

## Driveline System - General Information - Driveline System

Diagnosis and Testing

### Principles of Operation

For a detailed description of the driveline systems, refer to the relevant Description and Operation section in the workshop manual. REFER to:

[Driveshaft](#) (205-01 Driveshaft, Description and Operation),  
[Universal Joints](#) (205-01 Driveshaft, Description and Operation),  
[Rear Drive Axle and Differential](#) (205-02 Rear Drive Axle/Differential, Description and Operation),  
[Front Drive Axle and Differential](#) (205-03 Front Drive Axle/Differential, Description and Operation),  
[Front Drive Halfshafts](#) (205-04 Front Drive Halfshafts, Description and Operation),  
[Rear Drive Halfshafts](#) (205-05 Rear Drive Halfshafts, Description and Operation).

### Inspection and Verification



**CAUTION:** Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault, and may also cause additional faults in the vehicle being tested and/or the donor vehicle.

**NOTE:** Certain driveline symptoms are also common to the engine, transmission, wheel bearings, tires, and other parts of the vehicle. For this reason, ensure that the cause of the trouble is in the driveline before adjusting, repairing, or installing any new components.

1. Verify the customer concern.
2. Visually inspect for system integrity and obvious signs damage.
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart, alternatively, check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index.

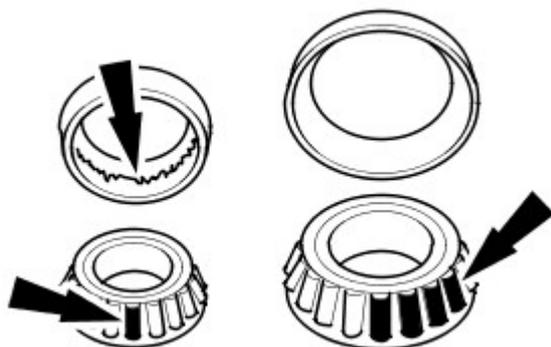
### Identify the Condition

Gear Howl and Whine

Howling or whining of the ring gear and pinion is due to an incorrect gear pattern, gear damage or incorrect bearing preload.

Bearing Whine

Bearing whine is a high-pitched sound similar to a whistle. It is usually caused by worn/damaged pinion bearings, which are operating at driveshaft speed. Bearing noise occurs at all driving speeds. This distinguishes it from gear whine which is speed dependent.



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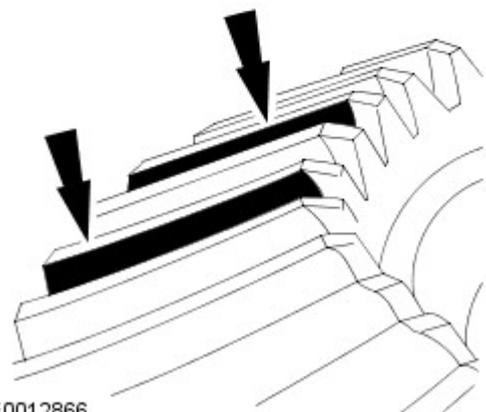
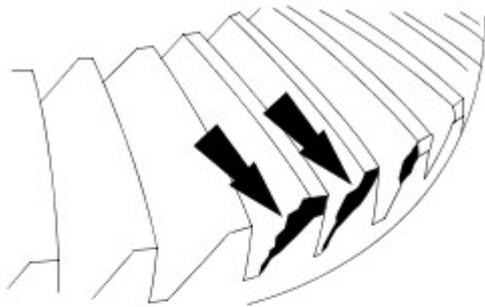
As noted, pinion bearings make a high-pitched, whistling noise, usually at all speeds. If however there is only one pinion bearing that is worn/damaged, the noise may vary in different driving phases.

A wheel bearing noise can be mistaken for a pinion bearing noise.

Chuckle

Chuckle that occurs on the coast driving phase is usually caused by excessive clearance between the differential gear hub and the differential case bore.

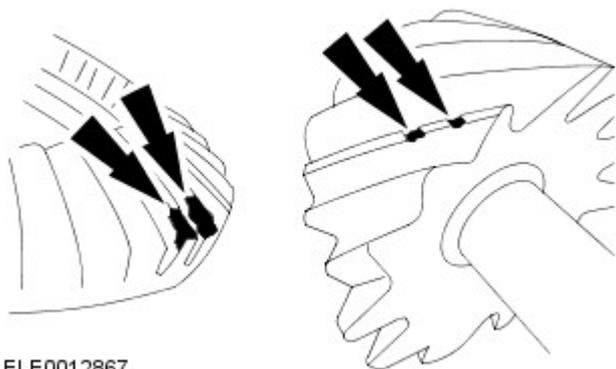
Damage to a gear tooth on the coast side can cause a noise identical to a chuckle. A very small tooth nick or ridge on the edge of a tooth can cause the noise.



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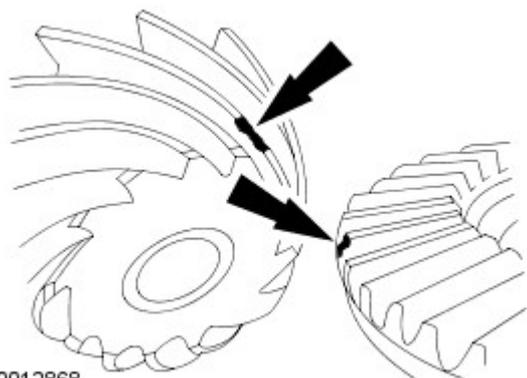
#### Knock

Knock, which can occur on all driving phases, has several causes including damaged teeth or gearset.



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A gear tooth damaged on the drive side is a common cause of the knock.



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#### Clunk

Clunk is a metallic noise heard when the automatic transmission is engaged in REVERSE or DRIVE. The noise may also occur when the throttle is applied or released. Clunk is caused by transmission calibration, backlash in the driveline or loose suspension components and is felt or heard in the vicinity of the rear drive axle.

## Bearing Rumble

Bearing rumble sounds like marbles being tumbled. This condition is usually caused by a worn/damaged wheel bearing. The lower pitch is because the wheel bearing turns at only about one-third of the driveshaft speed. Wheel bearing noise also may be high-pitched, similar to gear noise, but will be evident in all four driving modes.

## Symptom Chart

Symptom	Possible Cause	Action
Noise is at constant tone over a narrow vehicle speed range. Usually heard on light drive and coast conditions	<ul style="list-style-type: none"> <li>● Rear drive axle</li> </ul>	<ul style="list-style-type: none"> <li>● For additional information. GO to Pinpoint Test <a href="#">A</a>.</li> </ul>
Noise is the same on drive or coast	<ul style="list-style-type: none"> <li>● Road noise</li> <li>● Worn or damaged driveshaft joint</li> <li>● Driveshaft center bearing</li> <li>● Wheel bearing</li> </ul>	<ul style="list-style-type: none"> <li>● Normal condition (road noise)</li> <li>● Check and install new components as required. REFER to: <ul style="list-style-type: none"> <li>● <a href="#">Driveshaft - Vehicles Without: Diesel Particulate Filter (DPF)</a> (205-01 Driveshaft, Removal and Installation),</li> <li>● <a href="#">Rear Wheel Bearing</a> (204-02 Rear Suspension, Removal and Installation),</li> <li>● <a href="#">Front Wheel Bearing</a> (204-01 Front Suspension, Removal and Installation).</li> </ul> </li> </ul>
Noise is produced with the vehicle stationary and when driving	<ul style="list-style-type: none"> <li>● Engine</li> <li>● Transmission</li> </ul>	<ul style="list-style-type: none"> <li>● For additional information. REFER to: <ul style="list-style-type: none"> <li>● <a href="#">Engine</a> (303-00 Engine System - General Information, Diagnosis and Testing),</li> <li>● <a href="#">Diagnostics</a> (307-01 Automatic Transmission/Transaxle, Diagnosis and Testing).</li> </ul> </li> </ul>
Loud clunk in the driveline when shifting from reverse to forward	<ul style="list-style-type: none"> <li>● Transmission calibration</li> <li>● Transmission Mount</li> <li>● Transmission</li> <li>● Suspension components</li> <li>● Backlash in the driveline</li> <li>● Engine idle speed set too high</li> <li>● Engine mount</li> </ul>	<ul style="list-style-type: none"> <li>● Using the manufacturer approved diagnostic system, re-configure the Transmission Control Module (TCM) with the latest available calibration</li> <li>● Inspect and install new transmission mounts as required</li> <li>● For transmission diagnostics. REFER to: <a href="#">Diagnostics</a> (307-01 Automatic Transmission/Transaxle, Diagnosis and Testing).</li> <li>● Inspect and install new suspension components as required</li> <li>● Inspect and install new driveline components as required</li> <li>● Check and adjust the idle speed as required</li> <li>● Inspect and install new engine mounts as required</li> </ul>
Clicking, popping, or grinding noises	<ul style="list-style-type: none"> <li>● Inadequate or contaminated lubrication in the front/rear drive halfshaft constant velocity (CV) joint</li> <li>● Another component contacting the front/rear drive halfshaft</li> <li>● Wheel bearings, brakes or suspension components</li> </ul>	<ul style="list-style-type: none"> <li>● Inspect, clean and lubricate with new grease as required</li> <li>● Ensure all other components are clear from front/rear drive halfshaft</li> <li>● Inspect and install new components as required</li> </ul>
Vibration at highway speeds	<ul style="list-style-type: none"> <li>● Out of balance wheel(s) or tire(s)</li> <li>● Driveshaft misaligned/out of balance</li> <li>● Driveshaft center bearing touching body mounting point</li> </ul>	<ul style="list-style-type: none"> <li>● Balance and install new wheel(s) and tire(s) as required. REFER to: <a href="#">Wheel and Tire</a> (204-04 Wheels and Tires, Removal and Installation).</li> <li>● Check driveshaft alignment. Check driveshaft balance using manufacturer approved diagnostic system</li> <li>● Check driveshaft alignment</li> </ul>
Shudder, Vibration During Acceleration	<ul style="list-style-type: none"> <li>● Powertrain/driveline misalignment</li> <li>● High constant velocity (CV) joint operating angles caused by incorrect ride height</li> </ul>	<ul style="list-style-type: none"> <li>● Check for powertrain/driveline misalignment and rectify as required. Install new components as required</li> <li>● Check the ride height and verify the correct spring rate. Install new components as required</li> </ul>

Symptom	Possible Cause	Action
Lubricant Leak	<ul style="list-style-type: none"> <li>● Rear drive axle breather</li> <li>● Damaged seal</li> <li>● Rear drive axle filler plug</li> <li>● Rear drive axle cover/active on-demand coupling joint</li> </ul>	<ul style="list-style-type: none"> <li>● Check oil level and correct as necessary</li> <li>● Install new driveshaft/pinion seal as required. REFER to: <a href="#">Active On-Demand Coupling Drive Pinion Seal</a> (205-02 Rear Drive Axle/Differential, Removal and Installation).</li> <li>● Check and install new filler plug as required</li> <li>● Re-seal leaking joints as required</li> </ul>

## DTC Index

NOTE: If the control module or a component is suspect and the vehicle remains under manufacturer warranty, refer to the Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval programme is in operation, prior to the installation of a new module/component.

NOTE: Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer approved diagnostic system).

NOTE: When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the DMM leads into account.

NOTE: Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE: Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE: If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

For a complete list of all Diagnostic Trouble Codes (DTCs) that could be logged on this vehicle, please refer to Section 100-00.REFER to: [Diagnostic Trouble Code \(DTC\) Index - DTC: Rear Differential Control Module \(RDCM\)](#) (100-00 General Information, Description and Operation).

## Pinpoint Tests

PINPOINT TEST A : EXCESSIVE DRIVELINE NOISE	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
<b>A1: CHECK NOISE FROM VEHICLE ON ROAD TEST</b>	
	<b>1</b> Road test vehicle to determine load and speed conditions when noise occurs.
	<b>2</b> Assess the noise with different gears selected.
	Does the noise occur in different gears at the same vehicle speed? <b>Yes</b> INSTALL a new rear drive axle/differential assembly. REFER to: <a href="#">Differential Case</a> (205-02 Rear Drive Axle/Differential, Removal and Installation). RE-TEST the system for normal operation.
	<b>No</b> REFER to: <a href="#">Engine</a> (303-00 Engine System - General Information, Diagnosis and Testing) / <a href="#">Diagnostics</a> (307-01 Automatic Transmission/Transaxle, Diagnosis and Testing).