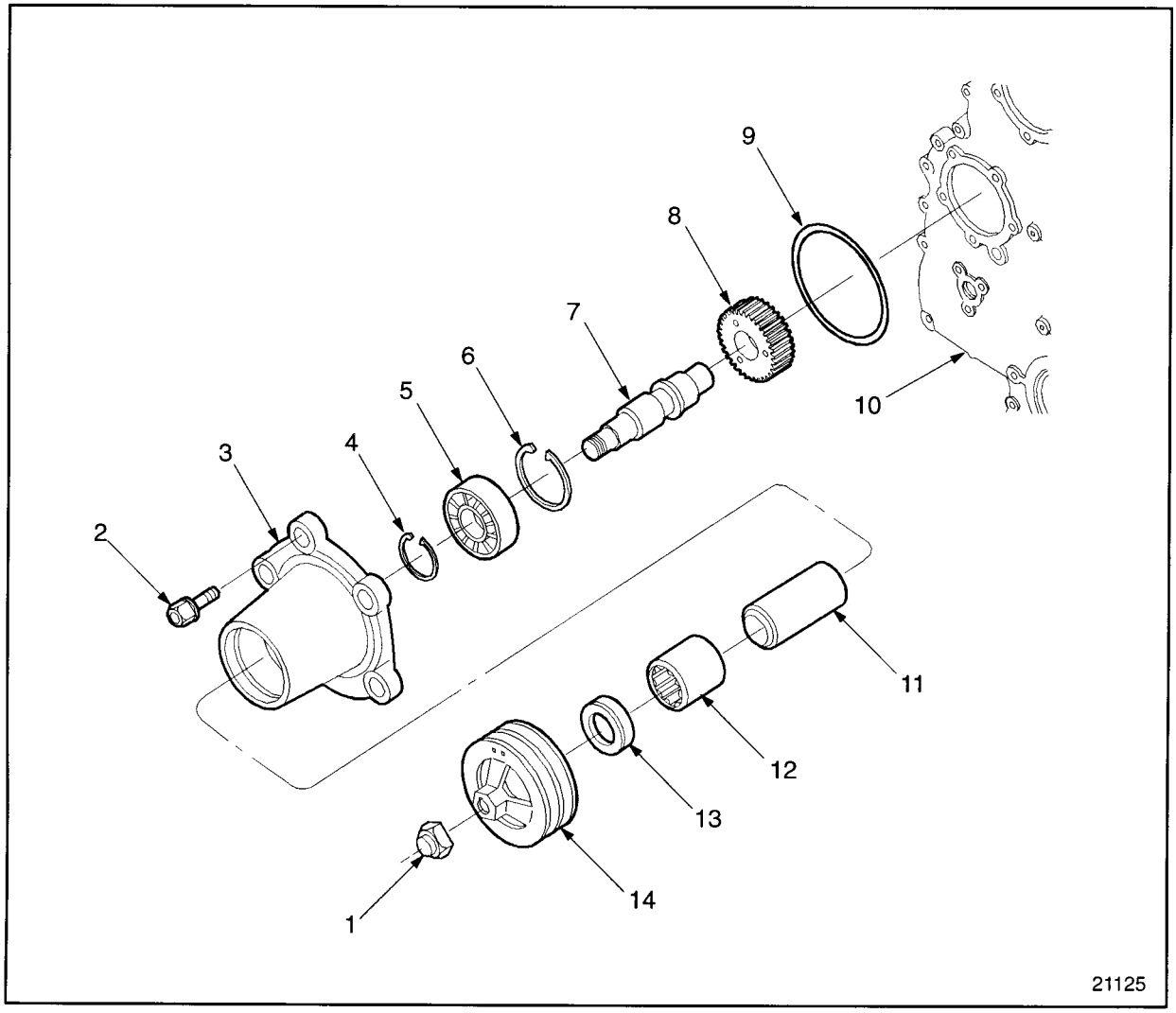
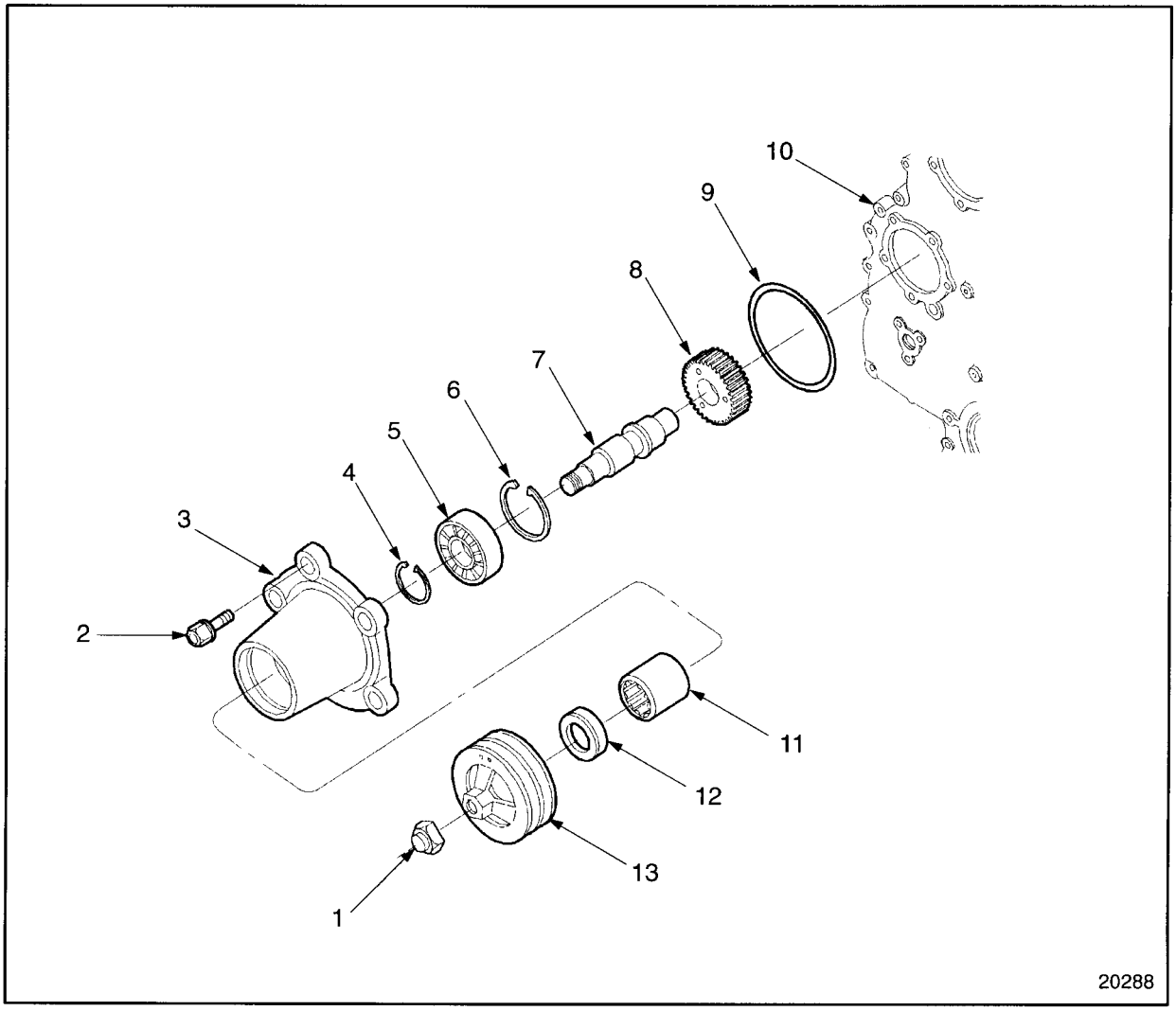
1.28 ACCESSORY DRIVE

The accessory drive assembly is mounted to the front of the gear case cover and utilizes a two-groove pulley to drive the alternator. See Figure 1-413, and see Figure 1-414.



1. Locknut
2. Mounting Bolts (5)
3. Drive Housing
4. Snap Ring (Small)
5. Ball Bearing
6. Snap Ring (Large)
7. Drive Shaft
8. Drive Gear
9. O-ring
10. Gear Case Cover
11. Bearing Inner Race
12. Needle Bearing
13. Oil Seal
14. Pulley

Figure 1-413 Accessory Drive Assembly Related Parts (Former Design)



1. Locknut
2. Mounting Bolts (5)
3. Drive Housing
4. Snap Ring (Small)
5. Ball Bearing
6. Snap Ring (Large)
7. Drive Shaft
8. Drive Gear
9. O-Ring
10. Gear Case Cover
11. Needle Bearing
12. Oil Seal
13. Pulley

Figure 1-414 Accessory Drive Assembly Related Parts (Current Design)

The accessory drive assembly is splash fed oil through two holes in the casting of the accessory drive housing. The oil returns to the crankcase via the gear case.

The accessory drive is driven by a drive gear which is pressed onto the drive shaft. The drive gear meshes with the bull gear and is driven at 2.41 times engine speed.

The drive shaft is supported by a ball bearing at the drive end and a needle bearing at the pulley end.

NOTE:
A design change has been made to the accessory drive assembly. The needle bearing inner race is now incorporated into the drive shaft. See Figure 1-413, and see Figure 1-414.

An O-ring is used to seal the accessory drive housing to the gear case cover.

1.28.1 Repair and Replacement of the Accessory Drive

To determine if repair is possible or replacement is necessary, perform the following procedures. See Figure 1-415.

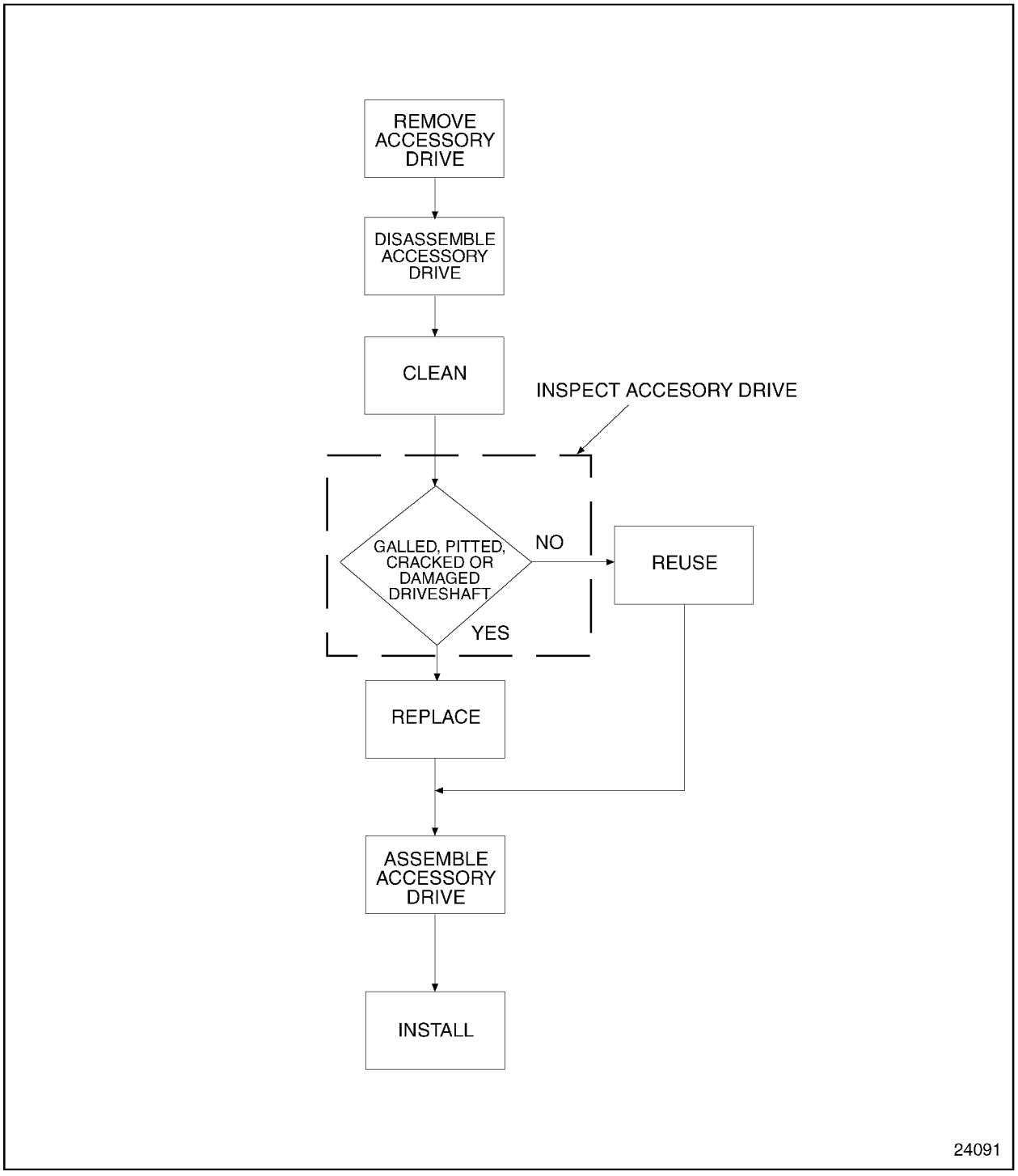


Figure 1-415 Flowchart for Repair or Replacement of Accessory Drive

1.28.2 Removal and Cleaning of the Accessory Drive

Precleaning is not necessary.

Remove the accessory drive as follows:

1. Loosen the alternator mounting bolts and the adjusting rod nuts to get slack in the alternator drive belts. Remove the alternator drive belts. Refer to section 13.13.10.
2. Remove the five bolts that secure the accessory drive assembly to the gear case cover.
3. Remove the accessory drive assembly by pulling it straight out of the gear case cover to avoid damaging the rubber O-ring. See Figure 1-416.

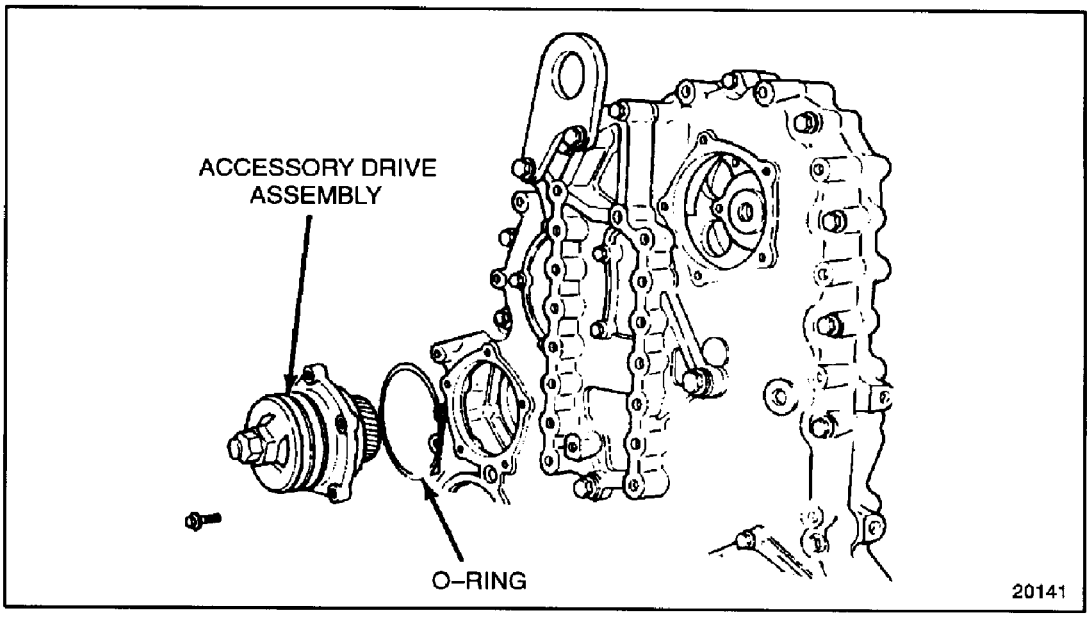


Figure 1-416 Accessory Drive Assembly Removal

1.28.3 Disassembly of the Accessory Drive

Disassemble the accessory drive as follows:

NOTE:
For disassembly and assembly of the accessory drive use toolset J 36024–D. See Figure 1-417.

NOTE:
Effective with engine serial number 6R631428, for accessory drive seal removal and installation use the following tools, J 45533 seal remover, J 45833 seal installer and J 45877 seal runout gauge adapter to verify proper installation of seal in accessory drive.These tools are part of toolset J 36024–D. See Figure 1-417.

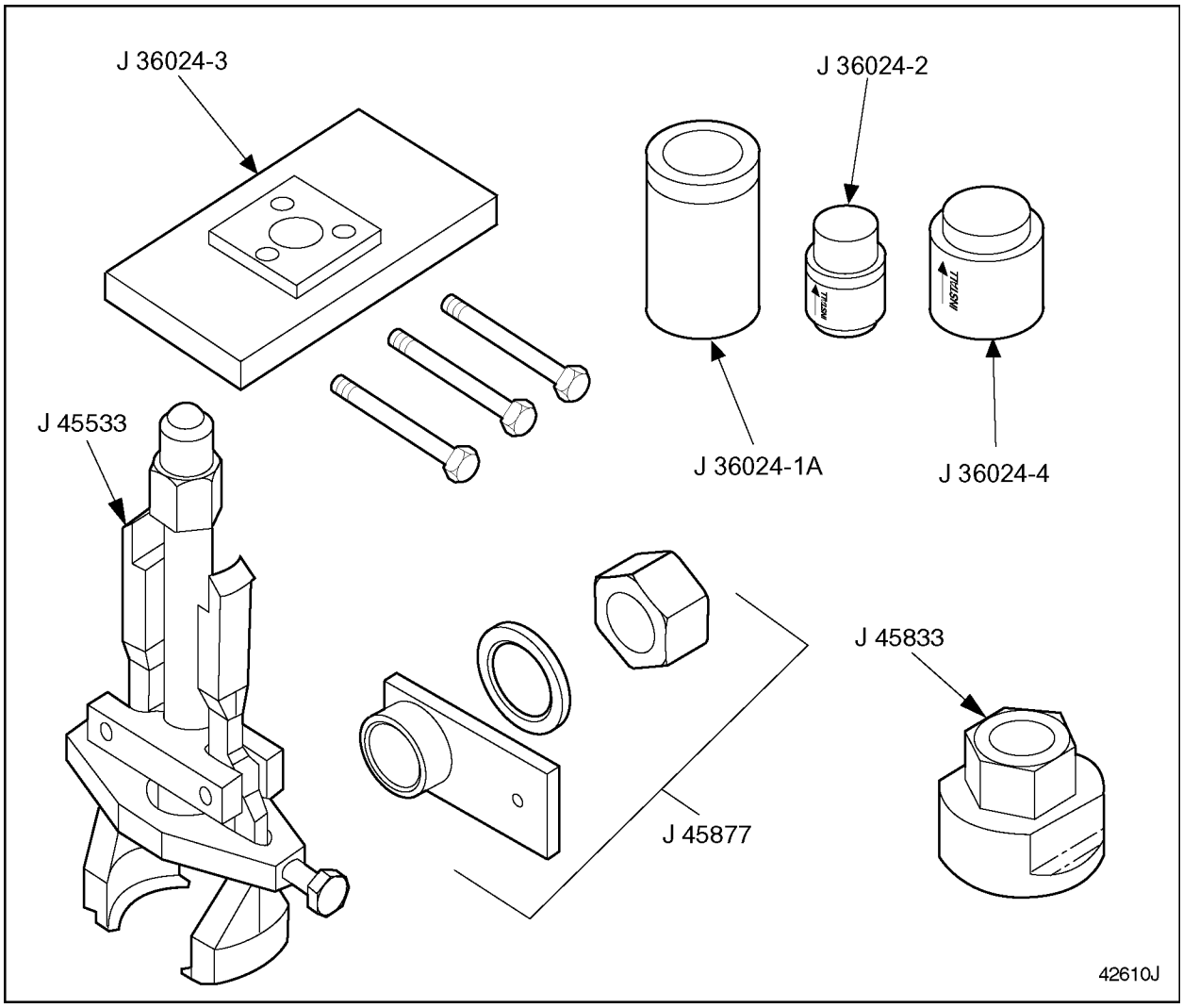


Figure 1-417 Accessory Drive Service Tool Set J 36024–D

1. Attach the accessory drive gear to the holding fixture, J 36024-3 (part of toolset J 36024–D) , using the three bolts provided. See Figure 1-418.

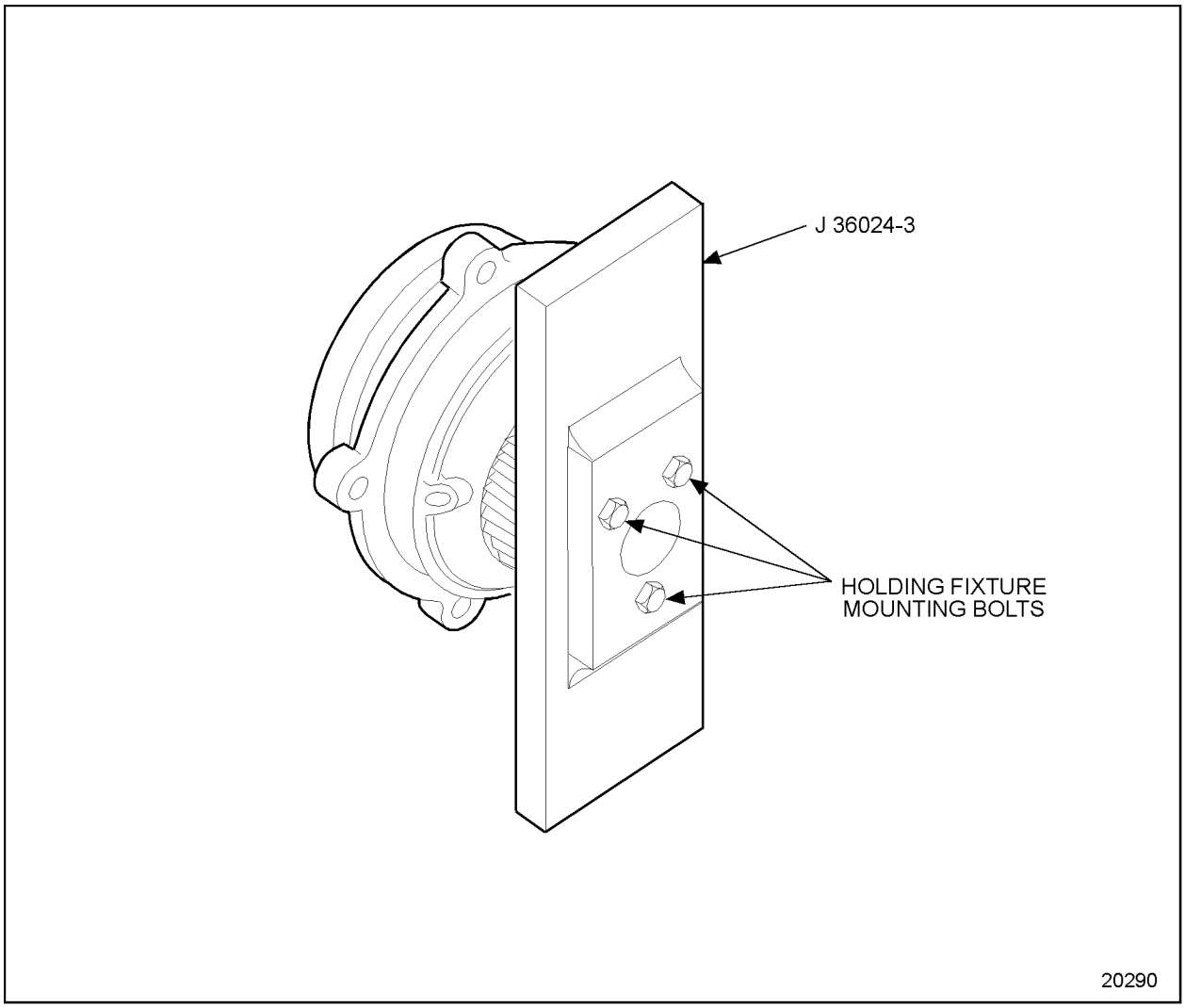


Figure 1-418 Holding Fixture

2. Place the accessory drive assembly holding fixture into a vise. See Figure 1-419.

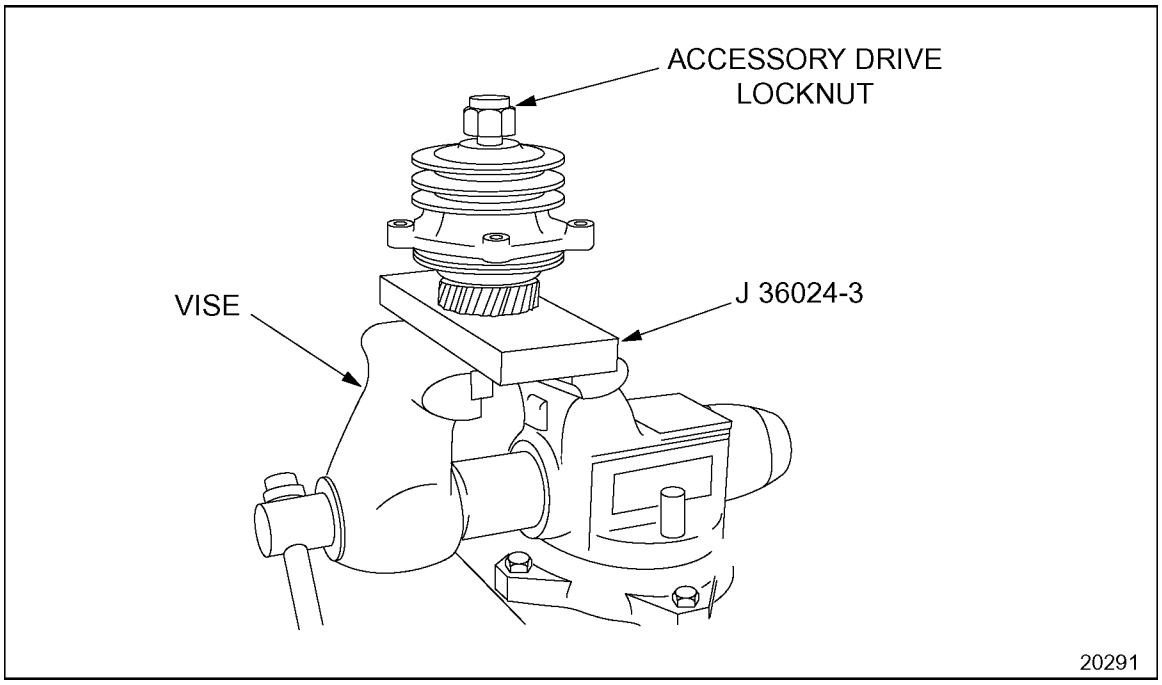
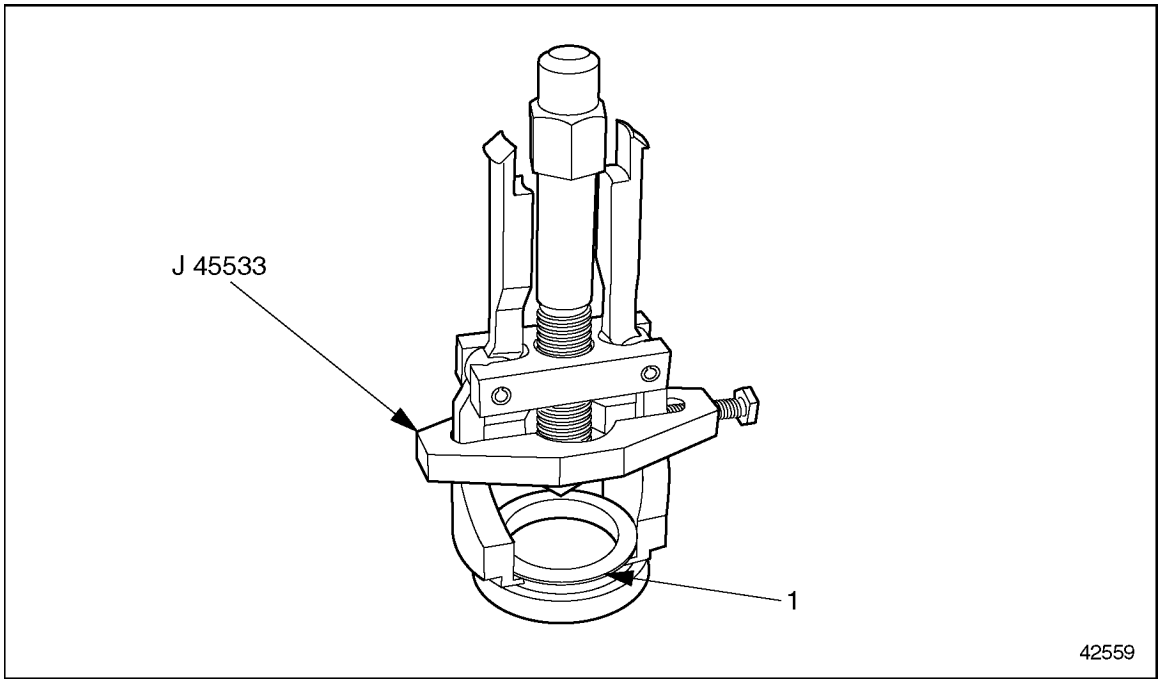


Figure 1-419 Accessory Drive Pulley Locknut Removal

3. Remove the accessory drive pulley locknut. See Figure 1-419.
4. Remove the accessory drive pulley by tapping it with a rubber hammer or fiber mallet. If the pulley does not come off easily, use a puller to remove it.



1. Seal Sleeve

Figure 1-419a J 45533 Accessory Drive Seal Remover

NOTE:
Perform steps 5, 6 and 7 unitized seal removal procedure for accessory drive assemblies effective with engine serial number 6R631428.

5. Using J 45533 (part of toolset J 36024–D) , remove seal sleeve.
   [a] Ensure taper end of puller bolt is pointed toward inside jaws.
   [b] Place inside jaws of tool over sleeve. See Figure 1-419a.
   [c] Finger tighten hex bolt on side of tool.
   [d] Remove sleeve by tightening puller bolt.

6. Removal of seal.

   [a] Invert puller bolt. See Figure 1-419b.

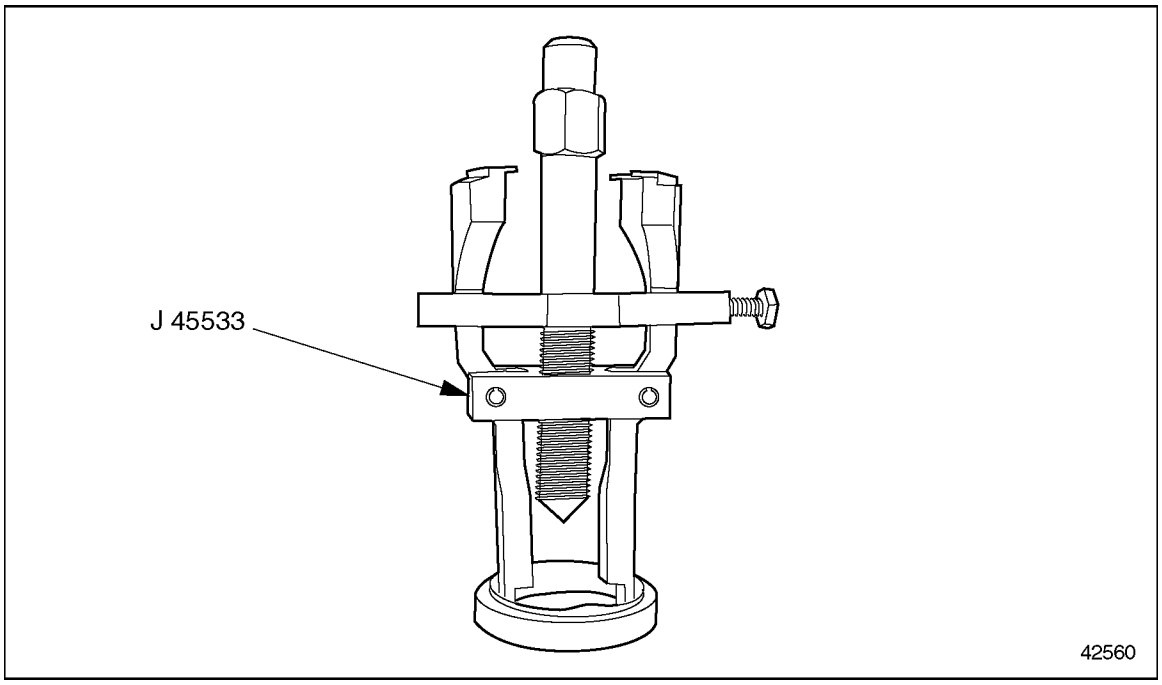


Figure 1-419b J 45533 Invert Puller Bolt

   [b] Loosen hex bolt on side of tool.

   [c] Using a rubber mallet, gently drive outside jaws between seal and shaft through the rubber membrane of seal until tool bottoms out.

   [d] Finger tighten hex bolt on side of tool.

   [e] Remove seal by tightening puller bolt.

7. Clean accessory drive housing at seal location.

8. Position the accessory drive assembly on a press bed with the holding fixture supported. See Figure 1-420.

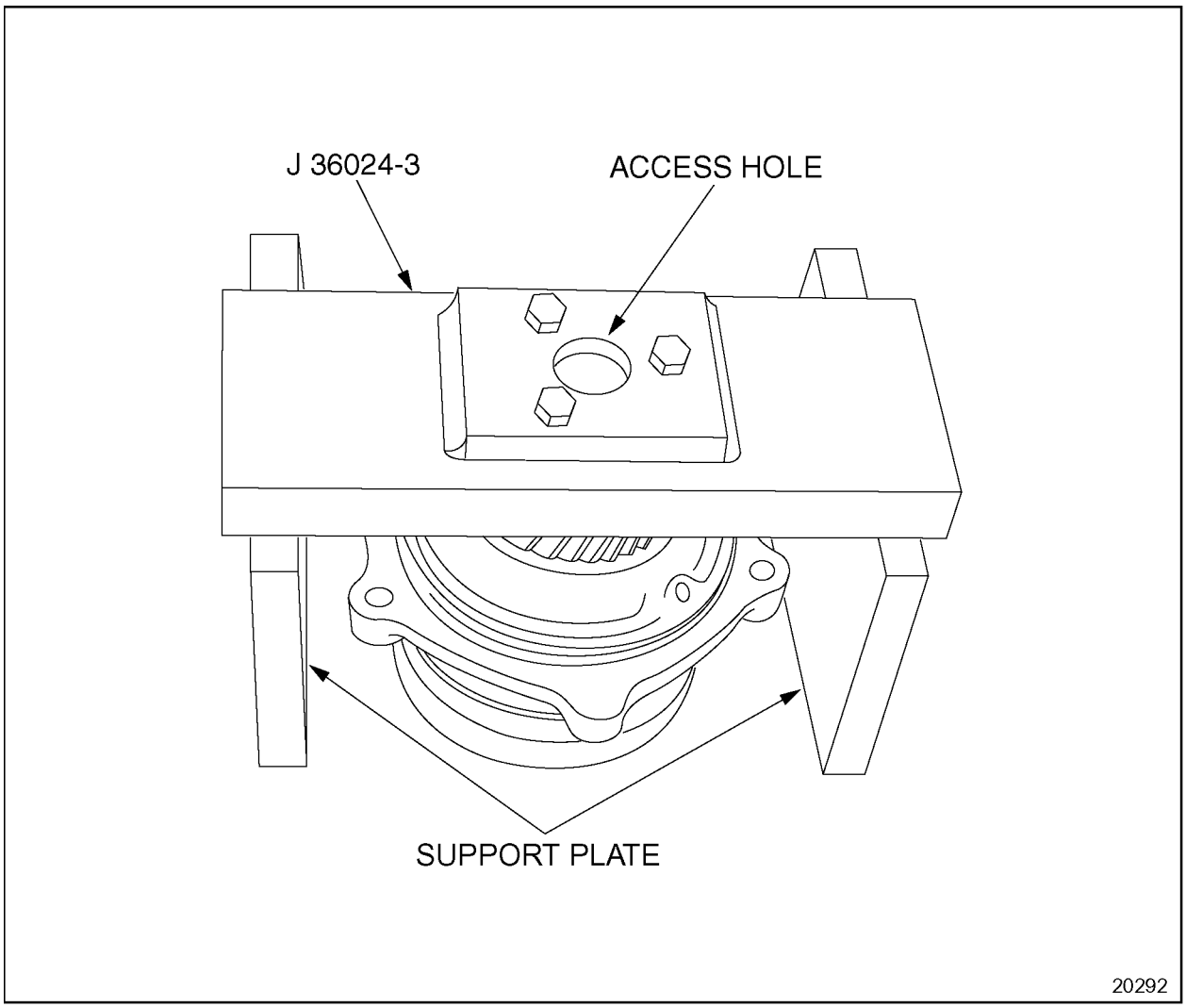


Figure 1-420 Accessory Drive Gear Removal

9. Using a press, apply pressure through the access hole in the holding fixture J 36024-3 (part of toolset J 36024–D), and press the drive shaft out of the gear. See Figure 1-420.

10. Remove the snap ring from the accessory drive housing. See Figure 1-421.

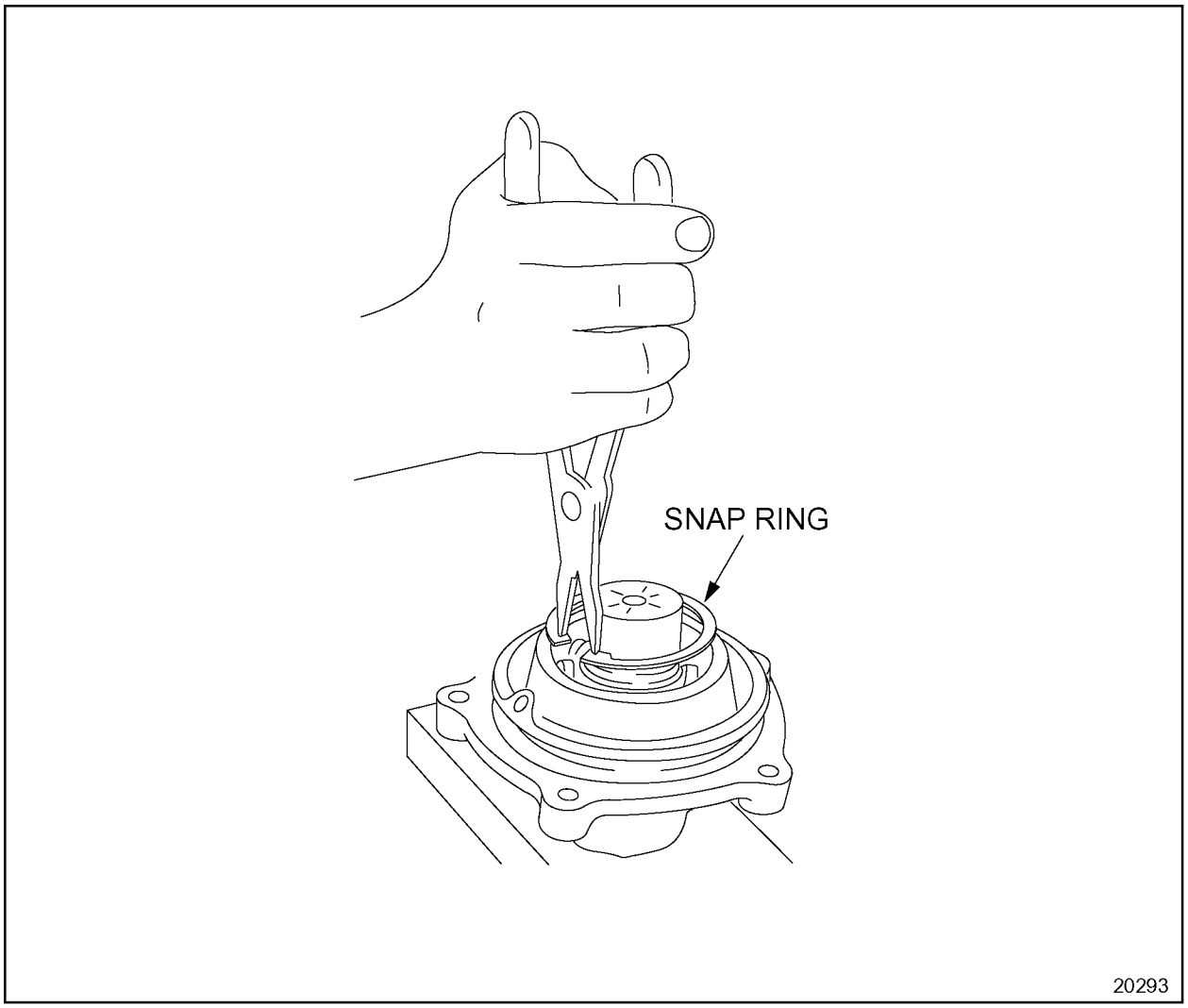


Figure 1-421 Snap Ring Removal

11. Turn the housing over and support the accessory drive housing on the machined surface using V-blocks.
12. Using a press, apply pressure to the pulley end of the shaft and remove the shaft and bearing assembly.
13. Turn the accessory drive housing over, and support it on the attaching bolt bosses using V-blocks.

NOTE:
On current design, the shaft serves as the inner race for the needle bearing.

NOTICE:
For assemblies with inner race for needle bearing, place the accessory drive shaft in a vise with soft jaws taking care not to damage the shaft surface.

14. Install J 36024-2 (part of toolset J 36024–D) and apply pressure to remove the needle bearing. See Figure 1-422.

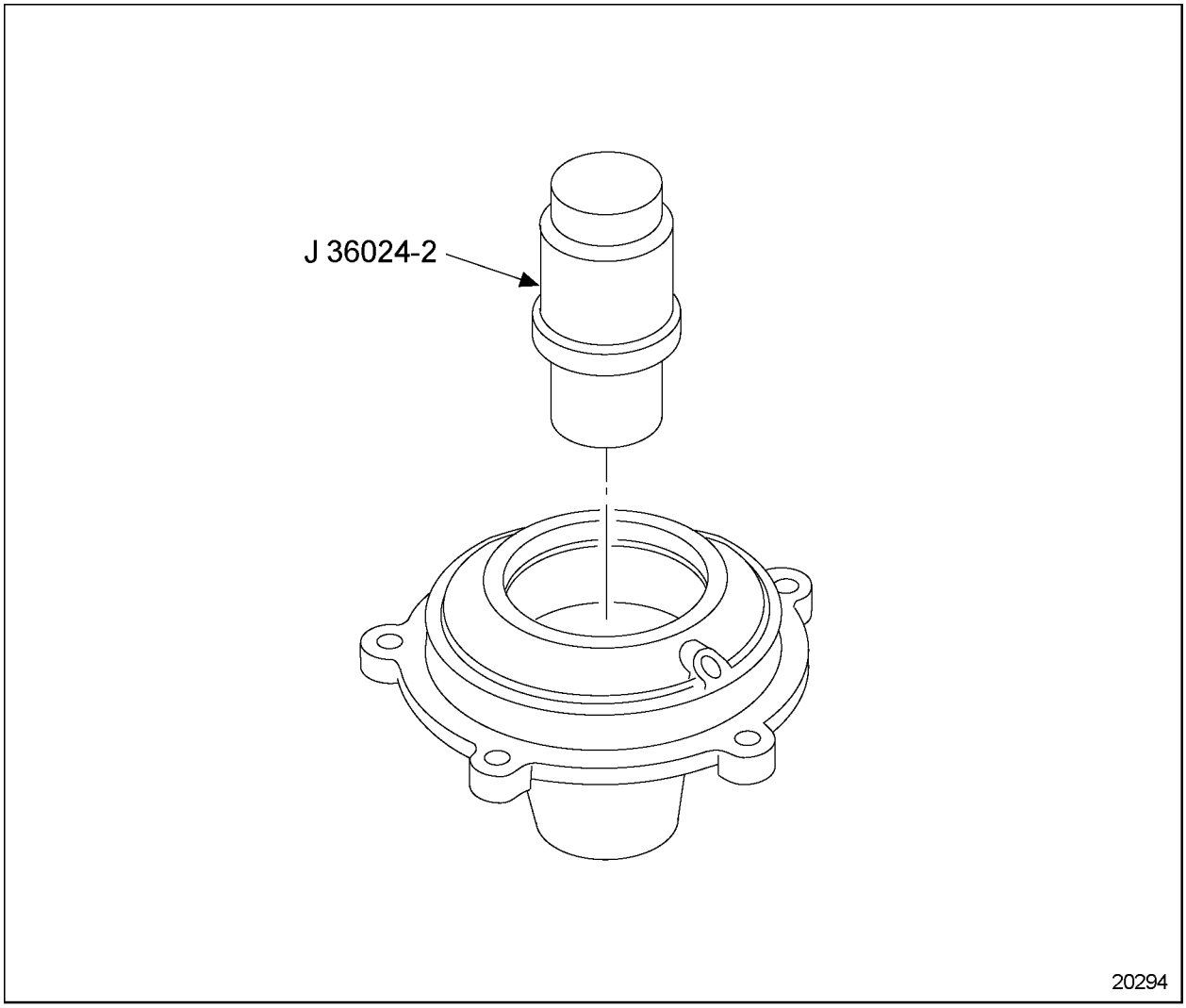


Figure 1-422 Needle Bearing Removal

15. Remove the needle bearing inner race from the accessory drive shaft with a two jaw puller utilizing the slots provided in the shaft. See Figure 1-423.

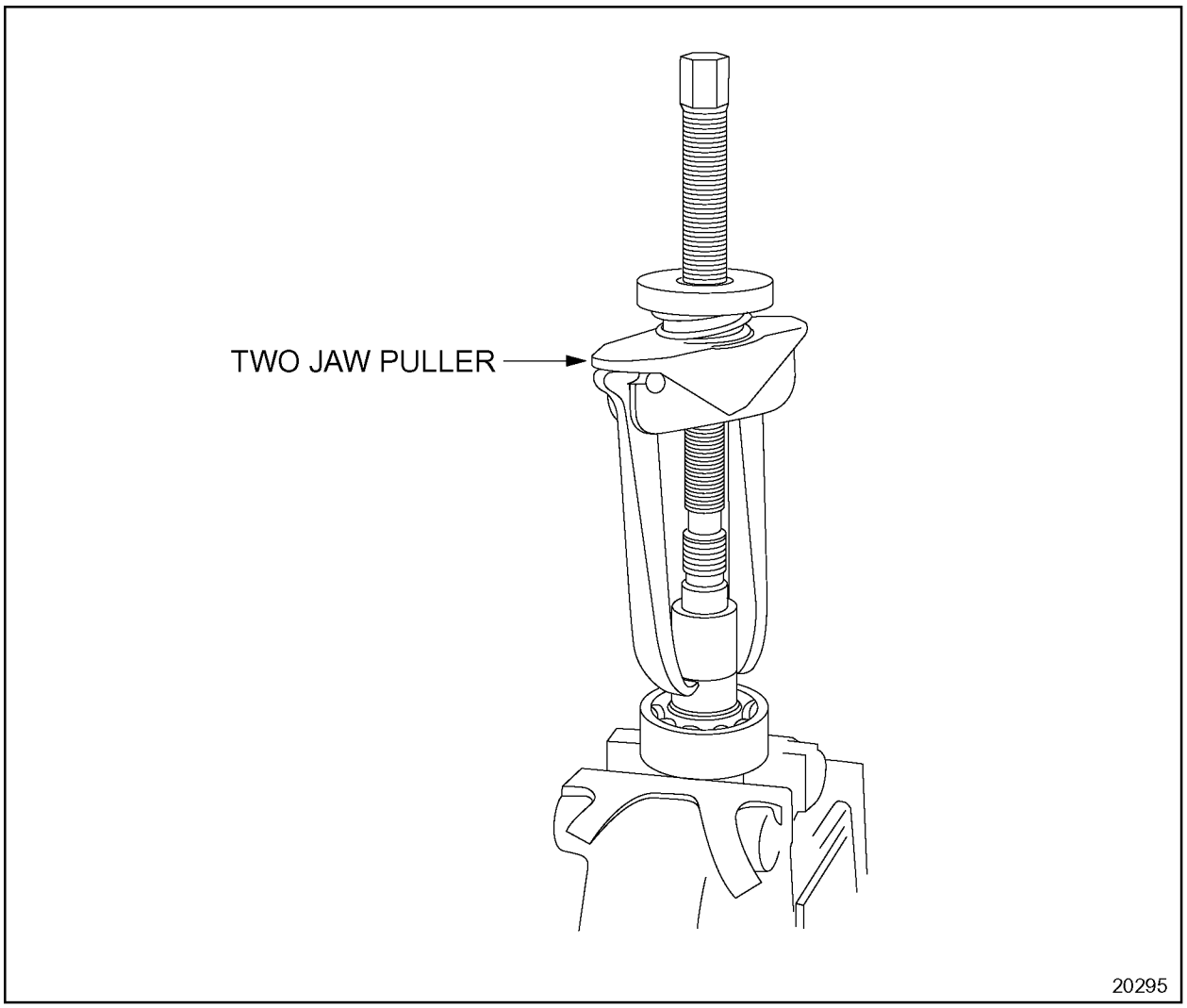


Figure 1-423 Bearing Inner Race Removal

16. Remove the snap ring from the accessory drive shaft. See Figure 1-424.

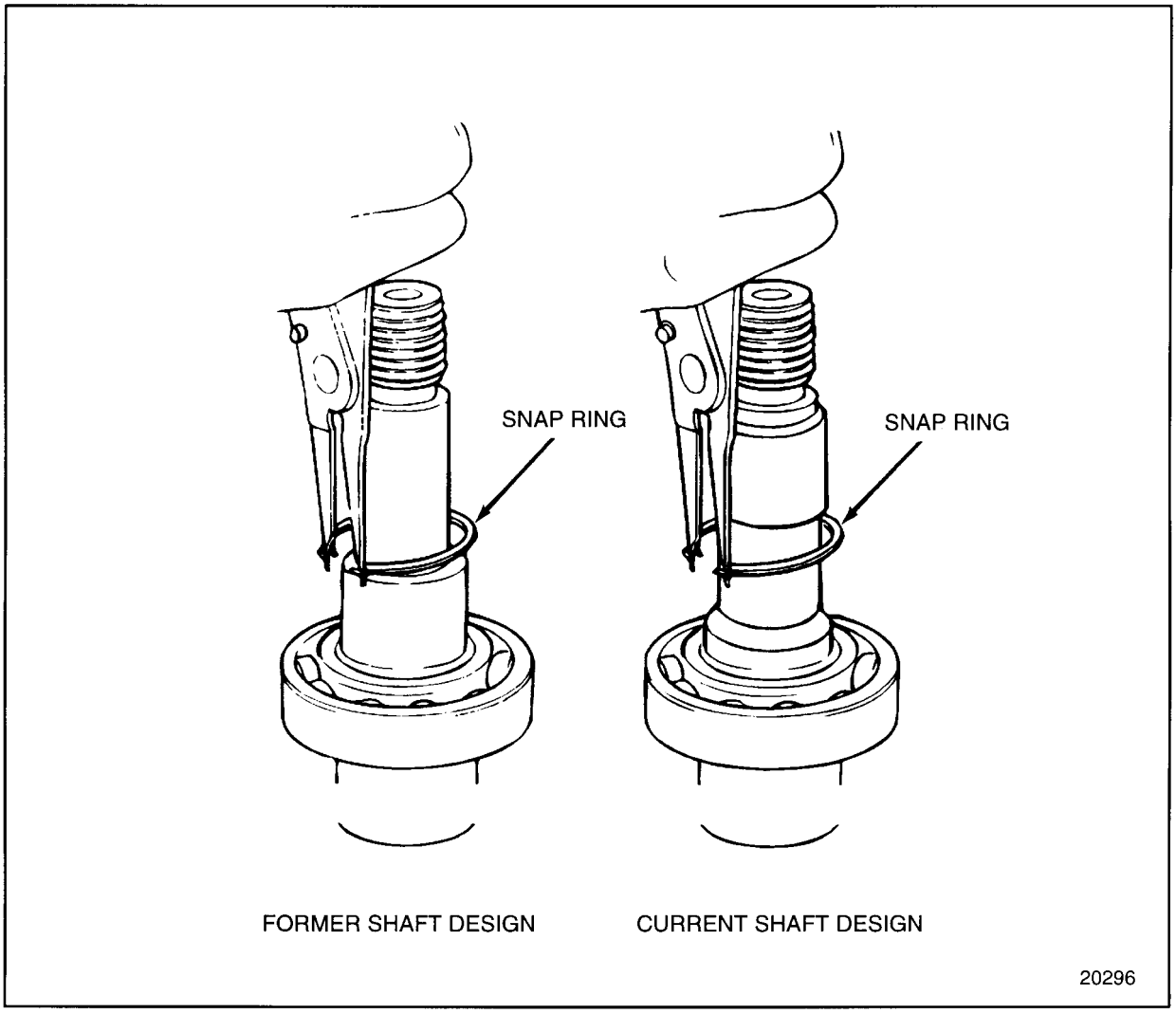


Figure 1-424 Snap Ring Removal

17. Position two steel press plates under the ball bearing outer race. See Figure 1-425.

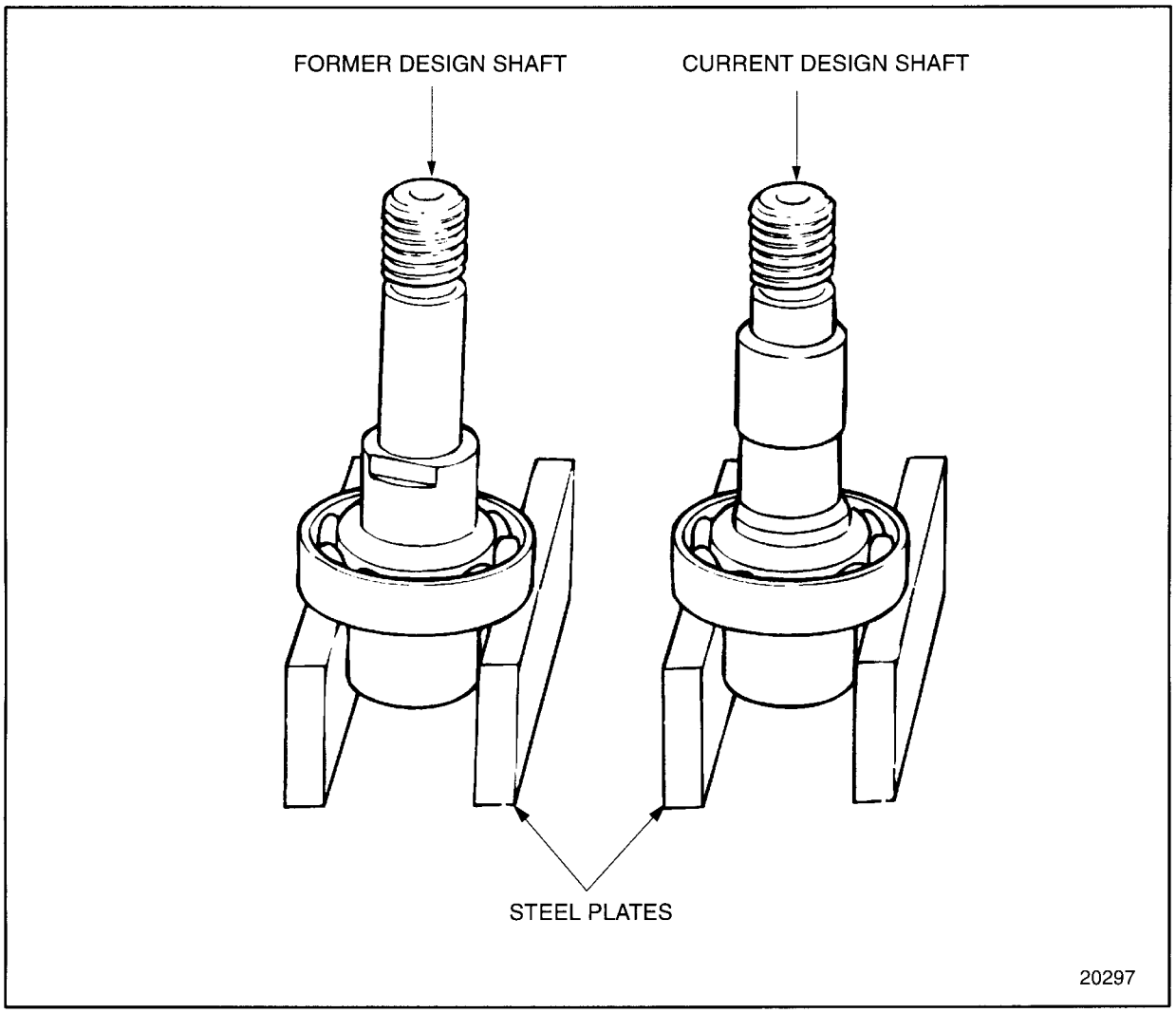


Figure 1-425 Position of the Steel Press Plates

NOTE:
Whenever the needle or ball bearing is removed from the shaft, they MUST be replaced with new bearing assemblies.

18. Use a press to apply pressure to the top of the shaft and remove the ball bearing from the shaft.

1.28.3.1 Inspection of the Accessory Drive

Clean the accessory drive prior to inspection as follows:

1. Clean all of the parts with clean fuel oil.

⚠ CAUTION:

To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.

2. Dry parts with compressed air.

Inspect the accessory drive as follows:

1. Visually examine the drive shaft for damage check the drive shaft for galling, pitting, cracks, or other damage.
   [a] If any damage is detected, replace with a new part.
   [b] If no damage is found, reuse the part.

1.28.4 Assembly of the Accessory Drive

Assemble the accessory drive as follows:

1. Place a new ball bearing on the accessory drive shaft. Use tool J 36024-1A (part of toolset J 36024–D) and a press to install the bearing onto the shaft until it bottoms out against the shoulder of the drive shaft. See Figure 1-426.

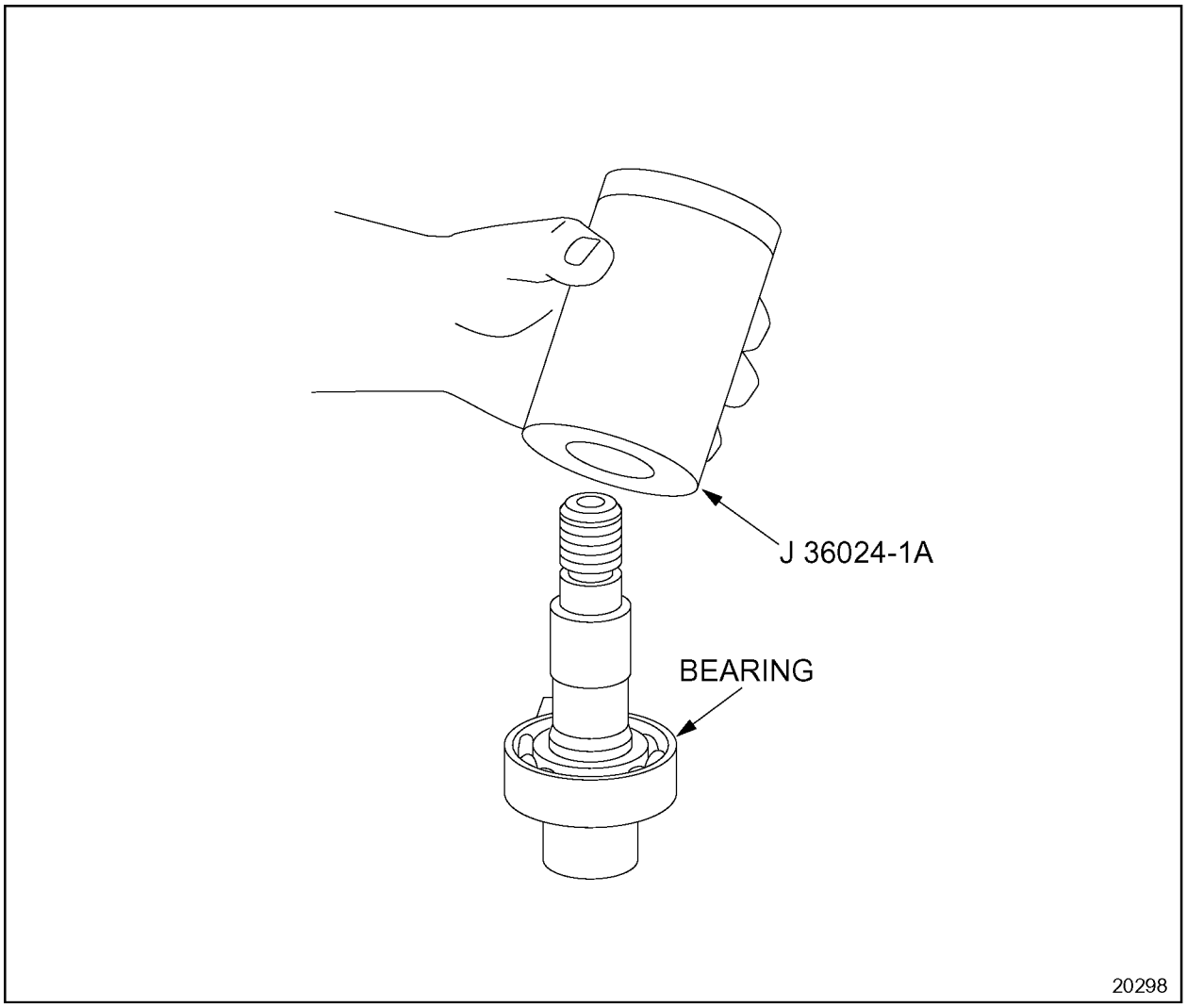


Figure 1-426 Bearing Installation

2. Install the snap ring to the accessory drive shaft making sure it is fully seated in the groove a full 360 degrees See Figure 1-427.

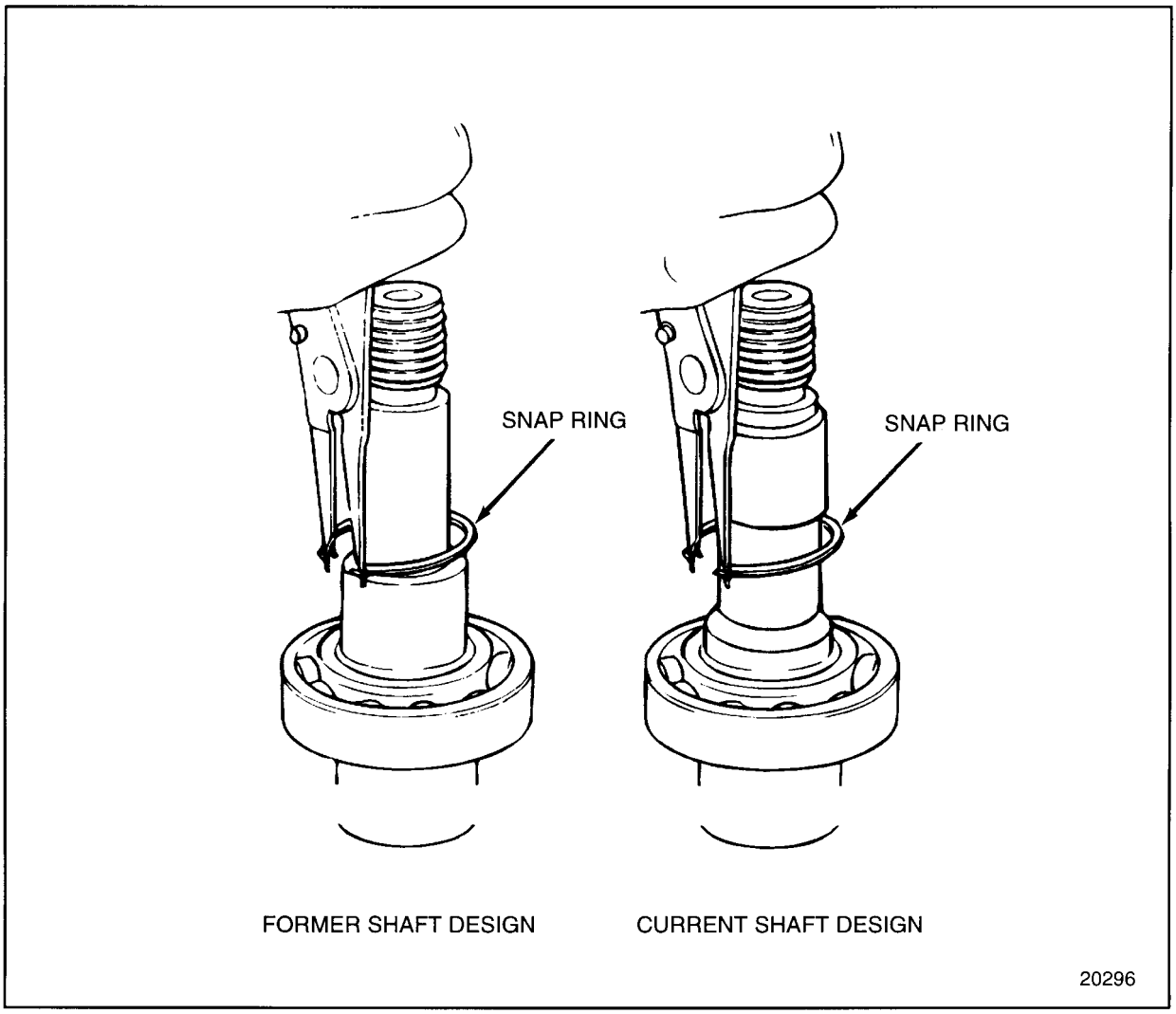


Figure 1-427 Snap Ring Installation

3. Place the needle bearing inner race on the accessory drive shaft. Use tool J 36024-1A (part of toolset J 36024–D) and a press to install the bearing inner race to the shaft until it is tight against the shoulder. See Figure 1-428.

NOTE:
On current design accessory drive shaft, the needle bearing inner race is incorporated into the shaft.

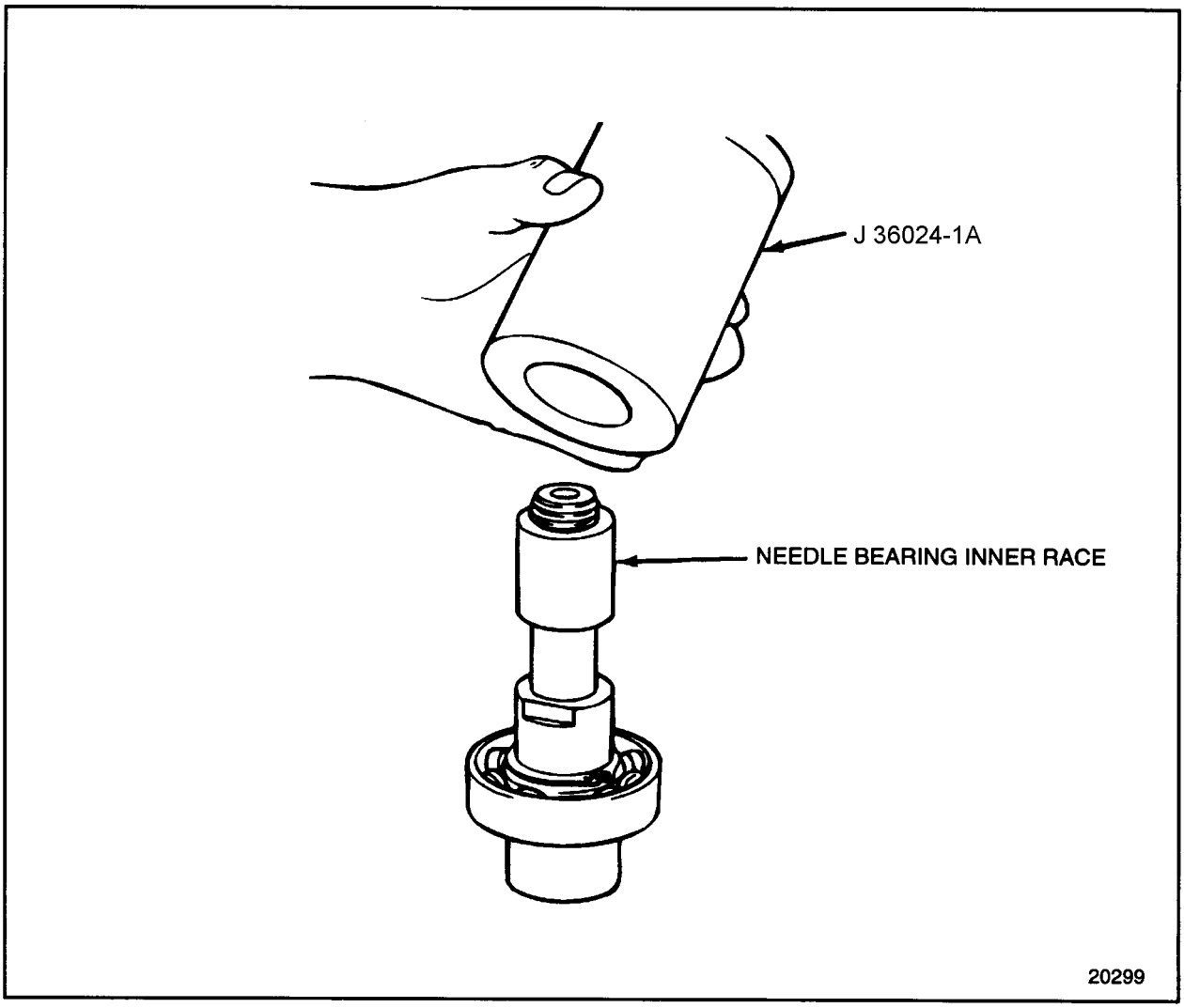


Figure 1-428 Needle Bearing Inner Race Installation

4. Install the needle bearing to the accessory drive housing using tool J 36024-2 (part of toolset J 36024–D). See Figure 1-429.

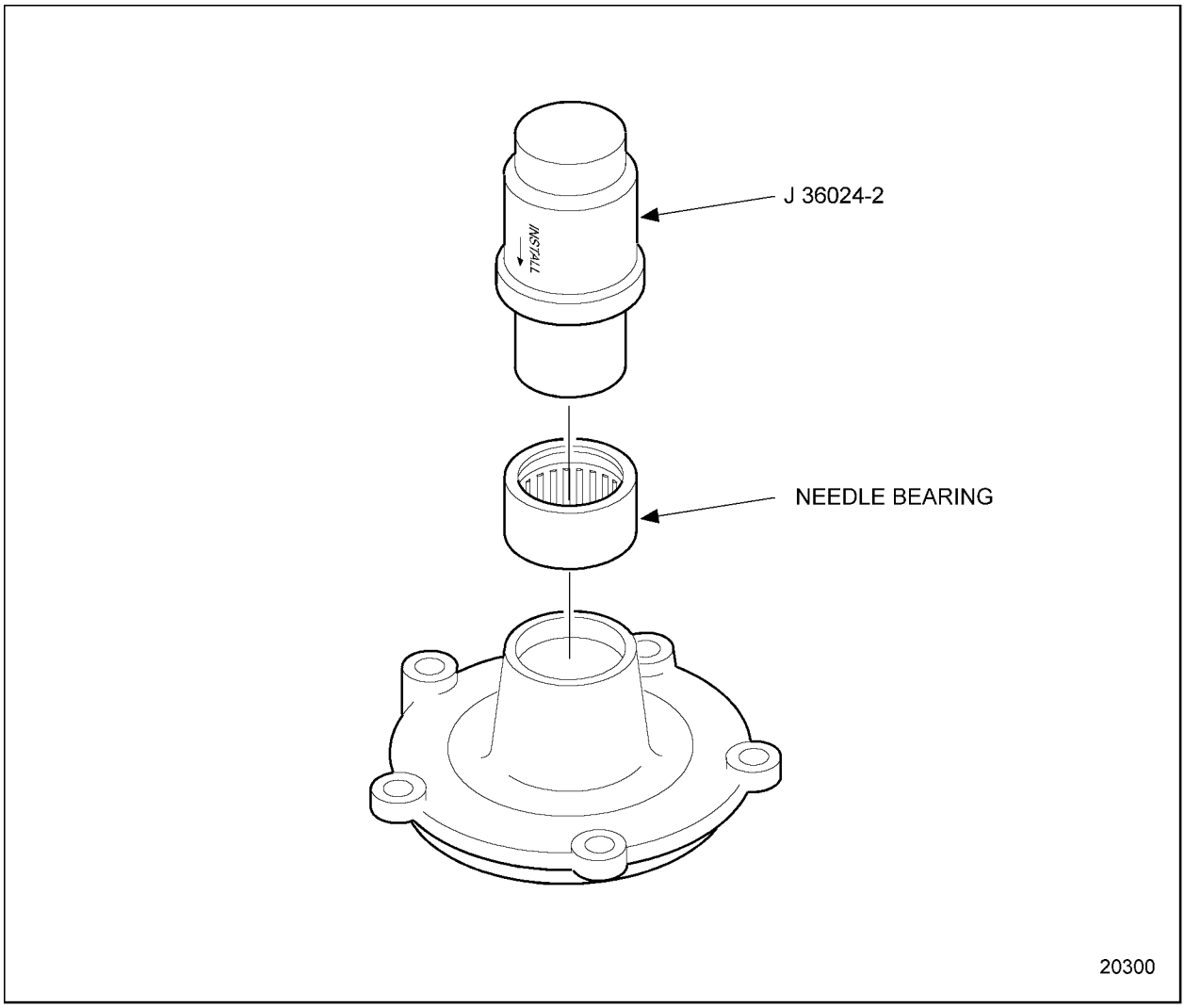


Figure 1-429 Needle Bearing Installation

NOTE:
The end of the bearing with the identification numbers must be against the installer.

NOTE:
The word INSTALL and an arrow are etched into the tool, J 36024-2 (part of toolset J 36024–D), to facilitate correct bearing installation.

5. Lubricate the oil seal contact area of the accessory drive housing with a thin film of engine oil.
6. Install the accessory drive oil seal to the accessory drive housing using the seal installer, J 36024-4 (part of toolset J 36024–D), and a plastic hammer or fiber mallet. The oil seal must be installed flush to 0.25 mm (0.010 in.) below the face of the housing. See Figure 1-430.

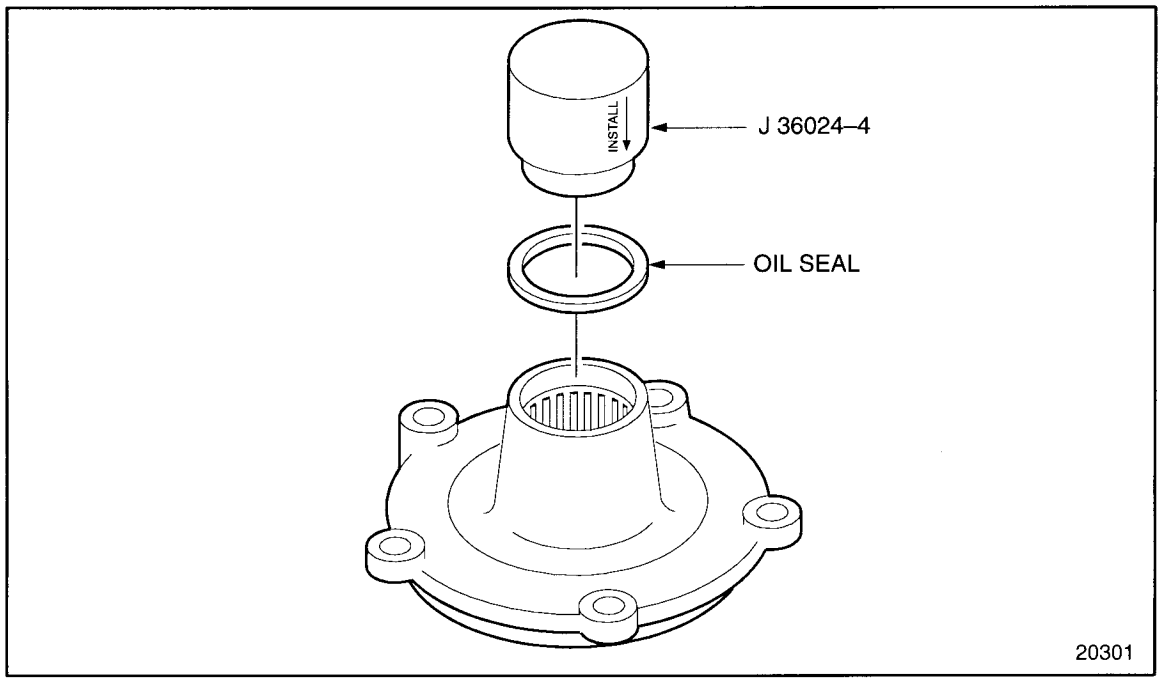


Figure 1-430 Accessory Drive Oil Seal Installation

7. Lubricate the oil seal with a thin film of engine oil.
8. Support the holding fixture, J 36024-3 (part of toolset J 36024–D) on two steel plates and position the accessory drive housing into the hole in the fixture. See Figure 1-421.

9. Install the drive shaft to the housing. See Figure 1-431.

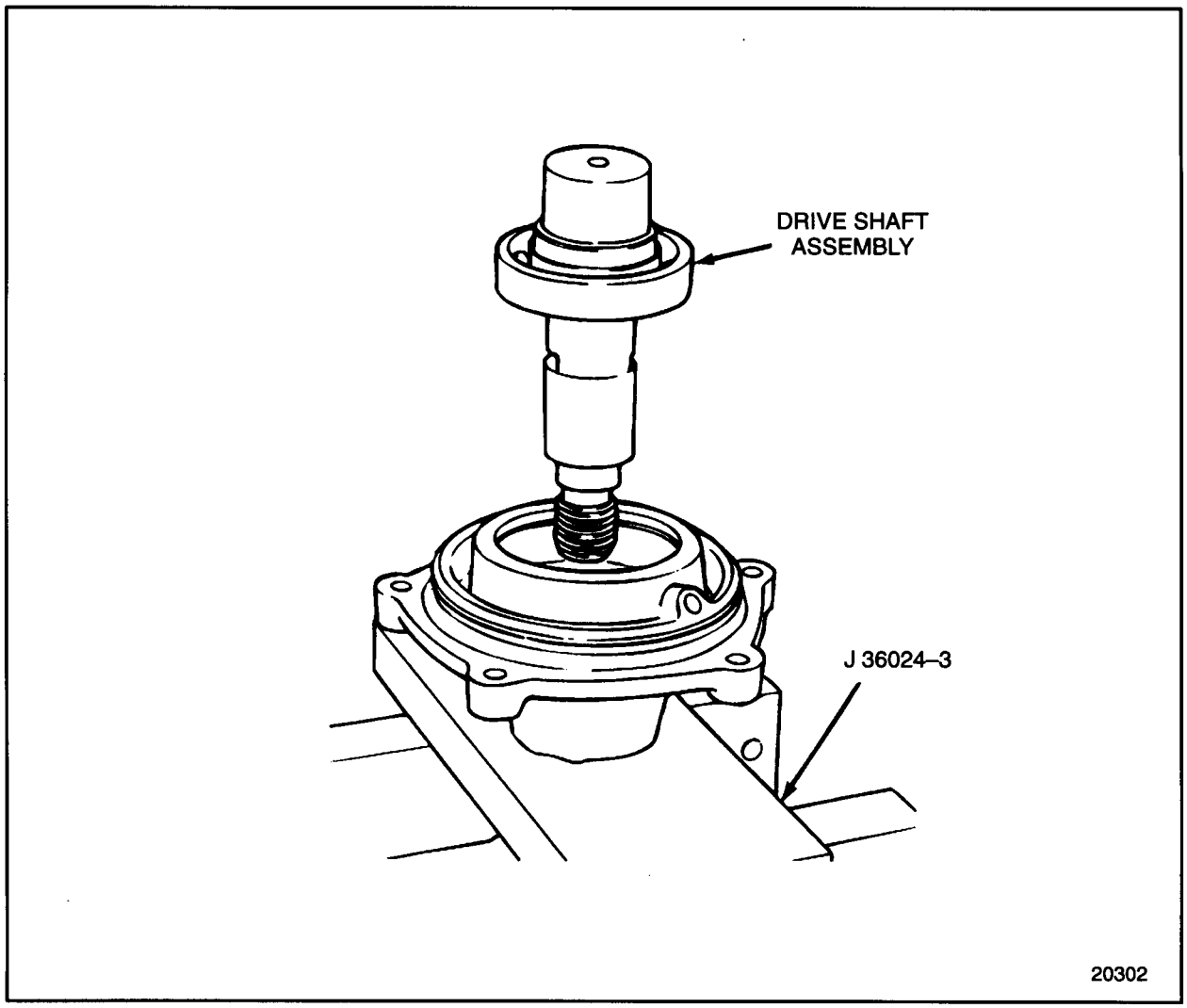


Figure 1-431 Drive Shaft Installation

10. Press the drive shaft into the housing by placing tool, J 36024-1A (part of toolset J 36024–D) , on the bearing outer race.

11. Press the bearing into the housing until the bearing is seated against the shoulder of the housing. See Figure 1-432.

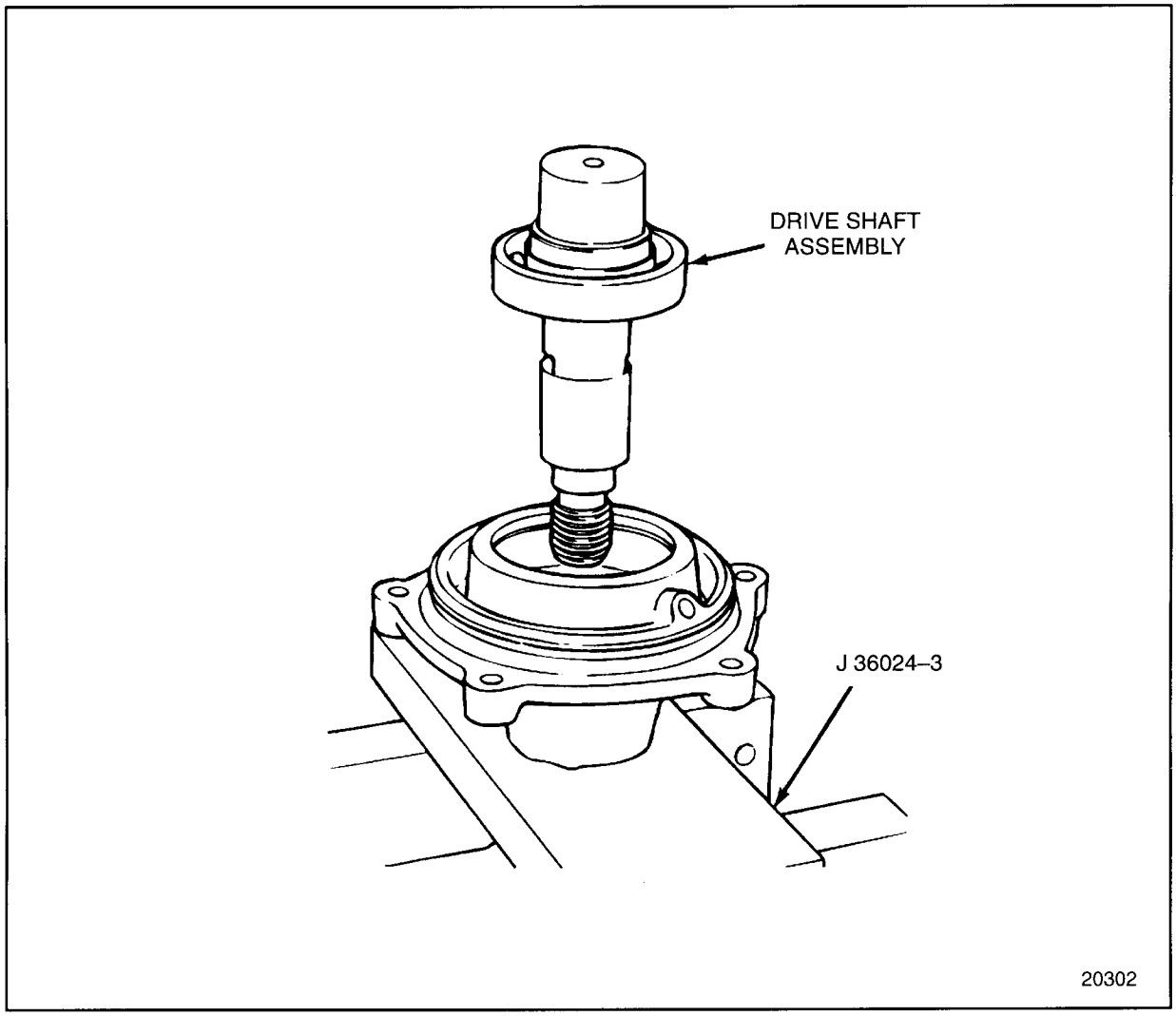


Figure 1-432 Bearing Installation

12. Install the snap ring to the accessory drive housing making sure the snap ring is fully seated in the groove a full 360 degrees See Figure 1-433.

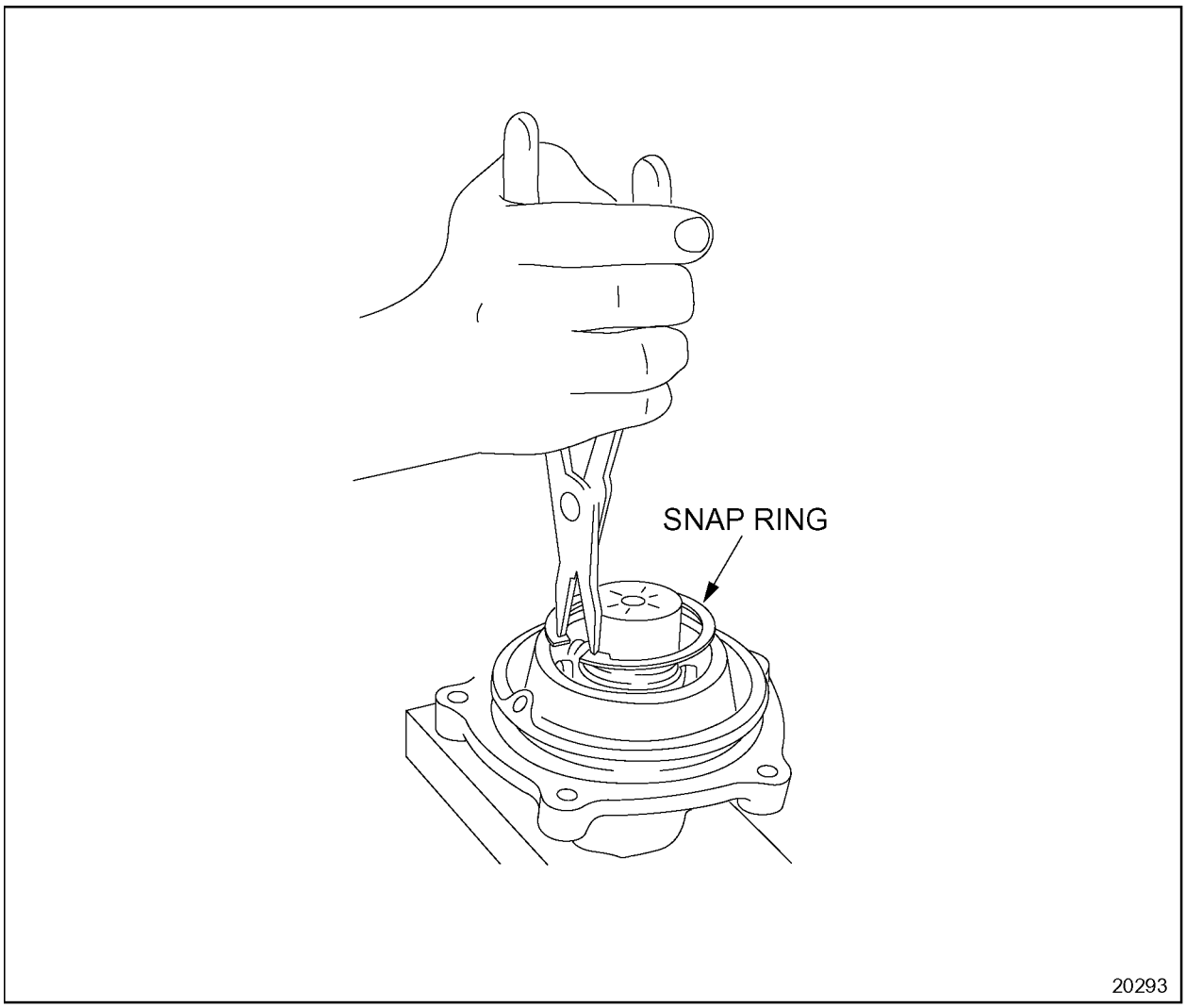


Figure 1-433 Snap Ring Installation

13. Lubricate the contact surfaces of the bearing with clean engine lubricating oil.

14. A film of Lubriplate® must be applied to the drive gear end of the accessory drive shaft. See Figure 1-434.

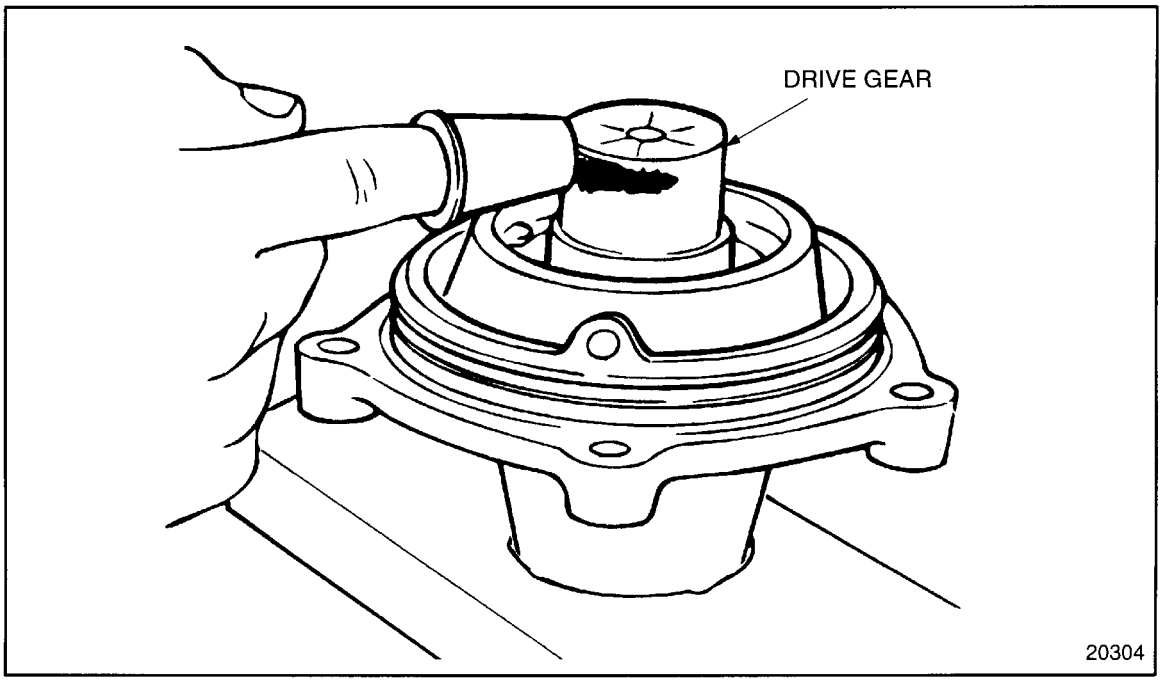


Figure 1-434 Drive Gear Installation Preparation

15. Use a press to install the drive gear on the accessory drive shaft until it is flush with the drive shaft end. Make sure the three threaded holes are facing up. See Figure 1-435.

NOTE:
Support the opposite end of the drive shaft on the press bed when pressing the gear on the shaft. A minimum press load of 17.8 kN (4000 lb) must be obtained when pressing the gear on the shaft.

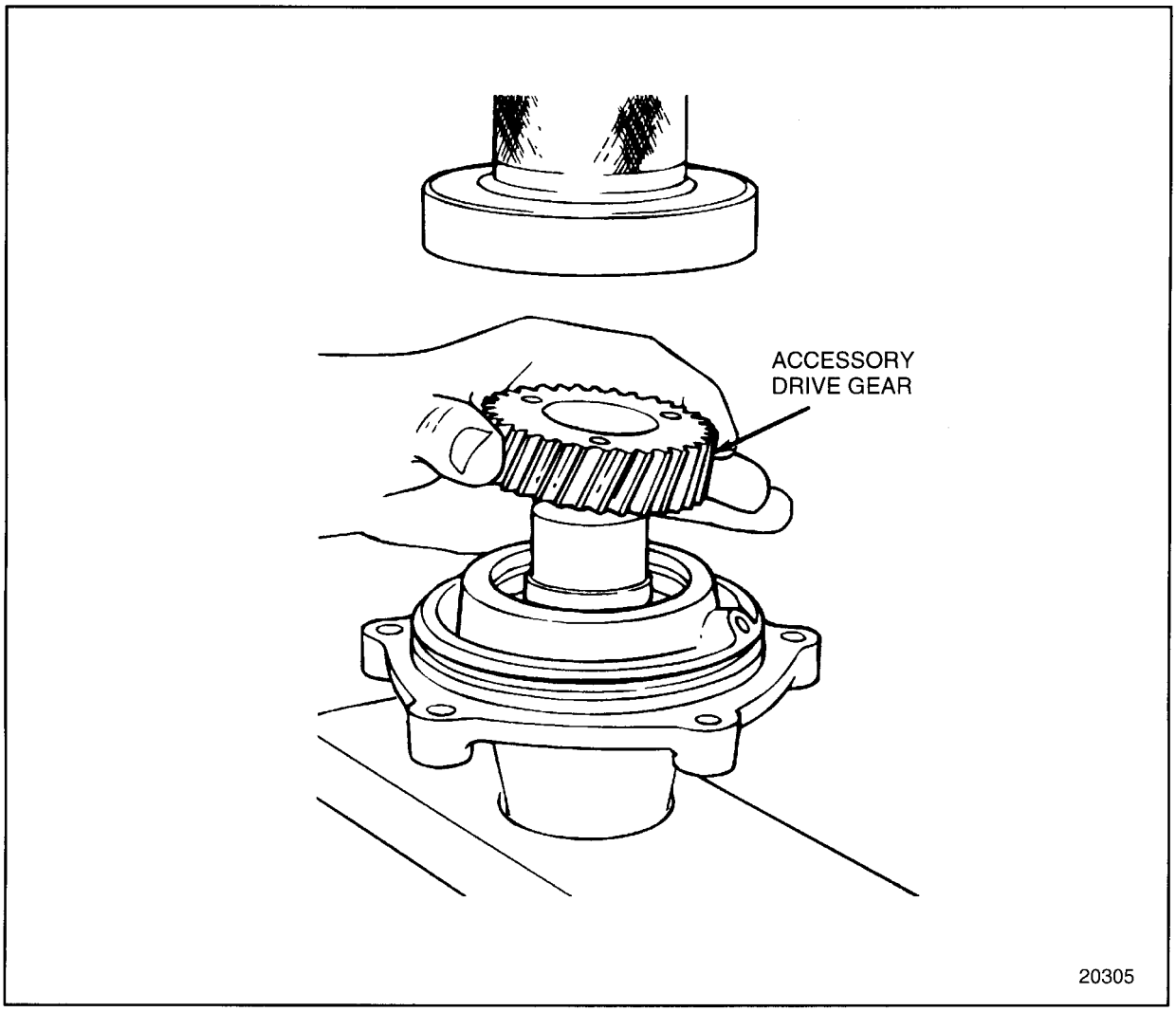
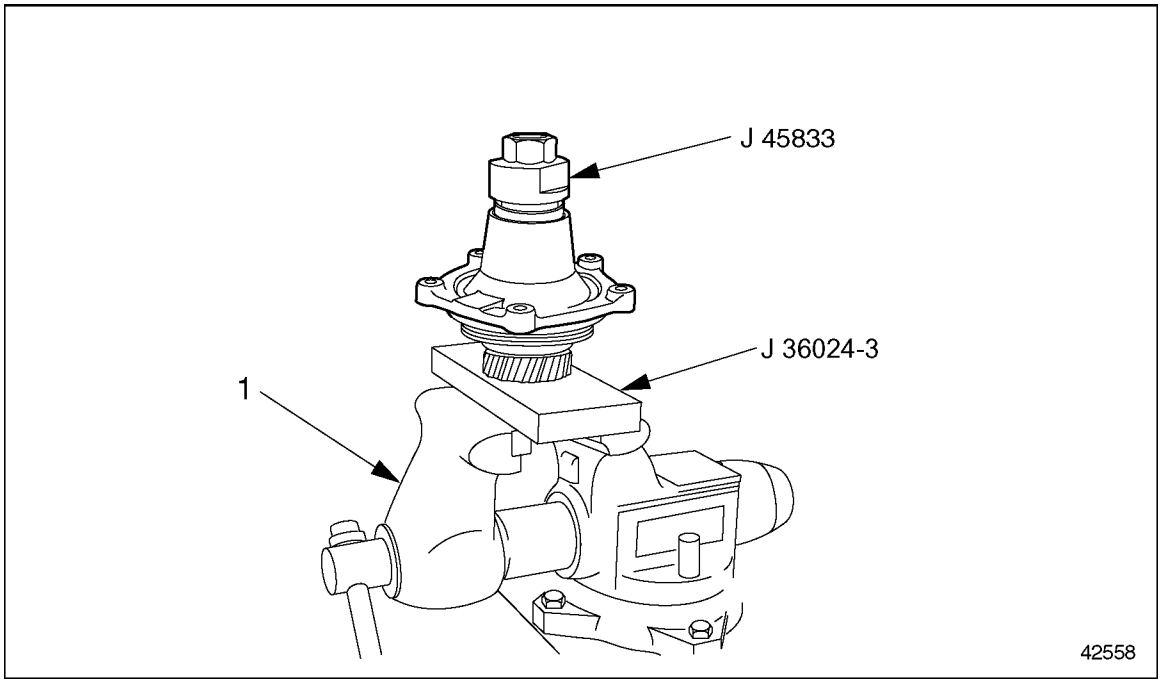


Figure 1-435 Accessory Drive Gear Installation

NOTE:
For accessory drive assemblies effective with engine serial number 6R631428 perform the procedures in steps 16 and 17.

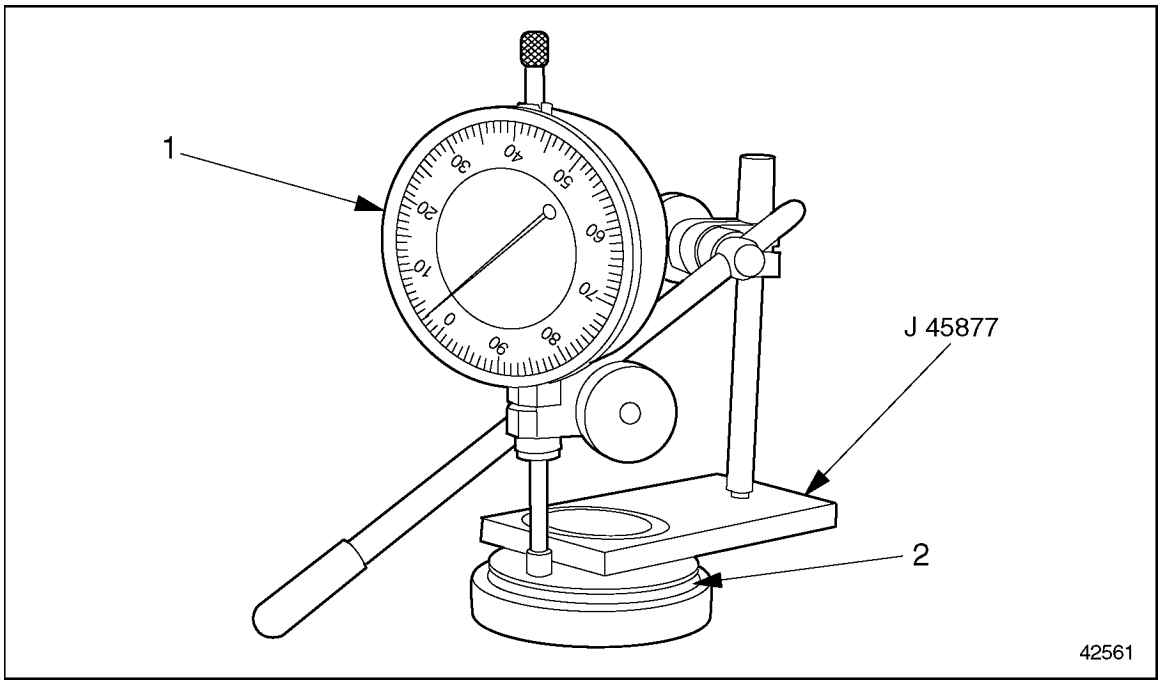
16. Install seal using J 45833 (part of toolset J 36024–D) by tightening installer nut until a positive stop is obtained. See Figure 1-435a.



1. Vise

Figure 1-435a J 45833 Accessory Drive Seal Installer

17. Measure sleeve and seal run out using J 45877 (part of toolset J 36024–D) and a dial indicator. Total indicator deflection should not exceed 0.0762 mm (0.003 in.) for the sleeve and 0.1778 mm (0.007 in.) for the seal. If the run out is greater for either measurement, install a new seal. See Figure 1-435b.



1. Dial Indicator
2. Seal Sleeve

Figure 1-435b J 45877 Seal Run Out Gauge Adaptor

18. Install the accessory drive pulley to the shaft.

NOTE:
If necessary, use tool J 36024-1A (part of toolset J 36024–D) to seat the pulley on the shaft. If pressing is necessary, the opposite (gear) end of the shaft must be supported during the pressing operation.

19. Attach J 36024-3 (part of toolset J 36024–D), to the drive gear. See Figure 1-418.
20. Place the accessory drive assembly holding fixture into a vise. See Figure 1-436.

21. Install and torque the accessory drive pulley locknut to 360-400 N·m (266-295 lb·ft). See Figure 1-436.

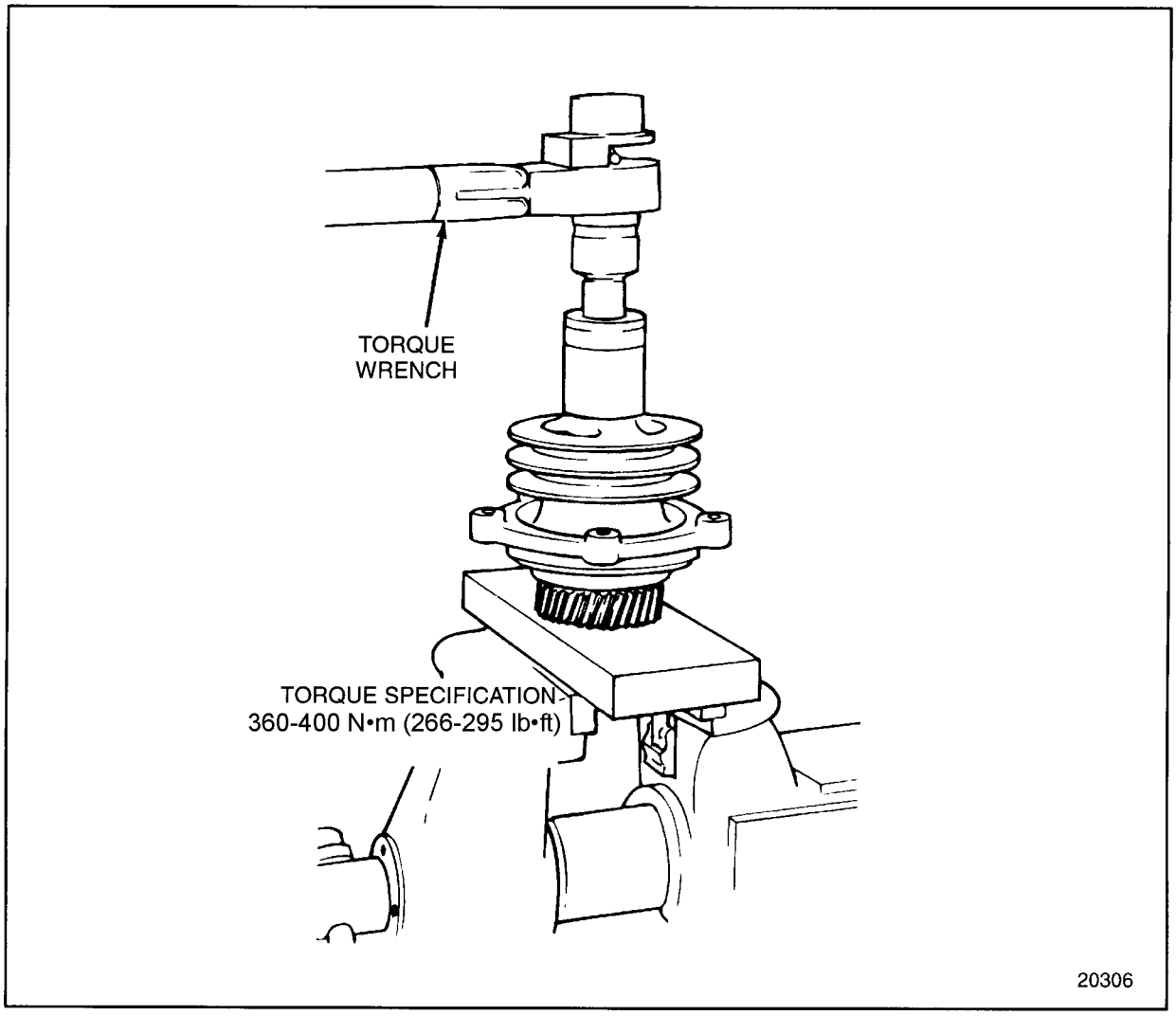


Figure 1-436 Accessory Drive Pulley Locknut Tightening

22. Support the accessory drive assembly. See Figure 1-437.

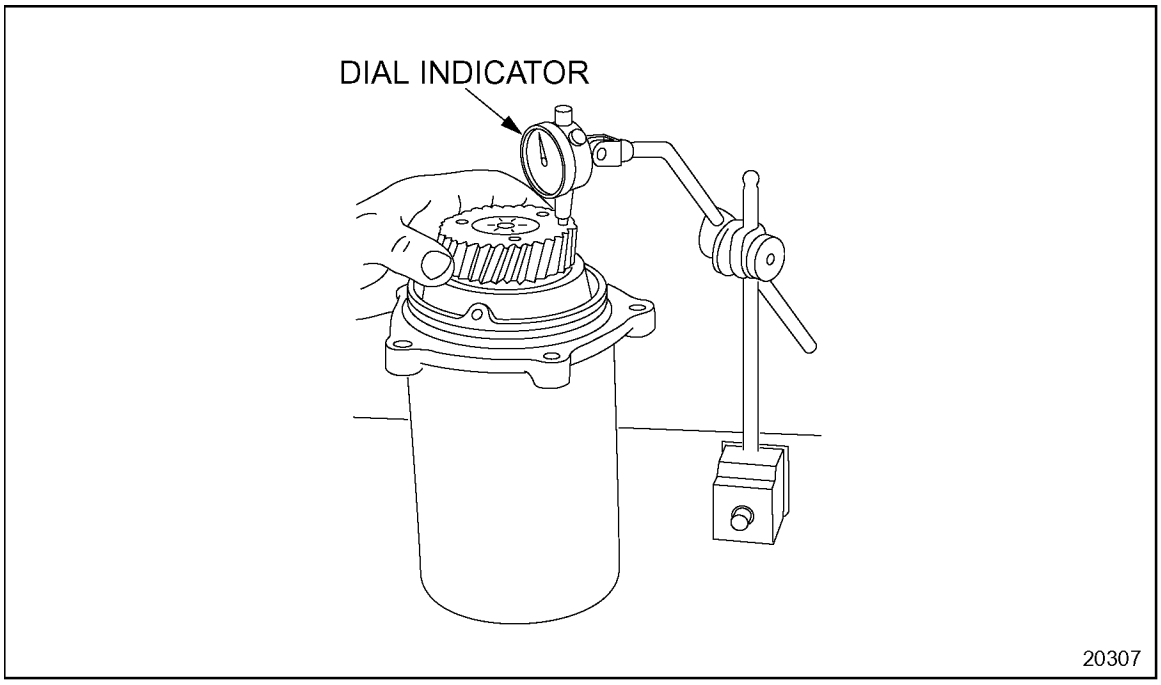


Figure 1-437 Accessory Drive Gear TIR Measurement

23. Assemble a dial indicator and magnetic base, so that the indicator stem rests on the face of the accessory drive gear just inboard of the drive gear teeth. See Figure 1-437.
24. Zero the dial indicator.
25. Rotate the drive gear two full rotations. See Figure 1-437. As the gear is rotated, the dial indicator needle may register both to the left and right of zero.
26. The total amount the dial indicator needle moves to the left and right of zero, added together, gives the total indicated run-out (TIR). The specified TIR is 0.04 mm (0.0015 in.).

1.28.5 Installation of the Accessory Drive

Install the accessory drive as follows:

1. Install the O-ring seal in the groove on the drive housing.
2. Lubricate the O-ring with petroleum jelly.
3. Install the accessory drive housing to its original position in the gear case cover.

NOTE:
The word "UP" is cast into the drive housing.

4. Install the bolts that secure the accessory drive housing to the gear case cover and torque to 30-38 N·m (22-28 lb·ft) using the pattern shown. See Figure 1-438.

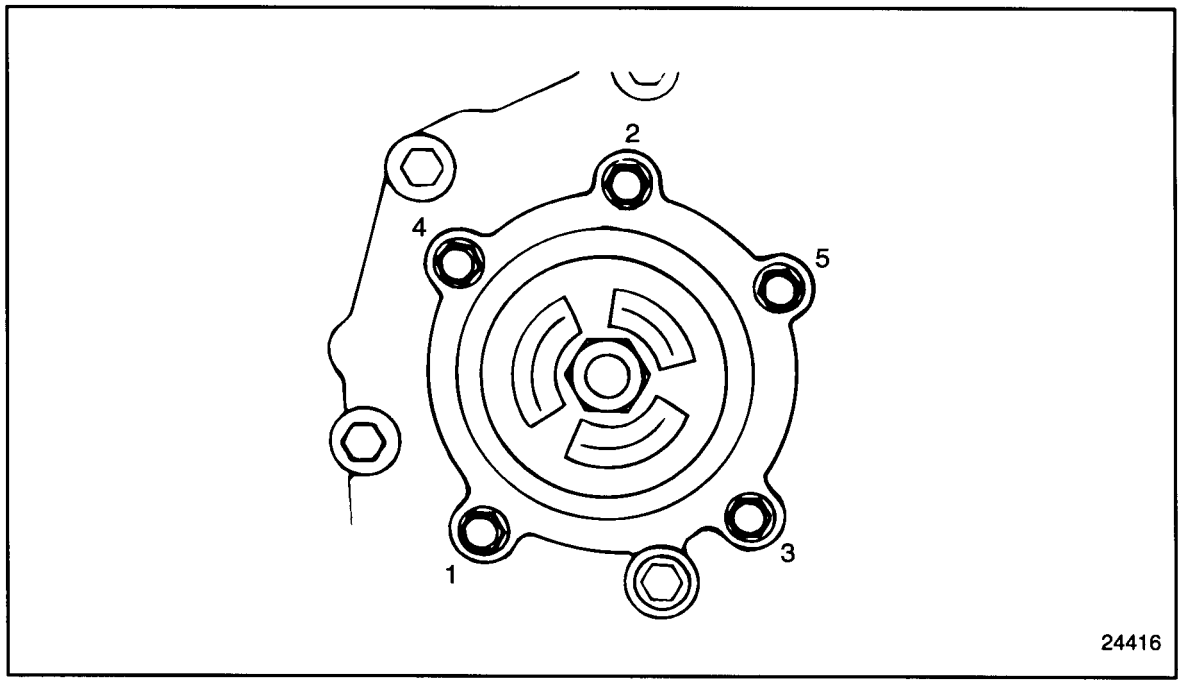


Figure 1-438 Accessory Drive Housing Bolt Torque Sequence

5. Check the bull gear-to-accessory drive gear backlash. Refer to section 1.21.2.1.
6. Adjust the alternator belts. Refer to section 13.13.10.
7. Tighten the alternator mounting bolts.
8. Install any other components removed for this procedure.
9. Refer to section 11.3 for verification of proper accessory drive installation.