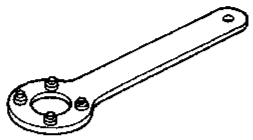
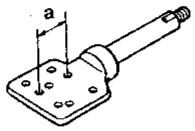
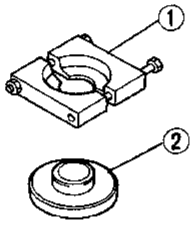
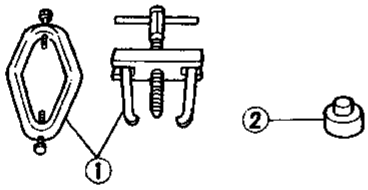
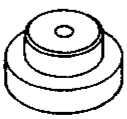
# PROPELLER SHAFT & DIFFERENTIAL CARRIER

# SECTION PD

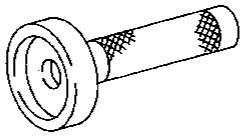
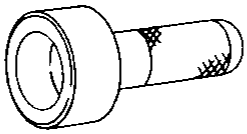
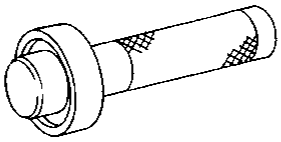
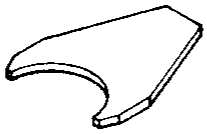
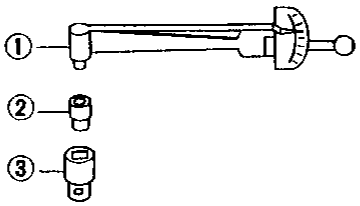
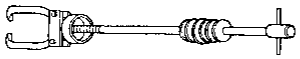


## CONTENTS

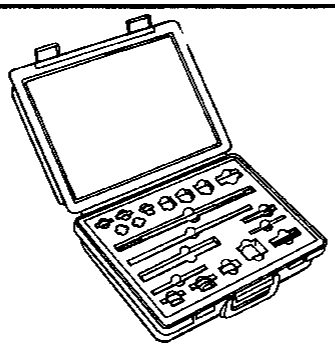
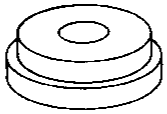
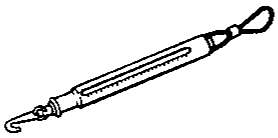
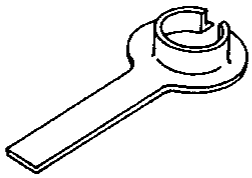
## Special Service Tools

| Tool number (Kent-Moore No.) Tool name | Description |
|---|---|
| ST38060002 (J34311) Drive pinion flange wrench |  Removing and installing propeller shaft lock nut, and drive pinion lock nut. |
| KV38100800 ( — ) Equivalent tool (J25604-01) Differential attachment |   a: 152 mm (5.98 in) Mounting final drive (To use, make a new hole.) |
| ST3090S000 ( — ) Drive pinion rear inner race puller set ① ST30031000 (J22912-01) Puller ② ST30901000 ( — ) Equivalent tool (J26010-01) Base |   Removing and installing drive pinion rear cone |
| ST3306S001 ( — ) Differential side bearing puller set ① ST33051001 ( — ) Equivalent tool (J22888) Body ② ST33061000 (J8107-2) Equivalent tool (J26010-01) Adapter |   Removing and installing differential side bearing inner cone |
| ST30611000 (J25742-1) Drift |  Installing pinion rear bearing outer race |
| ST30613000 (J25742-3) Drift |  Installing pinion front bearing outer race |

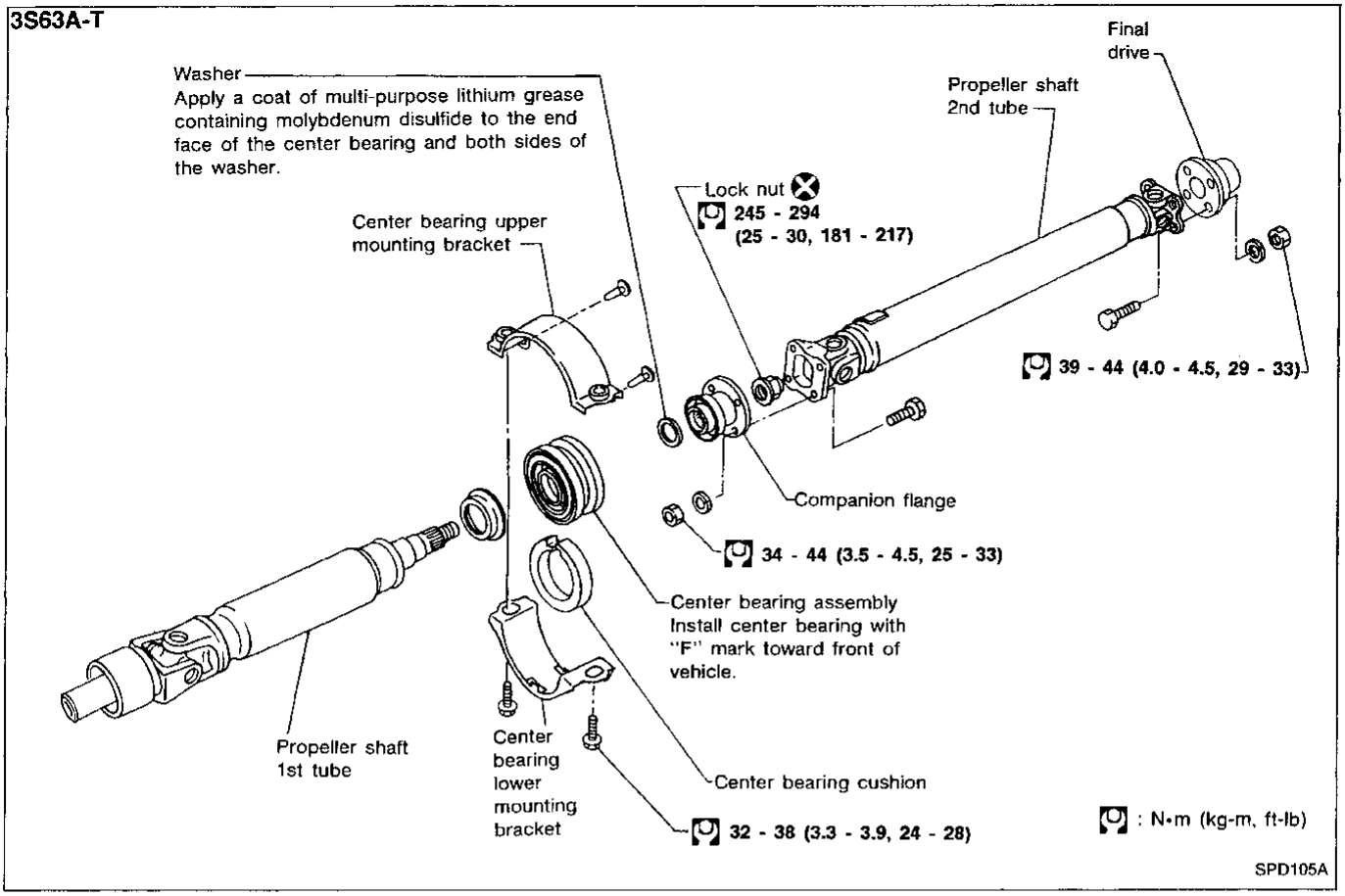
## Special Service Tools (Cont'd)

| Tool number (Kent-Moore No.) Tool name | Description |
|---|---|
| ST30701000 (J25742-2) Drift | Installing pinion rear bearing outer race  |
| KV38100200 (J26233) Gear carrier side oil seal drift | Installing side oil seal  |
| KV38100500 ( — ) Gear carrier front oil seal drift | Installing front oil seal  |
| KV38100300 (J25523) Differential side bearing inner cone | Installing side bearing inner cone  |
| KV38100600 (J25267) Side bearing spacer drift | Installing side bearing spacer  |
| ST3127S000 (See J25765-A) Preload gauge ① GG91030000 (J25765) Torque wrench ② HT62940000 ( — ) Socket adapter ③ HT62900000 ( — ) Socket adapter | Measuring pinion bearing preload and total preload   |
| HT72400000 ( — ) Slide hammer | Removing differential case assembly  |

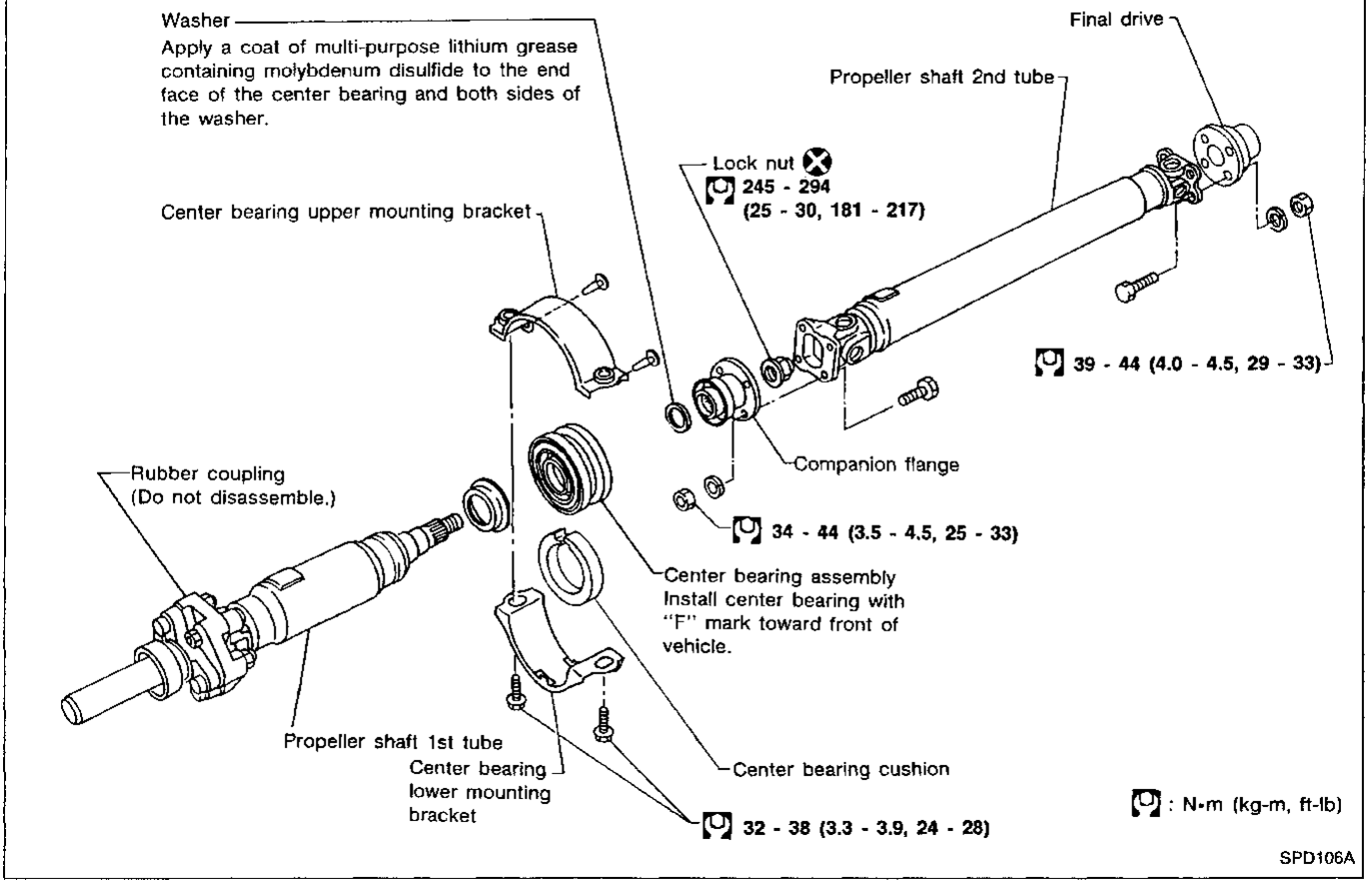
## Special Service Tools (Cont'd)

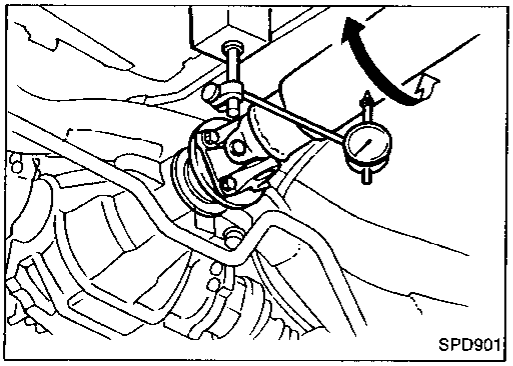
| Tool number (Kent-Moore No.) Tool name | Description | |
|---|---|---|
| (J34309) Differential shim selector |  | Adjusting bearing preload and gear height |
| (J25269-4) Side bearing discs (2 Req'd) |  | Selecting pinion height adjusting washer |
| (J8129) Spring gauge |  | Measuring carrier turning torque |
| KV38107900 (J39352) Side oil seal protector |  | Installing final drive side flange |

3S63A-T




3S63A-R



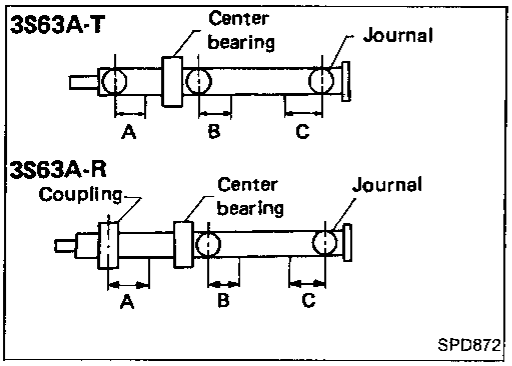

SPD901

## On-vehicle Service

### PROPELLER SHAFT VIBRATION

If vibration is present at high speed, inspect propeller shaft runout first.

1. Raise rear wheels.
2. Measure propeller shaft runout at indicated points by rotating final drive companion flange with hands.
   **Runout limit: 0.6 mm (0.024 in)**

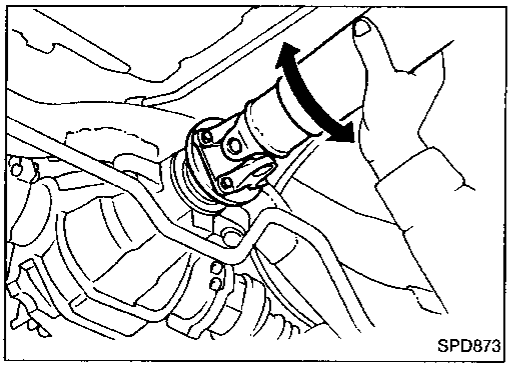


SPD872

**Propeller shaft runout measuring points:**

Unit: mm (in)

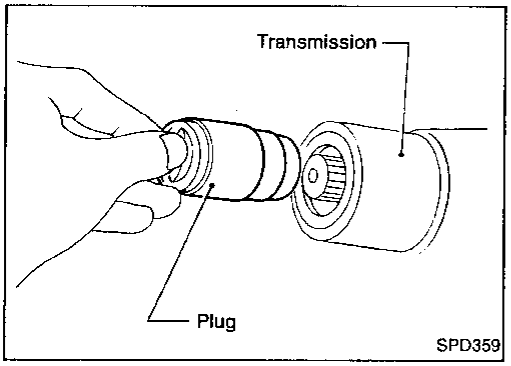
| Distance | Model | |
|---|---|---|
| | 3S63A-T | 3S63A-R |
| A | 155 (6.10) | 175 (6.89) |
| B | 165 (6.50) | 165 (6.50) |
| C | 185 (7.28) | 185 (7.28) |


SPD873

3. If runout exceeds specifications, disconnect propeller shaft at final drive companion flange; then rotate companion flange 90, 180 or 270 degrees and reconnect propeller shaft.
   **Runout limit: 0.6 mm (0.024 in)**
4. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
5. Perform road test.

### APPEARANCE CHECKING

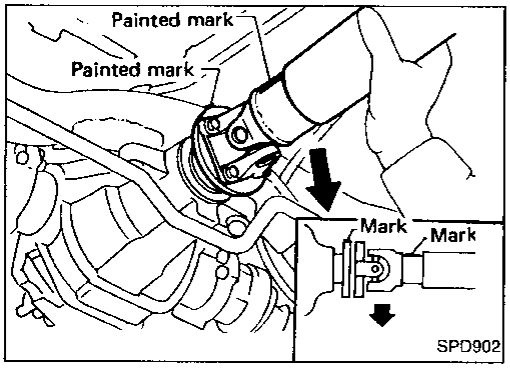
- Inspect propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace it.



SPD359

## Removal

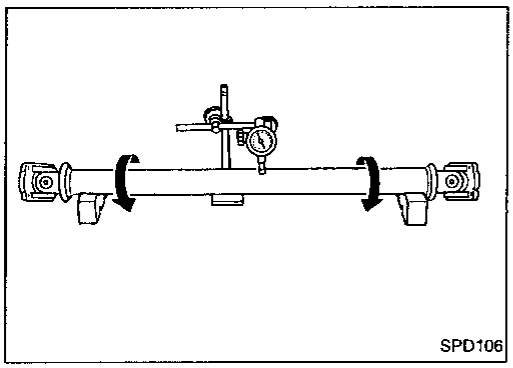
- Draw out propeller shaft from transmission and plug up rear end of transmission rear extension housing.



SPD902

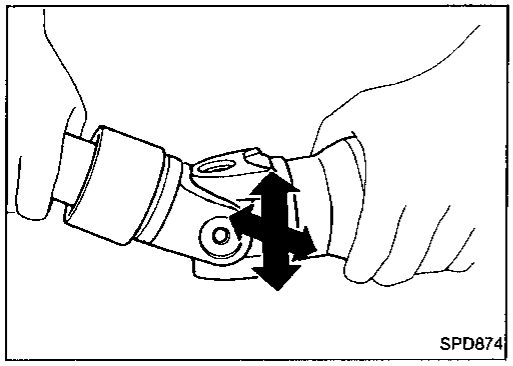
## Installation

- Temporarily install differential companion flange and flange yoke so that their alignment marks are located as close to each other as possible.
- Turn propeller shaft until alignment marks face straight upward. Securely fasten propeller shaft so that lower side wall of concave flange yoke will touch lower side wall of convex companion flange.


SPD106

## Inspection

- Inspect propeller shaft runout. If runout exceeds specifications, replace propeller shaft assembly.
  **Runout limit: 0.6 mm (0.024 in)**

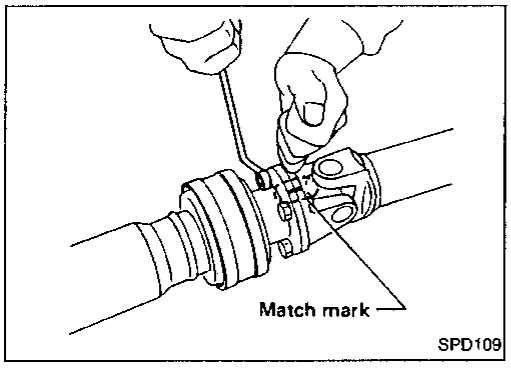

SPD874

- Inspect journal axial play.
  If the play exceeds specifications, replace propeller shaft assembly.
  **Journal axial play:**
  **0 mm (0 in)**

## Disassembly

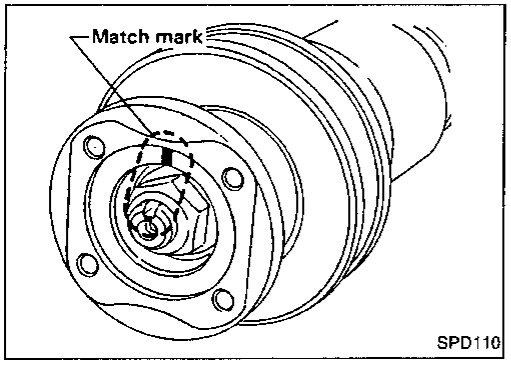
### CENTER BEARING

1. Put matchmarks on flanges, and separate 2nd tube from 1st tube.



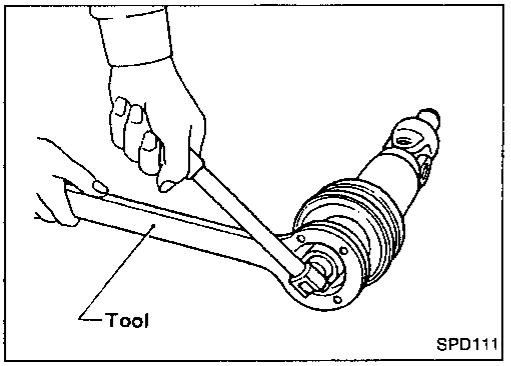
SPD109

2. Put matchmarks on the flange and shaft.



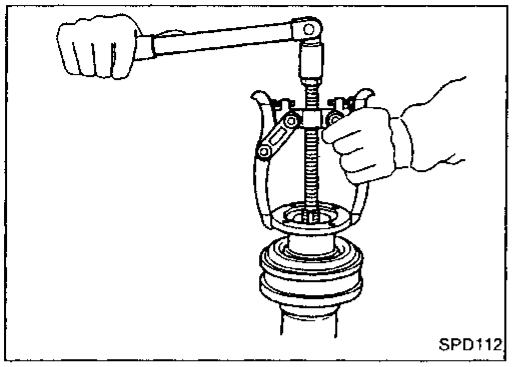
SPD110

3. Remove locking nut with Tool.
   **Tool number: ST38060002 (J34311)**

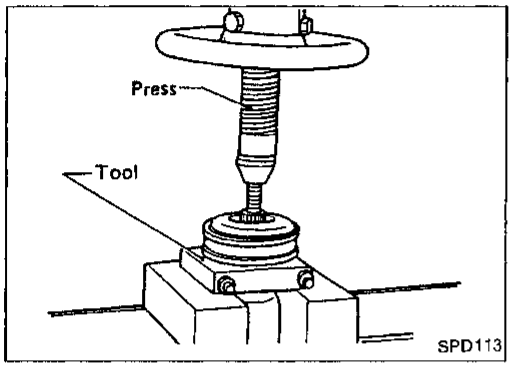


SPD111

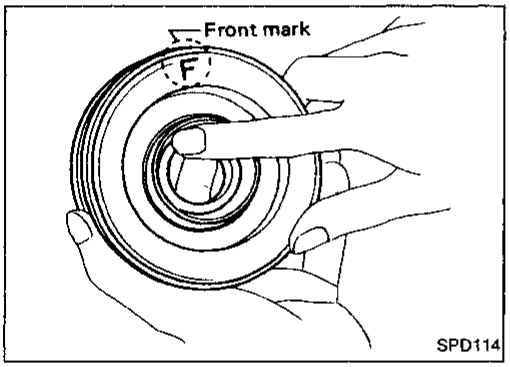
## Disassembly (Cont'd)




4. Remove companion flange with puller.



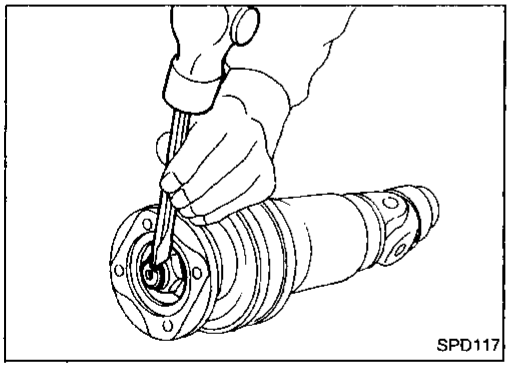

5. Remove center bearing with Tool and press.
   **Tool number: ST30031000 (J22912-01)**



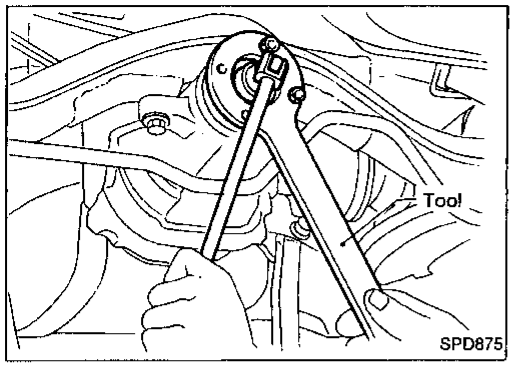

## Assembly

### CENTER BEARING

- When installing center bearing, position the "F" mark on center bearing toward front of vehicle.
- **Apply a coat of multi-purpose lithium grease containing molybdenum disulfide to the end face of the center bearing and both sides of the washer.**

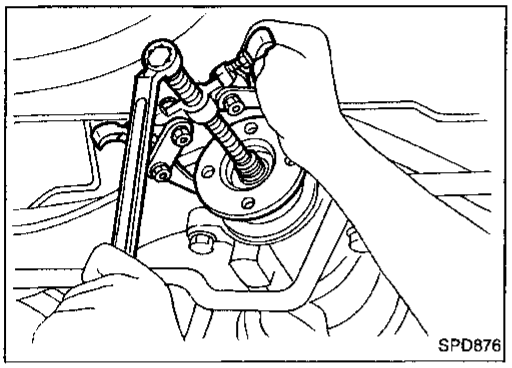



- Stake the nut. Always use new one.
- Align matchmarks when assembling tubes.

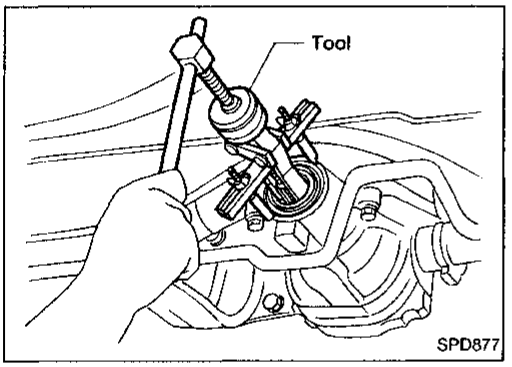



## Front Oil Seal Replacement

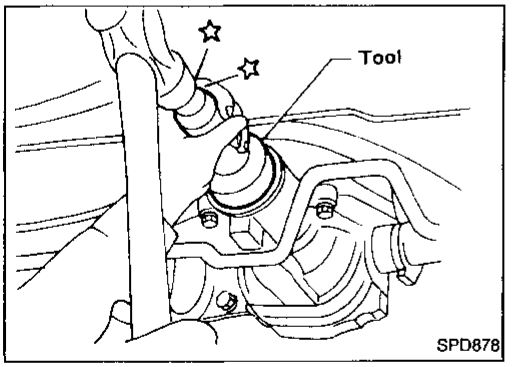
1. Remove propeller shaft.
2. Loosen drive pinion nut with Tool.
   **Tool number: ST38060002 (J34311)**



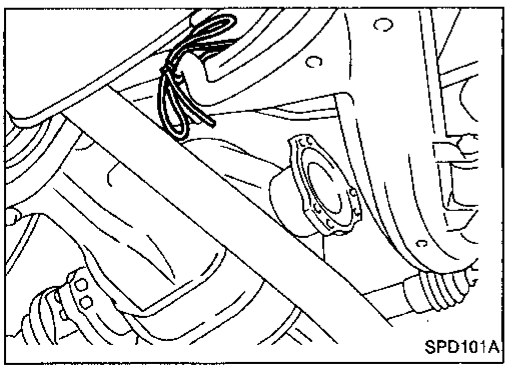

3. Remove companion flange.




4. Remove front oil seal.



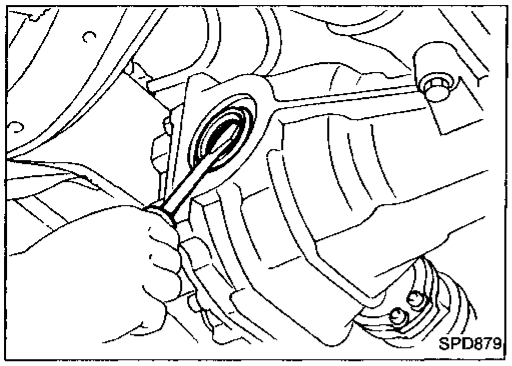

5. Apply multi-purpose grease to sealing lips of oil seal. Press front oil seal into carrier.
6. Install companion flange and drive pinion nut.
7. Install propeller shaft.



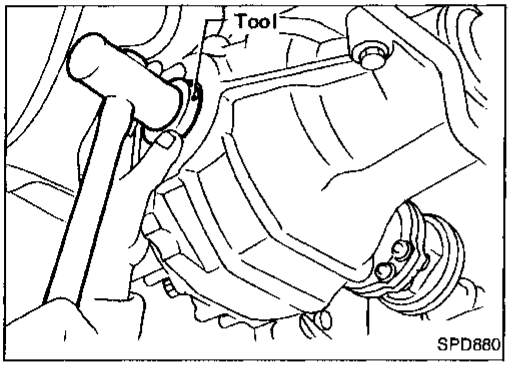

## Side Oil Seal Replacement

1. Disconnect final drive side flange and drive shaft flange and suspend drive shaft flange with wire.
2. Remove final drive side flange.

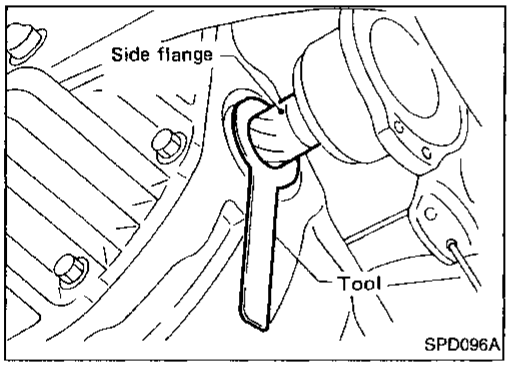
## Side Oil Seal Replacement (Cont'd)



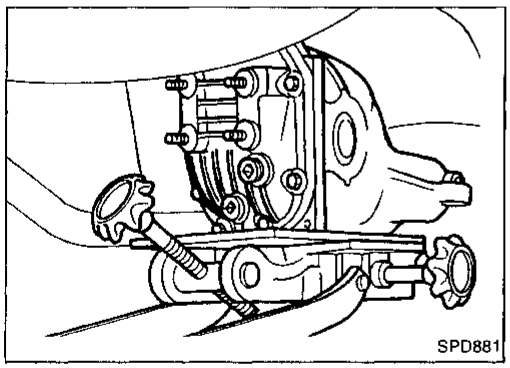

3. Remove oil seal.




4. Apply multi-purpose grease to sealing lips of oil seal. Press-fit oil seal into carrier with Tool.
   **Tool number: KV38100200 (J26233)**




5. Install final drive side flange with Tool.
   **Tool number: KV38107900 (J39352)**
6. Connect final drive side flange and drive shaft flange.




## Removal

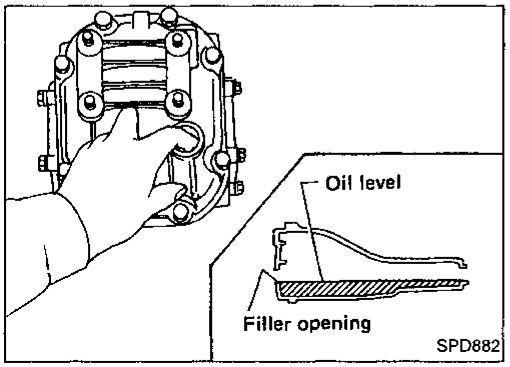
- Remove propeller shaft.

**Insert plug into rear oil seal after removing propeller shaft.**

- Remove drive shafts. Refer to section RA.
- Pull off final drive backward together with jack.

**CAUTION:**

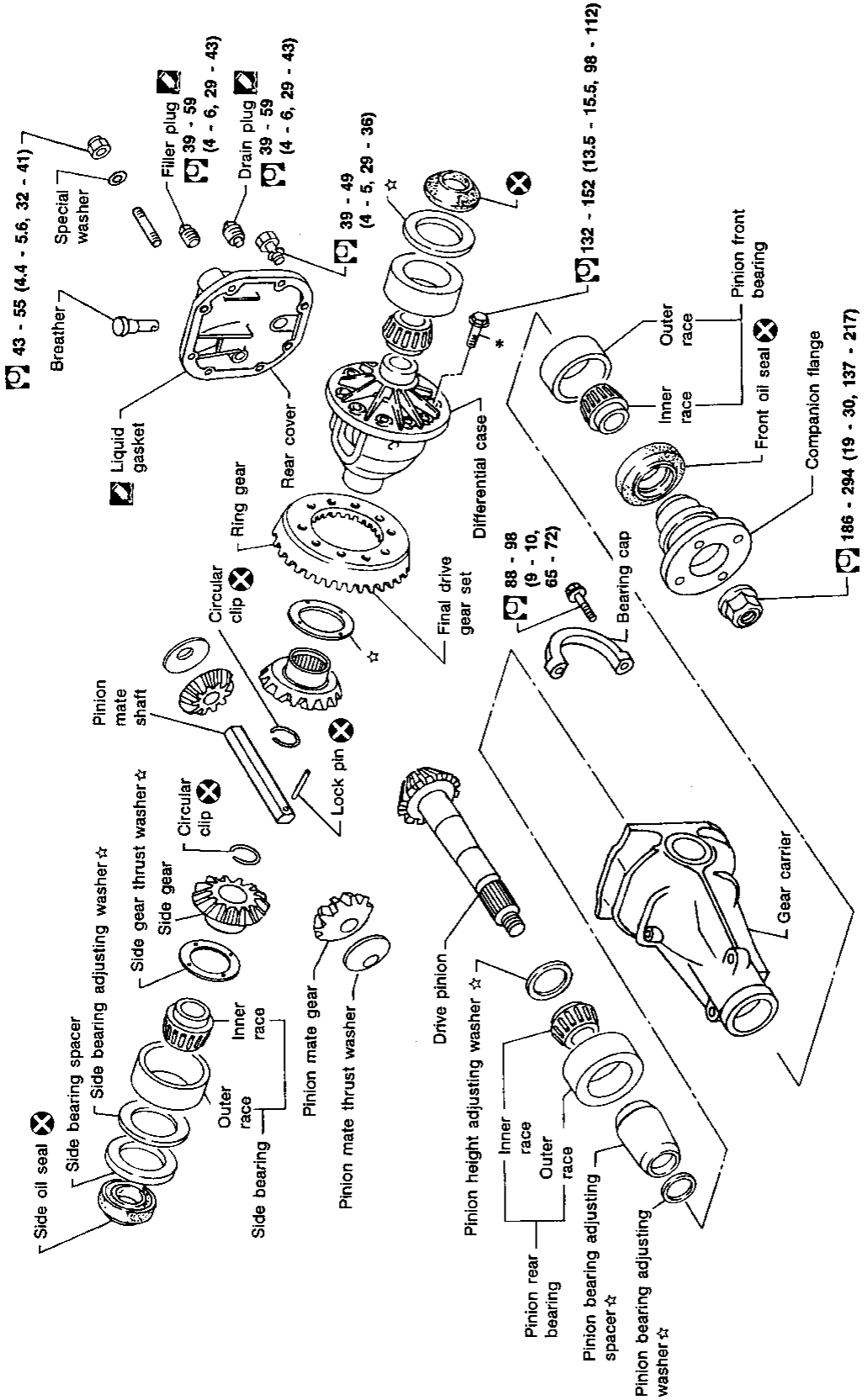
- **Be careful not to damage spline, sleeve yoke and front oil seal, when removing propeller shaft.**
- **After final drive is removed, support suspension member on a stand to prevent its insulators from being twisted or damaged.**




## Installation

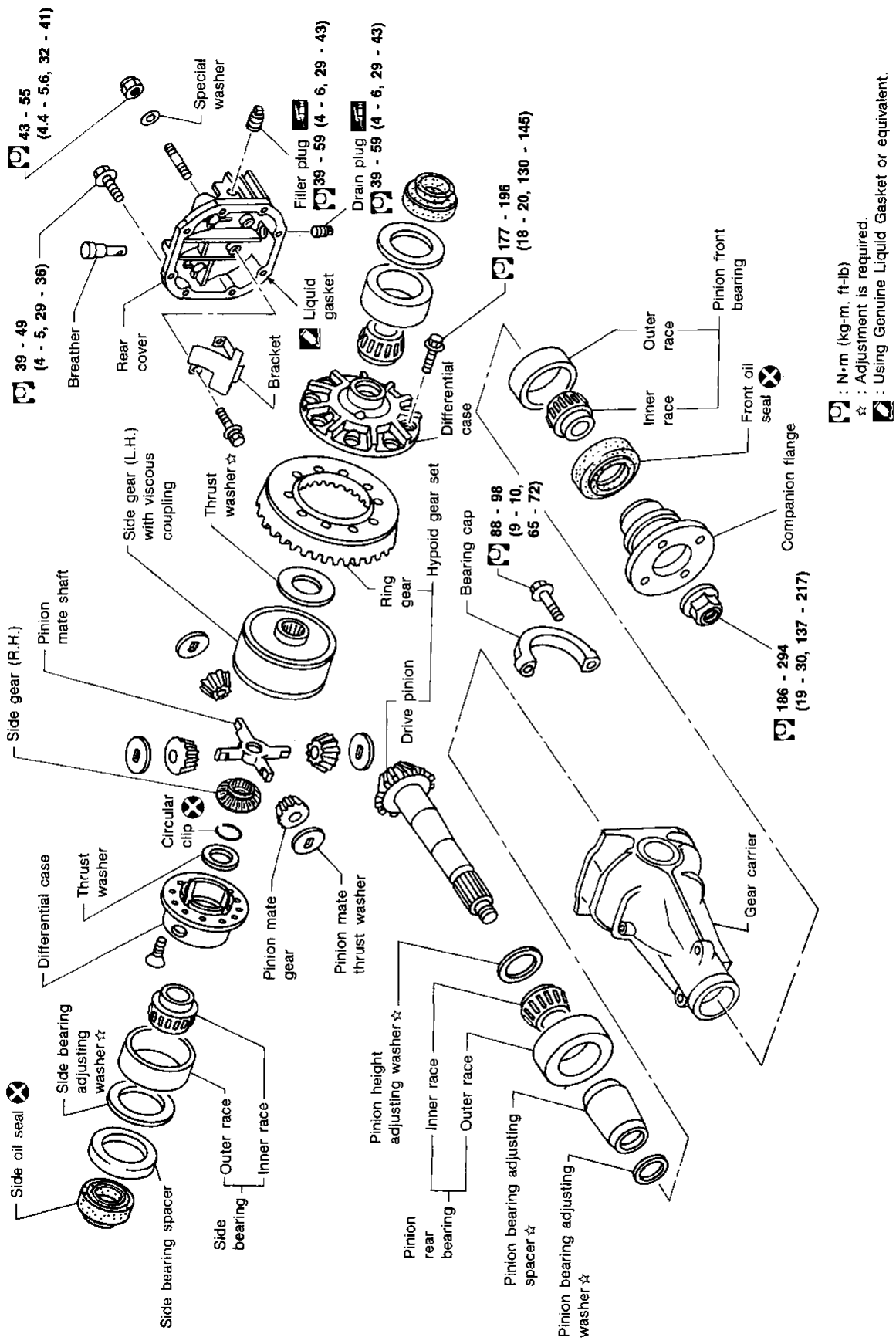
- Fill final drive with recommended gear oil.

## R200

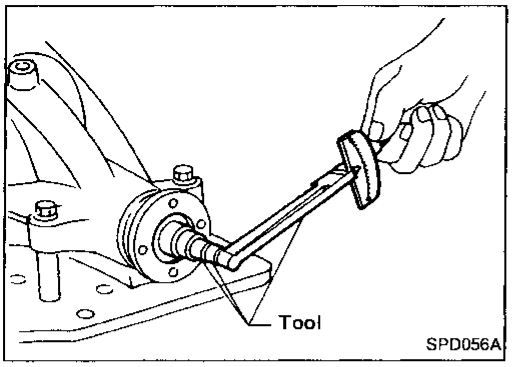



SPD227A

## R200V




SPD228A

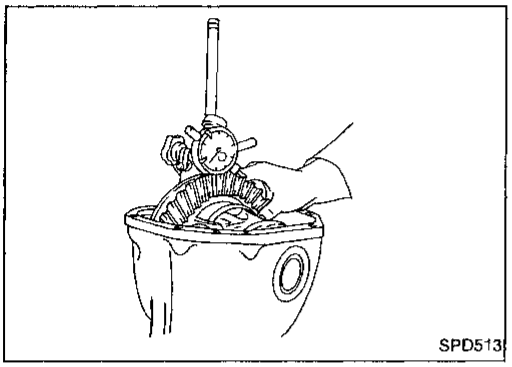



## Pre-inspection

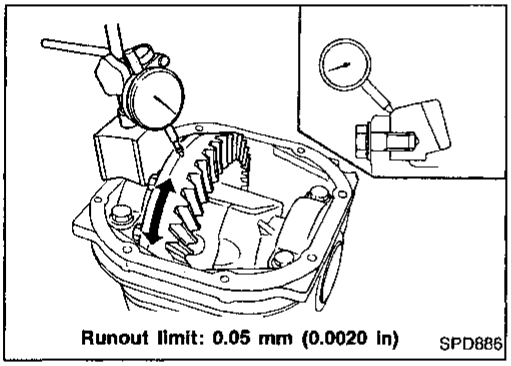
Before disassembling final drive, perform the following inspection.

- Total preload

1) Turn drive pinion in both directions several times to set bearing rollers.
2) Check total preload with Tool.
   **Tool number: ST3127S000 (J25765-A)**
   **Total preload:**
   **1.1 - 1.4 N·m (11 - 14 kg-cm, 9.5 - 12.2 in-lb)**



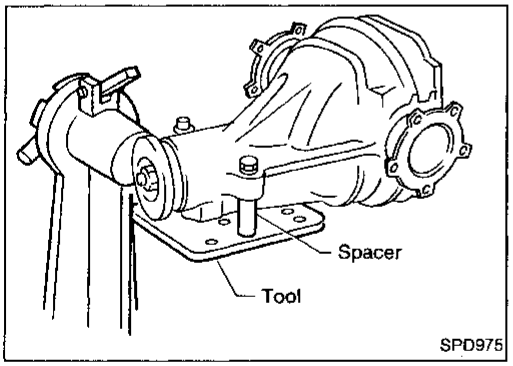

- Ring gear to drive pinion backlash
  Check ring gear-to-drive pinion backlash with a dial indicator at several points.
  **Ring gear-to-drive pinion backlash:**
  **0.10 - 0.15 mm (0.0039 - 0.0059 in)**




- Ring gear runout
  Check runout of ring gear with a dial indicator.
  **Runout limit: 0.05 mm (0.0020 in)**
- Tooth contact
  Check tooth contact. (Refer to Adjustment.)

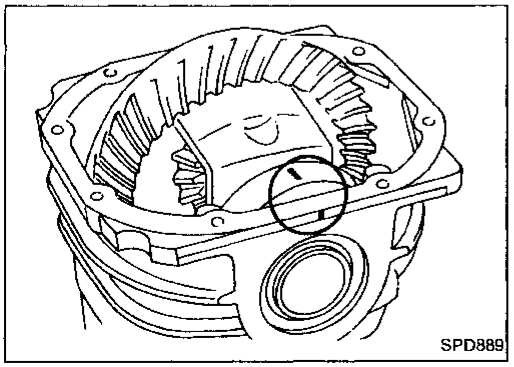
## Differential Carrier

1. Using two 45 mm spacers, mount carrier on Tool.
   **Tool number: KV38100800 ( — )**

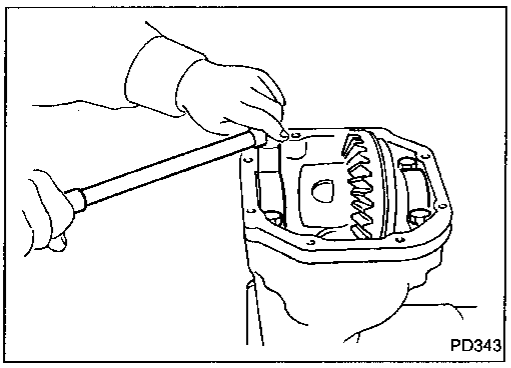



2. Paint or punch matchmarks on one side of the side bearing cap so it can be properly reinstalled.

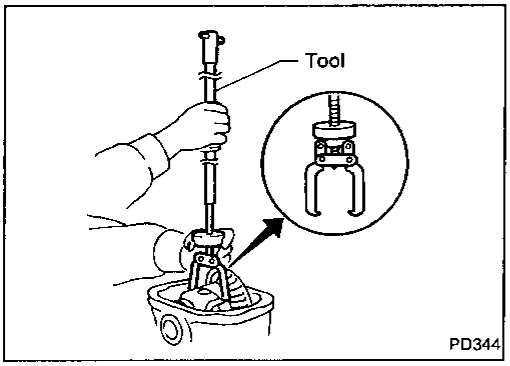
**Bearing caps are line-board during manufacture. Replace them in their proper positions.**



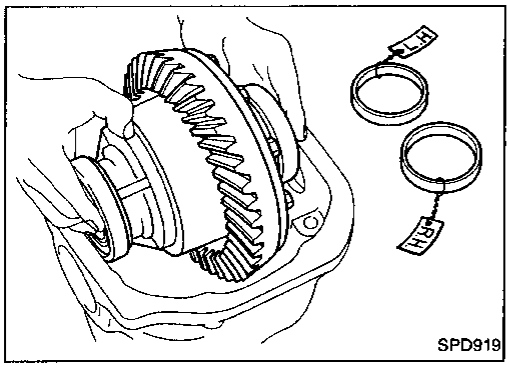
## Differential Carrier (Cont'd)



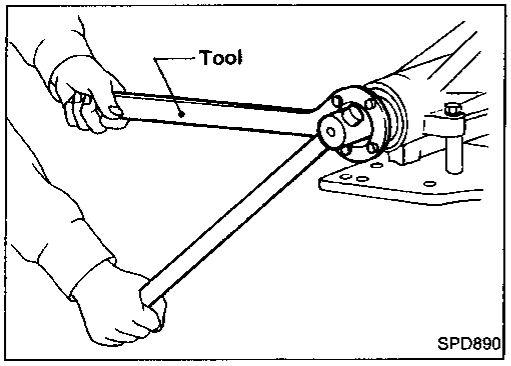

3. Remove side bearing caps.



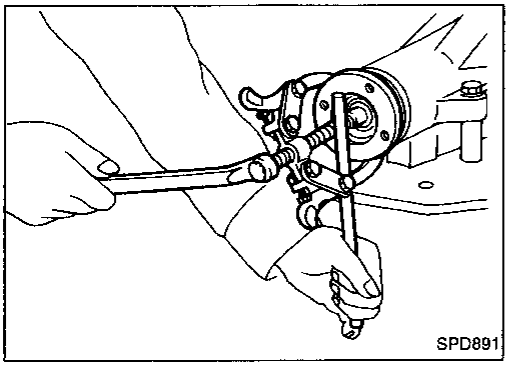

4. Lift differential case assembly out with Tool.
   **Tool number: HT72400000 ( — )**



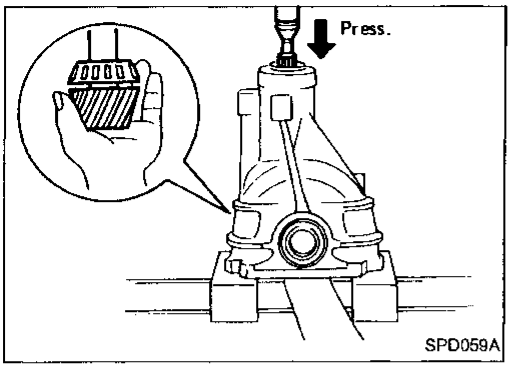

**Keep the side bearing outer races together with inner cone — do not mix them up.**



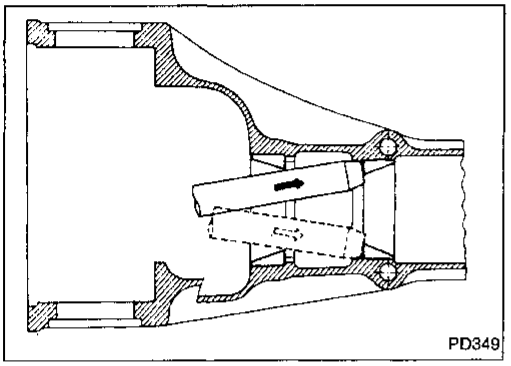

5. Loosen drive pinion nut and pull off companion flange.



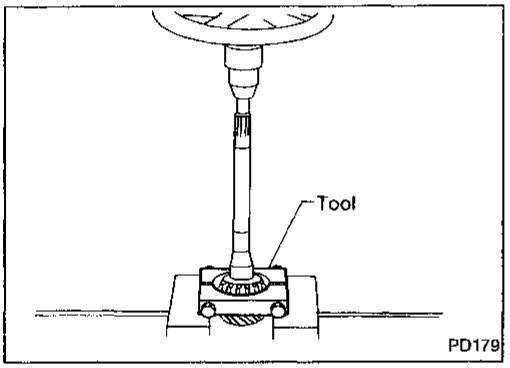
## Differential Carrier (Cont'd)




6. Take out drive pinion (together with rear bearing inner race, bearing spacer and adjusting washer).
7. Remove oil seal.
8. Remove front bearing inner race.
9. Remove side oil seal.

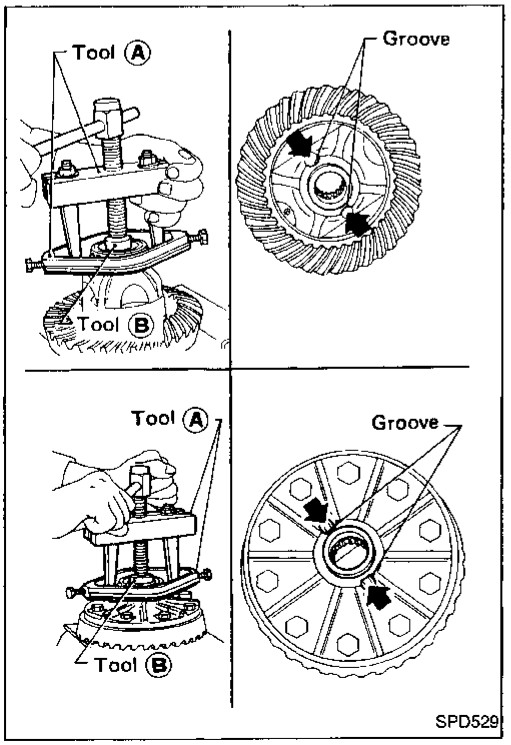



10. Remove pinion bearing outer races with a brass drift.




11. Remove pinion rear bearing inner race and drive pinion height adjusting washer with suitable tool.

## Differential Case



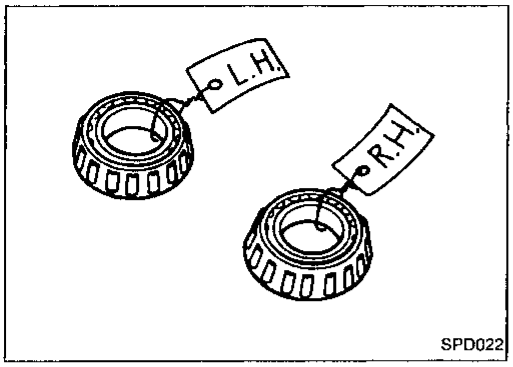

1. Remove side bearing inner cones.

**To prevent damage to bearing, engage puller jaws in groove.**

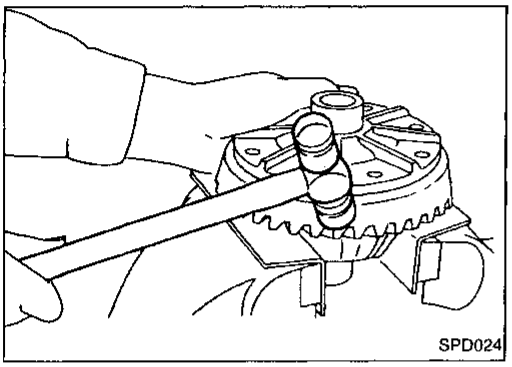
**Tool number:**

**Ⓐ ST33051001 ( — )**
**Equivalent tool (J2288)**
**Ⓑ ST33061000 (J8107-2)**

## Differential Case (Cont'd)

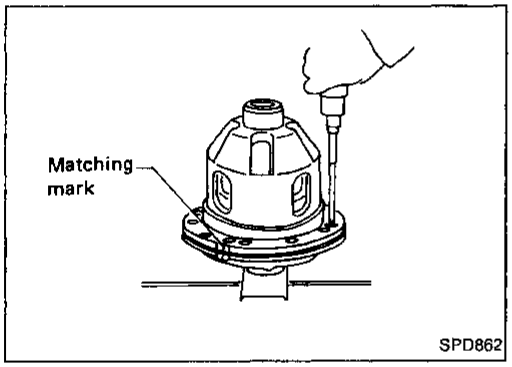



**Be careful not to confuse left- and right-hand parts. Keep bearing and bearing race for each side together.**



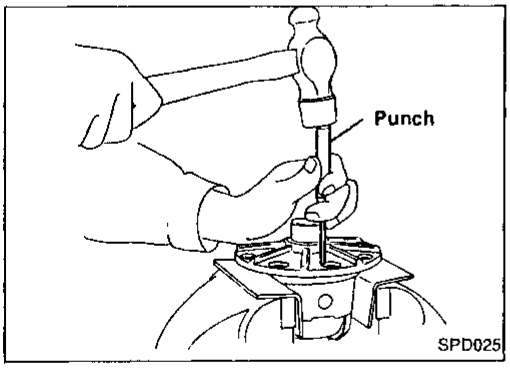

2. Loosen ring gear bolts in a criss-cross fashion.
3. Tap ring gear off the differential case with a soft hammer.

**Tap evenly all around to keep ring gear from binding.**




**R200V ONLY**

4. Loosen screws on differential cases A and B.
5. Separate differential cases A and B.

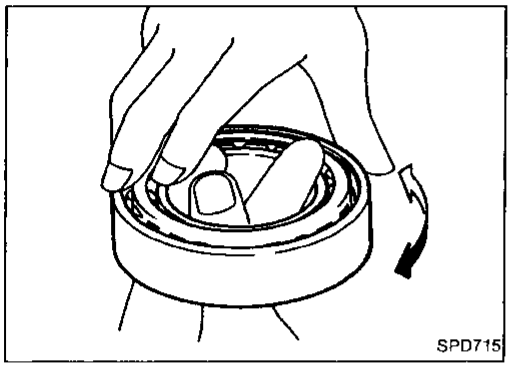



**R200 ONLY**

4. Drive out pinion mate shaft lock pin, with punch from ring gear side.

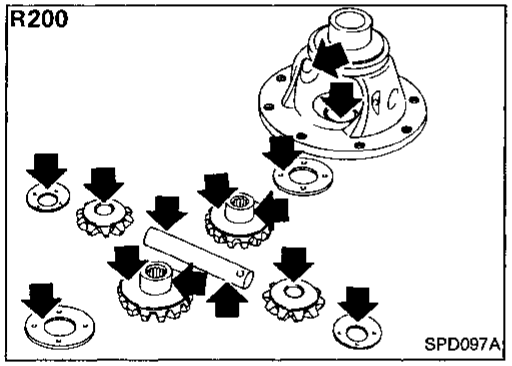
## Ring Gear and Drive Pinion

Check gear teeth for scoring, cracking or chipping. If any part is damaged, replace ring gear and drive pinion as a set (hypoid gear set).




## Bearing

1. Thoroughly clean bearing.
2. Check bearings for wear, scratches, pitting or flaking. Check tapered roller bearing for smooth rotation. If damaged, replace outer race and inner cone as a set.

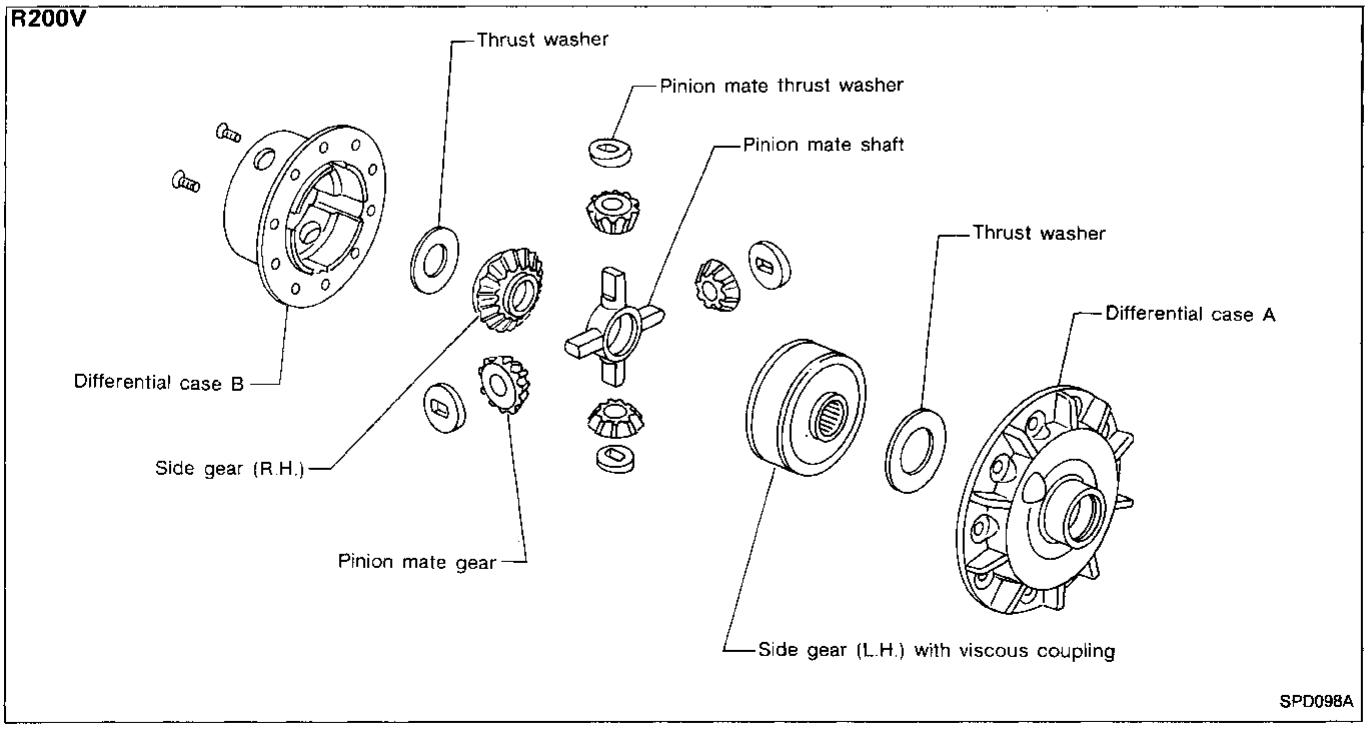



## Differential Case Assembly

Check mating surfaces of differential case, side gears, pinion mate gears, pinion mate shaft and thrust washers.

### R200V ONLY

In addition, check viscous coupling for oil leakage. If necessary, replace it with new one.

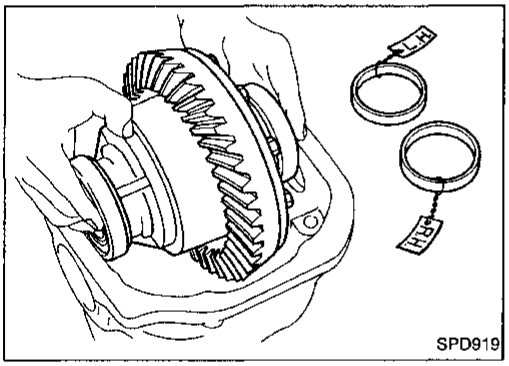


For quiet and reliable final drive operation, the following five adjustments must be made correctly.

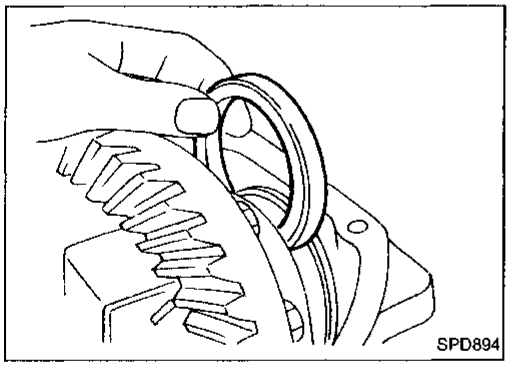
1. Side bearing preload
2. Pinion gear height
3. Pinion bearing preload
4. Ring gear to pinion backlash (Refer to ASSEMBLY.)
5. Ring and pinion gear tooth contact pattern

## Side Bearing Preload

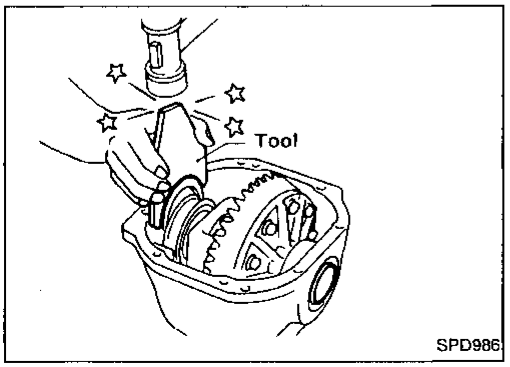
**A selection of carrier side bearing preload shims is required for successful completion of this procedure.**




1. Make sure all parts are clean and that the bearings are well lubricated with hypoid gear oil.
2. Place the differential carrier, with side bearings and bearing races installed, into the final drive housing.



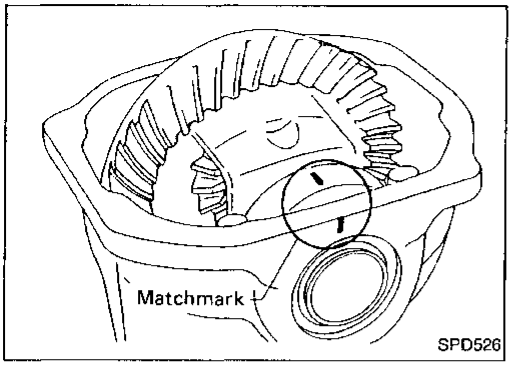

3. Put the side bearing spacer in place on the ring gear end of the carrier.



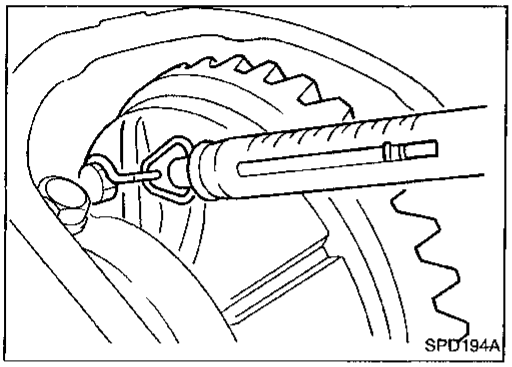

4. Using Tool side bearing spacer drift, place both of the original carrier side bearing preload shims on the carrier end, opposite the ring gear.

**Tool number: KV38100600 (J25267)**

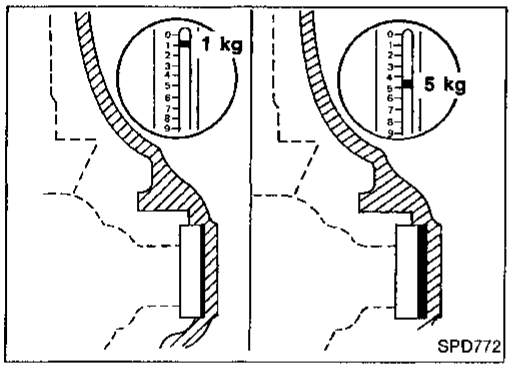
## Side Bearing Preload (Cont'd)



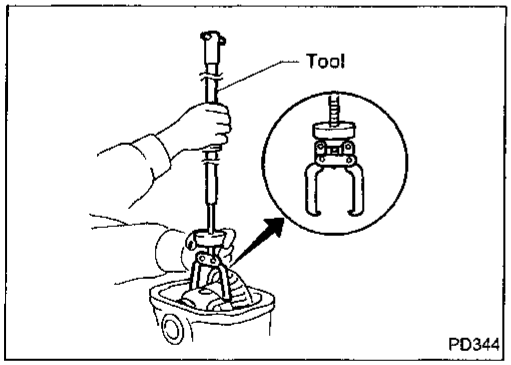

5. Install the side bearing caps in their correct locations and torque the bearing cap retaining bolts.
   **Specification:**
   **88 - 98 N·m (9 - 10 kg-m, 65 - 72 ft-lb)**
6. Turn the carrier several times to seat the bearings.



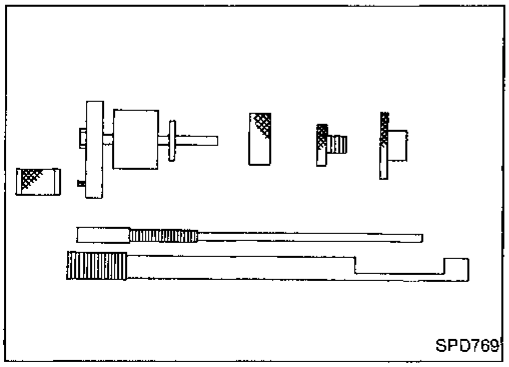

7. Measure the turning torque of the carrier at the ring gear retaining bolts with a spring gauge, J8129.
   **Specification:**
   **34.3 - 39.2 N (3.5 - 4 kg, 7.7 - 8.8 lb)**
   **of pulling force at the ring gear bolt**




8. If the carrier turning torque is not within the specification range, increase or decrease the total thickness of the side bearing adjusting washers until the turning torque is correct. If the turning torque is less than the specified range, install washers of greater thickness; if the turning torque is greater than the specification, install thinner washers. See the S.D.S. section for washer dimensions and part numbers.
9. Record the total amount of washer thickness required for the correct carrier side bearing preload.



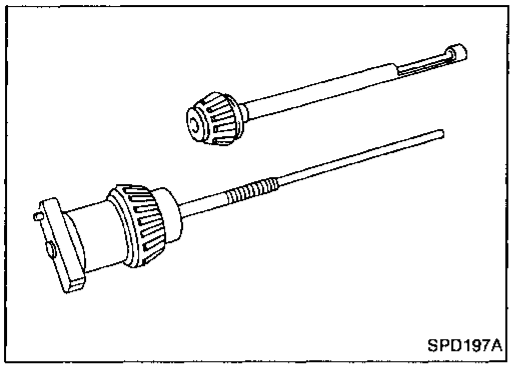

10. Remove the carrier from the final drive housing, saving the selected preload washers for later use during the assembly of the final drive unit.




## Pinion Gear Height and Pinion Bearing Preload

1. Make sure all parts are clean and that the bearings are well lubricated.
2. Assemble the pinion gear bearings into the pinion preload shim selector Tool, J34309.

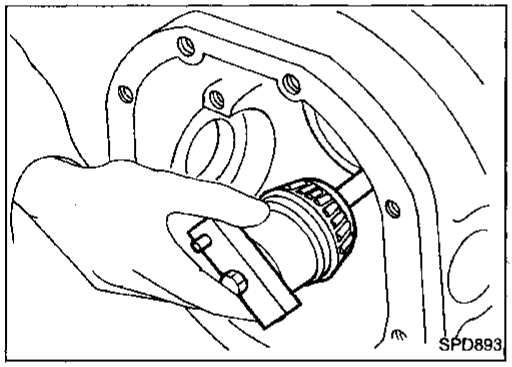
## Pinion Gear Height and Pinion Bearing Preload (Cont'd)


SPD197A

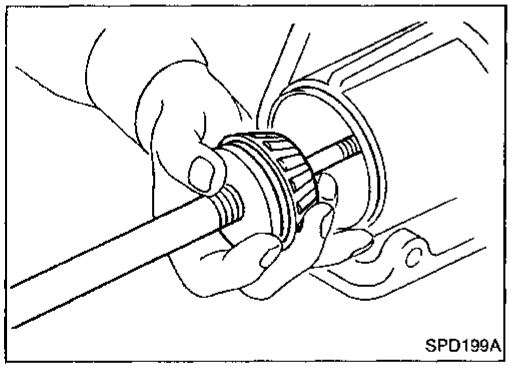
- **Front pinion bearing** — make sure the J34309-3 front pinion bearing seat is secured tightly against the J34309-2 gauge anvil. Then turn the front pinion bearing pilot, J34309-5, to secure the bearing in its proper position.
- **Rear pinion bearing** — the rear pinion bearing pilot, J34309-8, is used to center the rear pinion bearing only. The rear pinion bearing locking seat, J34309-4, is used to lock the bearing to the assembly.

**R200V ONLY**

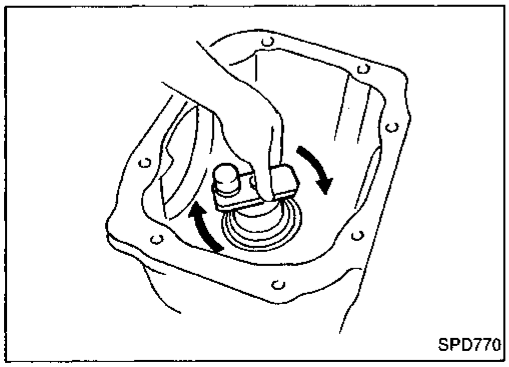
- **Installation of J34309-9 and J34309-16** — place a suitable 2.5 mm (0.098 in) thick plain washer between J34309-9 and J34309-16. Both surfaces of J34309-9 and J34309-16 must be parallel with a clearance of 2.5 mm (0.098 in).


SPD893

3. Place the pinion preload shim selector Tool, J34309-1, gauge screw assembly with the pinion rear bearing inner cone installed into the final drive housing.

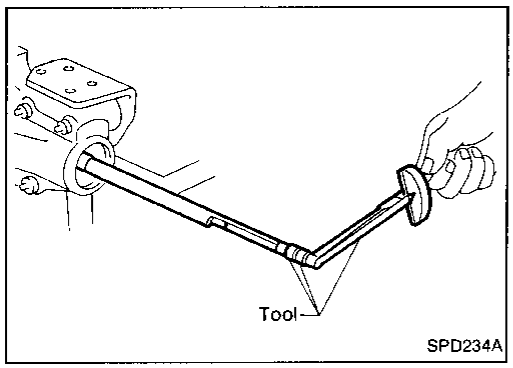

SPD199A

4. Assemble the front pinion bearing inner cone and the J34309-2 gauge anvil together with the J34309-1 gauge screw in the final drive housing. Make sure that the pinion height gauge plate, J34309-16, will turn a full 360 degrees, and tighten the two sections together by hand.

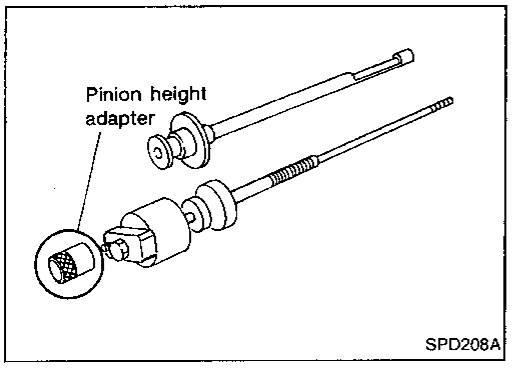

SPD770

5. Turn the assembly several times to seat the bearings.

## Pinion Gear Height and Pinion Bearing Preload (Cont'd)



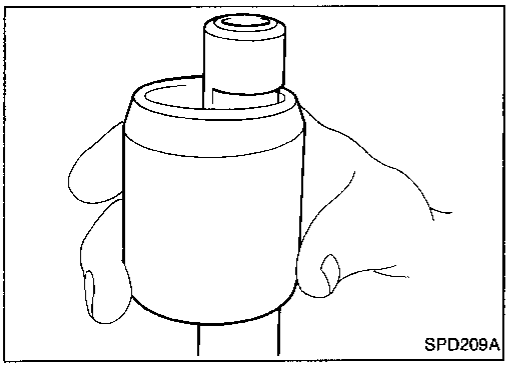

6. Measure the turning torque at the end of the J34309-2 gauge anvil using torque wrench J25765A.
   **Turning torque specification:**
   **1.0 - 1.3 N·m (10 - 13 kg-cm, 8.7 - 11.3 in-lb)**



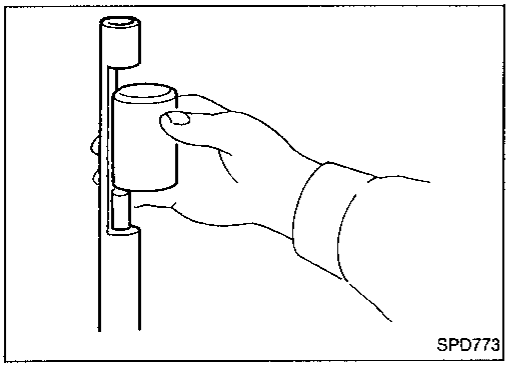

7. Place the J34309-11 "R200A" pinion height adapter onto the gauge plate and tighten it by hand.

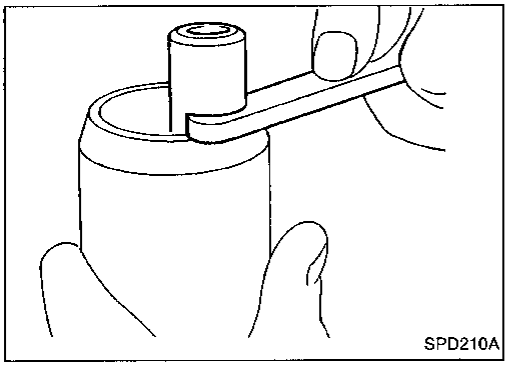
**CAUTION:**
**Make sure all machined surfaces are clean.**

**— PINION BEARING PRELOAD WASHER SELECTION —**



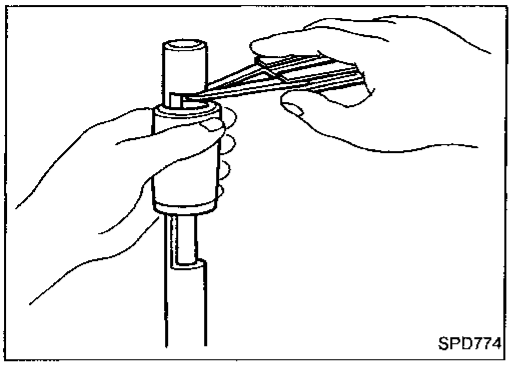

8. Place the solid pinion bearing spacer, small end first, over the J34309-2 gauge anvil and seat the small end squarely against the tip of the J34309-1 gauge screw in the tool recessed portion.



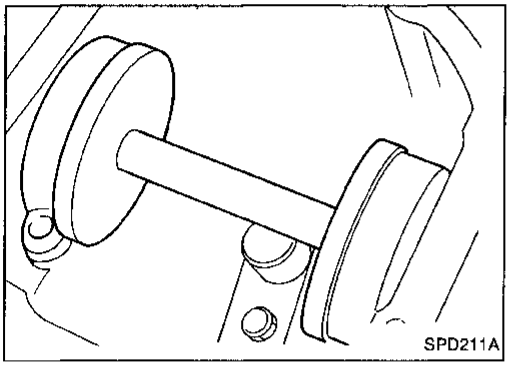

9. Select the correct thickness of pinion bearing preload adjusting washer using a standard gauge of 3.5 mm (0.138 in) and your J34309-101 feeler gauge. The exact measure you get with your gauges is the thickness of the adjusting washer required. Select the correct washer from the following chart.
   **Drive pinion bearing preload adjusting washer:**
   **Refer to S.D.S.**

## Pinion Gear Height and Pinion Bearing Preload (Cont'd)

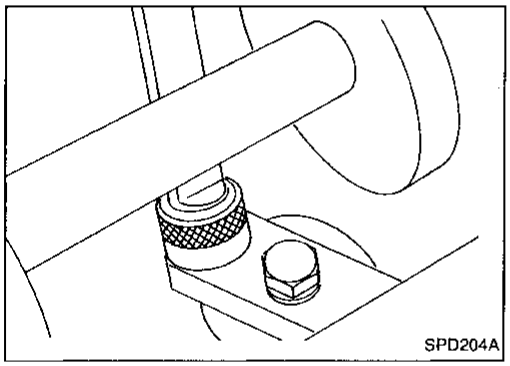



10. Set your selected, correct pinion bearing preload adjusting washer aside for use when assembling the pinion gear and bearings into the final drive.

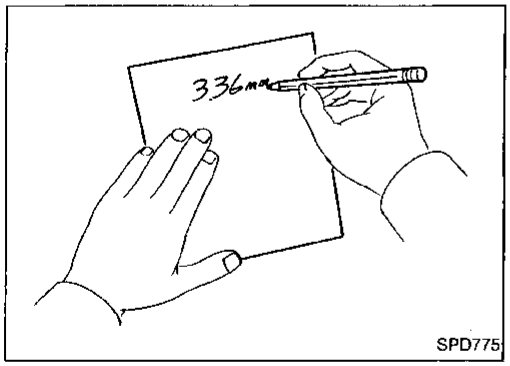
**— PINION HEIGHT ADJUSTING WASHER SELECTION —**



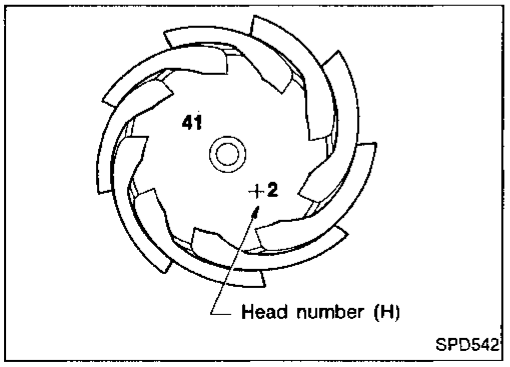

11. Now, position the side bearing discs, J25269-4, and arbor firmly into the side bearing bores.
    Install the side bearing caps and tighten the cap bolts to proper torque.




12. Select the correct standard pinion height adjusting washer thickness using a standard gauge of 3 mm (0.12 in) and your J34309-101 feeler gauge. Measure the distance between the J34309-11 pinion height adapter including the standard gauge and the arbor.




13. Write down your exact measurement.



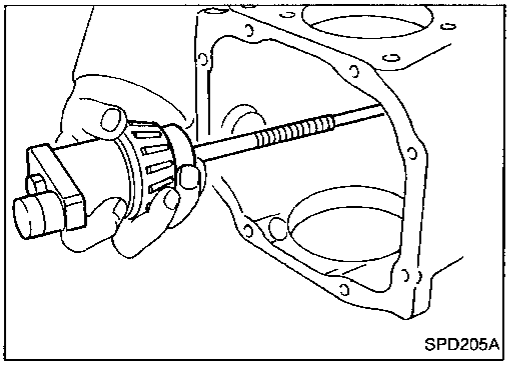

14. Correct the pinion height washer size by referring to the "pinion head number."

**There are two numbers painted on the pinion gear. The first one refers to the pinion and ring gear as a matched set and should be the same as the number on the ring gear. The second number is the "pinion head height number", and it refers to the ideal pinion height from standard for quietest operation. Use the following chart to determine the correct pinion height washer.**

## Pinion Gear Height and Pinion Bearing Preload (Cont'd)

| Pinion head height number | Add or remove from the standard pinion height washer thickness measurement |
|---|---|
| −6 | Add 0.06 mm (0.0024 in) |
| −5 | Add 0.05 mm (0.0020 in) |
| −4 | Add 0.04 mm (0.0016 in) |
| −3 | Add 0.03 mm (0.0012 in) |
| −2 | Add 0.02 mm (0.0008 in) |
| −1 | Add 0.01 mm (0.0004 in) |
| 0 | Use the selected washer thickness |
| +1 | Subtract 0.01 mm (0.0004 in) |
| +2 | Subtract 0.02 mm (0.0008 in) |
| +3 | Subtract 0.03 mm (0.0012 in) |
| +4 | Subtract 0.04 mm (0.0016 in) |
| +5 | Subtract 0.05 mm (0.0020 in) |
| +6 | Subtract 0.06 mm (0.0024 in) |

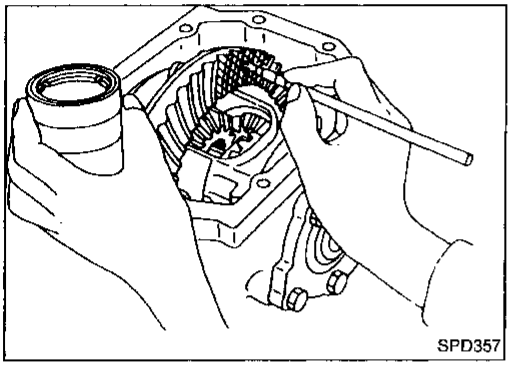
15. Select the correct pinion height washer.
    **Drive pinion height adjusting washer:**
    **Refer to S.D.S.**


SPD205A

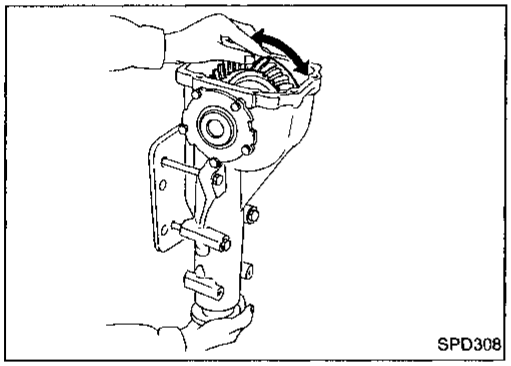
16. Remove the J34309 pinion preload shim selector Tool from the final drive housing and disassemble to retrieve the pinion bearings.

## Tooth Contact

Checking gear tooth contact pattern is necessary to verify correct relationship between ring gear and drive pinion.
Hypoid gears which are not positioned properly in relation to one another may be noisy, or have short life or both. With the checking of gear tooth contact pattern, the most desirable contact for low noise level and long life can be assured.

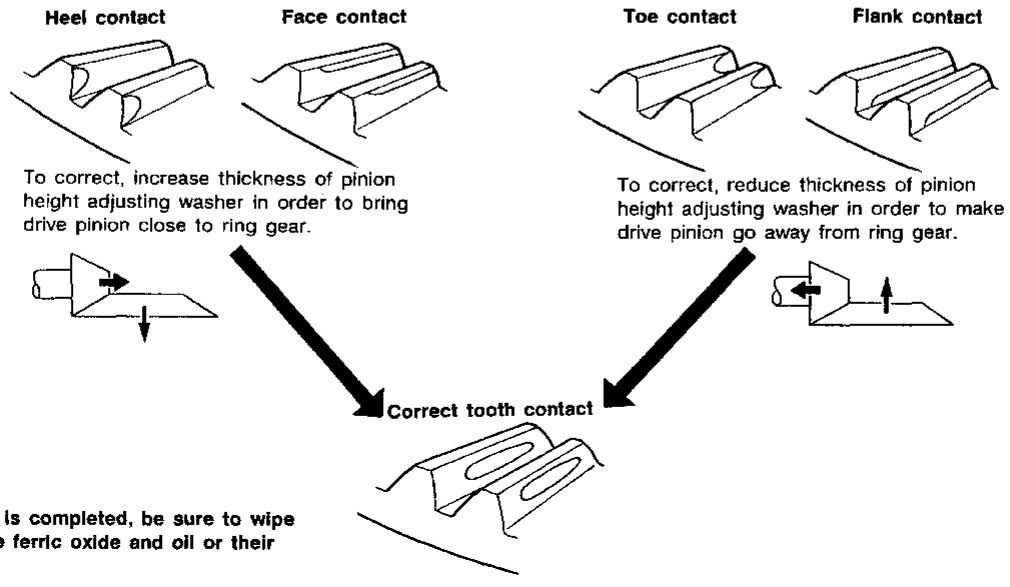

SPD357

1. Thoroughly clean ring gear and drive pinion teeth.
2. Sparingly apply a mixture of powdered titanium oxide and oil or equivalent to 3 or 4 teeth of ring gear drive side.


SPD308

3. Hold companion flange steady by hand and rotate the ring gear in both directions.

**Usually the pattern will be correct if you have calculated the shims correctly and the backlash is correct.**
**However, in rare cases you may have to use trial-and-error processes until you get a good tooth contact pattern.**
**The tooth pattern is the best indication of how well a differential has been set up.**




**When adjustment is completed, be sure to wipe off completely the ferric oxide and oil or their equivalent.**

SPD007

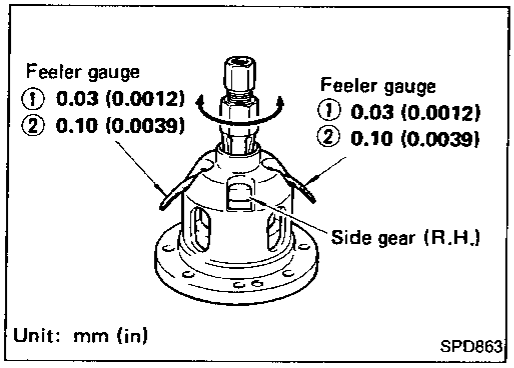
## Differential Case

Whenever side gears or pinion mate gears are replaced, selection of thrust washers should be carried out.
Before selecting thrust washers, make sure all parts are clean and well lubricated with hypoid gear oil.

**THRUST WASHER SELECTION**

**R200V ONLY**

1. Install the previously removed thrust washer on right side gear. On left side gear, install a suitable thrust washer. Temporarily tighten differential cases using two screws.
2. Position differential assembly so that right side gear is on the upper side. Place two feeler gauges with thickness of 0.03 mm (0.0012 in) between right side gear and thrust washer as shown at left.

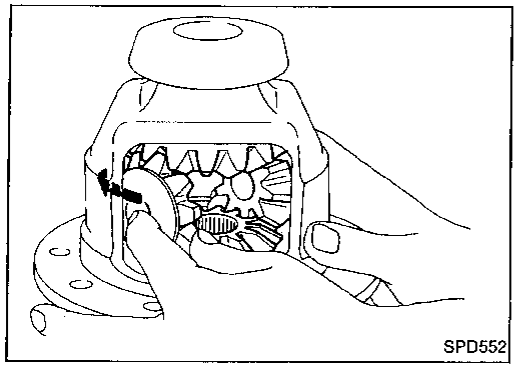


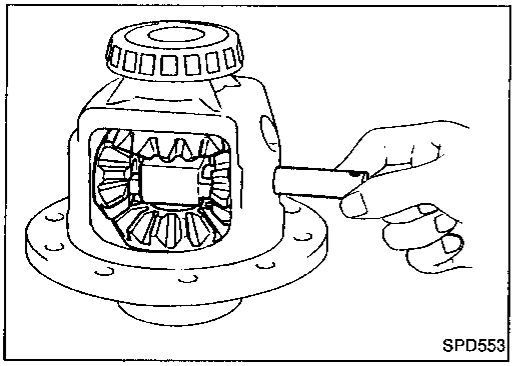

**Do not insert feeler gauge in oil groove portion of differential case.**

3. Rotate right side gear with a suitable tool attached to splines.
   If right side gear cannot be rotated, replace thrust washer used on left side gear with a thinner one.
4. Replace both 0.03 mm (0.0012 in) feeler gauges with 0.10 mm (0.0039 in) gauges. At this point, make sure right side gear does not rotate. If it does, replace thrust washer on left side gear with a thicker one so that right side gear does not rotate.

**R200 ONLY**

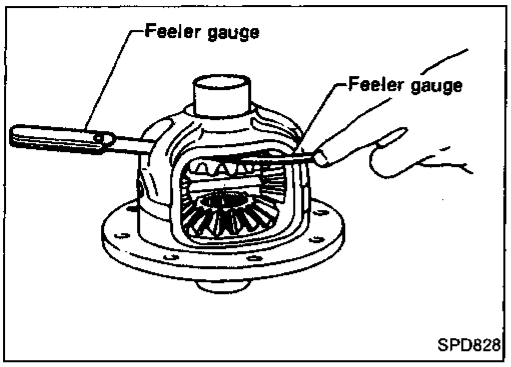
1. Install side gears, pinion mate gears, thrust washers and thrust block into differential case.



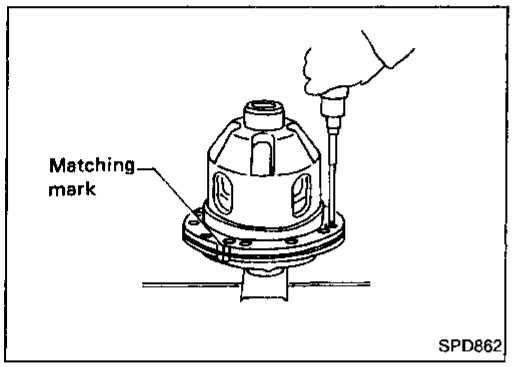

2. Fit pinion mate shaft to differential case so that it meets lock pin holes.

## Differential Case (Cont'd)



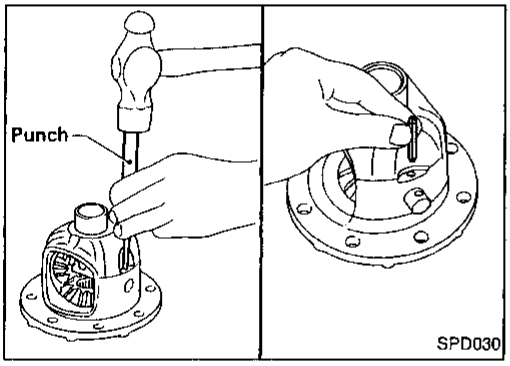

3. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer. Refer to S.D.S.

**Clearance between side gear thrust washer and differential case:**
**0.10 - 0.20 mm (0.0039 - 0.0079 in)**



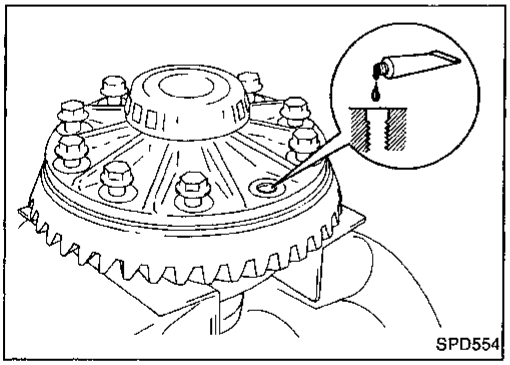

### ASSEMBLY

1. Install differential case A and B. —R200V ONLY—



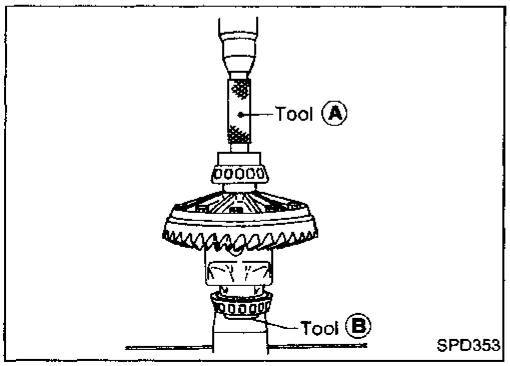

1. Install pinion mate shaft lock pin with a punch. —R200 ONLY—

**Make sure lock pin is flush with case.**



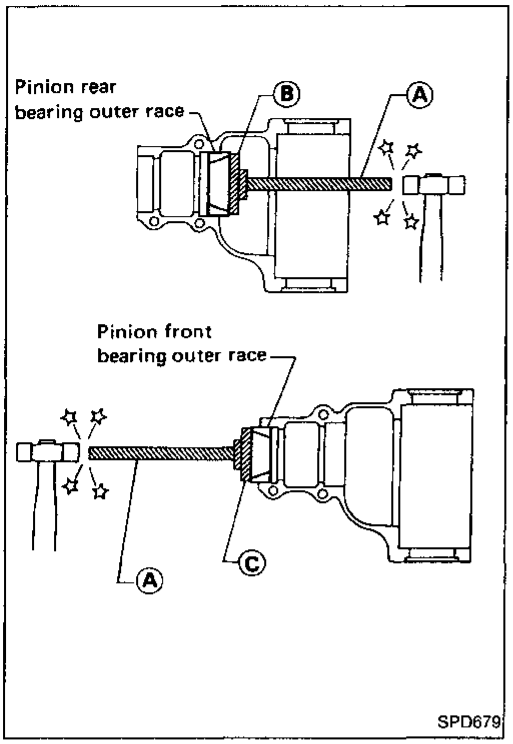

2. Place differential case on ring gear.
3. Apply locking sealant to ring gear bolts, and install them.

**Tighten bolts in a criss-cross fashion, lightly tapping bolt head with a hammer.**



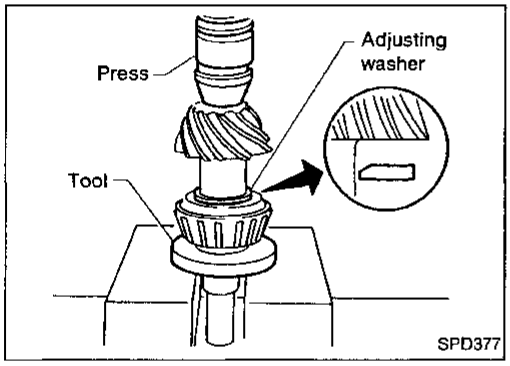

4. Press-fit side bearing inner cones on differential case with Tool.

**Tool number:**
**Ⓐ KV38100300 (J25523)**
**Ⓑ ST33061000 (J8107-2)**

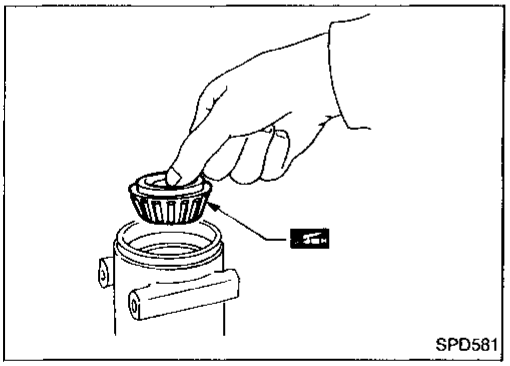



## Differential Carrier

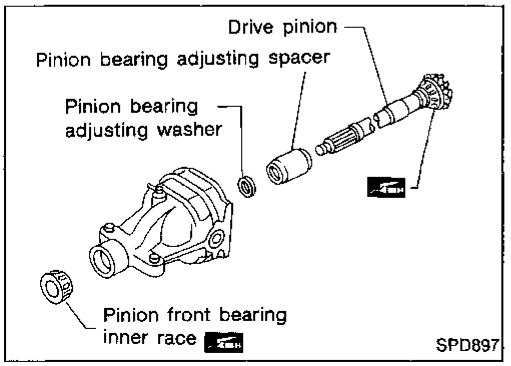
1. Press-fit front and rear bearing outer races with Tools.
   **Tool number:**
   - Ⓐ **ST30611000 (J25742-1)**
   - Ⓑ **ST30701000 (J25742-2)**
   - Ⓒ **ST30613000 (J25742-3)**
2. Select pinion bearing adjusting washer and drive pinion bearing spacer, referring to ADJUSTMENT.




3. Install selected drive pinion height adjusting washer in drive pinion, and press-fit pinion rear bearing inner cone in it, using press and Tool.
   **Tool number: ST30901000 ( — )**



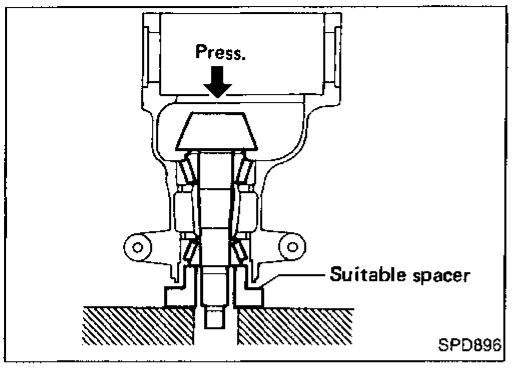

4. Place pinion front bearing inner cone in final drive housing.

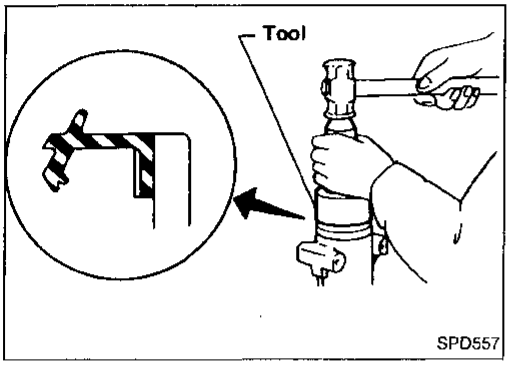



5. Set drive pinion assembly (as shown in figure at left) in differential carrier and install drive pinion, with press and suitable tool.

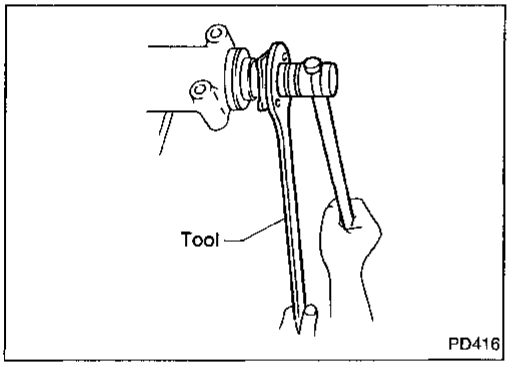
**Stop when drive pinion touches bearing.**
**Apply multi-purpose grease to pinion rear bearing inner race, pinion front bearing inner race.**

## Differential Carrier (Cont'd)



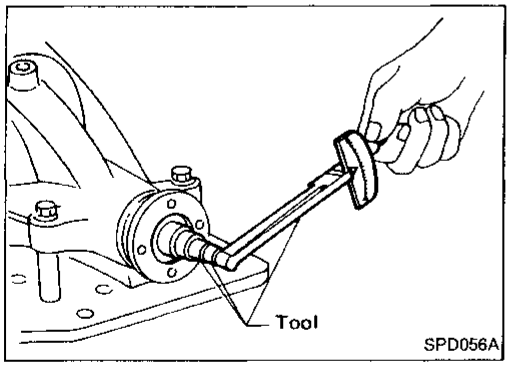

6. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install front oil seal with Tool.
   **Tool number: KV38100500 ( — )**




7. Install companion flange, and tighten pinion nut to specified torque with Tool.

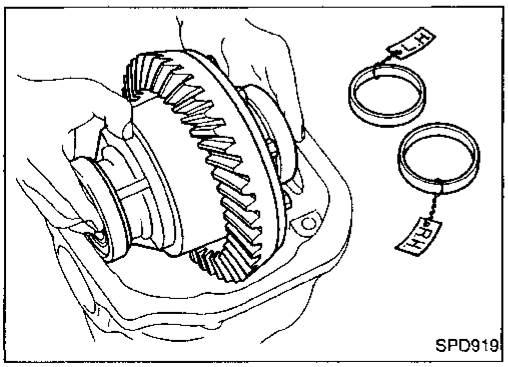
**Make sure that threaded portion of drive pinion and pinion nut are free from oil or grease.**

**Tool number: ST38060002 (J34311)**



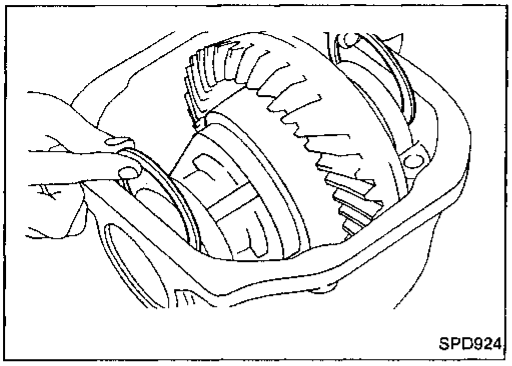

8. Turn drive pinion in both directions several times, and measure pinion bearing preload.
   **Pinion bearing preload:**
   **1.1 - 1.4 N·m (11 - 14 kg-cm, 9.5 - 12.2 in-lb)**

**When pinion bearing preload is outside the specifications, replace pinion bearing adjusting washer and spacer with a different thickness.**

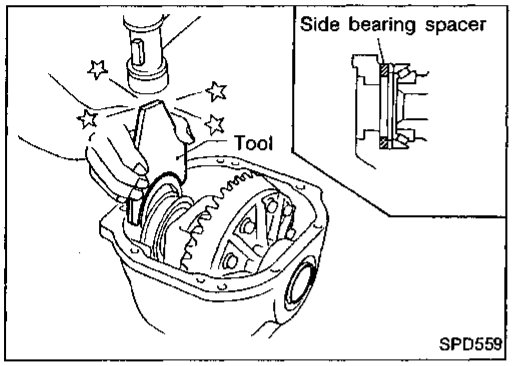



9. Select side bearing adjusting washer.
   Refer to ADJUSTMENT.
10. Install differential case assembly with side bearing outer races into gear carrier.

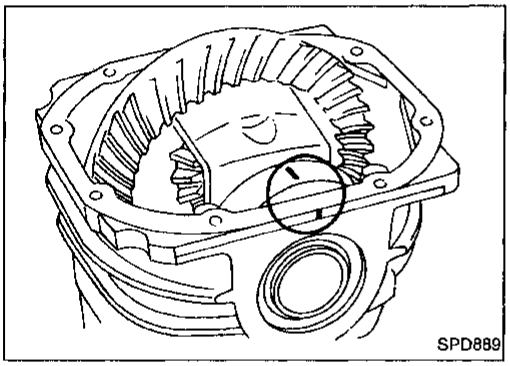
## Differential Carrier (Cont'd)



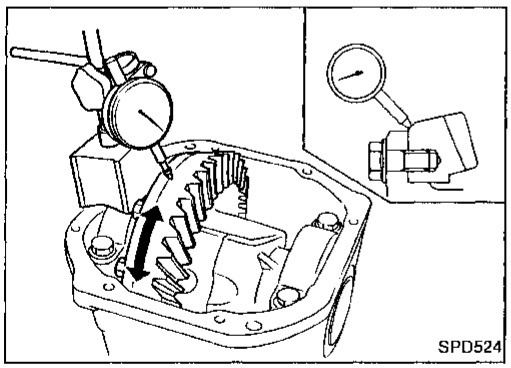

11. Insert left and right side bearing adjusting washers in place between side bearings and carrier.



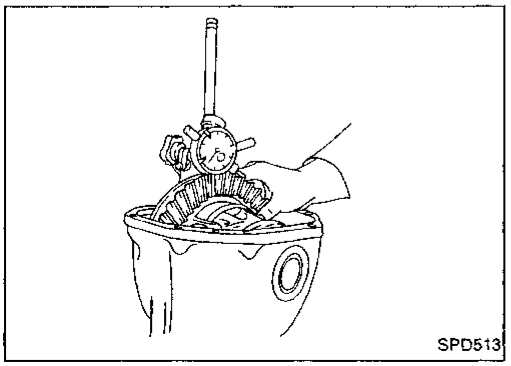

12. Drive in side bearing spacer with Tool.
    **Tool number: KV38100600 (J25267)**




13. Align mark on bearing cap with that on gear carrier and install bearing cap on gear carrier.




14. Check runout of ring gear with a dial indicator.
    **Runout limit: 0.05 mm (0.0020 in)**

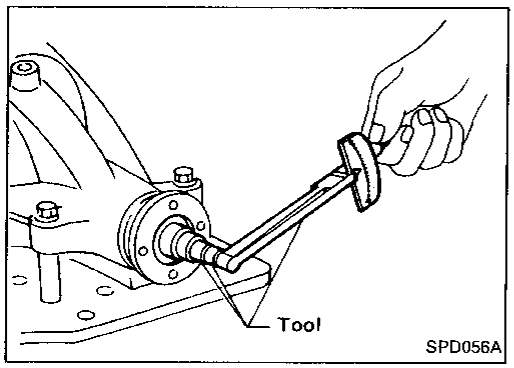



15. Measure ring gear to drive pinion backlash with a dial indicator.
    **Ring gear to drive pinion backlash:**
    **0.10 - 0.15 mm (0.0039 - 0.0059 in)**

- If backlash is too small, decrease thickness of left shim and increase thickness of right shim by the same amount.
  If backlash is too great, reverse the above procedure.

**Never change the total amount of shims as it will change the bearing preload.**

## Differential Carrier (Cont'd)




16. Check total preload with Tool.

**When checking preload, turn drive pinion in both directions several times to seat bearing rollers correctly.**

**Total preload:**

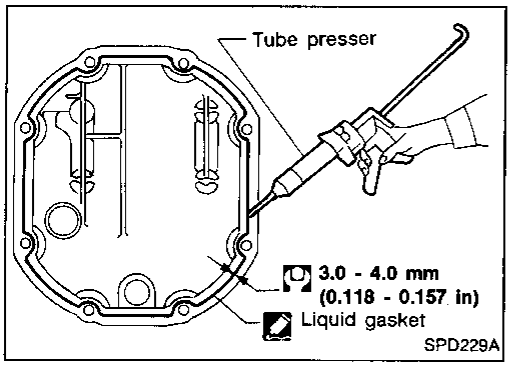
**Value more than 0.29 N·m (3.0 kg-cm, 2.6 in-lb) added on measured value of drive pinion preload**

- If preload is too great, remove the same amount of shim from each side.
- If preload is too small, add the same amount of shim to each side.

**Never add or remove a different number of shims for each side as it will change ring gear to drive pinion backlash.**

17. Recheck ring gear to drive pinion backlash because increase or decrease in thickness of shims will cause change of ring gear to pinion backlash.
- If backlash varies excessively in different places, foreign matter may be caught between the ring gear and the differential case.
- If the backlash varies greatly when the ring gear runout is within a specified range, replace the hypoid gear set or differential case.

18. Check tooth contact.
Refer to ADJUSTMENT.




19. Install rear cover

a. Before installing rear cover, remove all traces of liquid gasket from mating surface of rear cover using a scraper.
- Also remove traces of liquid gasket from mating surface of gear carrier.

b. Apply a continuous bead of liquid gasket to mating surface of rear cover.

- **Use Genuine Liquid Gasket or equivalent.**
- **Attaching should be done within 5 minutes after coating.**
- **Wait at least 1 hour before refilling gear oil.**
- **For the first 12 hours avoid abrupt acceleration or deceleration.**

# Propeller Shaft

## GENERAL SPECIFICATIONS

Unit: mm (in)

| Transmission | M/T | A/T |
|---|---|---|
| Propeller shaft model | 3S63A-R | 3S63A-T |
| Number of joints | 3 | |
| Coupling method with transmission | Sleeve type | |
| Type of journal bearings | Shell type (Non-disassembly type) | |
| Distance between yokes | 63.0 (2.480) | |

Unit: mm (in)

| Propeller shaft model | 3S63A-R | 3S63A-T |
|---|---|---|
| Shaft length (Spider to spider) | | |
| 1st | 395.0 (15.55) | 432.0 (17.01) |
| 2nd | | |
| Without A.B.S. | 605.0 (23.82) | |
| With A.B.S. | 590 (23.23) | |
| Shaft outer diameter | | |
| 1st | 75.0 (2.953) | |
| 2nd | 75.0 (2.953) | 75.0 (2.953) ... Large side<br>63.5 (2.500) ... Small side |

## SPECIFICATIONS AND ADJUSTMENT

Unit: mm (in)

| Propeller shaft model | 3S63A-R | 3S63A-T |
|---|---|---|
| Propeller shaft runout limit | 0.6 (0.024) | |
| Journal axial play | 0 (0) | |

# Final Drive

## GENERAL SPECIFICATIONS

| Final drive model | R200V | R200 |
|---|---|---|
| Ring gear pitch diameter mm (in) | 205 (8.07) | |
| Gear ratio | 4.083 | |
| Number of teeth (Ring gear/drive pinion) | 49/12 | |
| Oil capacity (approx.) ℓ (US pt, Imp pt) | 1.5 (3-1/8, 2-5/8) | 1.3 (2-3/4, 2-1/4) |
| Number of pinion gears | 4 | 2 |
| Side gear bearing spacer location | Right | |

## INSPECTION AND ADJUSTMENT

### Ring gear runout

| Ring gear runout limit mm (in) | 0.05 (0.0020) |
|---|---|

### Side gear adjustment —R200V—

| Clearance between side gear and differential case mm (in) | 0.03 - 0.09 (0.0012 - 0.0035) |
|---|---|

### Available side gear thrust washers (R200V)

| Thickness mm (in) | Part number |
|---|---|
| 0.80 (0.0315) | 38424-40F60 |
| 0.83 (0.0327) | 38424-40F61 |
| 0.86 (0.0339) | 38424-40F62 |
| 0.89 (0.0350) | 38424-40F63 |
| 0.92 (0.0362) | 38424-40F64 |
| 0.95 (0.0374) | 38424-40F65 |
| 0.98 (0.0386) | 38424-40F66 |
| 1.01 (0.0398) | 38424-40F67 |
| 1.04 (0.0409) | 38424-40F68 |
| 1.07 (0.0421) | 38424-40F69 |
| 1.10 (0.0433) | 38424-40F70 |
| 1.13 (0.0445) | 38424-40F71 |
| 1.16 (0.0457) | 38424-40F72 |
| 1.19 (0.0469) | 38424-40F73 |
| 1.22 (0.0480) | 38424-40F74 |
| 1.25 (0.0492) | 38424-40F75 |
| 1.28 (0.0504) | 38424-40F76 |
| 1.31 (0.0516) | 38424-40F77 |
| 1.34 (0.0528) | 38424-40F78 |
| 1.37 (0.0539) | 38424-40F79 |
| 1.40 (0.0551) | 38424-40F80 |
| 1.43 (0.0563) | 38424-40F81 |
| 1.46 (0.0575) | 38424-40F82 |
| 1.49 (0.0587) | 38424-40F83 |

## Final Drive (Cont'd)

### Side gear adjustment —R200—

| | |
|---|---|
| Clearance between side gear and differential case mm (in) | 0.10 - 0.20 (0.0039 - 0.0079) |

### Available side gear thrust washers (R200)

| Thickness mm (in) | Part number |
|---|---|
| 0.75 (0.0295) | 38424-N3110 |
| 0.78 (0.0307) | 38424-N3111 |
| 0.81 (0.0319) | 38424-N3112 |
| 0.84 (0.0331) | 38424-N3113 |
| 0.87 (0.0343) | 38424-N3114 |
| 0.90 (0.0354) | 38424-N3115 |
| 0.93 (0.0366) | 38424-N3116 |

### Drive pinion height adjustment

### Available pinion height adjusting washers

| Thickness mm (in) | Part number |
|---|---|
| 3.09 (0.1217) | 38154-P6017 |
| 3.12 (0.1228) | 38154-P6018 |
| 3.15 (0.1240) | 38154-P6019 |
| 3.18 (0.1252) | 38154-P6020 |
| 3.21 (0.1264) | 38154-P6021 |
| 3.24 (0.1276) | 38154-P6022 |
| 3.27 (0.1287) | 38154-P6023 |
| 3.30 (0.1299) | 38154-P6024 |
| 3.33 (0.1311) | 38154-P6025 |
| 3.36 (0.1323) | 38154-P6026 |
| 3.39 (0.1335) | 38154-P6027 |
| 3.42 (0.1346) | 38154-P6028 |
| 3.45 (0.1358) | 38154-P6029 |
| 3.48 (0.1370) | 38154-P6030 |
| 3.51 (0.1382) | 38154-P6031 |
| 3.54 (0.1394) | 38154-P6032 |
| 3.57 (0.1406) | 38154-P6033 |
| 3.60 (0.1417) | 38154-P6034 |
| 3.63 (0.1429) | 38154-P6035 |
| 3.66 (0.1441) | 38154-P6036 |

### Drive pinion preload adjustment

| Drive pinion bearing adjusting method | Pinion bearing adjusting washer and spacer |
|---|---|
| Drive pinion preload with front oil seal N·m (kg-cm, in-lb) | 1.1 - 1.4 (11 - 14, 9.5 - 12.2) |

### Available drive pinion bearing preload adjusting washers

| Thickness mm (in) | Part number |
|---|---|
| 3.80 - 3.82 (0.1496 - 0.1504) | 38125-61001 |
| 3.82 - 3.84 (0.1504 - 0.1512) | 38126-61001 |
| 3.84 - 3.86 (0.1512 - 0.1520) | 38127-61001 |
| 3.86 - 3.88 (0.1520 - 0.1528) | 38128-61001 |
| 3.88 - 3.90 (0.1528 - 0.1535) | 38129-61001 |
| 3.90 - 3.92 (0.1535 - 0.1543) | 38130-61001 |
| 3.92 - 3.94 (0.1543 - 0.1551) | 38131-61001 |
| 3.94 - 3.96 (0.1551 - 0.1559) | 38132-61001 |
| 3.96 - 3.98 (0.1559 - 0.1567) | 38133-61001 |
| 3.98 - 4.00 (0.1567 - 0.1575) | 38134-61001 |
| 4.00 - 4.02 (0.1575 - 0.1583) | 38135-61001 |
| 4.02 - 4.04 (0.1583 - 0.1591) | 38136-61001 |
| 4.04 - 4.06 (0.1591 - 0.1598) | 38137-61001 |
| 4.06 - 4.08 (0.1598 - 0.1606) | 38138-61001 |
| 4.08 - 4.10 (0.1606 - 0.1614) | 38139-61001 |

### Available drive pinion bearing preload adjusting spacers

| Length mm (in) | Part number |
|---|---|
| 54.50 (2.1457) | 38165-B4000 |
| 54.80 (2.1575) | 38165-B4001 |
| 55.10 (2.1693) | 38165-B4002 |
| 55.40 (2.1811) | 38165-B4003 |
| 55.70 (2.1929) | 38165-B4004 |
| 56.00 (2.2047) | 38165-61001 |

### Total preload adjustment

| | |
|---|---|
| Drive pinion to ring gear backlash mm (in) | 0.10 - 0.15 (0.0039 - 0.0059) |
| Total preload | Value more than 0.29 N·m (3.0 kg-cm, 2.6 in-lb) added on measured value of drive pinion preload |
| Side bearing adjusting method | Adjusting washer |

### Available side bearing adjusting washers

| Thickness mm (in) | Part number |
|---|---|
| 2.00 (0.0787) | 38453-N3100 |
| 2.05 (0.0807) | 38453-N3101 |
| 2.10 (0.0827) | 38453-N3102 |
| 2.15 (0.0846) | 38453-N3103 |
| 2.20 (0.0866) | 38453-N3104 |
| 2.25 (0.0886) | 38453-N3105 |
| 2.30 (0.0906) | 38453-N3106 |
| 2.35 (0.0925) | 38453-N3107 |
| 2.40 (0.0945) | 38453-N3108 |
| 2.45 (0.0965) | 38453-N3109 |
| 2.50 (0.0984) | 38453-N3110 |
| 2.55 (0.1004) | 38453-N3111 |
| 2.60 (0.1024) | 38453-N3112 |
| 2.65 (0.1043) | 38453-N3113 |