ask tire shop to provide the before and after runout value for each tire.</u> Enter the information in a Case File if one is open. PRINT Tire Shop Worksheet Mark the peak point of runout on each tire so it can be properly oriented when installed on the truck Road Force Balance Highlights Go to Step 15 No. At a commercial tire shop, have all wheels rebalanced and check radial runout with a dial indicator on the balance machine. Dismount tire as needed and

	<p>rotate on the rim to reduce runout as needed.</p> <p>Match Mounting Instructions</p> <p>PRINT Tire Shop Worksheet</p> <p>Mark the peak point of runout on each tire so it can be properly oriented when installed on the truck</p> <p>Go to Step 15</p>
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Step	Action	Decision
15	<p>DIAGNOSTIC: Reinstall front tires with the point of peak runout at the top (12 o'clock). Install the front tire with the <u>least runout</u> on the driver's side. Do not use any centering devices.</p> <p>Reinstall rear tires with the points of peak runout 180 degrees from each other, see Figure 4.</p> <p>Retest. Is Vibration still present?</p>	<p>Yes. Take another vibration recording with the Smartphone or tablet and review results to determine the source</p>
		<p>No. Procedure complete.</p>



WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the [Warranty Coding Manual](#) for Group and Noun Codes.

Standard Repair Time(s):

Refer to the [SRT Manual](#) for Repair Times

TBD

OTHER RESOURCES

[IK0600020 Determine Wheel Speed or Driveline Vibration using a Smart Phone and Free VibSensor Application](#)

[IK1400005 Driveline Information Center and Troubleshooting Procedures](#)

[IK0500038 Steering Shake, Shimmy, Shudder, or Steering Vibration](#)

[IK0400102 ProStar-Vibration While Braking](#)

Go back!		
<p>GoodYear Tire training videos related to wheel induced vibrations</p> <ul style="list-style-type: none"> • Understanding Vehicle Vibrations <ul style="list-style-type: none"> ◦ https://www.youtube.com/watch?v=QmPgJ3eXK_w • Controlling Vehicle Vibrations <ul style="list-style-type: none"> ◦ https://www.youtube.com/watch?v=1PRgSy0hZ3A • Minimize Vehicle Vibrations <ul style="list-style-type: none"> ◦ https://www.youtube.com/watch?v=6ZWsus4esQ8 • Reduce tire runout using Match Mounting <ul style="list-style-type: none"> ◦ https://www.youtube.com/watch?v=kuuYJPtzzC8 	<p>Goodyear Tire Website</p> <p>Goodyear tire manual</p>	<p>Michelin Tire Manual</p> <p>Road Force Balance Tire Manual Click Here Hunter Engineering MatchForce HD tire balanc https://www.youtube.com/watch?v=xqxrX2k9QY Locate a MatchForce HD tire machine near your http://www.hunter.com/heavy-duty/forcematch-h</p>
<p>Hide Details Feedback Information</p> <p style="text-align: right;">Viewed: 4989 Helpful: 48 Not Helpful: 9</p> <p>No Feedback Found</p>		