SECTION RFD
REAR FINAL DRIVE

CONTENTS

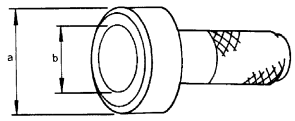
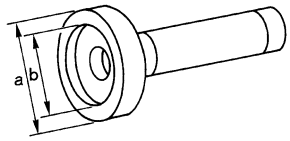
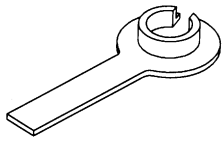
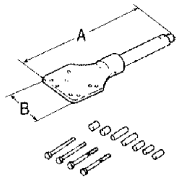
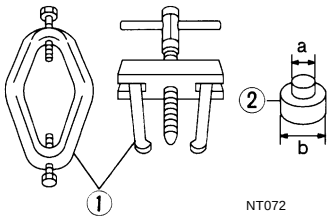
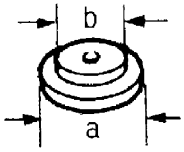
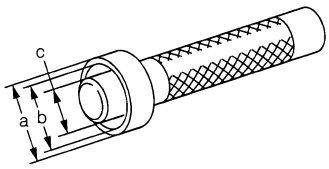
PREPARATION

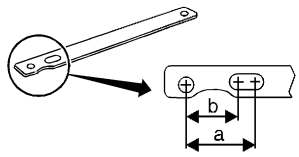
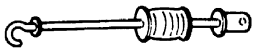
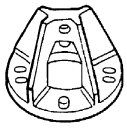
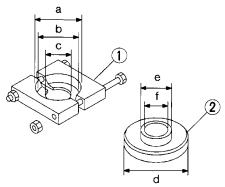
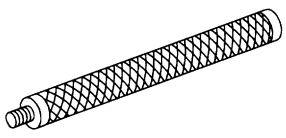
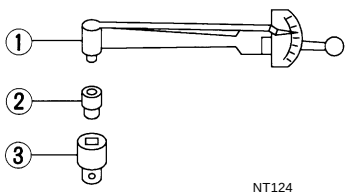
PFP:00002

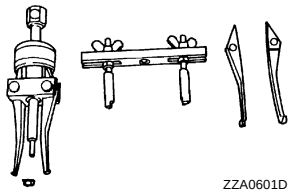
Special Service Tools

ADS0005U

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

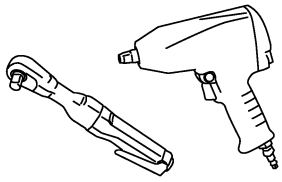
Tool name Tool number (Kent-Moore No.)		Description
Drift ST30720000 (J25405) a: 77 mm (3.03 in) dia. b: 55 mm (2.17 in) dia.	 ZZA0811D	Installing front oil seal
Drift KV38100200 (J26233) a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.	 ZZA1143D	Installing side oil seal
Protector KV38107900 (J39352)	 S-NT129	Installing side flange
Attachment KV38100800 (J25604-01) a: 541 mm (21.30 in) b: 200 mm (7.87 in)	 SDIA0267E	Fixing unit assembly
Differential side bearing puller set ST3306S001 (–) 1.ST3305S001 (–) 2.ST33061000 (J8107–2) a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.	 NT072	Removing and installing side bearing
Drift ST30613000 (J25742-3) a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia.	 ZZA0810D	Installing pinion front and rear bearing outer race
Drift KV38100300 (J25523) a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.	 ZZA1046D	Installing side bearing

Tool name Tool number (Kent-Moore No.)		Description
Drive pinion flange wrench KV40104000 (–) a : 85 mm (3.35 in) dia. b : 65 mm (2.56 in) dia.	 NT659	Removing and installing drive pinion nut
Sliding hammer ST36230000 (J25840-A)	 ZZA0803D	Removing side flange
Axle stand KV40104100 (–)	 ZZA0804D	Removing side flange
Sliding hammer HT72400000 (–)	 S-NT125	Removing differential case assembly
Drive pinion rear inner race puller set ST3090S000 (–) 1. ST30031000 (J22912-01) Puller 2. ST30901000 (–) Base Equivalent tool (J26010-01) a : 90 mm (3.54 in) dia. b : 80 mm (3.15 in) dia. c : 50 mm (1.97 in) dia. d : 79 mm (3.11 in) dia. e : 45 mm (1.77 in) dia. f : 35 mm (1.38 in) dia.	 S-NT640	Removing and installing drive pinion rear bearing inner race
Drift ST30611000 (J25742–1)	 S-NT090	Installing pinion rear bearing outer race (Use with ST30613000)
Preload gauge ST3127S000 (J25765-A) 1. GG91030000 Torque wrench (J25765) 2. HT62940000 (–) Socket adapter (1/2″) 3. HT62900000 (–) Socket adapter (3/8″)	 NT124	Measuring pinion bearing preload and total preload

Tool name Tool number (Kent-Moore No.)		Description
Oil seal puller ST33290001 (J34286)	 ZZA0601D	Removing front oil seal
Differential shim selection (J34309)	 NT134	Adjusting bearing preload gear height

Commercial Service Tools

ADS0005V

Power tool	 PBIC0190E

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS0005W

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

			Reference page	Refer to RFD-21, "Contact Surfaces"	Refer to RFD-27, "TOOTH CONTACT"	Refer to RFD-21, "Contact Surfaces"	Refer to RFD-15, "Pre-Inspection"	—	Refer to MA-22, "CHASSIS AND BODY MAINTENANCE"	NVH in PR section.	NVH in FAX, RAX, FSU and RSU sections.	NVH in WT section.	NVH in WT section.	NVH in RAX section.	NVH in BR section.	NVH in PS section.
			Possible cause and SUSPECTED PARTS	Rough gear tooth	Improper gear contact	Tooth surfaces worn	Incorrect backlash	Companion flange excessive runout	Improper gear oil	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	DIFFERENTIAL	Noise		×	×	×	×	×	×	×	×	×	×	×	×	×

×: Applicable

FRONT OIL SEAL

PFP:38189

Removal and Installation

ADS00081

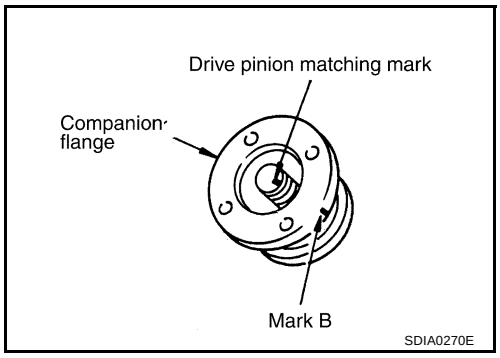
REMOVAL

1. Remove the propeller shaft. Refer to PR-5, "REAR PROPELLER SHAFT" .

   CAUTION:
   Do not impact or damage propeller shaft tube.

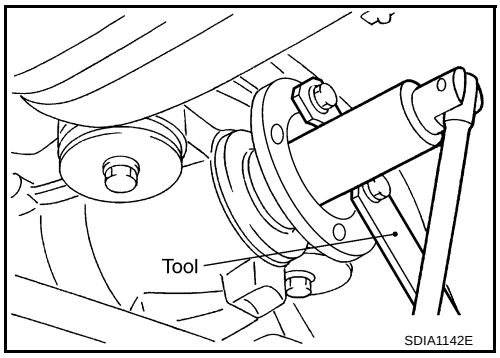
2. Put a mark on the end of the drive pinion corresponding to the B position mark on the companion flange.

   CAUTION:
   - **For matching mark, use paint. Never damage drive pinion.**
   - **The mark on the final drive companion flange indicates the maximum vertical runout position.**

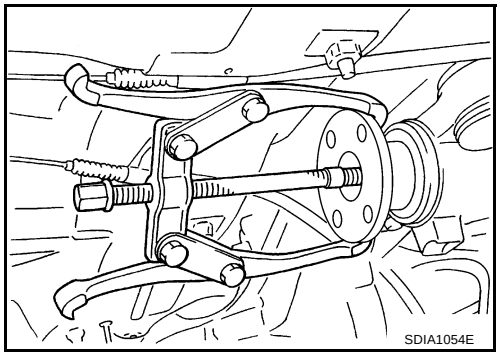


3. Using the drive pinion flange wrench, Remove drive pinion nut.

   Tool number : KV40104000 (–)

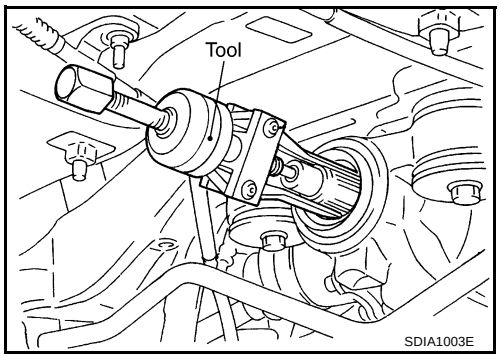


4. Using the puller, remove the companion flange.



5. Using the oil seal puller, remove front oil seal.

   Tool number : ST33290001 (J34286)

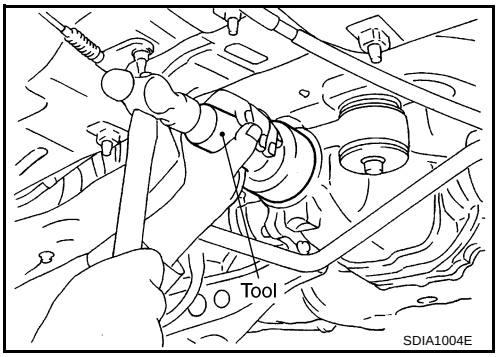


INSTALLATION

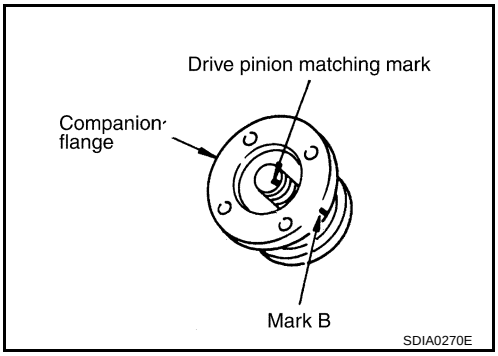
1. Apply multi-purpose grease to sealing lips of oil seal. Press front oil seal into carrier with tool.

   Tool number : ST30720000 (J25405)

   CAUTION:
   - **When installing the oil seal, be careful not to get it inclined.**
   - **Discard the old oil seal. Always replace with new one.**



2. Align the matching mark of drive pinion with the matching mark B of companion flange, then install the companion flange.



3. Apply oil or grease on the screw part of drive pinion and the seating surface of drive pinion nut.
4. Install drive pinion nut with tool.

   Tool number : KV4010400 (–)

   : 147 - 323N·m (15.0 - 32.0 kg-m, 109 - 238 ft-lb)

CAUTION:
The drive pinion nut is not reusable. Never reuse drive pinion nut.

5. Install propeller shaft. Refer to PR-5, "REAR PROPELLER SHAFT" .

SIDE OIL SEAL

PFP:33142

Removal and Installation

ADS0006Q

REMOVAL

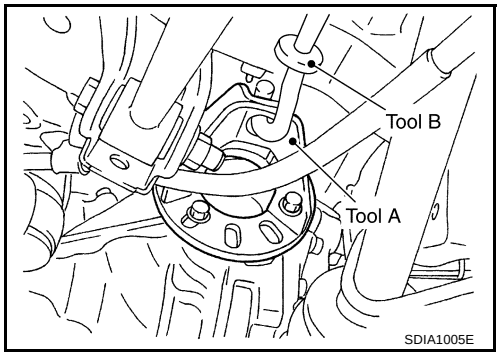
1. Remove side flange with the following procedure for press-fitting.

a. Remove rear ABS wheel sensor. Refer to BRC-42, "WHEEL SENSORS" .

b. Remove drive shaft. Refer to RAX-10, "REAR DRIVE SHAFT" and RAX-6, "WHEEL HUB" .

c. Install axle stand to side flange.

Tool number A : KV40104100 (–)

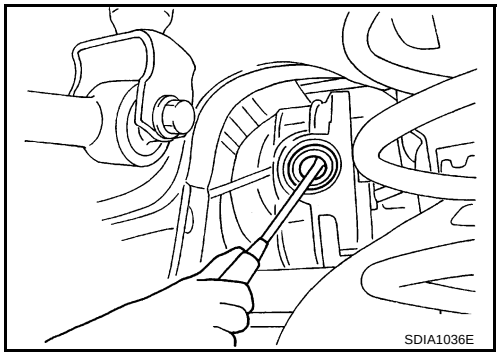


d. Using a sliding hammer, pull out the side flange.

Tool number B : ST36230000 (J25840–A)

Model	Circular clip installation position	
	Right side	Left side
R200	Final drive side	
R200V	Final drive side	Side flange side

2. Remove oil seal using a flat-bladed screwdriver.



INSTALLATION

NOTE:

Be sure to install the RH companion flange of the R200V, then install the LH companion flange. If LH companion flange is installed first, the RH companion flange comes out sometimes from the shock of installing the RH companion flange.

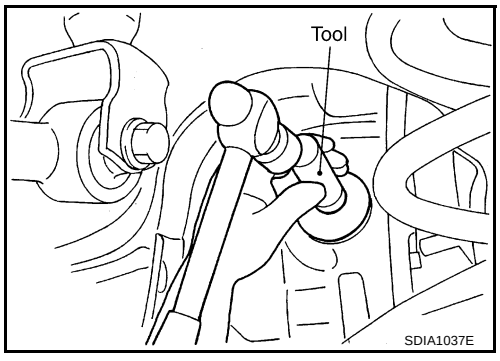
1. Apply multi-purpose grease to sealing lips of side oil seal.

2. Using the drift, press-fit oil seal so that its surface comes face to face with the end surface of the case.

Tool number : KV38100200 (J26233)

CAUTION:

- **When installing the oil seal be careful not to get it inclined.**
- **Discard the old oil seal. Always replace with new one.**

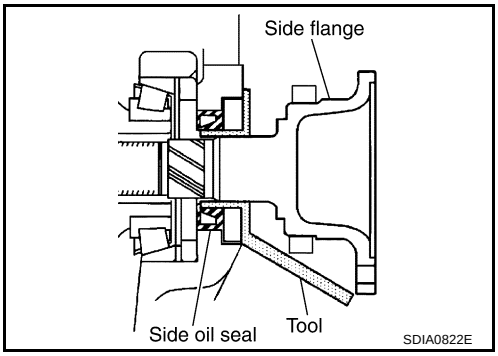


3. Install the side flange with the following procedure.

a. Attach the protector to side oil seal.

Tool number : KV38107900 (J39352)

b. After the side flange is inserted and the serrated part of side gear has engaged the serrated part of flange, remove the protector.



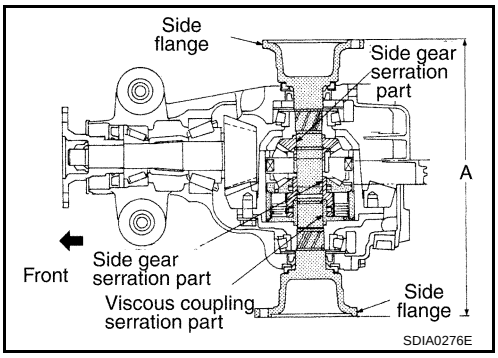
c. Put suitable drift on the center of side flange, then drive it until sound changes.

NOTE:
When installation is completed, driving sound of the side flange turns into a sound which seems to affect the whole final drive.

4. Confirm that the dimension of the side flange installation (Measurement A) in the illustration comes into the following, then install the drive shaft.

Measurement A

: Approx. 326 - 328 mm (12.83 - 12.91 in)



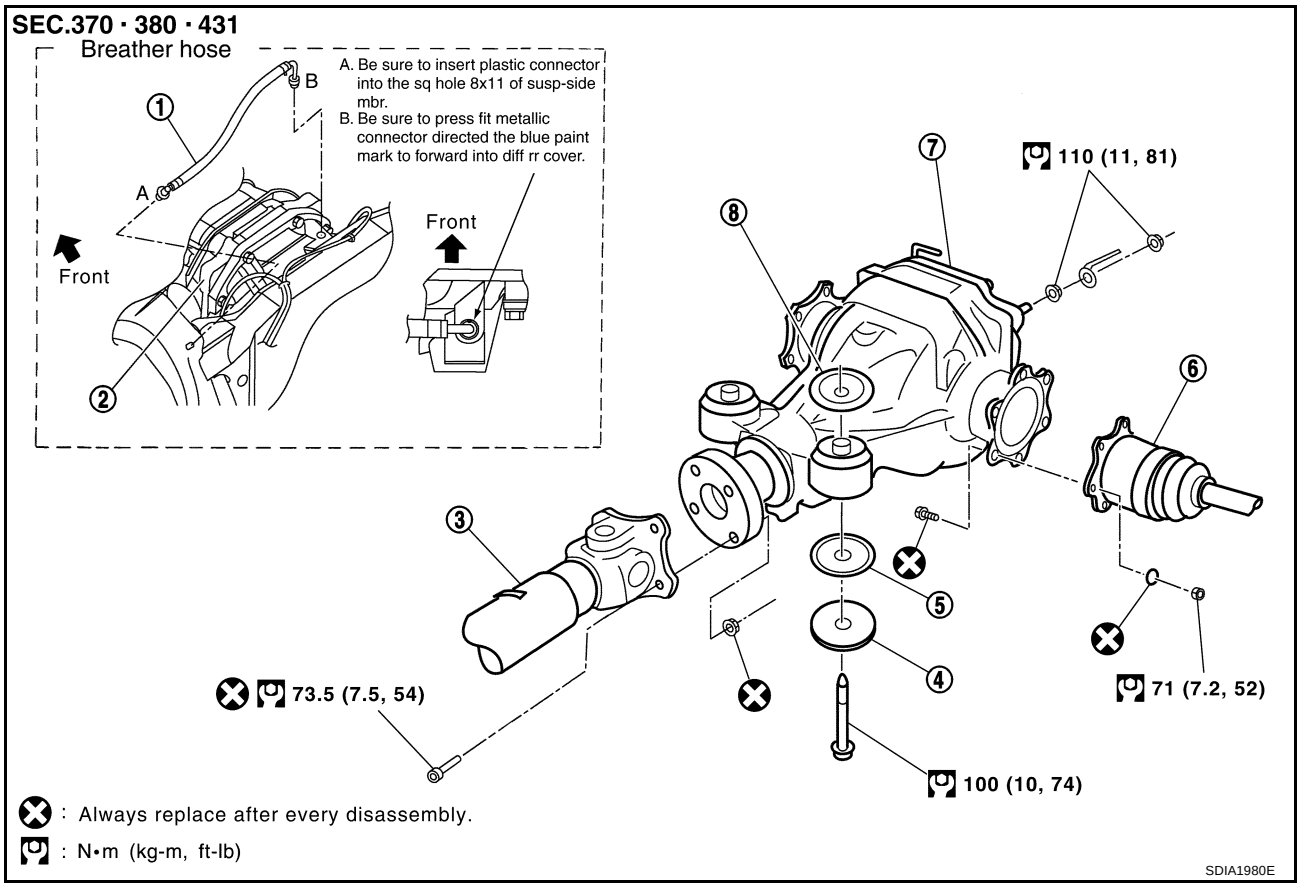
5. Align the installing position of the ABS wheel sensor. Refer to BRC-42, "WHEEL SENSORS" .

REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

ADS0006R



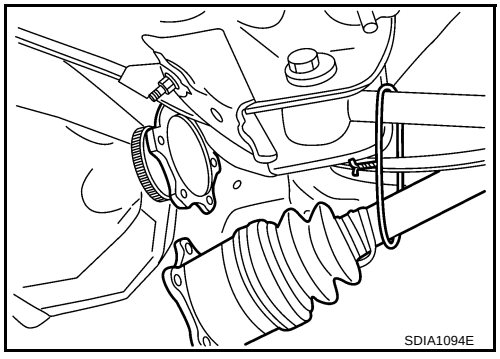
1. Breather hose
2. Final drive
3. Rear propeller shaft
4. Washer
5. Lower stopper
6. Drive shaft
7. Rear final drive assembly
8. Upper stopper

REMOVAL

1. Remove rear propeller shaft from the final drive. Refer to PR-7, "REMOVAL" .

   CAUTION:
   Do not impact or damage propeller shaft tube.
2. Remove rear stabilizer bar with power tool. Refer to RSU-16, "STABILIZER BAR" .
3. Remove drive shaft from final drive. Then suspend it by wire etc. Refer to RAX-10, "REAR DRIVE SHAFT" .
4. Remove breather hose from the final drive.
5. Remove ABS wheel sensor. Refer to BRC-42, "WHEEL SENSORS" .
6. Place a transmission jack on the final drive.

   CAUTION:
   Do not place a transmission jack on the rear cover (aluminum case).
7. Remove the mounting bolts and nuts connecting to the suspension member, and remove the rear final drive.



INSTALLATION

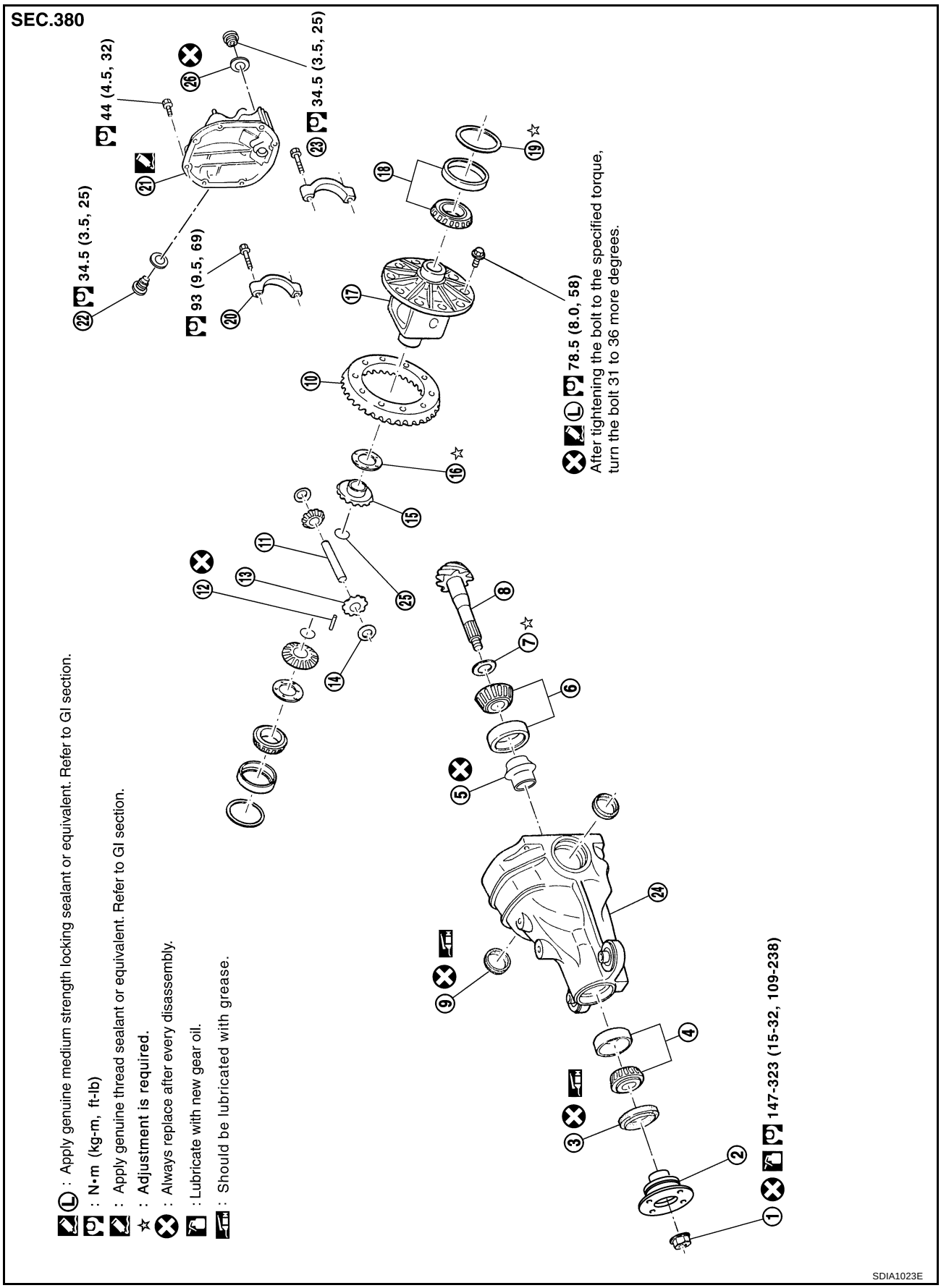
Install in the reverse order of removal.

CAUTION:

After installation, check the final drive oil level. Refer to MA-26, "Changing Differential Gear Oil" .

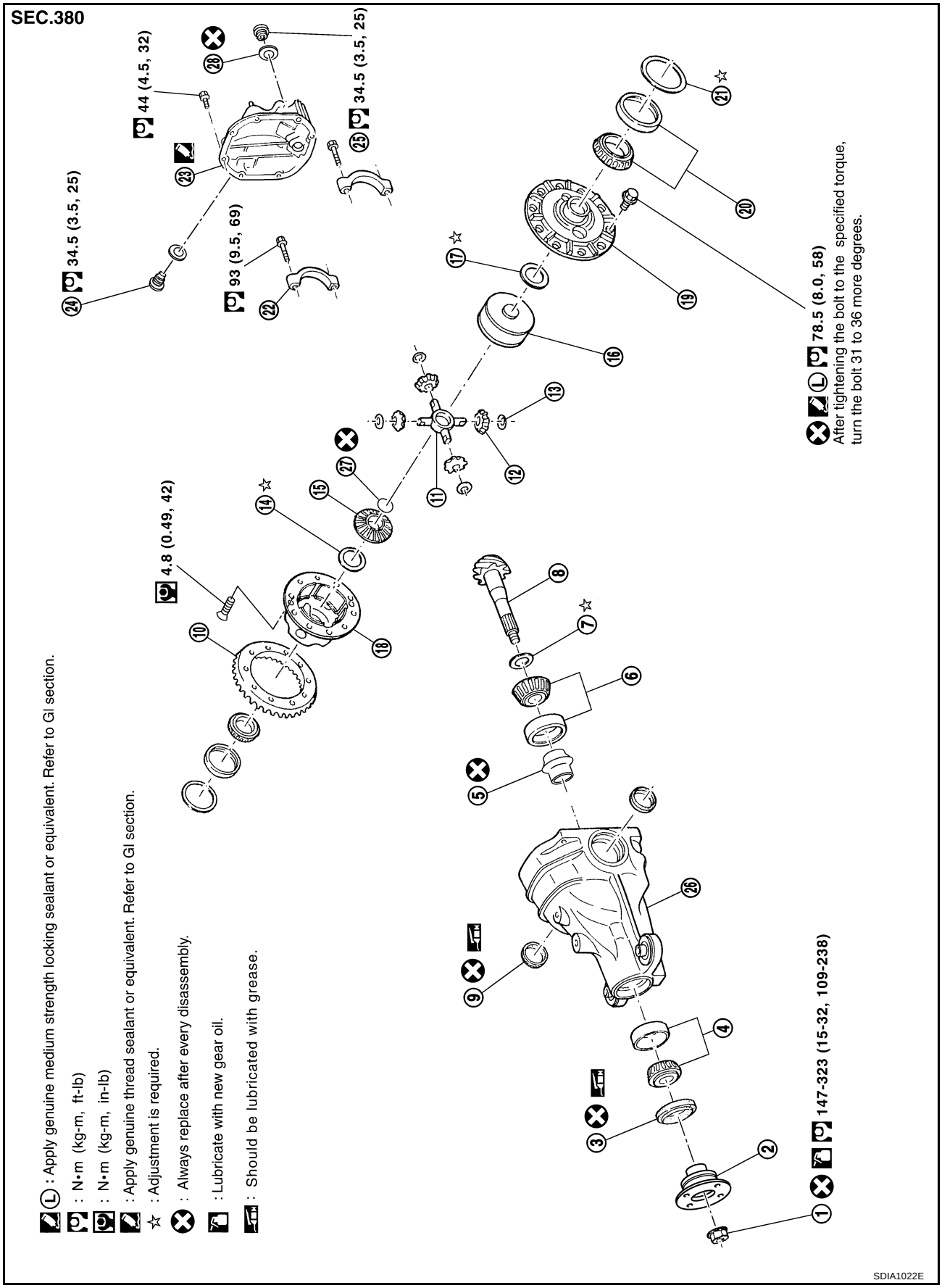
Components
R200 2–PINION

ADS0006S



1. Drive pinion nut
2. Companion flange
3. Front oil seal
4. Pinion front bearing
5. Pinion bearing adjusting spacer (Collapsible spacer)
6. Pinion rear bearing
7. Pinion height adjusting washer
8. Drive pinion
9. Side oil seal
10. Drive gear
11. Pinion mate shaft
12. Look pin
13. Pinion mate gear
14. Pinion mate thrust washer
15. Side gear
16. Side gear thrust washer
17. Differential case
18. Side bearing
19. Side bearing adjusting washer
20. Bearing cap
21. Rear cover
22. Filler plug
23. Drain plug
24. Gear carrier
25. Circular clip
26. Gasket

R200V VISCOUS



1. Drive pinion nut
2. Companion flange
3. Front oil seal
4. Pinion front bearing
5. Pinion bearing adjusting spacer (Collapsible spacer)
6. Pinion rear bearing
7. Pinion height adjusting washer
8. Drive pinion
9. Side oil seal
10. Drive gear
11. Pinion mate shaft
12. Pinion mate gear
13. Pinion mate thrust washer
14. Side gear thrust washer
15. Side gear
16. Viscous coupling
17. Side gear thrust washer
18. Differential case B
19. Differential case A
20. Side bearing
21. Side bearing adjusting washer
22. Bearing cap
23. Rear cover
24. Filler plug
25. Drain plug
26. Gear carrier
27. Circular clip
28. Gasket

Pre-Inspection

ADS0006T

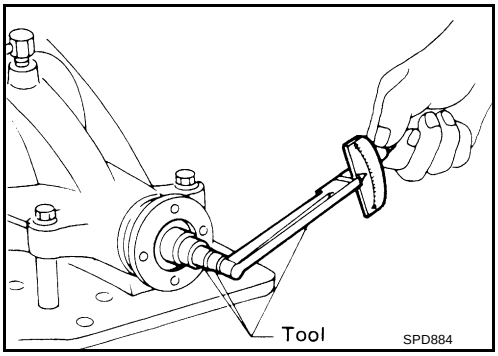
Before disassembling final drive, perform the following inspection.

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)

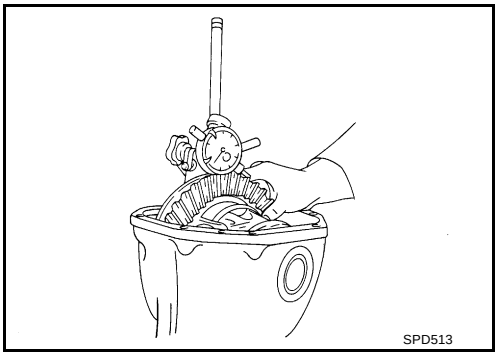
Total preload
: 2.84 - 3.75 N·m (0.29 - 0.38 kg-m, 26 - 33 in-lb)



DRIVE GEAR TO DRIVE PINION BACKLASH

Check drive gear to drive pinion backlash with a dial gauge at several points.

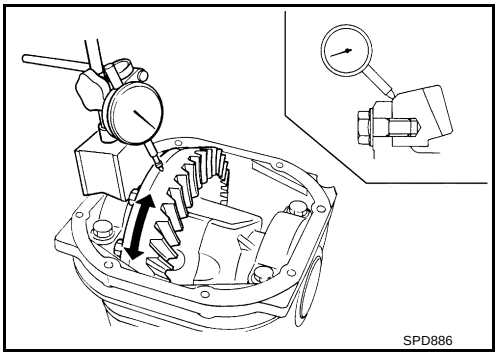
Drive gear backlash
: 0.10 - 0.15 mm (0.0039 - 0.0059 in)



DRIVE GEAR RUNOUT

Check runout of drive gear with a dial gauge.

Runout limit : 0.05 mm (0.0020 in) less



TOOTH CONTACT

Check tooth contact. Refer to RFD-27, "TOOTH CONTACT" .

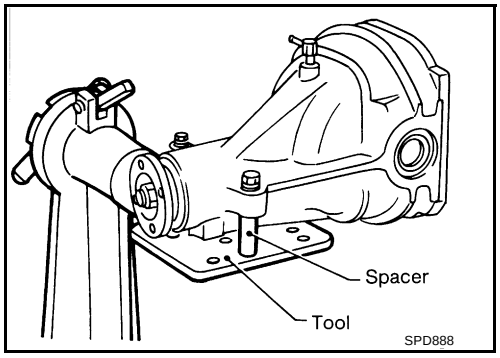
Disassembly and Assembly

ADS0006U

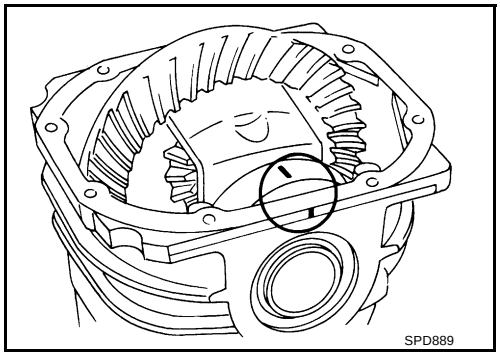
REMOVAL OF DIFFERENTIAL CASE ASSEMBLY

1. Using two 45 mm (1.77 in) spacers, mount carrier on Tool.

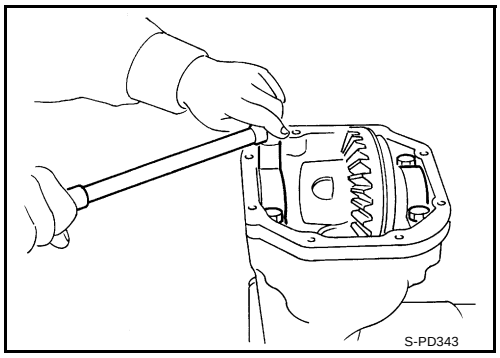
   Tool number : KV38100800 (J25604–01)



2. For proper reinstallation, paint match marks on one side of the bearing cap.
   Bearing caps are line-board during manufacture. Replace them in their proper positions.

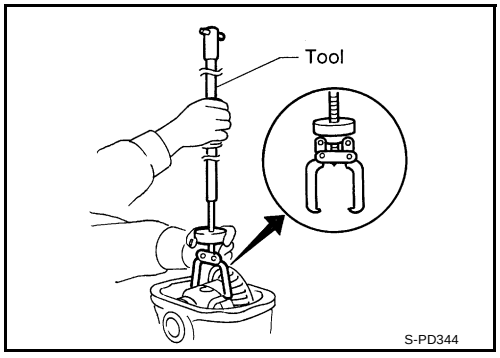


3. Remove bearing caps.

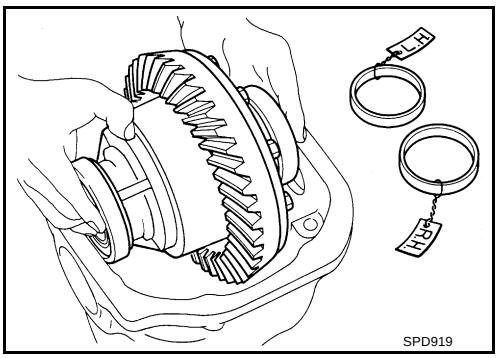


4. Lift differential case assembly out with Tool.

   Tool number : HT72400000 (–)



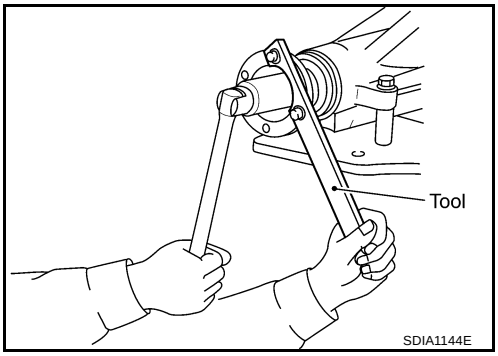
- Keep the side bearing outer races together with inner races. Do not mix them up.
  Also, keep adjusting washers together with bearings.



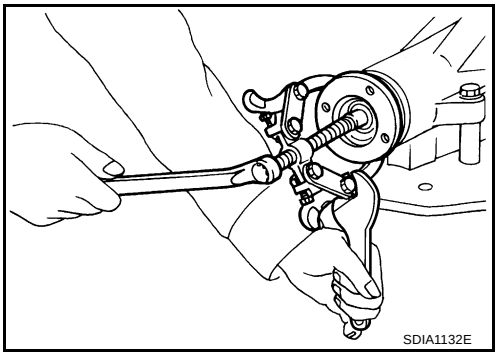
REMOVAL OF DRIVE PINION ASSEMBLY

1. Put match marks on companion flange and drive pinion with paint.
2. Loosen drive pinion nut with tool.

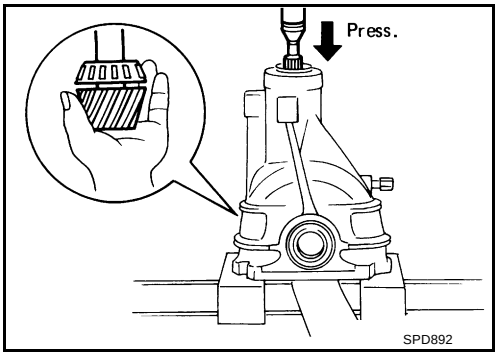
   Tool number : KV40104000 (–)



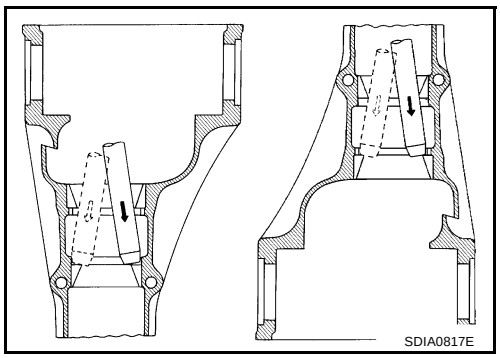
3. Using the puller remove companion flange.



4. Take out drive pinion (together with rear bearing inner race, bearing adjusting spacer).
5. Remove front oil seal. Refer to RFD-6, "FRONT OIL SEAL"
6. Remove pinion front bearing inner race.
7. Remove side oil seal. Refer to RFD-8, "SIDE OIL SEAL"

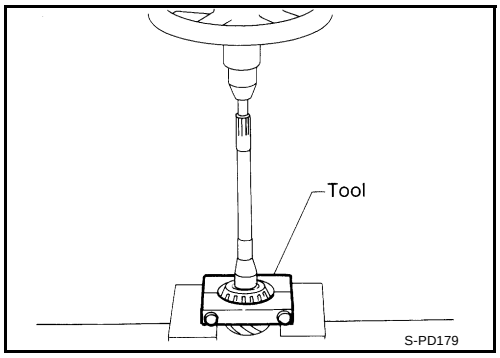


8. Remove pinion bearing outer races with a brass drift.



9. Remove pinion rear bearing inner race and drive pinion height adjusting washer with Tool.

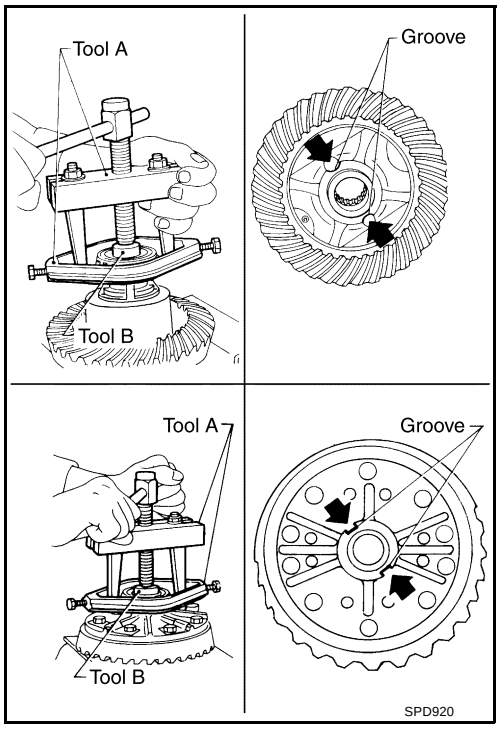
Tool number: : ST30031000 (J22912-01)



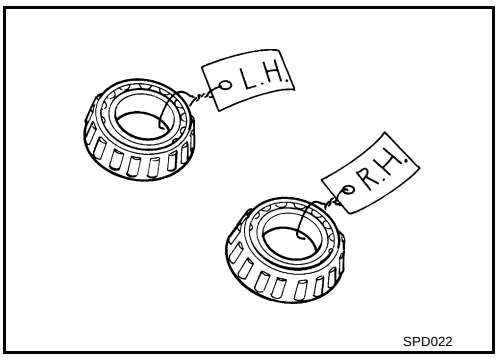
DISASSEMBLY OF DIFFERENTIAL CASE ASSEMBLY (R200 2–PINION)

1. Remove side bearing inner races.
   To prevent damage to bearing, engage puller jaws in groove.

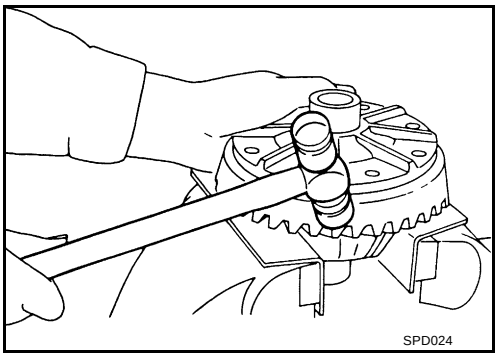
Tool number : A ST3305S001 (–)
: B ST33061000 (J8107-2)



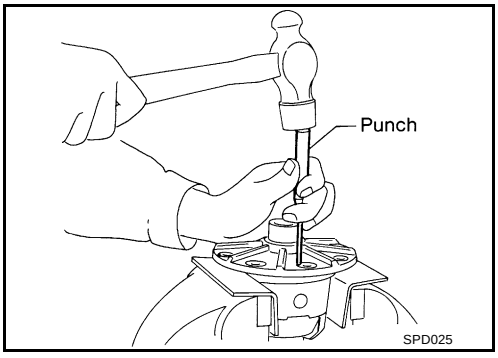
- Be careful not to confuse left- and right-hand parts.



2. Loosen drive gear bolts in a criss-cross fashion.
3. Tap drive gear off the differential case with a soft hammer.
   - Tap evenly all around to keep drive gear from binding.



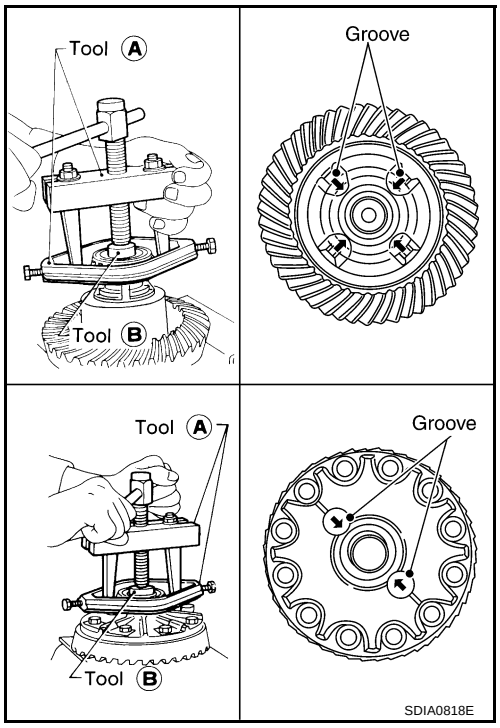
4. Drive out pinion mate shaft lock pin with punch from drive gear side.



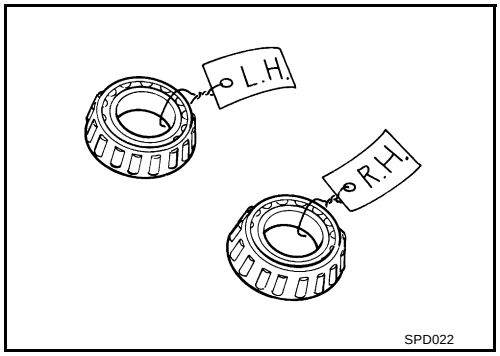
DISASSEMBLY OF DIFFERENTIAL CASE ASSEMBLY(R200V)

1. Remove side bearing inner race.
   To prevent damage to bearing, engage puller jaws in groove.

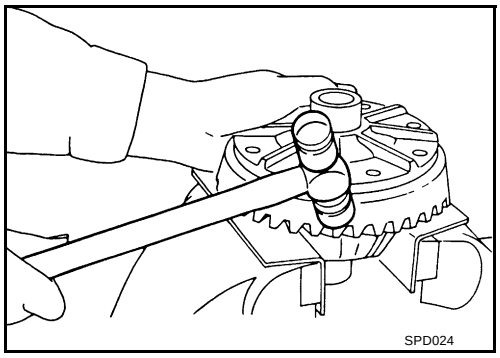
   Tool number : A ST3305S001 (–)
   : B ST33061000 (J8107-2)



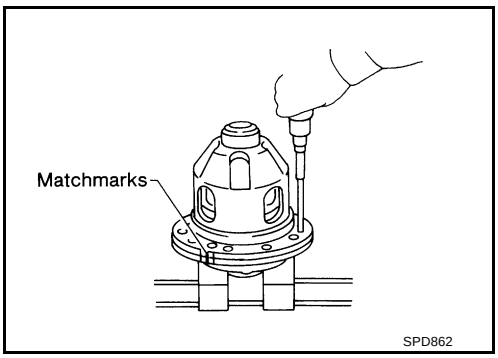
- Be careful not to confuse left- and right-hand parts.



2. Loosen drive gear bolts in a criss-cross fashion.
3. Tap ring gear off the differential case with a soft hammer.
   - Tap evenly all around to keep drive gear from binding.



4. Put match marks with paint
5. Loosen screws on differential cases A and B.
6. Separate differential cases A and B.



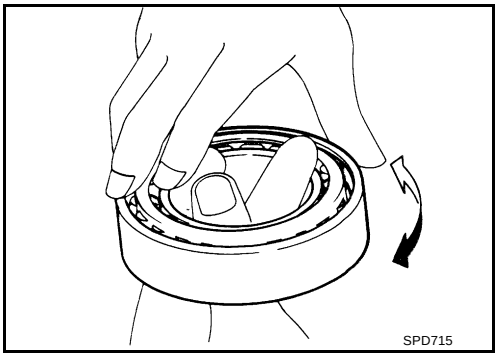
INSPECTION

Contact Surfaces

1. Clean the disassembled parts in suitable solvent and blow dry with compressed air.
2. If following surfaces are found to be burred or scratched, smooth with oil stone.
   - Differential case
   - Side gear
   - Pinion mate gear
   - Pinion mate shaft

Bearing

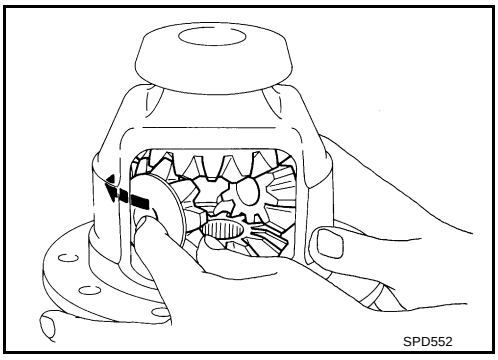
1. Thoroughly clean bearing.
2. Check bearings for wear, scratches, pitting or flaking.
   Check tapered roller bearing for smooth rotation. If damaged, replace outer race and inner race as a set.



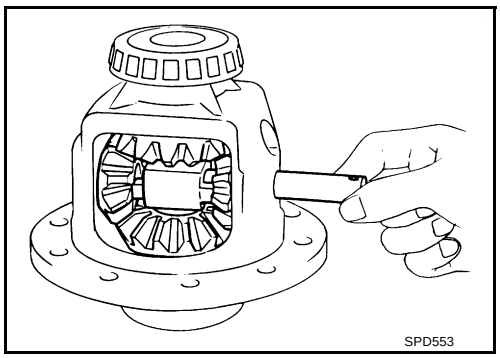
ADJUSTMENT OF DIFFERENTIAL CASE (R200 2–PINION)

Thrust Washer Selection

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



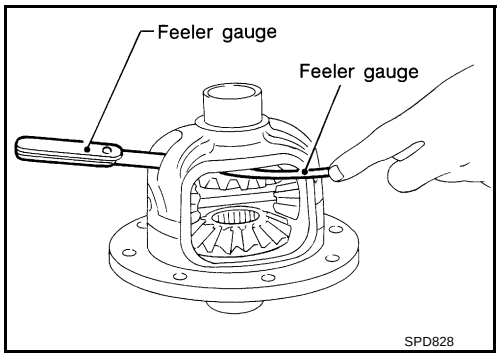
2. Fit pinion mate shaft to differential case so that it meets lock pin holes.



3. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer. Refer to RFD-34, "AVAILABLE SIDE GEAR THRUST WASHERS" .
Use two feeler gauges to prevent leaning of side gear as shown, figure.

Clearance between side gear thrust washer and differential case

: 0.20 mm (0.0079 in) less

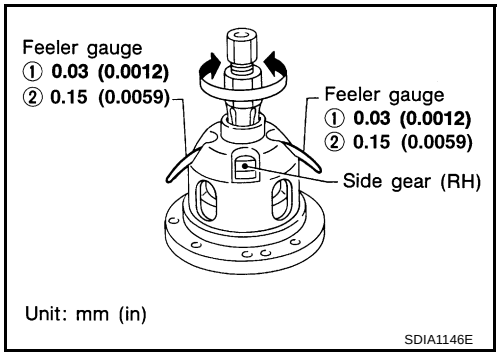


ADJUSTMENT OF DIFFERENTIAL CASE (R200V)

Side gear Thrust Washer Selection

Whenever side gears or pinion mate gears are replaced, select suitable thrust washers as follows:

1. Clean side gears and pinion mate gears using white gasoline.
2. Before assembling gears, apply hypoid gear oil to frictional surfaces.
3. Install the previously removed thrust washer on right side gear. On left side gear, install a suitable thrust washer. Temporarily tighten differential cases using two screws.
4. Position differential assembly so that right side gear is on the upper side. Place feeler gauge of 0.03 mm (0.0012 in) thickness between right side gear and thrust washer as shown.



- Do not place feeler gauge at groove side of differential case.

5. Also place a 0.03 mm (0.0012 in) additional feeler gauge between right side gear and thrust washer so that it is positioned diagonal to (180° apart from) the feeler gauge described previously.
6. Rotate right side gear with a suitable tool attached to splines. If hard to rotate, replace thrust washer on left side gear with a thinner one.
7. Replace both 0.03 mm (0.0012 in) feeler gauges with 0.15 mm (0.0059 in) gauges. At this point, make sure right side gear does not rotate. If it rotates, replace thrust washer on left side gear with a thicker one to prevent rotation.
8. As explained in above example, select suitable thrust washers to ensure that:

a. Both side gears rotate. [0.03 mm (0.0012 in) feeler gauges are used in this case.]
b. Side gear is held stationary. [0.15 mm (0.0059 in) feeler gauges are used in this case.]

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

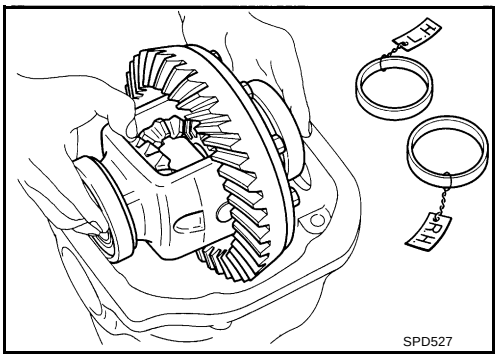
1. Side bearing preload
2. Pinion gear height
3. Pinion bearing preload
4. Drive gear to pinion backlash.

5. Drive and pinion gear tooth contact pattern

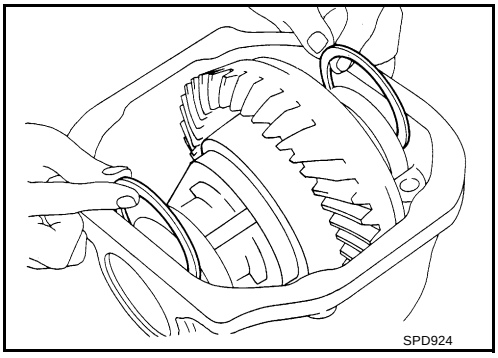
SIDE BEARING PRELOAD

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

1. Make sure all parts are clean. Also, make sure the bearings are well lubricated with light oil or DEXRON™ type automatic transmission fluid.
2. Place the differential case assembly, with side bearing outer races installed, gear carrier.



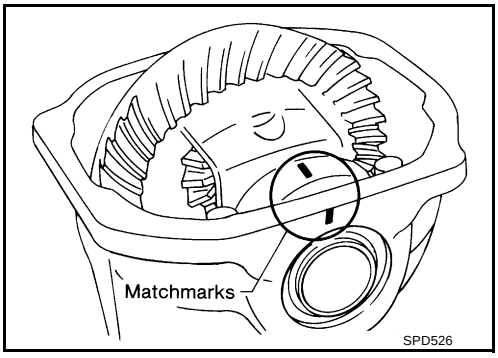
3. Insert left and right side bearing adjusting washer in place between side bearings and gear carrier.



4. Install the bearing caps in their correct locations and torque the bearing cap retaining bolts.

   : 93 N·m (9.5 kg-m, 69 ft-lb)

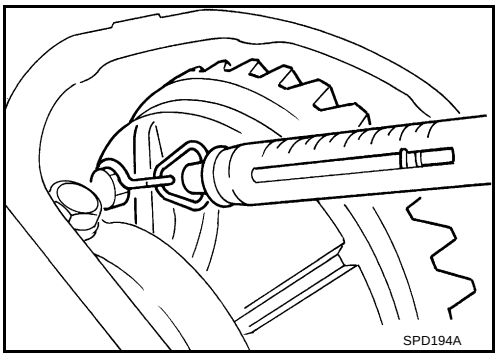
5. Turn the carrier several times to seat the bearings.



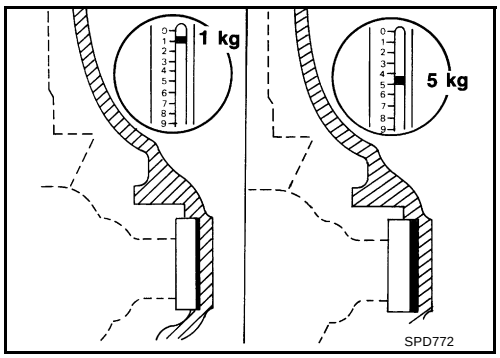
6. Measure the turning torque of the carrier at the drive gear retaining bolts with a spring gauge, J-8129.

   Specification

   : 34.2 - 39.2 N (3.5 - 4 kg, 7.7 - 8.8 lb)
   of pulling force at the drive gear bolt

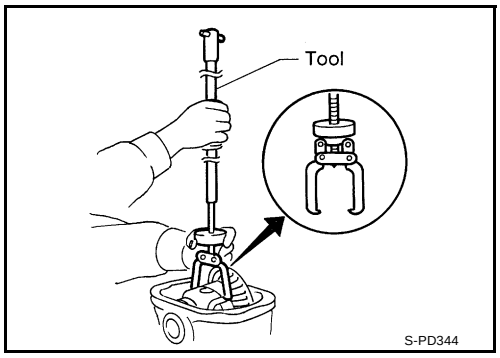


7. If the turning torque is not within the specifications, correct the torque as follows:
   - If the turning torque is less than the specified range, install washers of greater thickness.
   - If the turning torque is greater than the specification, install thinner washers.
   - See the SDS section for washer dimensions and part numbers.
8. Record the total amount of washer thickness required for the correct carrier side bearing preload.



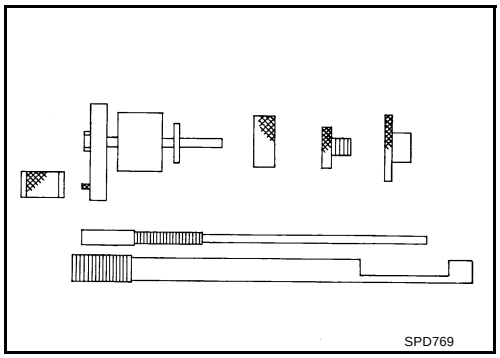
9. Remove the carrier from the final drive housing. Save the selected washers for later use during the assembly of the final drive unit.

Tool number : HT72400000 (–)

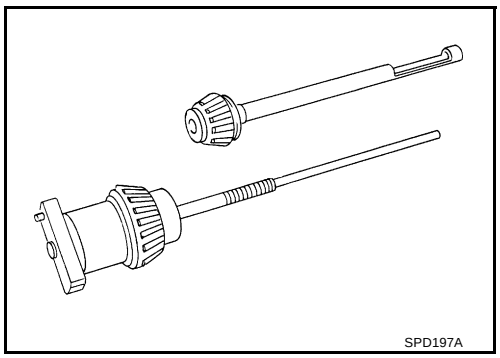


PINION GEAR HEIGHT

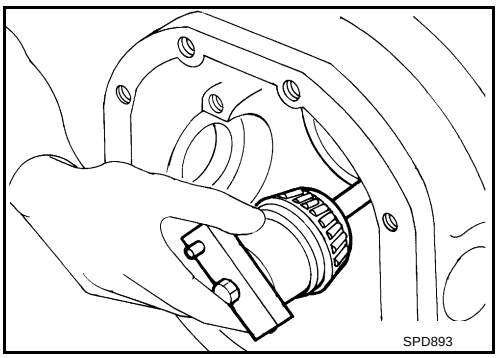
1. Make sure all parts are clean and that the bearings are well lubricated.
2. Assemble the pinion bearings into the differential shim selection Tool, J34309.



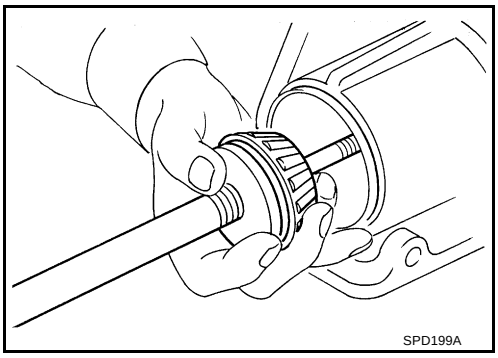
- Pinion front bearing; make sure the J34309-3 pinion front bearing seat is secured tightly against the J34309-2 gauge anvil. Then turn the pinion front bearing pilot, J34309-5, to secure the bearing in its proper position.
- Rear pinion bearing; the pinion rear bearing pilot, J34309-8, is used to center the pinion rear bearing only. The pinion rear bearing locking seat, J34309-4, is used to lock the bearing to the assembly.
- Installation of J34309-9 and J34309-16; place a suitable 2.5 mm (0.098 in) thick plain washer between J34309-9 and J34309-16. Both surfaces of J34309-9 and J34309-16 must be parallel with a clearance of 2.5 mm (0.098 in).



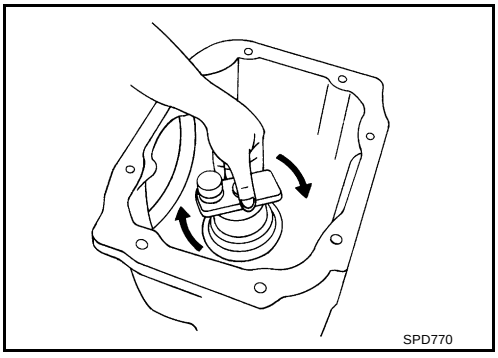
3. Install the pinion rear bearing inner race into the final drive housing. Then place the pinion preload shim selector Tool, J34309-1, gauge screw assembly.



4. Assemble the front pinion bearing inner race and the J34309-2 gauge anvil. Assemble them 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. Tighten the two sections together by hand.



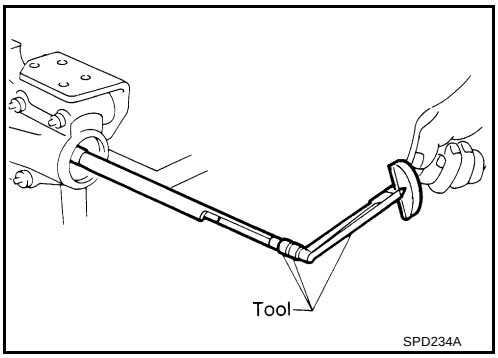
5. Turn the assembly several times to seat the bearings.



6. Measure the turning torque at the end of the J34309-2 gauge anvil using torque wrench J-25765A.

Turning torque specification

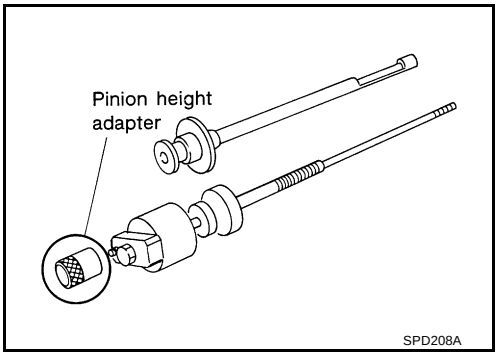
: 1.0 - 1.3 N·m(0.11 - 0.13 kg-m, 9 - 11 in-lb)



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

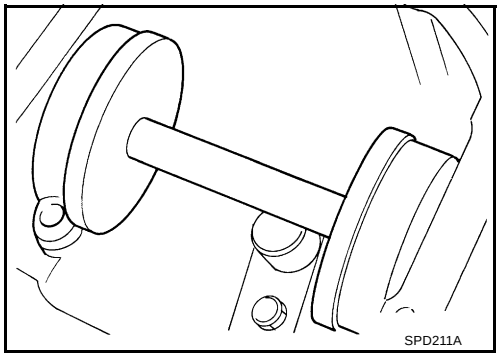
CAUTION:

Make sure all machined surfaces are clean.

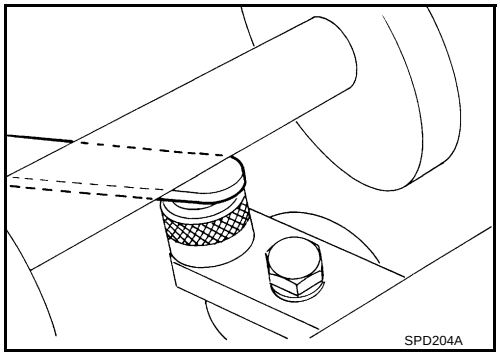


Pinion Height Adjusting Washer Selection

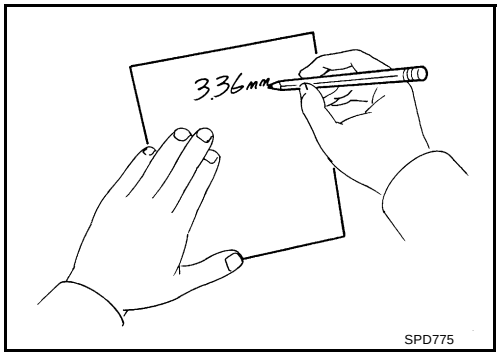
1. Now, position the side bearing discs, J25269-4, and arbor firmly into the side bearing bores. Install the bearing caps and tighten the cap bolts to proper torque.



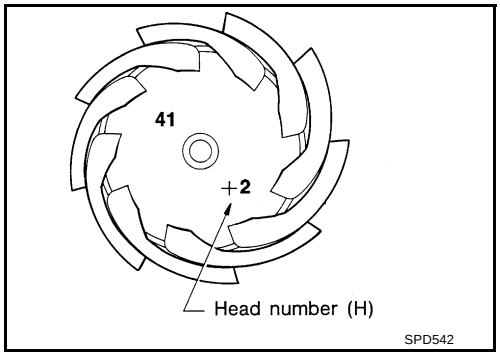
2. Select the correct standard pinion height adjusting washer thickness. Select by using a standard gauge of 3 mm (0.12 in) and your J34309-101 feeler gauge. Measure the distance between the J34309-11 pinion height adapter including the standard gauge and the arbor.



3. Write down your exact measurement (the value of feeler gauge).



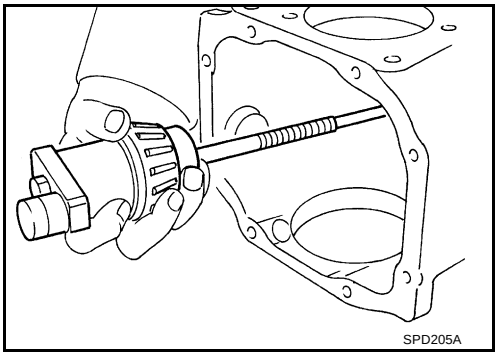
4. Correct the pinion height washer size by referring to the “pinion head number”.



There are two numbers painted on the drive pinion gear. The first one refers to the drive pinion and drive gear as a matched set. This number should be the same as the number on the drive gear. The second number is the “pinion head height number”. It refers to the ideal pinion height from standard for quietest operation. 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)

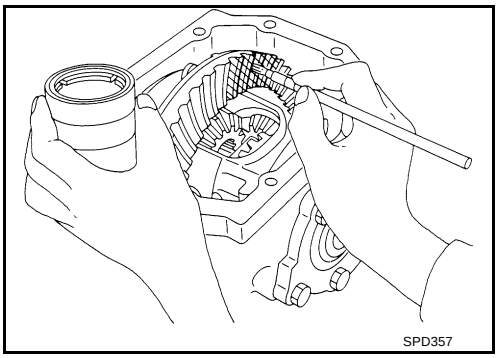
5. Select the correct pinion height washer as follows. Refer to RFD-35, "AVAILABLE PINION HEIGHT ADJUSTING WASHERS" .
6. Remove the J34309 pinion differential shim selection Tool from the final drive housing. Then disassemble to retrieve the pinion bearings.


SPD205A

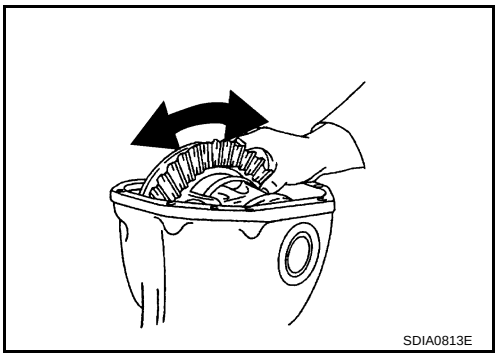
TOOTH CONTACT

Checking gear tooth contact pattern is necessary to verify correct relationship between drive gear and drive pinion.
Hypoid gears which are not positioned in proper arrangement may be noisy and/or have a short life. Check gear tooth contact pattern to obtain the best contact for low noise and long life.

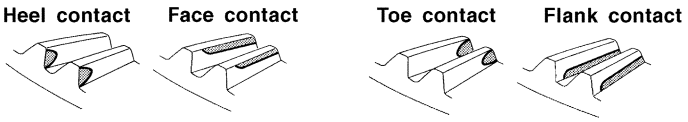
1. Thoroughly clean drive gear and drive pinion teeth.
2. Lightly apply a mixture of powdered ferric oxide and oil or the equivalent. Apply it to 3 or 4 teeth of drive gear drive side.


SPD357

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

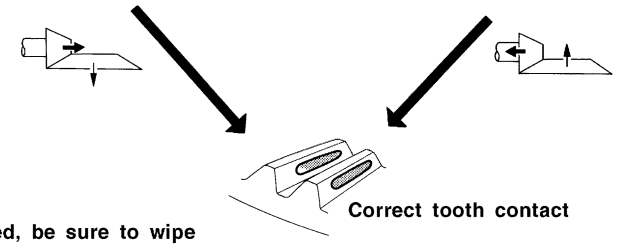

SDIA0813E

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.



To correct, increase thickness of pinion height adjusting washer in order to bring drive pinion close to Drive gear.

To correct, reduce thickness of pinion height adjusting washer in order to make drive pinion go away from Drive gear.



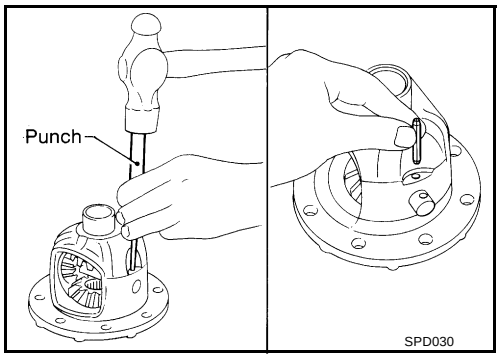
Correct tooth contact

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

SDIA1910E

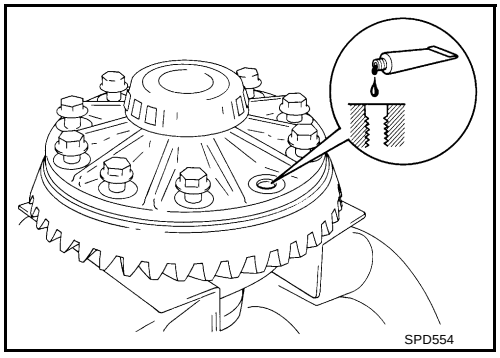
ASSEMBLY OF DIFFERENTIAL CASE ASSEMBLY (R200 2–PINION)

1. Install pinion mate shaft lock pin with a punch.
   Make sure lock pin is flush with case.



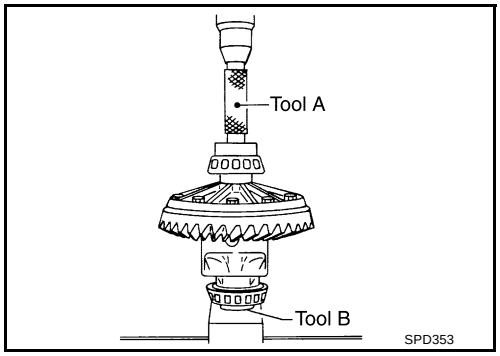
2. Place differential case on drive gear.
3. Apply genuine medium strength locking sealant or equivalent. Refer to GI-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" to drive gear bolts, and install them.

- Tighten bolts in a criss-cross fashion.
- After tightening the bolt to the specified torque, turn the bolt 31 to 36 more degrees.



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

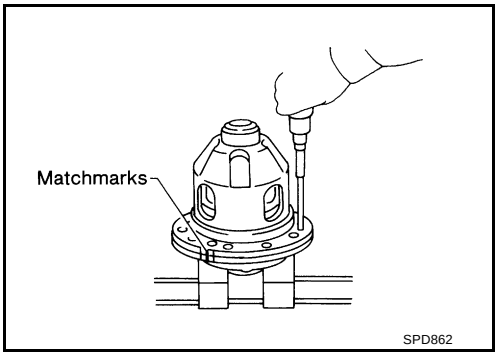
Tool number : A KV38100300 (J25523)
: B ST33061000 (J8107-2)



ASSEMBLY OF DIFFERENTIAL CASE ASSEMBLY (R200V)

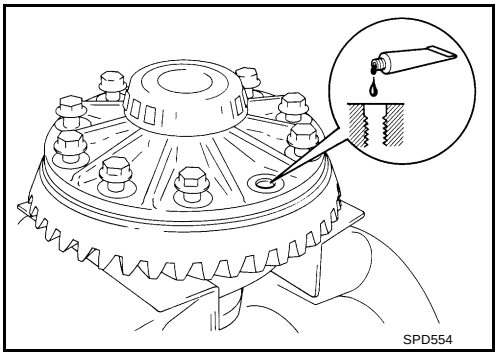
1. Install differential cases A and B.

: 4.8 N·m(0.49 kg-m, 42 in-lb)



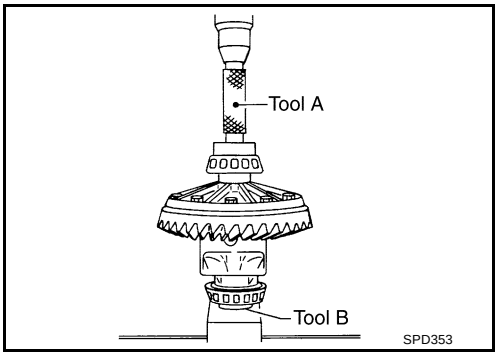
2. Place differential case on drive gear.
3. Apply genuine medium strength locking sealant or equivalent. Refer to GI-47, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" to drive gear bolts, and install them.

- Tighten bolts in a criss-cross fashion.
- After tightening the bolt to the specified torque, turn the bolt 31 to 36 more degrees.



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

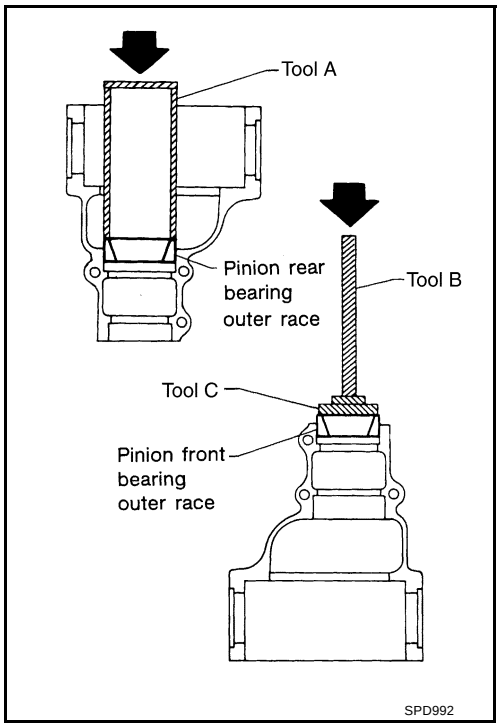
Tool number : A KV38100300 (J25523)
: B ST33061000 (J8107-2)



INSTALLATION OF DRIVE PINION ASSEMBLY

1. Press-fit pinion front and rear bearing outer races with Tools.

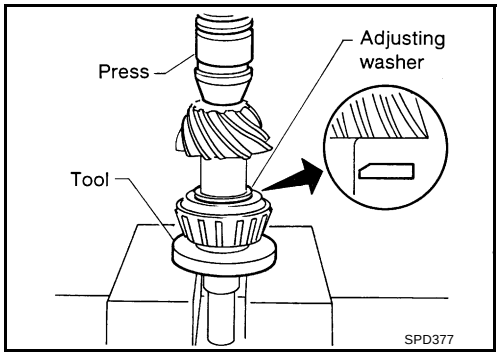
Tool number : A Suitable tool
: B ST30611000 (J25742-1)
: C ST30613000 (J25742-3)



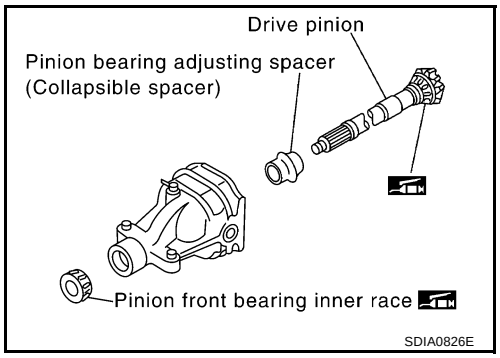
2. Select pinion height adjusting washer. Refer to RFD-26, "Pinion Height Adjusting Washer Selection" .

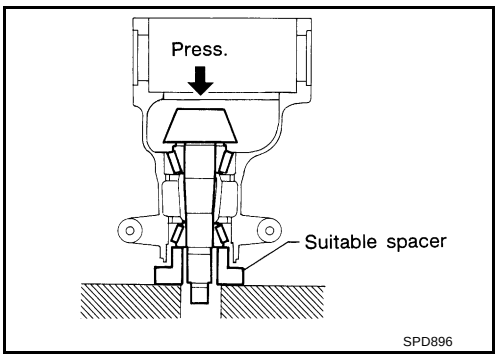
3. Install selected pinion height adjusting washer in drive pinion. Using press and Tool, press-fit pinion rear bearing inner race into it.

Tool number : ST30901000 (–)



4. Set drive pinion assembly (as shown in figure) in differential carrier and install drive pinion, with press and suitable tool.
Stop when drive pinion touches bearing.
Apply multi-purpose grease to pinion rear bearing inner race and pinion front bearing inner race.



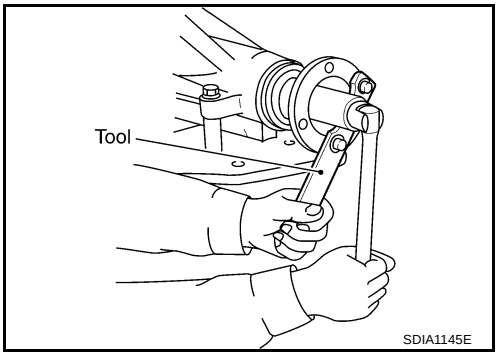


5. Install front oil seal with Tool. Refer toRFD-6, "Removal and Installation" .

6. Install companion flange, and tighten pinion nut to minimum. Ascertain that threaded portion of drive pinion and drive pinion nut are free from oil or grease.

Tool number : KV40104000 (–)

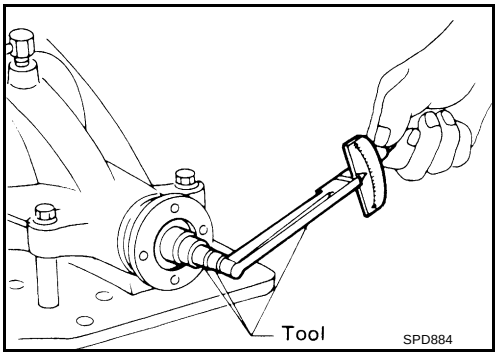
CAUTION:
The drive pinion nut is not reusable. Never reuse drive pinion nut.



7. Tighten the drive pinion nut by very small degrees until the specified preload in achieved, when checking the preload, turn drive pinion in both directions several times.

Tool number
: ST3127S000 (J25765-A)

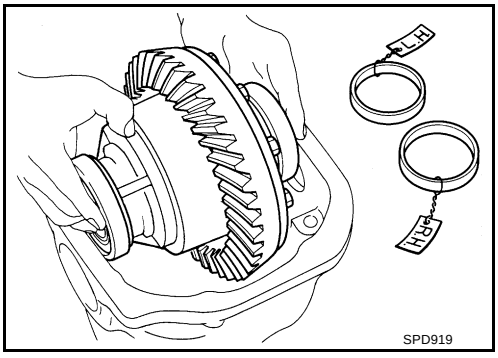
Pinion bearing preload
: 2.65 - 3.23 N·m (0.27 - 0.32 kg-m, 24 - 28 in-lb)



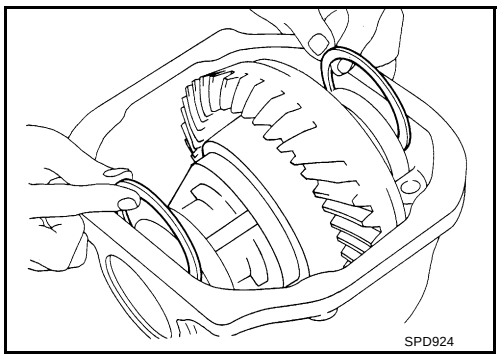
- If pinion bearing preload is too small, tighten the drive pinion nut more.
- If pinion bearing preload is too great, replace pinion bearing adjusting spacer.

INSTALLATION OF DIFFERENTIAL CASE ASSEMBLY

1. Select side bearing adjusting washer. Refer to RFD-23, "SIDE BEARING PRELOAD" .
2. Install differential case assembly with side bearing outer races into gear carrier.

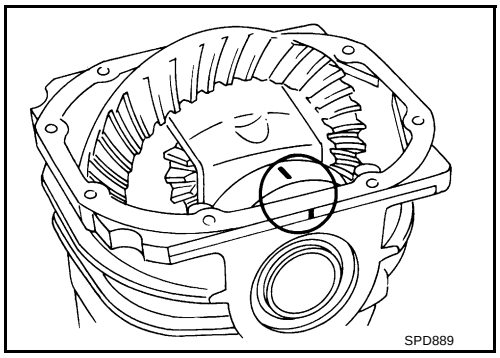


3. Insert left and right side bearing adjusting washers in place between side bearings and carrier.



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

   : **93 N·m (9.5 kg-m, 69 fl-lb)**

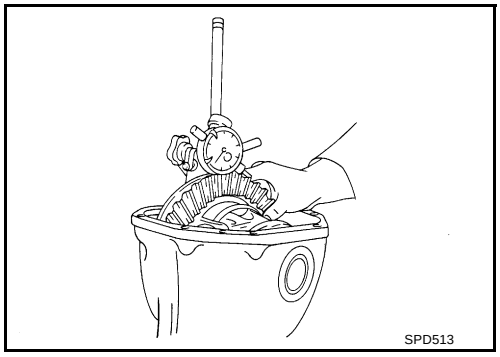


5. Install side oil seal. Refer to RFD-8, "Removal and Installation" .

6. Measure drive gear-to-drive pinion backlash with a dial indicator at several point.

   Drive gear backlash

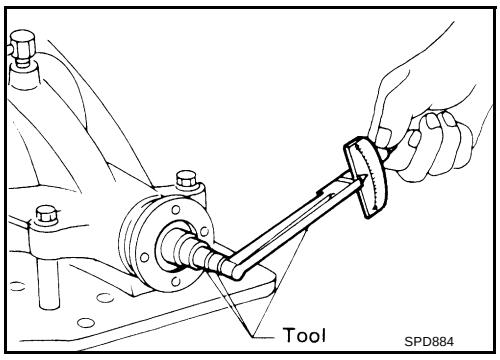
   : 0.10 - 0.15 mm (0.0039 - 0.0059 in) less



- It backlash is too small, adjustment of washer thickness is required. Decrease thickness of left shim and increase thickness of right by the same amount.
  If backlash is too great, reverse the above procedure.
- Never change the total amount of washers as it will change the bearing preload.

7. Check total preload with Tool.

   Tool number : ST3127S000 (J25765-A)



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

Total preload : 2.84 - 3.75 N·m (0.29 - 0.38 kg-m, 26 - 33 in-lb)

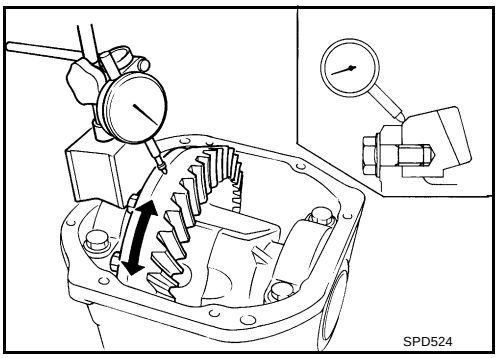
- If preload is too great, remove the same amount of washer to each side.
- If preload is too small, add the same amount of washer to each side.
  Never add or remove a different number of washers for each side. Difference in number of washers will change drive gear to drive pinion backlash.

8. Recheck drive gear to drive pinion backlash. Increase or decrease in thickness of shims will cause change to drive gear to pinion backlash.

- Check whether the backlash varies excessively in different places. Foreign matter may be caught between the drive gear and the differential case causing the trouble.
- The backlash can vary greatly even when the drive gear runout is within a specified range. In that case, replace the hypoid gear set or differential case.

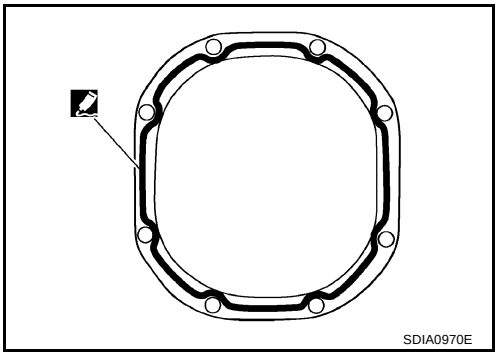
9. Check runout of drive gear with a dial indicator.

Runout limit : 0.05 mm (0.0020 in) less



10. Check tooth contact.
    Refer to RFD-27, "TOOTH CONTACT" .

11. Install rear cover. Apply sealant to rear cover side and install gear carrier.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS0008B

Applied model	VQ35DE engine	
	M / T	A / T
Final drive model	R200 (2 – pinion) / R200V (LSD)	
Gear ratio	3.538	3.357
Number of teeth (Drive gear / drive pinion)	46 / 13	47 / 14
Oil capacity (Approx.)	1.4 liter (3 US pt, 2 - 1/2 Imp pt)	

Drive Gear Runout

ADS0008C

Unit: mm (in)

Type	R200, R200V
Drive gear runout limit	0.05 (0.0020) less

Side Gear Adjustment

ADS0008H

Unit: mm (in)

Type	R200	R200V
Clearance limit between side gear and differential case mm (in)	0.20 (0.0079) less	0.15 (0.0059) less

AVAILABLE SIDE GEAR THRUST WASHERS

Unit: mm (in)

Type	R200		R200V	
	Thickness	Part number	Thickness	Part number
Thrust washer	0.75 (0.0295)	38424 0C000	0.80 (0.0315)	38424 40F60
	0.78 (0.0307)	38424 0C001	0.83 (0.0327)	38424 40F61
	0.81 (0.0319)	38424 0C002	0.86 (0.0339)	38424 40F62
	0.84 (0.0331)	38424 0C003	0.89 (0.0350)	38424 40F63
	0.87 (0.0343)	38424 0C004	0.92 (0.0362)	38424 40F64
	0.90 (0.0350)	38424 0C005	0.95 (0.0374)	38424 40F65
	0.93 (0.0366)	38424 0C006	0.98 (0.0386)	38424 40F66
			1.01 (0.0398)	38424 40F67
			1.04 (0.0409)	38424 40F68
			1.07 (0.0421)	38424 40F69
			1.10 (0.0433)	38424 40F70
			1.13 (0.0445)	38424 40F71
			1.16 (0.0457)	38424 40F72
			1.19 (0.0469)	38424 40F73
			1.22 (0.0480)	38424 40F74
			1.25 (0.0492)	38424 40F75
			1.28 (0.0504)	38424 40F76
			1.31 (0.0516)	38424 40F77
			1.34 (0.0528)	38424 40F78
			1.37 (0.0539)	38424 40F79
			1.40 (0.0551)	38424 40F80
			1.43 (0.0563)	38424 40F81
			1.46 (0.0575)	38424 40F82
			1.49 (0.0587)	38424 40F83

Drive Pinion Height Adjustment

ADS0008J

AVAILABLE PINION HEIGHT ADJUSTING WASHERS

Unit: mm (in)

Type	R200, R200V			
	Thickness	Part number	Thickness	Part number
Adjusting washer	3.05 (0.1201)	38154 0C000	3.35 (0.1319)	38154 0C010
	3.08 (0.1213)	38154 0C001	3.38 (0.1331)	38154 0C011
	3.11 (0.1224)	38154 0C002	3.41 (0.1343)	38154 0C012
	3.14 (0.1236)	38154 0C003	3.44 (0.1354)	38154 0C013
	3.17 (0.1248)	38154 0C004	3.47 (0.1366)	38154 0C014
	3.20 (0.1260)	38154 0C005	3.50(0.1378)	38154 0C015
	3.23 (0.1272)	38154 0C006		
	3.26 (0.1283)	38154 0C007		
	3.29 (0.1295)	38154 0C008		
	3.32 (0.1307)	38154 0C009		

Drive Pinion Preload Adjustment

ADS0008K

Type	R200, R200V
Drive pinion preload	2.65 – 3.23 N·m (0.27 – 0.32 kg–m, 24 – 28 in lb)

Side Bearing Preload Adjustment

ADS0008L

Type	R200, R200V
Side bearing preload <Reference value>	0.20 – 0.52 N·m (0.02 – 0.05 kg–m, 2 – 4 in lb)
Torque by spring gauge	34.2 – 39.2 N (3.5 – 4 kg, 7.7 – 8.8 lb)

SIDE BEARING ADJUSTING WASHERS

Unit: mm (in)

Type	R200, R200V			
	Thickness	Part number	Thickness	Part number
Adjusting washer	2.00 (0.0787)	38453 N3100	2.35 (0.0925)	38453 N3107
	2.05 (0.0807)	38453 N3101	2.40 (0.0945)	38453 N3108
	2.10 (0.0827)	38453 N3102	2.45 (0.0965)	38453 N3109
	2.15 (0.0846)	38453 N3103	2.50 (0.0984)	38453 N3110
	2.20 (0.0866)	38453 N3104	2.55 (0.1004)	38453 N3111
	2.25 (0.0886)	38453 N3105	2.60 (0.1024)	38453 N3112
	2.30 (0.0906)	38453 N3106	2.65 (0.1043)	38453 N3113

Total Preload Adjustment

ADS0008M

Type	R200, R200V
Total preload with oil seal	2.84 – 3.75 N·m (0.29 – 0.38 kg–m, 26 – 33 in lb)
Drive gear to drive pinion backlash	0.10 – 0.15 mm (0.0039 – 0.0059 in)