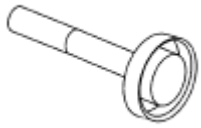
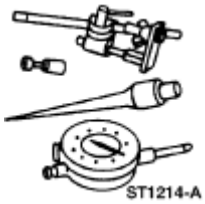
## Differential Case

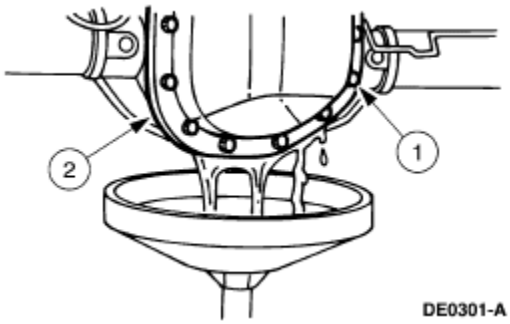
| Special Tool(s) | |
|---|---|
|  ST2473-A | Installer, Differential Carrier Bearing<br>205-D044 (D81T-4221-A) or equivalent |
|  ST2251-A | Remover, Differential Carrier Bearing<br>205-S419 (Forcing Screw) |
|  ST1214-A | Dial Indicator Gauge with Holding Fixture<br>100-002 (TOOL-4201-C) or equivalent |
|  ST1485-A | Installer, Differential Shim<br>205-228 (T85T-4067-AH) |
|  ST2249-A | Collets, Differential Carrier Bearing<br>205-430 (Part of 205-S419) |
|  ST2250-A | Retaining Ring, Differential Carrier Bearing<br>205-431 (Part of 205-S419) |
|  ST1543-A | Step Plate, Differential Carrier Bearing<br>205-432 (Part of 205-S419) |

**Removal**

1. Raise and support the vehicle. For additional information, refer to Section 100-02 .

2. Remove the differential housing cover.
    1. Remove the 12 differential housing cover bolts and drain the lubricant from the rear axle housing.

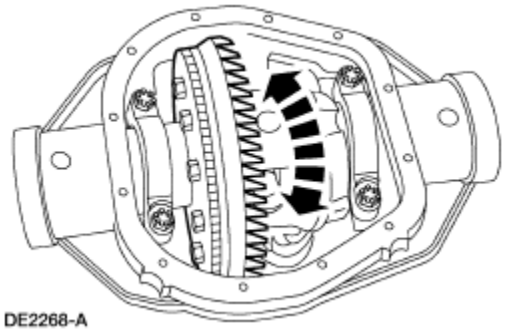
    2. Remove the differential housing cover.




3. Remove the axle shafts. For additional information, refer to Axle Shaft in this section.

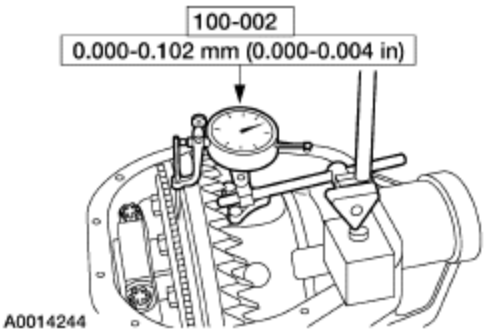
4. Wipe the lubricant from the internal working parts, and visually inspect the parts for wear or damage.

5. Rotate the differential case to see if there is any roughness which would indicate damaged bearings or gears.




6. **NOTE:** There is a space between the anti-lock speed sensor ring and the ring gear for measuring ring gear backface runout.

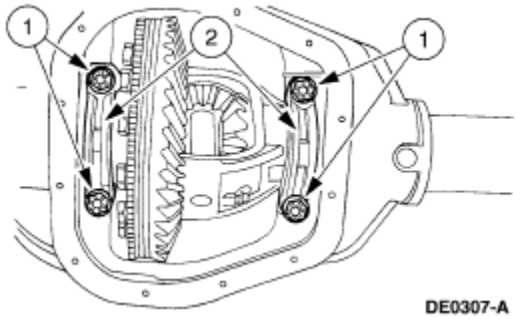
    Positioning the special tool, inspect ring gear backlash and ring gear backface runout.



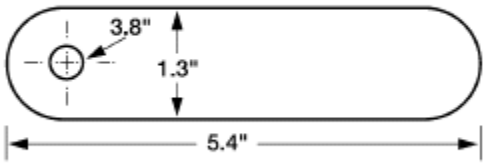

7. **CAUTION: Mark the position of the bearing caps, as arrows may not be visible. The bearing caps must be installed in their identical locations and positions.**

   Loosen the differential case.

   1. Remove the bearing cap bolts.
   2. Remove the bearing caps.



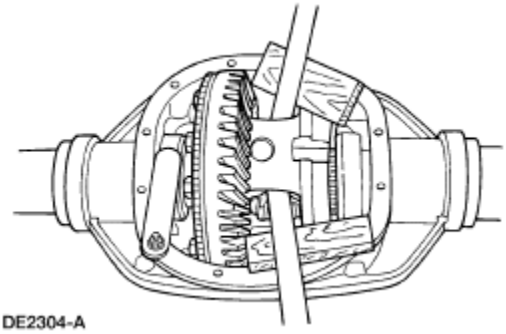

8. To simplify the installation, fabricate two differential case retaining straps from metal stock as shown.




9. **WARNING: Be careful not to allow the differential case to fall.**

**CAUTION: Place a wood block between the pry bar and the rear axle housing to protect the machined surface from damage.**

Use the pry bar and the wood block to remove the differential case from the rear axle housing.



DE2304-A

10. Remove the ring gear bolts.

DE0309-A

11. **CAUTION: Care should be taken not to damage the ring bolt hole threads.**

    **NOTE:** The anti-lock speed sensor ring cannot be reused once removed.

    Insert a punch in the bolt holes. Drive off the ring gear and, if necessary, the anti-lock speed sensor ring.

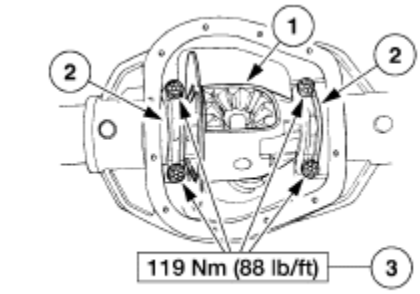
DE0310-B

12. Install the differential case without the ring gear.

1. Position the differential case assembly, including bearing clips and shims, in the housing.

2. Install the differential bearing caps.

3. Install the differential bearing cap bolts.

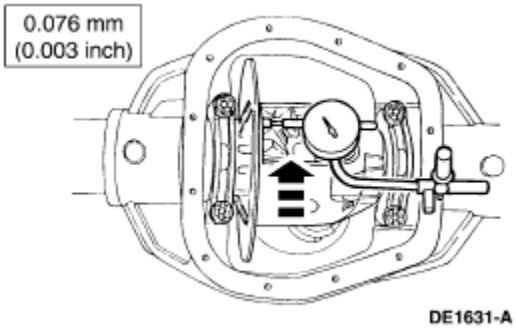


DE2314-A

13. **NOTE:** Rotate the differential case to make sure the differential bearings are properly seated.

    **NOTE:** If runout is within specification, install a new ring gear and pinion. If runout exceeds specification, the ring gear is true and the concern is due to either a damaged differential case or differential bearings. Inspect the differential bearings. If the differential bearings are not damaged, replace both the differential case and the differential bearings.

    Measure the differential case runout by rotating the differential case.

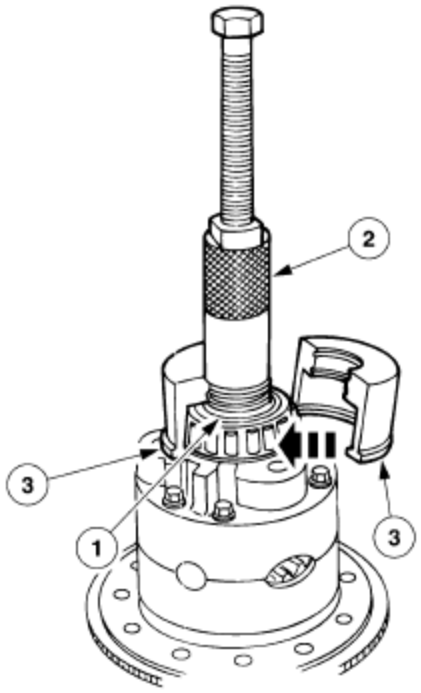


DE1631-A

14. Remove the differential case from the rear axle housing, and prepare to remove the differential bearings.
    1. Position the Step Plate.

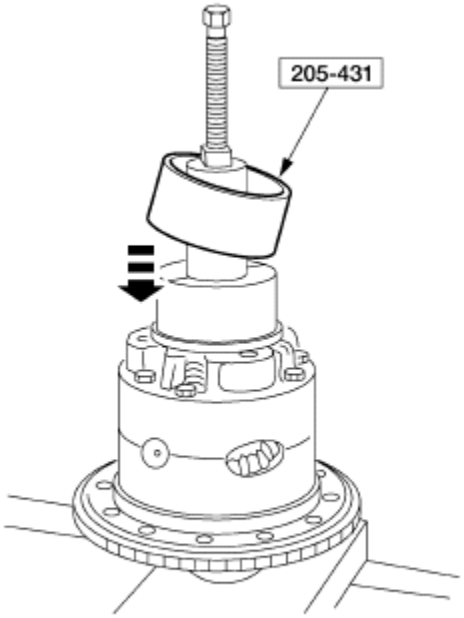
    2. Position the Carrier Bearing Remover (Forcing Screw) and the Remover and Replacer Tube.

    3. Position the Side Carrier Bearing Collets.



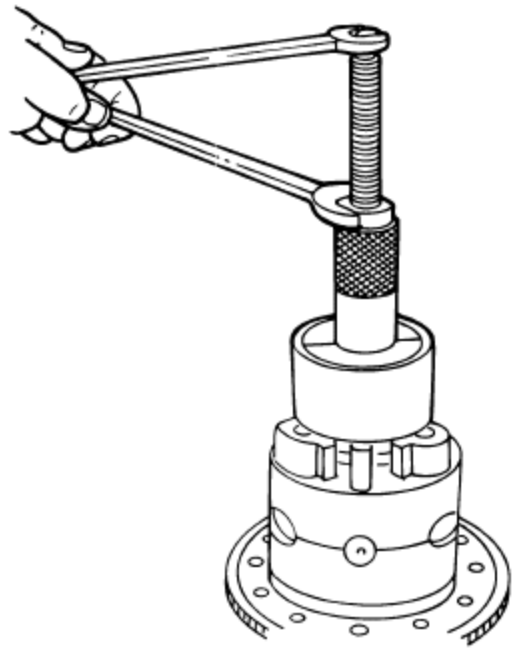

DE2299-A

15. Position the special tool.



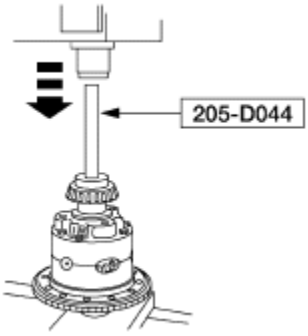

A0014242

16. Using two wrenches, remove the differential bearing.
    - Repeat the procedure for the other differential bearing.



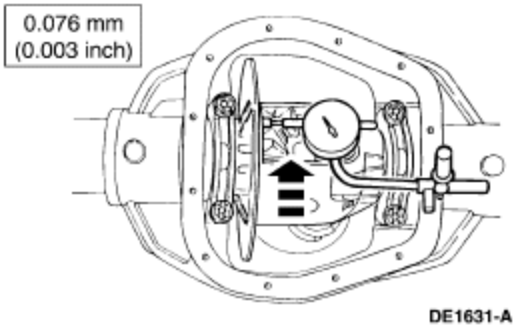
DE2301-A

17. Using the special tool, install the new differential bearings on the differential case.




A0014243

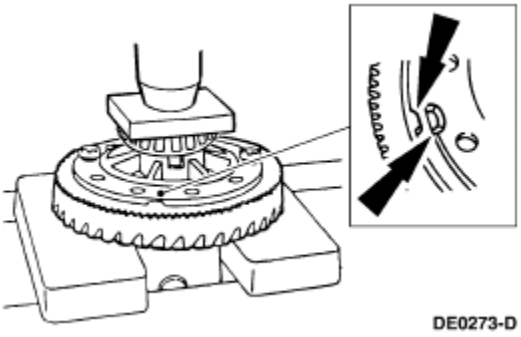
18. Measure the differential case runout without the ring gear.
    - Check the case runout again with the new differential bearings. If the runout is now within the specification shown, use the new differential bearings for assembly. If the runout is still excessive, the differential case is damaged and must be replaced.



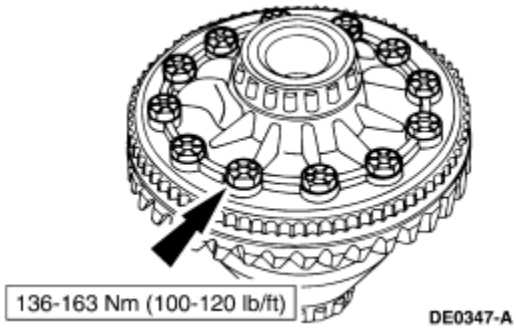

**Installation**

**All vehicles**

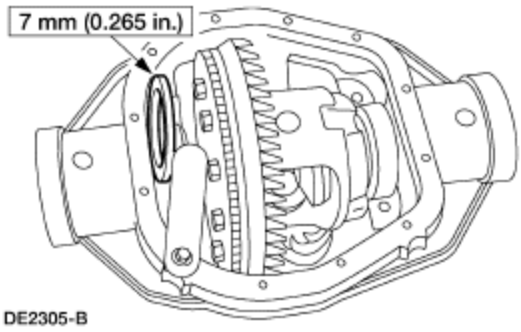
1. Press the ring gear and, if removed, a new anti-lock speed sensor on the differential case.




2. Install the ring gear bolts.
   - Apply Stud and Bearing Mount E0AZ-19554-BA or equivalent meeting Ford specification WSK-M2G349-A1 to the ring gear bolts.



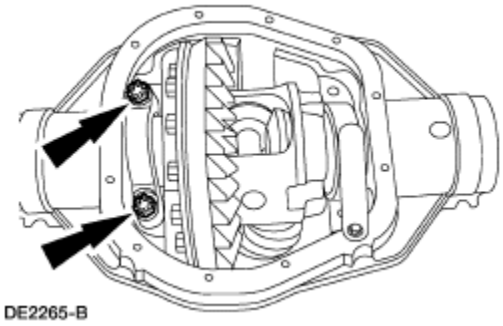

3. With the pinion depth set and the pinion installed, place the differential case in the rear axle housing.
   - Install a shim on the left side as shown in the illustration.



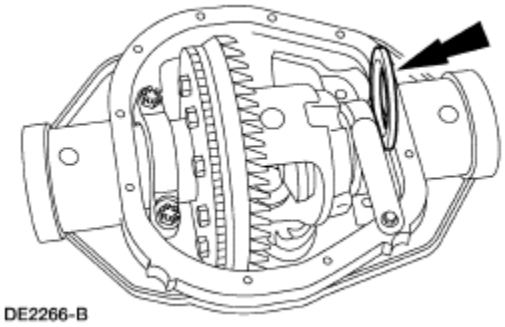

4. **CAUTION: The bearing caps must be installed in their original locations and positions.**

   **NOTE:** Apply pressure toward the left side to make sure the left bearing is seated.

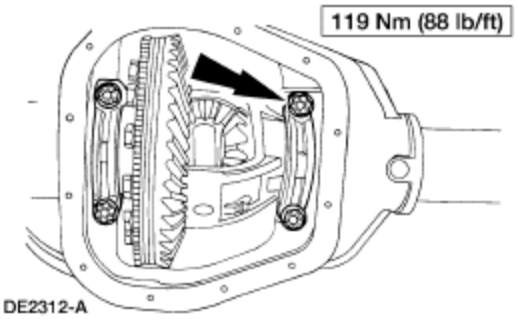
   Install the left bearing cap, and loosely install the bearing cap bolts.



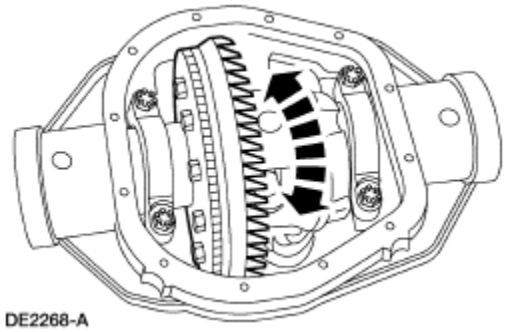

5. Install progressively larger shims on the right side until the largest shim selected can be assembled by hand.




6. Install the right side bearing cap, and tighten the bolts.

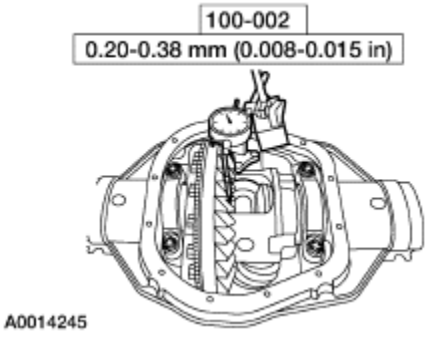



7. Rotate the differential case to make sure it rotates freely.




**Measuring backlash**

8. Using the special tool, measure ring gear backlash.
   - If the backlash is within specification, go to Backlash within specification in this procedure. The specification shown is the full allowable range. For the preferred range, refer to Specifications in this section.
   - If a zero backlash condition occurs, go to Zero backlash in this procedure.
   - If the backlash is not within specification, go to Backlash not within specification in this procedure.




**Zero backlash**

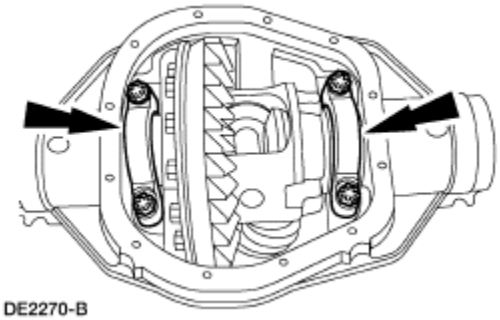
9. If a zero backlash condition occurs, add a 0.50 mm (0.020 inch) shim to the RH side and subtract 0.50 mm (0.020 inch) from the LH side to allow backlash indication. Check backlash. Repeat Step 8.

| Backlash Change Required | | Thickness Change Required | |
|---|---|---|---|
| mm | Inch | mm | Inch |
| 0.025 | 0.001 | 0.050 | 0.002 |
| 0.050 | 0.002 | 0.050 | 0.002 |
| 0.076 | 0.003 | 0.101 | 0.004 |
| 0.101 | 0.004 | 0.152 | 0.006 |
| 0.127 | 0.005 | 0.152 | 0.006 |
| 0.152 | 0.006 | 0.203 | 0.008 |
| 0.177 | 0.007 | 0.254 | 0.010 |
| 0.203 | 0.008 | 0.254 | 0.010 |
| 0.228 | 0.009 | 0.304 | 0.012 |
| 0.254 | 0.010 | 0.355 | 0.014 |
| 0.279 | 0.011 | 0.355 | 0.014 |
| 0.304 | 0.012 | 0.406 | 0.016 |
| 0.330 | 0.013 | 0.457 | 0.018 |
| 0.335 | 0.014 | 0.457 | 0.018 |
| 0.381 | 0.015 | 0.508 | 0.020 |

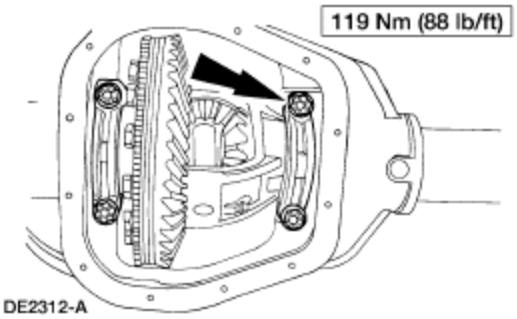
10.

**Backlash not within specification**

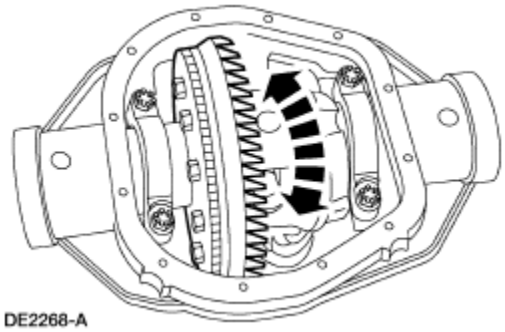
10. To increase or decrease backlash, remove the bearing caps, and install a thicker shim and a thinner shim as shown.
    - If backlash is not within specification, correct by increasing the thickness of one differential bearing shim and decreasing the thickness on the other differential bearing shim by the same amount.



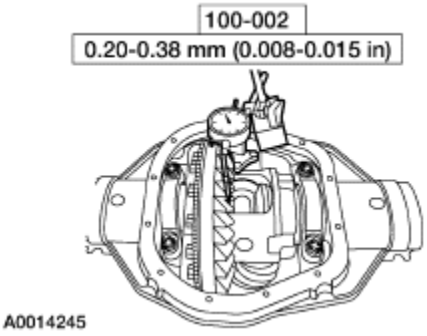

11. Install the bearing caps and bearing cap bolts.




12. Rotate the differential several times to make sure the differential bearings are properly seated.

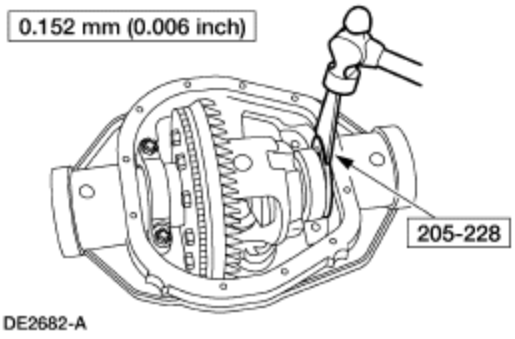



13. Using the special tool, recheck the backlash.
    - If backlash is within specification, go to Backlash within specification in this procedure. If not, repeat Step 8.
    - The specification shown is the full allowable range. For the preferred range, refer to Specifications in this section.

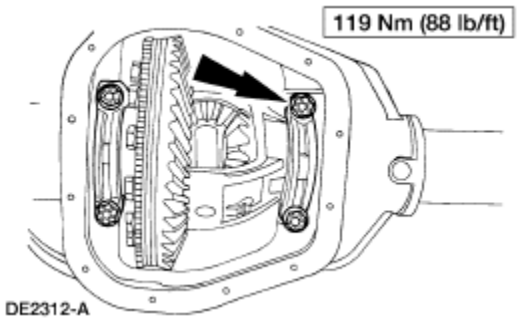



**Backlash within specification**

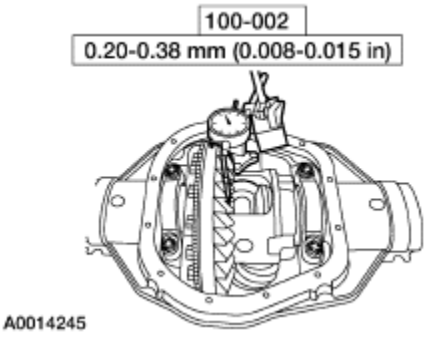
14. Remove the bearing caps and bolts.
    - To establish differential bearing preload, increase both left and right shim sizes by the specification shown in the illustration.
    - Using the special tool, ensure the differential bearing shims are fully seated and the assembly turns freely.




15. Install the bearing caps and bearing cap bolts.




16. Using the special tool, verify the backlash.
    - The specification shown is the full allowable range. For the preferred range, refer to Specifications in this section.
    - For further adjustments, refer to Section 205-00 .




17. Install the axle shafts; for additional information, refer to Axle Shaft in this section.

18. **CAUTION: Make sure the machined surfaces on both the rear axle housing and the differential housing are clean and free of oil before applying the new silicone sealant. The inside of the rear axle must be covered when cleaning the machined surface to prevent contamination.**

    Clean the gasket mating surface of the rear axle and the differential housing cover.

19. Apply a new, continuous bead of sealant to the differential housing cover.
    - Use Clear Silicone Rubber D6AZ-19562-AA or equivalent meeting Ford Specifications ESB-M4G92-A.