PROPELLER SHAFT & DIFFERENTIAL CARRIER

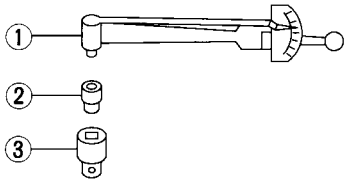
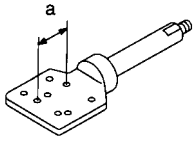
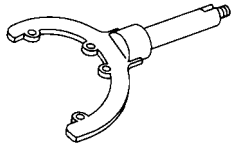
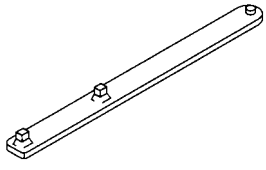
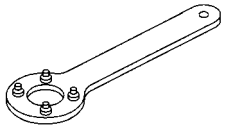
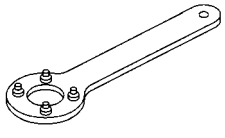
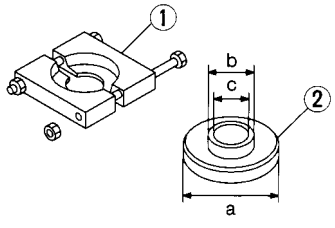
SECTION PD

CONTENTS

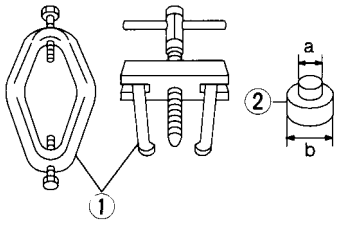
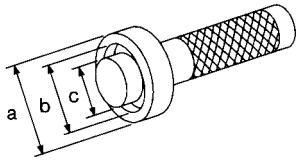
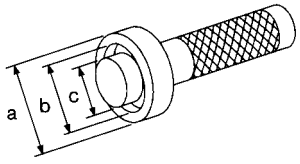
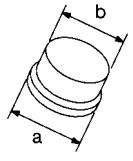
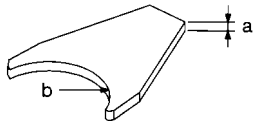
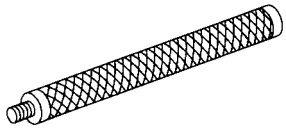
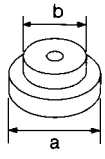
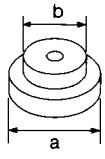
CONTENTS (Cont'd.)

Special Service Tools

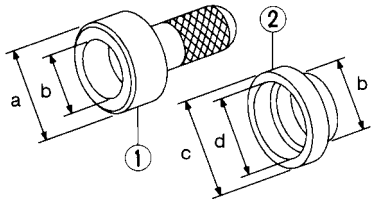
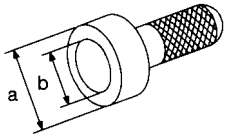
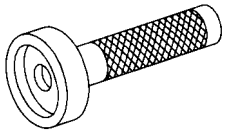
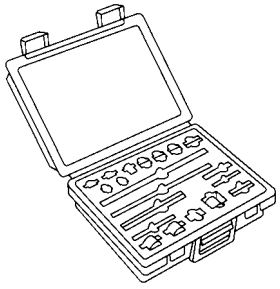
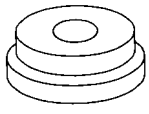
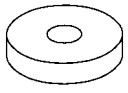
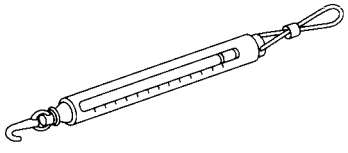
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description		Unit application	
			R200A	H233B
ST3127S000 (See J25765-A) Preload gauge ① GG91030000 (J25765) Torque wrench ② HT62940000 (—) Socket adapter ③ HT62900000 (—) Socket adapter	 NT124	Measuring pinion bearing preload and total preload	X	X
KV38100800 (J34310, J25604-01) Differential attachment	 NT119	Mounting final drive (To use, make a new hole.) **a: 152 mm (5.98 in)**	X	—
ST06340000 (J24310, J34310) Differential attachment	 NT140	Mounting final drive	—	X
ST32580000 (J34312) Differential side bearing adjusting nut wrench	 NT141	Adjusting side bearing preload and backlash (ring gear-drive pinion)	—	X
ST38060002 (J34311) Drive pinion flange wrench	 NT113	Removing and installing propeller shaft lock nut, and drive pinion lock nut	X	—
KV38104700 (J34311) Drive pinion flange wrench	 NT113	Removing and installing propeller shaft lock nut, and drive pinion lock nut	—	X
ST3090S000 (—) Drive pinion rear inner race puller set ① ST30031000 (J22912-01) Puller ② ST30901000 (J26010-01) Base	 NT527	Removing and installing drive pinion rear inner cone **a: 79 mm (3.11 in) dia.** **b: 45 mm (1.77 in) dia.** **c: 35 mm (1.38 in) dia.**	X	X

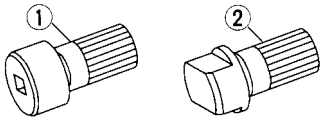
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description		Unit application	
			R200A	H233B
ST3306S001 Differential side bearing puller set ① ST33051001 (J22888-20) Body ② ST33061000 (J8107-2) Adapter	 NT072	Removing and installing differential side bearing inner cone **a: 28.5 mm (1.122 in) dia.** **b: 38 mm (1.50 in) dia.**	X	X
KV38100300 (J25523) Differential side bearing drift	 NT085	Installing side bearing inner cone **a: 54 mm (2.13 in) dia.** **b: 46 mm (1.81 in) dia.** **c: 32 mm (1.26 in) dia.**	X	—
ST33190000 (J25523) Differential side bearing drift	 NT085	Installing side bearing inner cone **a: 52 mm (2.05 in) dia.** **b: 45.5 mm (1.791 in) dia.** **c: 34 mm (1.34 in) dia.**	—	X
ST33081000 (—) Side bearing puller adapter	 NT431	Installing side bearing inner cone **a: 43 mm (1.69 in) dia.** **b: 33.5 mm (1.319 in) dia.**	—	X
KV38100600 (J25267) Side bearing spacer drift	 NT528	Installing side bearing spacer **a: 8 mm (0.31 in)** **b: R42.5 mm (1.673 in)**	X	—
ST30611000 (J25742-1) Drift	 NT090	Installing pinion rear bearing outer race (Use with ST30621000 or ST30613000)	X	X
ST30621000 (J25742-5) Drift	 NT073	Installing pinion rear bearing outer race (Use with ST30611000) **a: 79 mm (3.11 in) dia.** **b: 59 mm (2.32 in) dia.**	X	X
ST30613000 (J25742-3) Drift	 NT073	Installing pinion front bearing outer race (Use with ST30611000) **a: 72 mm (2.83 in) dia.** **b: 48 mm (1.89 in) dia.**	X	X

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description		Unit application	
			R200A	H233B
KV381025S0 (—) Oil seal fitting tool ① ST30720000 (J25405) Drift bar ② KV38102510 (—) Drift	 NT525	Installing front oil seal **a: 77 mm (3.03 in) dia.** **b: 55 mm (2.17 in) dia.** **c: 71 mm (2.80 in) dia.** **d: 65 mm (2.56 in) dia.**	—	X
KV38100500 (J25273) Gear carrier front oil seal drift	 NT115	Installing front oil seal **a: 85 mm (3.35 in) dia.** **b: 60 mm (2.36 in) dia.**	X	—
KV38100200 (J26233) Gear carrier side oil seal drift	 NT120	Installing side oil seal	X	—
(J34309) Differential shim selector	 NT134	Adjusting bearing pre-load and gear height	X	X
(J25269-4) Side bearing discs (2 Req'd)	 NT136	Selecting pinion height adjusting washer	X	—
(J25269-18) Side bearing discs (2 Req'd)	 NT135	Selecting pinion height adjusting washer	—	X
(J8129) Spring gauge	 NT127	Measuring carrier turning torque	X	X

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description		Unit application	
			R200A	H233B
KV381052S0 (—) Rear axle shaft dummy ① KV38105210 (—) Torque wrench side ② KV38105220 (—) Vice side	 NT142	Checking differential torque on limited slip differential	—	X

NVH Troubleshooting Chart

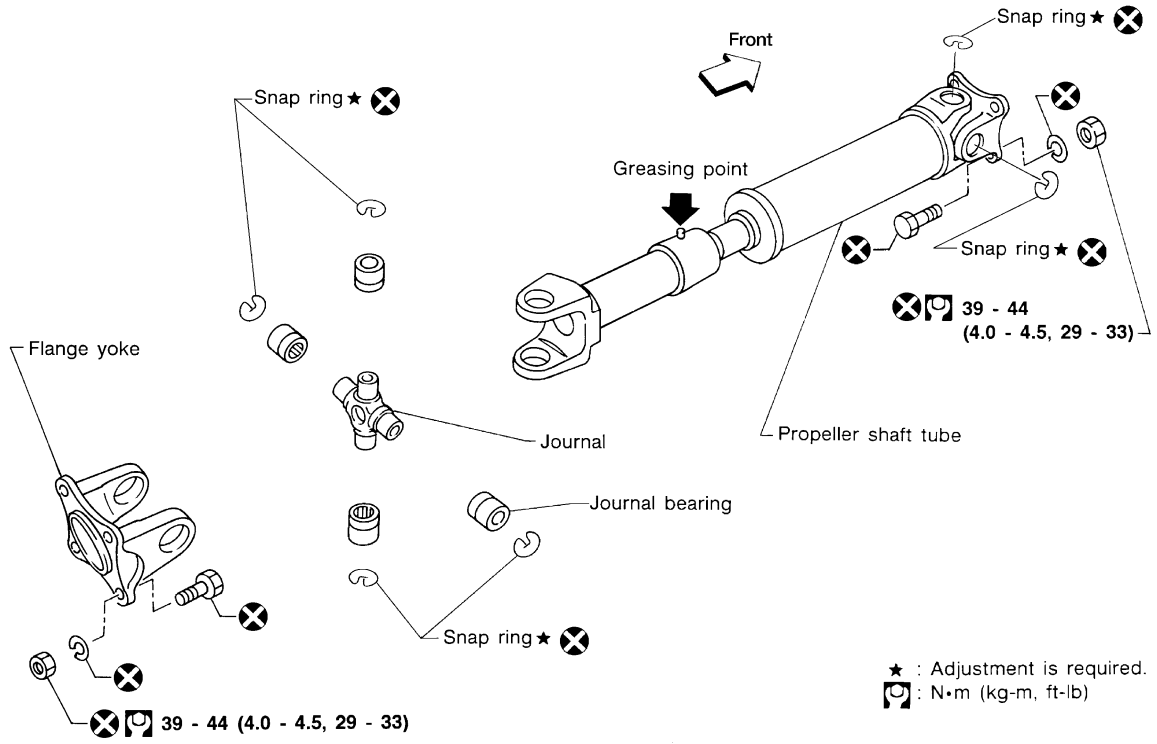
Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	PD-8, 11	—	—	—	PD-9	PD-9	PD-23, 42	PD-30, 52	PD-23, 42	PD-35, 56	—	Refer to MA section	Refer to PROPELLER SHAFT in this chart	Refer to DIFFERENTIAL in this chart	NVH in FA section	NVH in FA, RA section	NVH in FA section	NVH in FA section	NVH in BR section	NVH in ST section
Possible cause and SUSPECTED PARTS			Uneven rotation torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	Rough gear tooth	Improper gear contact	Tooth surfaces worn	Incorrect backlash	Companion flange excessive runout	Improper gear oil	PROPELLER SHAFT	DIFFERENTIAL	DRIVE SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	BRAKES	STEERING
Symptom	PROPELLER SHAFT	Noise	X	X	X	X	X	X	X								X	X	X	X	X	X	X
		Shake		X			X											X	X	X	X	X	X
		Vibration	X	X	X	X	X	X	X									X	X	X			X
	DIFFERENTIAL	Noise								X	X	X	X	X	X	X		X	X	X	X	X	X

X : Applicable

Front propeller shaft (Model 2F1310)

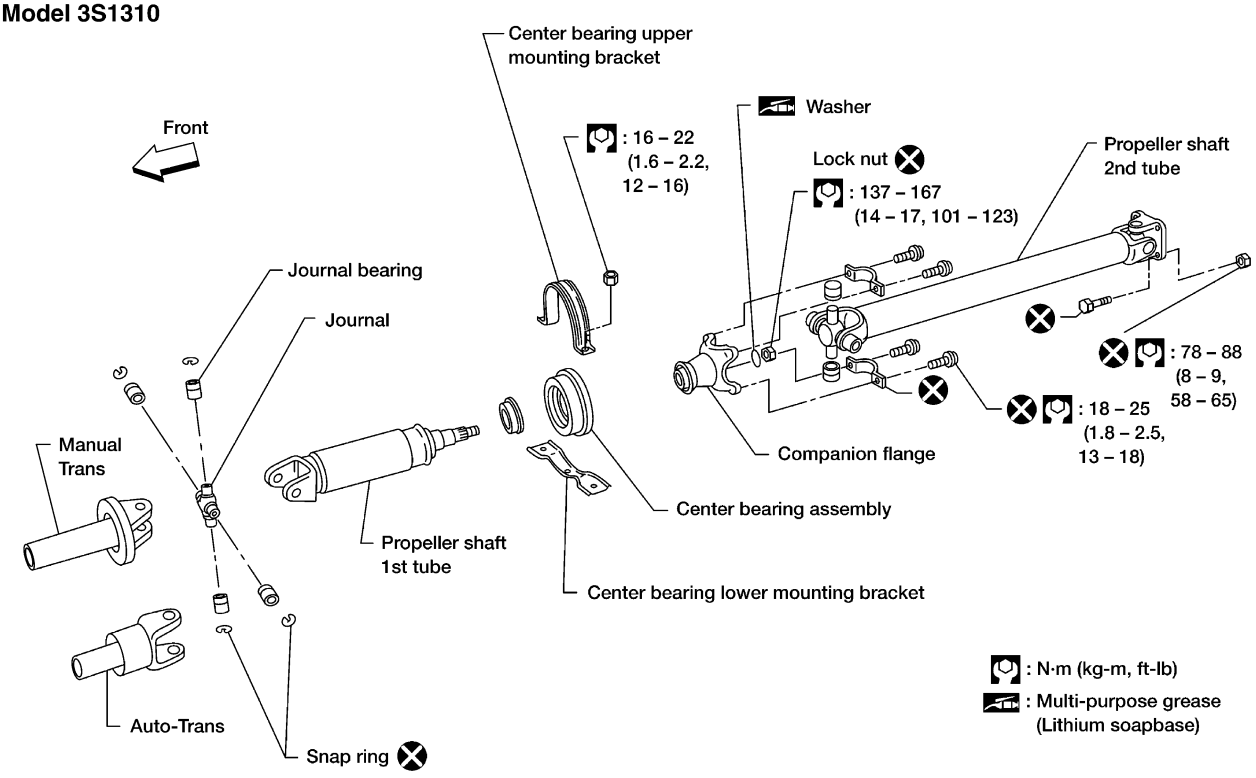
SEC. 370



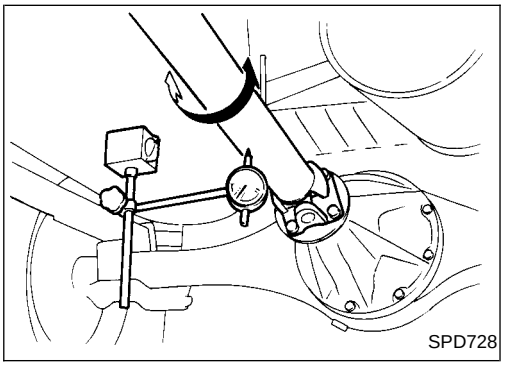
APD025

Rear propeller shaft (Model 3S1310)

SEC. 370
Model 3S1310



WPD017


SPD728

On-vehicle Service

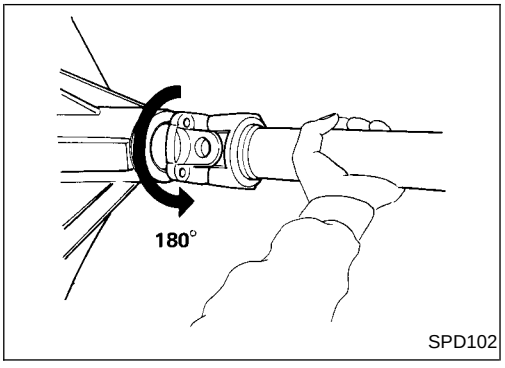
PROPELLER SHAFT VIBRATION

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

1. Raise rear end of vehicle until wheels are clear of the ground.
2. Measure propeller shaft runout at several points along propeller shaft by rotating final drive companion flange using hands.
3. If runout exceeds specifications, disconnect propeller shaft at final drive companion flange. Rotate companion flange 180 degrees, then reconnect propeller shaft.
   Runout limit: 0.6 mm (0.024 in)
4. Check runout again. If runout still exceeds the limit, replace propeller shaft assembly.
5. Perform road test.

APPEARANCE CHECKING

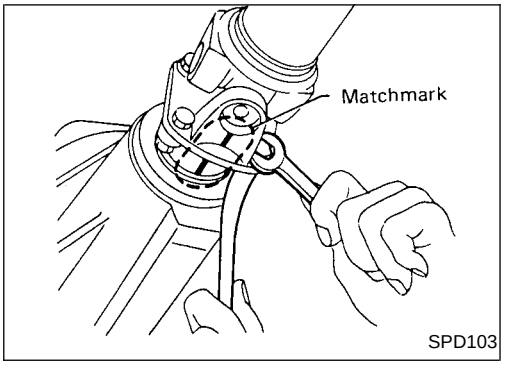
- Inspect propeller shaft tube surface for dents or cracks and replace as necessary.
- Check center bearing for noise or damage and replace as necessary.



SPD102

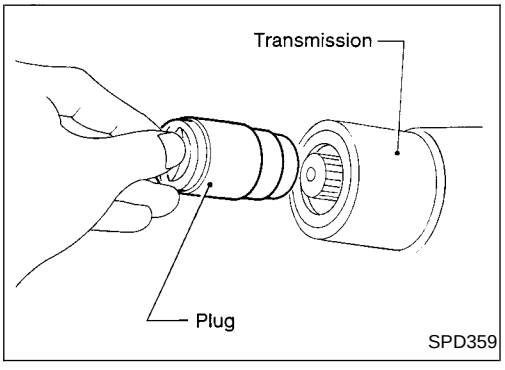
Removal and Installation

1. Place matching marks on flanges, then separate propeller shaft from final drive.



SPD103

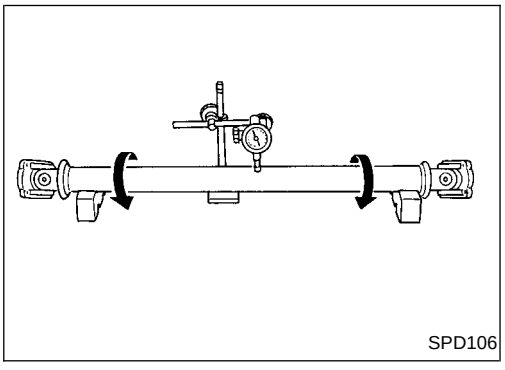
2. Remove propeller shaft.
- **Insert plug into rear oil seal after removing rear propeller shaft.**



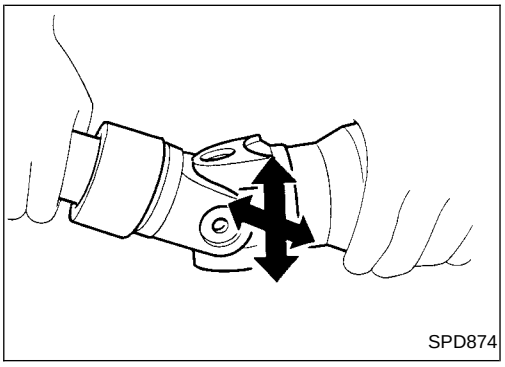
SPD359

Inspection

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


SPD106

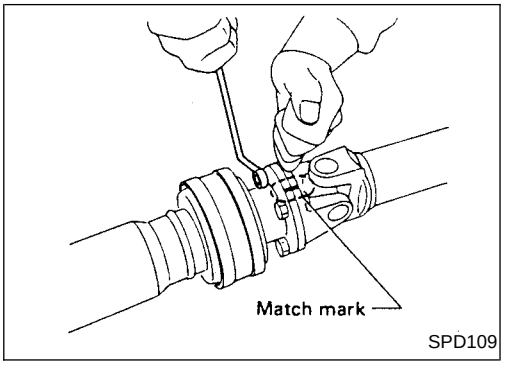
Inspection (Cont'd)


SPD874

- Inspect journal axial play.
  If play exceeds the limit, replace propeller shaft assembly.
  Journal axial play:
  0.02 mm (0.0008 in) or less

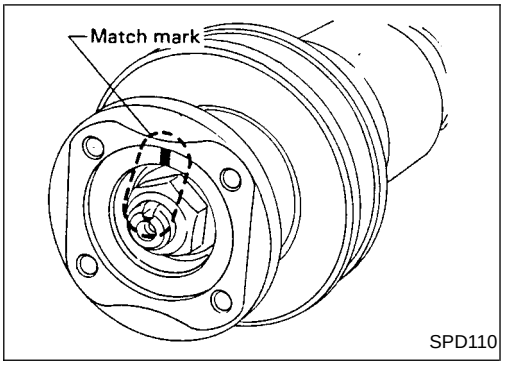
Disassembly

CENTER BEARING



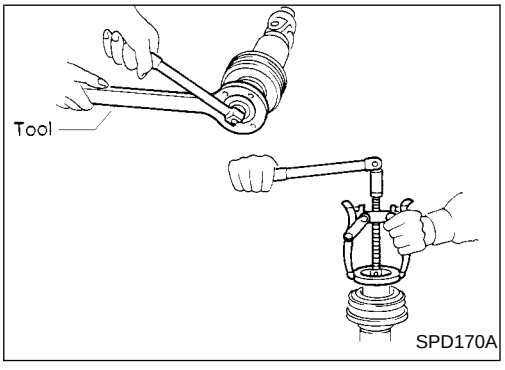
SPD109

1. Place matching marks on flanges, then separate 2nd tube from 1st tube.



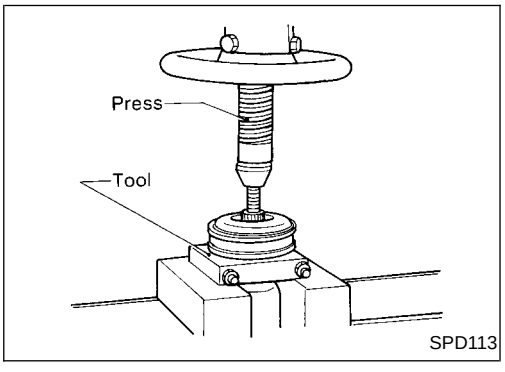
SPD110

2. Place matching marks on the flange and shaft.



SPD170A

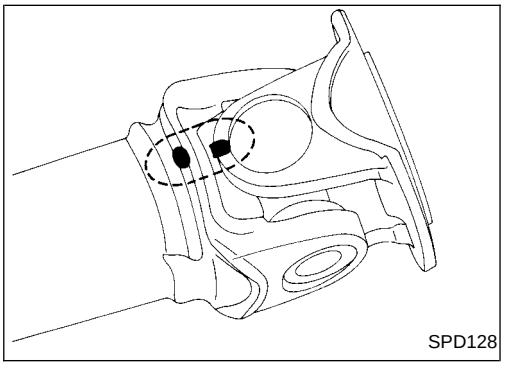
3. Remove locking nut using Tool.
   Tool number:
   ST38060002 (J34311)
4. Remove companion flange using puller.



SPD113

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

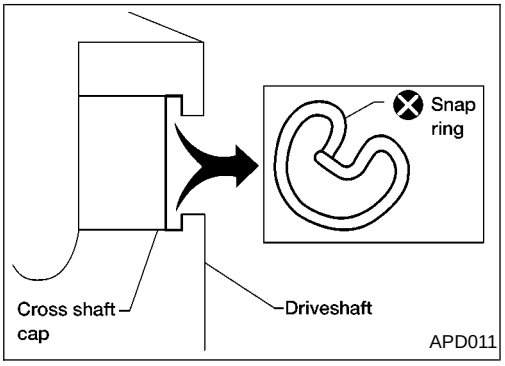
Disassembly (Cont'd)


SPD128

JOURNAL

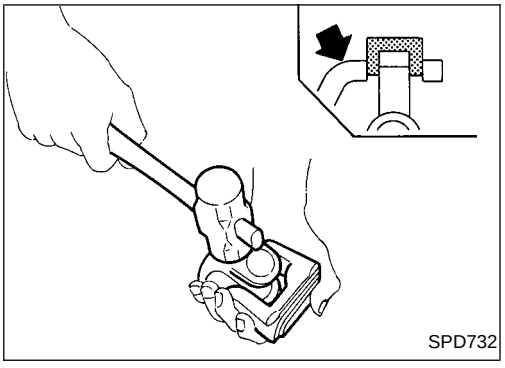
NOTE:

1. Place matching marks on propeller shaft and flange or yoke.

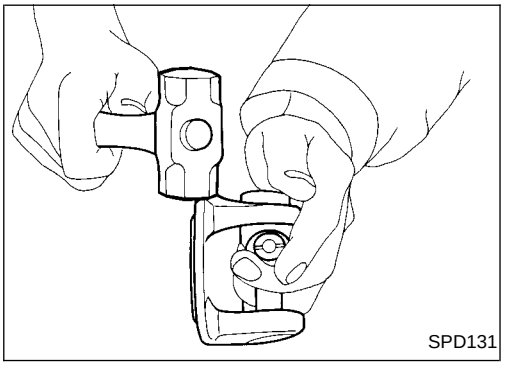


APD011

2. Remove snap ring.


SPD732

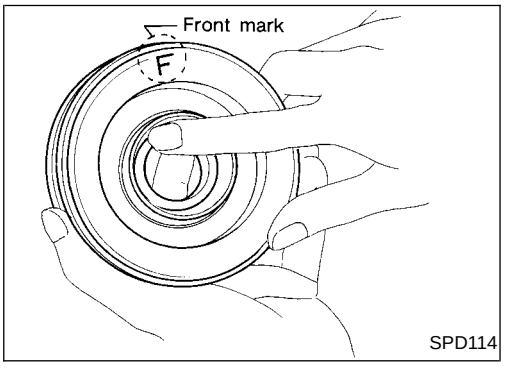
3. Remove pushed out journal bearing by lightly tapping yoke with a hammer, taking care not to damage journal and yoke hole.


SPD131

4. Remove bearing at opposite side in above operation.

Put marks on disassembled parts so that they can be reinstalled in their original positions.

Assembly

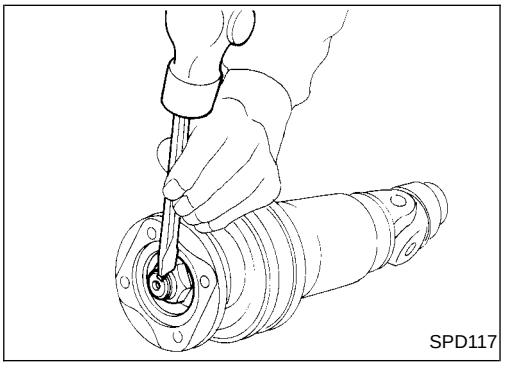


SPD114

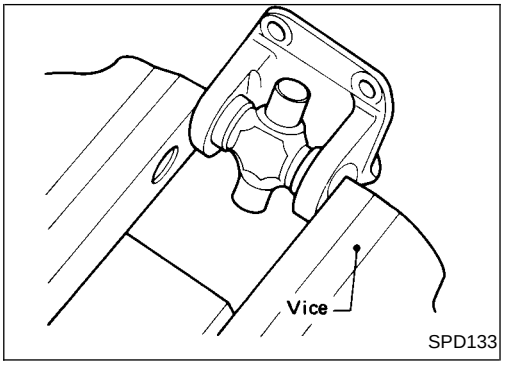
CENTER BEARING

- 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.**

Assembly (Cont'd)


SPD117

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

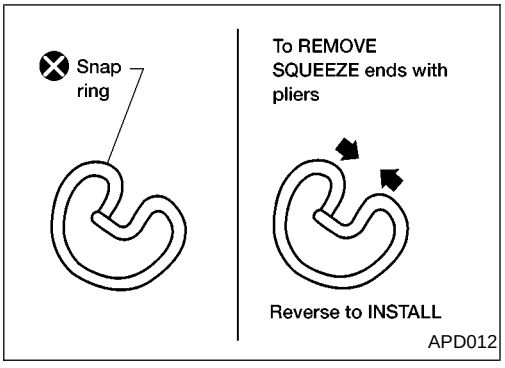


SPD133

JOURNAL

1. Assemble journal bearing. Apply recommended multi-purpose grease on bearing inner surface.

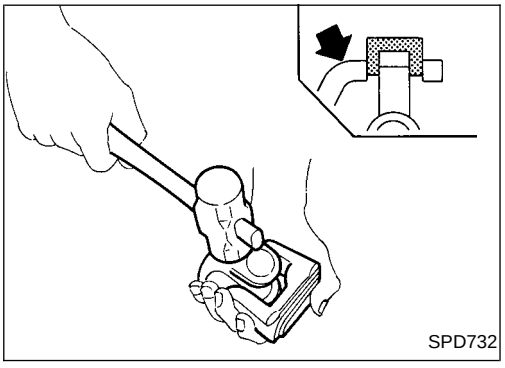
When assembling, be careful that needle bearing does not fall down.



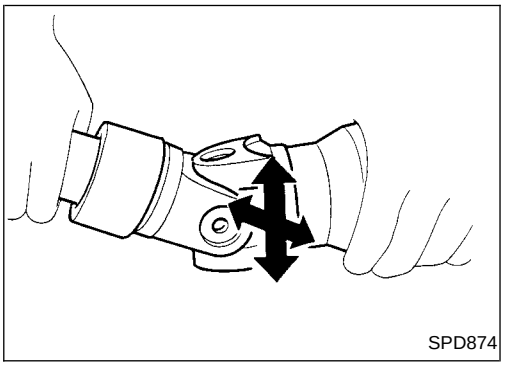
APD012

2. Select snap ring that will provide specified play in axial direction of journal, and install them.
   Refer to SDS, PD-57.

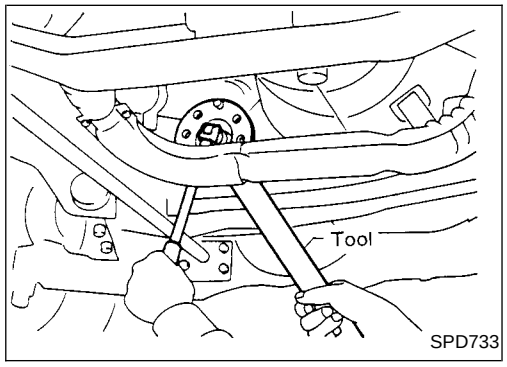
Select snap rings with a difference in thickness at both sides within 0.06 mm (0.0024 in).


SPD732

3. Adjust thrust clearance between bearing and snap ring to zero by tapping yoke.


SPD874

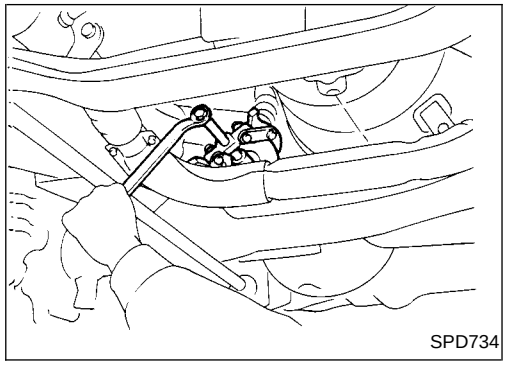
4. Check to see that journal moves smoothly and check for axial play.
   Axial play: 0.02 mm (0.0008 in) or less



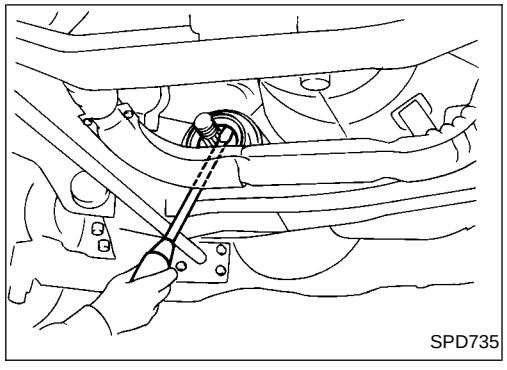
Front Oil Seal Replacement

(Front final drive: Model R200A)

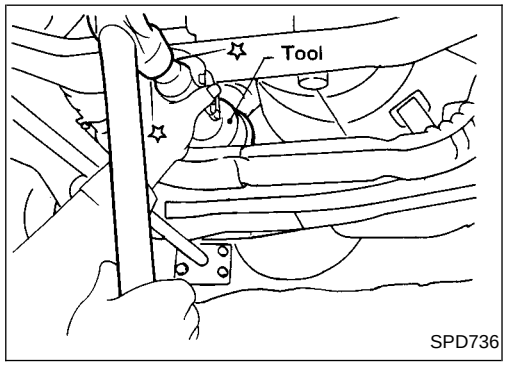
1. Remove front propeller shaft.
2. Loosen drive pinion nut.
   Tool number: ST38060002 (J34311)



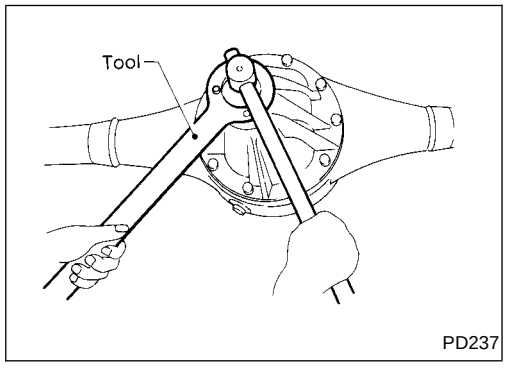
3. Remove companion flange.



4. Remove front oil seal.



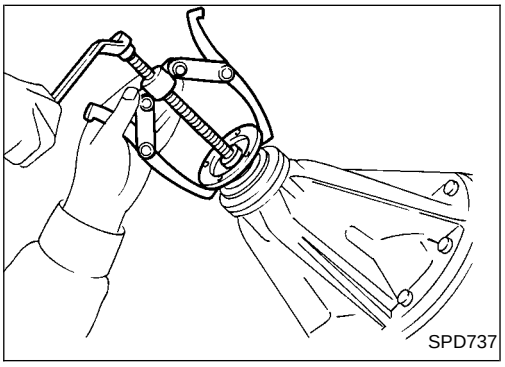
5. Apply multi-purpose grease to cavity at sealing lips of oil seal. Press front oil seal into carrier.
   Tool number:
   KV38100500 (J25273)
6. Install companion flange and drive pinion nut.
7. Install propeller shaft.



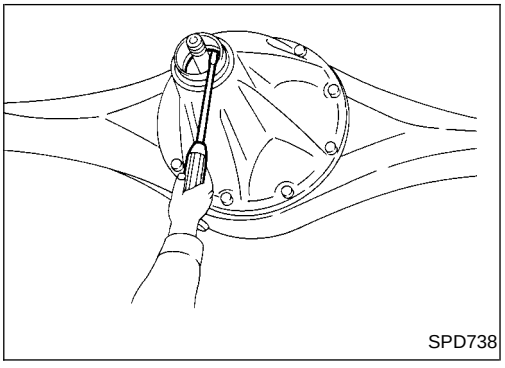
(Rear final drive: Model H233B)

1. Remove rear propeller shaft.
2. Loosen drive pinion nut.
   Tool number: KV38104700 (J34311)

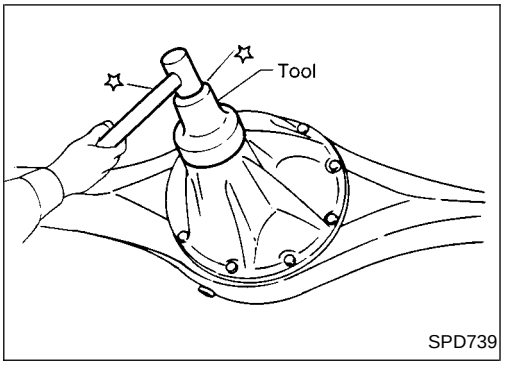
Front Oil Seal Replacement (Cont'd)


SPD737

3. Remove companion flange.

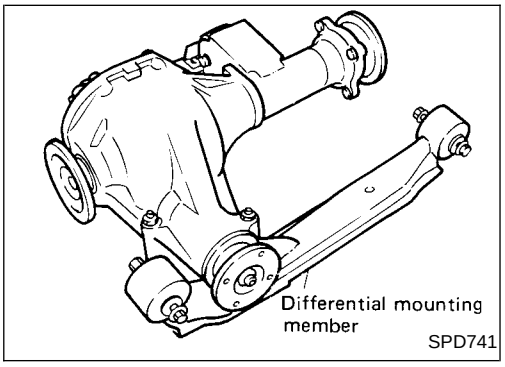

SPD738

4. Remove front oil seal.



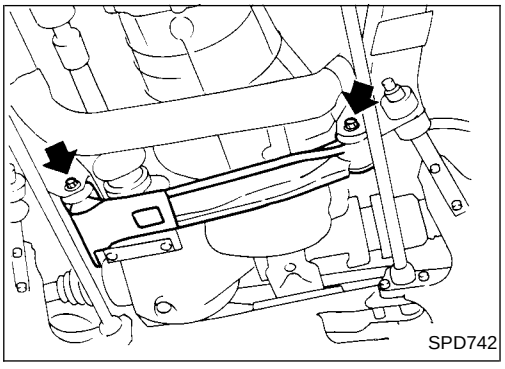
SPD739

5. Apply multi-purpose grease to cavity at sealing lips of oil seal. Press front oil seal into carrier.
   Tool number:
   ST30720000 (J25405)
   KV38102510 (—)
6. Install companion flange and drive pinion nut.
7. Install rear propeller shaft.



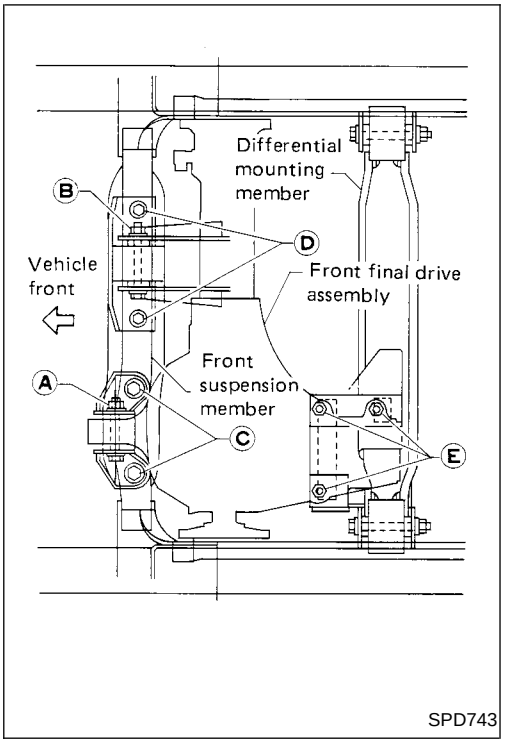
Removal

1. Remove front propeller shaft.
2. Separate drive shaft from front final drive. Refer to FA section [“Drive Shaft”, “FRONT AXLE (4WD)”].
3. Remove engine mounting bolts and raise up engine.
4. Remove front final drive together with differential mounting member.



Installation

1. Install front final drive assembly together with differential mounting member.



2. Tighten front final drive securing bolts and nuts by following the procedure to prevent drive train vibration.

a. Temporarily tighten nut Ⓐ.
b. Temporarily tighten nut Ⓑ.
c. Tighten bolt Ⓒ to the torque of 68 to 87 N·m (6.9 to 8.9 kg-m, 50 to 64 ft-lb).
d. Tighten bolt Ⓓ to the torque of 68 to 87 N·m (6.9 to 8.9 kg-m, 50 to 64 ft-lb).
e. Tighten nut Ⓐ to the torque of 68 to 87 N·m (6.9 to 8.9 kg-m, 50 to 64 ft-lb).
f. Tighten nut Ⓑ to the torque of 68 to 87 N·m (6.9 to 8.9 kg-m, 50 to 64 ft-lb).
g. Tighten nut Ⓔ to the torque of 68 to 87 N·m (6.9 to 8.9 kg-m, 50 to 64 ft-lb).

3. Install drive shaft. Refer to FA section [“Drive Shaft”, “FRONT AXLE (4WD)”].
4. Install front propeller shaft.

Removal

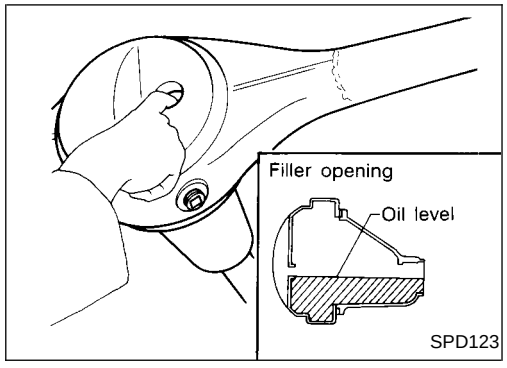
- Remove propeller shaft.

Plug front end of transfer.

- Remove axle shaft.
  Refer to RA section (''REAR AXLE'').

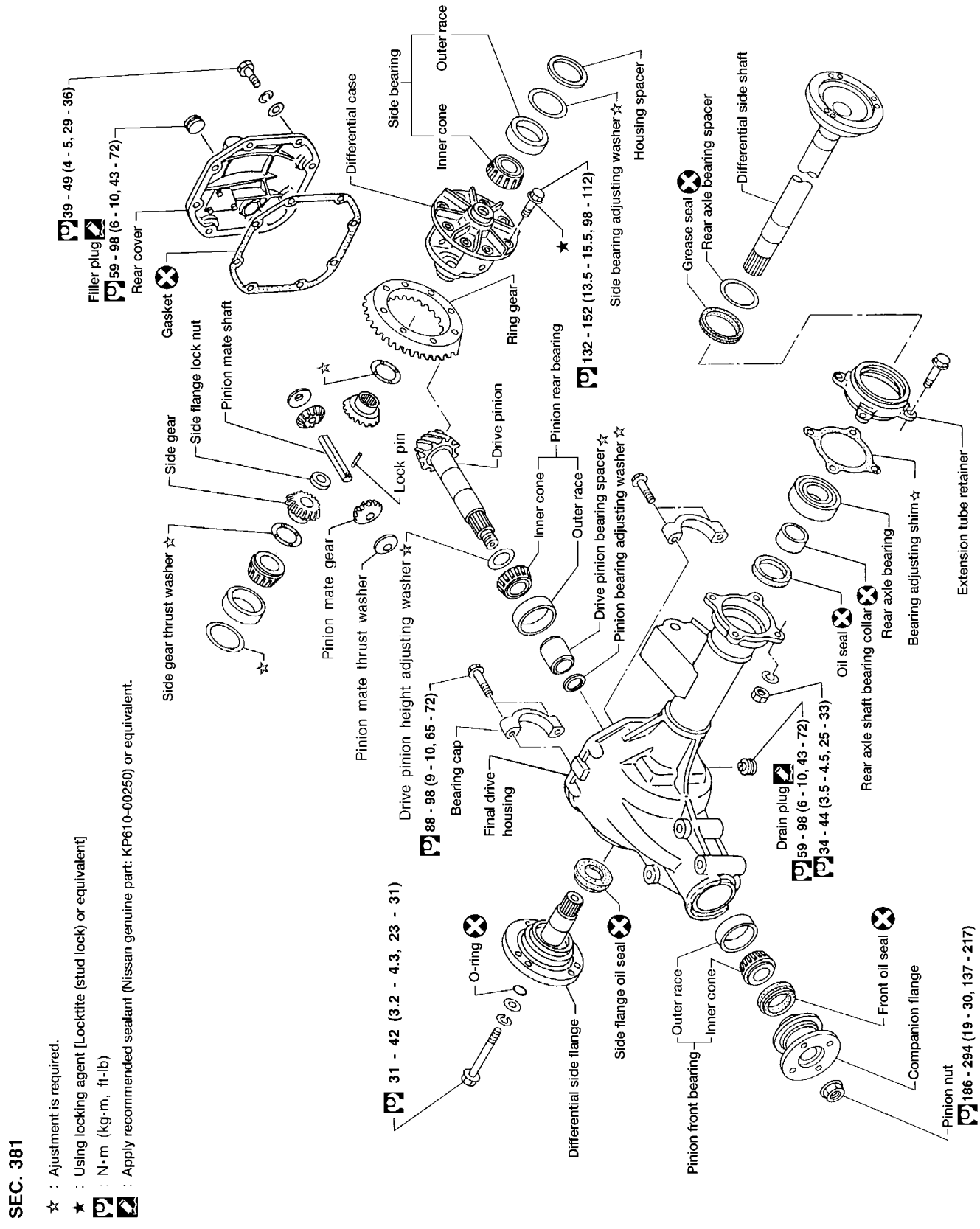
CAUTION:

- **Be careful not to damage spline, sleeve yoke and front oil seal when removing propeller shaft.**
- **Before removing the final drive assembly or rear axle assembly, disconnect the ABS sensor harness connector from the assembly and move it away from the final drive/ rear axle assembly area. Failure to do so may result in the sensor wires being damaged and the sensor becoming inoperative.**



Installation

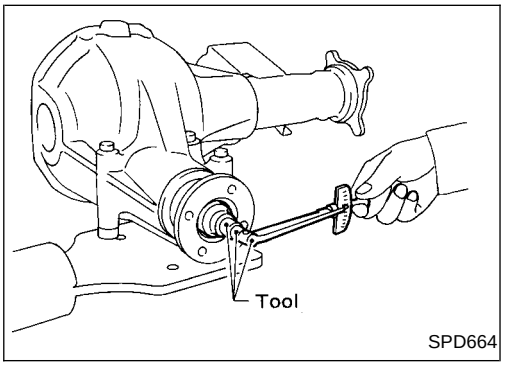
- Fill final drive with recommended gear oil.



SEC. 381

☆ : Ajustment is required.
★ : Using locking agent [Locktite (stud lock) or equivalent]
: N·m (kg-m, ft-lb)
: Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.

APD020

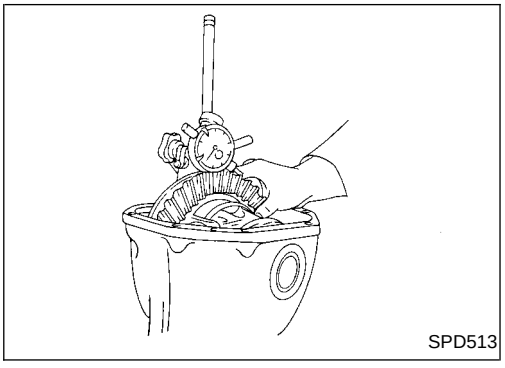


Pre-inspection

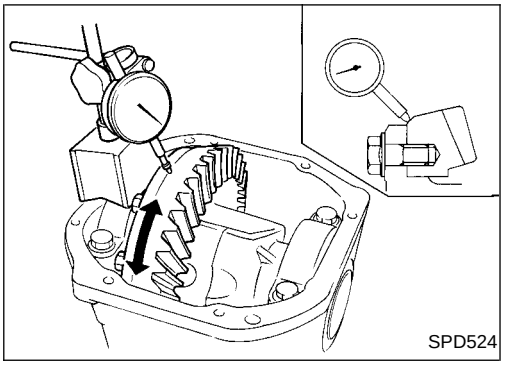
Before disassembling final drive, perform the following inspection.

- Total preload

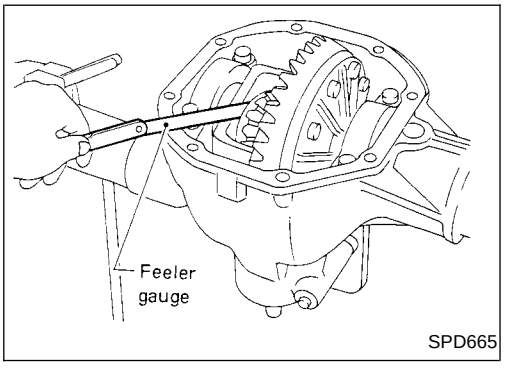
1) Turn drive pinion in both directions several times to set bearing rollers.
2) Check total preload with Tool.
   Tool number: ST3127S000 (J25765-A)
   Total preload:
   1.4 - 1.7 N·m (14 - 17 kg-cm, 12 - 15 in-lb)



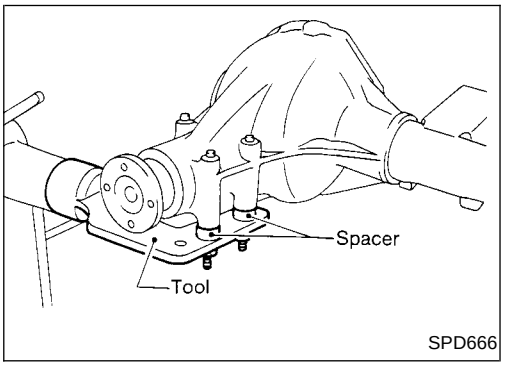
- Ring gear to drive pinion backlash
  Check backlash of ring gear with a dial indicator at several points.
  Ring gear-to-drive pinion backlash:
  0.10 - 0.15 mm (0.0039 - 0.0059 in)



- 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 (PD-30).



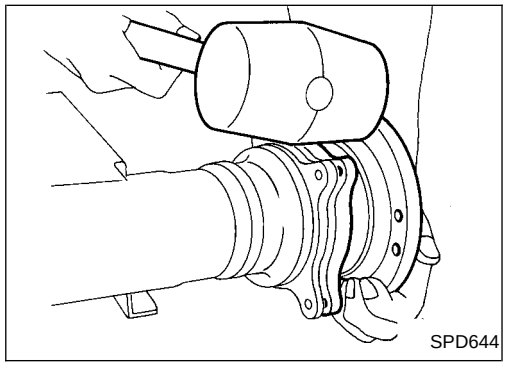
- Side gear to pinion mate gear backlash
  Using a feeler gauge, measure clearance between side gear thrust washer and differential case.
  Clearance between side gear thrust washer and differential case:
  Less than 0.15 mm (0.0059 in)



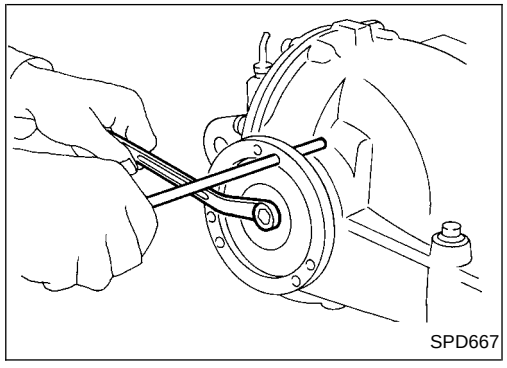
Final Drive Housing

1. Using three spacers [20 mm (0.79 in)], mount final drive assembly on Tool.
   Tool number:
   KV38100800 (J34310, J25604-01)

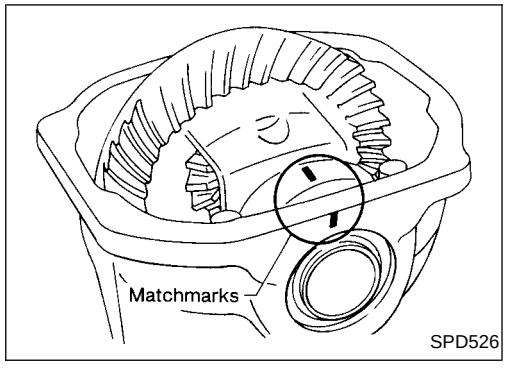
Final Drive Housing (Cont'd)


SPD644

2. Remove differential side shaft assembly.


SPD667

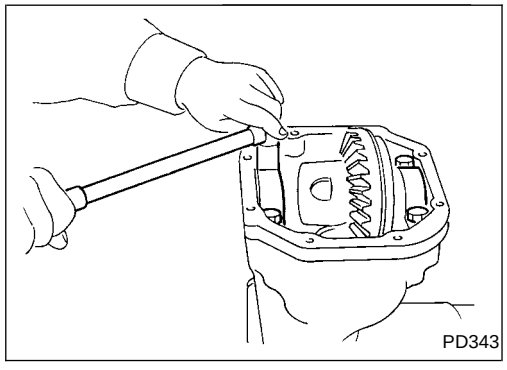
3. Remove differential side flange.



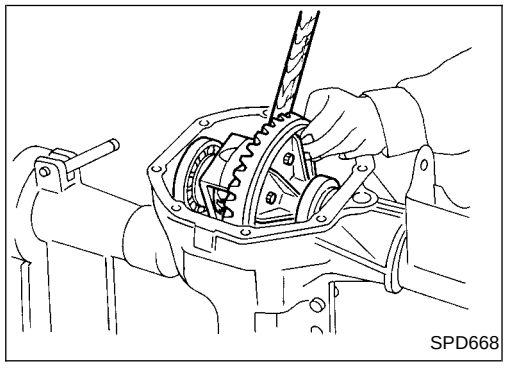
SPD526

4. Put match marks on one side of side bearing cap with paint or punch to ensure that it is replaced in proper position during reassembly.

Bearing caps are line-bored during manufacture and should be put back in their original places.

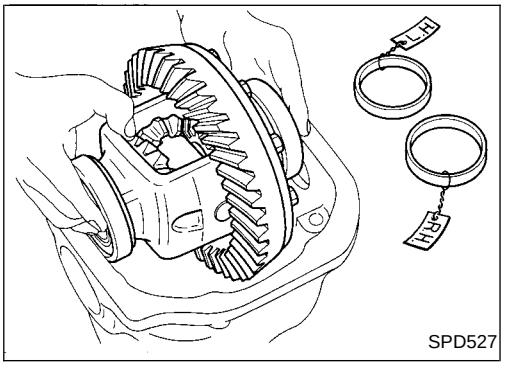

PD343

5. Remove side bearing caps.


SPD668

6. Remove differential case assembly with a pry bar.

Final Drive Housing (Cont'd)

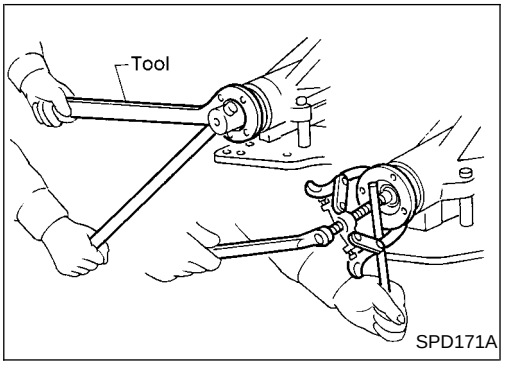


SPD527

Be careful to keep the side bearing outer races together with their respective inner cones — don't mix them up.

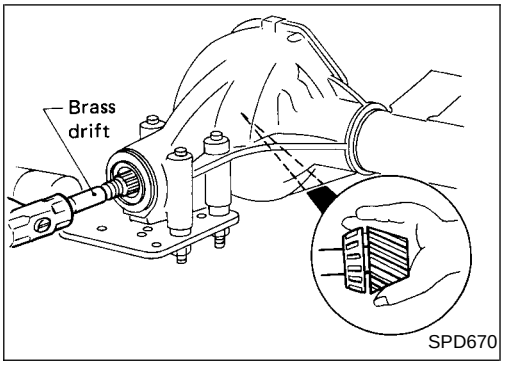
CAUTION:

Side bearing spacer is placed on either the left or right depending upon final drive gear ratio. It should be labeled so that it may be replaced correctly.



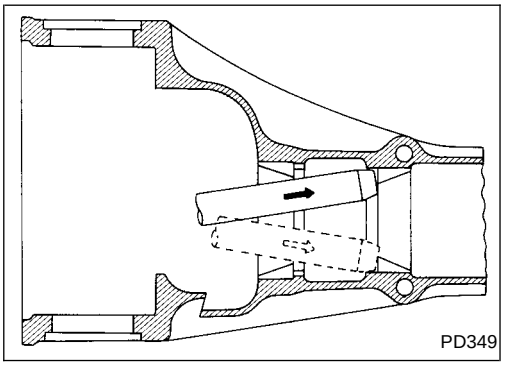
SPD171A

7. Loosen drive pinion nut.
   Tool number: ST38060002 (J34311)
8. Remove companion flange with puller.

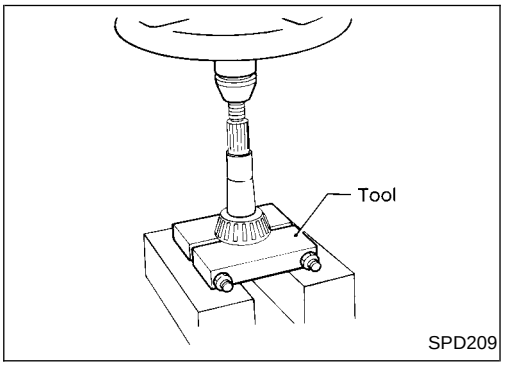


SPD670

9. Take out drive pinion together with rear bearing inner cone, drive pinion bearing spacer and pinion bearing adjusting washer.
10. Remove front oil seal and pinion front bearing inner cone.

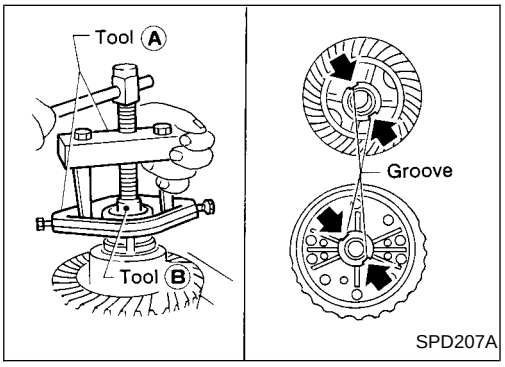

PD349

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



SPD209

12. Remove pinion rear bearing inner cone and drive pinion height adjusting washer.
    Tool number: ST30031000 (J22912-01)



Differential Case

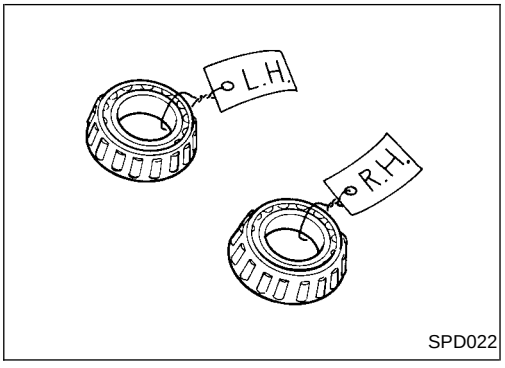
1. Remove side bearing inner cones.

To prevent damage to bearing, engage puller jaws in grooves.

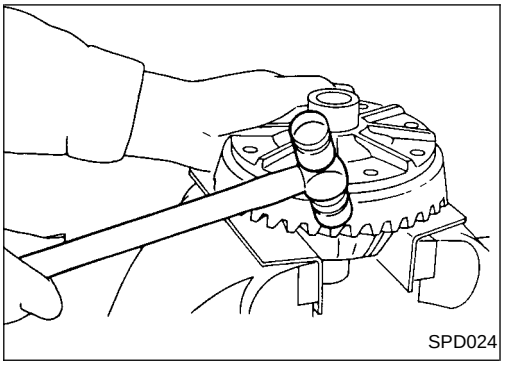
Tool number:

Ⓐ ST33051001 (J22888-20)

Ⓑ ST33061000 (J8107-2)

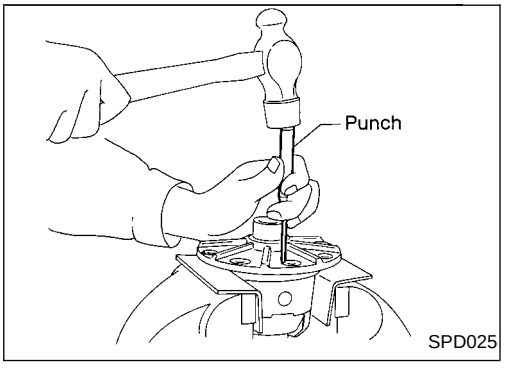


Be careful not to confuse the right and left hand parts.
Keep bearing and bearing race for each side together.

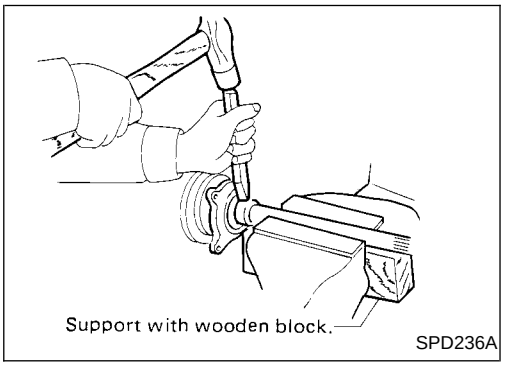


2. Loosen ring gear bolts in a criss-cross pattern.
3. Tap ring gear off the differential case with a soft hammer.

Tap evenly all around to keep ring gear from binding.



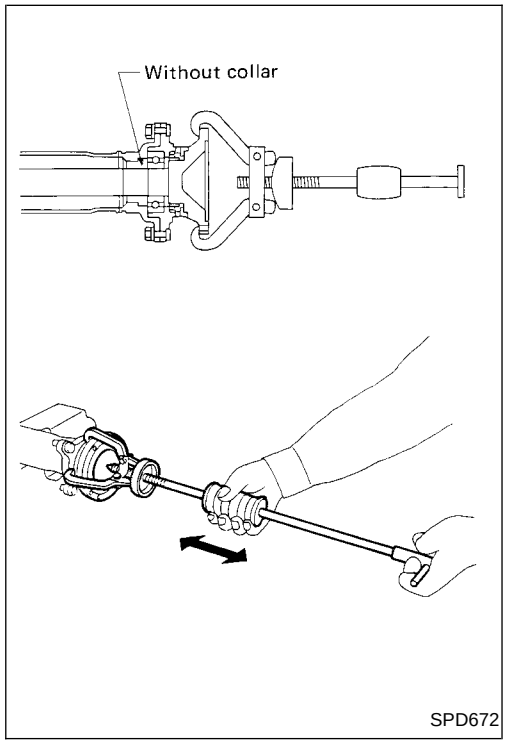
4. Punch off pinion mate shaft lock pin from ring gear side.



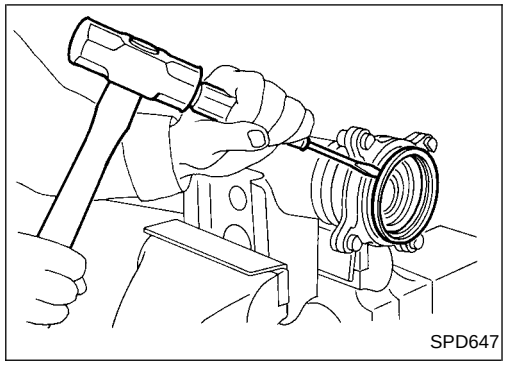
Differential Side Shaft

1. Cut collar with cold chisel. Be careful not to damage differential side shaft.

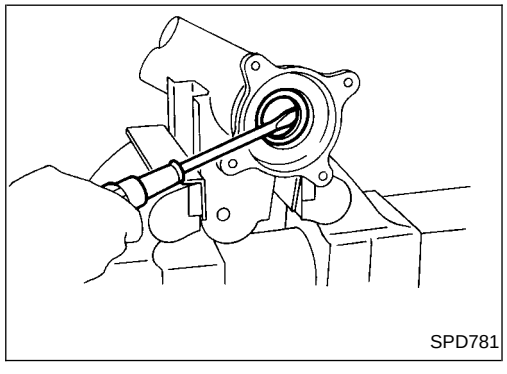
Differential Side Shaft (Cont'd)



2. Reinstall differential side shaft into extension tube and secure with bolts. Remove rear axle bearing by drawing out differential side shaft from rear axle bearing with puller.

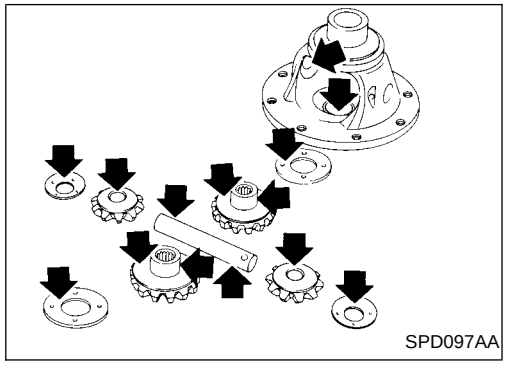


3. Remove grease seal and oil seal.



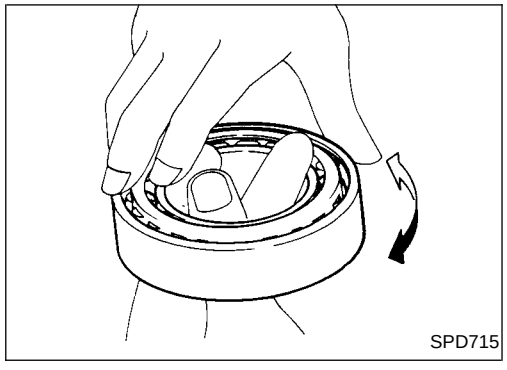
Ring Gear and Drive Pinion

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


SPD097AA

Differential Case Assembly

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


SPD715

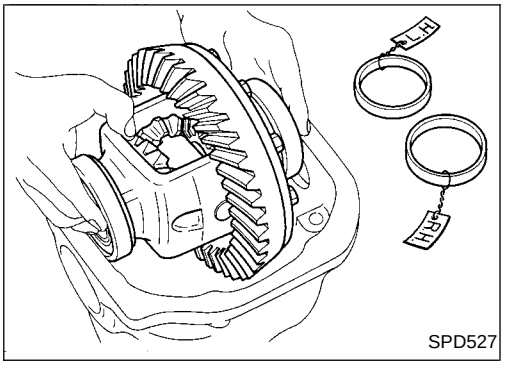
Bearing

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

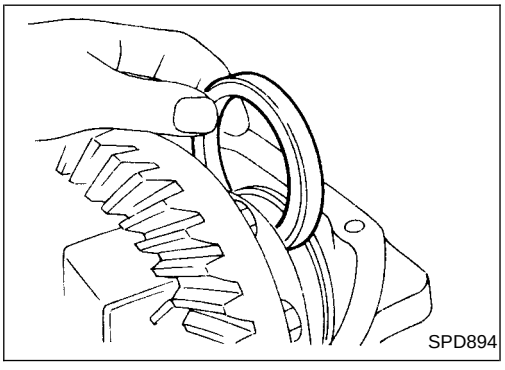
For quiet and reliable final drive operation, the following five adjustments must be made correctly:
1. Side bearing preload
2. Pinion gear height
3. Pinion bearing preload
4. Ring gear-to-pinion backlash. Refer to ASSEMBLY (PD-35).
5. Ring and pinion gear tooth contact pattern

Side Bearing Preload

A selection of carrier side bearing adjusting washer is required for successful completion of this procedure.

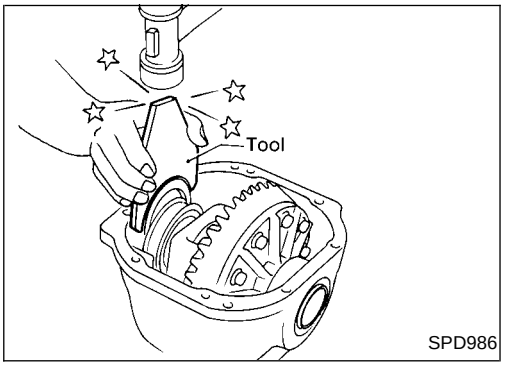


1. Make sure all parts are clean and that the bearings are well lubricated with light oil or "DEXRON™" type automatic transmission fluid.
2. Place the differential carrier, with side bearings and bearing races installed, into the final drive housing.



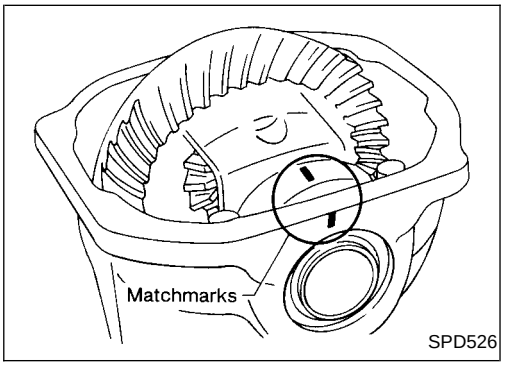
3. Put the side bearing spacer in place.

CAUTION:
Side bearing spacer is placed on either the right or left depending upon final drive gear ratio. Be sure to replace it on the correct side.



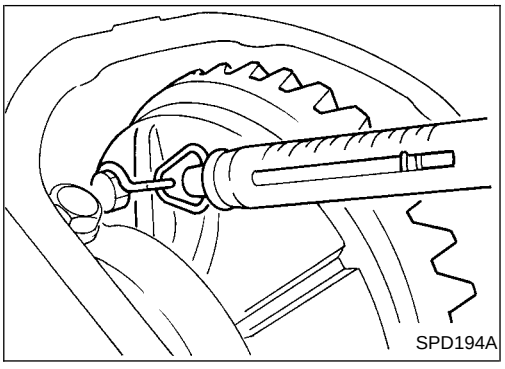
4. Using Tool, install original carrier side bearing preload shims on the carrier end, opposite the ring gear.
   Tool number: KV38100600 (J25267)

Side Bearing Preload (Cont'd)

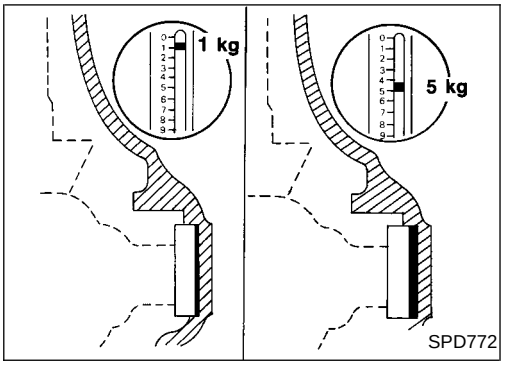


SPD526

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.

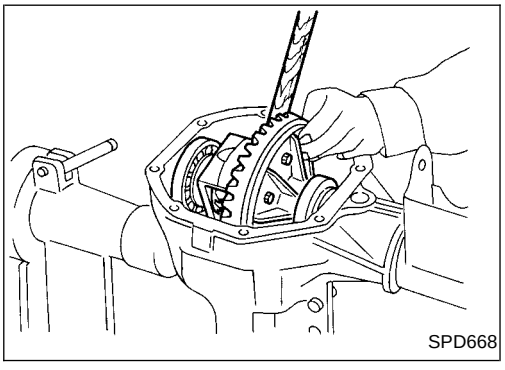

SPD194A

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 - 4.0 kg, 7.7 - 8.8 lb)
   of pulling force at the ring gear bolt.



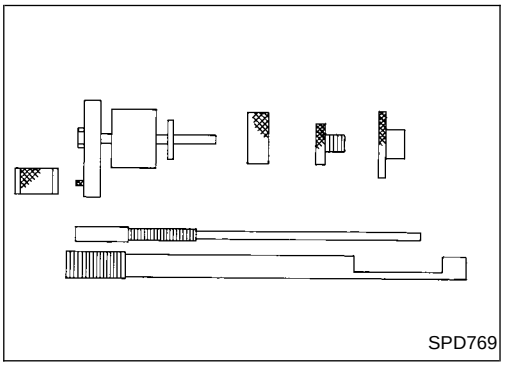
SPD772

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 SDS section for washer dimensions and part numbers.
9. Record the total amount of washer thickness required for the correct carrier side bearing preload.


SPD668

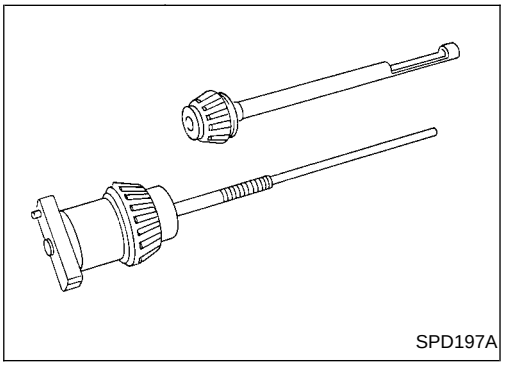
10. Remove the carrier from the final drive housing, saving the selected preload washers for later use during the assembly of the final drive unit.

Pinion Gear Height and Pinion Bearing Preload

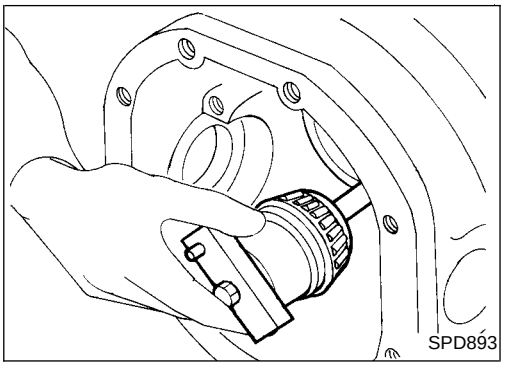

SPD769

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

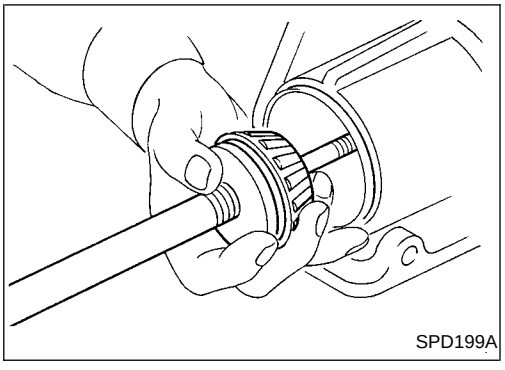
Pinion Gear Height and Pinion Bearing Preload (Cont'd)


SPD197A

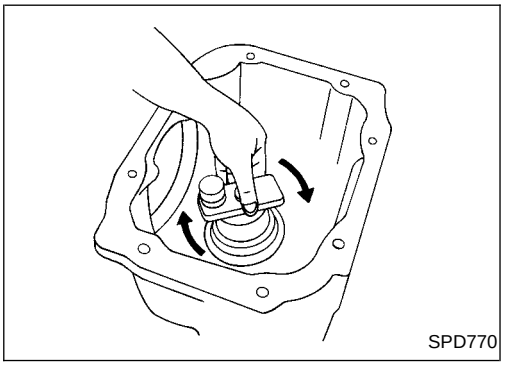
- **Front Pinion Bearing** — make sure the J34309-3 front pinion bearing seat is secured tightly against the J34309-2 gauge anvil. Then turn the front pinion bearing pilot, J34309-5, to secure the bearing in its proper position.
- **Rear Pinion Bearing** — the rear pinion bearing pilot, J34309-15, is 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.


SPD893

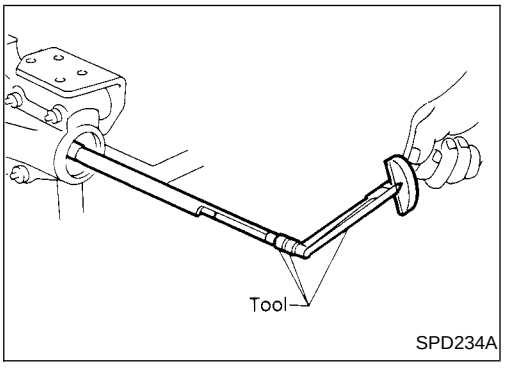
3. Place the pinion preload shim selector Tool, J34309-1, gauge screw assembly with the pinion rear bearing inner cone installed into the final drive housing.


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

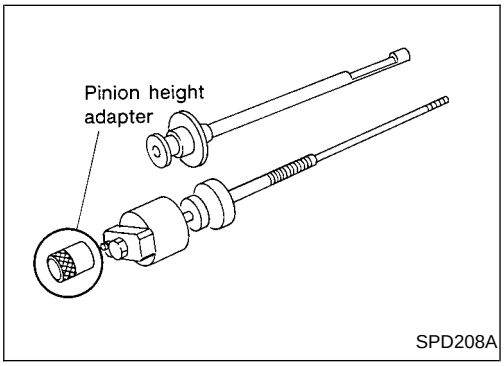
5. Turn the assembly several times to seat the bearings.



SPD234A

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)

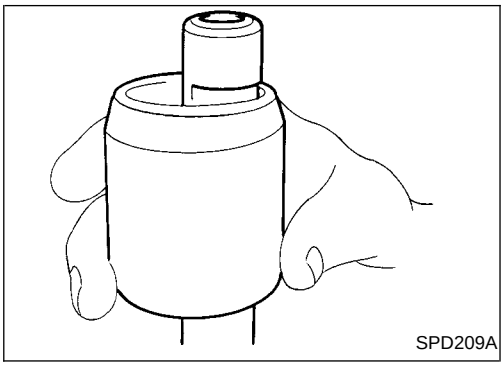
Pinion Gear Height and Pinion Bearing Preload (Cont'd)



SPD208A

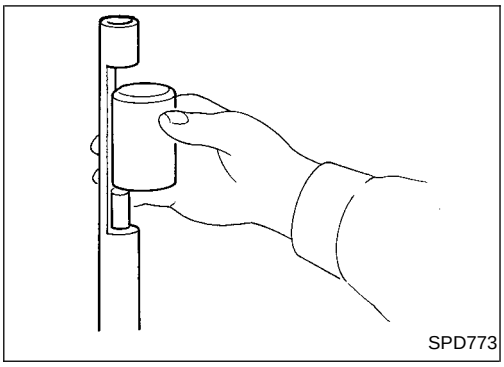
7. Place the J34309-1 "R200A" pinion height adapter onto the gauge plate and tighten it by hand.

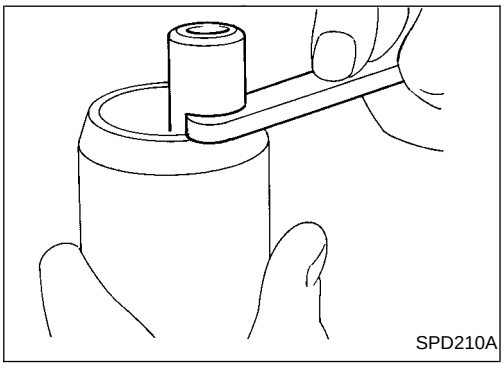
CAUTION:
Make sure all machined surfaces are clean.


SPD209A

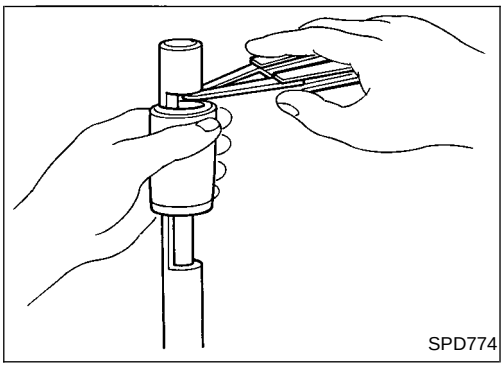
PINION BEARING PRELOAD WASHER SELECTION

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.

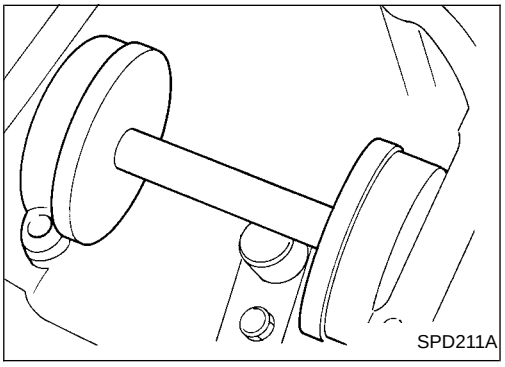

SPD773


SPD210A

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.
   Drive pinion bearing preload adjusting washer:
   Refer to SDS (PD-59).
10. Set your selected, correct pinion bearing preload adjusting washer aside for use when assembling the pinion gear and bearings into the final drive.

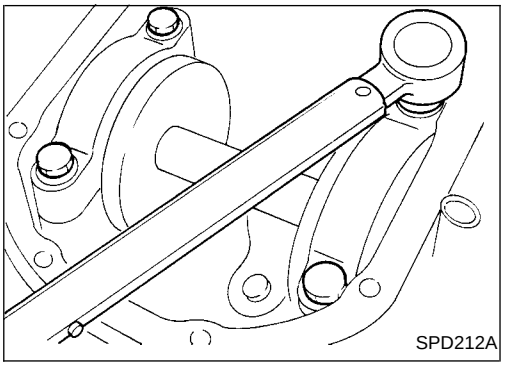

SPD774

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

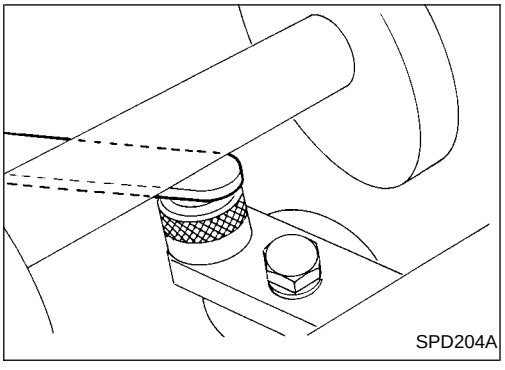

SPD211A

PINION HEIGHT ADJUSTING WASHER SELECTION

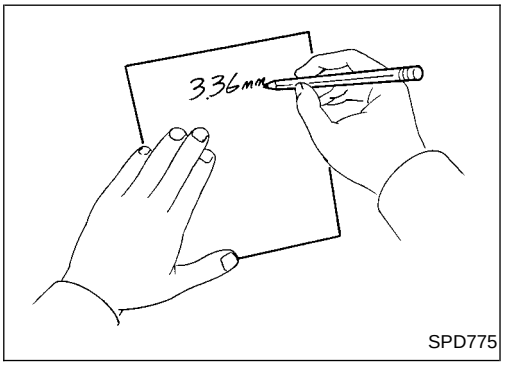
11. Now, position the side bearing discs, J25269-4, and arbor firmly into the side bearing bores.


SPD212A

12. Install the side bearing caps and tighten the cap bolts.
    Specification:
    88 - 98 N·m (9 - 10 kg-m, 65 - 72 ft-lb)

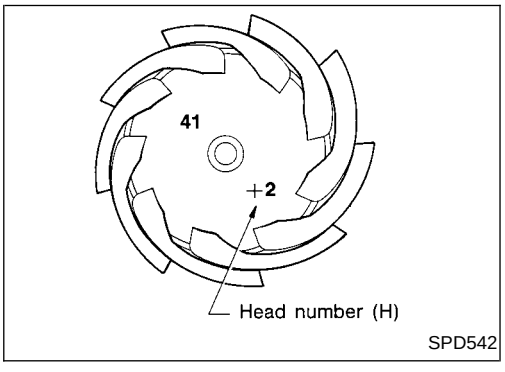

SPD204A

13. Select the correct standard pinion height adjusting washer thickness by using a standard gauge of 3.0 mm (0.118 in) and your J34309-101 feeler gauge. Measure the gap between the J34309-11 ''R200A'' pinion height adapter and the arbor.



SPD775

14. Write down your exact total measurement.



SPD542

15. Correct the pinion height washer size by referring to the ''pinion head number''.

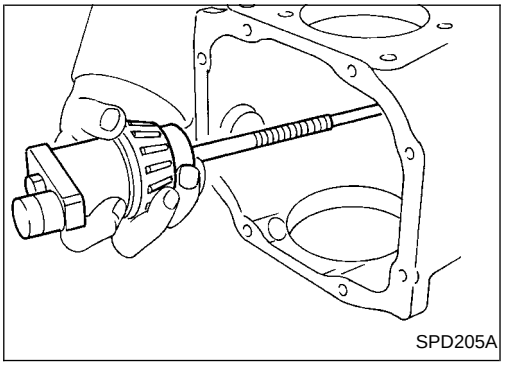
There are two numbers painted on the pinion gear. The first one refers to the pinion and ring gear as a matched set and should be the same as the number on the ring gear. The second number is the ''pinion head height number'', and it refers to the ideal pinion height from standard for quietest operation.

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

Use the following chart to determine the correct pinion height washer.

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)

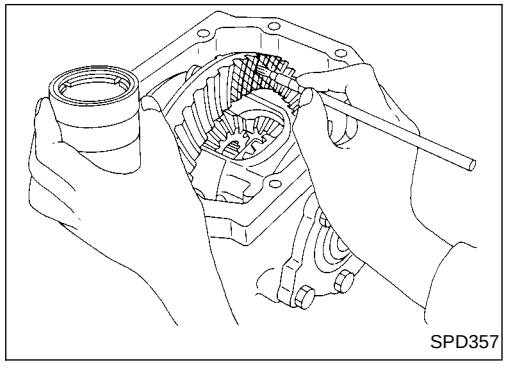
16. Select the correct drive pinion height washer.
    Drive pinion height adjusting washer:
    Refer to SDS (PD-59).


SPD205A

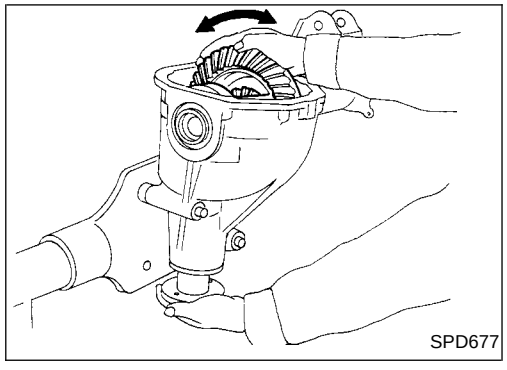
17. Remove the J34309 pinion preload shim selector tool from the final drive housing and disassemble to retrieve the pinion bearings.

Tooth Contact

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

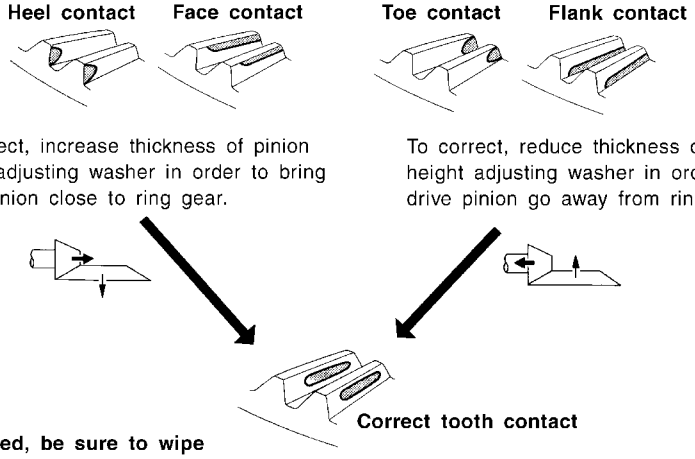

SPD357

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


SPD677

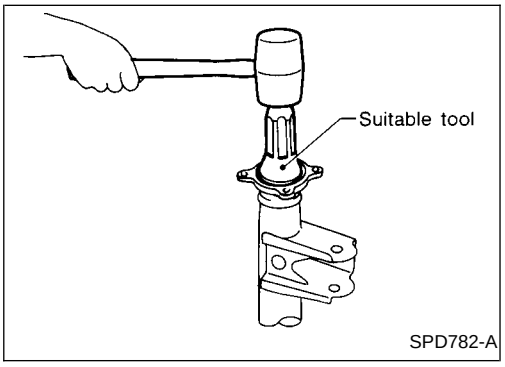
3. Hold companion flange steady by hand and rotate the ring gear in both directions.

Usually the pattern will be correct if shims are correctly calculated and the backlash is correct. However, in rare cases, trial and error processes may be employed to obtain a correct pattern. The tooth pattern is the best indication of how well a differential has been set up.



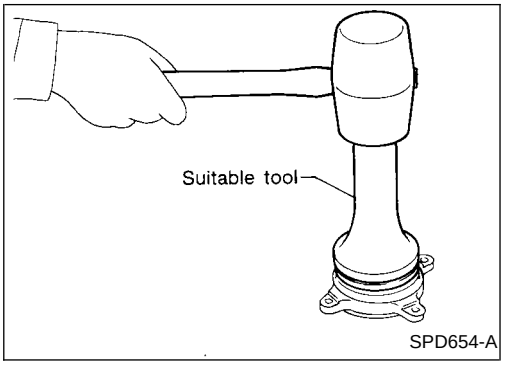
When adjustment is completed, be sure to wipe off completely the ferric oxide and oil or their equivalent.

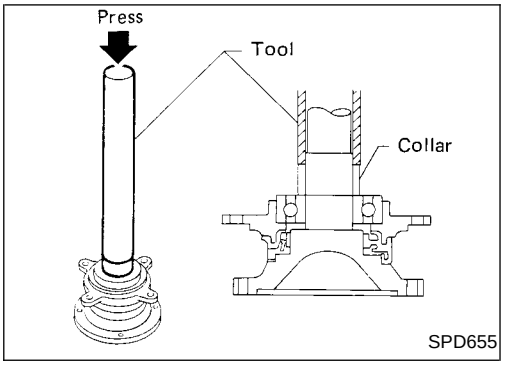
SPD007-B



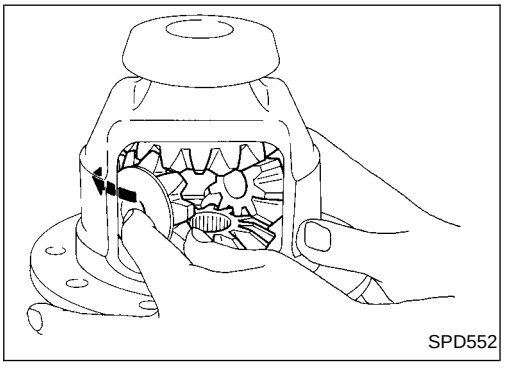
Differential Side Shaft

1. Install oil seal and grease seal.



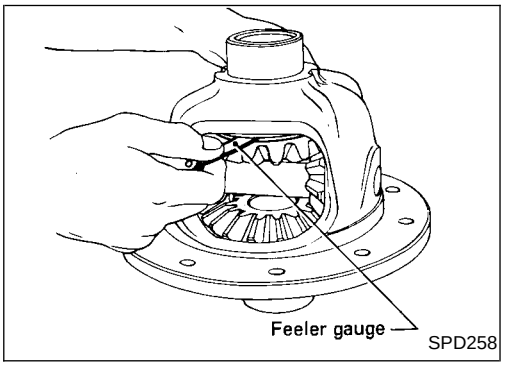


2. Install extension tube retainer, rear axle bearing and rear axle shaft bearing collar on differential side shaft.



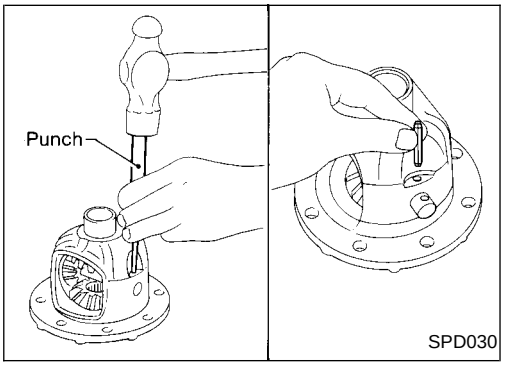
Differential Case

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



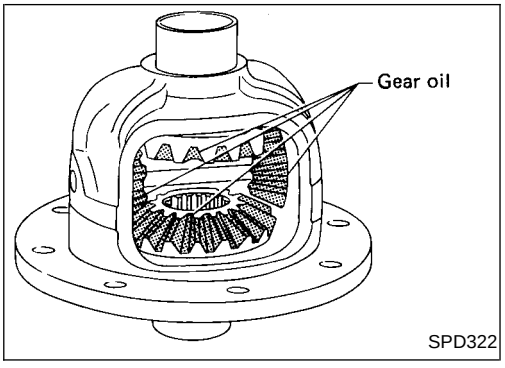
2. Fit pinion mate shaft to differential case so that it meets lock pin holes.
3. Adjust backlash between side gear and pinion mate gear by selecting side gear thrust washer.
   Refer to SDS (PD-58).
   Backlash between side gear and pinion mate gear (Clearance between side gear thrust washer and differential case):
   Less than 0.15 mm (0.0059 in)

Differential Case (Cont'd)

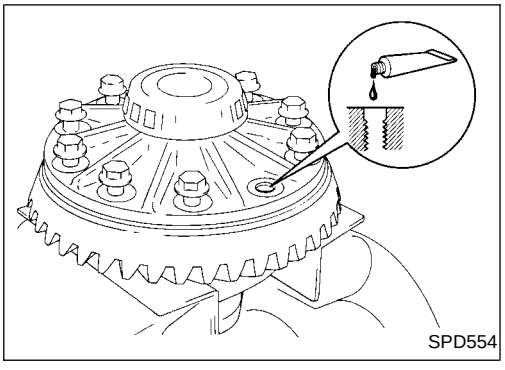


4. Install pinion mate shaft lock pin with a punch.

Make sure lock pin is flush with case.

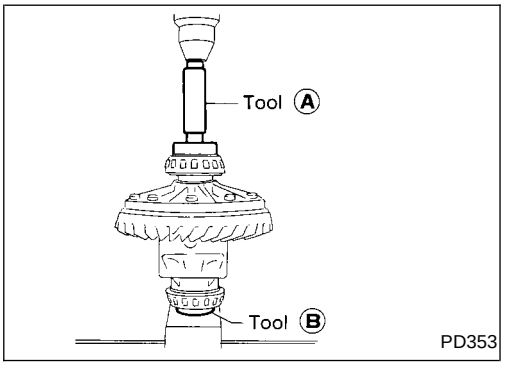


5. Apply gear oil to gear tooth surfaces and thrust surfaces and check to see they turn properly.



6. Install differential case assembly on ring gear.
7. Apply locking agent [Locktite (stud lock) or equivalent] to ring gear bolts, and install them.

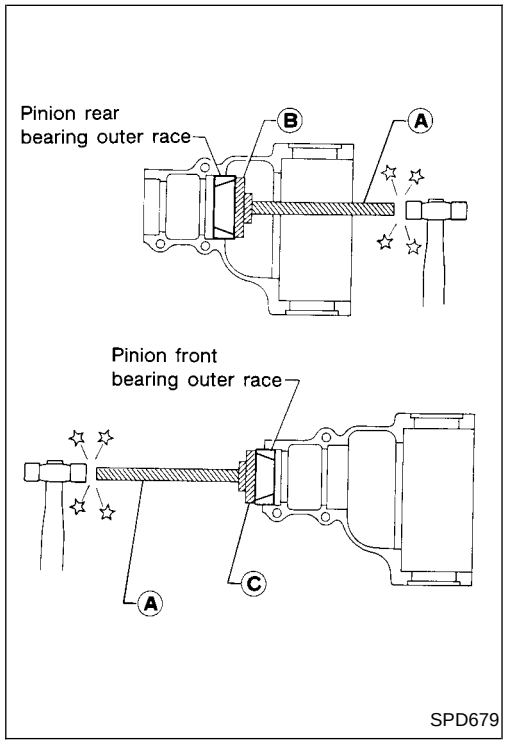
Tighten bolts in a criss-cross pattern, lightly tapping bolt head with a hammer.



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

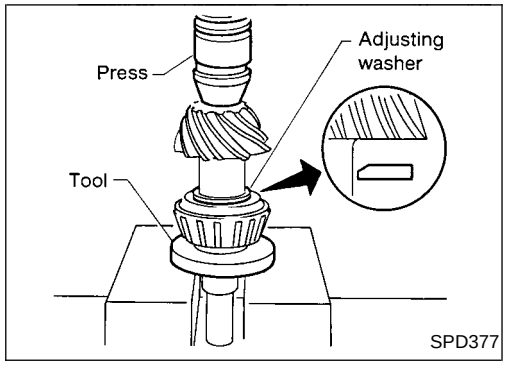
Tool number:

Ⓐ KV38100300 (J25523)
Ⓑ ST33061000 (J8107-2)

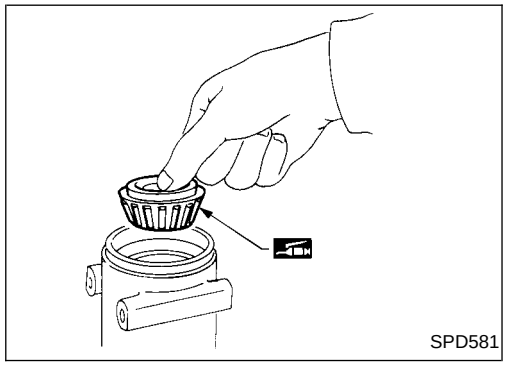


Final Drive Housing

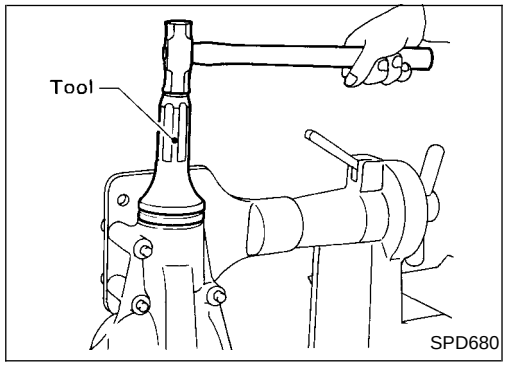
1. Press-fit front and rear bearing outer races with Tools.
   Tool number:
   Ⓐ ST30611000 (J25742-1)
   Ⓑ ST30621000 (J25742-5)
   Ⓒ ST30613000 (J25742-3)



2. Select drive pinion height adjusting washer and pinion bearing adjusting washer. Refer to ADJUSTMENT (PD-25).
3. Install 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 (J26010-01)

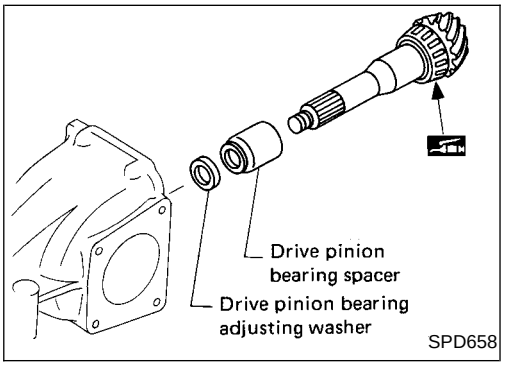


4. Place pinion front bearing inner cone in final drive housing.



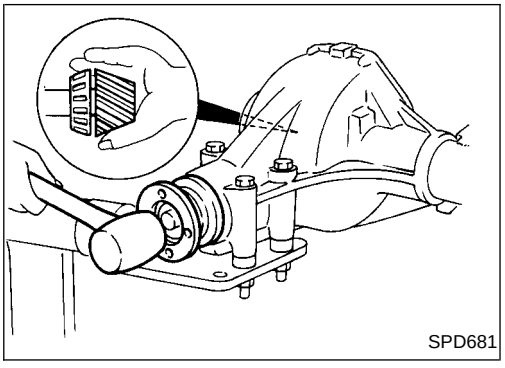
5. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install front oil seal.
   Tool number:
   KV38100500 (J25273)

Final Drive Housing (Cont'd)

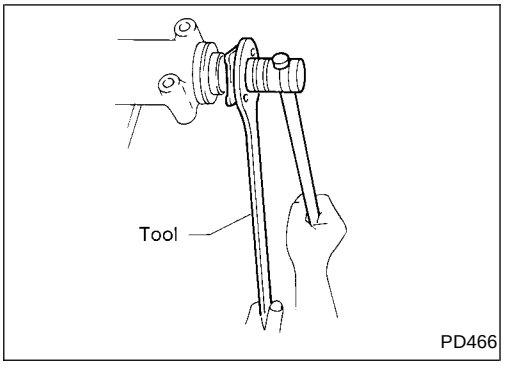


SPD658

6. Place drive pinion bearing spacer, drive pinion bearing adjusting washer and drive pinion in final drive housing.


SPD681

7. Insert companion flange into drive pinion by tapping the companion flange with a soft hammer.

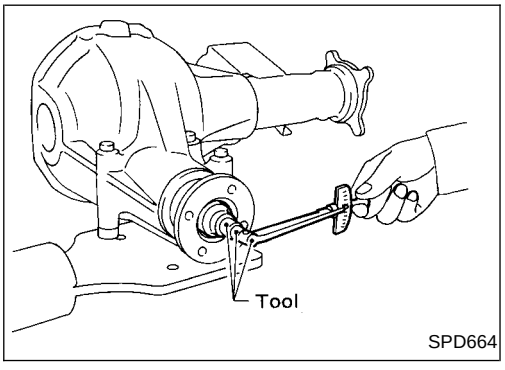


PD466

8. Tighten pinion nut to the specified torque.

The threaded portion of drive pinion and pinion nut should be free from oil or grease.

Tool number: ST38060002 (J34311)



SPD664

9. Turn drive pinion in both directions several revolutions, and measure pinion bearing preload.

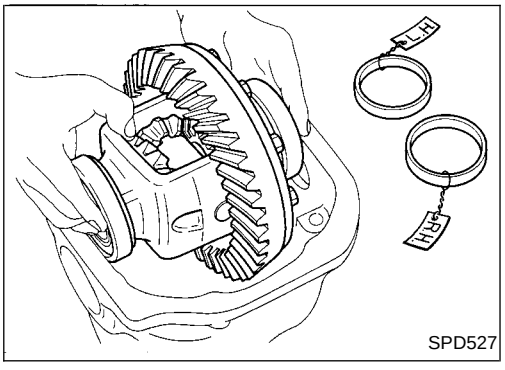
Tool number: ST3127S000 (J25765-A)

Pinion bearing preload:

1.1 - 1.4 N·m

(11 - 14 kg-cm, 9.5 - 12.2 in-lb)

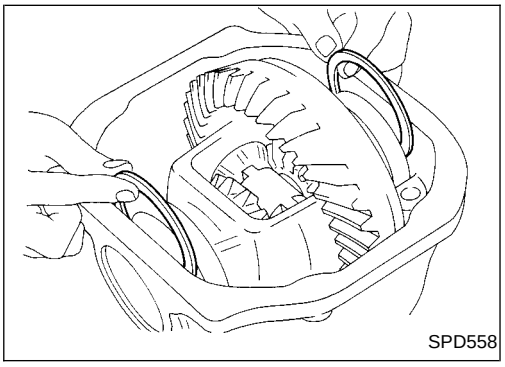
When pinion bearing preload is outside the specifications, replace pinion bearing adjusting washer and spacer with a different thickness.



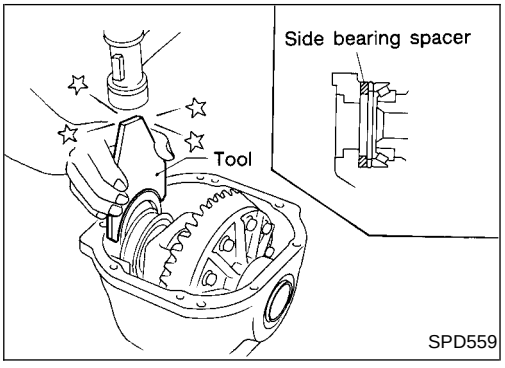
SPD527

10. Select side bearing adjusting washer.
    Refer to ADJUSTMENT (PD-24).
11. Install differential case assembly with side bearing outer races into final drive housing.

Final Drive Housing (Cont'd)

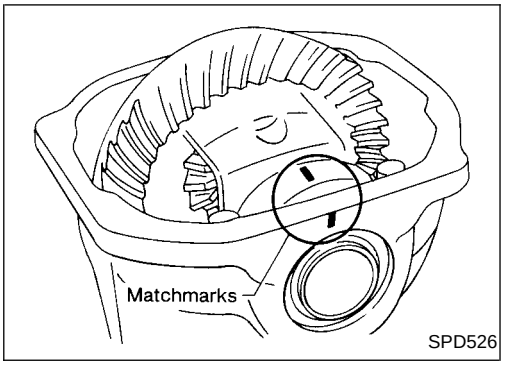

SPD558

12. Insert left and right side bearing adjusting washers in place between side bearings and final drive housing.



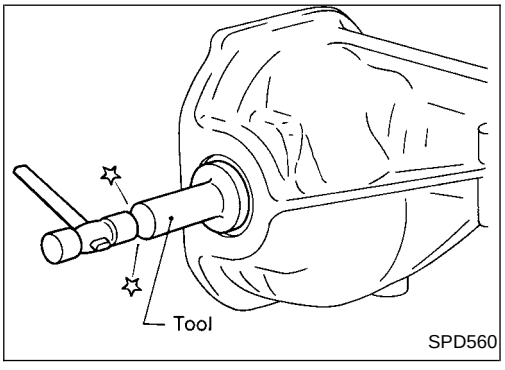
SPD559

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



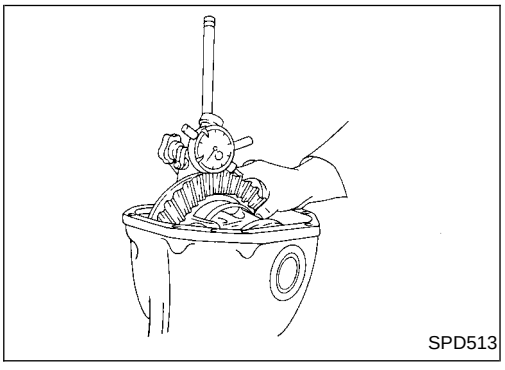
SPD526

14. Align mark on bearing cap with that on final drive housing and install bearing cap on final drive housing.



SPD560

15. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install side oil seal.
    Tool number: KV38100200 (J26233)

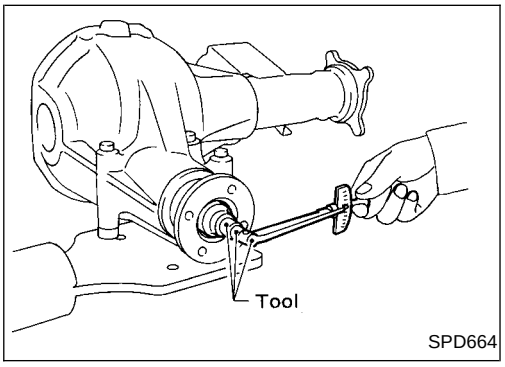

SPD513

16. 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 right shim and increase thickness of left 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.

Final Drive Housing (Cont'd)



SPD664

17. Check total preload with Tool.

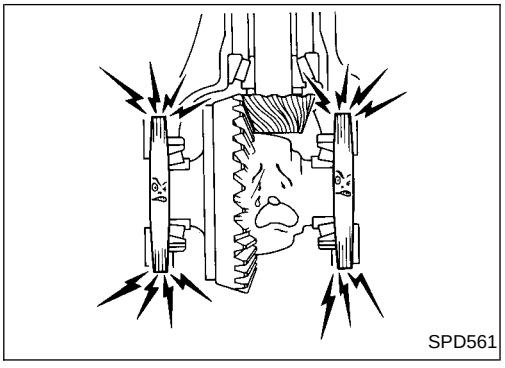
When checking preload, turn drive pinion in both directions several times to set bearing rollers.

Tool number: ST3127S000 (J25765-A)

Total preload:

1.4 - 1.7 N·m

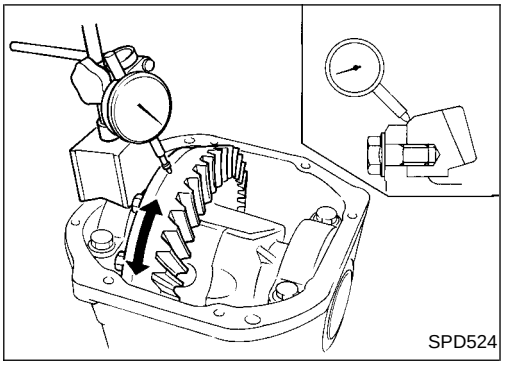
(14 - 17 kg-cm, 12 - 15 in-lb)


SPD561

- 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.

18. Recrecheck ring gear to drive pinion backlash because increase or decrease in thickness of shims will cause change of ring gear-to-pinion backlash.


SPD524

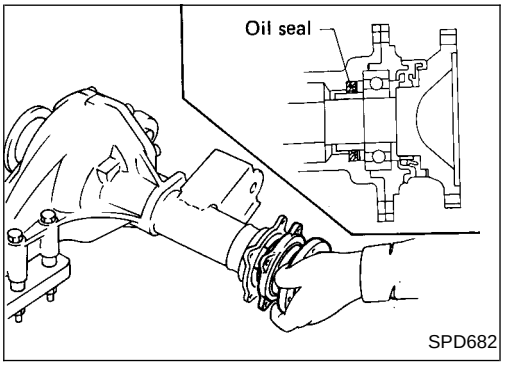
19. Check runout of ring gear with a dial indicator.

Runout limit:

0.05 mm (0.0020 in)

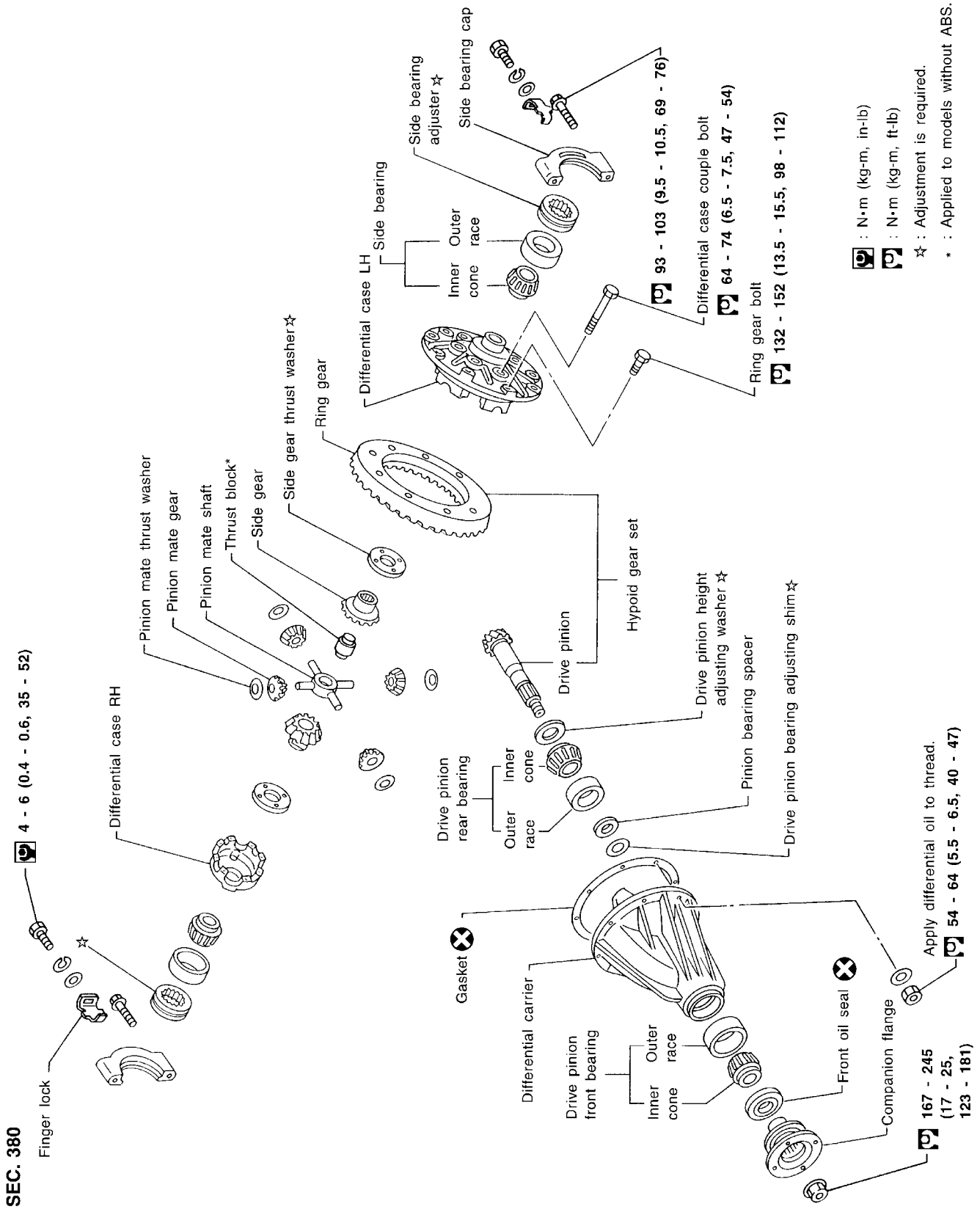
- If backlash varies excessively in different places, the variance may have resulted from foreign matter caught between the ring gear and the differential case.
- If the backlash varies greatly when the runout of the ring gear is within a specified range, the hypoid gear set or differential case should be replaced.

20. Check tooth contact. Refer to ADJUSTMENT (PD-30).
21. Install rear cover and gasket.

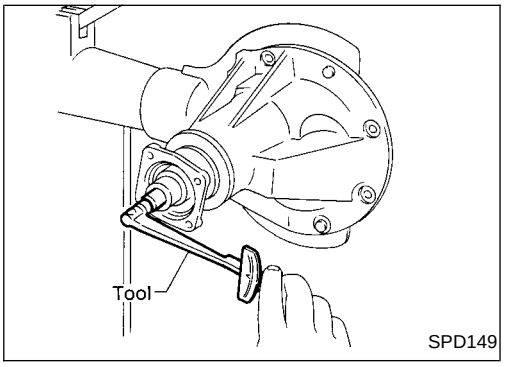


SPD682

22. Install differential side shaft assembly.


SEC. 380
Finger lock
4 - 6 (0.4 - 0.6, 35 - 52)
Differential case RH
Pinion mate thrust washer
Pinion mate gear
Pinion mate shaft
Thrust block*
Side gear
Side gear thrust washer☆
Ring gear
Differential case LH
Side bearing
Inner cone
Outer race
Side bearing adjuster☆
Side bearing cap
93 - 103 (9.5 - 10.5, 69 - 76)
Differential case couple bolt
64 - 74 (6.5 - 7.5, 47 - 54)
Ring gear bolt
132 - 152 (13.5 - 15.5, 98 - 112)
Hypoid gear set
Drive pinion
Drive pinion height adjusting washer☆
Drive pinion rear bearing
Inner cone
Outer race
Pinion bearing spacer
Drive pinion bearing adjusting shim☆
Gasket
Differential carrier
Drive pinion front bearing
Inner cone
Outer race
Front oil seal
Companion flange
Apply differential oil to thread.
54 - 64 (5.5 - 6.5, 40 - 47)
167 - 245 (17 - 25, 123 - 181)
: N·m (kg-m, in-lb)
: N·m (kg-m, ft-lb)
☆: Adjustment is required.
*: Applied to models without ABS.

SPD427A



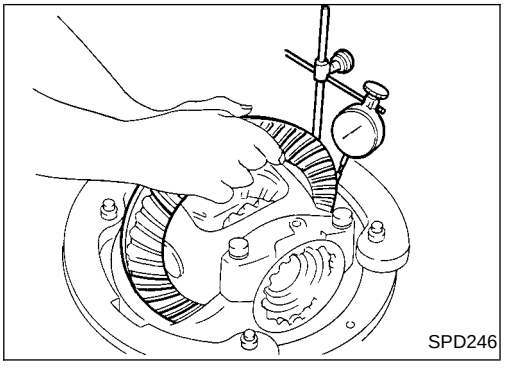
Pre-inspection

Before disassembling final drive, perform the following inspection.

- Total preload

a. Turn drive pinion in both directions several times to seat bearing rollers correctly.
b. Check total preload with Tool.

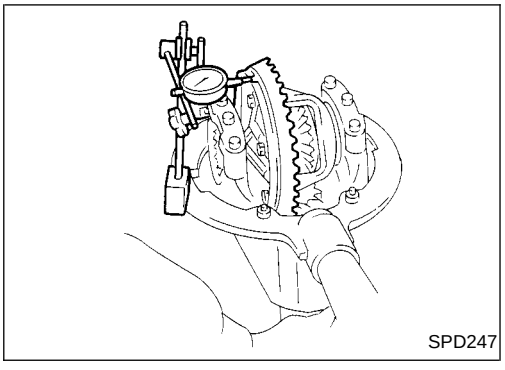
Total preload (With front oil seal):
Drive pinion bearing
New: 1.5 - 1.7 N·m (15 - 17 kg-cm, 13 - 15 in-lb)
Old: 1.7 - 2.5 N·m (17 - 25 kg-cm, 15 - 22 in-lb)
Tool number: ST3127S000 (J25765-A)



- Ring gear-to-drive pinion backlash

Check backlash of ring gear with a dial indicator at several points.

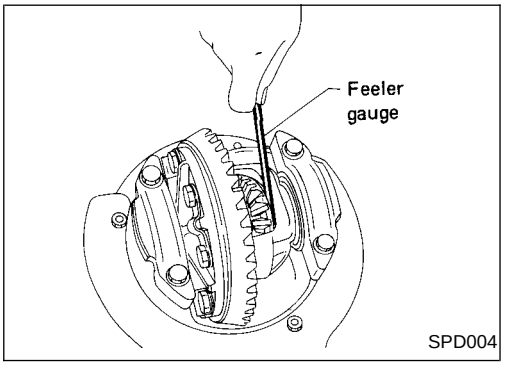
Ring gear-to-drive pinion backlash:
0.13 - 0.18 mm (0.0051 - 0.0071 in)



- Ring gear runout

Check runout of ring gear with a dial indicator.

Runout limit:
0.08 mm (0.0031 in)



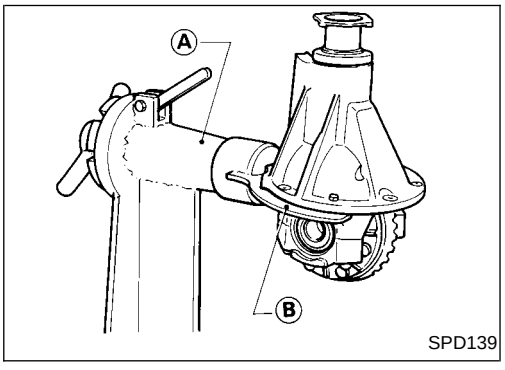
- Tooth contact

Check tooth contact, referring to ''ADJUSTMENT'', PD-52.

- Side gear-to-pinion mate gear backlash

Measure clearance between side gear thrust washer and differential case with a feeler gauge.

Clearance between side gear thrust washer and differential case:
0.1 - 0.2 mm (0.004 - 0.008)

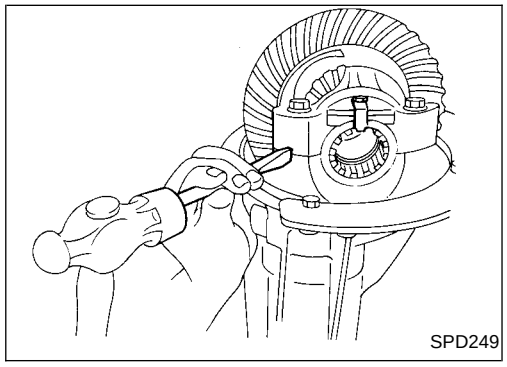


Differential Carrier

1. Mount final drive assembly on Tool.

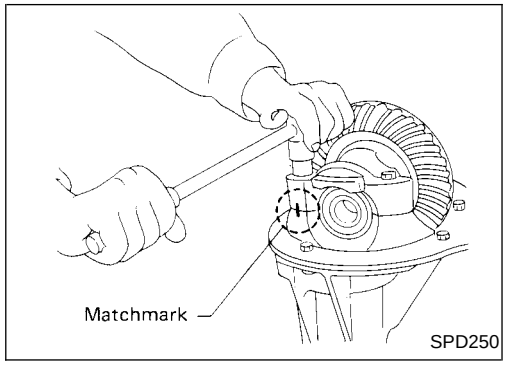
Tool numbers:
Ⓐ ST0501S000 (—)
Ⓑ ST06340000 (J24310, J34310)

Differential Carrier (Cont'd)


SPD249

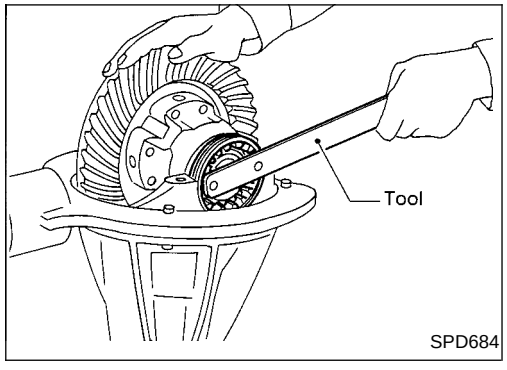
2. Put match marks on one side of side bearing cap with paint or punch to ensure that it is replaced in proper position during reassembly.

Bearing caps are line-bored during manufacture and should be put back in their original places.



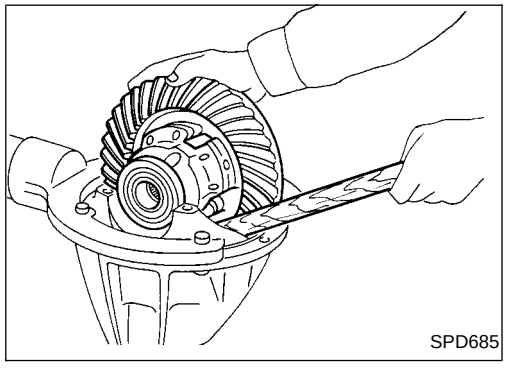
SPD250

3. Remove side lock fingers and side bearing caps.

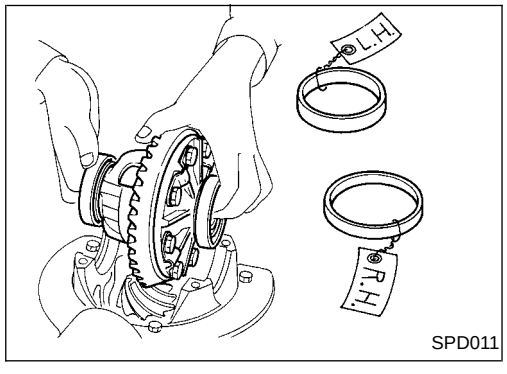


SPD684

4. Remove side bearing adjuster with Tool.
   Tool number: ST32580000 (J34312)


SPD685

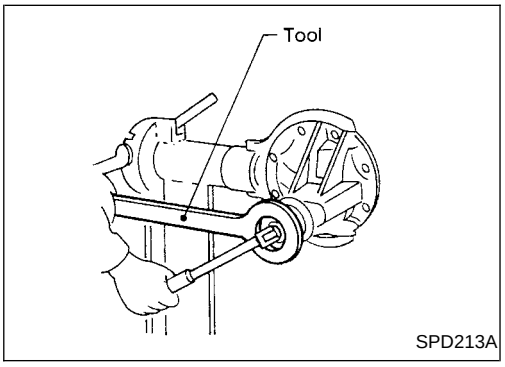
5. Remove differential case assembly with a pry bar.



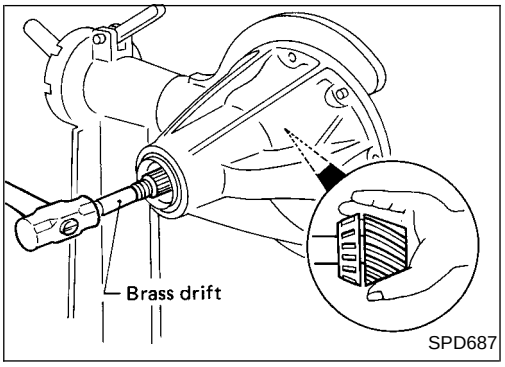
SPD011

Keep the side bearing outer races together with their respective inner cones — do not mix them up.

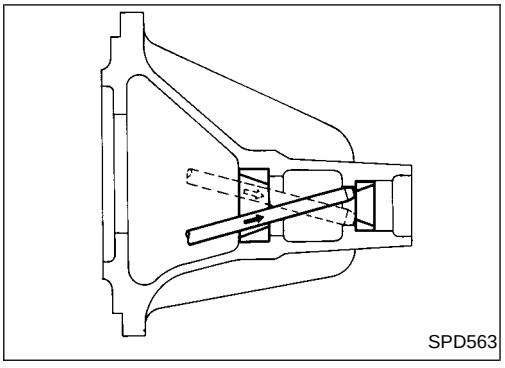
Differential Carrier (Cont'd)



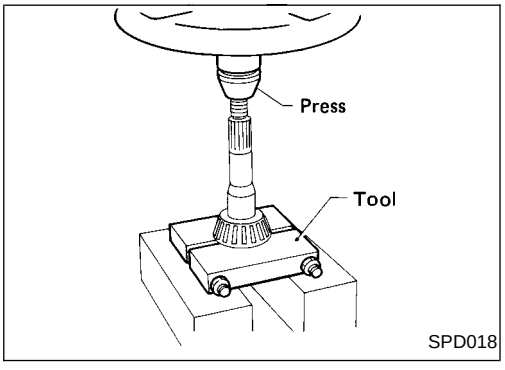
6. Remove drive pinion nut with Tool.
   Tool number: KV38104700 (J34311)
7. Remove companion flange with puller.
8. Remove ABS sensor.



9. Take out drive pinion together with pinion rear bearing inner cone, drive pinion bearing spacer and pinion bearing adjusting shim.

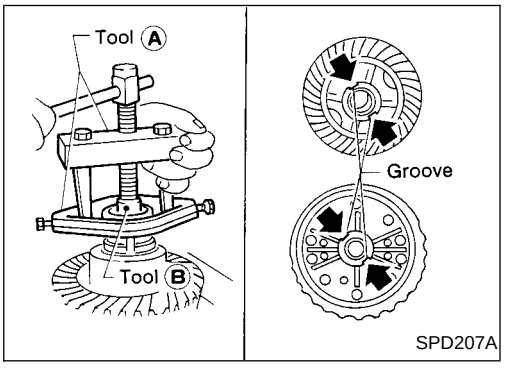


10. Remove front oil seal and pinion front bearing inner cone.
11. Remove pinion bearing outer races with a brass drift.



12. Remove pinion rear bearing inner cone and drive pinion adjusting washer.
    Tool number: ST30031000 (J22912-01)

Differential Case



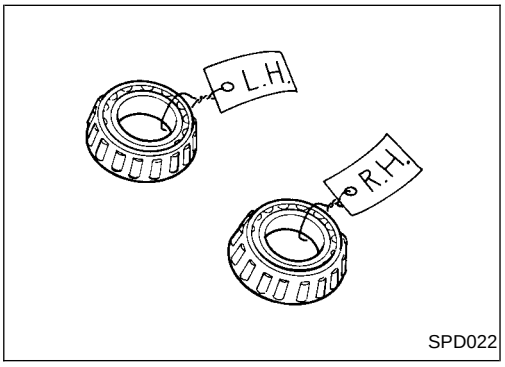
1. Remove side bearing inner cones.

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

Tool numbers:

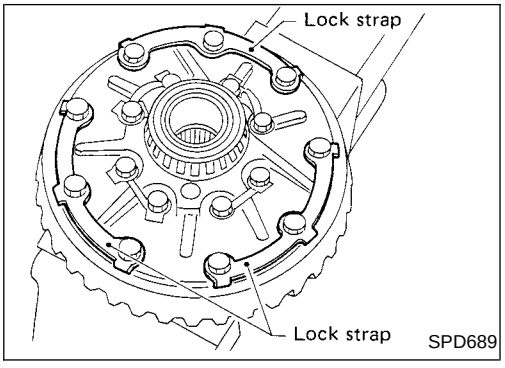
Ⓐ ST33051001 (J22888-20)
Ⓑ ST33061000 (J8107-2)

Differential Case (Cont'd)



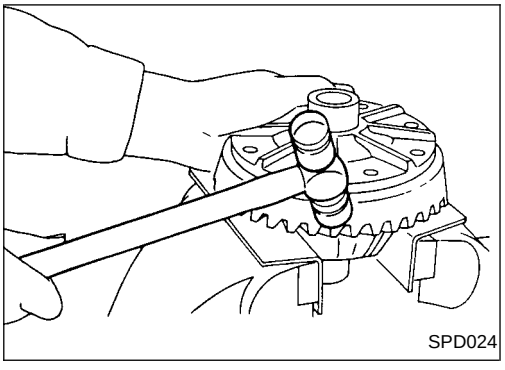
SPD022

Be careful not to confuse the left and right hand parts.



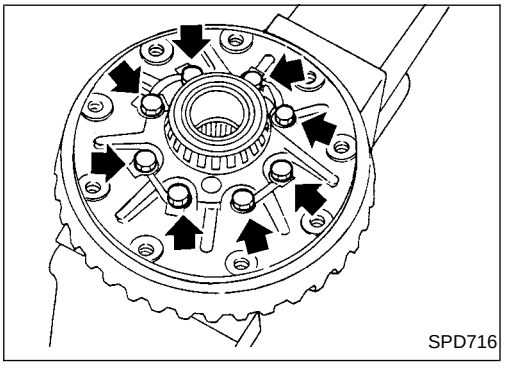
SPD689

2. Spread out lock straps and loosen ring gear bolts in a criss-cross fashion.


SPD024

3. Tap ring gear off differential case with a soft hammer.

Tap evenly all around to keep ring gear from binding.

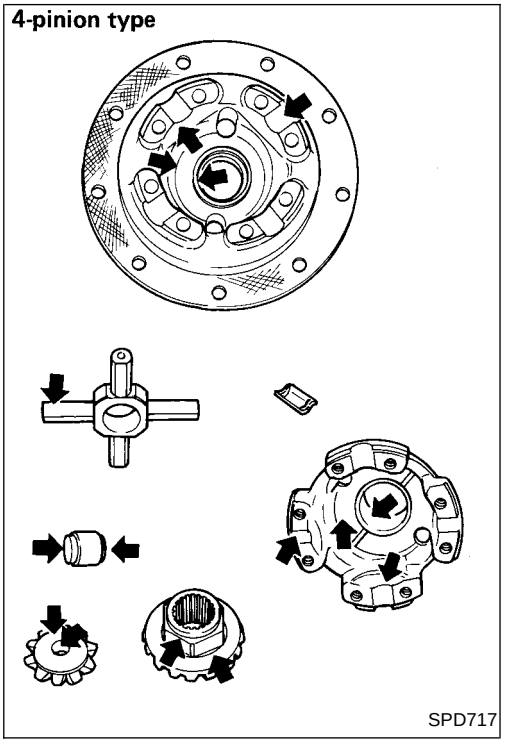

SPD716

4. Separate differential case LH and RH.

Put match marks on both differential case LH and RH sides prior to separating them.

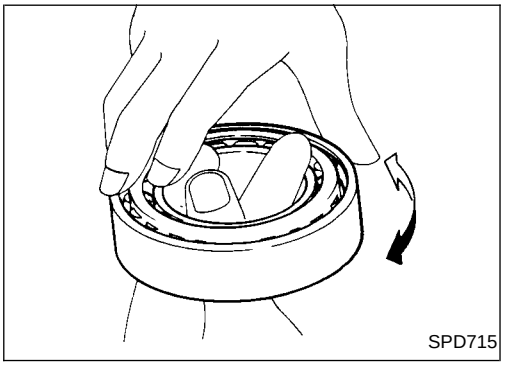
Ring Gear and Drive Pinion

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



Differential Case Assembly

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

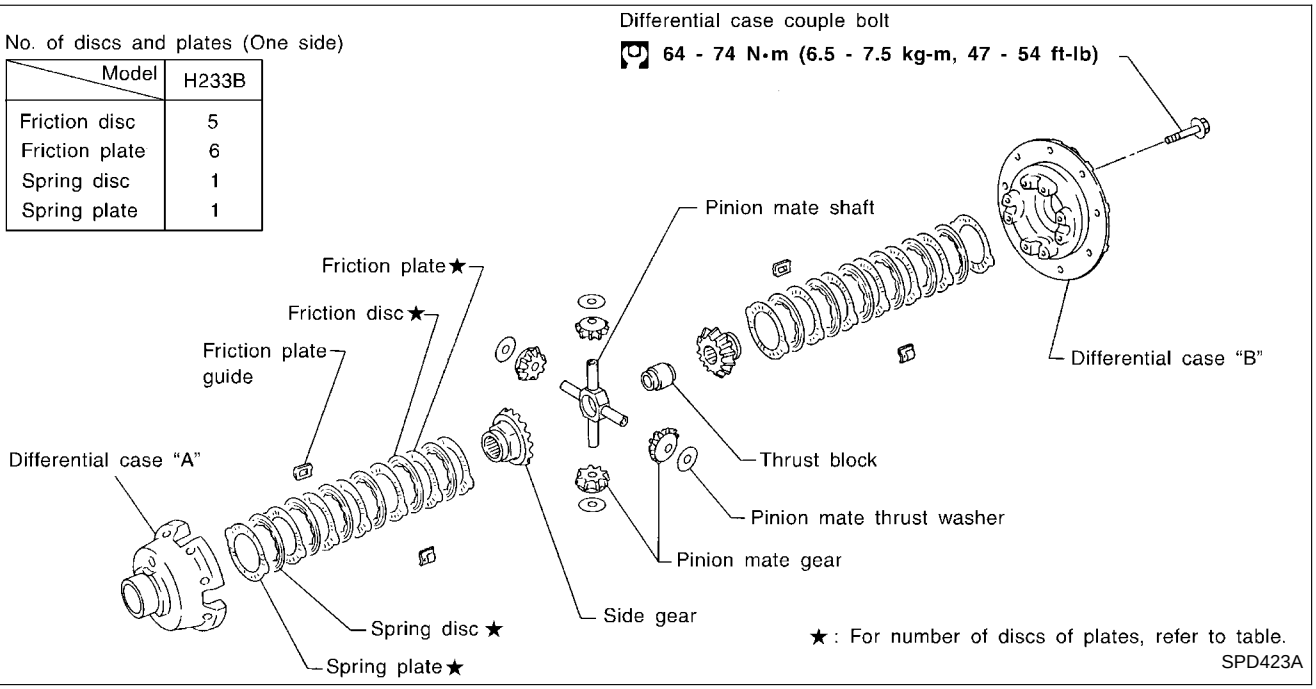


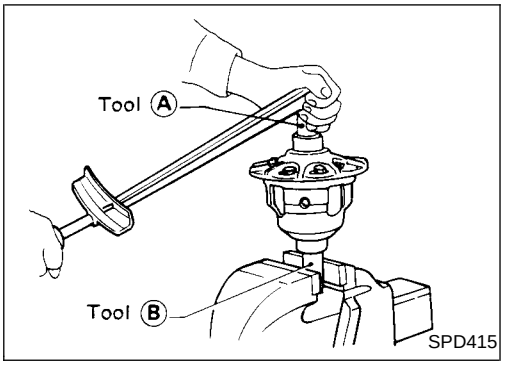
Bearing

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.

No. of discs and plates (One side)

Model	H233B
Friction disc	5
Friction plate	6
Spring disc	1
Spring plate	1





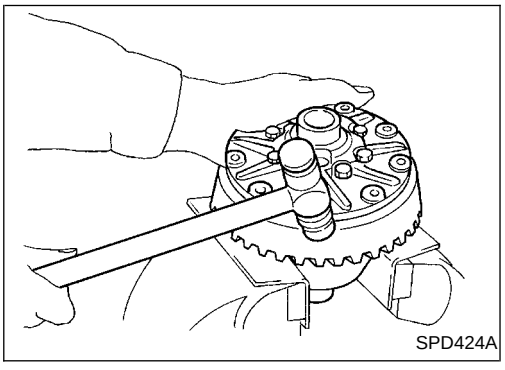
CAUTION:
Do not run engine when only one wheel (rear) is off the ground.

Preparation for Disassembly

CHECKING DIFFERENTIAL TORQUE

Measure differential torque with Tools.
If it is not within the specifications, inspect components of limited slip differential.

Differential torque:
201 - 240 N·m
(20.5 - 24.5 kg-m, 148 - 177 ft-lb)
Tool numbers:
Ⓐ KV38105210 (—)
Ⓑ KV38105220 (—)

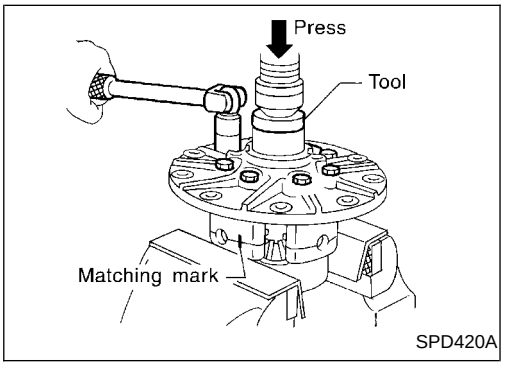


Disassembly

1. Remove side bearing inner cone with Tool.
2. Loosen ring gear bolts in a criss-cross fashion.
3. Tap ring gear off gear case with a soft hammer.

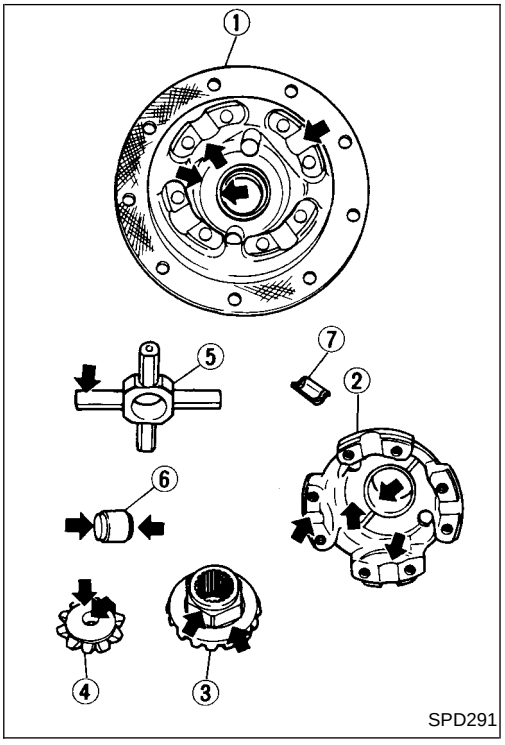
Tap evenly all around to keep ring gear from binding.

Disassembly (Cont'd)



4. Remove couple bolts on differential cases A and B with a press.
   Tool number: ST33081000 (—)
5. Separate differential cases A and B.
   Draw out component parts (discs and plates, etc.).

Put marks on differential cases so that they can be reinstalled in their original positions.



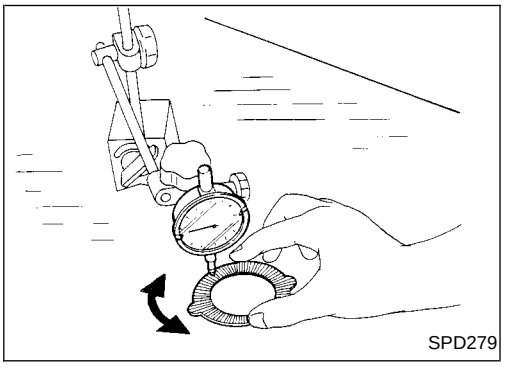
Inspection

CONTACT SURFACES

1. Clean the disassembled parts in suitable solvent and blow dry with compressed air.
2. If the following surfaces are found with burrs or scratches, smooth with oil stone.
   ① Differential case B
   ② Differential case A
   ③ Side gear
   ④ Pinion mate gear
   ⑤ Pinion mate shaft
   ⑥ Thrust block
   ⑦ Friction plate guide

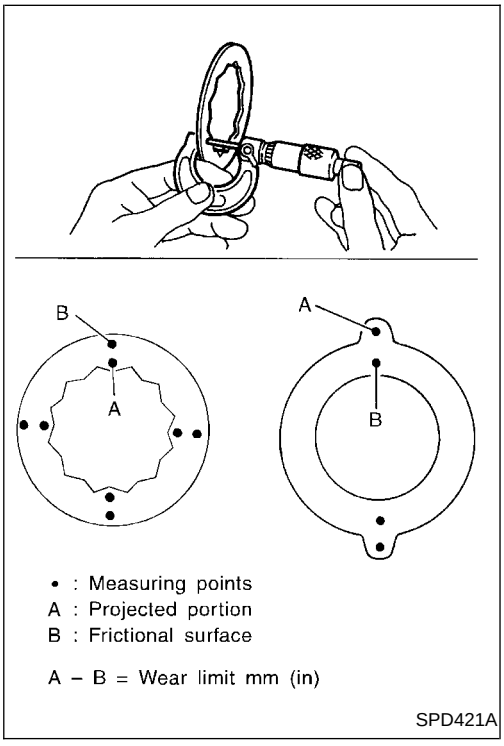
DISC AND PLATE

1. Clean the discs and plates in suitable solvent and blow dry with compressed air.
2. Inspect discs and plates for wear, nicks and burrs.

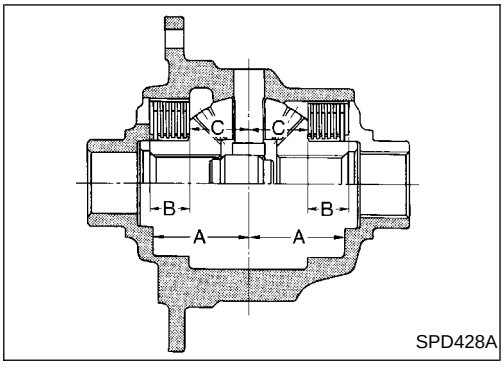


3. Check friction discs or plates for warpage.
   Allowable warpage:
   0.08 mm (0.0031 in)
   If it exceeds limits, replace with a new disc or plate to eliminate possibility of clutch slippage or sticking.

Inspection (Cont'd)



4. Measure frictional surfaces and projected portions of friction discs, plates, spring disc and plate.
   If any part has worn beyond the wear limit, replace it with a new one that is the same thickness as the projected portion.
   Wear limit:
   0.1 mm (0.004 in) or less



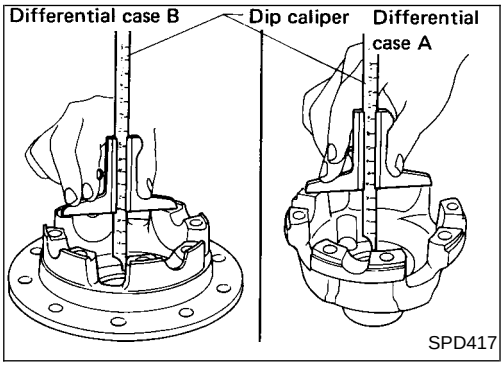
Adjustment

FRICTION DISC AND FRICTION PLATE END PLAY

End play of friction disc and friction plate can be calculated by using the following equation and should be adjusted within the following range.
Adjustment can be made by selecting friction disc having two different thicknesses.

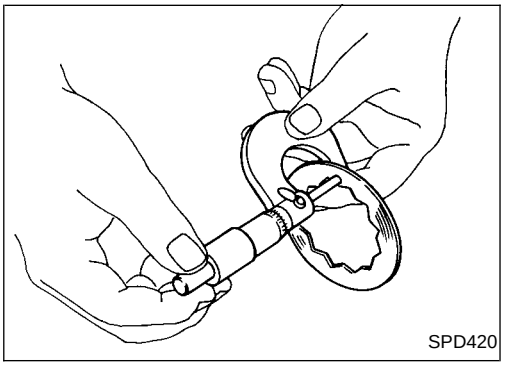
End play E:
0.05 - 0.15 mm (0.0020 - 0.0059 in)
E = A − (B + C)

A: Length of differential case contact surface to differential case inner bottom.
B: Total thickness of friction discs, friction plates, spring disc and spring plate in differential case on one side.
C: Length of differential case contact surface to back side of side gear.

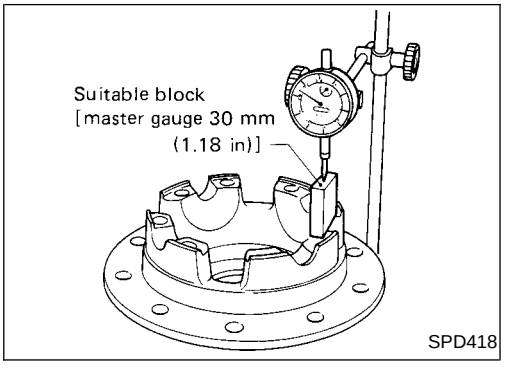


1. Measure values of "A".
   Standard length A:
   49.50 - 49.55 mm (1.9488 - 1.9508 in)

Adjustment (Cont'd)


SPD420

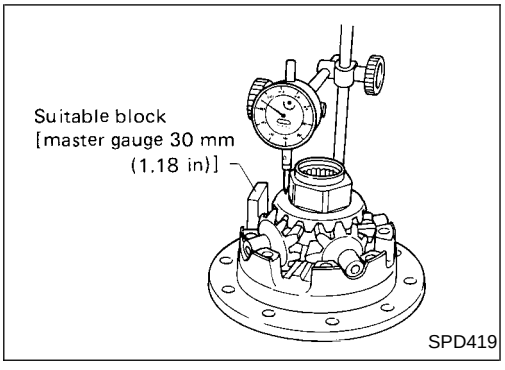
2. Measure thickness of each disc and plate.
   Total thickness "B'':
   19.24 - 20.26 mm (0.7575 - 0.7976 in)
   No. of discs and plates (One side):
   Friction disc 5
   Friction plate 6
   Spring disc 1
   Spring plate 1



SPD418

3. Measure values of "C''.
a. Attach a dial indicator to the base plate.
b. Place differential case B on the base plate, and install a master gauge on case B.

Then adjust the dial indicator scale to zero with its tip on the master gauge.



SPD419

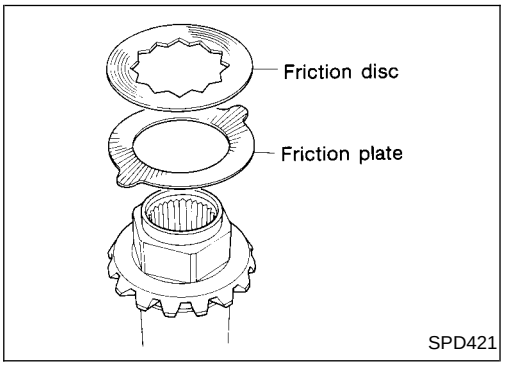
c. Install pinion mate gears, side gears and pinion mate shaft in differential case B.
d. Set dial indicator's tip on the side gear, and read the indication.

Example:

E = A − D = A − (B + C) = 0.05 to 0.15 mm
A = 49.52 mm
B = 19.45 mm
C = 29.7 mm

D = B + C		E = A − D	
B ...	19.45	A ...	49.52
+C ...	29.7	−D ...	49.15
	49.15		0.37

From the above equation, end play of 0.37 mm exceeds the specified range of 0.05 to 0.15 mm.
Select suitable discs and plates to adjust correctly.



SPD421

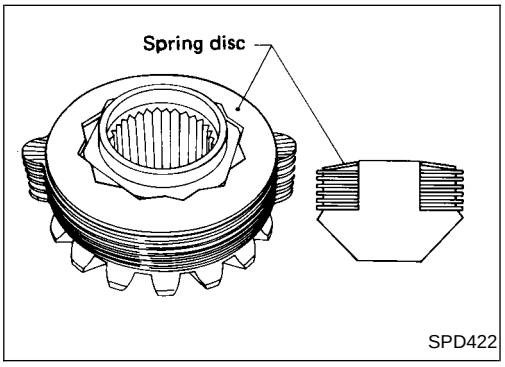
Assembly

Prior to assembling discs and plates, properly lubricate them by dipping them in limited slip differential oil.

1. Alternately position specified number of friction plates and friction discs on rear of side gear.

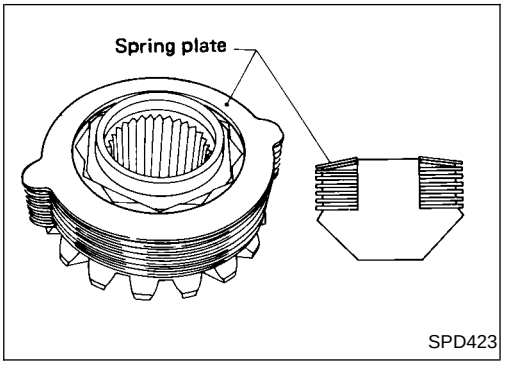
Always position a friction plate first on rear of side gear.

Assembly (Cont'd)

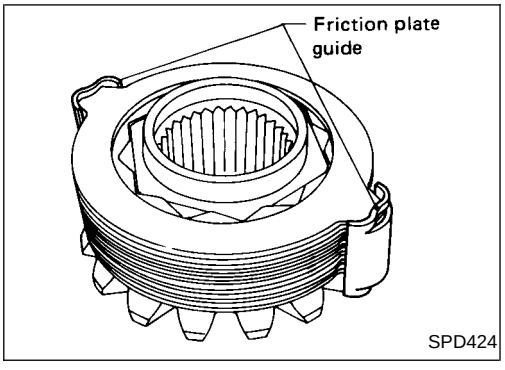


2. Install spring disc.

Align the twelve angular holes in spring disc with the hexagonal area of the side gear.

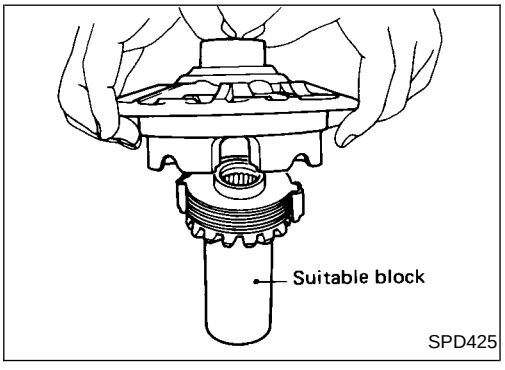


3. Install spring plate.



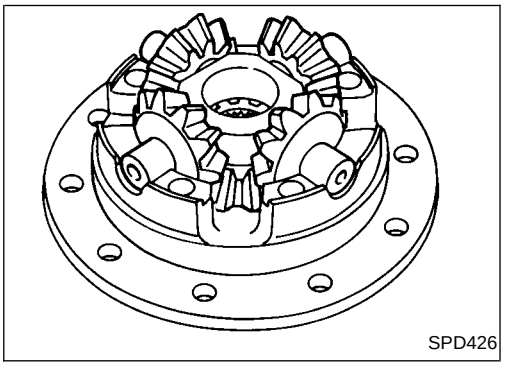
4. Install friction plate guides.

Correctly align the raised portions of friction plates, and apply grease to inner surfaces of friction plate guides to prevent them from falling.



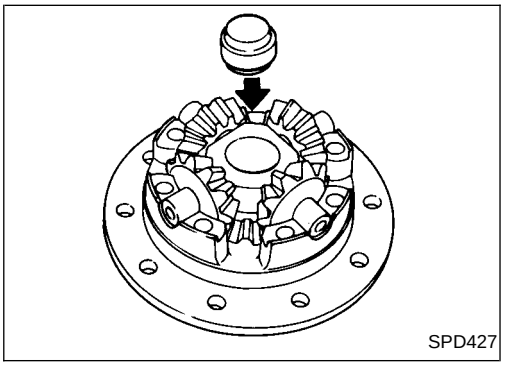
5. Install differential case B over side gear, discs, plates and friction plate guide assembly.

- **Install differential case B while supporting friction plate guides with your middle finger by inserting through oil hole in differential case.**
- **Be careful not to detach spring disc from the hexagonal part of the side gear.**

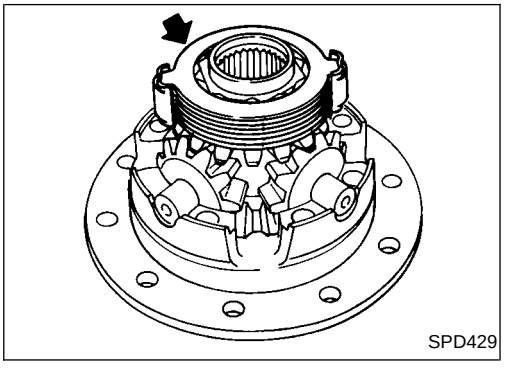


6. Install pinion mate gears and pinion shaft to differential case B.

Assembly (Cont'd)

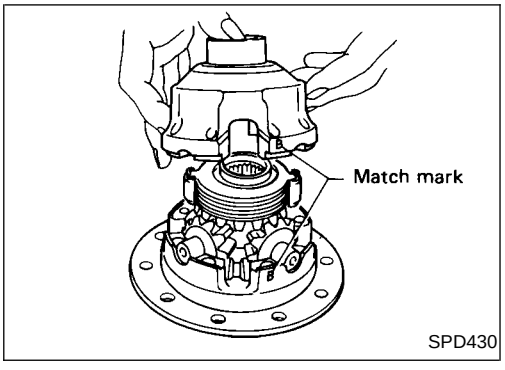

SPD427

7. Install thrust block.


SPD429

8. Install side gear to pinion mate gears.
9. Install each disc and plate.

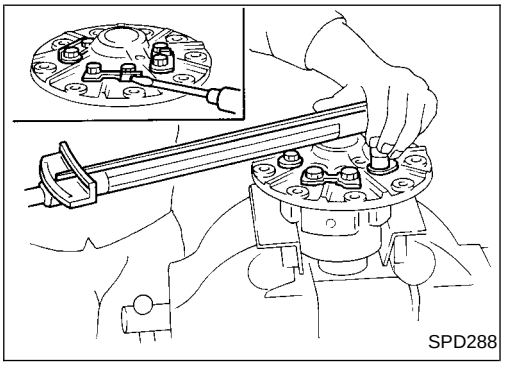
Use same procedures as outlined in steps 1. through 4.



SPD430

10. Install differential case A.

Position differential cases A and B by correctly aligning marks stamped on cases.


SPD288

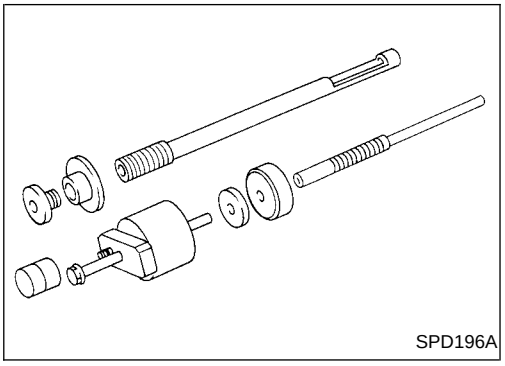
11. Tighten differential case bolts.
12. Place ring gear on differential case and install new lock straps and bolts.

Tighten bolts in a criss-cross fashion, lightly tapping bolt head with a hammer.
Then bend up lock straps to lock the bolts in place.

13. Install side bearing inner cone.
14. Check differential torque.

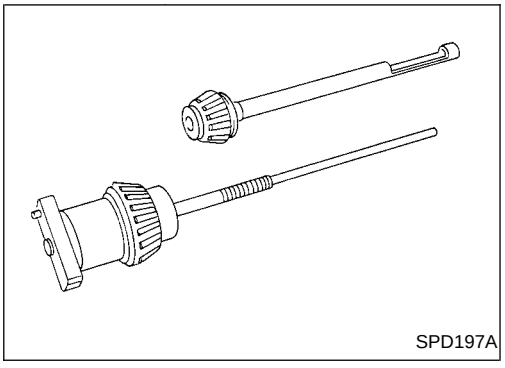
For quiet and reliable final drive operation, the following five adjustments must be made correctly:

1. Side bearing preload
2. Pinion gear height
3. Side bearing preload
4. Ring gear-to-pinion backlash. Refer to Differential Carrier, "ASSEMBLY", (PD-54).
5. Ring and pinion gear tooth contact pattern

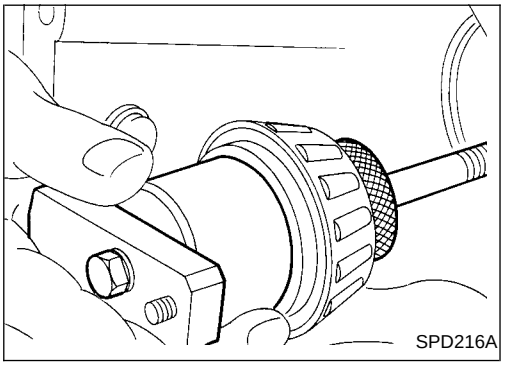

SPD196A

Pinion Gear Height

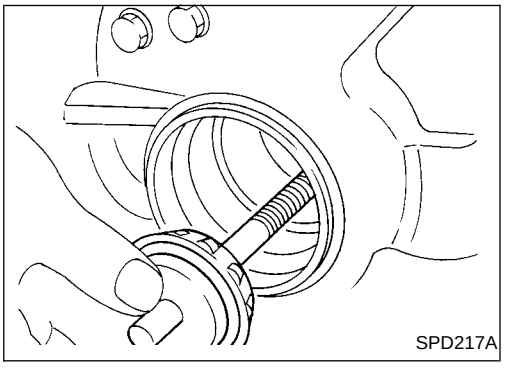
1. Make sure all parts are clean and that the bearings are well lubricated.
2. Assemble the pinion gear bearings into the pinion pre-load shim selector tool, J34309.


SPD197A

- **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.
- **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.

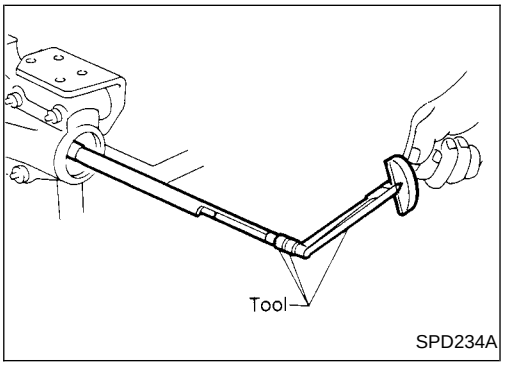

SPD216A

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

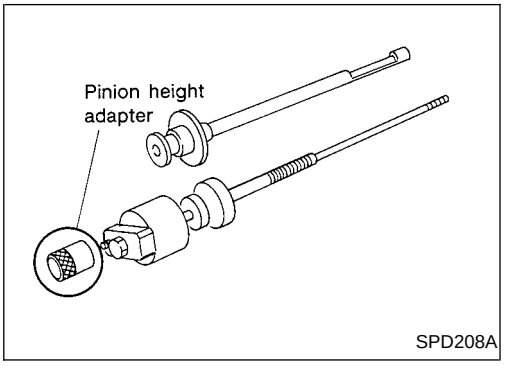

SPD217A

4. Install the J34309-2 gauge anvil with the front pinion bearing into the final drive housing and assemble it to the J34309-1 gauge screw. Make sure that the J34309-16 gauge plate will turn a full 360 degrees, and tighten the two sections by hand to set bearing pre-load.
5. Turn the assembly several times to seat the bearings.

Pinion Gear Height (Cont'd)



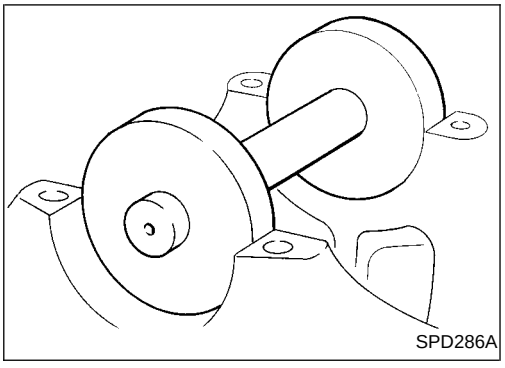
6. Measure the turning torque at the end of the J34309-2 gauge anvil using torque wrench J25765A.
   Turning torque specification:
   0.4 - 0.9 N·m (4 - 9 kg-cm, 3.5 - 7.8 in-lb)



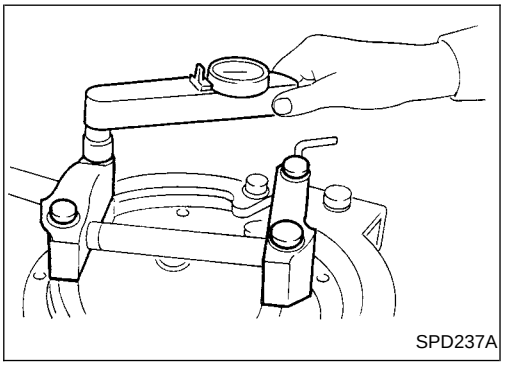
7. Place the J34309-12 "H233B" pinion height adapter onto the gauge plate and tighten it by hand.

CAUTION:
Make sure all machined surfaces are clean.

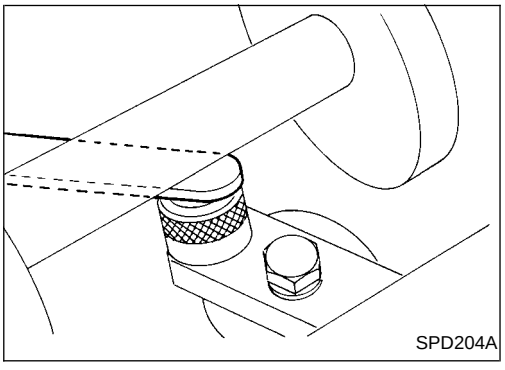
PINION HEIGHT ADJUSTING WASHER SELECTION



8. Position the J25269-18 side bearing discs and the arbor into the side bearing bores.

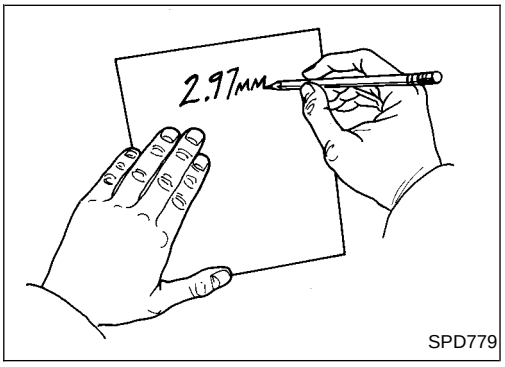


9. Install the bearing caps and torque the bolts.
   Specification:
   93 - 103 N·m (9.5 - 10.5 kg-m, 69 - 76 ft-lb)

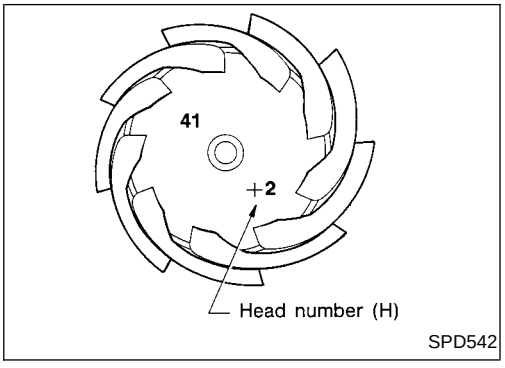


10. Select the correct standard pinion height adjusting washer thickness using a standard gauge of 2.5, 3.0, or 3.5 mm (0.098, 0.118, or 0.138 in) and your J34309-101 feeler gauge. Measure the distance between the J34309-12 "H233B" pinion height adapter and the arbor.

Pinion Gear Height (Cont'd)



11. Write down your exact total measurement.

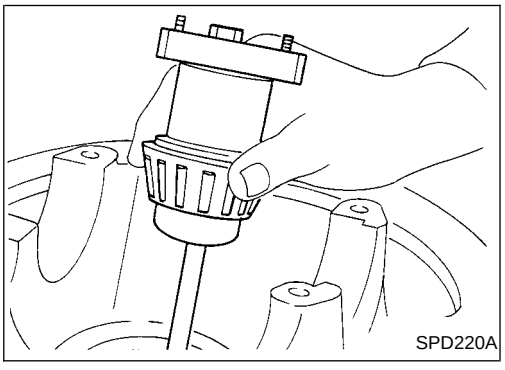


12. Correct the pinion height washer size by referring to the "pinion head height number".

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 the quietest operation. Use the following chart to determine the correct pinion height washer.

Pinion Head Height Number	Add or Remove from the Selected 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)

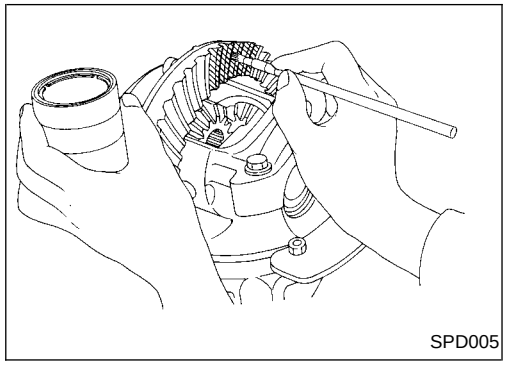
13. Select the correct pinion height washer.
    Drive pinion height adjustment:
    Refer to SDS (PD-60).



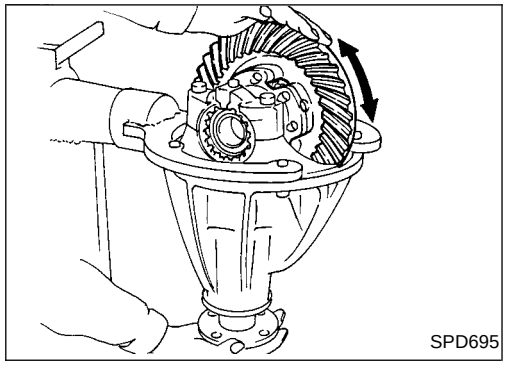
14. Remove the J34309 pinion preload shim selector tool from the final drive housing and disassemble to retrieve the pinion bearings.

Tooth Contact

Gear tooth contact pattern check is necessary to verify correct relationship between ring gear and drive pinion.
Hypoid gear sets which are not positioned properly may be noisy, or have short life or both. With a pattern check, the most desirable contact for low noise level and long life can be assured.

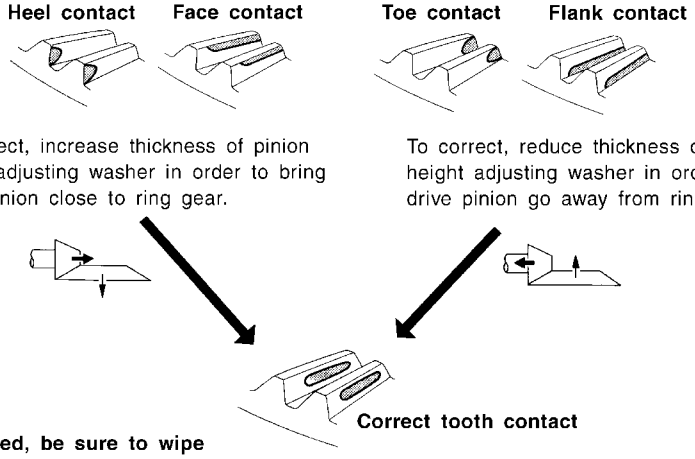

SPD005

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


SPD695

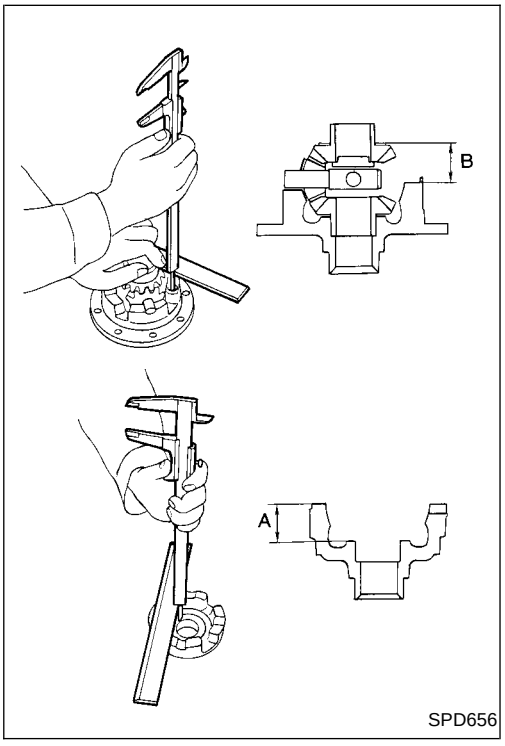
3. Hold companion flange steady and rotate the ring gear in both directions.

Usually the pattern will be correct if shims are correctly calculated and the backlash is correct. However, in rare cases, trial and error processes may be employed to obtain a correct pattern. The tooth pattern is the best indication of how well a differential has been set up.



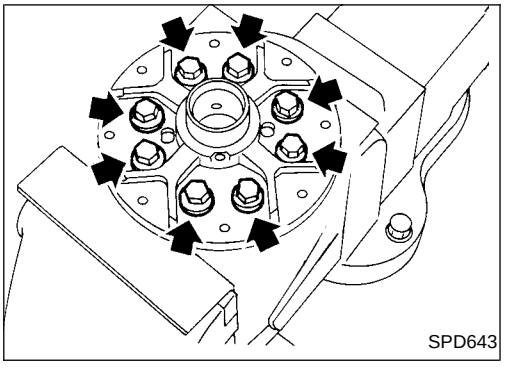
When adjustment is completed, be sure to wipe off completely the ferric oxide and oil or their equivalent.

SPD007-B

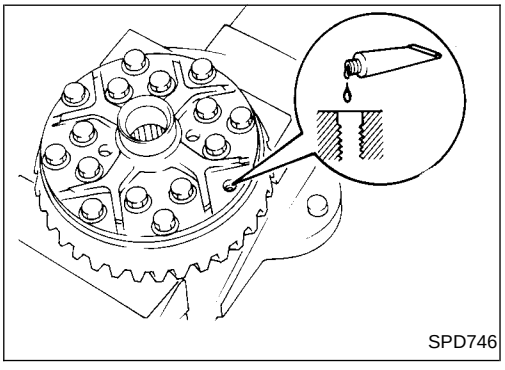


Differential Case

1. Measure clearance between side gear thrust washer and differential case.
   Clearance between side gear thrust washer and differential case (A − B):
   Less than 0.15 mm (0.0059 in)
   The clearance can be adjusted with side gear thrust washer. Refer to SDS, PD-59.
2. Apply gear oil to gear tooth surfaces and thrust surfaces and check to see they turn properly.

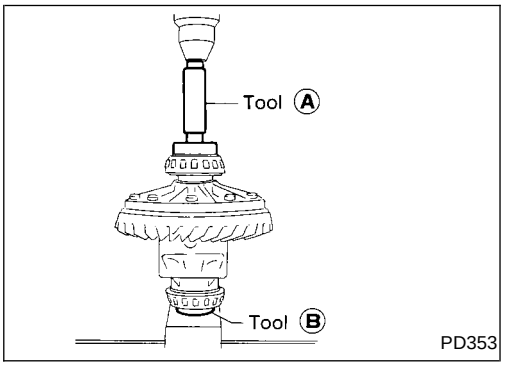


3. Install differential case LH and RH.
4. Install differential case on ring gear.

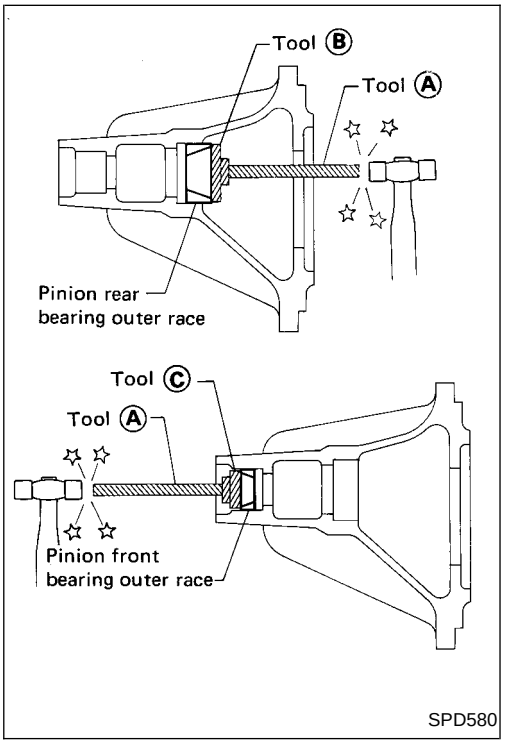


5. Place differential case on ring gear.
6. Apply locking agent [Locktite (stud lock) or equivalent] to ring gear bolts, and install them.

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

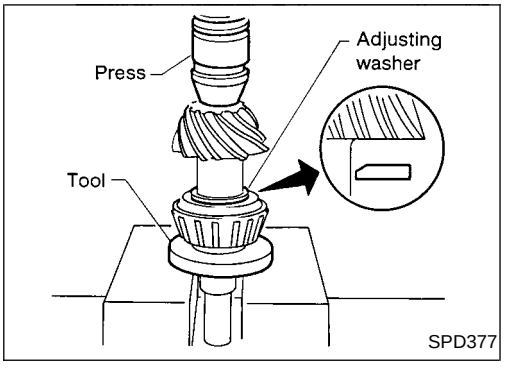


7. Press-fit side bearing inner cones on differential case with Tool.
   Tool numbers:
   Ⓐ ST33190000 (J25523)
   Ⓑ ST33081000 (—)

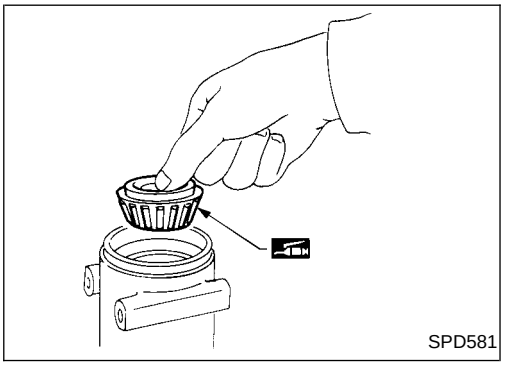


Differential Carrier

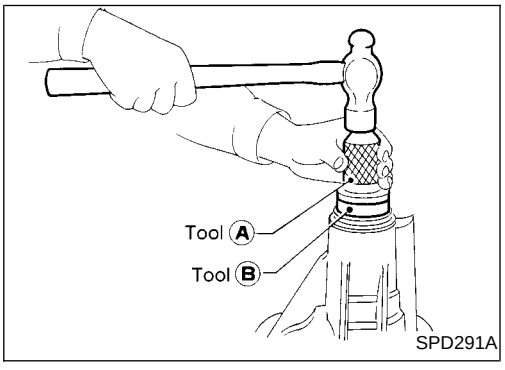
1. Press-fit front and rear bearing outer races with Tools.
   Tool numbers:
   - Ⓐ **ST30611000 (J25742-1)**
   - Ⓑ **ST30621000 (J25742-5)**
   - Ⓒ **ST30613000 (J25742-3)**



2. Select drive pinion height adjusting washer. Refer to ''ADJUSTMENT'', PD-49.
3. Install drive pinion adjusting washer in drive pinion, and press-fit pinion rear bearing inner cone in it, with press and Tool.
   Tool number: ST30901000 (J26010-01)

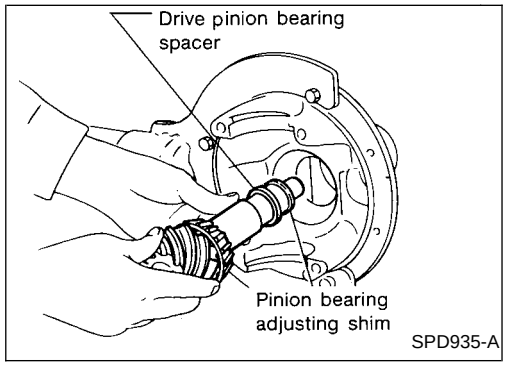


4. Place pinion front bearing inner cone in gear carrier.

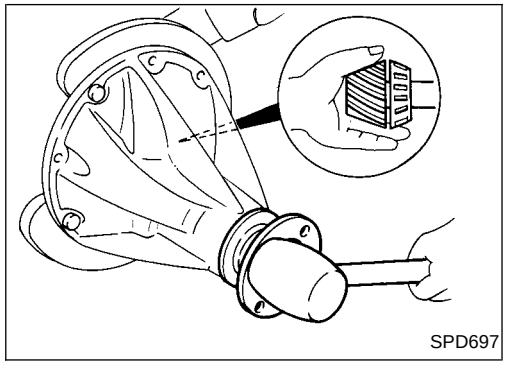


5. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install front oil seal.
   Tool numbers:
   - Ⓐ **ST30720000 (J25405)**
   - Ⓑ **KV38102510 (—)**

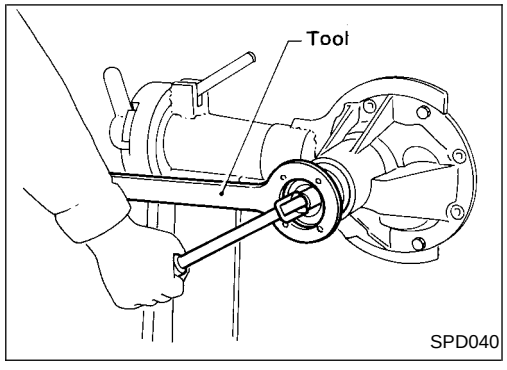
Differential Carrier (Cont'd)



6. Install drive pinion bearing spacer, pinion bearing adjusting shim and drive pinion in gear carrier.



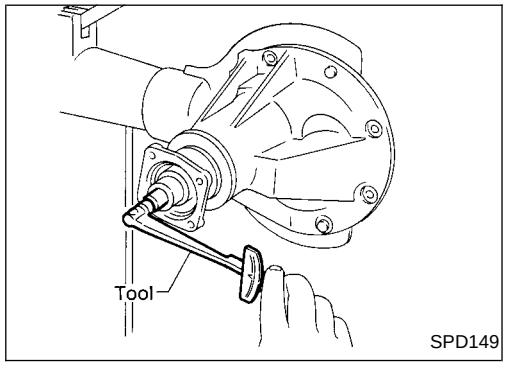
7. Insert companion flange into drive pinion by tapping the companion flange with a soft hammer.



8. Tighten pinion nut to the specified torque.

The threaded portion of drive pinion and pinion nut should be free from oil or grease.

Tool number: KV38104700 (J34311)

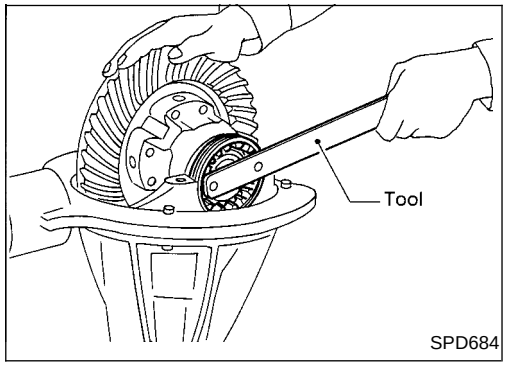


9. Turn drive pinion in both directions several times, and measure pinion bearing preload.

Tool number: ST3127S000 (J25765-A)
Pinion bearing preload (With front oil seal):
1.4 - 1.7 N·m (14 - 17 kg-cm, 12 - 15 in-lb)
Pinion bearing preload (Without front oil seal):
1.2 - 1.5 N·m (12 - 15 kg-cm, 10 - 13 in-lb)

If preload is out of specification, adjust the thickness of spacer and shim combination by replacing shim and spacer with thinner one.

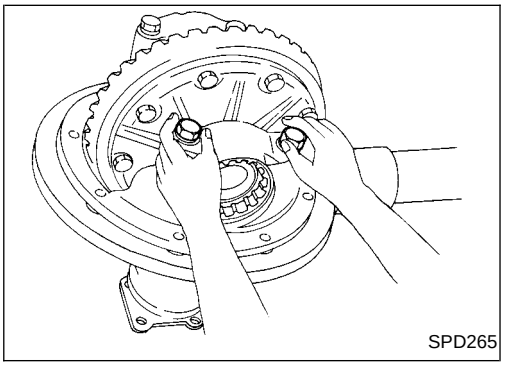
- Start from the combination of thickest spacer and shim.
- Combine each spacer and shim thickness one by one until the correct specification is achieved.



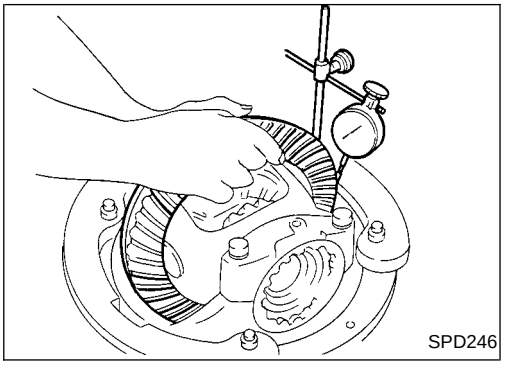
10. Install differential case assembly with side bearing outer races into gear carrier.
11. Position side bearing adjusters on gear carrier with threads properly engaged; screw in adjusters lightly at this stage of assembly.

Tool number: ST32580000 (J34312)

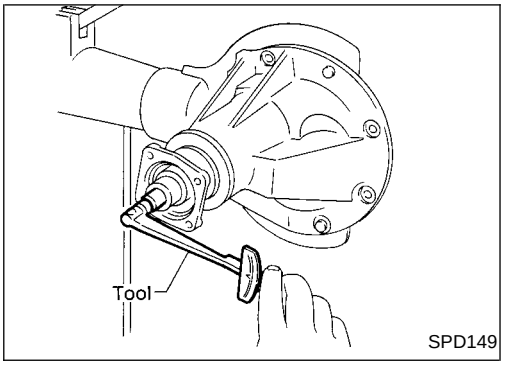
Differential Carrier (Cont'd)


SPD265

12. Align mark on bearing cap with that on gear carrier and install bearing cap on gear carrier.
- Do not tighten at this point to allow further tightening of side bearing adjusters.

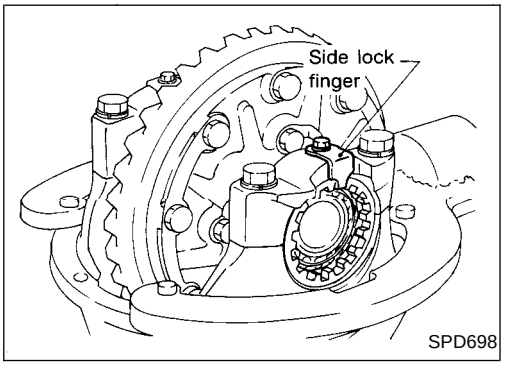

SPD246

13. Tighten both right and left side bearing adjusters alternately and measure ring gear backlash and total preload at the same time. Adjust right and left side bearing adjusters by tightening them alternately so that proper ring gear backlash and total preload can be obtained.
Ring gear-to-drive pinion backlash:
0.13 - 0.18 mm (0.0051 - 0.0071 in)



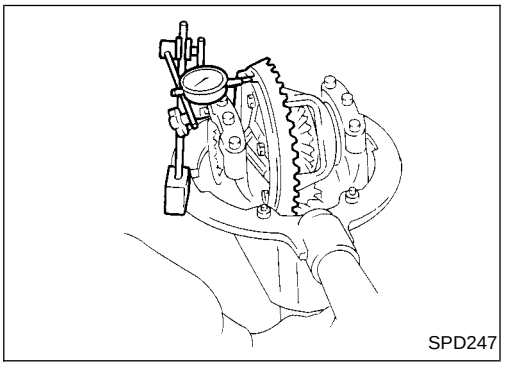
SPD149

- **When checking preload, turn drive pinion in both directions several times to set bearing rollers.**
Tool number: ST3127S000 (J25765-A)
Total preload (With front oil seal):
Drive pinion bearing
New: 1.5 - 1.7 N·m (15 - 17 kg-cm, 13 - 15 in-lb)
Old: 1.7 - 2.5 N·m (17 - 25 kg-cm, 15 - 22 in-lb)



SPD698

14. Tighten side bearing cap bolts.
15. Install side lock finger in place to prevent rotation during operation.


SPD247

16. Check runout of ring gear with a dial indicator.
Runout limit: 0.08 mm (0.0031 in)
- If backlash varies excessively in different places, the variance may have resulted from foreign matter caught between the ring gear and the differential case.
- If the backlash varies greatly when the runout of the ring gear is within a specified range, the hypoid gear set or differential case should be replaced.
17. Check tooth contact. Refer to ''ADJUSTMENT'', PD-52.

Propeller Shaft

GENERAL SPECIFICATIONS

Location		Front	Rear
Propeller shaft model		2F1310	3S1310
Number of joints		2	3
Coupling method with transmission		Flange type	Sleeve type
Type of journal bearings		Solid type (disassembly type)	
Shaft length (Spider to spider)	1st	542 (21.3)	398 (15.7)
mm (in)	2nd	—	840.3 (33.1)
Shaft diameter	1st	50.8 (2.0)	76.2 (3.0)
mm (in)	2nd	—	76.2 (3.0)

INSPECTION AND ADJUSTMENT

Service data

Unit: mm (in)

Propeller shaft runout limit	0.6 (0.024)
Journal axial play	0.02 (0.0008) or less

Snap ring

Unit: mm (in)

Thickness	Color	Part number
1.99 (0.0783)	White	37146-C9400
2.02 (0.0795)	Yellow	37147-C9400
2.05 (0.0807)	Red	37148-C9400
2.08 (0.0819)	Green	37149-C9400
2.11 (0.0831)	Blue	37150-C9400
2.14 (0.0843)	Light brown	37151-C9400
2.17 (0.0854)	Black	37152-C9400
2.20 (0.0866)	No paint	37153-C9400

Final Drive

GENERAL SPECIFICATIONS

Grade		XE		SE	
Front final drive		R200A		R200A	
		2-pinion		2-pinion	
	Gear ratio	4.375 4.625 *1		4.625	
	Oil capacity (Approx.) l (US pt, Imp pt)	1.5 (3-1/8, 2-5/8)		1.5 (3-1/8, 2-5/8)	
Rear final drive		H233B		H233B	
		Standard	Optional	Standard	Optional
		4-pinion	LSD	4-pinion	LSD
	Gear ratio	4.375 4.625*1		4.625	
	Number of teeth (Ring gear/drive pinion)	35/8 37/8 *1		37/8	
	Oil capacity (Approx.) l (US pt, Imp pt)	2.8 (5-7/8, 4-7/8)		2.8 (5-7/8, 4-7/8)	

*1 Optional tire (P265/70R15) equipped models.

INSPECTION AND ADJUSTMENT (R200A)

Ring gear runout

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

Side gear adjustment

Side gear backlash (Clearance between side gear and differential case) mm (in)	Less than 0.15 (0.0059)

Available side gear thrust washers

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

Side bearing adjustment

Differential carrier assembly turning resistance N (kg, lb)	34.3 - 39.2 (3.5 - 4.0, 7.7 - 8.8)

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

Final Drive (Cont'd)

INSPECTION AND ADJUSTMENT (R200A) (CONT'D)

Total preload adjustment

Total preload N·m (kg-cm, in-lb)	1.4 - 1.7 (14 - 17, 12 - 15)
Ring gear backlash mm (in)	0.10 - 0.15 (0.0039 - 0.0059)

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

Available drive pinion bearing preload adjusting washers

Thickness mm (in)	Part number
3.81 (0.1500)	38125-61001
3.83 (0.1508)	38126-61001
3.85 (0.1516)	38127-61001
3.87 (0.1524)	38128-61001
3.89 (0.1531)	38129-61001
3.91 (0.1539)	38130-61001
3.93 (0.1547)	38131-61001
3.95 (0.1555)	38132-61001
3.97 (0.1563)	38133-61001
3.99 (0.1571)	38134-61001
4.01 (0.1579)	38135-61001
4.03 (0.1587)	38136-61001
4.05 (0.1594)	38137-61001
4.07 (0.1602)	38138-61001
4.09 (0.1610)	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

INSPECTION AND ADJUSTMENT (H233B)

Ring gear runout

Ring gear runout limit mm (in)	0.08 (0.0031)

Side gear adjustment (without LSD)

Side gear backlash (Clearance between side gear to differential case) mm (in)	0.1 - 0.2 (0.004 - 0.008)

Available side gear thrust washers

Thickness mm (in)	Part number
1.75 (0.0689)	38424-T5000
1.80 (0.0709)	38424-T5001
1.85 (0.0728)	38424-T5002

— Additional service for LSD model — Differential torque adjustment

Differential torque N·m (kg-m, ft-lb)	201 - 240 (20.5 - 24.5, 148 - 177)
Number of discs and plates	
Friction disc	10
Friction plate	12
Spring disc	2
Spring plate	2
Wear limit of plate and disc mm (in)	0.1 (0.004)
Allowable warpage of friction disc and plate mm (in)	0.08 (0.0031)
Total thickness mm (in)	19.24 - 20.26 (0.7575 - 0.7976)

Available discs and plates

Part name	Thickness mm (in)	Part number
Friction disc	1.48 - 1.52 (0.0583 - 0.0598)	38433-C6000 (Standard type)
	1.58 - 1.62 (0.0622 - 0.0638)	38433-C6001 (Adjusting type)
Friction plate	1.48 - 1.52 (0.0583 - 0.0598)	38432-C6000
Spring disc	1.48 - 1.52 (0.0583 - 0.0598)	38436-C6000
Spring plate	1.48 - 1.52 (0.0583 - 0.0598)	38435-C6010

Final Drive (Cont'd)

INSPECTION AND ADJUSTMENT (H233B) (CONT'D)

Drive pinion height adjustment

Available pinion height adjusting washers

Thickness mm (in)	Part number
2.58 (0.1016)	38151-01J00
2.61 (0.1028)	38151-01J01
2.64 (0.1039)	38151-01J02
2.67 (0.1051)	38151-01J03
2.70 (0.1063)	38151-01J04
2.73 (0.1075)	38151-01J05
2.76 (0.1087)	38151-01J06
2.79 (0.1098)	38151-01J07
2.82 (0.1110)	38151-01J08
2.85 (0.1122)	38151-01J09
2.88 (0.1134)	38151-01J10
2.91 (0.1146)	38151-01J11
2.94 (0.1157)	38151-01J12
2.97 (0.1169)	38151-01J13
3.00 (0.1181)	38151-01J14
3.03 (0.1193)	38151-01J15
3.06 (0.1205)	38151-01J16
3.09 (0.1217)	38151-01J17
3.12 (0.1228)	38151-01J18
3.15 (0.1240)	38151-01J19
3.18 (0.1252)	38151-01J60
3.21 (0.1264)	38151-01J61
3.24 (0.1276)	38151-01J62
3.27 (0.1287)	38151-01J63
3.30 (0.1299)	38151-01J64
3.33 (0.1311)	38151-01J65
3.36 (0.1323)	38151-01J66
3.39 (0.1335)	38151-01J67
3.42 (0.1346)	38151-01J68
3.45 (0.1358)	38151-01J69
3.48 (0.1370)	38151-01J70
3.51 (0.1382)	38151-01J71
3.54 (0.1394)	38151-01J72
3.57 (0.1406)	38151-01J73
3.60 (0.1417)	38151-01J74
3.63 (0.1429)	38151-01J75
3.66 (0.1441)	38151-01J76

Drive pinion preload adjustment

Drive pinion bearing preload adjusting method	Adjusting shim and spacer
Drive pinion preload N·m (kg-cm, in-lb)	
With front oil seal	1.4 - 1.7 (14 - 17, 12 - 15)
Without front oil seal	1.2 - 1.5 (12 - 15, 10 - 13)

Available drive pinion preload adjusting shims

Thickness mm (in)	Part number
2.31 (0.0909)	38125-82100
2.33 (0.0917)	38126-82100
2.35 (0.0925)	38127-82100
2.37 (0.0933)	38128-82100
2.39 (0.0941)	38129-82100
2.41 (0.0949)	38130-82100
2.43 (0.0957)	38131-82100
2.45 (0.0965)	38132-82100
2.47 (0.0972)	38133-82100
2.49 (0.0980)	38134-82100
2.51 (0.0988)	38135-82100
2.53 (0.0996)	38136-82100
2.55 (0.1004)	38137-82100
2.57 (0.1012)	38138-82100
2.59 (0.1020)	38139-82100

Available drive pinion preload adjusting spacers

Length mm (in)	Part number
4.50 (0.1772)	38165-76000
4.75 (0.1870)	38166-76000
5.00 (0.1969)	38167-76000
5.25 (0.2067)	38166-01J00
5.50 (0.2165)	38166-01J10

Total preload adjustment

Total preload N·m (kg-cm, in-lb) With front oil seal	Drive pinion bearing	New	1.5 - 1.7 (15 - 17, 13 - 15)
		Old	1.7 - 2.5 (17 - 25, 15 - 22)
Ring gear backlash		mm (in)	0.13 - 0.18 (0.0051 - 0.0071)
Side bearing adjusting method			Side adjuster