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Service Information Bulletin

SUBJECT	DATE
Model 4 Front Rear Tandem (FRT) Pinion Bearing Replacement	August 2013

Additions, Revisions, or Updates

Publication Number / Title	Platform	Section Title	Change
DDC-SVC-MAN-0141	Detroit Axles	Removal of the Front Rear Tandem (FRT) Pinion Bearing	New sections.
		Installation of the Front Rear Tandem (FRT) Pinion Bearing	

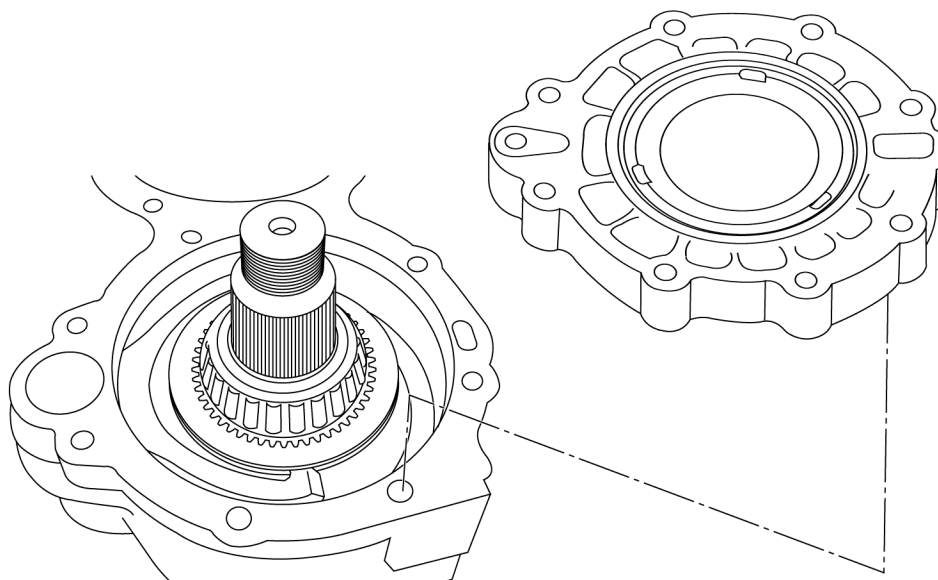


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2 Removal of the Front Rear Tandem (FRT) Pinion Bearing

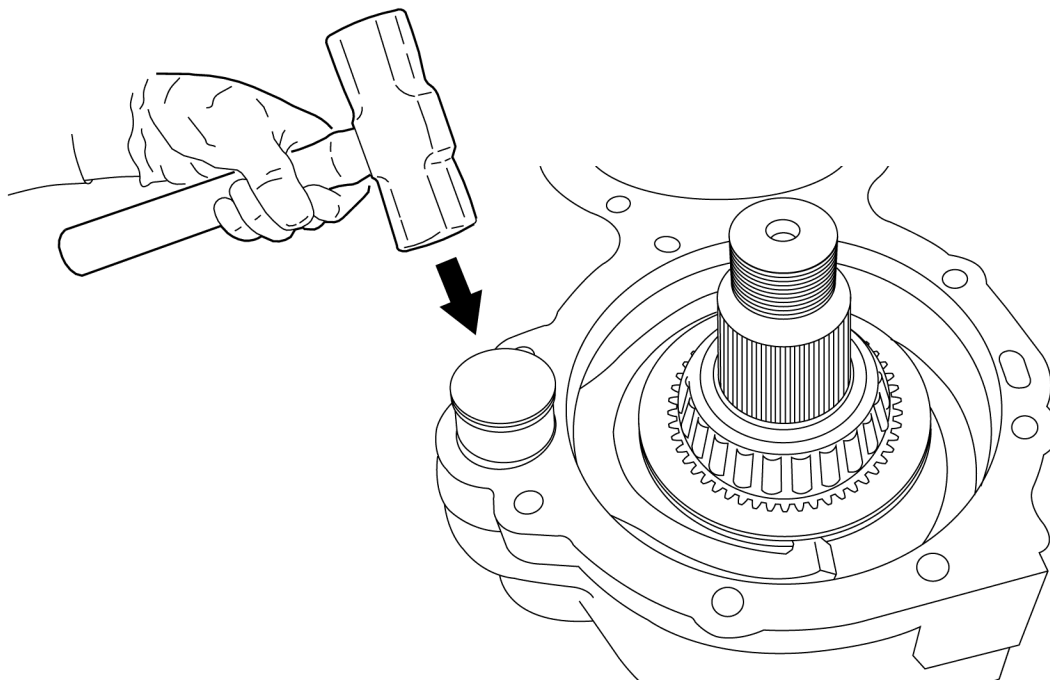
Remove as follows:

1. Remove the input yoke nut and washer from the center of the forward rear carrier.
2. Remove the forward carrier input yoke from the forward input shaft.
3. Remove the bearing cage cap screws from the bearing cage. Remove the bearing cage assembly. Clean all sealant from bearing cage housing and mating surface.



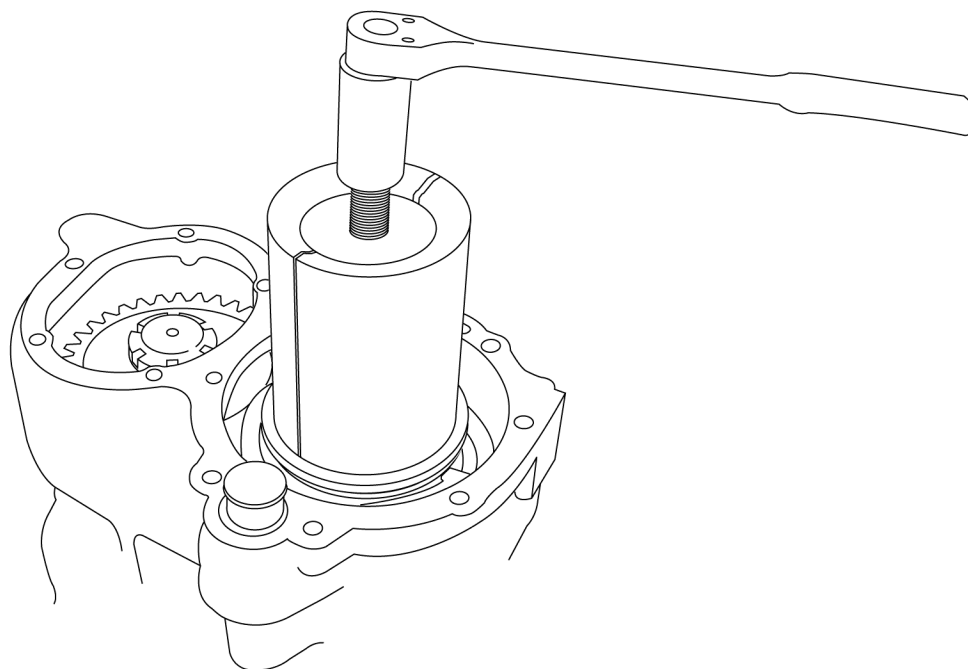
d330065

4. Remove the pinion cover cap screws from the pinion cover. Clean all sealant from the pinion cover and mating surface.
5. Using a brass or plastic mallet, squarely tap the shift shaft to unseat it, and then remove the shift shaft, shift fork and clutch collar.



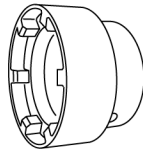
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6. Install bearing puller (DDE W420589033300) and remove bearing.



d330067

7. Remove Interaxle Differential (IAD) by lifting straight out.
 8. Remove ring gear. Refer to section "Rebuilding of the Differential".
 9. Remove pinion nut using special socket W 742589020700.



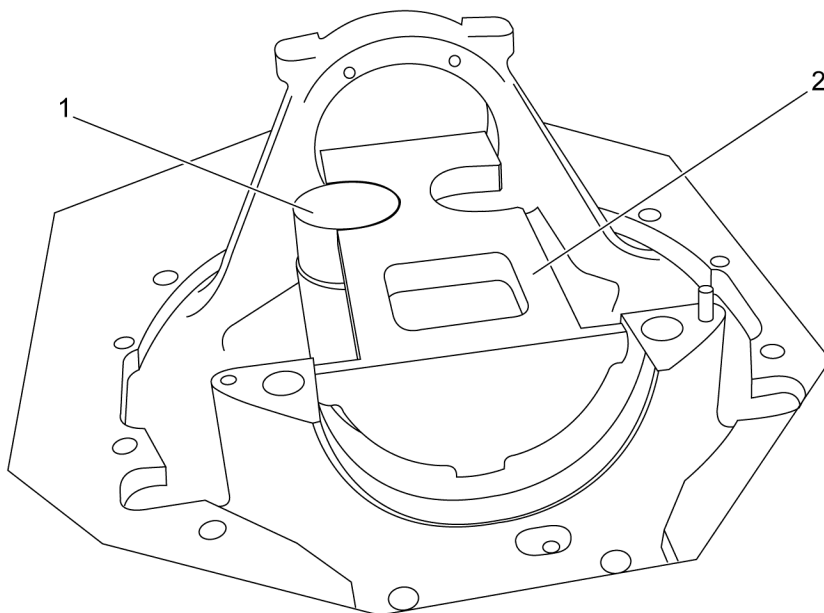
d330018

10. Using a suitable press, push out the pinion.
11. Remove the helical gear and tail bearing.
12. Using a brass drift and hammer, remove the head bearing race (which is next to the ring gear) and tail bearing races.
Note that pinion shims are located below the head bearing race.
13. Clean all bearing race surfaces.

3 Installation of the Front Rear Tandem (FRT) Pinion Bearing

Install as follows:

1. Install “c” dimension tools DDE W420589001902 (1) and W4200589001901 (2). Make sure they are flush against each other.

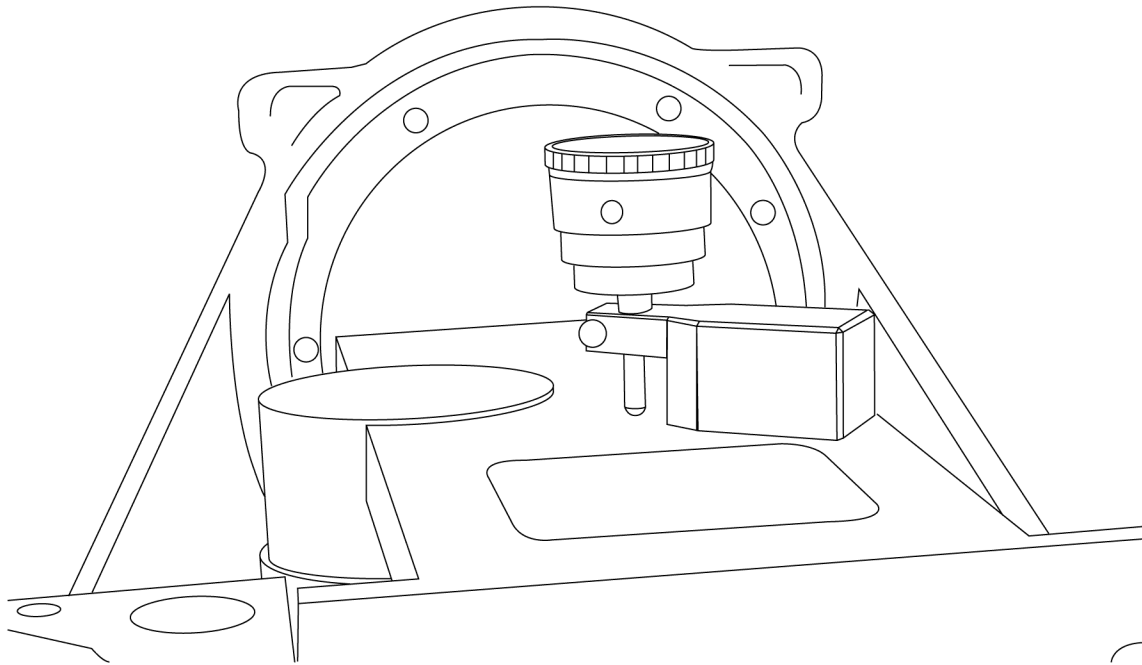


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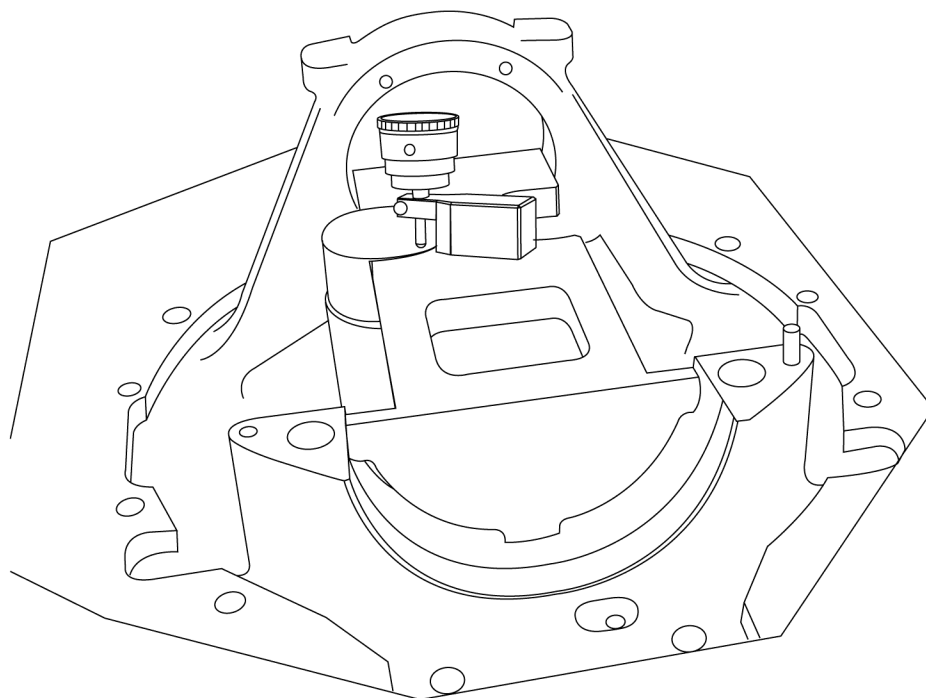
2. Install dial indicator; measure difference in the heights noted in the illustrations below. This difference will be used for step 2 of the below calculation.

Table 1.

Model 4 FRT Pinion Bearing Calculation		
1.	Tool Dimension (This is the height of the tool)	248.720
2.	Measured Difference	
3.	Equals line 1 minus line 2	
4.	Measured Bearing Height (Measurement provided in parts kit)	
5.	Equals line 3 minus line 4	
6.	Standard Value (This value is constant and does not change)	196.500
7.	Desired Shim Thickness (Equals line 5 minus line 6)	

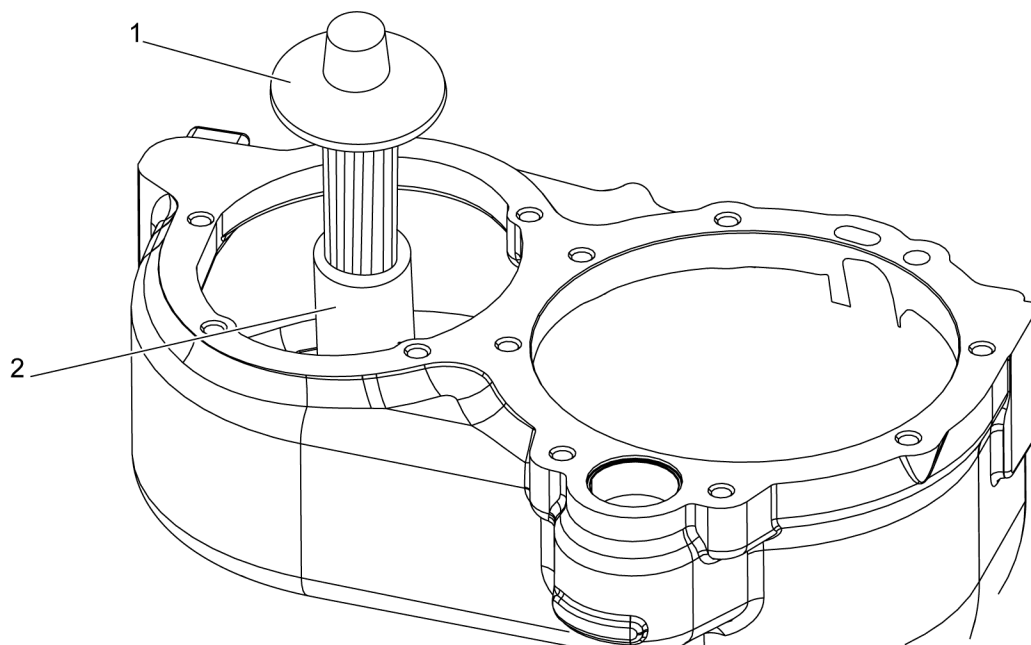


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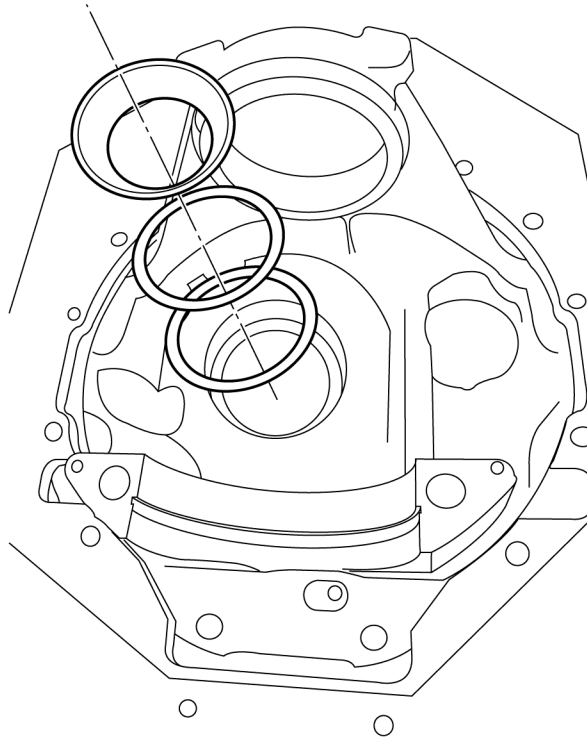
d330091a

3. Remove all tooling.
4. Using bearing driver DDE W420589001504 (1) along with DDE W420589001502 (2) and a suitable press or hammer and drift, install new tail bearing race.



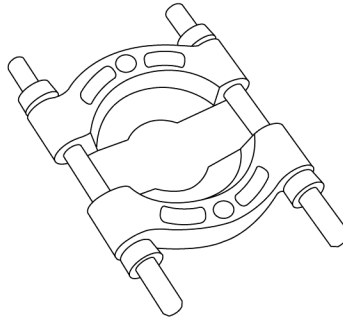
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5. Install shim(s), if necessary. There may be more than one shim(s) being installed into head bearing race cavity. If so, then install race using DDE W420589001504 along with DDE W420589001502.



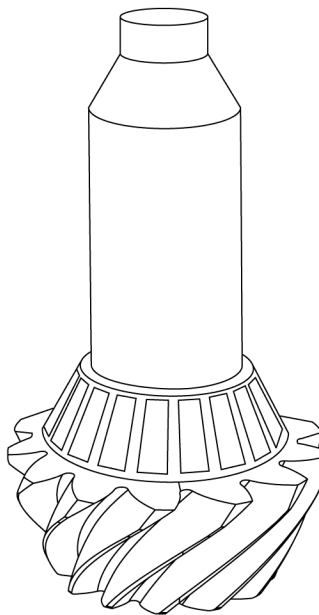
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6. Using locally sourced bearing remover, remove old bearing from pinion gear.



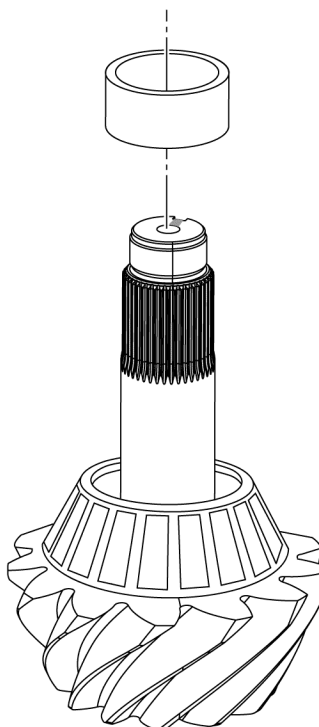
d580133

7. Use bearing installer DDE W420589001503, press a new pinion head bearing into place.



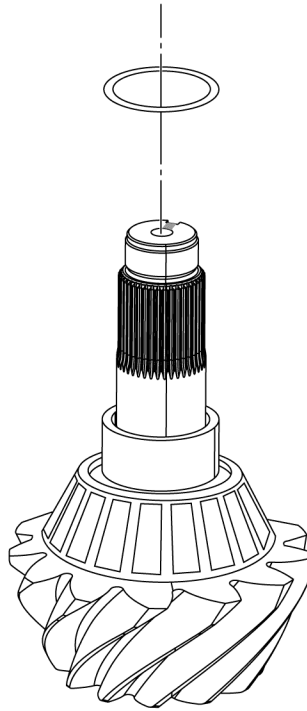
d330093

8. Install the pinion bearing spacer.



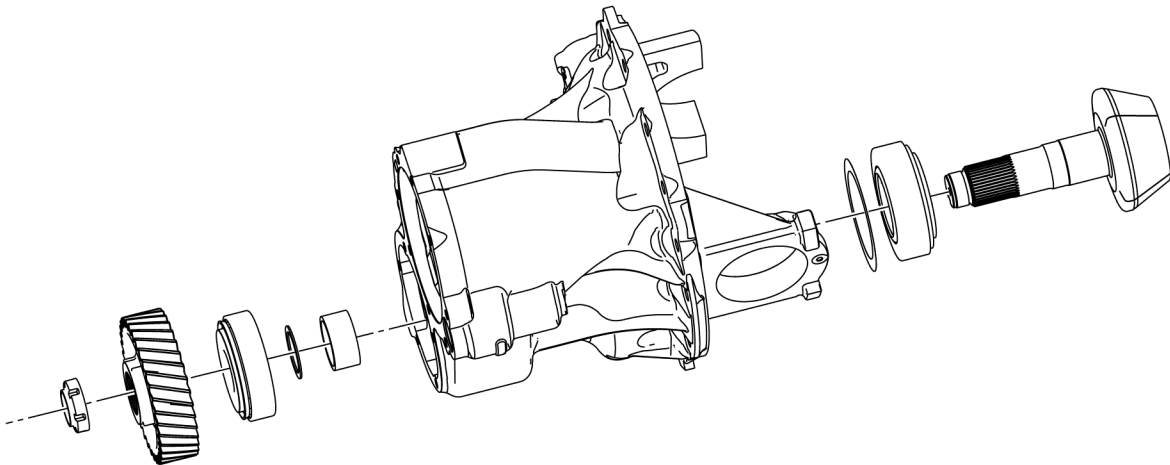
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9. Install temporary shim (2.50 test shim is provide in the kit). Install onto pinion.



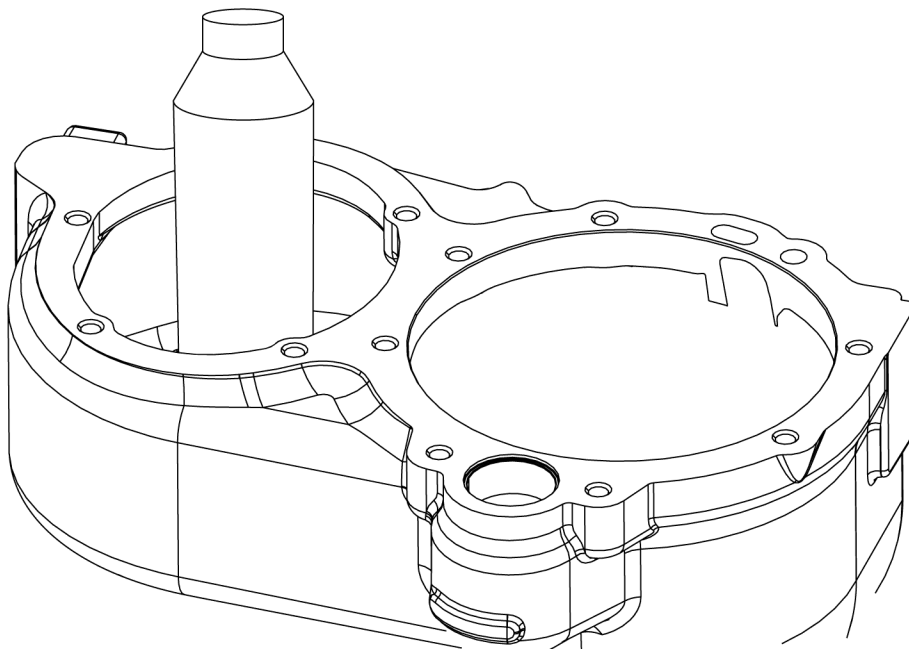
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10. Install pinion into carrier. It is necessary to support from underside.



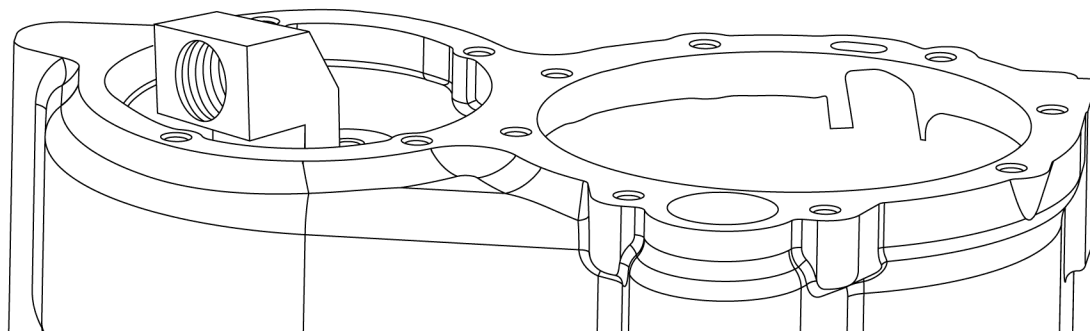
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11. Using bearing installer DDE W420589001503 and a suitable press, install the tail bearing onto pinion shaft.



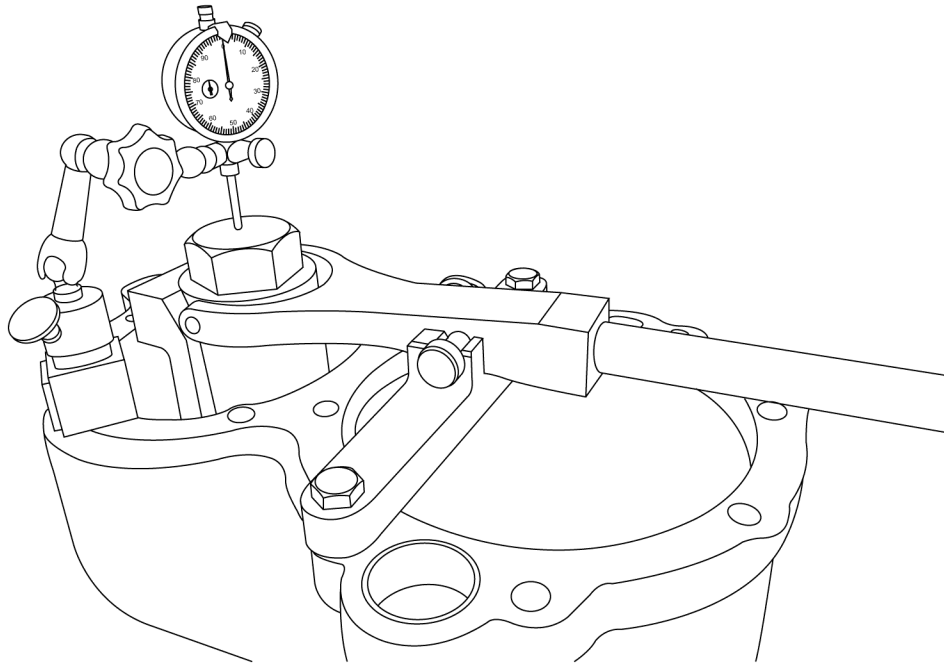
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12. Remove bearing installer.
13. Install counterholder.



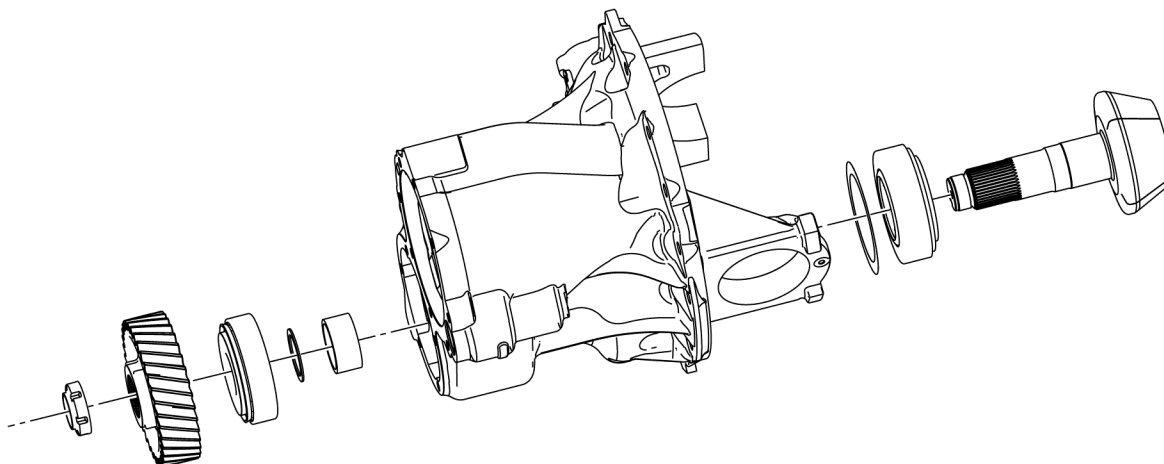
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14. Install yoke nut measuring device using a 56 mm (2 3/16-in.) 12-point socket; torque to 1200 N·m (886 lb·ft).
15. Install push-pull arm.
16. Install dial indicator.



d330089

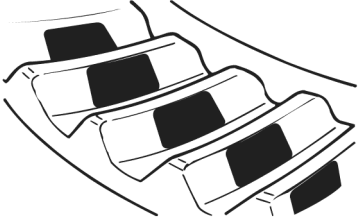
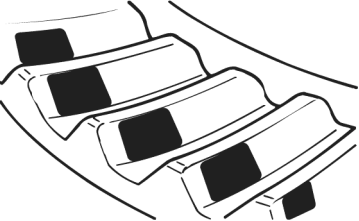
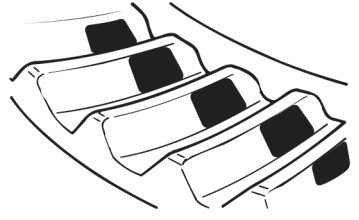
17. Pull down on arm to check end play on pinion. Rotate the pinion several times in order to fully seat the pinion bearings to get an accurate measurement. *Example: Take the end play measurement and subtract that from the size of the shim installed. Our shim was 2.36mm (0.093 in.). Our end play 0.220 mm (0.0086 in.). For the calculation, subtract 0.05 mm (0.002 in.) – this is a standard value needed to calculate the preload: 2.36 mm - 0.22 mm - 0.05 mm (0.093 in. - 0.0086 in. - 0.002 in.). Proper size of tail shim for preload is 2.09 mm (0.082 in.). Verify size of shim with micrometer.*
18. Remove all special tools.
19. Using press, press the pinion back out of the carrier housing
20. Remove test shim and then install the correct shim based off of the measurement above.
21. Supporting pinion from below, guide pinion into housing; do not fully seat at this time. Install spacer, then shim onto pinion. Install upper bearing and then slide helical gear into housing. Continue to raise pinion into carrier, aligning onto pinion splines with the helical gear. Using bearing installer tool DDE W420589001503, press gear and bearing back onto pinion shaft.



d330096

22. Install pinion nut. Torque to 1200 N·m (886 lb·ft); check rotating torque. Rotating torque should be between 7 to 25 N·m (5 to 18 lb·ft). If OK, remove pinion nut. Apply Loctite 277 to threads. Re-torque to 1200 N·m (886 lb·ft) and stake the pinion nut. If turning torque is too high, increase shim size. If turning torque is too low, decrease shim size.
23. Reinstall the ring gear. Refer to section “Rebuilding of the Differential”.
24. After ring gear installation, it is necessary to check the pinion and ring gear tooth contact pattern. Apply gear marking compound to 4 to 6 teeth of the ring gear. Cover both the drive and coast side. Rotate the ring gear forwards and backwards so pinion teeth have been fully engaged with paint marks on ring gear. Be sure that a contact pattern can be observed. See examples below.

Table 2.

<p>Good Tooth Contact Pattern</p>	 <p>d330100</p>
<p>High Tooth Contact Pattern – increase pin head shim size</p>	 <p>d330101</p>
<p>Low Tooth Contact Pattern – decrease pinion head shim size</p>	 <p>d330102</p>

25. Reinstall Interaxle Differential (IAD). Refer to section “Replacement of the Interaxle Differential”.