

**2001-03 AUTOMATIC TRANSMISSIONS****P111 CVT Overhaul****APPLICATION**

**WARNING:** The Prius charging system uses about 300 volts. Do not attempt to service system, as it requires special tools and training.

**WARNING:** When performing any inspection or service procedure on this vehicle, ensure the following service precautions are followed to prevent personal injury or death due to the extremely high voltage:

- Ensure ignition is off and ignition key is removed from ignition before performing any inspection or service procedure in engine compartment, as engine may automatically start and shut off when ignition is on.
- Read all service and warning labels in engine compartment before performing any procedures in engine compartment.
- All high voltage wire harness connectors contain Orange connectors. DO NOT touch any wiring harness that contains Orange connectors.
- High voltage battery and other high voltage components may be identified by HIGH VOLTAGE caution labels. DO NOT touch these components.
- If necessary to inspect or service high voltage system, ensure ignition is off. Remove service plug to prevent electrocution. Service plug is located at left side trim panel in trunk. Carry service plug in your pocket to prevent other technicians from reinstalling it while vehicle is being serviced. After removing the service plug, wait at least 5 minutes to allow condenser inside the inverter to discharge before touching any high voltage wiring harness, connectors or components.
- If necessary to touch any high voltage wiring harness, connectors or components, use insulated gloves. Ensure insulated gloves are dry and in good condition and that no holes exist in insulated gloves by applying air pressure to insulated glove before touching any high voltage wiring harness, connectors or components.
- DO NOT wear any metal objects while working on vehicle which may accidentally drop and cause a short circuit.
- If any high voltage wiring harness connector is disconnected, ensure terminal on wiring harness connector is wrapped with tape to prevent wiring harness connector from contacting any surface.
- If servicing high voltage system, place sign on roof of vehicle to

indicate to other technicians that high voltage system is being serviced.

**NOTE:** Only overhaul information for transaxle is provided in this article. Electric motor diagnosis and repair should be accomplished by a certified Toyota technician, due to possible personal injury from high voltage.

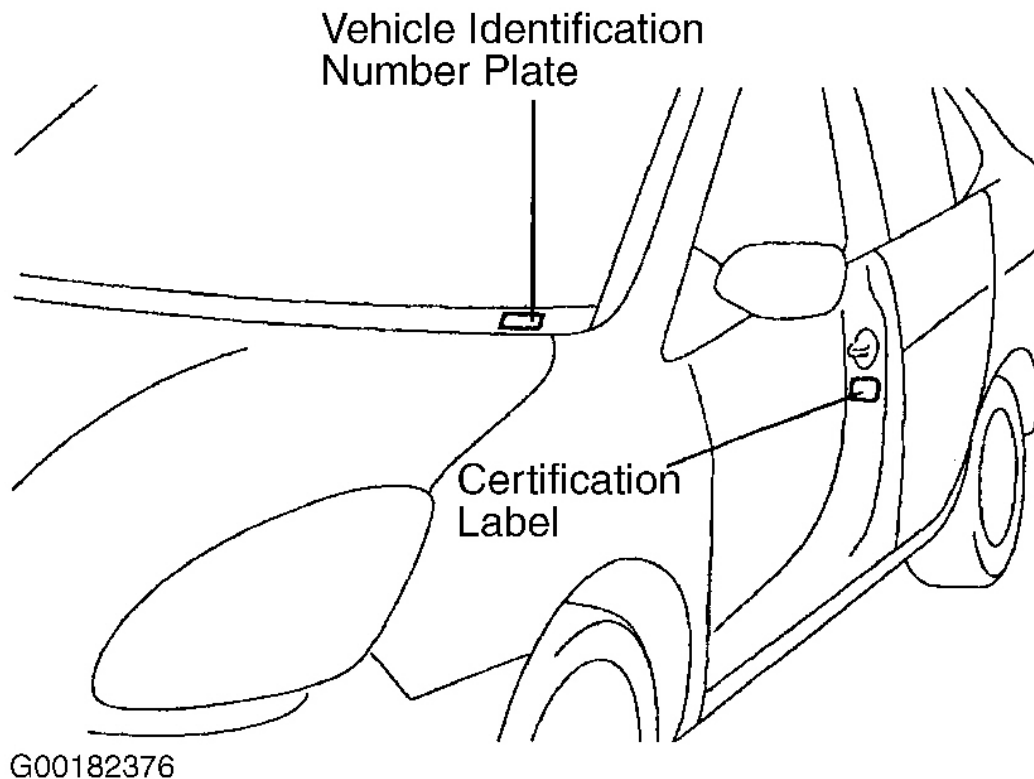
#### TRANSAXLE APPLICATION

| Application | Transaxle Model |
|-------------|-----------------|
| Prius       | P111            |

## IDENTIFICATION

### TRANSAXLE

Vehicle Identification Number (VIN) is used for correct application of component parts and assemblies. VIN is stamped on vehicle identification number plate, located at top left corner of dash and on certification label, located on driver's door jamb. See **Fig. 1**.



**Fig. 1: Locating Vehicle Identification Number (VIN) Plate & Certification Label**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## **GEAR RATIO**

CVT transaxle has a gear ratio of 3.905:1.

## **DESCRIPTION & OPERATION**

### **INTRODUCTION**

Transaxle is an Electronically Controlled Continuously Variable Transaxle (ECVT) which is used for seamless, stepless acceleration and deceleration. The continuously variable function in this transaxle is achieved through a power split device known as a simple compound planetary gear set, as well as motor generators No. 1 and No. 2. It is through these motor generators and the planetary gear set that the continuously variable ratio occurs. At times, this planetary assembly is used to drive the vehicle, charge the high voltage battery, or both (power split device).

An inverter, located in engine compartment, converts electrical power between the DC battery and the 3-phase alternating current (AC) voltage from 2 motor generators in transaxle. The inverter also transmits information to a computer called the High Voltage Electronic Control Unit (HVECU). Motor generator No. 1 is used to recharge high voltage battery and supply electrical power to motor generator No. 2. It also regulates the amount of electrical power supplied to motor generator No. 2 through the inverter, which varies motor generator No. 2 speed, effectively controlling the continuously variable ratio function of the transaxle. Motor generator No. 2 always drives the wheels except during deceleration, at which time the wheels are driving motor generator No. 2, which is generating electricity to be stored in high voltage battery. If the vehicle is moving forward or backward under power, motor generator No. 2 is driving the wheels.

Gearshift lever gear positions are: Park ("P"), Reverse ("R"), Neutral ("N"), normal driving position ("D") and engine braking position ("B"), which is used to assist in deceleration of vehicle during high speed (down hill) driving. Transaxle has a shift lock system to minimize the possibility of incorrect operation. Transaxle may only be shifted out of Park when brake pedal is depressed, and ignition switch is in the ON position, and gearshift lever lock release button is depressed. For additional information on shift and key interlock systems, see appropriate SHIFT INTERLOCK SYSTEMS article.

## **LUBRICATION**

**NOTE:** See appropriate **SERVICING** article.

## **TROUBLE SHOOTING**

**NOTE:** Transaxle malfunctions may be caused by poor engine performance, improper adjustments, fluid condition or failure of hydraulic, mechanical or electronic components. Ensure all concerns have been properly checked prior to transaxle overhaul.

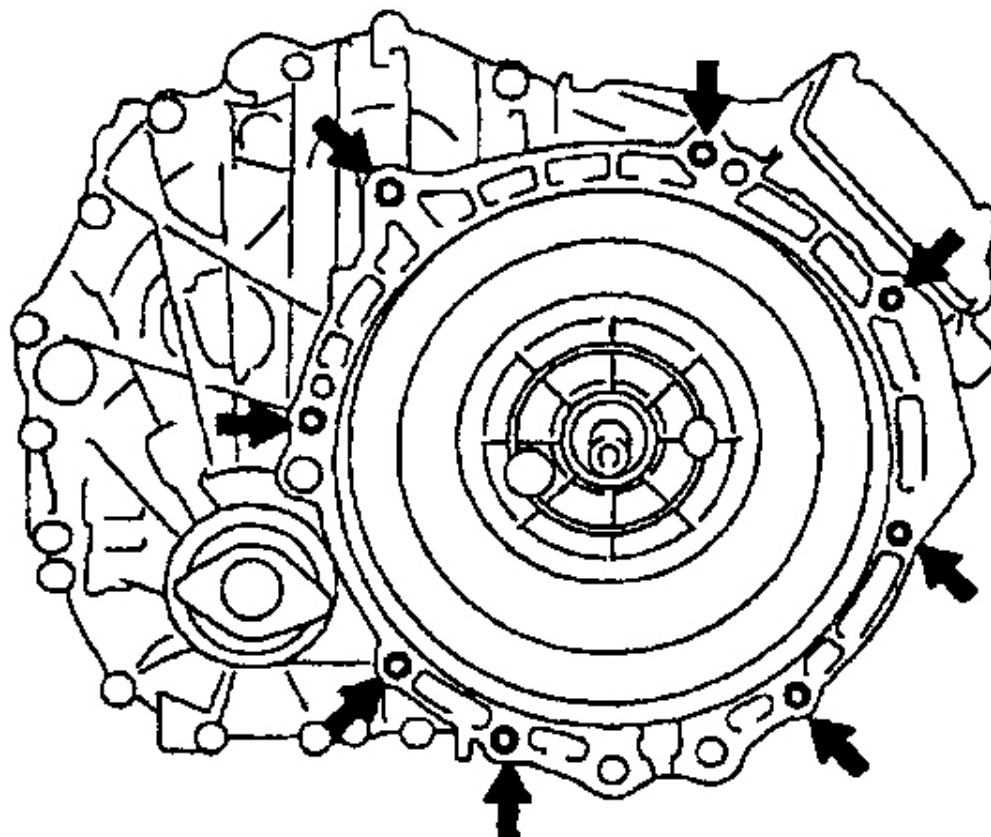
## TRANSAXLE DISASSEMBLY

**NOTE:** Do not bend pull or bend the high voltage cable at motor generator No. 1 assembly.

1. Remove engine and transaxle from vehicle as an assembly. See appropriate REMOVAL & INSTALLATION article. Remove drain plug and drain transaxle fluid. Remove 8 bolts and separate transaxle from the engine. See [Fig. 2](#).

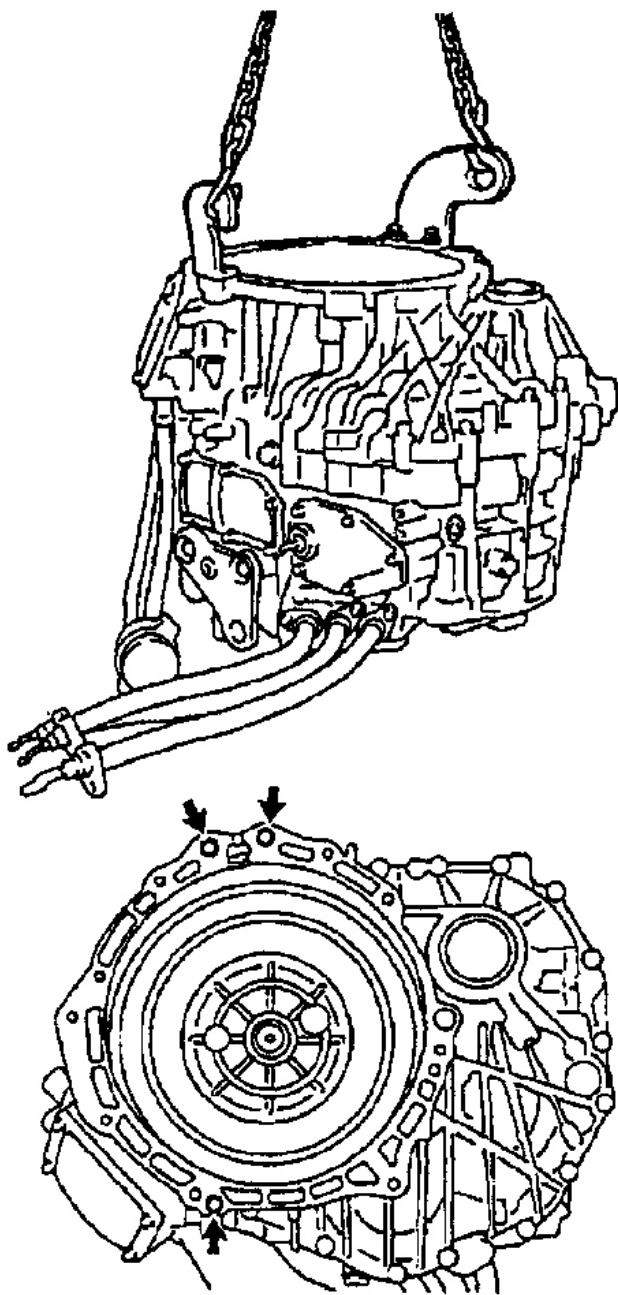
**NOTE:** Place a wooden block underneath transaxle to stabilize it during the following procedure.

2. Install engine hanger with chain on motor generator No. 1 assembly side of transaxle. Lift transaxle up and install a wooden block underneath transaxle to stabilize it. See [Fig. 3](#).
3. Remove 21 bolts. See [Fig. 4](#). Using a screwdriver and a hammer, separate motor generator No. 1 assembly from motor generator No. 2 assembly. See [Fig. 5](#).
4. When separating motor generator No. 1 assembly from motor generator No. 2 assembly, to prevent drive sprocket from being removed with motor generator No. 1 assembly, push down chain with a taped screwdriver tip. See [Fig. 6](#).
5. Remove counter driven gear assembly from motor generator No. 2 assembly. Remove differential case assembly from motor generator No. 2 assembly. See [Fig. 7](#) and [Fig. 21](#). Remove 2 race and needle roller bearing. See [Fig. 8](#). Remove drive sprocket sub-assembly and chain.
6. Remove input shaft assembly. See [Fig. 9](#). Remove needle roller bearing and 2 bearing races. Remove planetary ring gear. Remove ring gear flange and shim. See [Fig. 10](#). Remove counter drive gear and shim by tapping the case with a plastic hammer. See [Fig. 11](#).
7. Remove 12 bolts and oil pan with gasket. See [Fig. 22](#). Remove magnet from oil pan. Check for steel (magnetic) bearing and gear wear material in oil pan. Also check for brass (non-magnetic) bushing wear. Note findings for reference.
8. Remove bolt and oil stainer. See [Fig. 12](#). Remove "O" ring from oil strainer. Set motor generator No. 2 assembly on wooden blocks. See [Fig. 13](#). Remove 3 bolts and mounting bracket. Remove 2 bolts and 2 wiring harness connectors. Remove 2 water jacket unions from motor generator No. 2 assembly. See [Fig. 22](#).
9. Remove 6 bolts and parking cover. Remove bolt, detent spring cover and detent spring. Remove 6 bolts and motor water jacket cover. See [Fig. 22](#). Remove 5 bolts and parking shaft cover. Using a screwdriver, remove oil seal from cover.



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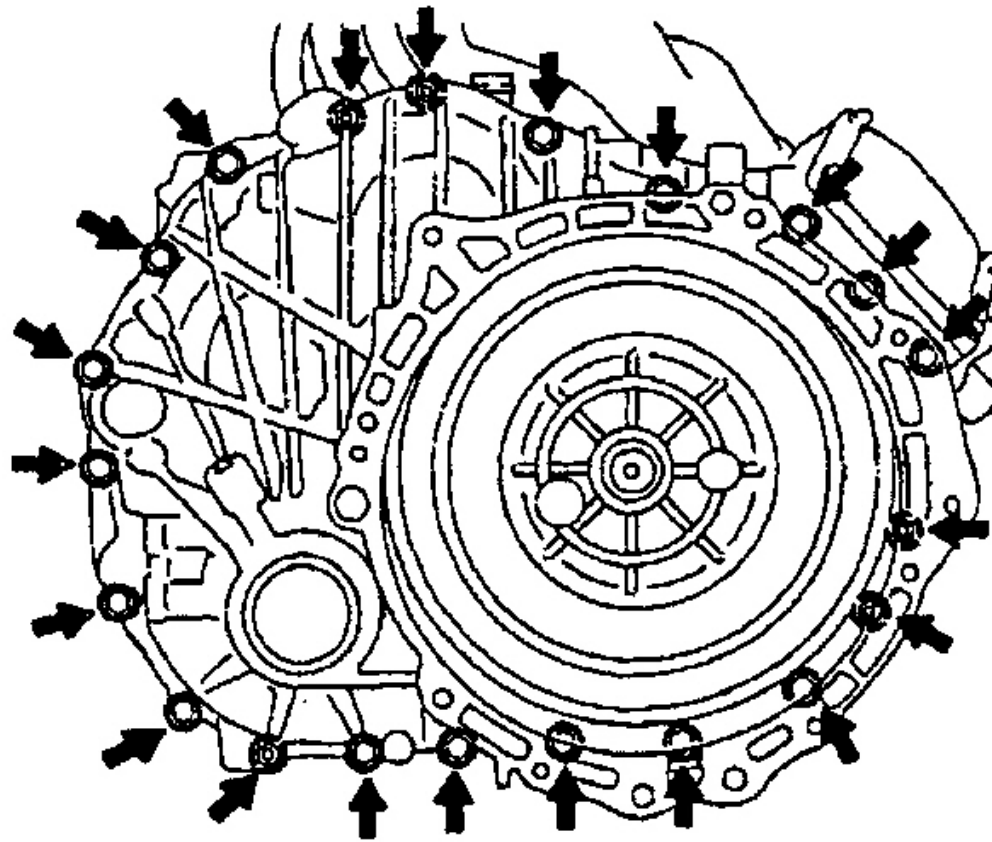
**Fig. 2: Separating Transaxle From Engine**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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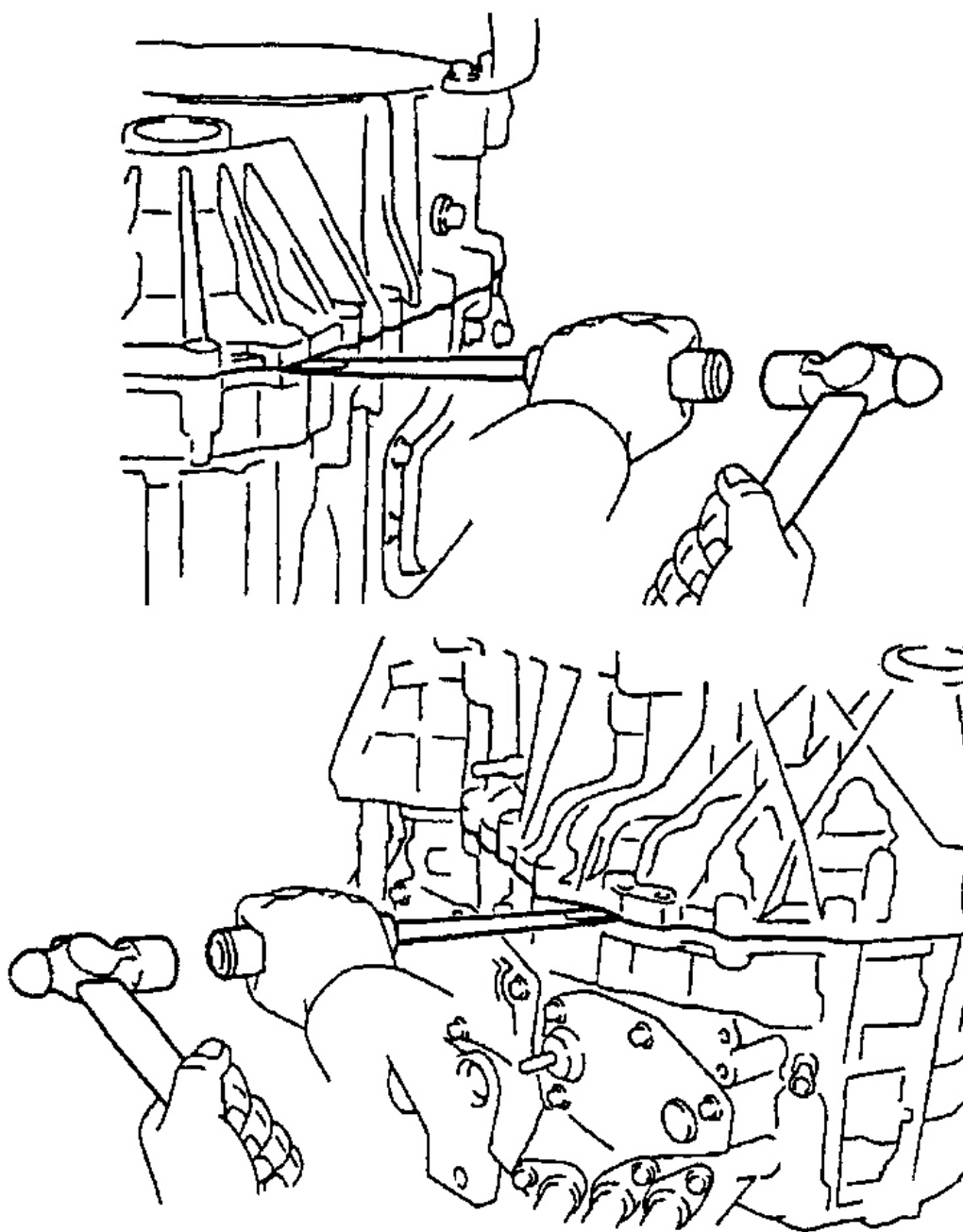
**Fig. 3: Installing Engine Hanger**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



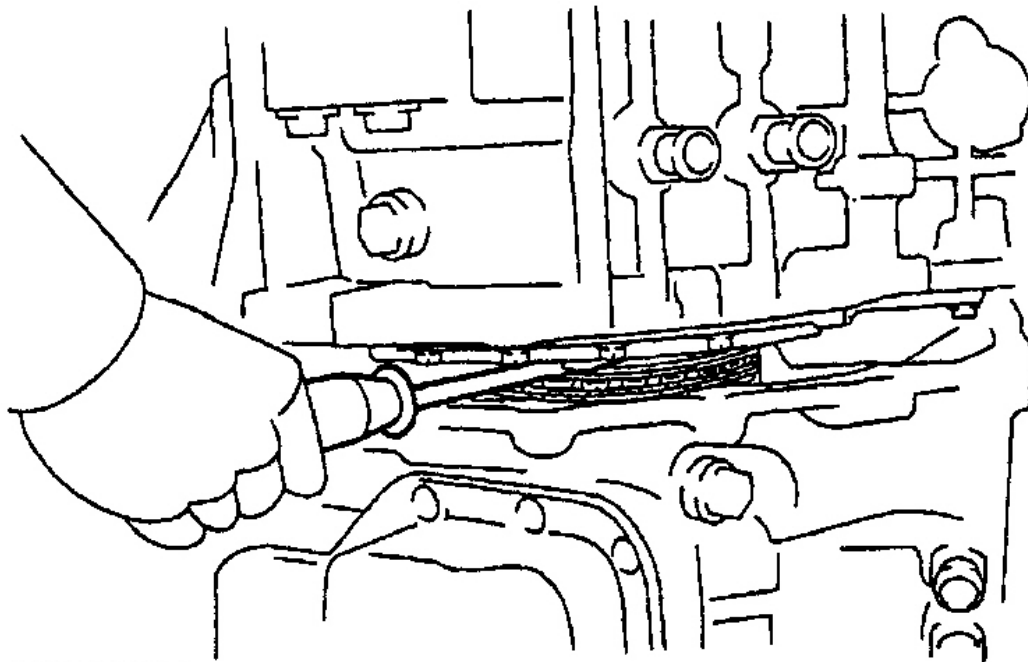
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**Fig. 4: Removing Motor Generator No. 1 Assembly Bolts**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



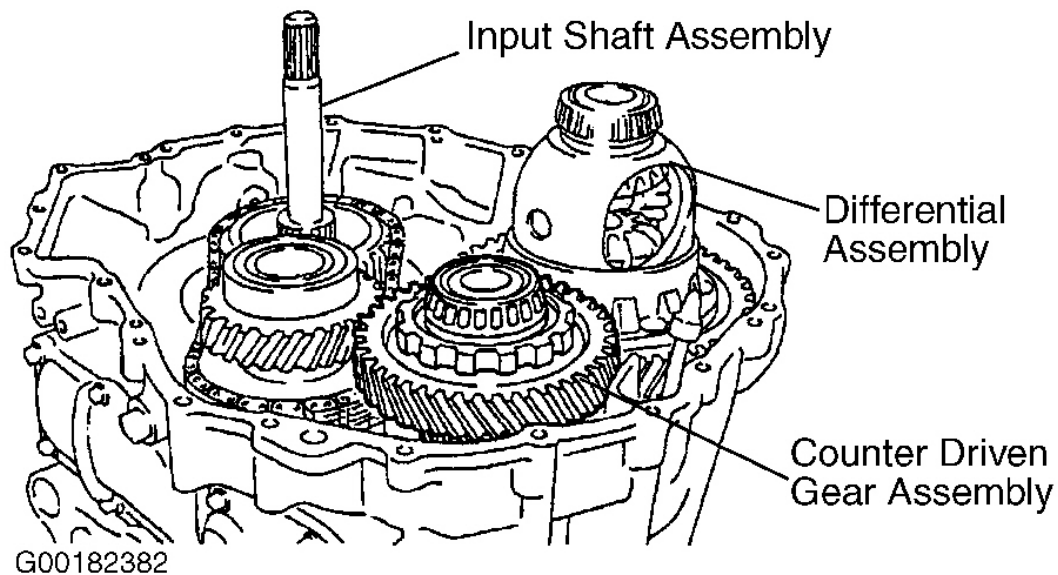
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**Fig. 5: Separating Motor Generator No. 1 Assembly From Motor Generator No. 2 Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

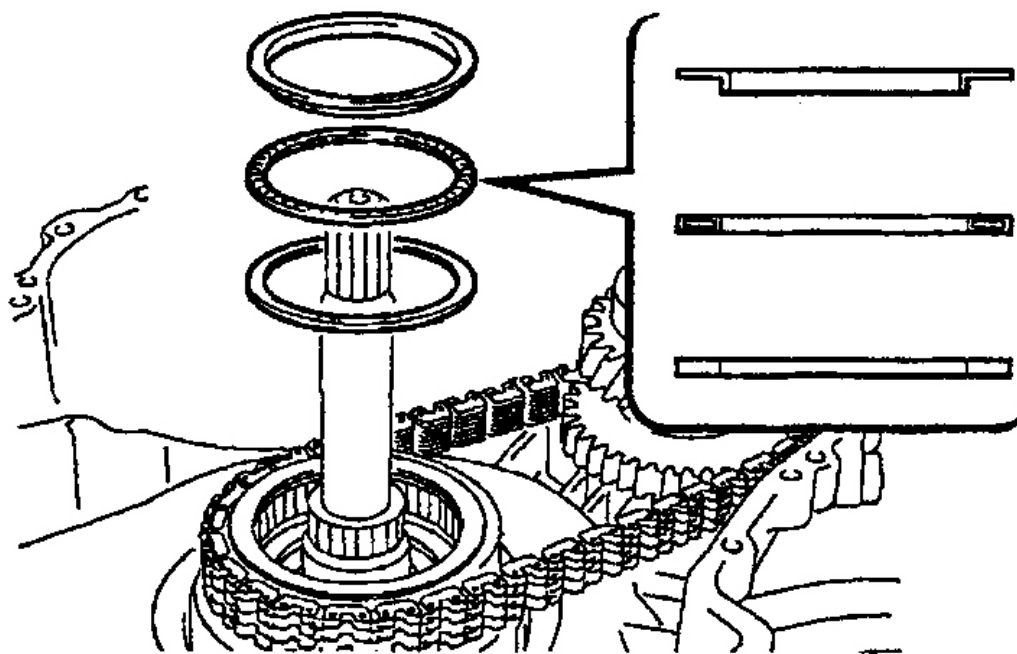


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**Fig. 6: Pushing Down On Chain With Screwdriver Tip**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

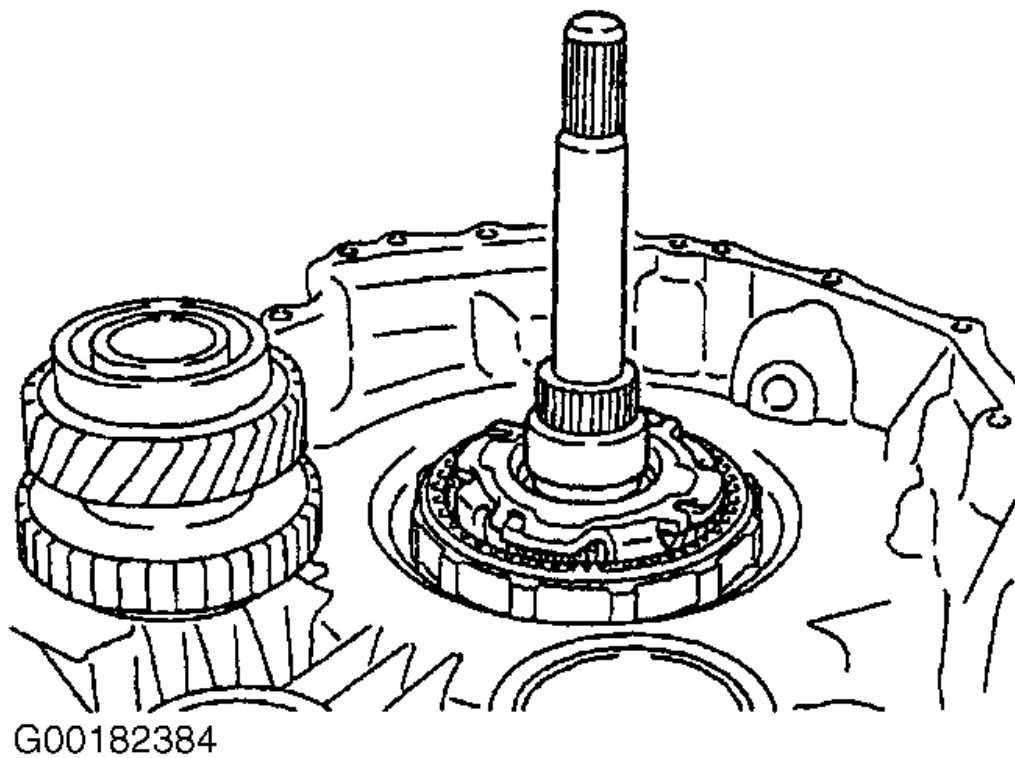


**Fig. 7: Removing Counter Driven Gear Assembly From Motor Generator No. 2 Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

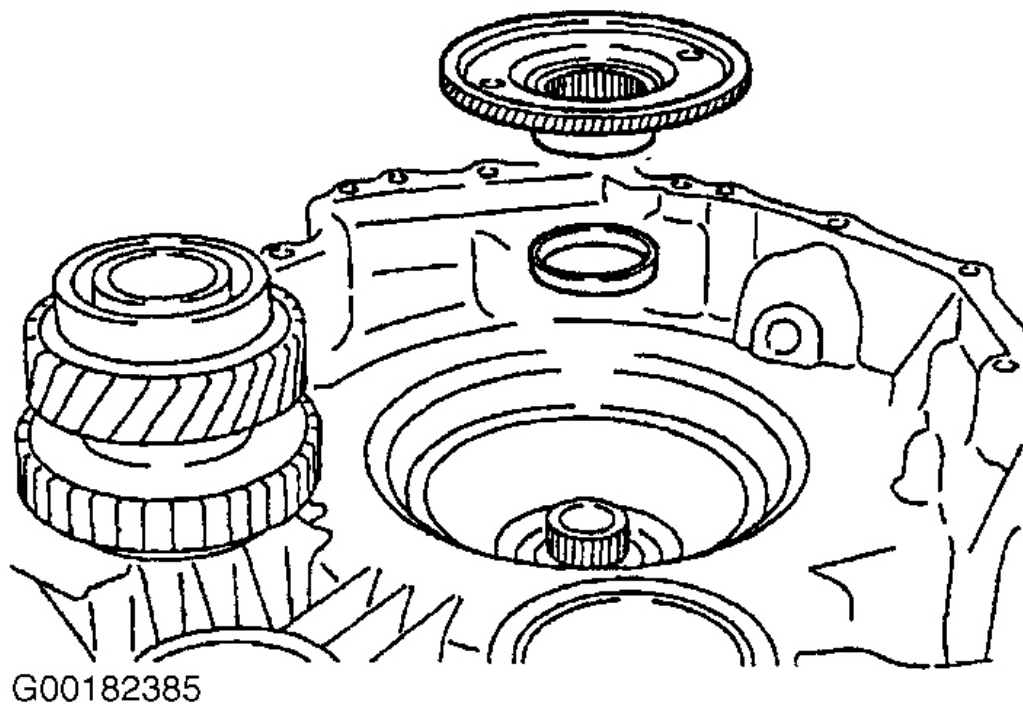


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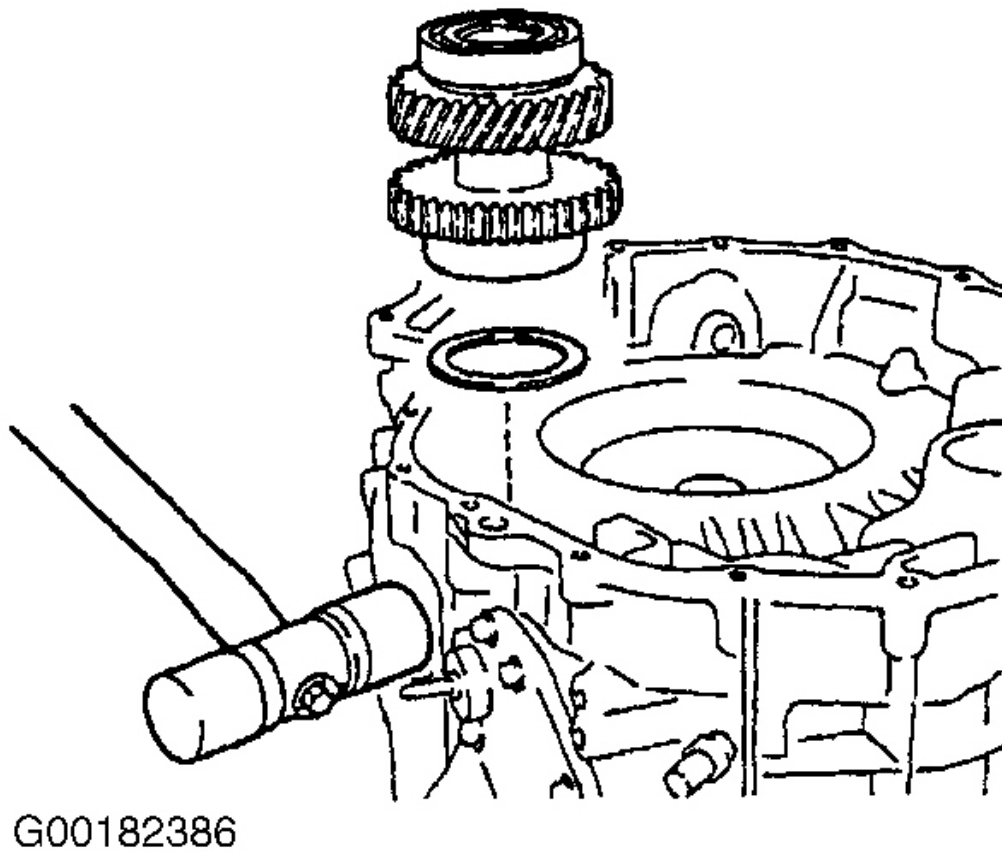
**Fig. 8: Removing 2 Race & Needle Roller Bearing**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



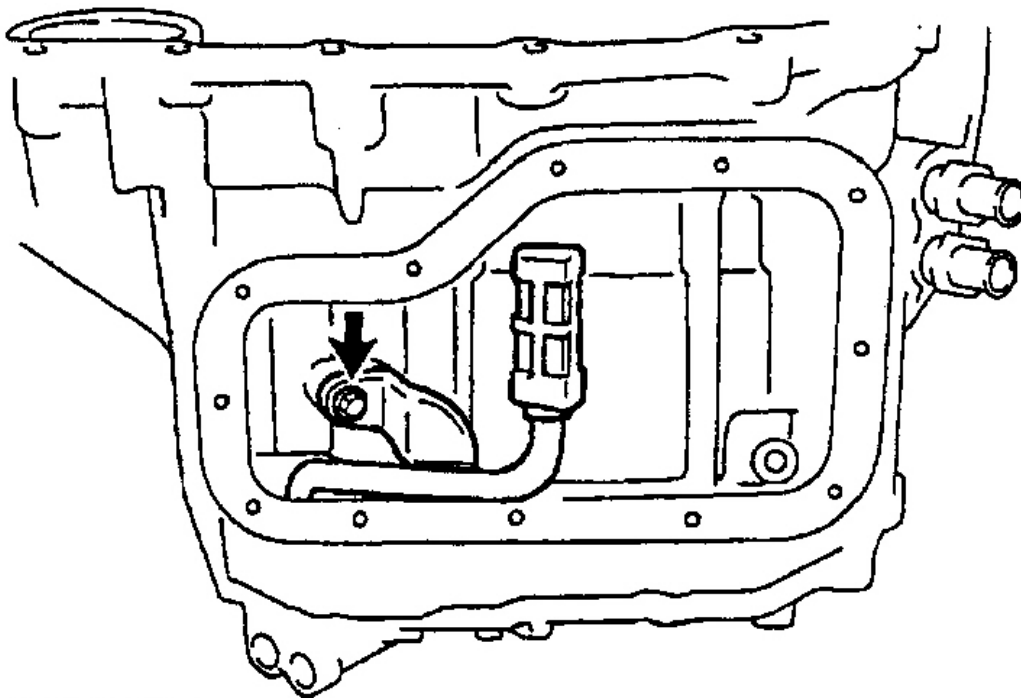
**Fig. 9: Removing Input Shaft Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 10: Removing Ring Gear Flange & Shim**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



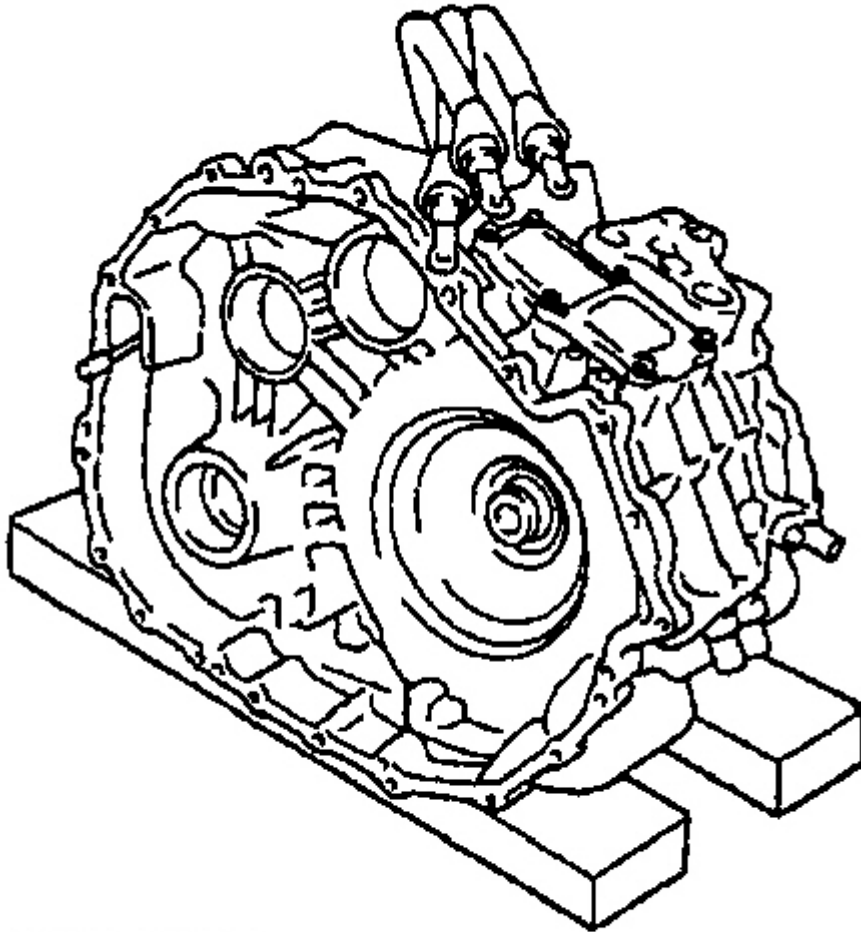
**Fig. 11: Removing Counter Drive Gear & Shim**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 12: Removing Oil Strainer**

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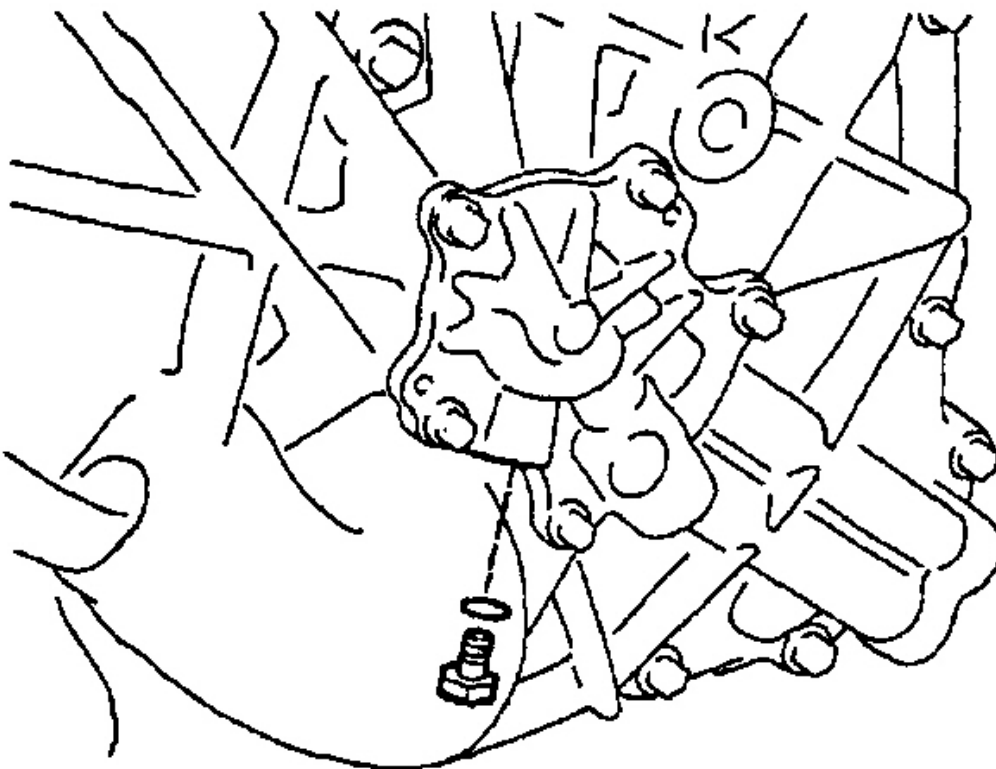


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**Fig. 13: Placing Motor Generator No. 2 Assembly On Wooden Blocks**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

10. Remove parking lock shaft assembly. See **Fig. 22** . Remove washer from parking lock shaft. Using a chisel and a hammer, cut and remove spacer. Using a pin punch and a hammer, drive out pin. Remove parking lock lever No. 3 from parking lock shaft.
11. Remove plug from oil pump cover. See **Fig. 14** . Remove "O" ring from plug. Remove 5 bolts and oil pump cover. Remove "O" ring from motor generator No. 2 assembly. Mark drive and driven rotor for reassembly reference. Remove drive and driven rotor from motor generator No. 2 assembly. Remove oil pump drive shaft. See **Fig. 22** .
12. Using appropriate puller, remove differential side bearing outer race and shim. Using appropriate puller, remove counter driven gear side bearing outer race and shim. See **Fig. 21** .

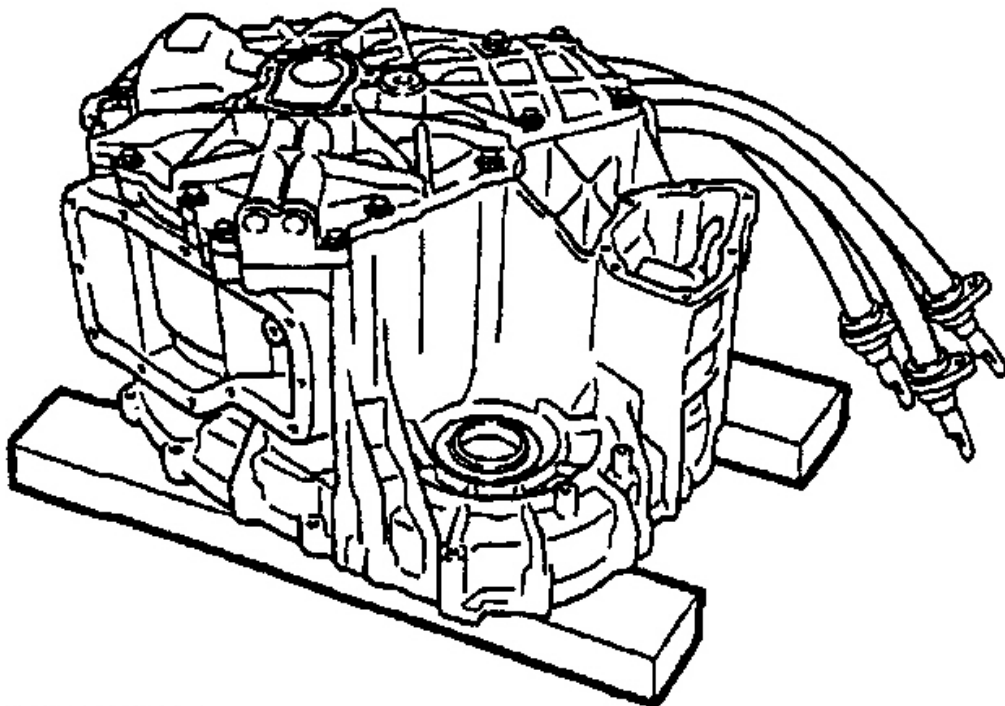
13. Turn motor generator No. 2 assembly over and place on wooden blocks to stabilize unit. See **Fig. 15** . Do not bend the parking lock rod. Using a screwdriver, pry out left side differential oil seal. Remove 2 screw plugs using a hexagon wrench. Remove 2 filler plugs and gaskets. See **Fig. 16** .
14. Remove breather plug. Place wooden blocks under motor generator No. 1 assembly to stabilize unit. See **Fig. 17** . Remove 4 bolts and power cable cover. See **Fig. 21** . Remove 6 bolts and high voltage cable. See **Fig. 18** . Remove bolt and wiring harness connector.
15. Remove 2 water jacket unions from motor generator No. 1 assembly. Remove housing tube. See **Fig. 21** . Using appropriate puller, remove input shaft oil seal. Using a screwdriver, remove right side differential oil seal. Turn motor generator No. 1 assembly upside down.
16. Remove bolt and lock clamp. See **Fig. 19** . Remove parking lock pawl shaft and parking lock pawl. Remove 2 bolts, sleeve bracket, torsion spring and parking lock sleeve. See **Fig. 21** .
17. Remove cam guide sleeve from sleeve bracket. Using appropriate puller, remove counter driven gear side bearing outer race (right side). Using appropriate puller, remove differential side bearing outer race (right side). Remove screw plug from motor generator No. 1 assembly using hexagon wrench. Remove drain plug and gasket (if necessary). See **Fig. 20** .



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**Fig. 14: Removing Oil Pump Cover Plug**

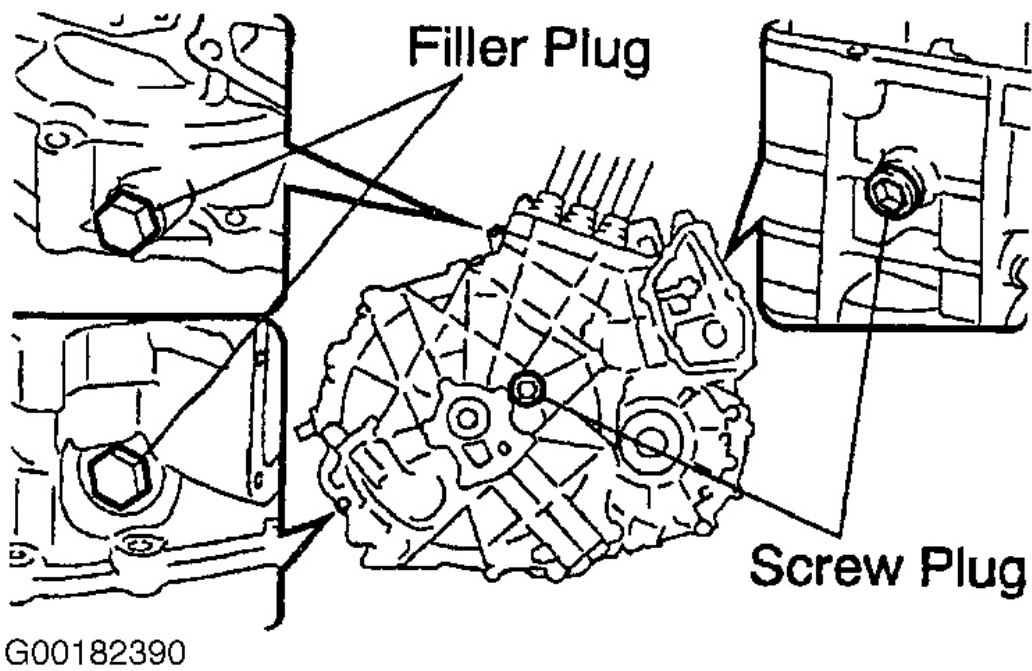
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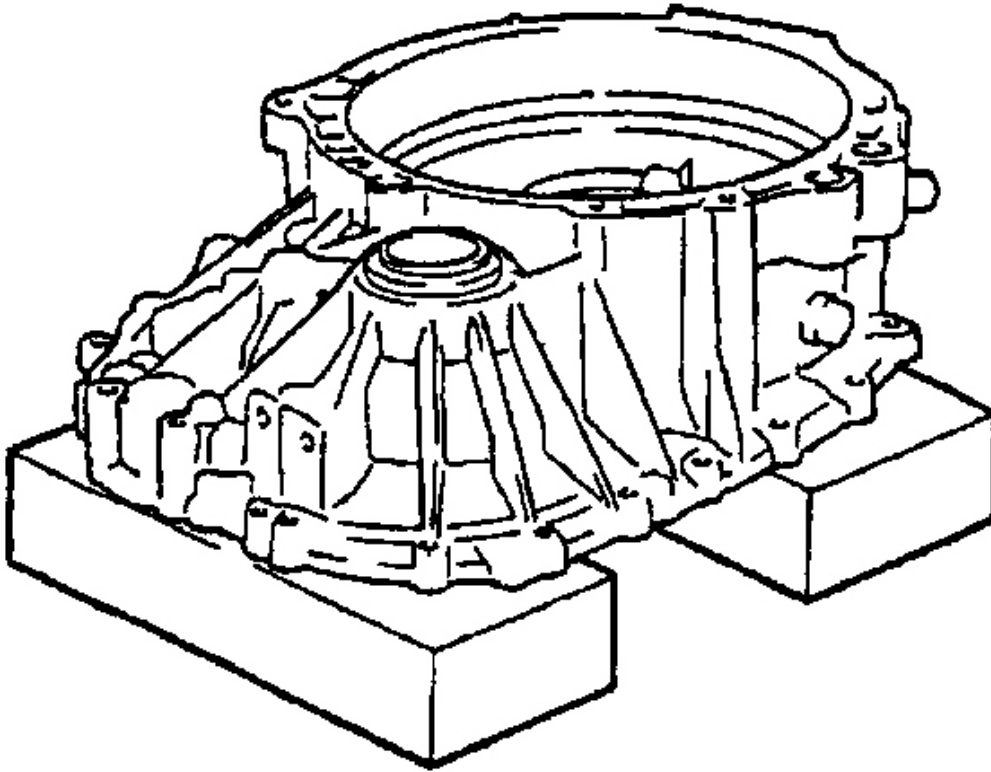
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**Fig. 15: Repositioning Motor Generator No. 2 On Wooden Blocks**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

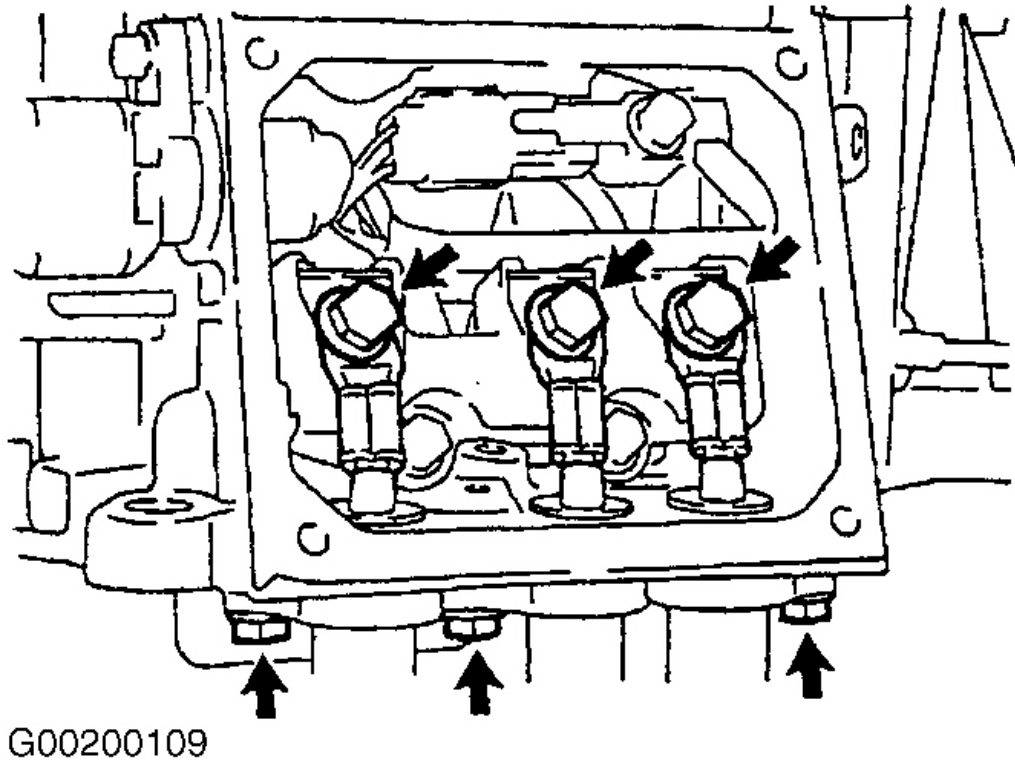


**Fig. 16: Removing Filler Plugs & Screw Plugs**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

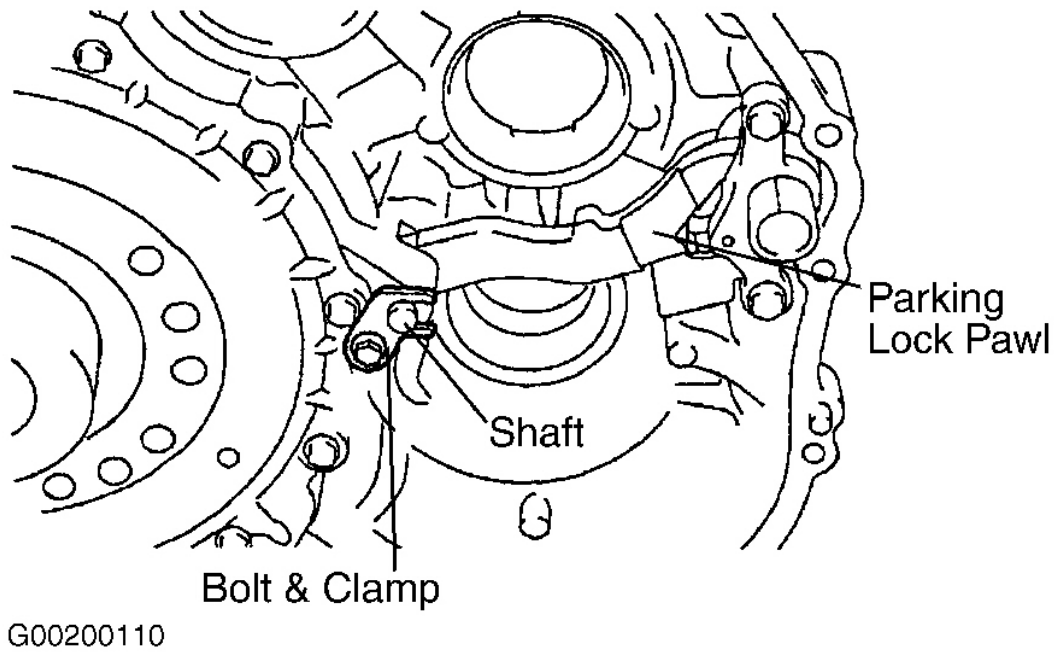


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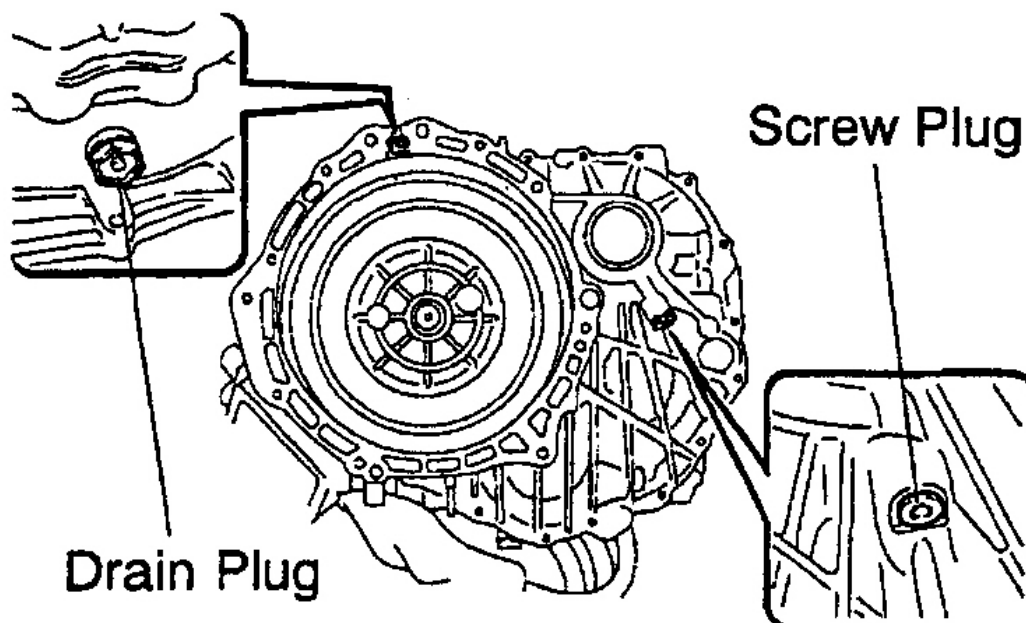
**Fig. 17: Placing Wooden Blocks Under Motor Generator No. 1 Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 18: Removing High Voltage Cable Bolts**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

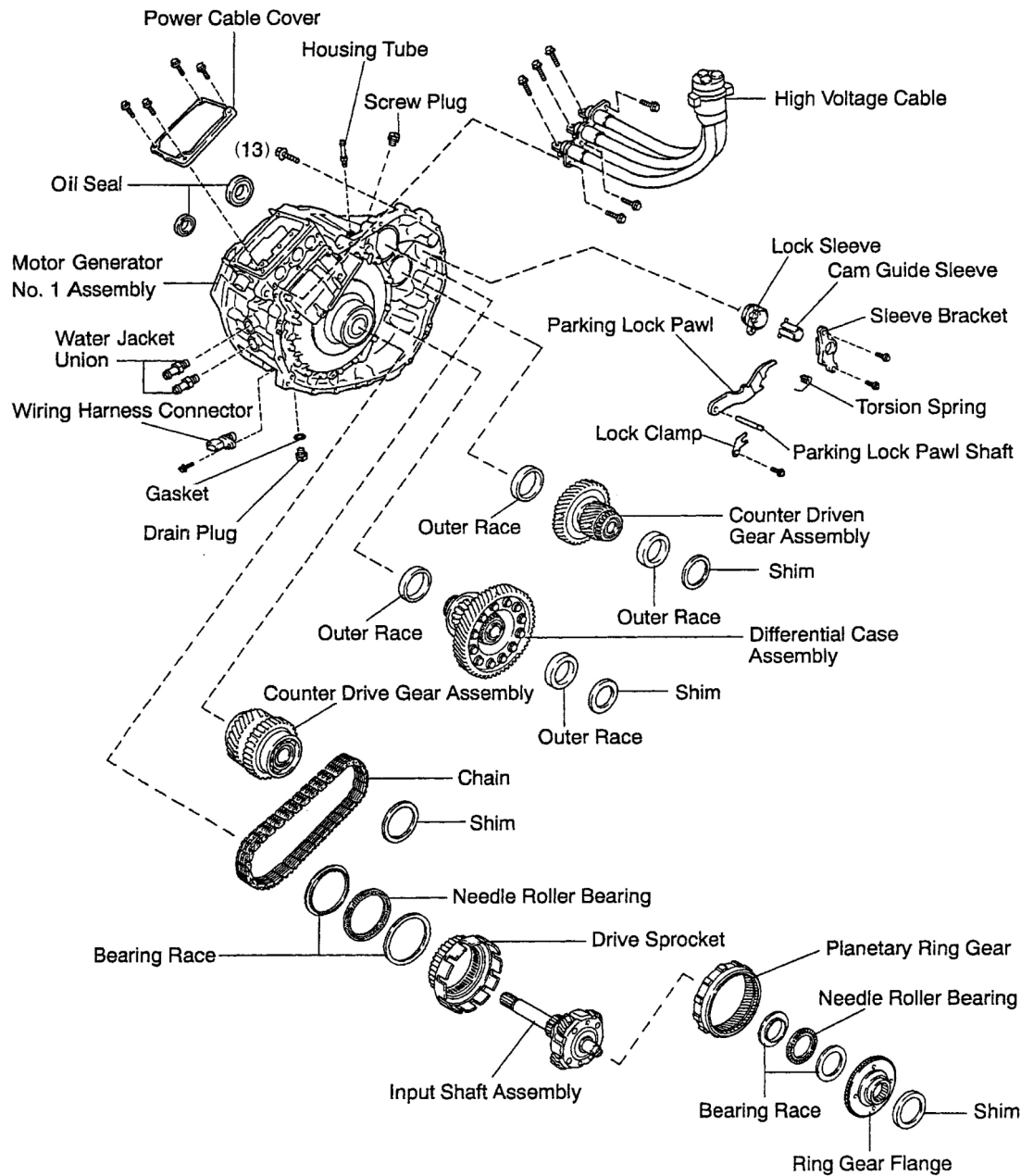


**Fig. 19: Removing Lock Clamp Bolt**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



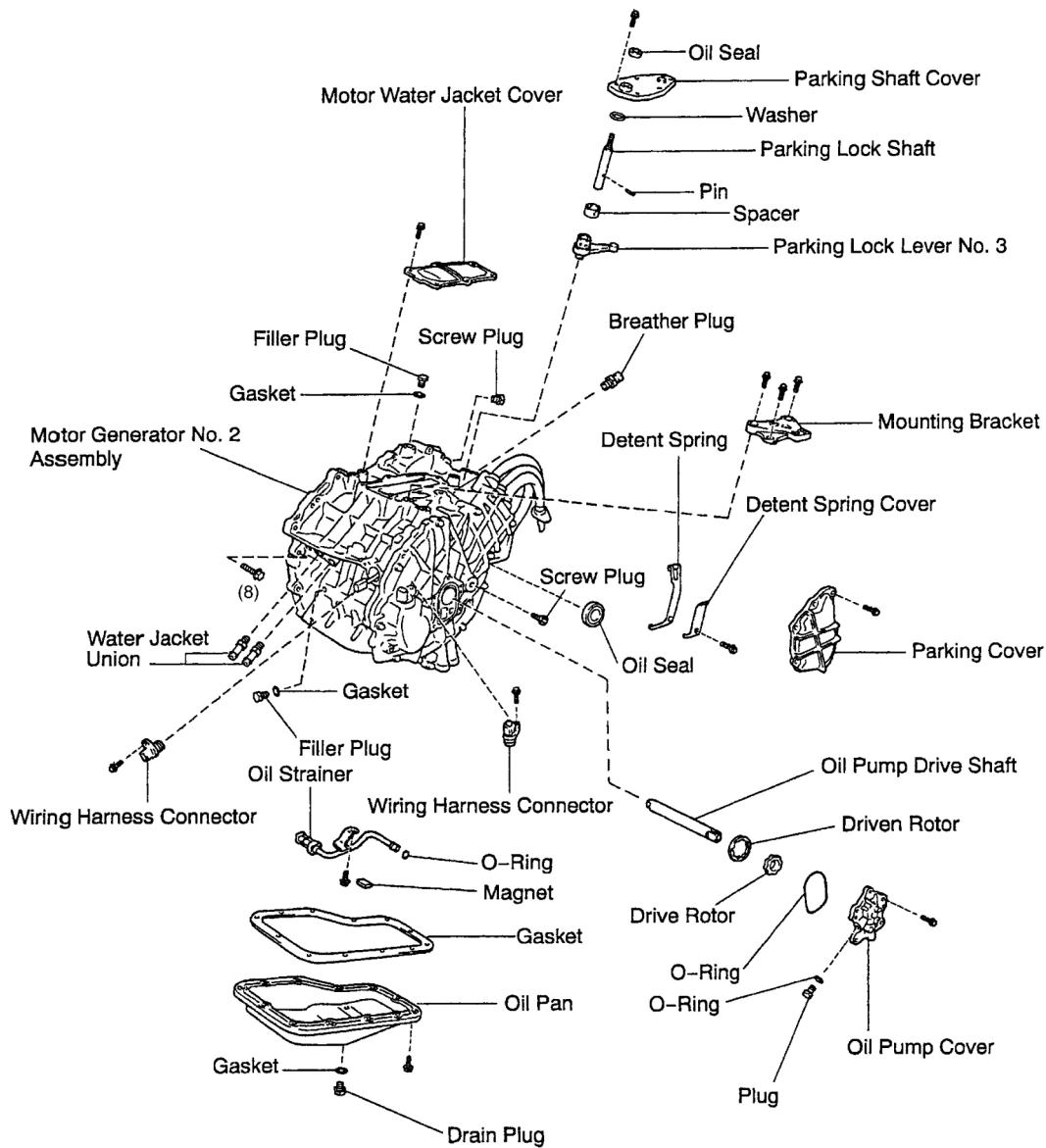
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**Fig. 20: Removing Drain Plug & Screw Plug From Motor Generator No. 1 Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 21: Exploded View Of Motor Generator No. 1 Assembly Components**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 22: Exploded View Of Motor Generator No. 2 Assembly Components**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## COMPONENT DISASSEMBLY & REASSEMBLY

### INPUT SHAFT ASSEMBLY

#### Disassembly

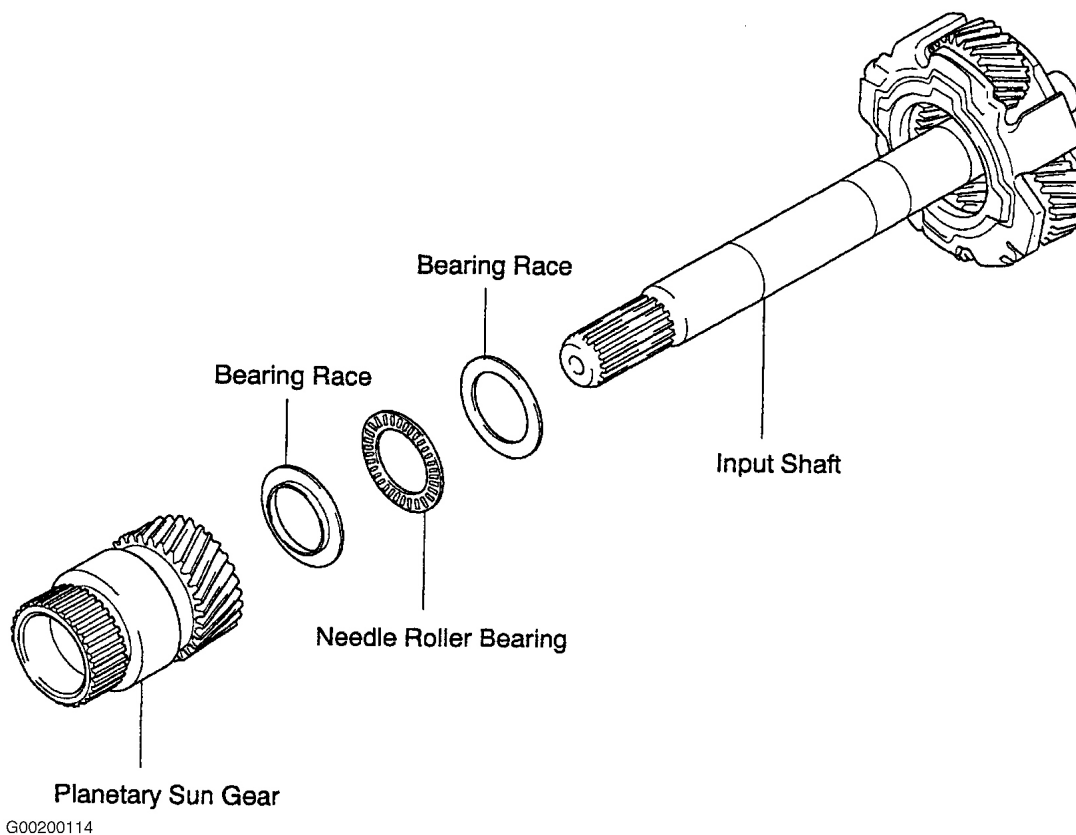
Remove planetary sun gear from input shaft. Using a screwdriver, remove needle roller bearing and 2 bearing races. See [Fig. 23](#).

### Inspection

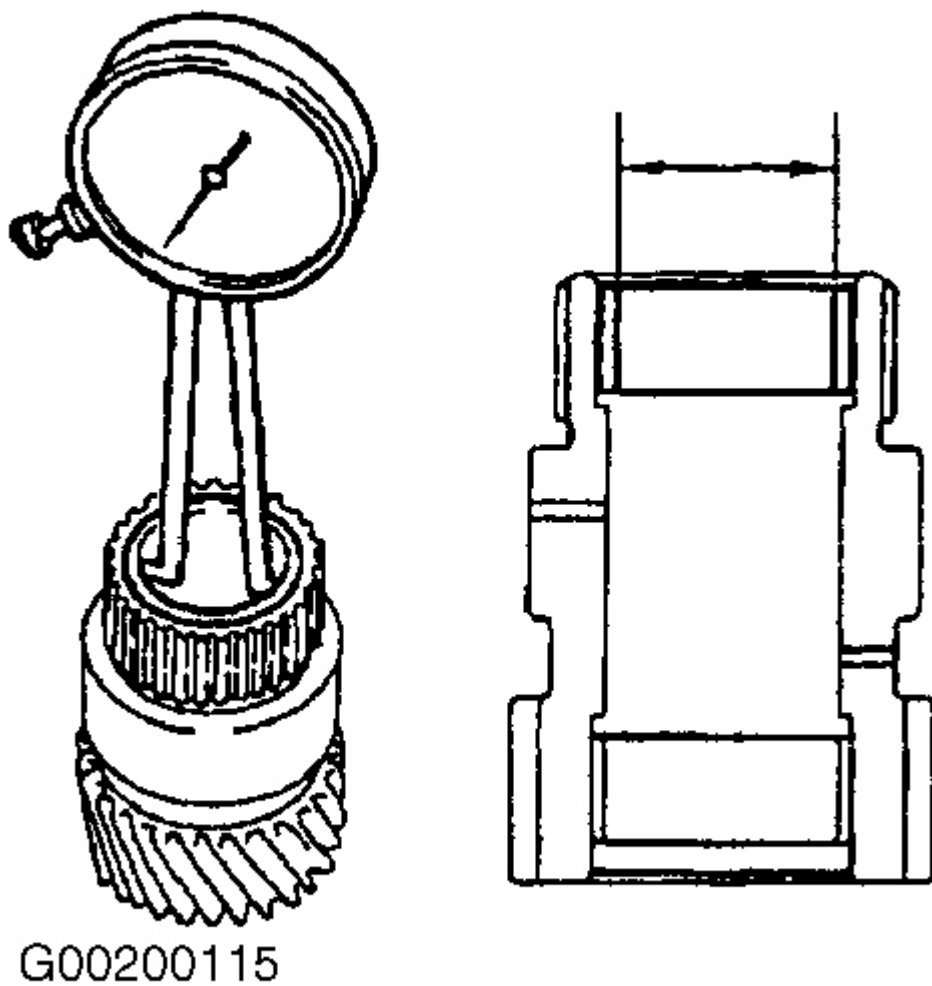
Using a dial indicator, measure bushing inside diameter on both sides of planetary sun gear. See **Fig. 24** and **Fig. 25**. Standard diameter should be 1.005-1.006" (25.53-25.55 mm). Maximum diameter is 1.008" (25.60 mm). Ensure there are no burnt spots or scratches on bushing. If bushing inside diameter exceeds specification, replace planetary sun gear. Check needle roller bearing for burnt spots, deformation or play due to wear. Replace as necessary.

### Reassembly

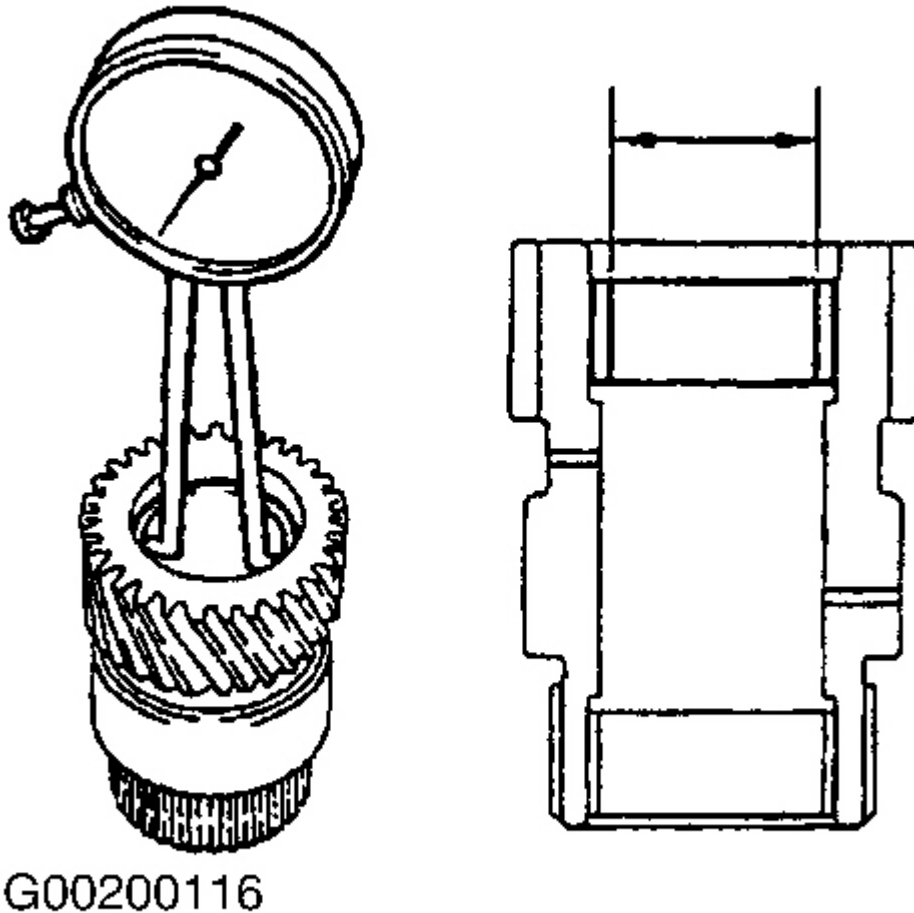
To reassemble, reverse disassembly procedure.



**Fig. 23: Exploded View Of Input Shaft**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 24: Measuring Planetary Sun Gear Bushing Inside Diameter (1 Of 2)**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 25: Measuring Planetary Sun Gear Bushing Inside Diameter (2 Of 2)**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## COUNTER DRIVE GEAR

### Disassembly

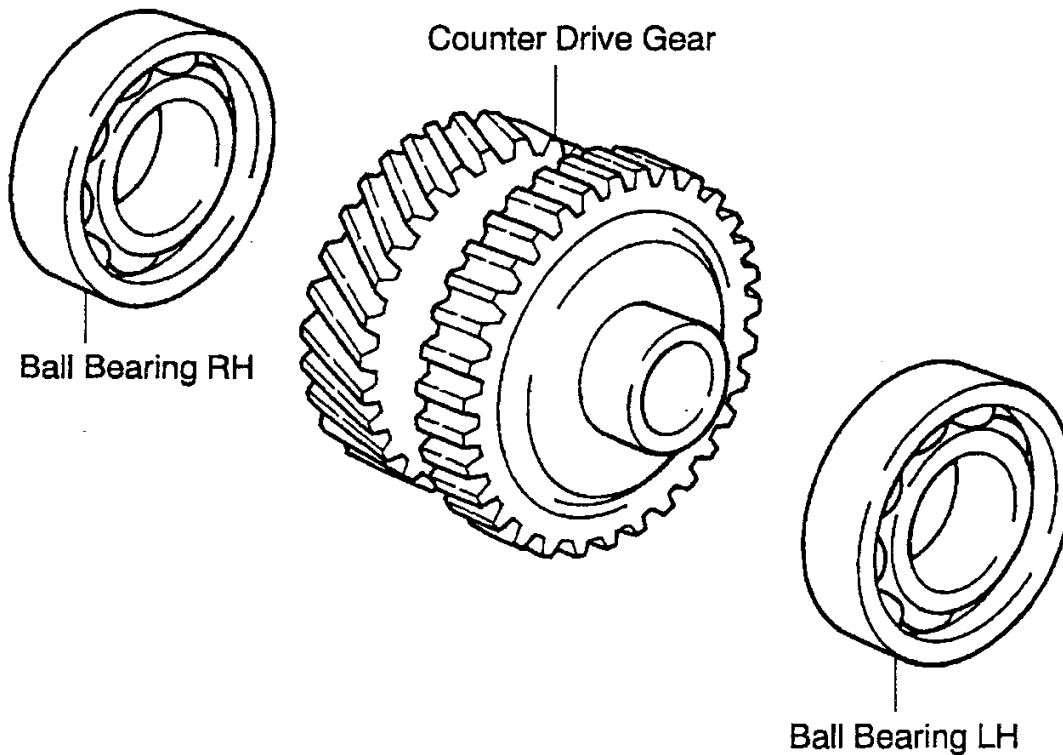
Using appropriate adapter and a press, remove ball bearings from counter drive gear (if necessary). See **Fig. 26** .

### Inspection

Check bearings for burnt spots, deformation or play due to wear. Replace as necessary. Check counter drive gear teeth for chips or wear. Replace as necessary.

### Reassembly

To reassemble, reverse disassembly procedure using appropriate adapter and a press.



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**Fig. 26: Identifying Counter Drive Gear & Bearings**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

### COUNTER DRIVEN GEAR

#### Disassembly

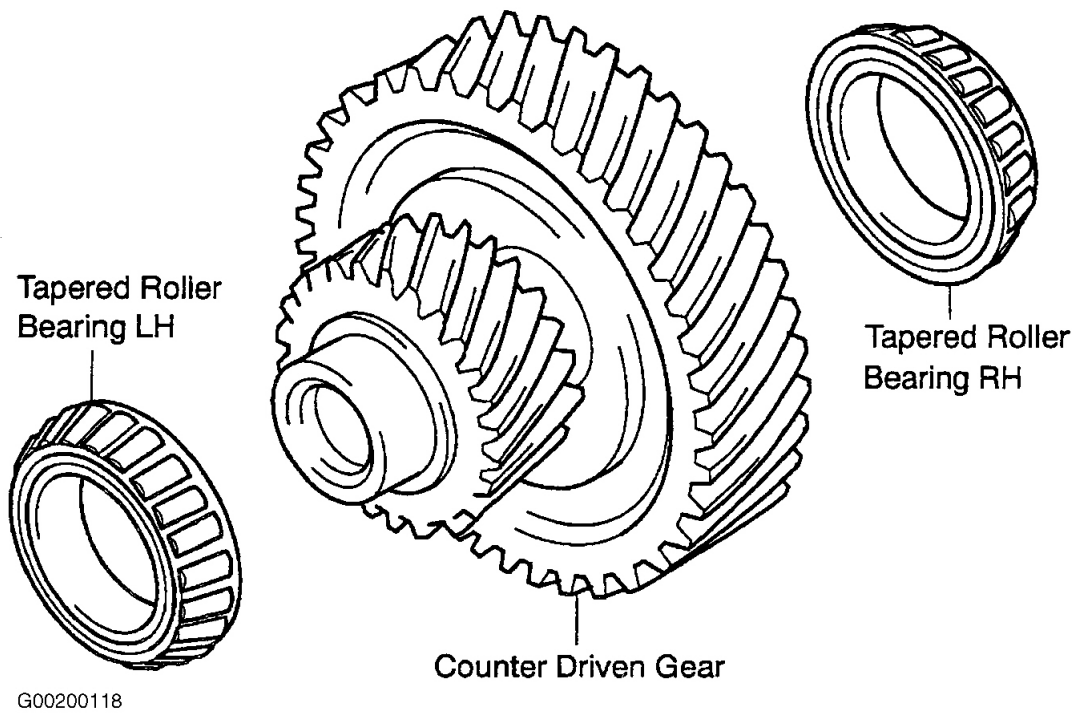
Using appropriate adapter and a press, remove tapered roller bearings from counter driven gear (if necessary). See **Fig. 27**.

#### Inspection

Check bearings for burnt spots, deformation or play due to wear. Replace as necessary. Check counter driven gear teeth for chips or wear. Replace as necessary.

#### Reassembly

To reassemble, reverse disassembly procedure using appropriate adapter and a press.



**Fig. 27: Identifying Counter Drive Gear & Bearings**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## DRIVE SPROCKET

### Disassembly

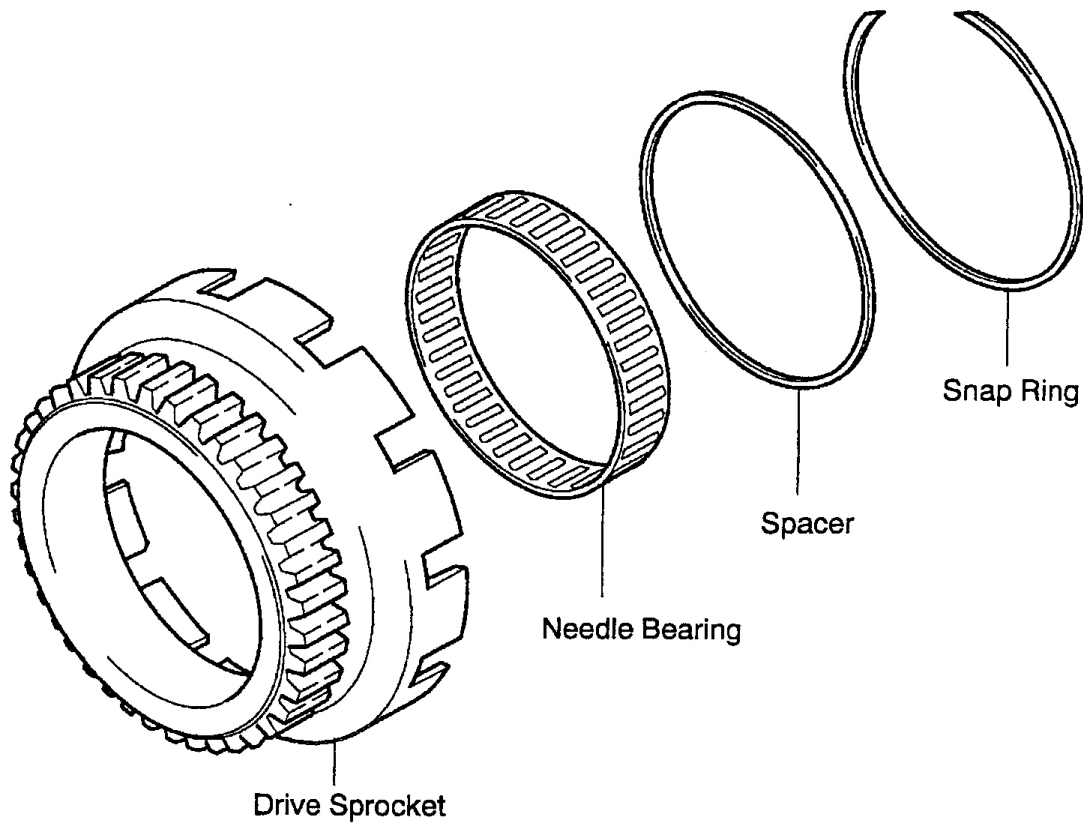
Using a screwdriver, remove snap ring. Remove needle bearing and spacer. See **Fig. 28**.

### Inspection

Check needle bearing for burnt spots, deformation or play due to wear. Replace as necessary. Check drive sprocket teeth for chips or wear. Replace as necessary.

### Reassembly

To reassemble, reverse disassembly procedure.



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**Fig. 28: Identifying Drive Sprocket Components**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**DIFFERENTIAL ASSEMBLY****Disassembly**

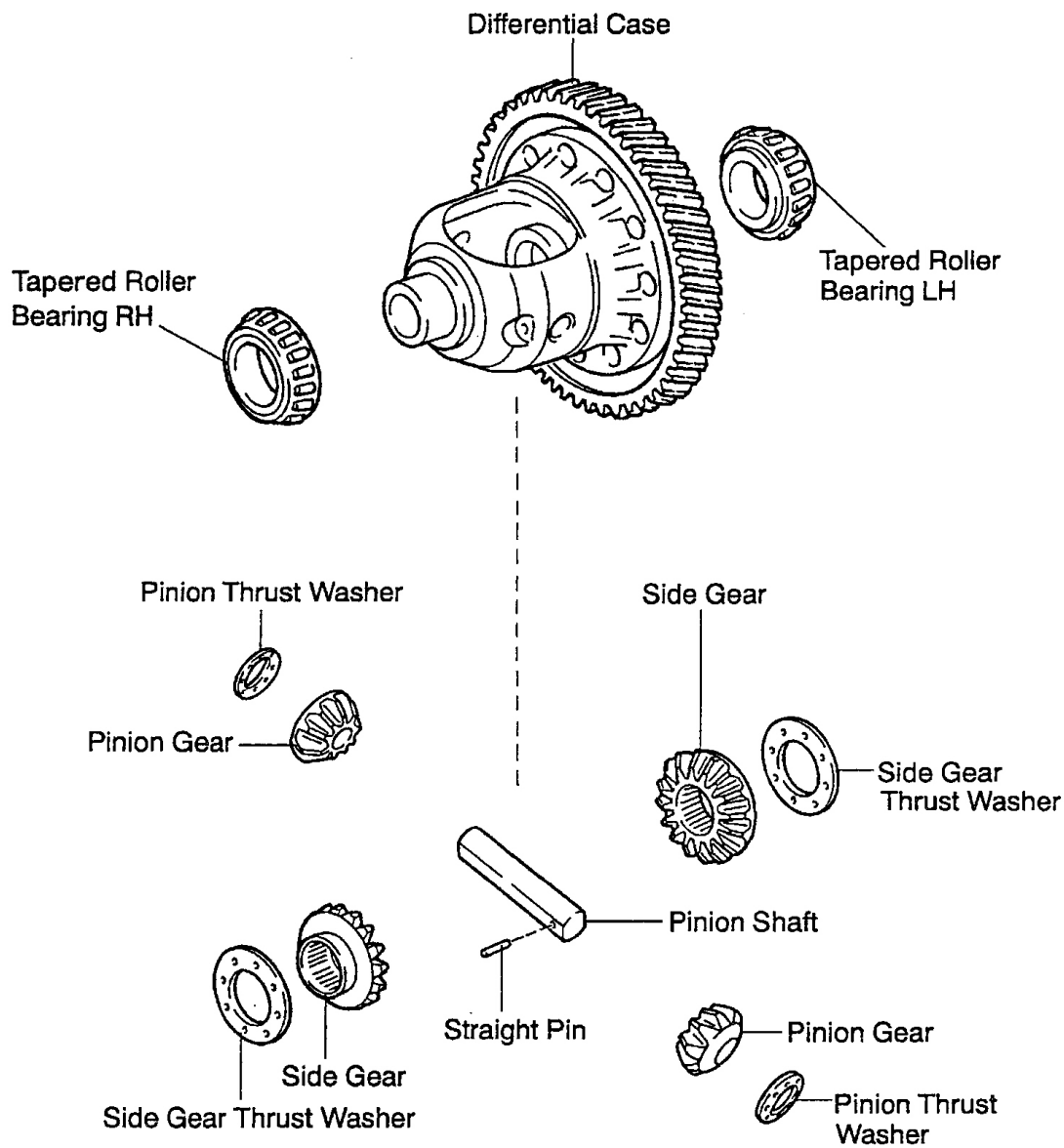
1. Secure differential case in a soft-jawed vise. Using appropriate puller, remove tapered roller bearings from differential case. See **Fig. 29** . Note size and location of roller bearings for reassembly reference. One bearing has 22 large rollers, and the other bearing has 24 small rollers. Using a pin punch and a hammer, drive out straight pin. See **Fig. 30** .
2. Remove pinion shaft, 2 pinion gears, 2 pinion thrust washers, 2 side gears, and 2 side gear thrust washers from differential case. See **Fig. 29** .

**Inspection**

Check tapered roller bearings for burnt spots, deformation or play due to wear. Replace as necessary. Check ring gear, pinion gear and side gear teeth for chips or wear. Replace as necessary.

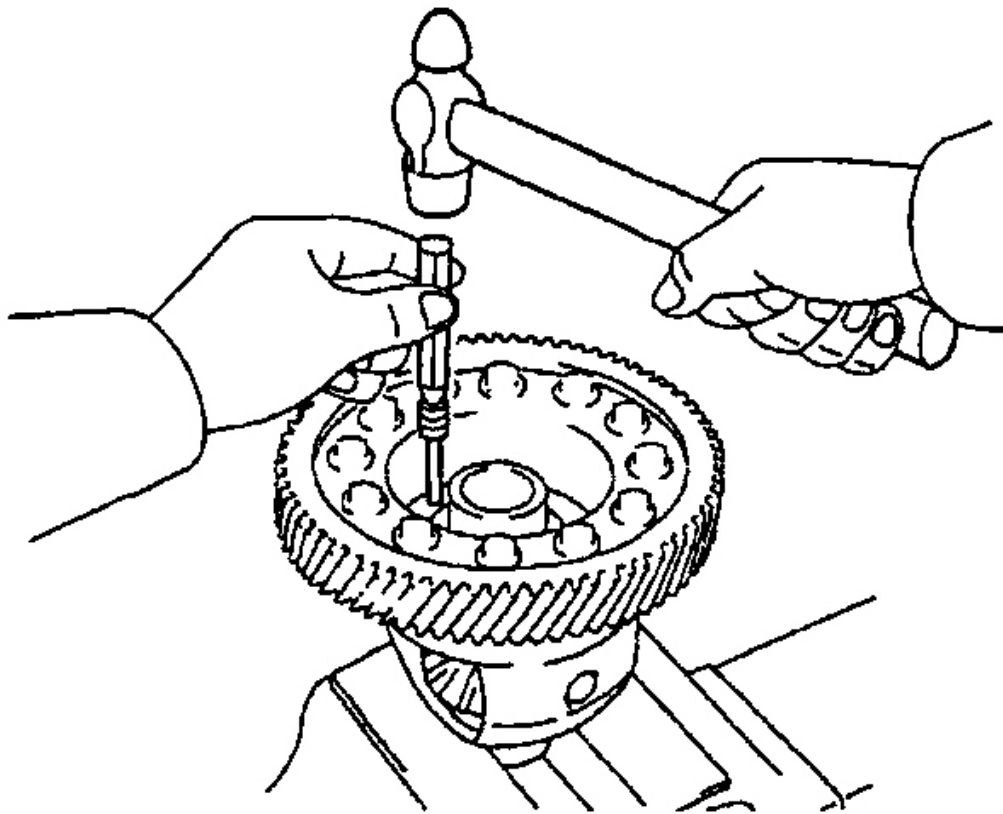
**Reassembly**

1. Coat 2 side gear thrust washers and 2 pinion thrust washers with ATF. Install 2 side gears, 2 pinion gears and 4 thrust washers into differential case. See **Fig. 29**.
2. Check side gear backlash. Using a dial indicator, measure side gear backlash while pushing one pinion gear toward differential case. See **Fig. 31**. Backlash should be .0020-.0079" (.050-.200 mm). If backlash is not within specification, select appropriate thrust washers to ensure backlash is within specification. Thrust washers are available in thicknesses from .037" (.95 mm) to .047" (1.20 mm), in increments of .002" (.05 mm). Select thrust washers of the same size for both sides.
3. Using a pin punch and a hammer, install straight pin. Stake differential case at straight pin after installation. Using appropriate adapter and a press, install tapered roller bearings to differential case. See **Fig. 29**. Ensure roller bearings are installed correctly. Left side (ring gear side) bearing has 22 large rollers, and right side bearing has 24 small rollers.



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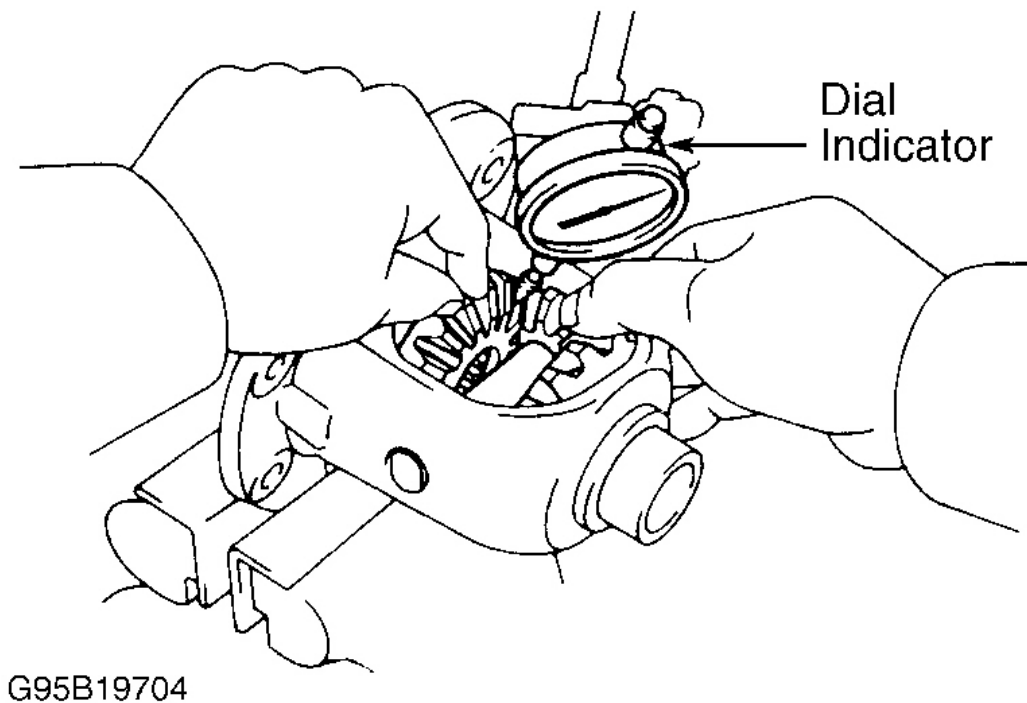
**Fig. 29: Exploded View Of Differential Assembly**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 30: Driving Out Straight Pin**

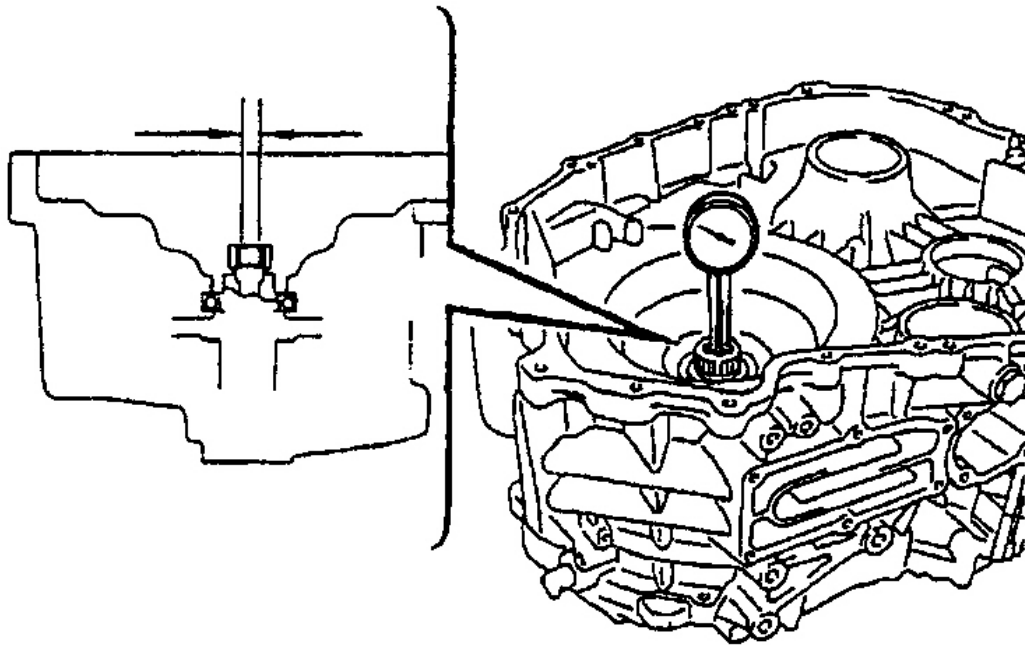
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 31: Measuring Differential Pinion Gear Backlash**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## TRANSMISSION REASSEMBLY

1. Inspect rotor bushing for motor generator No. 2 assembly. Using a dial indicator, measure bushing inside diameter. See **Fig. 32** . Standard diameter should be .788-.789" (20.03-20.05 mm). Maximum diameter is .791" (20.10 mm). If inside diameter exceeds specification, replace motor generator No. 2 assembly.
2. Place on wooden blocks under motor generator No. 1 assembly to stabilize unit. See **Fig. 17** . Apply sealant to screw plug and install it into motor generator No. 1 assembly using a hexagon wrench. See **Fig. 20** . Install NEW gasket and drain plug. Tighten plug to specification. See **TORQUE SPECIFICATIONS** .

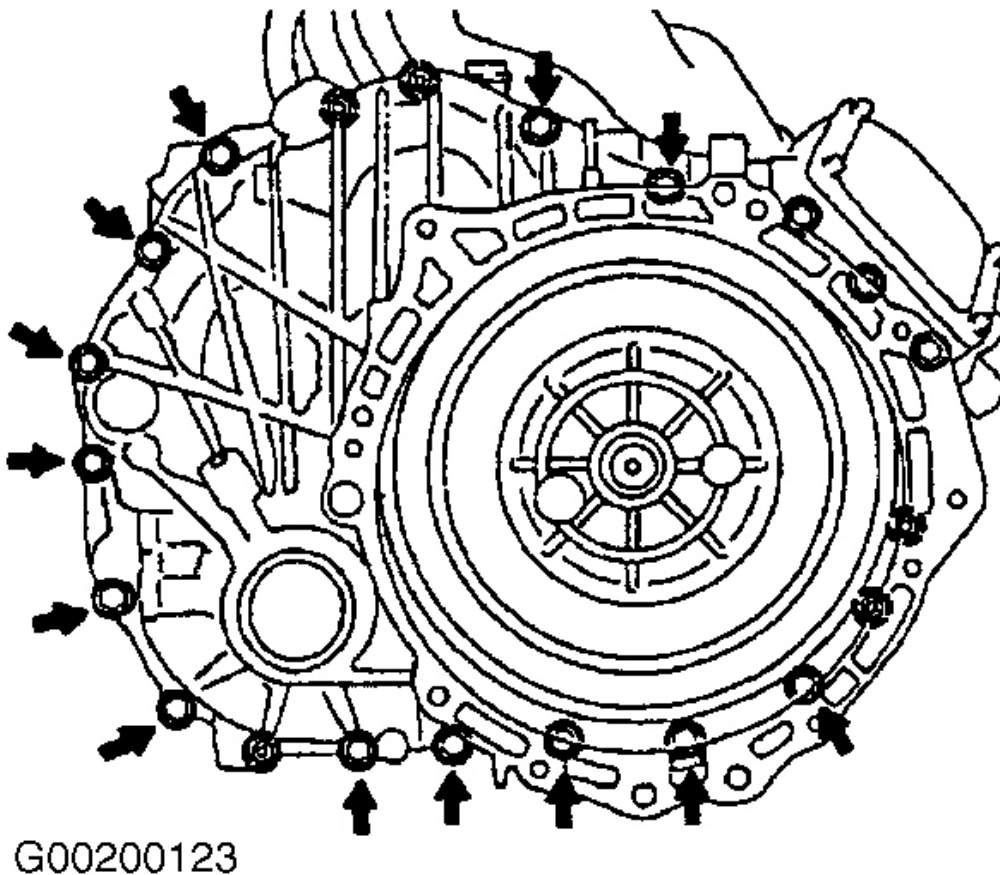


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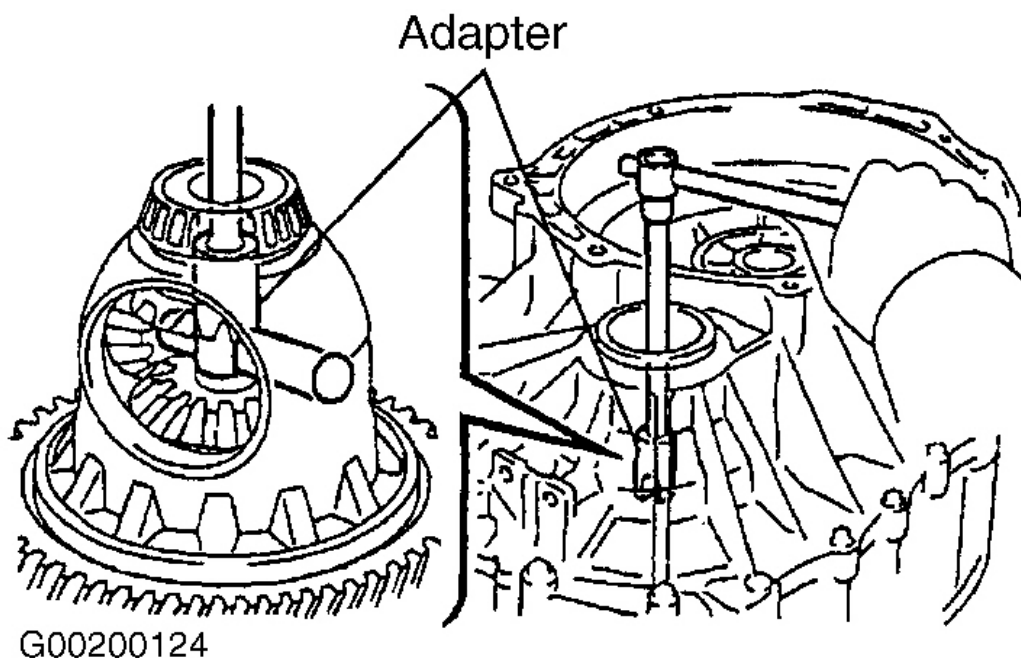
**Fig. 32: Measuring Rotor Bushing Inside Diameter**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Place wooden blocks under motor generator No. 2 assembly to stabilize unit. See **Fig. 15** . Be careful not to bend parking lock rod. Apply thread sealant to 2 screw plugs and install them into motor generator No. 2 assembly using hexagon wrench. Install 2 NEW gaskets to filler plugs and install plugs. See **Fig. 16** . Tighten plugs to specification. See **TORQUE SPECIFICATIONS** .
4. Using appropriate adapter, driver and a hammer, install NEW differential oil seals to motor generator No. 1 and No. 2 assemblies. Install oil seals to a depth of .087-.126" (2.20-3.20 mm). Coat lip of seal with ATF. Install breather plug and tighten to specification.
5. Place wooden blocks under motor generator No. 2 assembly to stabilize unit in a horizontal position. Do not apply excessive force to high voltage cable. Using appropriate adapter, driver and a hammer, install differential side bearing outer race and shim to motor generator No. 2 assembly. If replacing shim, ensure NEW shim is same thickness as original shim.
6. Using appropriate adapter, driver and a hammer, install counter driven gear tapered roller bearing outer race and shim to motor generator No. 2 assembly. Using appropriate adapter, driver and a hammer, install differential side bearing outer race to motor generator No. 1 assembly. Using appropriate adapter, driver and a hammer, install counter driven gear tapered roller bearing outer race to motor generator No. 1 assembly.
7. Install differential assembly into motor generator No. 2 assembly. See **Fig. 7** . Apply ATF to side bearing. Install engine hanger with chain on motor generator No. 1 assembly side of transaxle. Lift transaxle up and install a wooden block underneath transaxle to stabilize it. See **Fig. 3** .

8. Install 13 bolts and motor generator No. 1 assembly to motor generator No. 2 assembly. See **Fig. 33** . Using appropriate adapter, rotate differential case assembly in both directions to seat bearings. See **Fig. 34** .
9. Using appropriate adapter and INCH-lb. torque wrench, measure differential preload. See **Fig. 34** . Preload (starting torque) for NEW bearings should be 8.67-13.90 INCH lbs. (.98-1.57 N.m). Preload (starting torque) for used bearings should be 4.34-6.90 INCH lbs. (.49-.78 N.m). Turning torque for all bearings should be 6.90-12.13 INCH lbs. (.78-1.37 N.m) at 60 RPM. If preload is not within specification, replace shim located behind left side differential outer race.



**Fig. 33: Installing Assemblies Using 13 Bolts**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



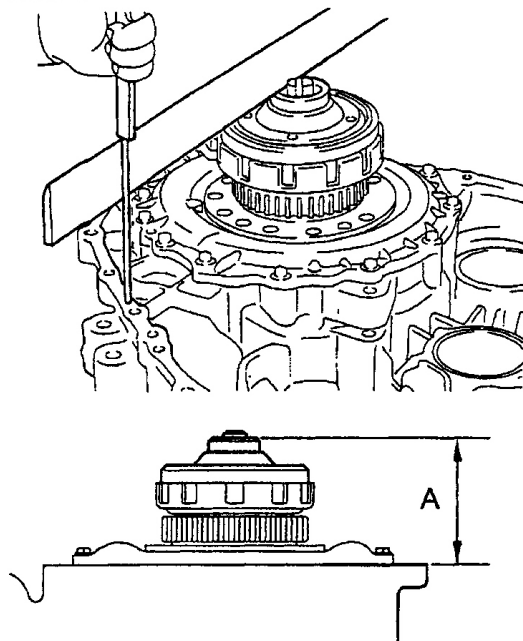
**Fig. 34: Rotating Differential Assembly For Preload Check**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

10. Shims are available in thicknesses from .0709" (1.800 mm) to .0744" (1.890 mm), in increments of .0011" (.030 mm). Shims are marked with numbers from No. 1 to No. 4.
11. Shims are also available in thicknesses from .0756" (1.920 mm) to .0913" (2.320 mm), in increments of .0011" (.030 mm). Shims are marked with numbers from No. 50 to No. 70.
12. Shims are also available in thicknesses from .0921" (2.340 mm) to .0969" (2.460 mm), in increments of .0011" (.030 mm). Shims are marked with numbers from No. 19 to No. 23.
13. As shim thickness is increased by .0007" (.020 mm), preload will increase about 2.04 INCH lbs. (.23 N.m).
14. Remove 13 bolts and separate motor generator No. 1 assembly from motor generator No. 2 assembly. See **Fig. 33** . Install counter driven gear into motor generator No. 2 assembly. See **Fig. 7** . Apply ATF to side bearing.
15. Install engine hanger with chain on motor generator No. 1 assembly side of transaxle. Lift transaxle up and install a wooden block underneath transaxle to stabilize it. See **Fig. 3** . Mate motor generator No. 1 assembly with motor generator No. 2 assembly. Install 21 bolts. See **Fig. 4** . Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
16. Using appropriate adapter, rotate differential case assembly in both directions to seat bearings. See **Fig. 34** .
17. Using appropriate adapter and INCH-lb. torque wrench, measure counter driven gear preload. Preload (starting torque) for NEW bearings should be 33.72-53.99 INCH lbs. (3.81-6.10 N.m). Preload (starting

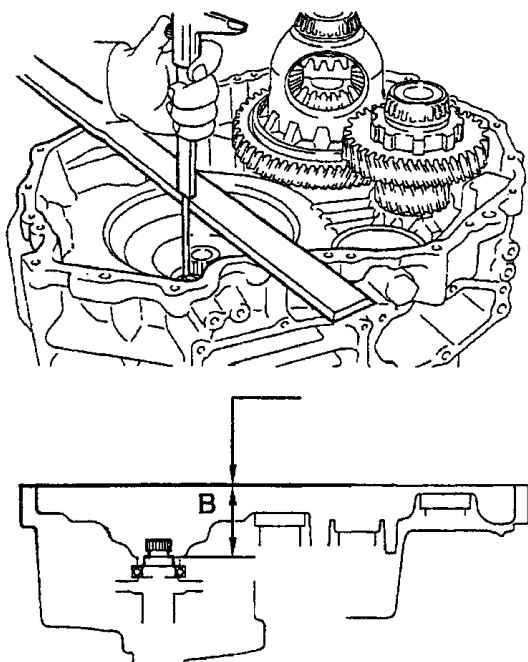
torque) for used bearings should be 16.91-26.82 INCH lbs. (1.91-3.03 N.m). Turning torque for all bearings should be 29.12-58.95 INCH lbs. (3.29-6.66 N.m) at 60 RPM. If preload is not within specification, replace shim located behind left side counter driven gear outer race.

18. Shims are available in thicknesses from .0492" (1.250 mm) to .0516" (1.310 mm), in increments of .0011" (.030 mm). Shims are marked with numbers from No. 1 to No. 3.
19. Shims are also available in thicknesses from .0528" (1.340 mm) to .0685" (1.740 mm), in increments of .0007" (.020 mm). Shims are marked with numbers from No. 50 to No. 70.
20. Shims are also available in thicknesses from .0693" (1.760 mm) to .0740" (1.880 mm), in increments of .0011" (.030 mm). Shims are marked with numbers from No. 18 to No. 22.
21. As shim thickness is increased by .0007" (.020 mm), preload will increase about 9.74 INCH lbs. (1.10 N.m).
22. Remove 13 bolts and separate motor generator No. 1 assembly from motor generator No. 2 assembly. See **Fig. 33** . Install 2 bearing races and needle roller bearing to motor generator No. 1 assembly. See **Fig. 21** .
23. Install drive sprocket assembly to motor generator No. 1 assembly. Install input shaft assembly. Install 2 bearing races and needle roller bearing. Install planetary ring gear. Install ring gear flange. See **Fig. 21** .
24. Using a straightedge and vernier calipers, measure dimensions "A" and "B". See **Fig. 35** . Select an input shaft shim that will ensure value is within specification. Shim thickness equals dimension "B" minus "A". Shims (12) are available in thicknesses from .039" (1.00 mm) to .126" (3.20 mm), in increments of .008" (.20 mm). Shims are marked with numbers from No. 1 to No. 12.
25. Install counter drive gear assembly to motor generator No. 1 assembly. Using a straightedge and vernier calipers, measure dimensions "A" and "B". See **Fig. 36** . Select a counter drive gear shim that will ensure value is within specification. Shim thickness equals dimension "B" minus "A". Shims (11) are available in thicknesses from .053" (1.35 mm) to .073" (1.85 mm), in increments of .002" (.05 mm). Shims are marked with letters from "A" to "L", (except the letter "I").

**Dimension A:**

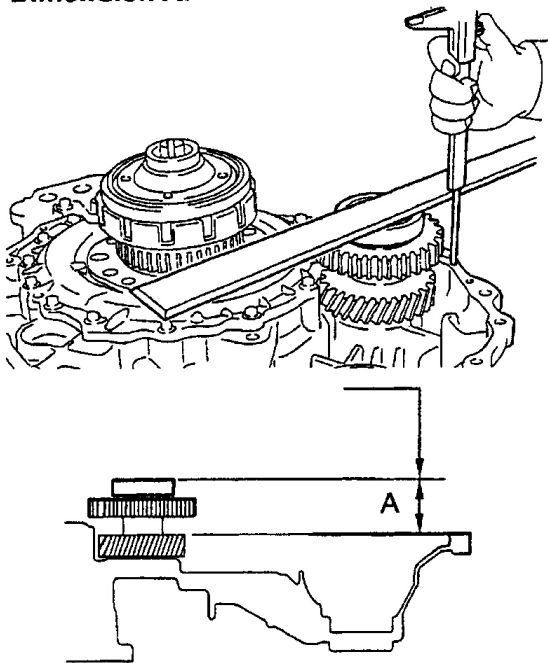
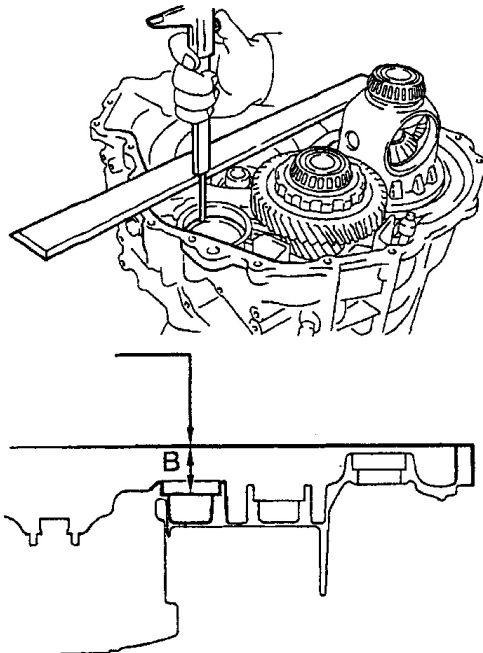


**Dimension B:**



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**Fig. 35: Measuring Input Shaft Shim Thickness**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**Dimension A:****Dimension B:**

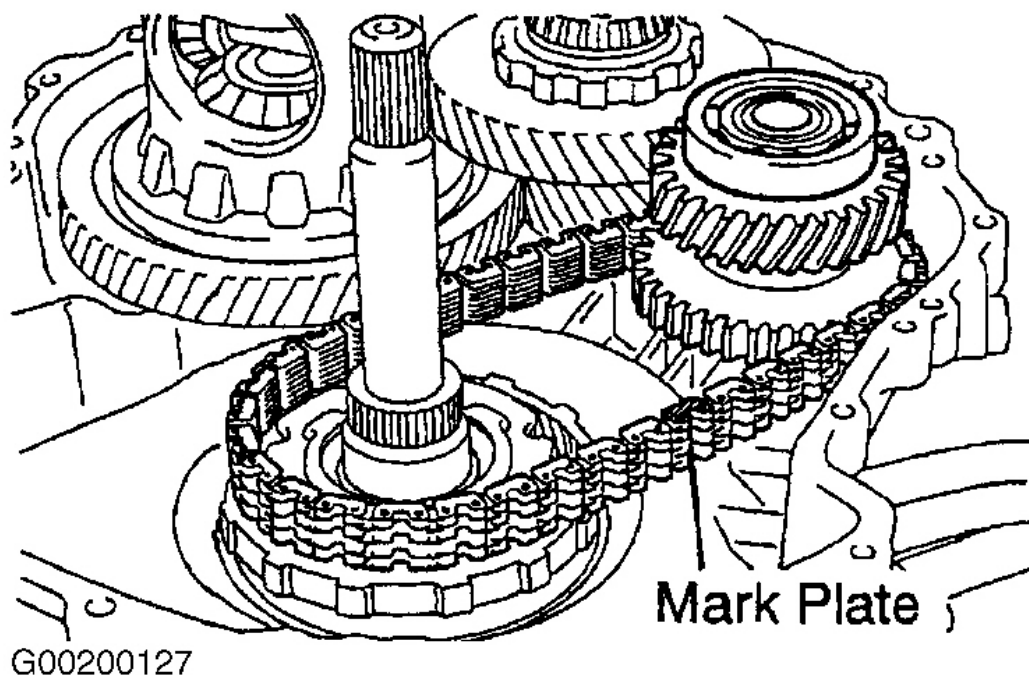
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**Fig. 36: Measuring Counter Drive Gear Shim Thickness**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

26. Install shim selected in step 24 . Install ring gear flange, 2 races and thrust bearing. Apply ATF to thrust bearing. Install planetary ring gear. Install input shaft assembly. See **Fig. 9** . Install shim selected in step

25 .

27. Install counter drive gear assembly and chain at the same time. Install chain with mark plate facing up. See **Fig. 37** . Install chain on drive sprocket and install both components. Apply ATF to drive sprocket needle roller bearing. Install 2 bearing races and needle roller bearing. Apply ATF to bearing.
28. Install lock sleeve. Install cam guide sleeve to sleeve bracket. Install cam guide sleeve, sleeve bracket, torsion spring and 2 bolts. See **Fig. 21** . Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .



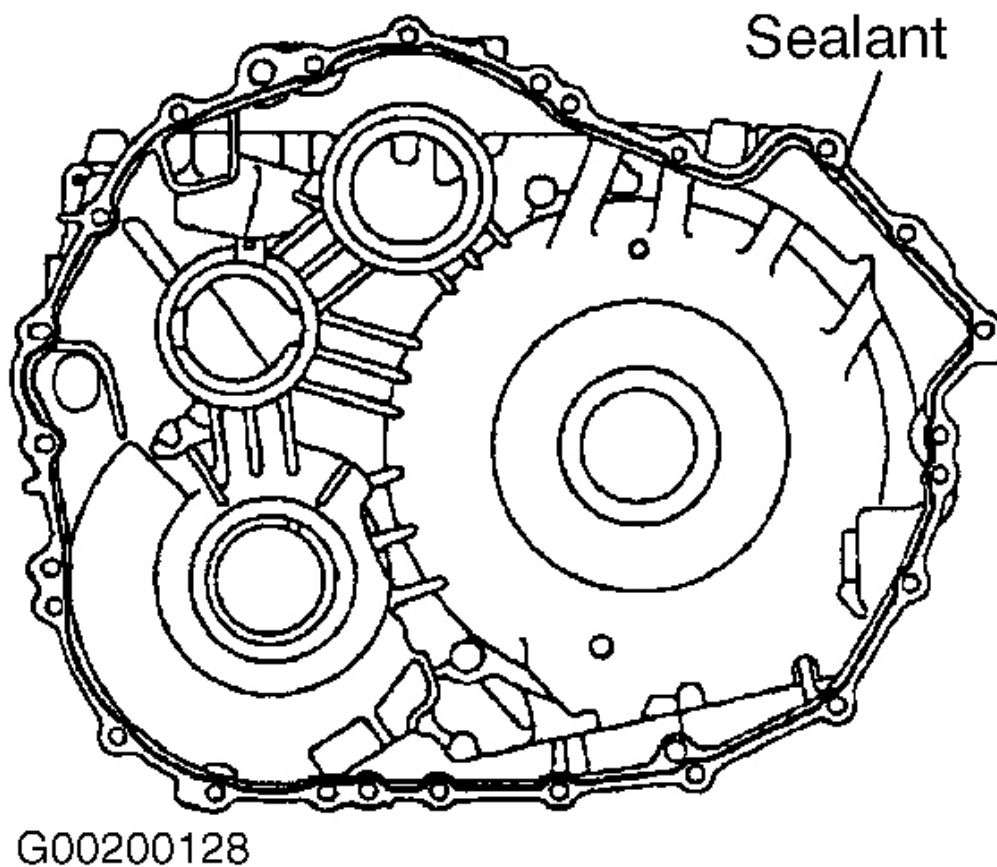
**Fig. 37: Locating Mark Plate On Chain**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

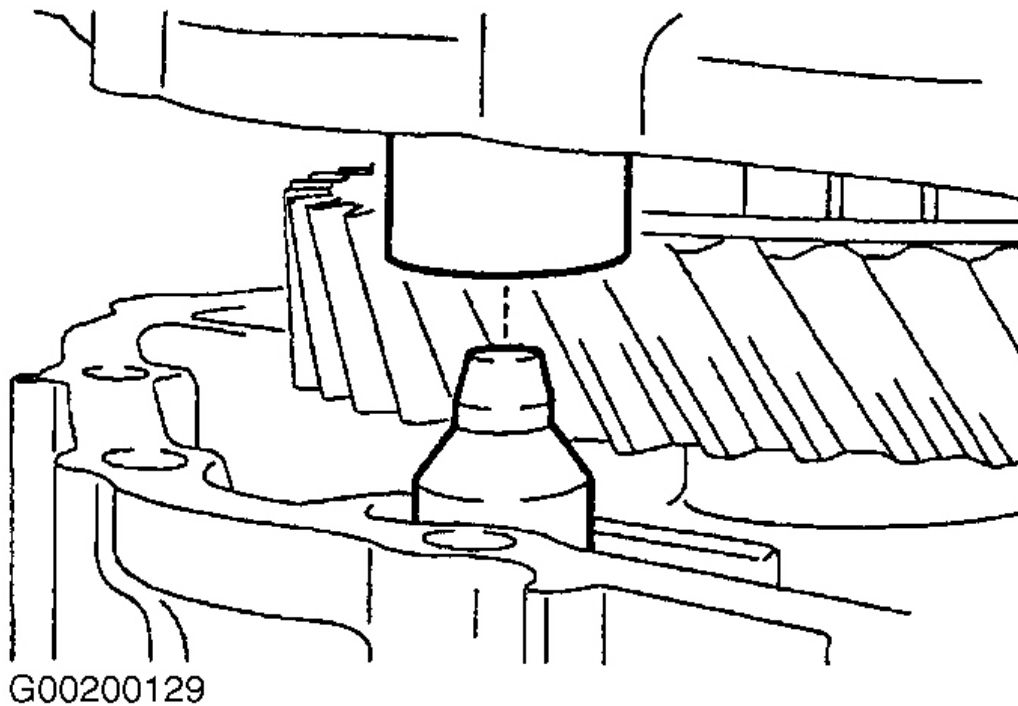
29. Install parking lock pawl. Using a screwdriver, fit torsion spring into cutout of parking lock pawl. Install parking lock pawl shaft, lock clamp and bolt. See **Fig. 19** . Tighten bolt to specification.
30. Install NEW "O" ring to oil strainer. Install bolt and oil strainer. See **Fig. 12** . Tighten bolt to specification. Install magnet to oil pan. Apply thread sealant to oil pan bolt threads. Install NEW gasket and oil pan with 12 bolts. Tighten bolts to specification.
31. Install NEW gasket and drain plug. Tighten plug to specification. Apply Three Bond (1281) sealant to outer sealing surface of motor generator No. 2 assembly. See **Fig. 38** . Install motor generator No. 1 assembly to motor generator No. 2 assembly. Ensure parking rod is inserted into cam guide sleeve. See **Fig. 39** .
32. Apply thread sealant to bolt threads. Install 21 bolts and tighten to specification. See **Fig. 4** . See **TORQUE SPECIFICATIONS** . Using appropriate adapter, driver and a hammer, install NEW input

shaft oil seal to a depth of .039-.059" (1.00-1.50 mm). See **Fig. 40** . Drive oil seal in until adapter comes in contact with case. Coat lip of oil seal with ATF.

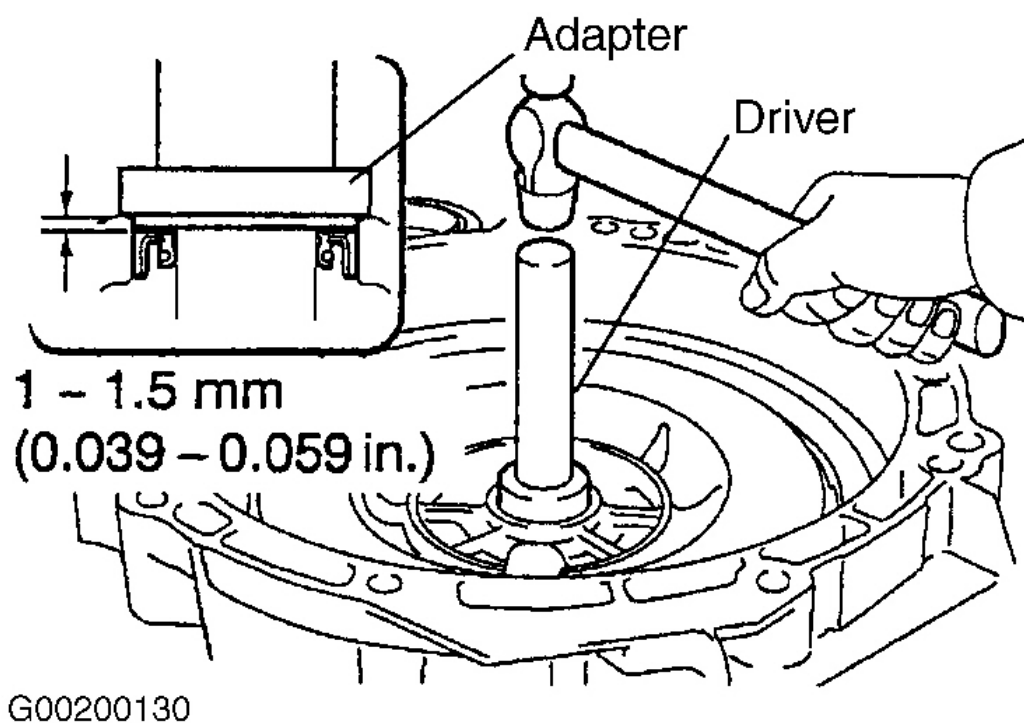
33. Position transaxle in position as shown in **Fig. 41** . Install parking lock lever No. 3 to parking lock shaft. Using a pin punch and a hammer, drive in pin. See **Fig. 22** . Turn spacer and lever shaft to align small hole in spacer with staking position mark on lever shaft. See **Fig. 42** . Using a pin punch, stake spacer through small hole. Ensure spacer does not turn.



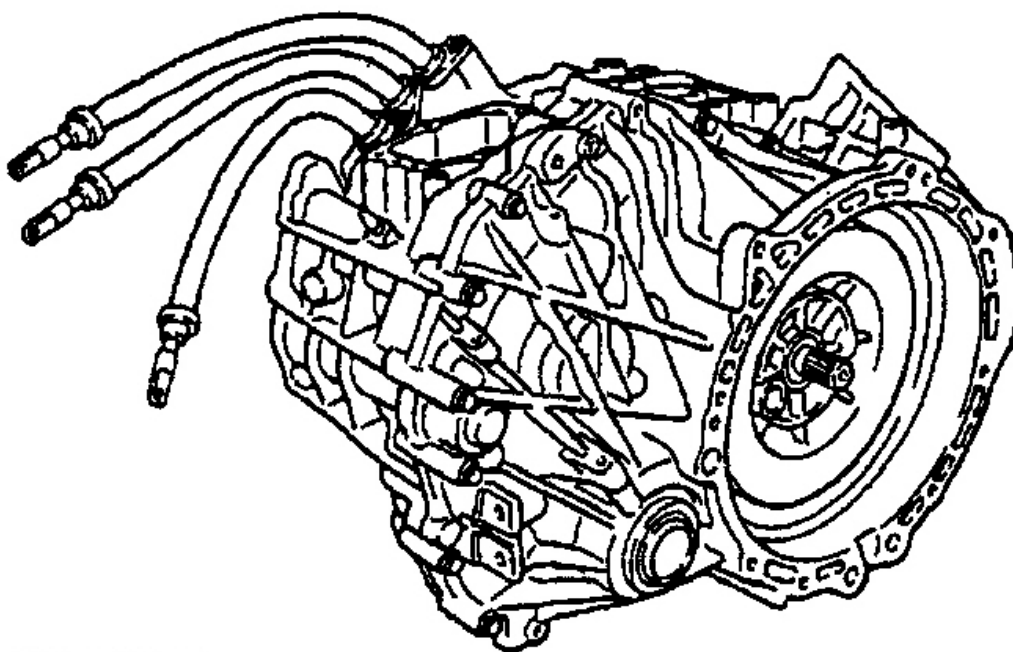
**Fig. 38: Applying Sealant To Motor Generator No. 2 Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 39: Inserting Parking Rod Into Cam Guide Sleeve**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

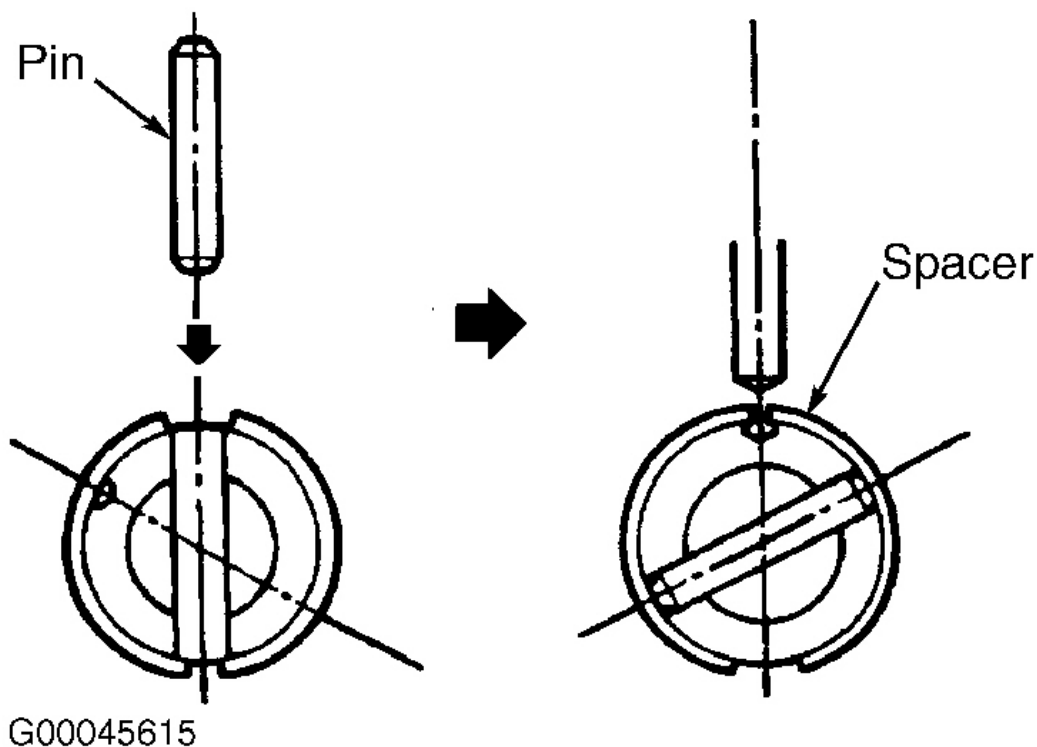


**Fig. 40: Installing Input Shaft Oil Seal**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



G00200131

**Fig. 41: Positioning Transaxle For Parking Lock Shaft**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

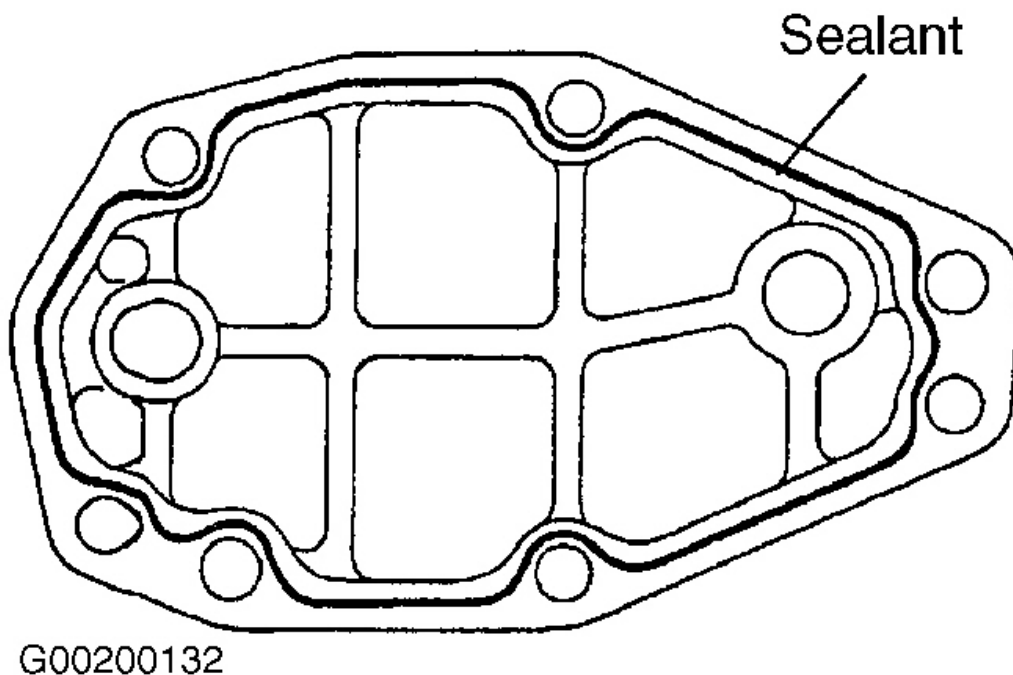


**Fig. 42: Staking Spacer To Parking Lock Shaft**

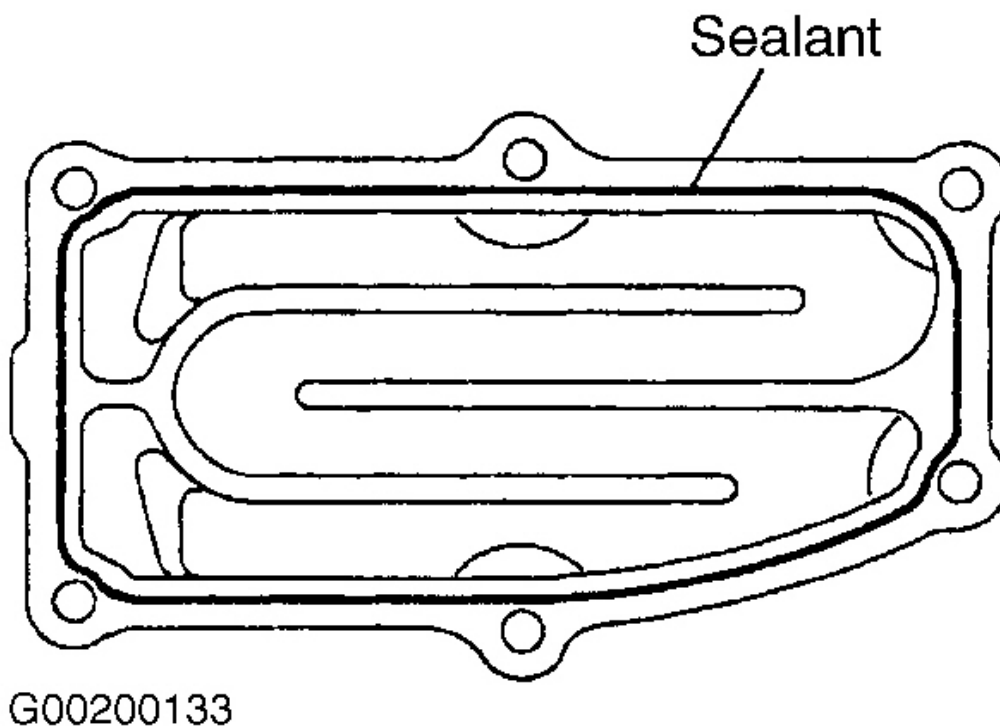
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

34. Apply ATF to parking lock shaft. Apply lubricant to parking lock lever No. 3. Install washer to parking lock shaft. See **Fig. 22** . Install parking lock shaft. Using appropriate adapter and a hammer, install NEW oil seal to parking shaft cover. Coat oil seal lip with lubricant.
35. Remove any old sealant material and be careful not to drop any oil on contact surfaces of parking shaft cover and motor generator No. 2 assembly. Ensure sealing surfaces are clean. Apply Three Bond 1281 sealant to parking lock cover. See **Fig. 43** . Ensure cover is installed within 10 minutes of applying sealant to cover.
36. Install 5 bolts and parking shaft cover. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Ensure oil seal lip is not damaged during cover installation.
37. Remove any old sealant material and be careful not to drop any oil on contact surfaces of motor water jacket cover and motor generator No. 2 assembly. Ensure sealing surfaces are clean. Apply sealant to motor water jacket cover. See **Fig. 44** . Ensure cover is installed within 10 minutes of applying sealant to cover.
38. Apply thread sealant to cover bolt threads. Install 6 bolts and tighten to specification. Apply thread sealant to housing tube threads. Install housing tube and tighten to specification. Install detent spring and detent spring cover with bolt. See **Fig. 22** . Tighten bolt to specification. See **TORQUE SPECIFICATIONS** .

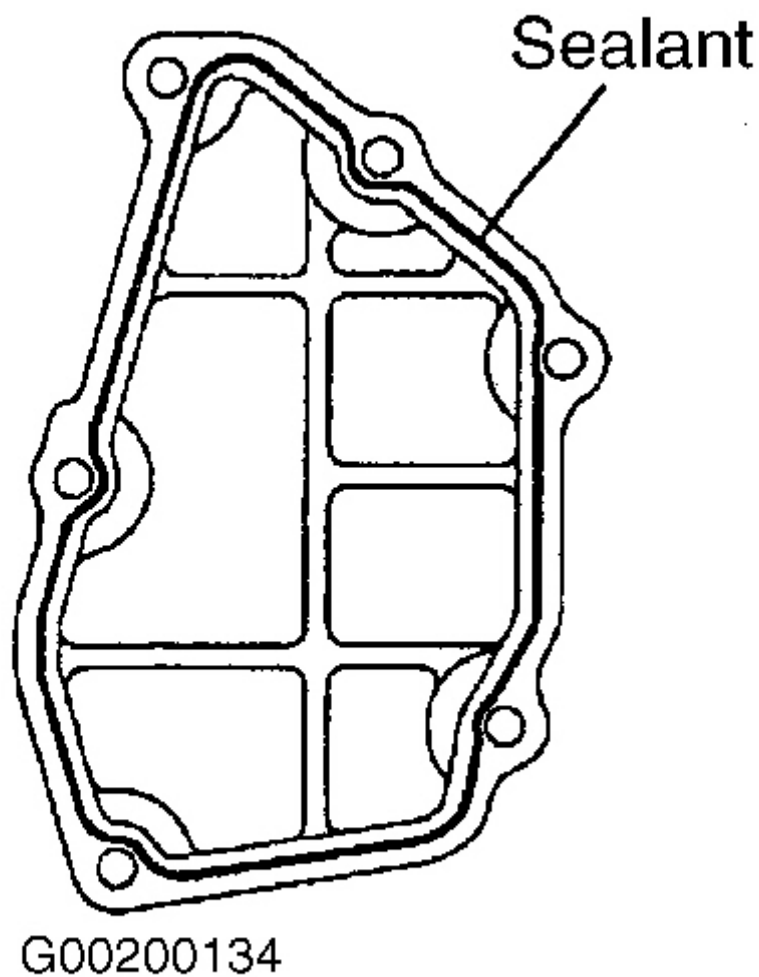
39. Remove any old sealant material and be careful not to drop any oil on contact surfaces of parking cover and motor generator No. 2 assembly. Ensure sealing surfaces are clean. Apply sealant to parking cover. See **Fig. 45** . Ensure cover is installed within 10 minutes of applying sealant to cover. Install parking cover with 6 bolts. Tighten bolts to specification.
40. Apply ATF to individual sliding parts of oil pump. Install oil pump drive shaft. Install oil pump driven rotor and drive rotor. See **Fig. 22** . Note reference marks made during disassembly. Install NEW "O" ring without twisting it. Apply thread sealant to bolts. Install oil pump cover and 5 bolts. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
41. Install NEW "O" ring to oil pump cover plug. Install plug and tighten to specification. Install 2 wiring harness connectors and 2 bolts on motor generator No. 2 assembly. Tighten bolts to specification.
42. Install wiring harness connector and bolt on motor generator No. 1 assembly. Tighten bolt to specification. Apply Three Bond (1344) Loctite 242 sealant to water jacket union threads. Install 4 water jacket unions and tighten to specification. See **TORQUE SPECIFICATIONS** .
43. Install 3 top bolts for high voltage cable. Tighten bolts to specification. See **TORQUE SPECIFICATIONS** . Apply Three Bond (1344) Loctite 242 sealant to 3 lower bolt threads. Install 3 bolts, located below high voltage cable bolts and tighten to specification. See **Fig. 18** .
44. Apply sealant around outer edge of power cable cover. Ensure cover is installed within 10 minutes of applying sealant to cover. Install power cable cover with 4 bolts. Tighten bolts to specification. Apply Three Bond (1324) sealant to bolt threads. Install 3 bolts and mounting bracket. See **Fig. 22** . Tighten bolts to specification.



**Fig. 43: Applying Sealant To Parking Shaft Cover**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 44: Applying Sealant To Motor Water Jacket Cover**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



**Fig. 45: Applying Sealant To Parking Cover**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

| Application                             | Ft. Lbs. (N.m) |
|-----------------------------------------|----------------|
| Drain Plug                              | 36 (49)        |
| Filler Plug                             | 29 (39)        |
| High Voltage Cable Bolt (3 Upper Bolts) | 13 (18)        |
| Housing Tube                            | 11 (15)        |

**2001 Toyota Prius****2001-03 AUTOMATIC TRANSMISSIONS P111 CVT Overhaul**

|                                           |            |
|-------------------------------------------|------------|
| Motor Generator No. 1 Assembly Bolts (13) | 18 (25)    |
| Motor Generator No. 2 Assembly Bolts (8)  | 18 (25)    |
| Motor Generator No. 2 Assembly Screw Plug | 18 (25)    |
| Mounting Bracket Bolt                     | 38 (52)    |
| Transaxle-To-Engine Bolt                  | 24 (33)    |
| Water Jacket Union                        | 37 (50)    |
| <b>INCH Lbs. (N.m)</b>                    |            |
| Breather Plug                             | 100 (11.3) |
| Detent Spring Cover Bolt                  | 89 (10)    |
| High Voltage Cable Bolt (3 Lower Bolts)   | 49 (5.5)   |
| Motor Generator No. 1 Assembly Screw Plug | 112 (12.7) |
| Motor Water Jacket Cover Bolt             | 49 (5.5)   |
| Oil Pan Bolt                              | 67 (7.6)   |
| Oil Pump Cover Bolt                       | 49 (5.5)   |
| Oil Pump Cover Plug                       | 65 (7.4)   |
| Oil Strainer Bolt                         | 49 (5.5)   |
| Parking Cover Bolt                        | 49 (5.5)   |
| Parking Lock Clamp Bolt                   | 49 (5.5)   |
| Parking Shaft Cover Bolt                  | 115 (13)   |
| Power Cable Cover Bolt                    | 42 (4.8)   |
| Sleeve Bracket Bolt                       | 115 (13)   |
| Wiring Harness Connector Bolt             | 49 (5.5)   |

**TRANSMISSION SPECIFICATIONS****TRANSMISSION SPECIFICATIONS**

| <b>Application</b>                    | <b>In. (mm)</b>         |
|---------------------------------------|-------------------------|
| Chain Link Count                      | 74                      |
| Differential Oil Seal Installed Depth | .087-.126 (2.20-3.20)   |
| Differential Side Gear Backlash       | .0020-.0079 (.050-.200) |
| Gear Tooth Count                      |                         |
| Chain Drive Sprocket                  | 39                      |
| Chain Driven Sprocket                 | 36                      |
| Counter Gear Drive Gear               | 30                      |
| Counter Gear Driven Gear              | 44                      |
| Final Gear Drive Gear                 | 26                      |
| Final Gear Driven Gear                | 75                      |
| Planetary Gear Set Ring Gear          | 78                      |
| Planetary Gear Set Pinion Gear        | 23                      |
| Planetary Gear Set Sun Gear           | 30                      |
| Input Shaft Oil Seal Depth            | .039-.059 (1.00-1.50)   |

**2001 Toyota Prius**

2001-03 AUTOMATIC TRANSMISSIONS P111 CVT Overhaul

**Motor Generator No. 2 Rotor Bushing Inside Diameter**

|          |                         |
|----------|-------------------------|
| Standard | .788-.789 (20.03-20.05) |
|----------|-------------------------|

|         |              |
|---------|--------------|
| Maximum | .791 (20.10) |
|---------|--------------|

**Planetary Sun Gear Bushing Inside Diameter**

|          |                           |
|----------|---------------------------|
| Standard | 1.005-1.006 (25.53-25.55) |
|----------|---------------------------|

|         |               |
|---------|---------------|
| Maximum | 1.008 (25.60) |
|---------|---------------|