

PROPELLER SHAFT AND AXLE

SECTION 4B
REAR AXLE

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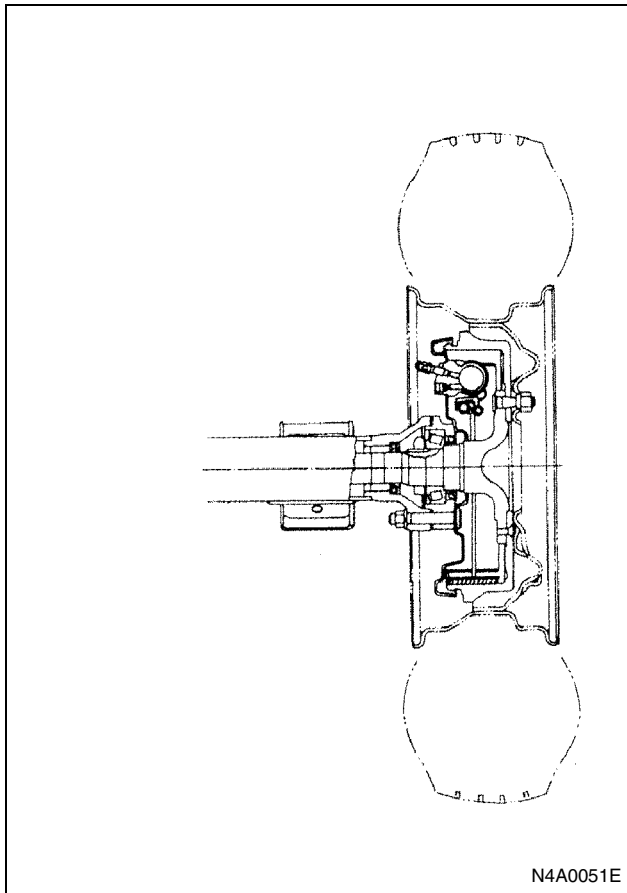
 Limited Slip Differential (LSD); Viscous Type.. 4B-56

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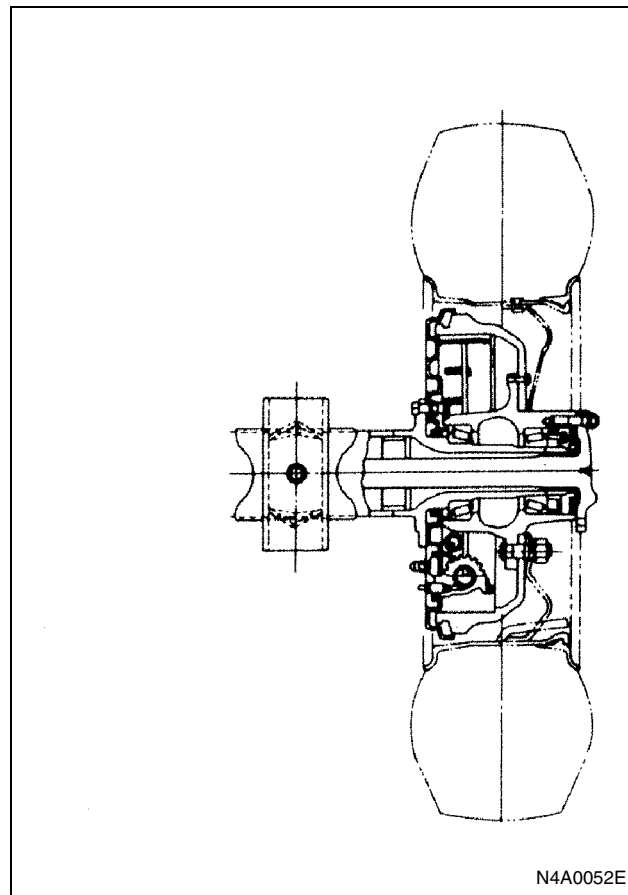
GENERAL DESCRIPTION

Hub and Drum

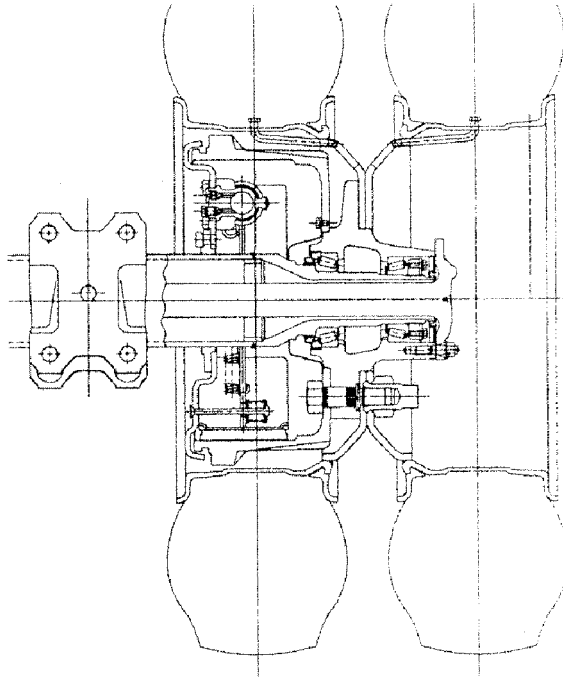
NHR Model (Single Tire (Semi Floating Type))



NKR Model (Single Tire (Full Floating Type))



NHR55, 69, NKR55, 66, 69, 71, 77, NPR66, 70, 71, 75, 77, NQR66, 70, 71, 75, NPS71, 75 Models (Dual Tire)

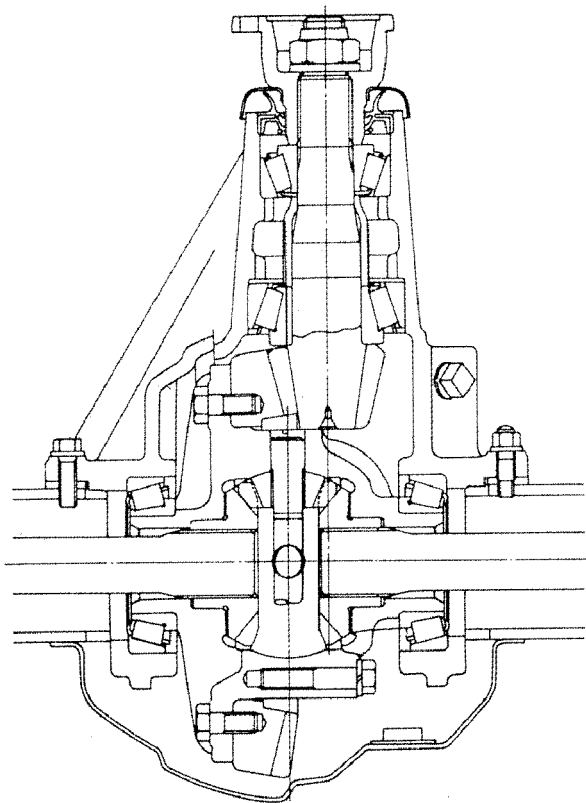


N4A0053E

4B-4 REAR AXLE

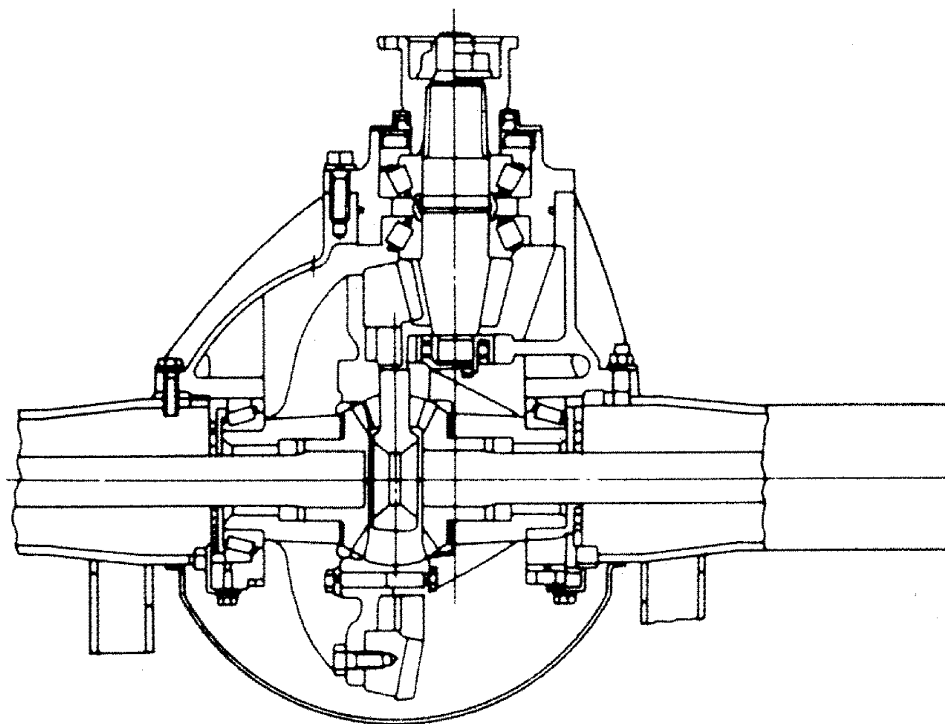
Differential Carrier Assembly

244 mm (9.6 in) size



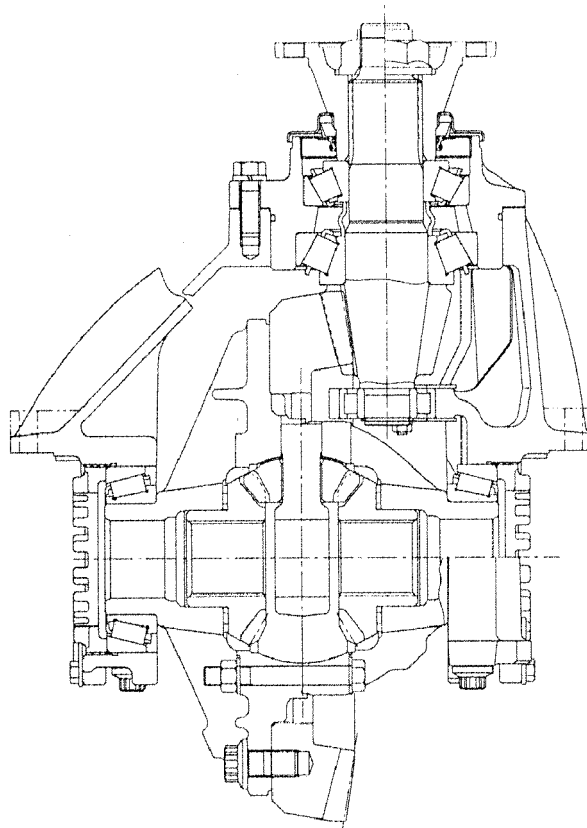
N4A0054E

292 mm (11.5 in) size



N4A0055E

320 mm (12.5 in) size

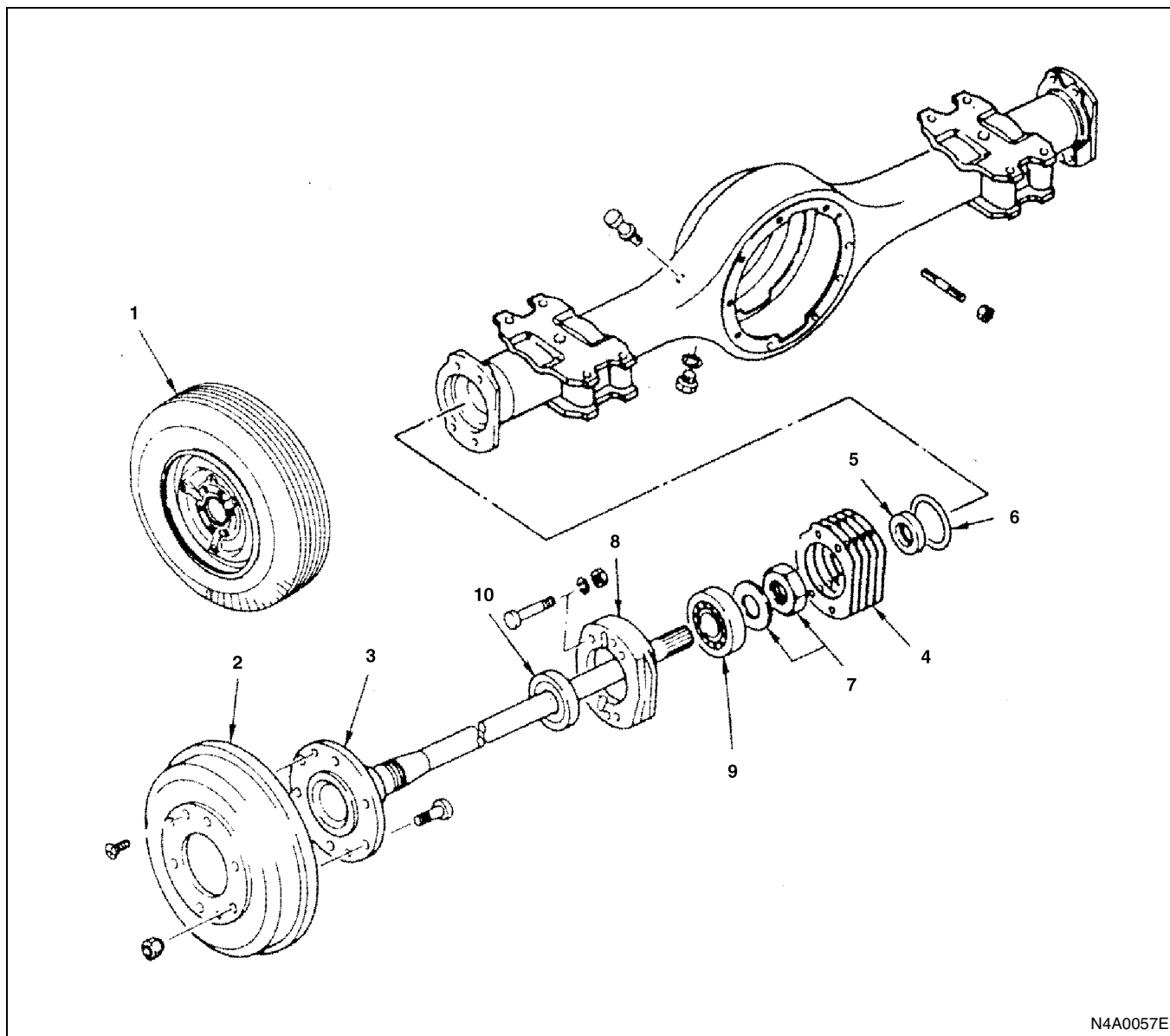


N4A0056E

ON-VEHICLE SERVICE

Rear Hub and Brake Drum (NHR Model; Semi Floating)

Single Tire



N4A0057E

Legend

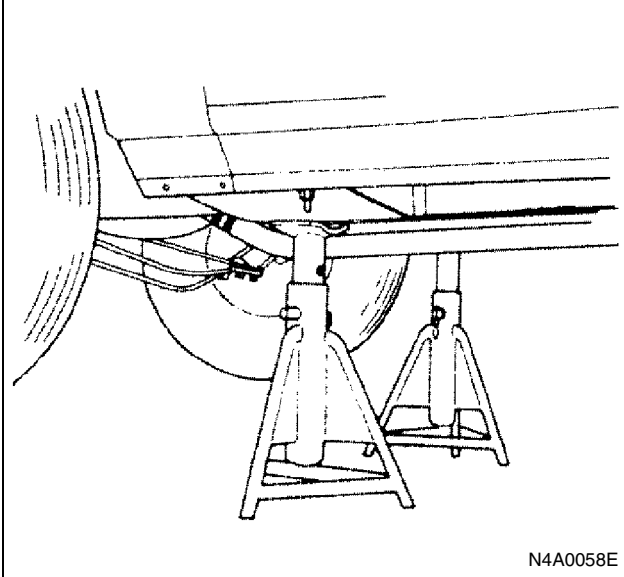
- | | |
|-----------------------------------|--------------------------------|
| 1. Wheel and tire | 6. O-ring |
| 2. Brake drum | 7. Bearing lock nut and washer |
| 3. Axle shaft with brake assembly | 8. Bearing holder |
| 4. Shim | 9. Bearing |
| 5. Axle case oil seal | 10. Oil seal |

Removal

Preparation:

Raise vehicle to working level.

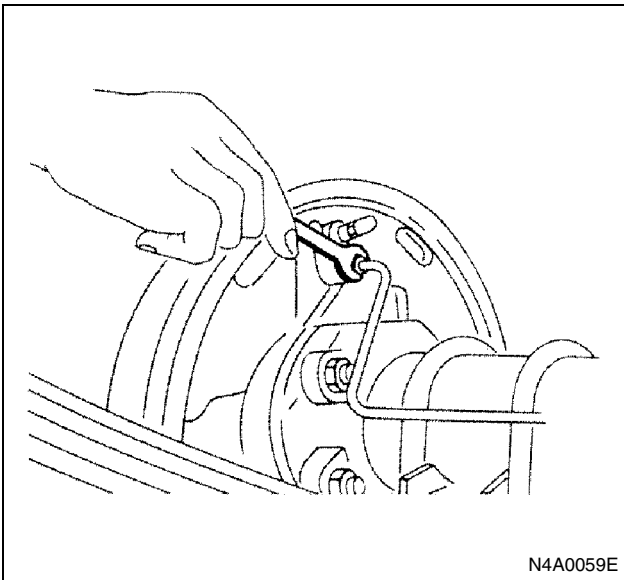
Support the axle assembly with a suitable jack and chassis stands.



1. Wheel and Tire
2. Brake Drum

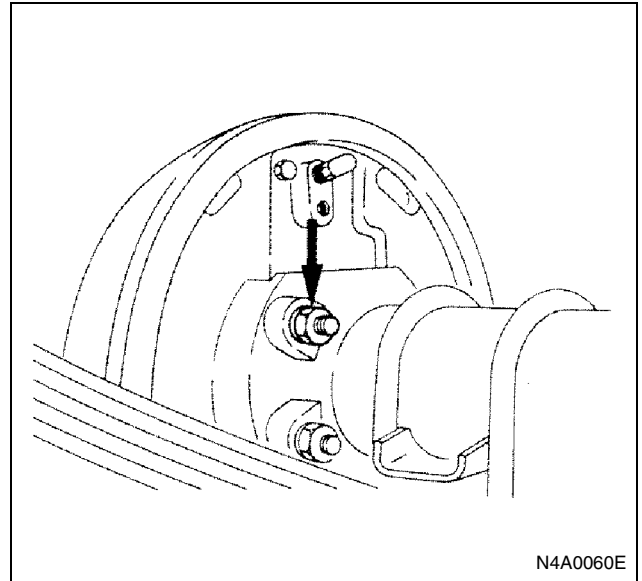
Before disassembly of axle shaft assembly, disconnect the following parts.

Disconnect the brake pipe from brake wheel cylinder on the back plate.

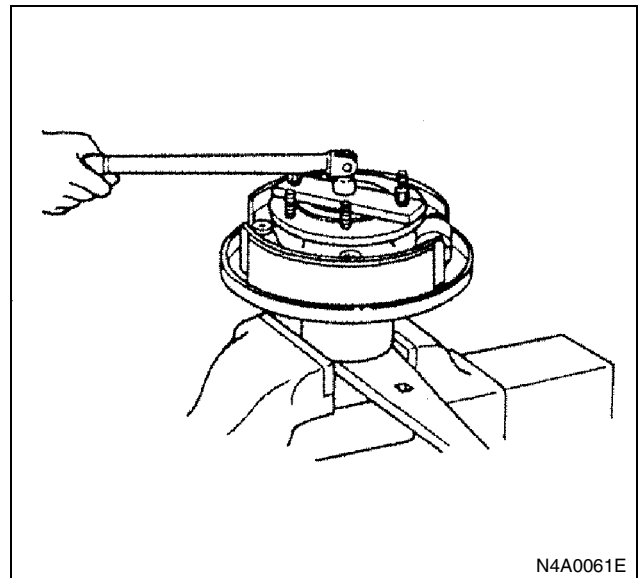


3. Axle Shaft with Brake Assembly

Remove four nuts from the bearing holder fixing-bolts.

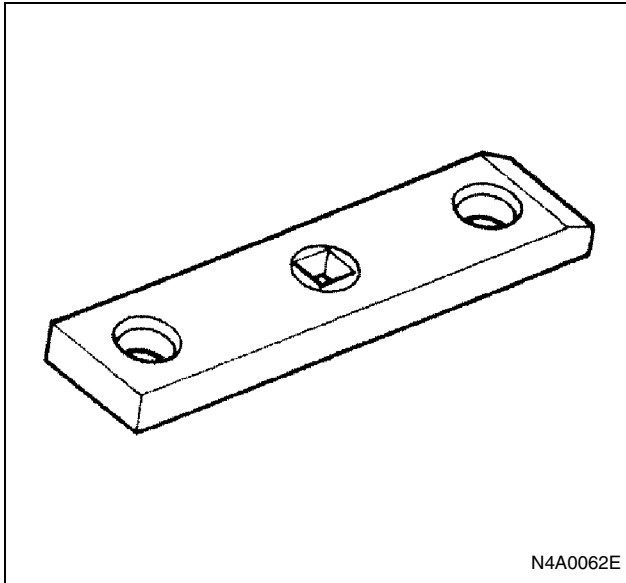


4. Shim
5. Axle Case Oil Seal
6. O-ring
7. Bearing Lock Nut and Washer
 - 1) Flatten the locking portion on the lock nut.
 - 2) Clamp special tool; wrench into vise, and mount axle shaft into wrench.
Wrench: 5-8840-2329-0
 - 3) Install special tool onto flange studs, lock into position with two wheel nuts, and turn axle shaft loose from lock nut.
Remover: 5-8840-2003-0



Notice:

Because of the high torque on the locknut, it is sometimes advantageous to have an assistant when performing this operation.

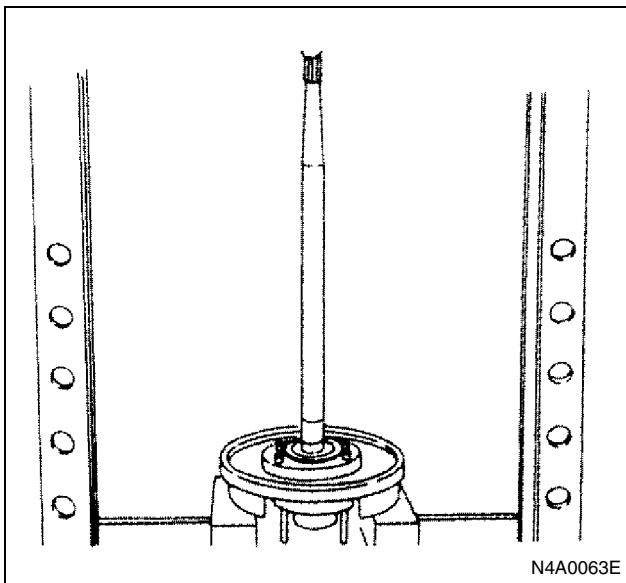


8. Bearing Holder

Remove the bearing holder and bearing from the axle shaft by means of a press.

Notice:

Only a slight amount of pressure from the press is required to loosen bearing from the shaft. Be sure to support the backing plate solidly, and to hold onto the axle shaft to prevent it from falling to the floor.

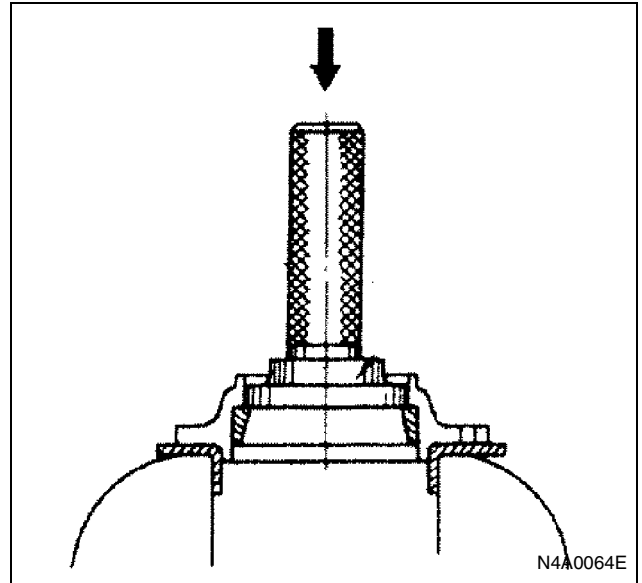


9. Bearing

Drive out the bearing outer race using a special tool.

Remover: 9-8521-1772-0

Grip: 9-8522-1148-0

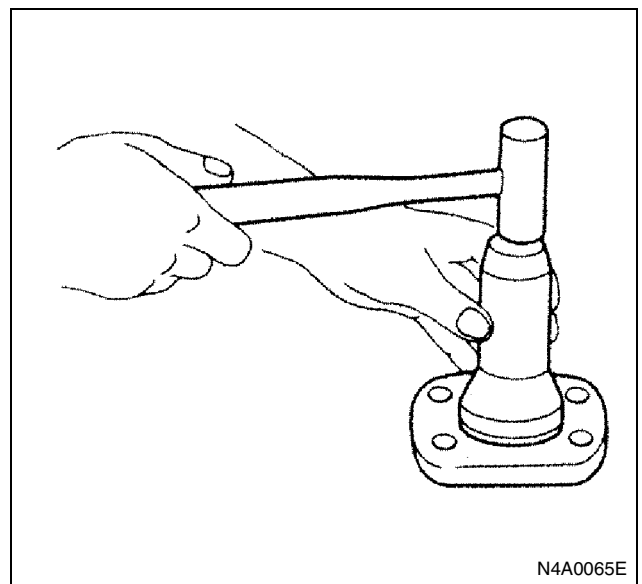


10. Oil Seal

Installation

1. Oil Seal

Installer: 9-8522-1269-0

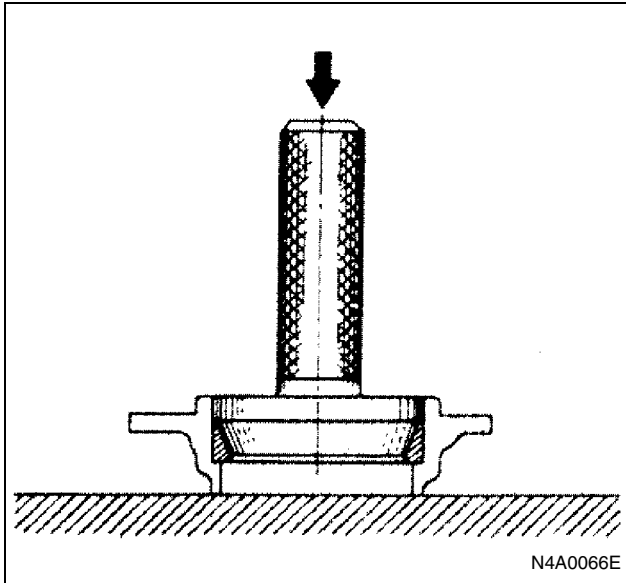


2. Bearing

Installer: 9-8522-1268-0

Grip: 9-8522-1148-0

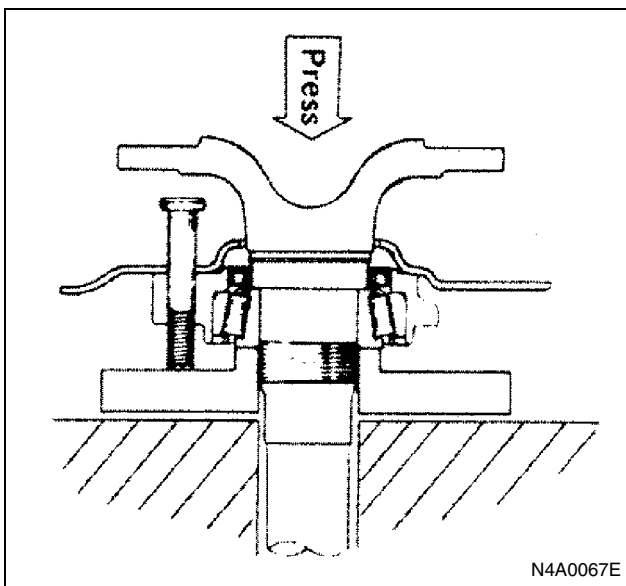
Apply generous amount of grease to the bearing inner race.



3. Bearing Holder

- 1) Insert four through-bolts into back plate.
- 2) Install bearing holder to back plate.
- 3) Install the above parts onto the axle shaft.
- 4) Install bearing over axle shaft and press into bearing holder.

Installer: 9-8522-1271-0



4. Bearing Lock Nut and Washer

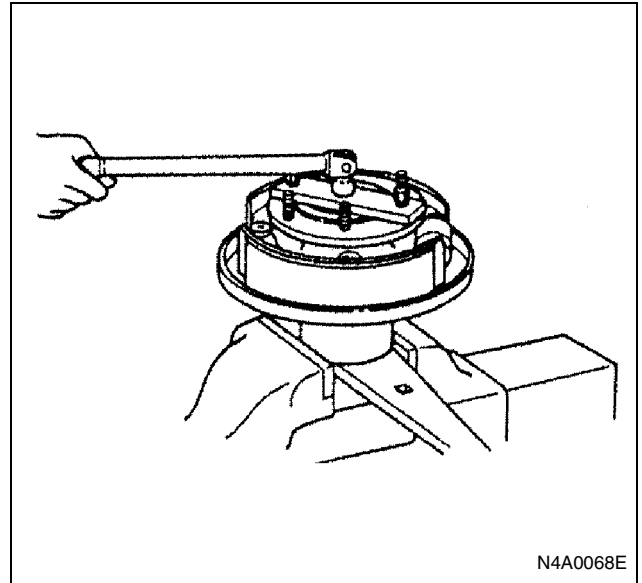
- 1) Install the washer with the washer tab inserted to the groove on the axle shaft.
- 2) Discard used bearing lock nut and install a new one into the position by using a vise and special tools.

Installer: 5-8840-2003-0

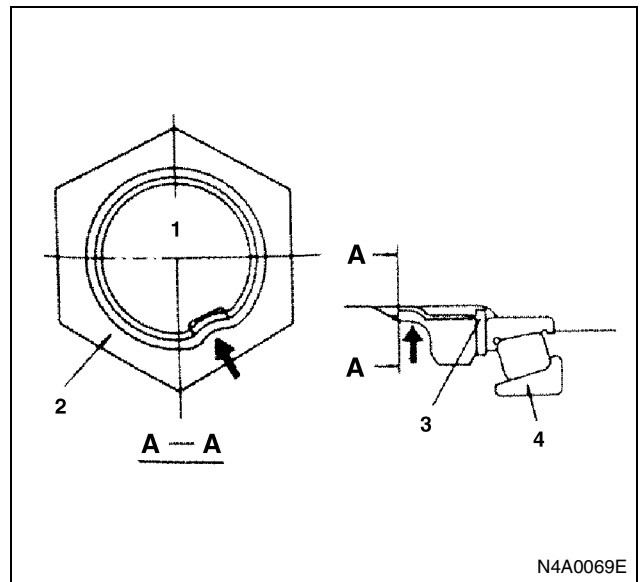
Wrench: 5-8840-2329-0

Tighten:

Bearing lock nut to 260 N·m (26.5 kg·m / 192 lb·ft)



- 3) Stake the bearing lock nut at groove portion on the axle shaft.



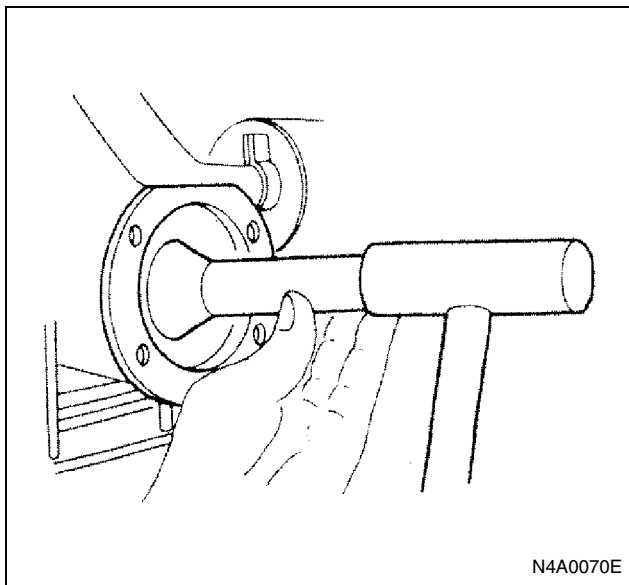
Legend

1. Axle shaft
2. Nut
3. Bearing lock nut
4. Bearing

5. O-Ring

6. Oil seal; Axle Case

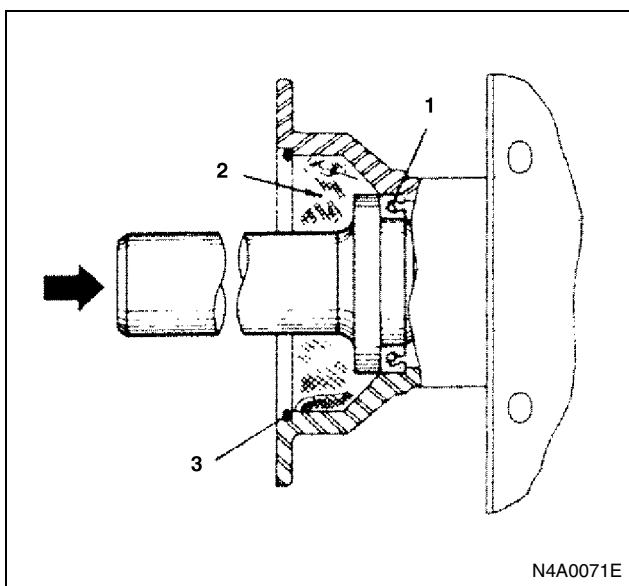
- 1) Installer: 9-8522-1272-0



- 2) Apply measured amount of good quality grease to the inner face of the rear axle case.

Type of grease: Wheel bearing grease of Multipurpose type grease

Amount of grease required: 80 g (2.8 oz)



Legend

1. Oil seal
2. Grease
3. O-ring

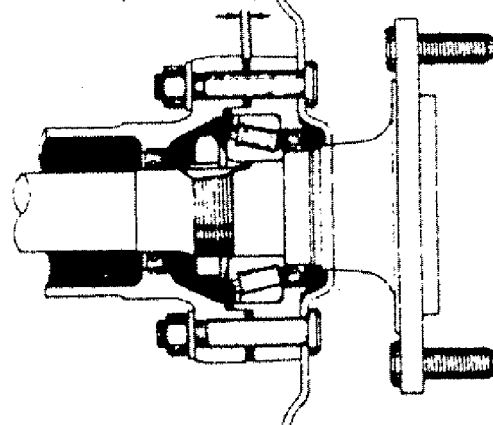
7. Shim

Install the axle shaft assembly to the axle case with a 1 mm (0.039 in) thick shim fitted in position between the bearing holder and axle case flange. Install and tighten the bolts evenly in progression.

Tighten:

Bearing holder nut to 74 N·m (7.5 kg·m / 54 lb·ft)

Shim 1 mm (0.039 in)

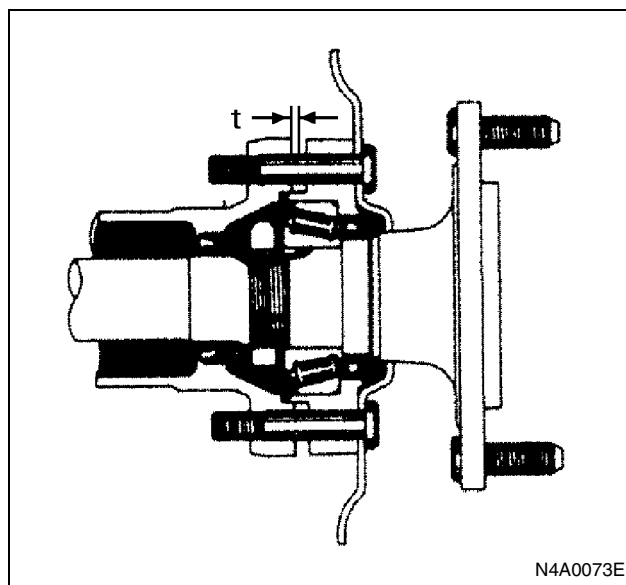


Install the axle shaft assembly on the opposite side and push it in until it is fitted against the differential thrust block.

Then, measure the clearance (t) between the bearing holder and axle case flange and determine the thickness of the shim to be installed by the following formula:

Measured clearance (t) + 0.3 mm (0.012 in.) = thickness of shim to be installed.

Thickness of shims available, 0.05, 0.076, 0.13, 0.5, 1.0 mm (0.002, 0.003, 0.005, 0.02, 0.04 in)



8. Axle Shaft with Brake Assembly

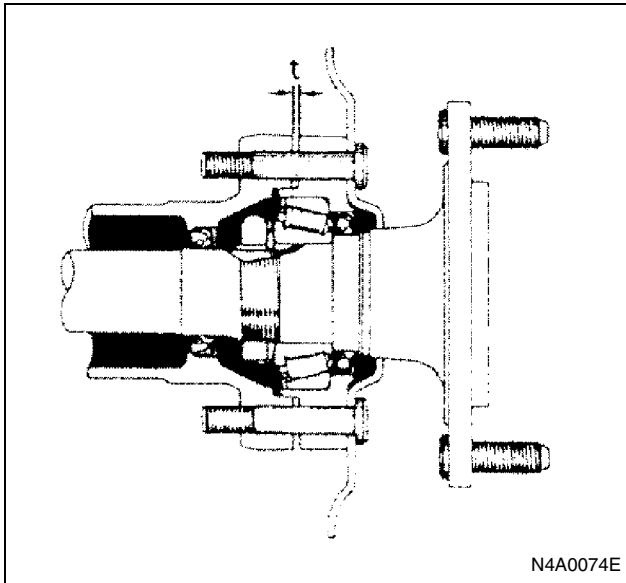
Tighten:

Bearing holder nut to 74 N·m (7.5 kg·m / 54 lb·ft)

- Connect the brake pipes to wheel cylinder.
- Brake air bleeding, refer to servicing to Section 5 "Brake".

Notice:

To install the axle shaft assembly, follow the reassembly procedure outline under the Section 5 "Brake".



N4A0074E

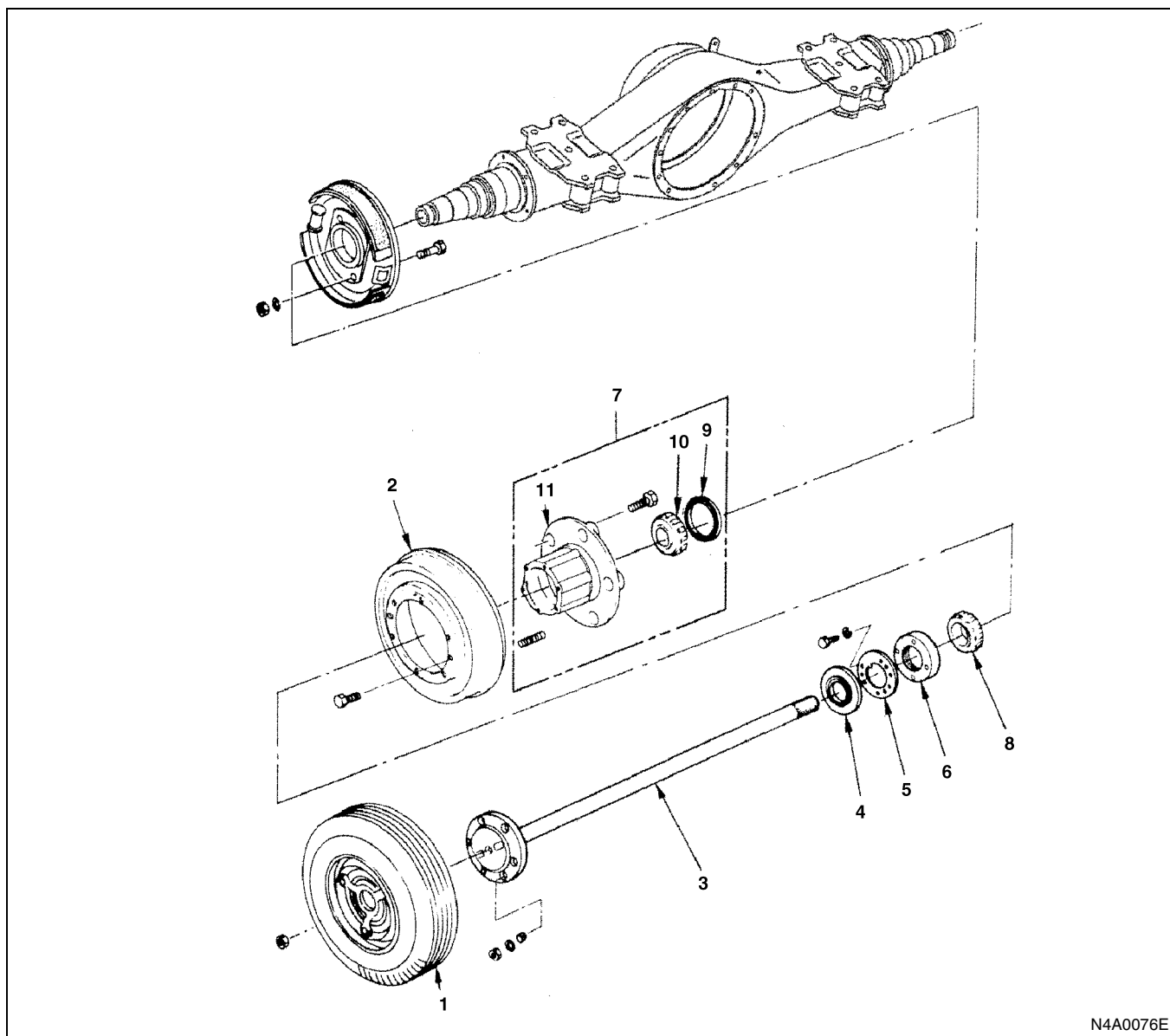
9. Brake Drum
10. Wheel and Tire

Tighten:

Wheel nut to 167 N·m (17 kg·m / 123 lb·ft)

Rear Hub and Brake Drum (NKR Model; Full Floating)

Single Tire



N4A0076E

Legend

- | | |
|---------------------|-------------------|
| 1. Wheel and tire | 7. Hub assembly |
| 2. Brake drum | 8. Outer bearing |
| 3. Axle shaft | 9. Inner oil seal |
| 4. Outer oil seal | 10. Inner bearing |
| 5. Lock washer | 11. Hub |
| 6. Bearing lock nut | |

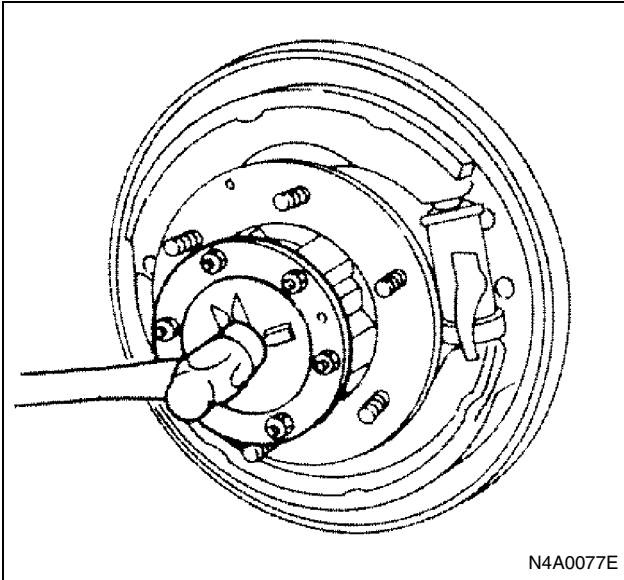
Removal

Preparation:

Jack up and support the vehicle on stands.

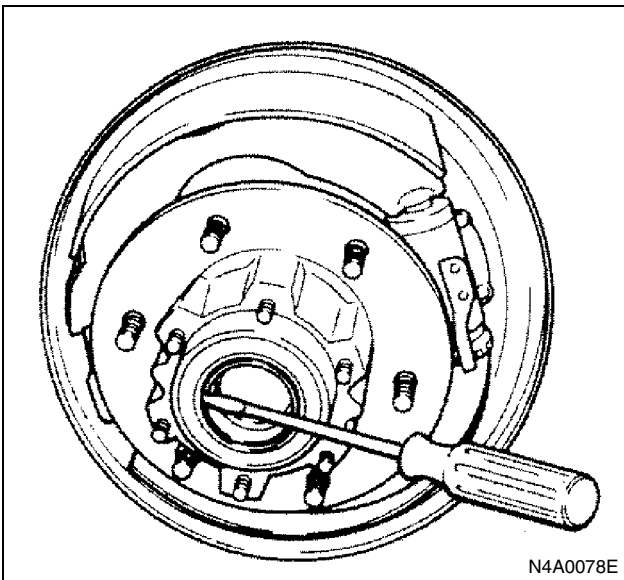
1. Wheel and Tire
2. Brake Drum
3. Axle Shaft

Remove the collar by tapping on the upper face of the axle shaft with a hammer, then remove the axle shaft.

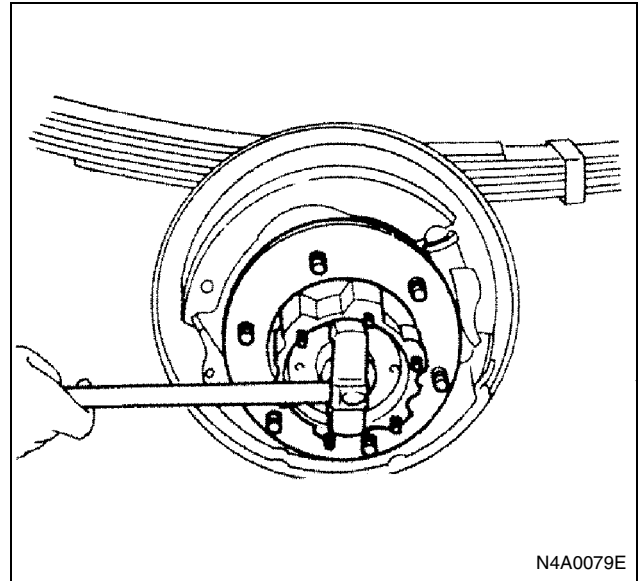


4. Outer Oil Seal

Take out the hub outer oil seal using a screwdriver.



5. Lock Washer
 6. Bearing Lock Nut
- Wrench: 9-8522-1188-0

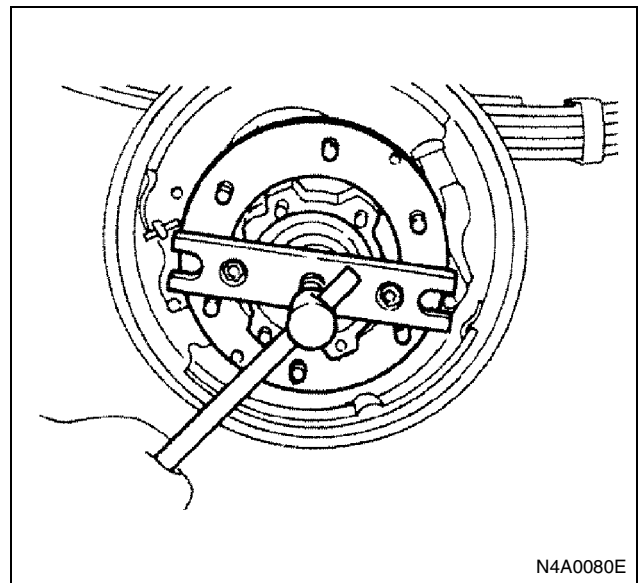


7. Hub Assembly

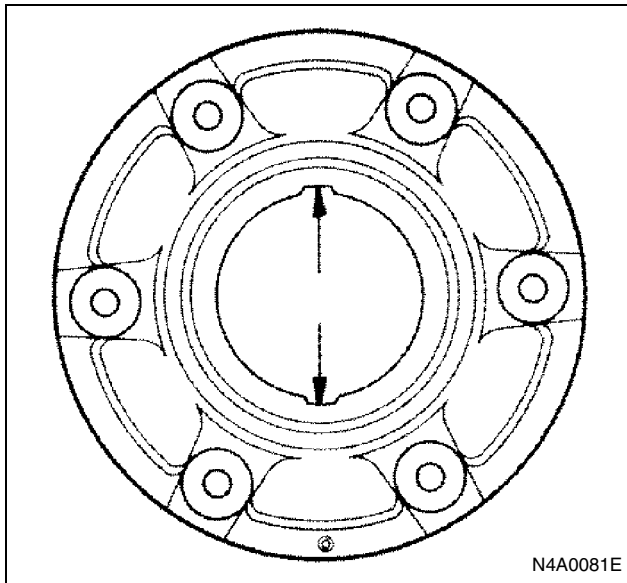
Remover: 9-8521-0116-0

If the hub inner bearing and the hub inner oil seal remain on the axle tube, remove the hub inner bearing using a special tool.

Remover: 9-8521-0092-0



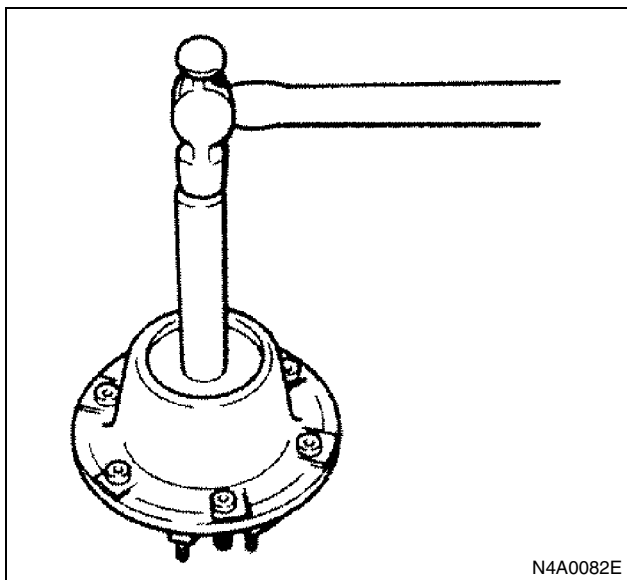
8. Outer Bearing
 9. Inner Oil Seal
 10. Inner Bearing
- Drive out the hub inner bearing outer race together with the hub inner bearing inner race and the hub inner oil seal by using a proper bar through two notches.



11. Hub

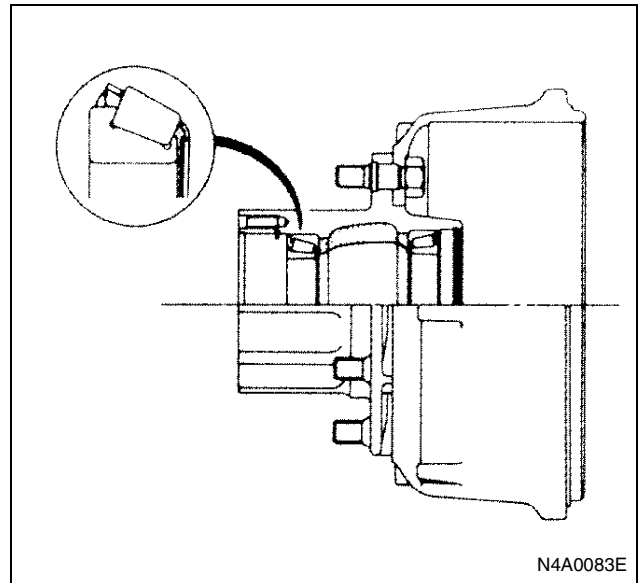
Installation

1. Hub
2. Inner Bearing
Install the bearing outer race.
Installer: 9-8522-1194-0
Grip: 9-8522-1148-0
If removed outer bearing outer race, install the bearing outer race.
Installer: 9-8522-1195-0
Grip: 9-8522-1148-0

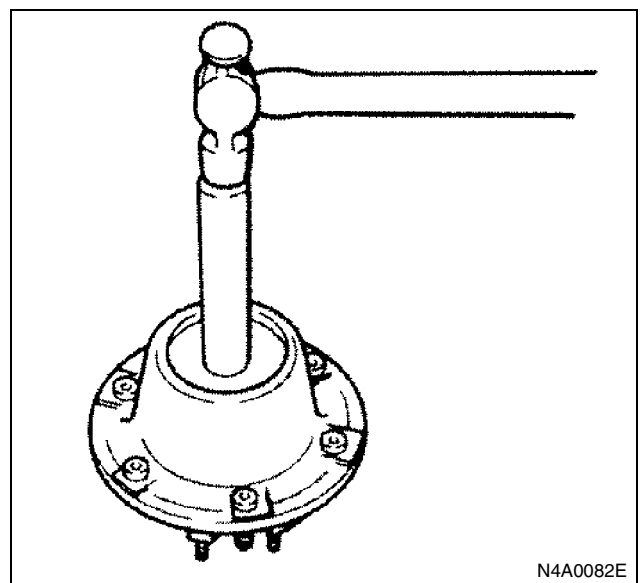


Apply specified grease into the bearing and grease well in the hub.

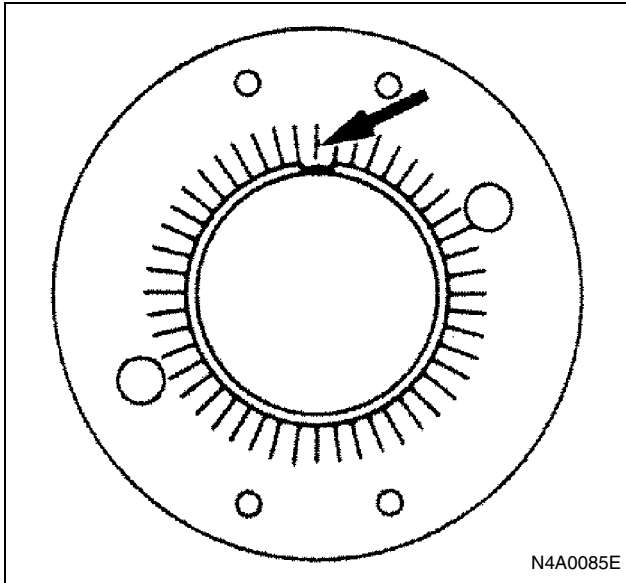
Amount of grease: 280 g (9.8 oz)



3. Inner Oil Seal
Installer: 9-8522-1607-0
Grip: 9-8522-1608-0



4. Outer Bearing
5. Hub Assembly
6. Bearing Lock Nut
 - 1) Install the bearing nut, so that its side with notched line is turned outward.
The forty eight (48) slits are provided on the bearing nut, to ensure locking and easy maintenance.



10. Brake Drum
11. Wheel and Tire

Tighten:

Wheel nut to 167 N·m (17 kg·m / 123 lb·ft)

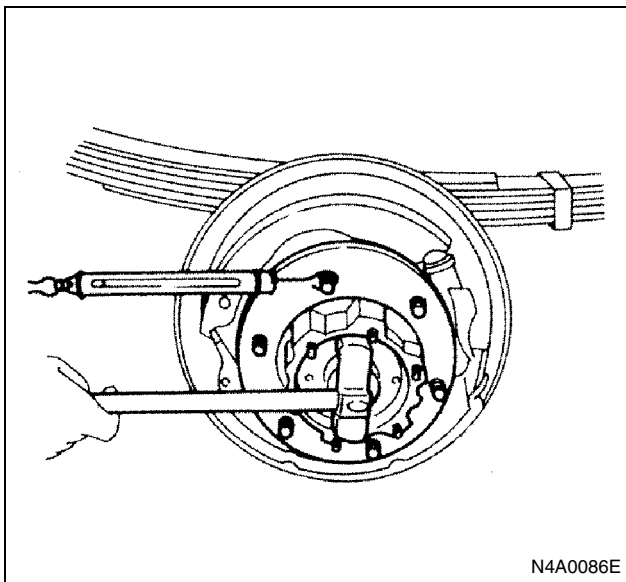
- 2) Align notched line on the bearing nut with the center of groove in the axle case, so that two threaded holes in the bearing nut line up with two holes in the lock washer.

Wrench: 9-8522-1188-0

- 3) Adjustment of wheel bearing preload.

Bearing preload (at wheel pin), 42 — 52 N (4.3 — 5.3 kg / 9.5 — 11.7 lb)

- 4) While the wheel bearing pre-load is adjusted, if the notched line on the bearing nut is not aligned with the groove on the axle case, adjust to turn the lock nut clockwise to align.



7. Lock Washer

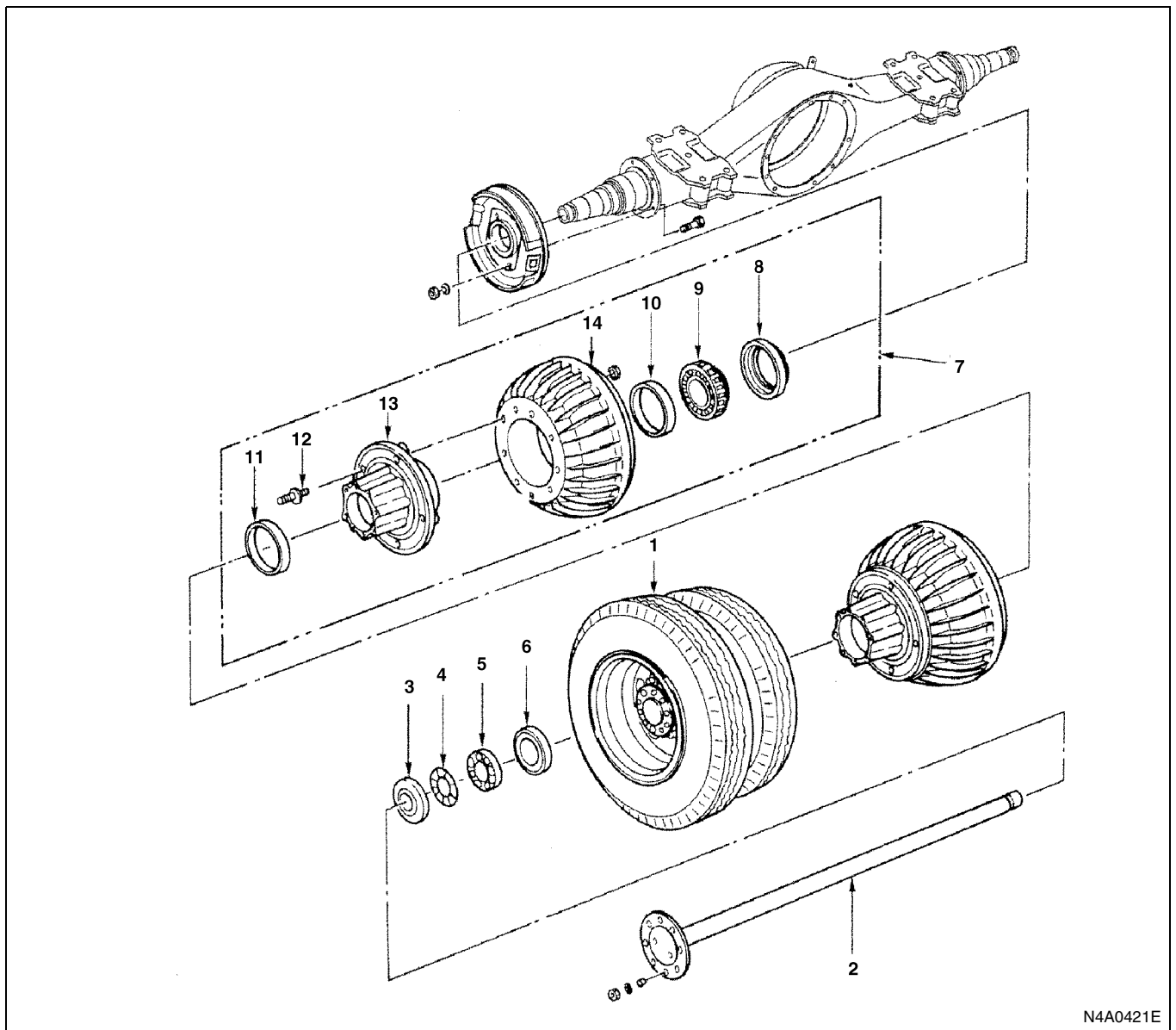
Install lock washer and fix it to the bearing nut by the lock bolt. The lug of lock washer should be inserted to the groove on the axle case.

8. Outer Oil Seal
9. Axle Shaft

Tighten:

Axle shaft nut to 46 N·m (4.7 kg·m / 34 lb·ft)

Rear Hub and Brake Drum (NHR, NKR, NQR, NPS Models; Full Floating)



N4A0421E

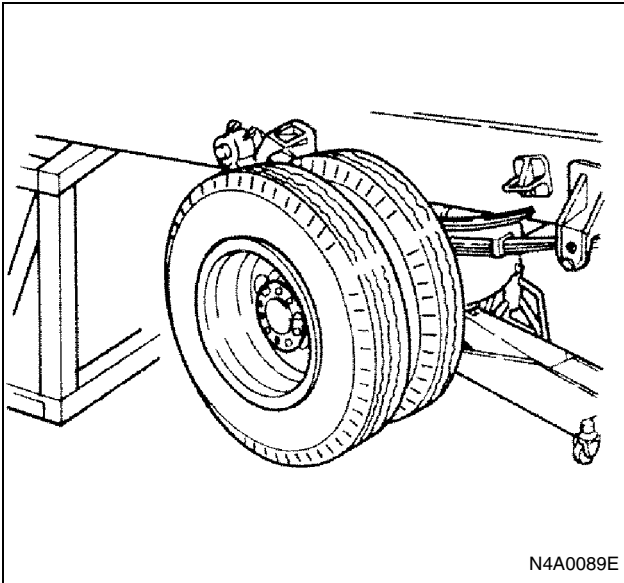
Legend

- | | |
|-----------------------|------------------------------|
| 1. Wheel and tire | 8. Inner oil seal |
| 2. Axle shaft | 9. Inner bearing |
| 3. Outer oil seal | 10. Inner bearing outer race |
| 4. Lock washer | 11. Outer bearing outer race |
| 5. Bearing lock nut | 12. Wheel pin |
| 6. Outer bearing | 13. Hub |
| 7. Hub and brake drum | 14. Brake drum |

Removal

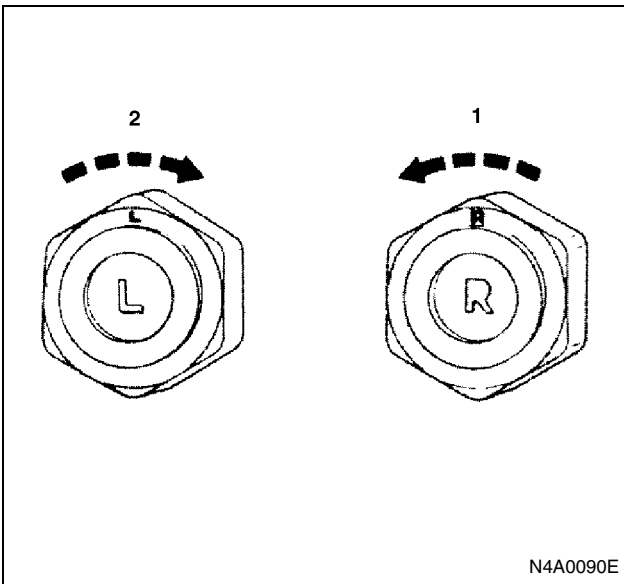
Preparation:

Jack up and support the vehicle on stands.



1. Wheel and Tire

Right side wheel nut (1) have right hand threads and left side wheel nut (2) have left hand threads.

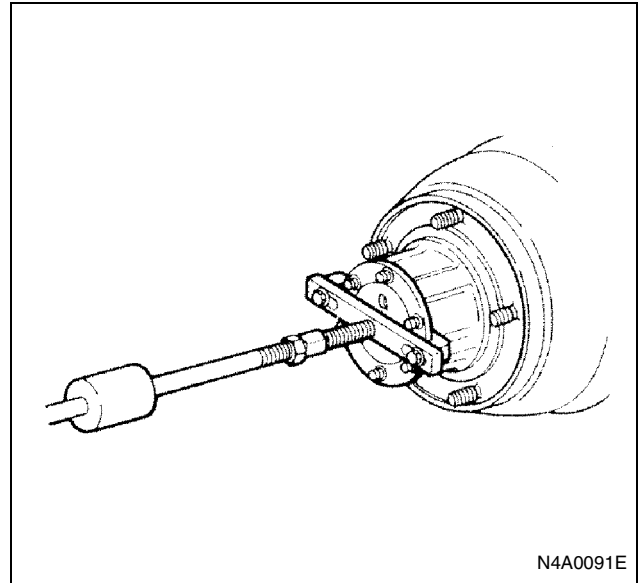


2. Axle Shaft

Use the axle shaft remover and the sliding hammer to remove the axle shaft.

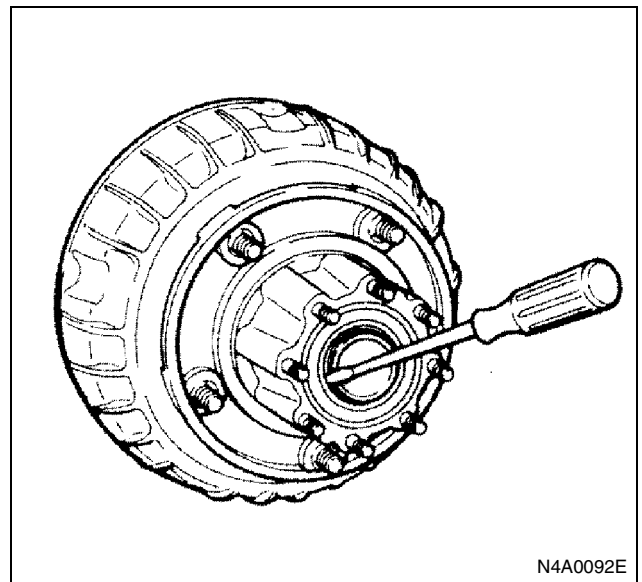
Axle Shaft Remover: 5-8840-2027-0

Sliding Hammer: 5-8840-0084-0



3. Outer Oil Seal

Use a pry bar to pry the oil seal from the axle case.



4. Lock Washer

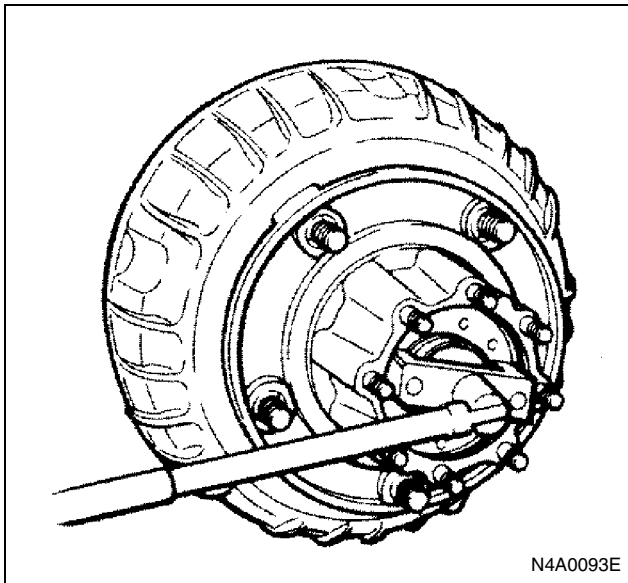
5. Bearing Lock Nut

Use the lock nut remover to remove the lock nut.

Lock Nut Remover:

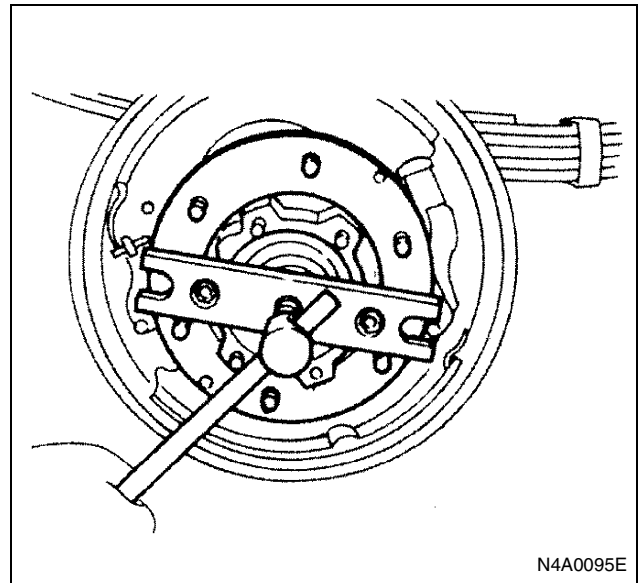
9-8522-1188-0 (For lock bolt P.C.D. 70 mm (2.8 in.))

9-8522-1606-0 (For lock bolt P.C.D. 74 mm (2.9 in.))



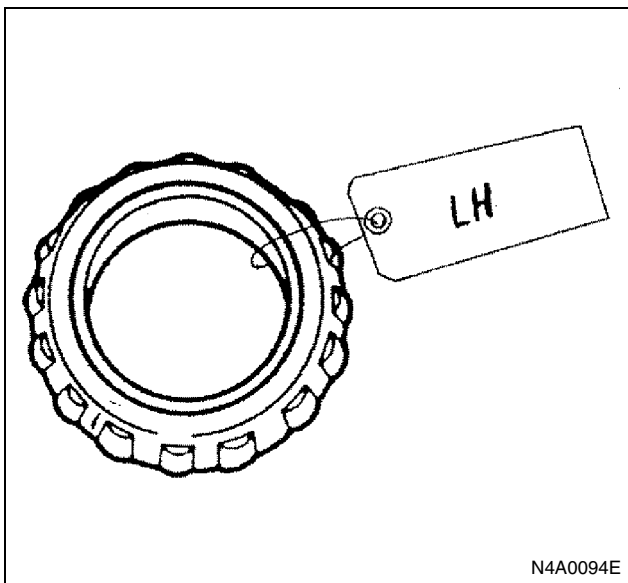
6. Outer Bearing

If the bearings are to be reinstalled, tag each bearing with the fitting position from which it was removed.



Rear Hub Remover:

9-8521-2501-0 (For except NHR, NKR Flat Low)

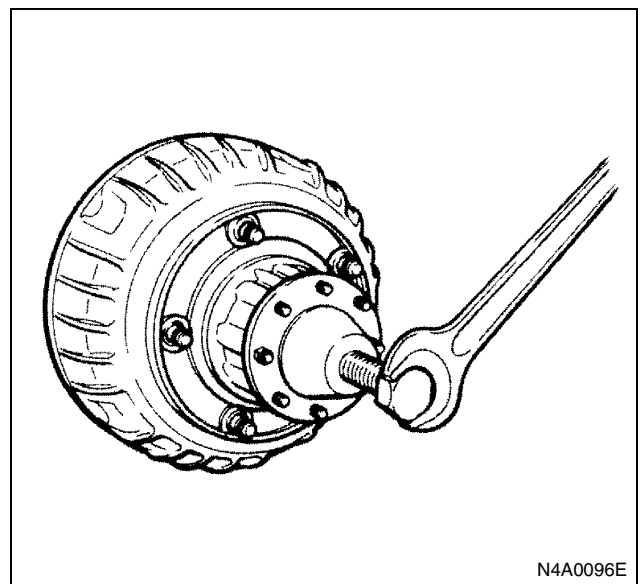


7. Hub and Brake Drum

Use the rear hub remover to remove the hub and the brake drum.

Rear Hub Remover:

9-8521-0116-0 (For NHR, NKR Flat Low)



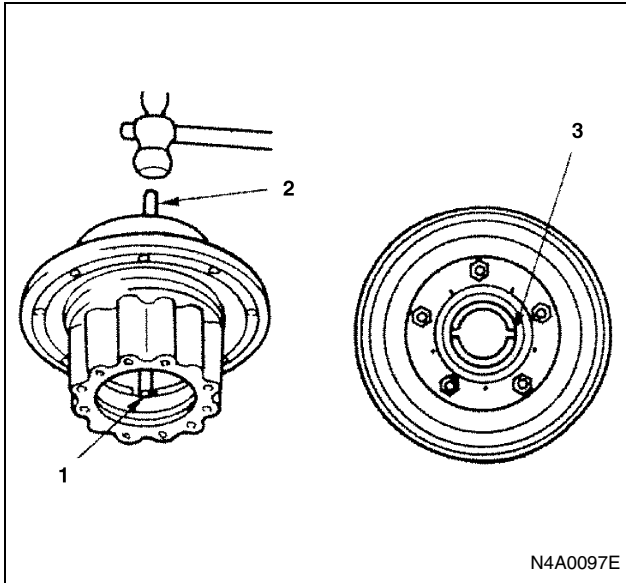
8. Inner Oil Seal

9. Inner Bearing

10. Inner Bearing Outer Race

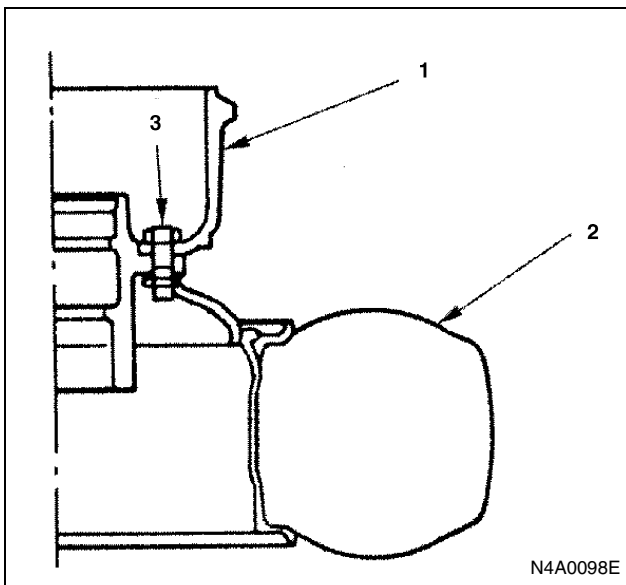
11. Outer Bearing Outer Race

Use a hammer and a brass bar (2) to drive the outer races (3) from the hub (1) at the two points shown in the illustration.



12. Wheel Pin

- 1) Set the rear hub with brake drum (1) to the wheel with tire (2) previously removed from the vehicle.
Turn the wheel pin nuts (3) counterclockwise to loosen them.
- 2) The pin nuts are loosened counterclockwise on both sides of the vehicle.



- 3) Remove the brake drum from the rear hub.
- 4) Discard the wheel pins and nuts.
The wheel pins and nuts cannot be reused.

13. Hub

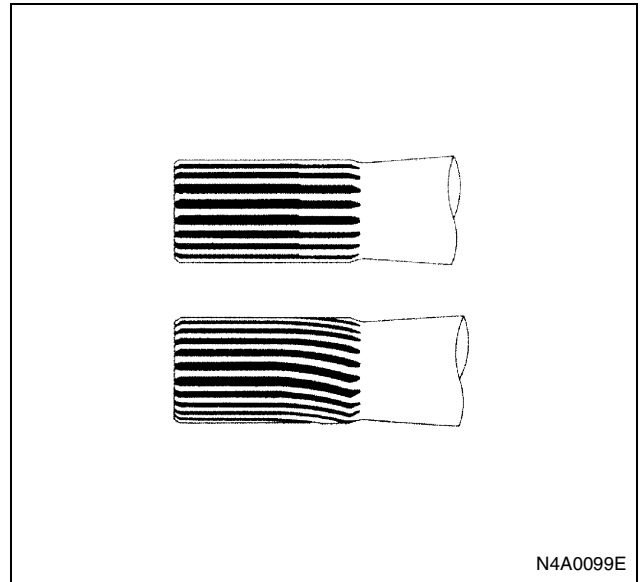
14. Brake Drum

Inspection and Repair

Make necessary adjustments, repairs, and part replacement if excessive wear or damage is discovered during inspection.

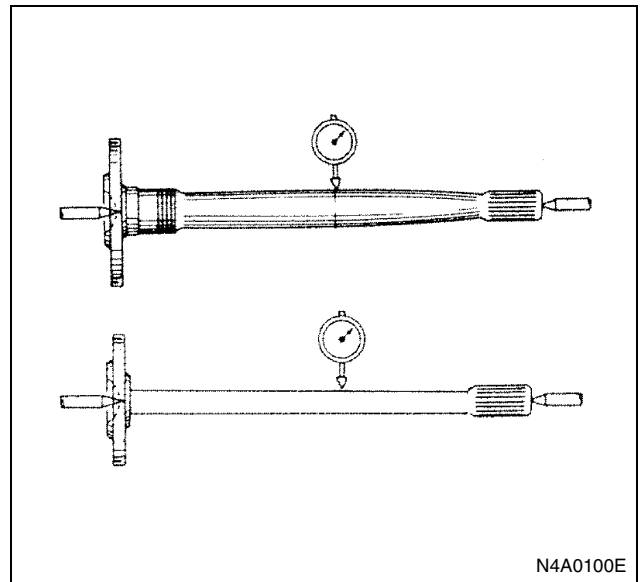
Axle Shaft Spline

Inspect the spline for wear, damage or other abnormal conditions.



Axle Shaft Run-Out

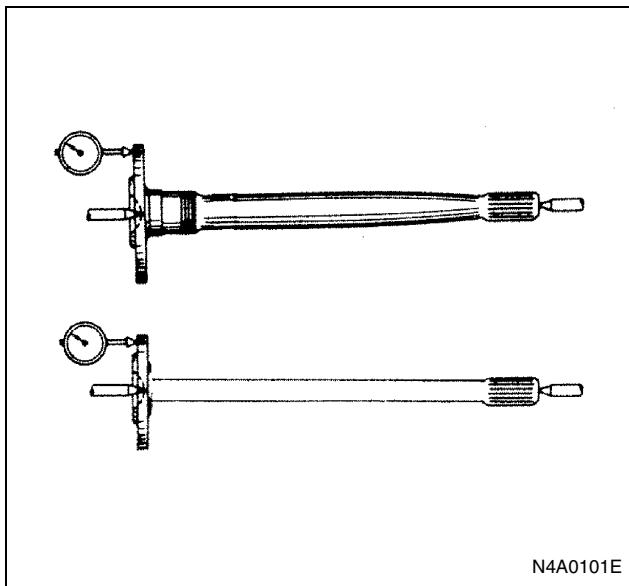
Limit, 1 mm (0.039 in)



4B-20 REAR AXLE

Axle Shaft Flange Run-Out

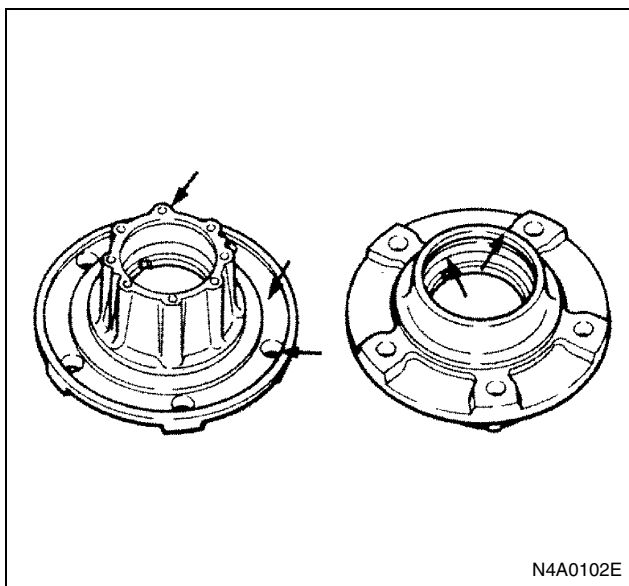
Limit, 0.15 mm (0.00591 in)



Hub

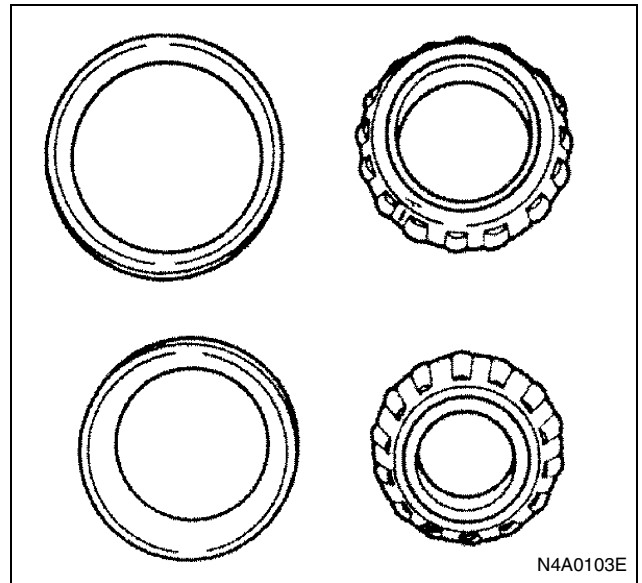
Inspect the oil seal and bearing fitting faces for excessive wear and damage.

Inspect the wheel pin threads and stud bolt threads for excessive damage and cracks.



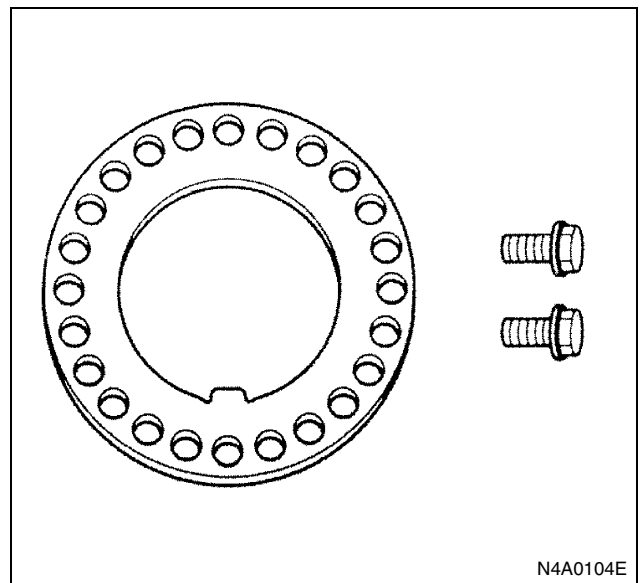
Bearing

Inspect the bearing for excessive wear, abnormal noise, rough rotation, and freezing.



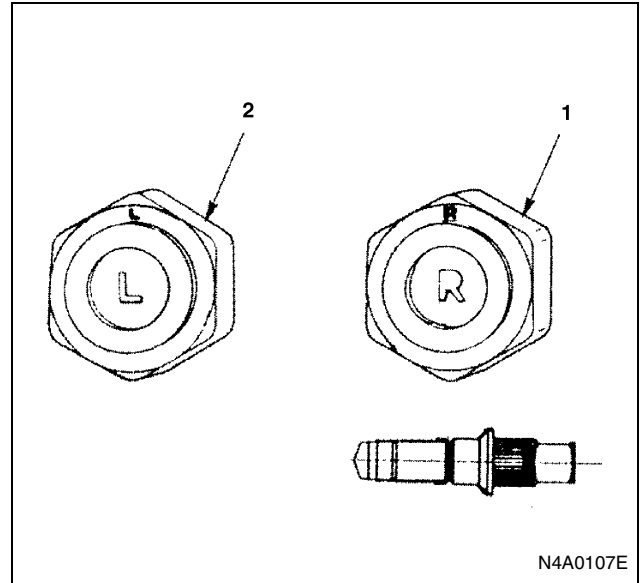
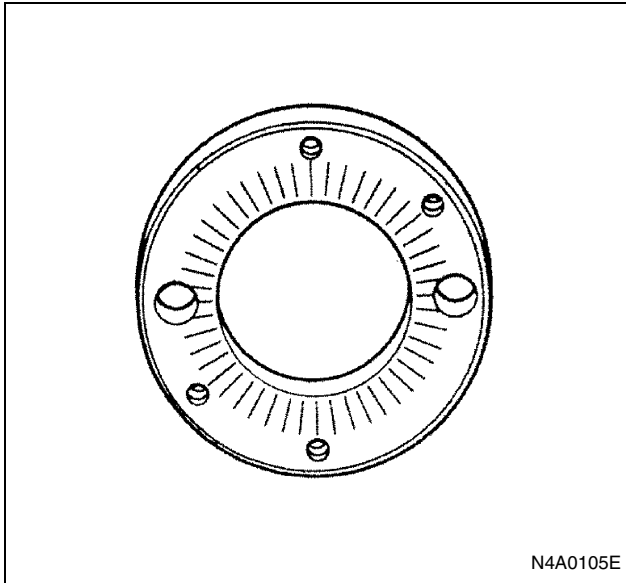
Lock Washer

Inspect the lock washer for excessive wear, cracks, warpage, and other damage.



Bearing Lock Nut

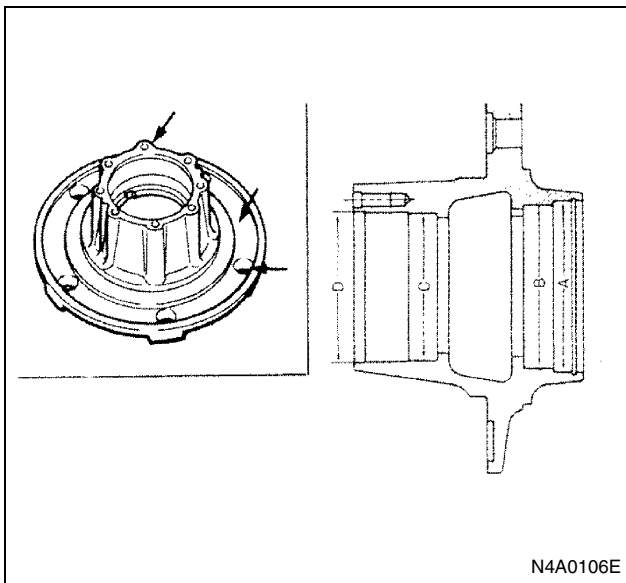
Inspect the bearing lock nut threads and contact surfaces for excessive wear, warpage, and other damage. Light damage to the contact surfaces can be repaired with an oil stone or a piece of fine sandpaper.



Installation

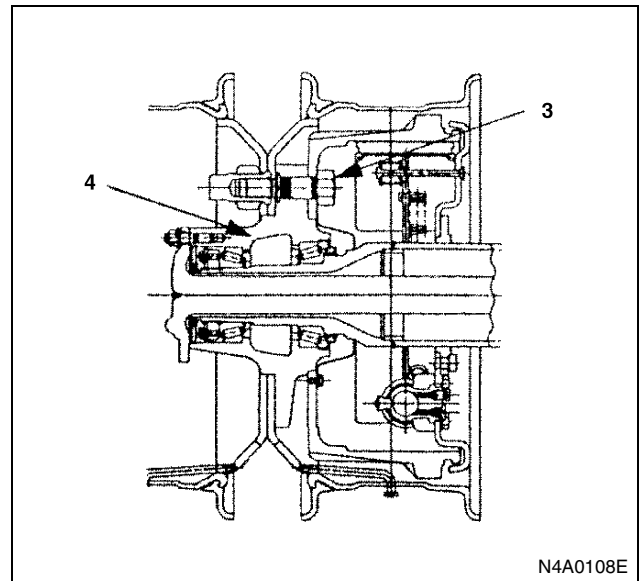
1. Brake Drum
2. Hub
 - 1) Clean the hub inside and outside surfaces.
 - 2) Apply bearing grease to the hub cavity.

Hub bearing grease amount, 285 g (10.1 oz)



- 2) Install the wheel pins (3) to the hub (4).
Note the installation direction shown in the illustration.

Tap the wheel pin into the hub with a hammer.



3) Wheel Pin Nut Torque

Brake drum diameter 228 mm: 206 N·m (21 kg·m / 152 lb·ft)

Brake lining width 75 mm: 343 N·m (35 kg·m / 253 lb·ft)

Brake lining width 100 mm: 392 N·m (40 kg·m / 289 lb·ft)

3. Wheel Pin

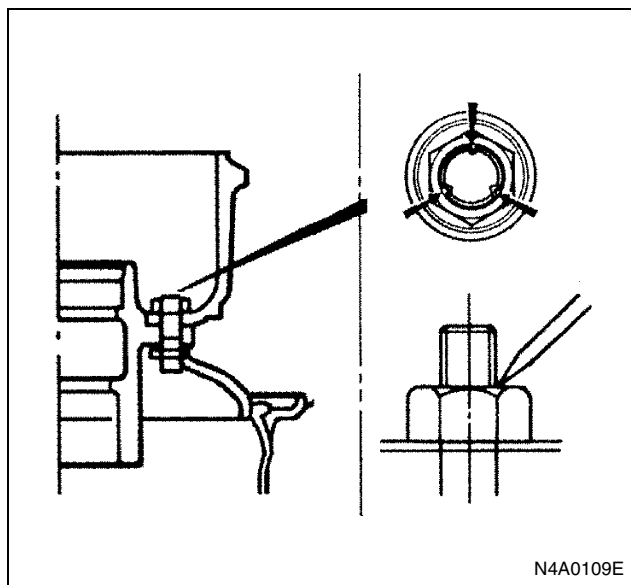
- 1) Right side hub wheel pins (1) have right hand threads and left side hub wheel pins (2) have left hand threads.

N·m (kg·m/lb·ft)		
(WHLPIN M16 Flange nut)	Brake drum diameter 228 mm / 240 mm / 260 mm	270 (27.6/200)
(WHLPIN M16 Hex nut)	Brake drum diameter 228 mm / 240 mm / 260 mm	235 (24/173)
(WHLPIN M18)	Brake lining width 75 mm / 100 mm	343 (35/253)

4B-22 REAR AXLE

		N·m (kg·m/lb·ft)
(WHLPIN M20)	Brake lining width 100 mm / 120 mm	392 (40/289)

- 4) Caulk three portions of each wheel nut to prevent them from loosening.



4. Outer Bearing Outer Race

5. Inner Bearing Outer Race

Use the bearing outer race installer and the drive handle to install the outer race to the hub.

Outer Bearing Outer Race Installer:

9-8522-1195-0

(Outer race outside diameter 92 mm (3.6 in.))

9-8522-1610-0

(Outer race outside diameter 97.6 mm (3.8 in.))

Drive Handle:

9-8522-1608-0

Inner Bearing Outer Race Installer:

9-8522-1194-0

(Outer race outside diameter 101.6 mm (4 in.))

9-8522-1609-0

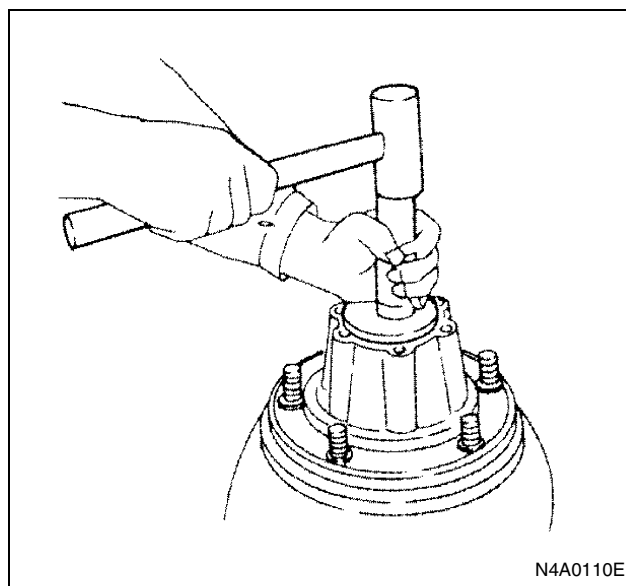
(Outer race outside diameter 108 mm (4.3 in.))

5-8840-2426-0

(Outer race outside diameter 120 mm (4.72 in.))

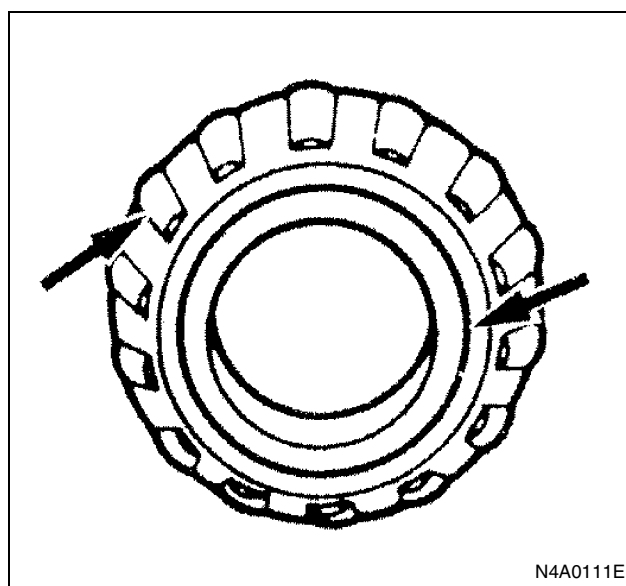
Drive Handle:

9-8522-1148-0



6. Inner Bearing

Apply an ample coat of bearing grease between the inner race and the roller cage.



7. Inner Oil Seal

- 1) Apply grease to the oil seal lip inner and outer circumferences.

- 2) Use the oil seal installer and the drive handle to install the oil seal to the hub.

Oil Seal Installer:

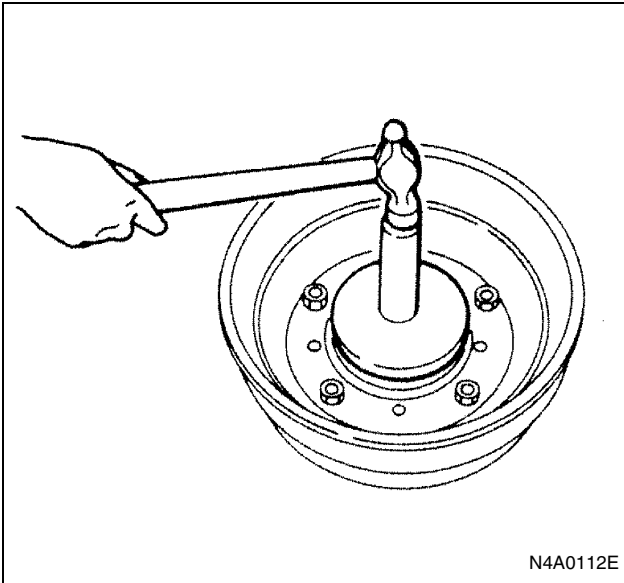
9-8522-1607-0 (Except NQR70)

Oil Seal Installer:

5-8840-2427-0 (NQR70)

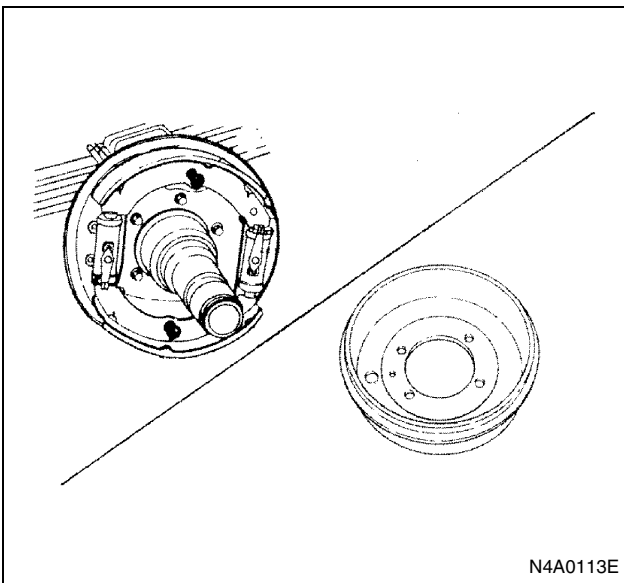
Drive Handle:

9-8522-1608-0



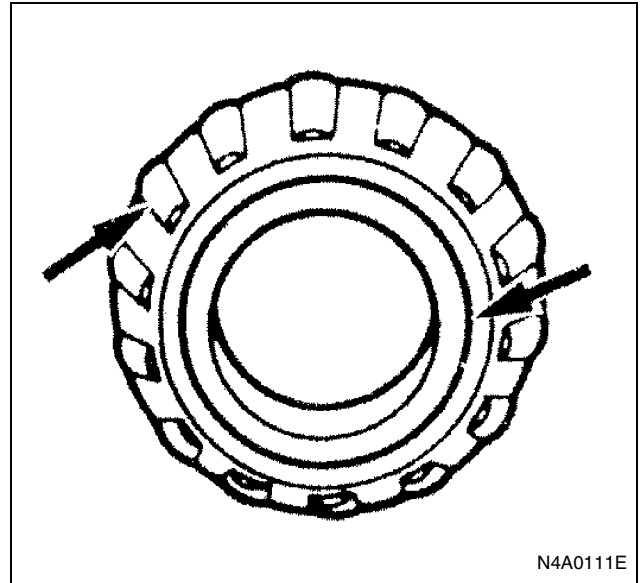
8. Hub and Brake Drum

- 1) Wipe away any oil or other foreign material from the brake linings and the brake drum inside surfaces.
- 2) Clean the rear axle case tip.
- 3) Install the hub assembly to the rear axle case.



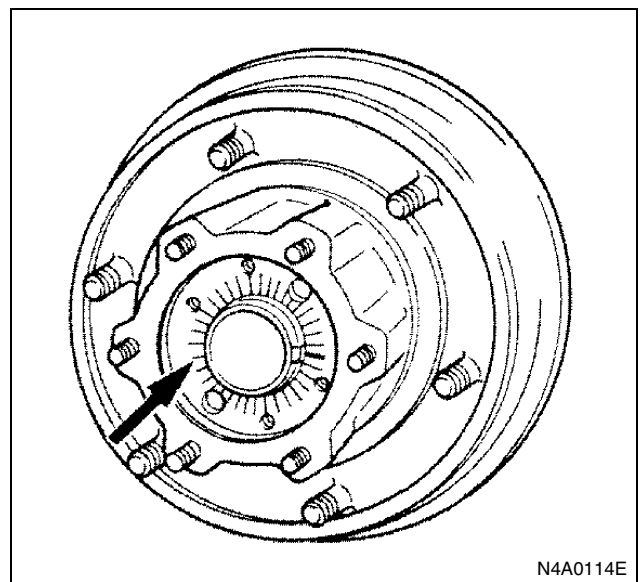
9. Outer Bearing

Apply an ample coat of bearing grease between the inner race and the roller cage.



10. Bearing Lock Nut

Install the lock nut with the notched line facing out.



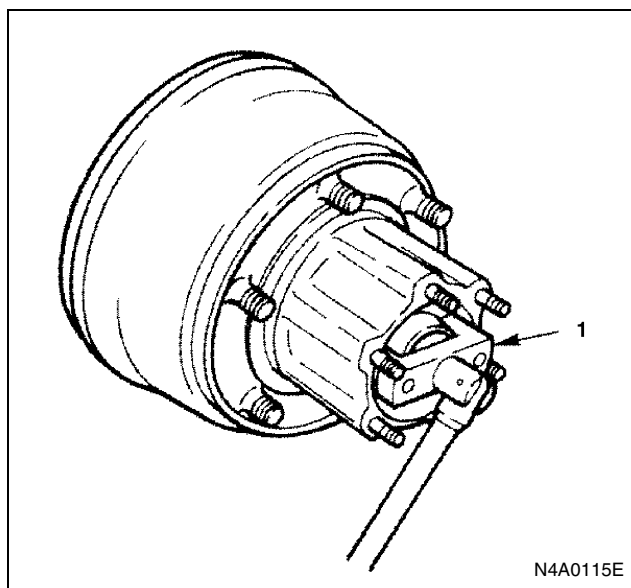
Hub Bearing Preload Measuring Method

- 1) Turn the hub to the left and right several times to establish bearing conformity.
- 2) Use the bearing nut wrench (1) to tighten the bearing nut until the hub can not be manually rotated.

Bearing Nut Wrench:

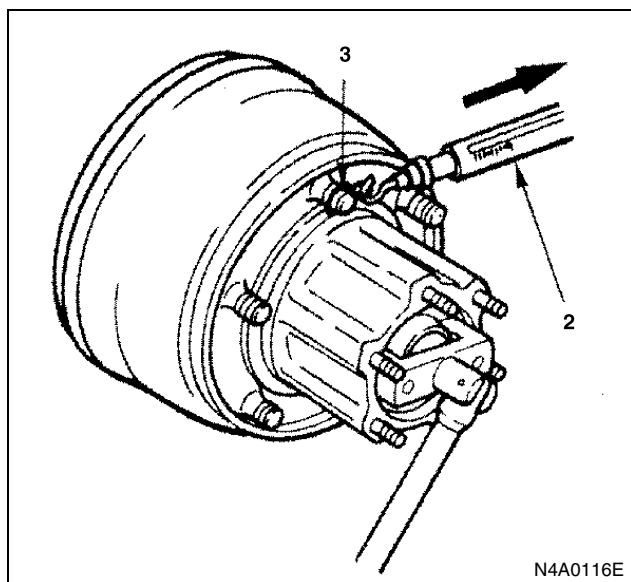
9-8522-1188-0 (For lock bolt P.C.D. 70 mm (2.8 in.))

9-8522-1606-0 (For lock bolt P.C.D. 74 mm (2.9 in.))



- 3) Loosen the bearing nut until hub rotates easily.
- 4) Set the spring balancer (2) to the wheel pin (3) in the position shown in the illustration.
- 5) Measure the hub bearing preload by carefully pulling on the spring balancer and noting the indicator reading.

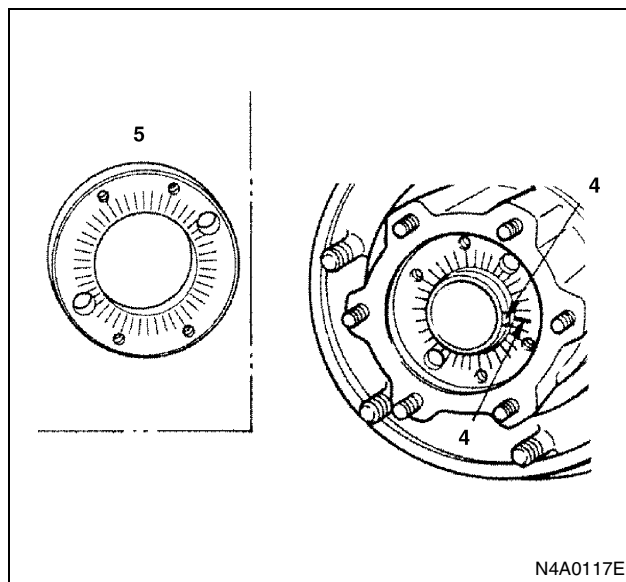
Hub Bearing Preload (At Wheel Pin)		N (kg/lb)
P.C.D.139.7		61.1 — 75.6 (6.2 — 7.7/13.7 — 17)
P.C.D.170		50.2 — 62.2 (5.1 — 6.3/11.2 — 13.9)
P.C.D.184.15		46.3 — 57.4 (4.7 — 5.9/10.4 — 13)
P.C.D.203.2		42 — 52 (4.3 — 5.3/ 9.5 — 11.7)
P.C.D.222.25		38 — 48.0 (3.9 — 4.9/ 8.6 — 10.8)



- 6) Rotate the hub several times to the right and left.
- 7) Measure the bearing preload a second time.
- 8) Align the axle case groove with the closest bearing nut slit.

Notice:

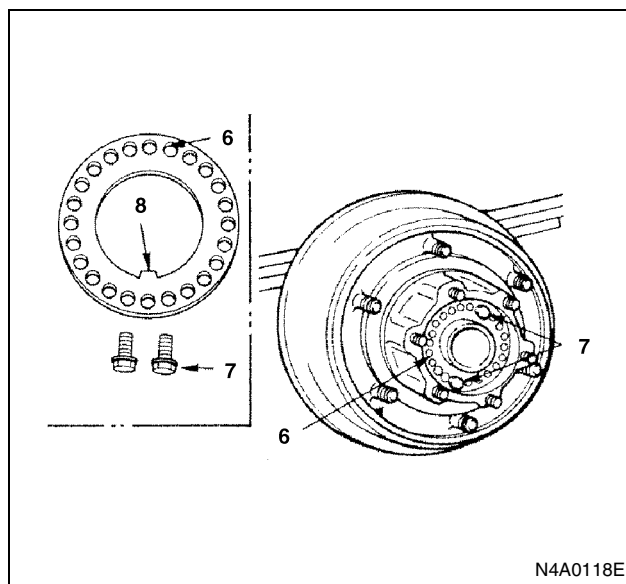
If it is difficult to align the axle case and bearing nut, slightly tighten the bearing nut.

**Legend**

4. Bearing nut slit
5. Lock nut

11. Lock Washer

- 1) Install the lock washer (6) with the lock washer tabs inserted to the axle case grooves.
- 2) Install the lock bolts (7) to prevent the bearing nut from loosening.
- 3) Check that the lock washer tabs (8) are inserted to the axle case grooves.



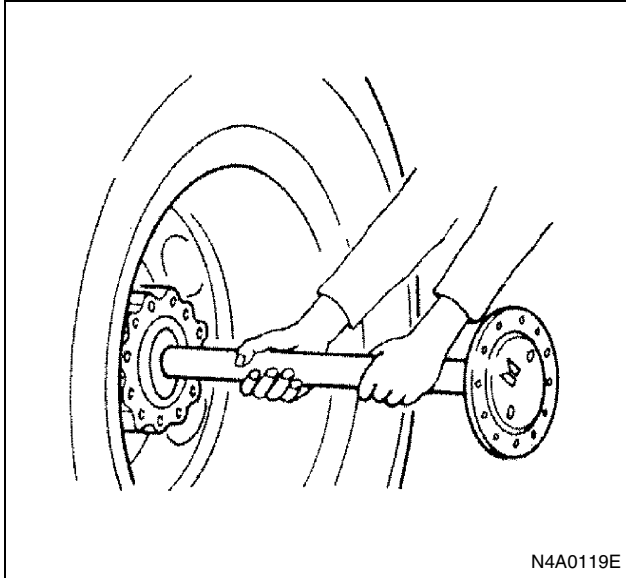
12. Outer Oil Seal

Apply grease to the oil seal lip inner and outer circumferences.

- NHR, NKR, S/Tire: 167 N·m (17 kg·m / 123 lb·ft)

13. Axle Shaft

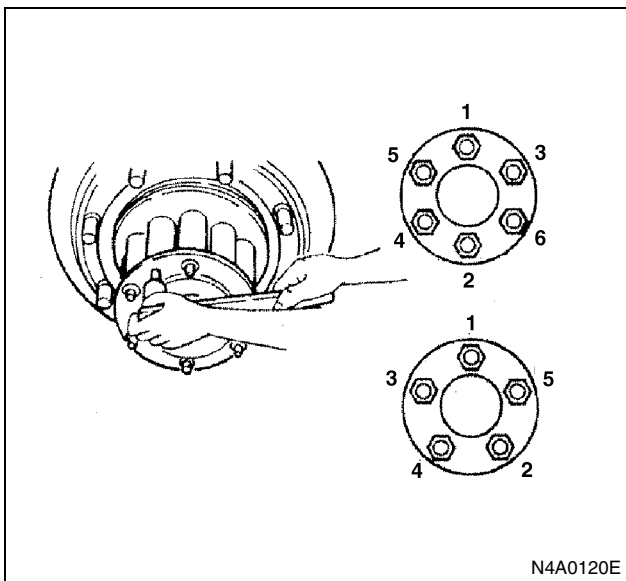
- 1) Clean the axle shaft.
- 2) Apply gear oil to the axle shaft spline.
- 3) Insert the axle shaft into the axle case.
Take care not to damage the oil seal.



- 4) Tighten the axle shaft nuts to the specified torque a little at a time in the numerical order shown in the illustration.

Tighten:

Axel shaft nut to 46 N·m (4.7 kg·m / 34 lb·ft)



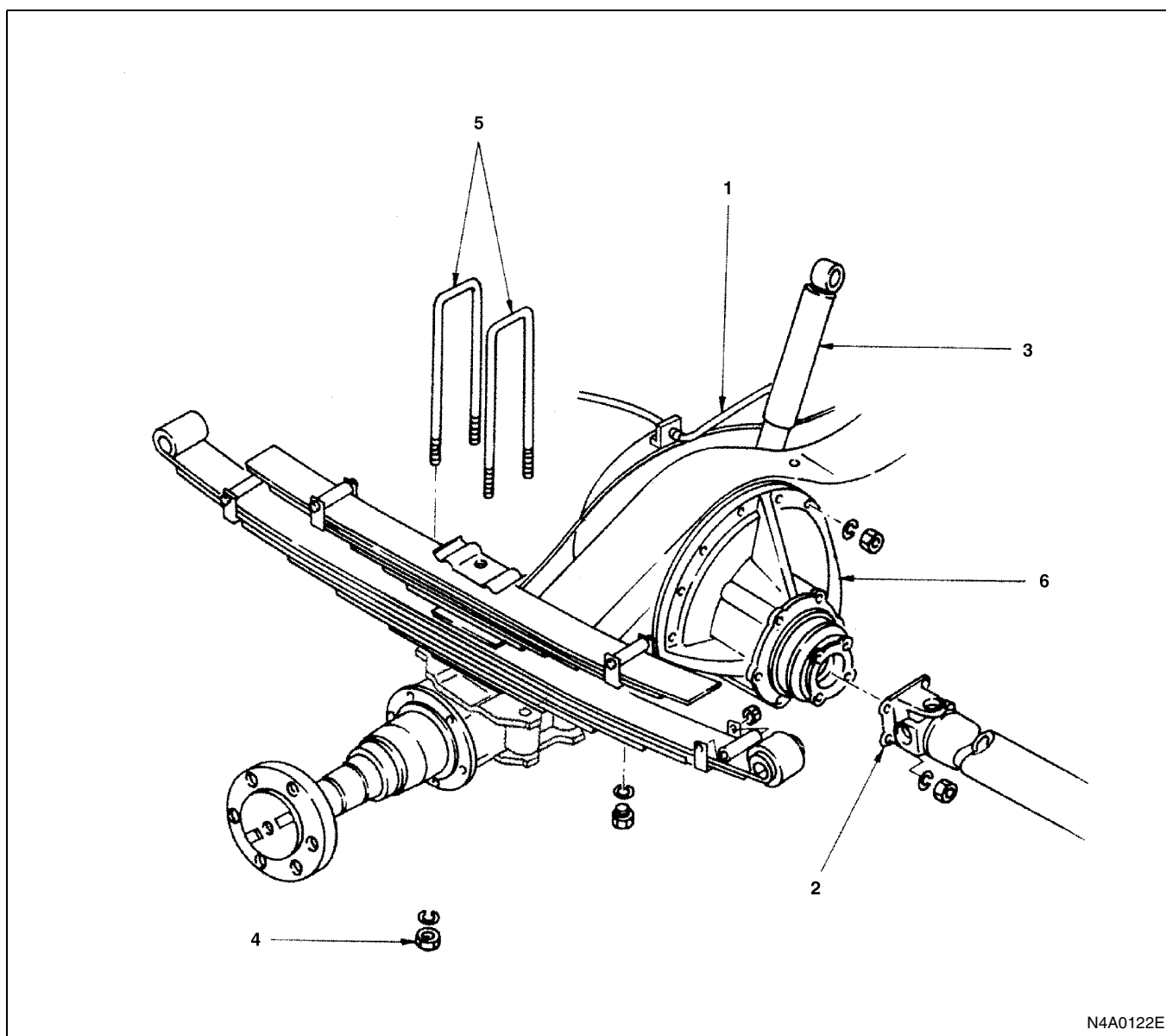
14. Wheel and Tire

Tighten:

Wheel nut to

- NHR Dual Tire, NKR NPR Flat low: 343 N·m (35 kg·m / 253 lb·ft)
- Except above models: 490 N·m (50 kg·m / 361 lb·ft)

Rear Axle Assembly



Legend

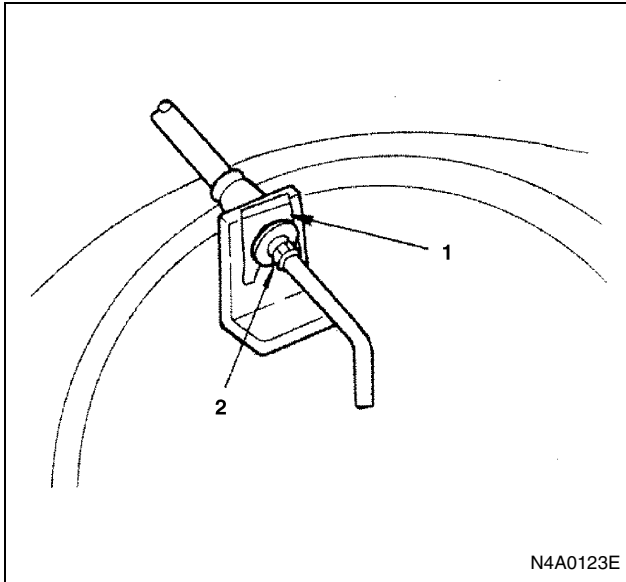
- | | |
|-------------------------|-----------------------|
| 1. Rear flexible hose | 4. Nut and washer |
| 2. Rear propeller shaft | 5. U-bolt |
| 3. Rear shock absorber | 6. Rear axle assembly |

Removal

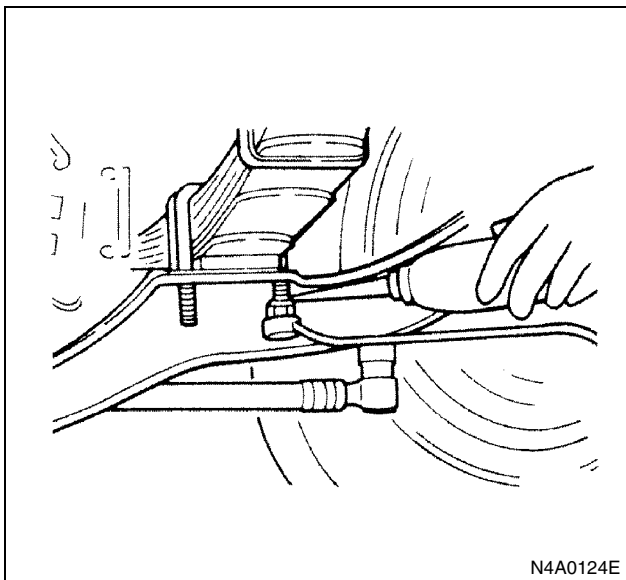
Preparation:

Jack up and support the vehicle on stands.

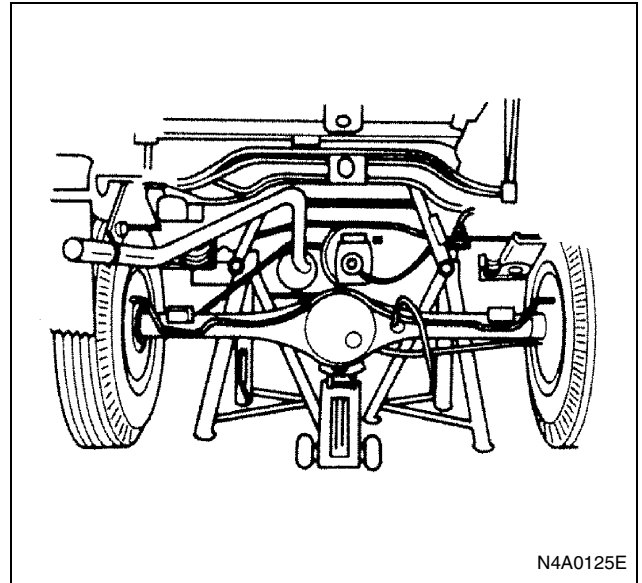
1. Rear Flexible Hose
Loosen the nut (1), then pry off a clip (2).



2. Rear Propeller Shaft
3. Rear Shock Absorber
Remove the shock absorber lower end.
4. Nut and Washer
If the U-bolt are heavily rusted, apply a generous amount of oil to the threads when turning them loose to prevent seizure.



5. U-bolt
6. Rear Axle Assembly
Move to the rear axle side.



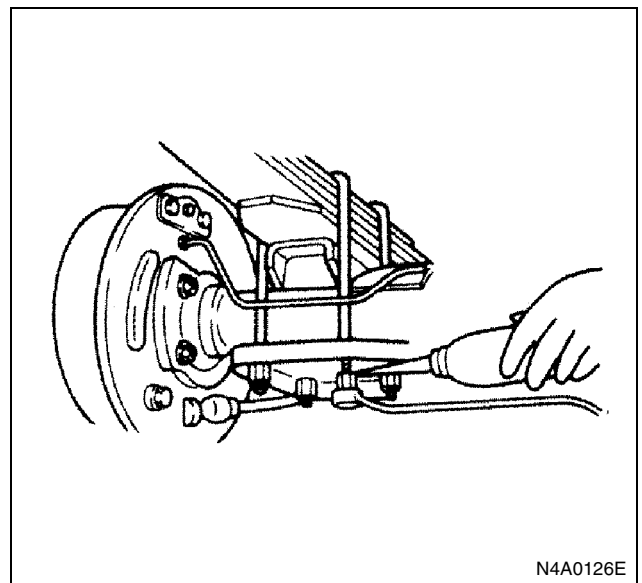
Installation

1. Rear Axle Assembly
2. U-bolt
3. Nut and Washer
When tightening the nuts apply oil as necessary to prevent damaging the threads.

Tighten:

U-bolt nut

- NQR: 294 N·m (30 kg·m / 217 lb·ft)
- Except NQR: 177 N·m (18 kg·m / 130 lb·ft)

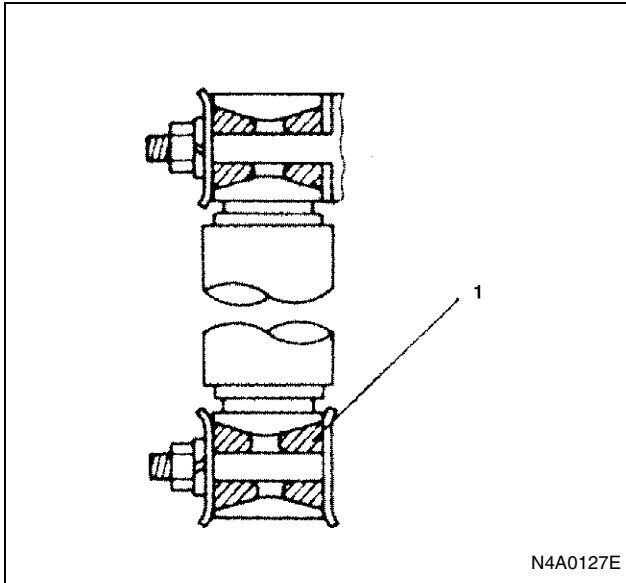


4. Rear Shock Absorber
Refer to the drawing for parts installation.

Tighten:

Shock absorber lower nut

- NHR, NKR single tire: 61 N·m (6.2 kg·m / 45 lb·ft)
- NKR dual tire: 95 N·m (9.7 kg·m / 70 lb·ft)
- NPR, NQR, NPS: 40 N·m (4.1 kg·m / 30 lb·ft)



Legend

1. Rubber bushing

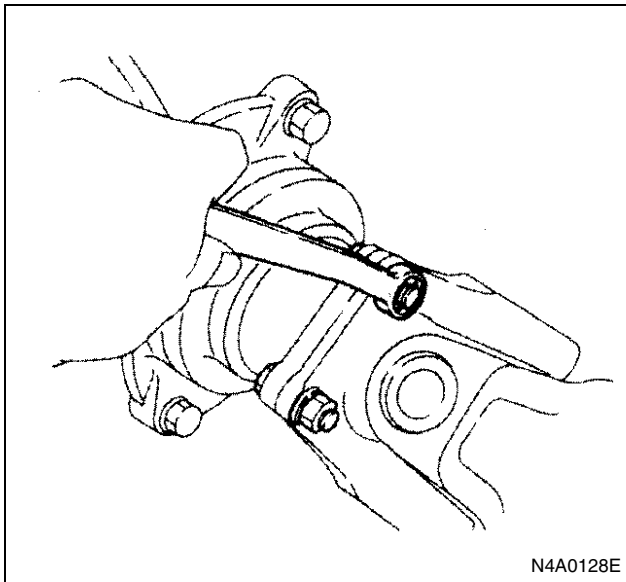
5. Rear Propeller Shaft

Connect the propeller shaft assembly after tightening U-bolt nuts.

Tighten:

Propeller shaft nut

- M10: 63 N·m (6.4 kg·m / 46 lb·ft)
- M12: 103 N·m (10.5 kg·m / 76 lb·ft)

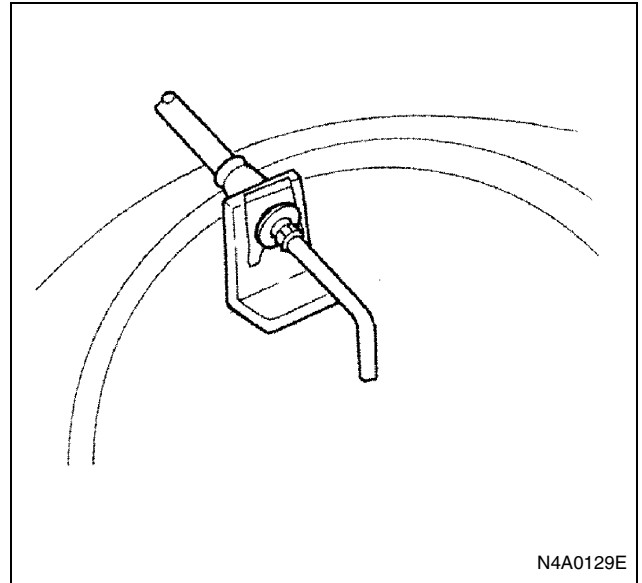


6. Rear Flexible Hose

To install, follow the disassemble procedure in reverse order.

Tighten:

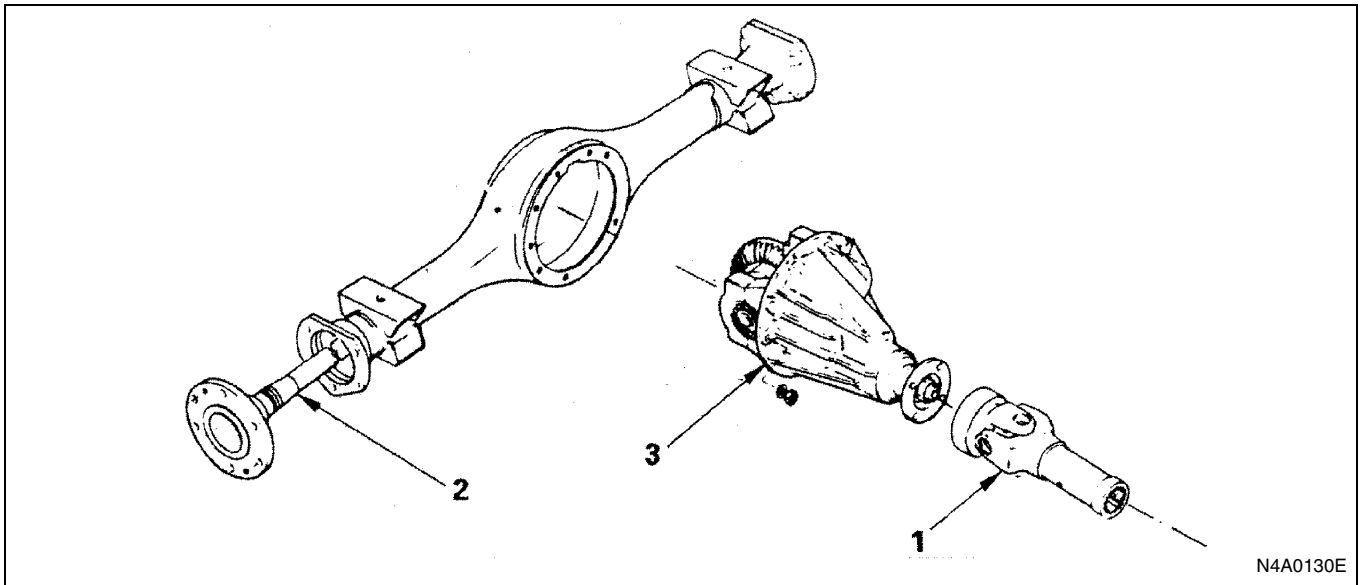
Flare nut to 16 N·m (1.6 kg·m / 12 lb·ft)



Perform bleeding operation after installation of the brake flexible hoses.

Refer to Section 5 "Service information" for brake oil air bleeding procedure.

Differential Assembly (NHR Single Tire Model; Semi-Floating)



Legend

- | | |
|-----------------------------------|--------------------------|
| 1. Propeller shaft | 3. Differential assembly |
| 2. Axle shaft with brake assembly | |

Removal

Preparation:

- Raise vehicle to working level.
- Support the axle assembly with suitable jack and chassis stand.
- Drain the oil from the axle case.

1. Propeller Shaft

2. Axle Shaft with Brake Assembly

To remove the axle shaft assembly, follow the removal procedure outlined under "Rear Hub and Brake Drum" after finding the axle assembly is semi-floating rear axle.

3. Differential Assembly

3. Propeller Shaft

Tighten:

Propeller shaft nut torque: 63 N·m (6.4 kg·m / 46 lb·ft)

Installation

1. Differential Assembly

Apply liquid gasket (BELCO BOND NO. 4 or equivalent) to the jointing faces of the axle case and carrier.

Tighten:

Differential carrier bolt and nut to

- Bolt: 64 N·m (6.5 kg·m / 47 lb·ft)
- Nut: 64 N·m (6.5 kg·m / 47 lb·ft)

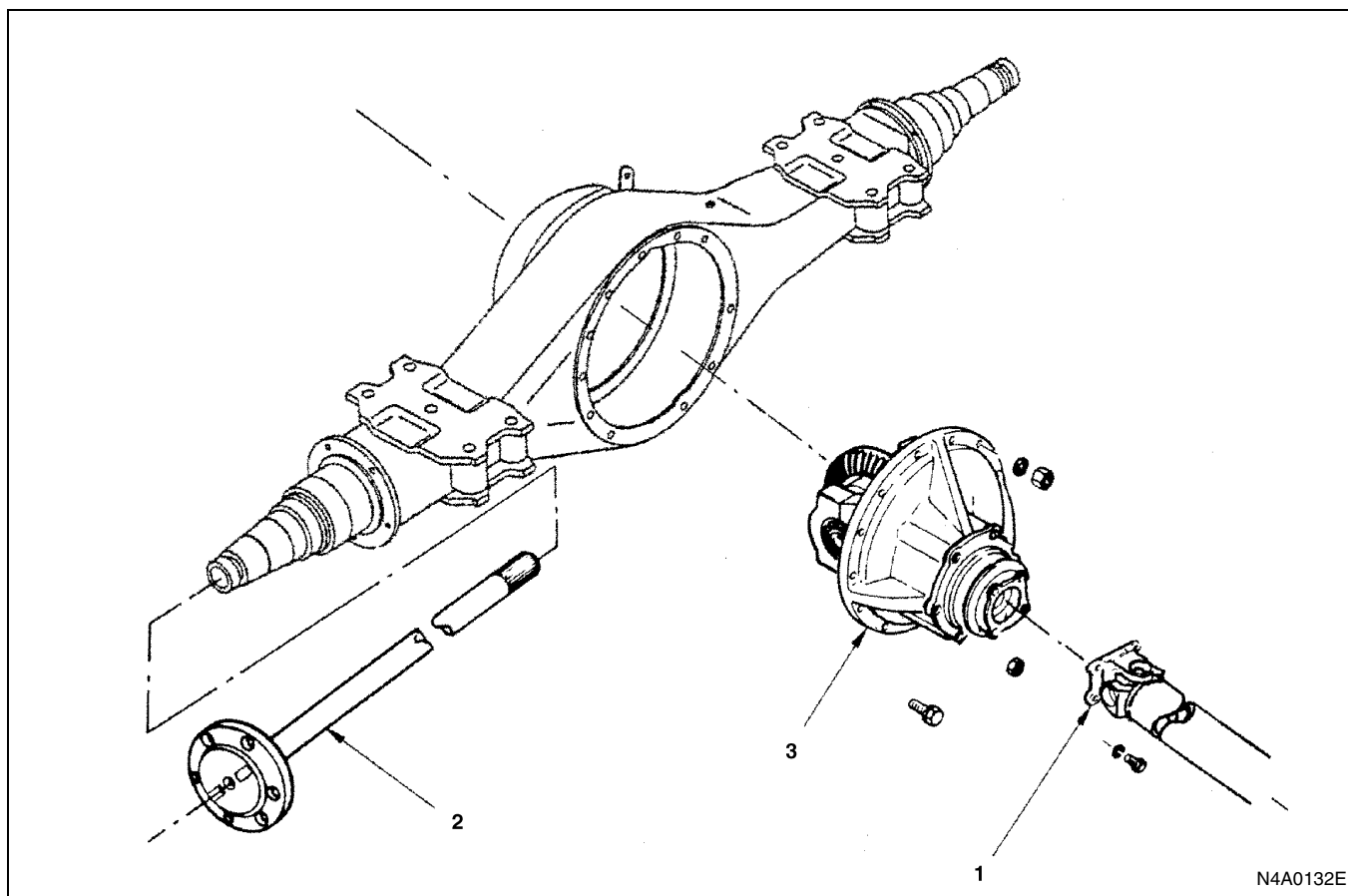
2. Axle Shaft with Brake Assembly

To install the axle shaft assembly, follow the installation procedure outlined under "Rear Hub and Brake Drum" after finding the axle assembly is semi-floating rear axle.

Tighten:

Bearing holder nut to: 74 N·m (7.5 kg·m / 54 lb·ft)

Differential Assembly (NKR Single Tire and All Dual Tire Models; Full Floating)



Legend

- 1. Propeller shaft
- 2. Axle shaft

- 3. Differential assembly

Removal

Preparation:

Drain the oil from the axle case.

1. Propeller Shaft
2. Axle Shaft
3. Differential Assembly

To remove, turn push bolt into threaded holes in the differential carrier, so that differential assembly is lifted off the position.

2. Axle Shaft

Tighten:

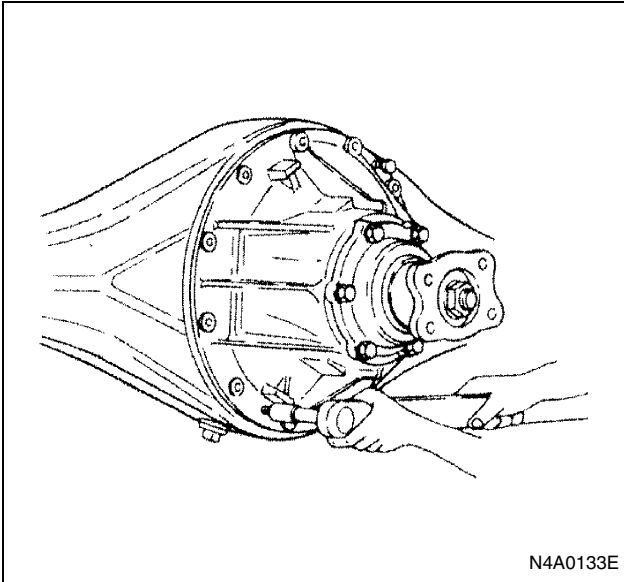
Axle shaft nut to 46 N·m (4.7 kg·m / 34 lb·ft)

3. Propeller Shaft

Tighten:

Propeller shaft nut to

- M10: 62.7 N·m (6.4 kg·m / 46 lb·ft)
- M12: 103 N·m (10.5 kg·m / 76 lb·ft)



Installation

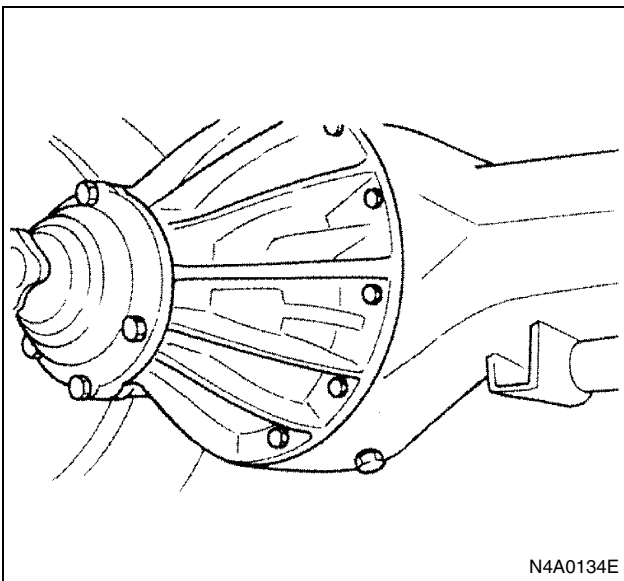
1. Differential Assembly

Apply liquid gasket (BELCO BOND No. 4 or equivalent) to the joining faces of the axle case and carrier.

Tighten:

Differential carrier bolt and nut to

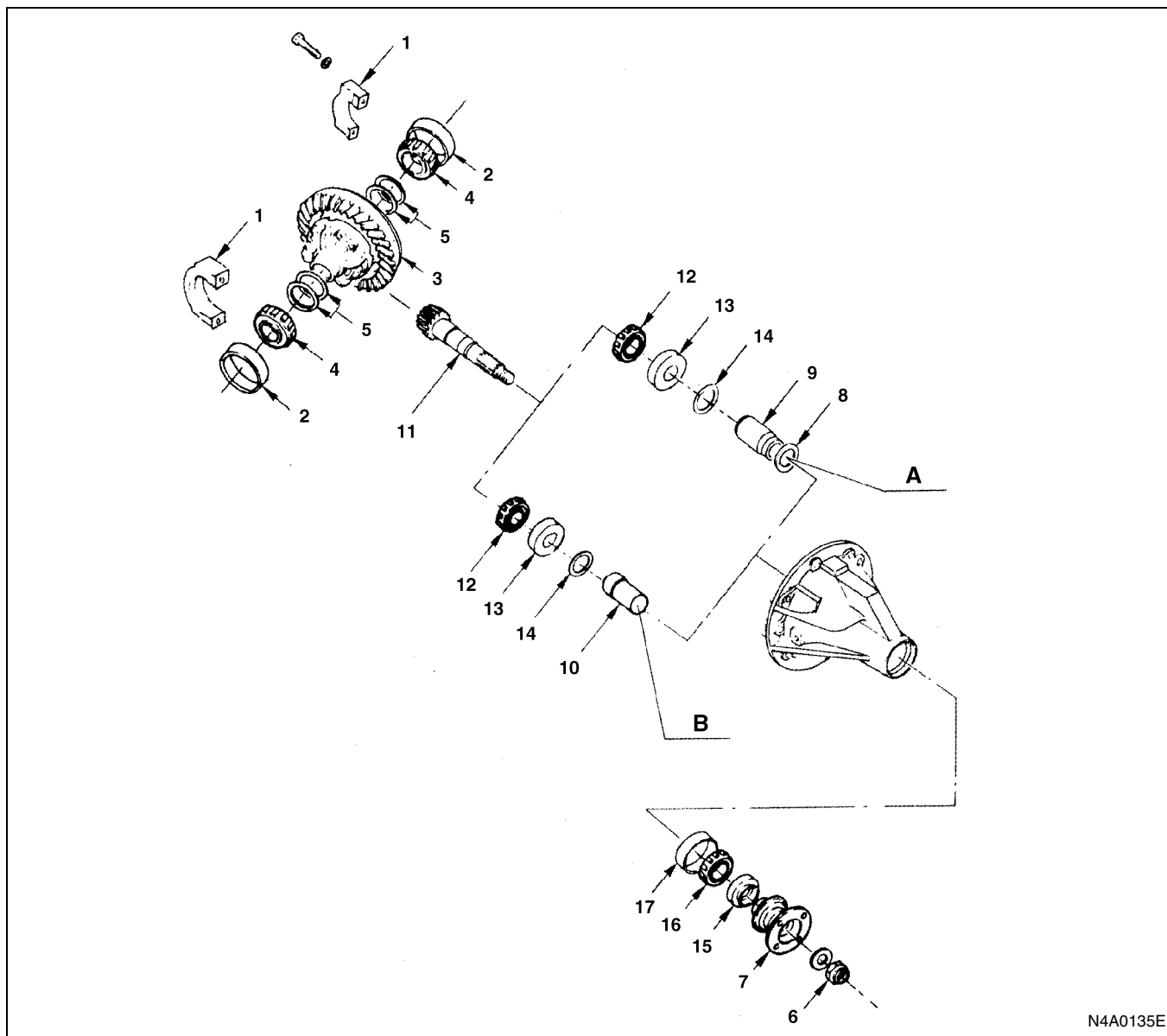
- 244 — 320 mm differential: 64 N·m (6.5 kg·m / 47 lb·ft)



UNIT REPAIR

244 mm Rear Differential

Major Components



N4A0135E

Legend

- | | |
|--|------------------------------------|
| A. NKR | 9. Distance piece (NKR model) |
| B. NHR | 10. Collapsible spacer (NHR model) |
| 1. Bearing Cap | 11. Drive pinion |
| 2. Side bearing outer race | 12. Inner bearing inner race |
| 3. Differential cage assembly | 13. Inner bearing outer race |
| 4. Side bearing inner race | 14. Pinion depth adjusting shim |
| 5. Backlash and preload adjusting shim | 15. Oil seal |
| 6. Flange nut | 16. Outer bearing inner race |
| 7. Flange | 17. Outer bearing outer race |
| 8. Bearing preload adjusting shim | |

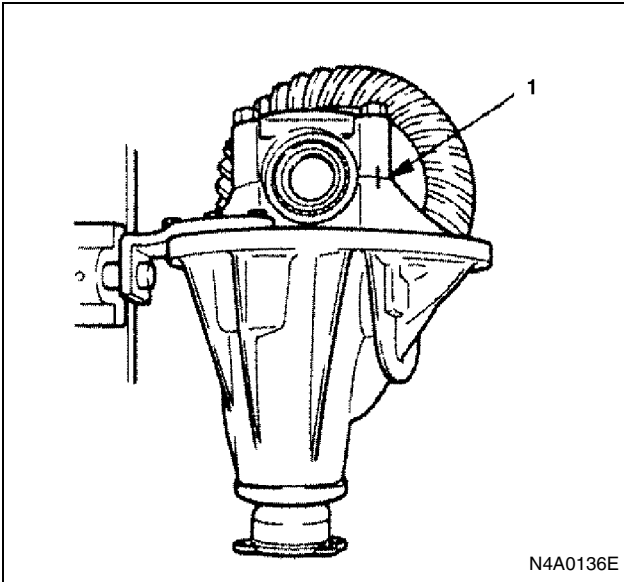
Disassembly

1. Bearing cap

Set the differential assembly onto a special fixture.
Apply a setting mark (1) to the side bearing cap and differential carrier.

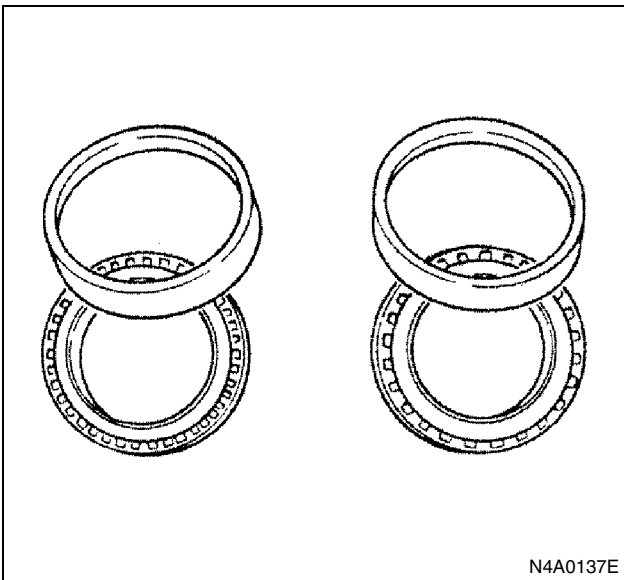
Fixture: 5-8840-2029-0

Base: 5-8840-0003-0



2. Side Bearing Outer Race

After removal, keep right and left side bearing assemblies separate to maintain inner and outer race combinations.



3. Differential Cage Assembly

4. Side Bearing Inner Race

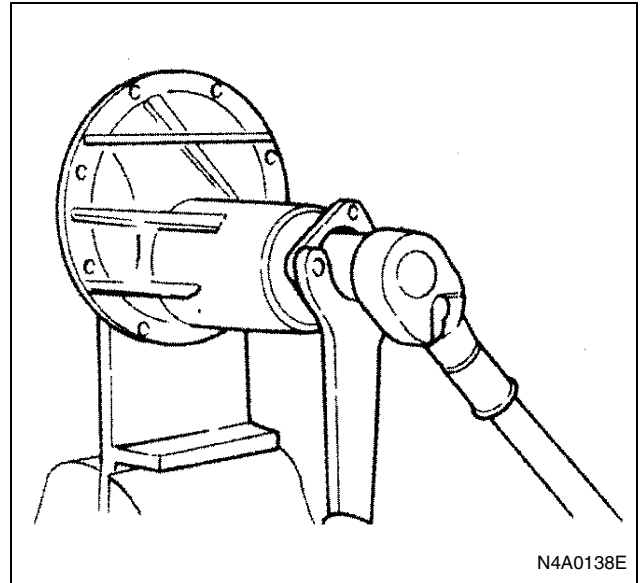
Remover: 9-8521-0061-0

Adapter: 5-8840-2031-0

5. Backlash and Preload Adjusting Shim

6. Flange Nut

Holding wrench: 9-8511-1507-0



7. Flange

8. Bearing Preload Adjusting Shim

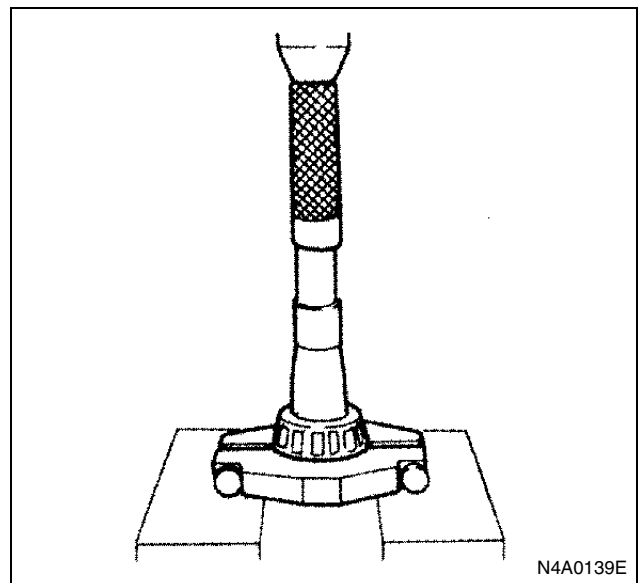
9. Distance Piece (NKR model)

10. Collapsible Spacer (NHR model)

11. Drive Pinion

12. Inner Bearing Inner Race

Remover: 5-8840-0015-0



13. Inner Bearing Outer Race

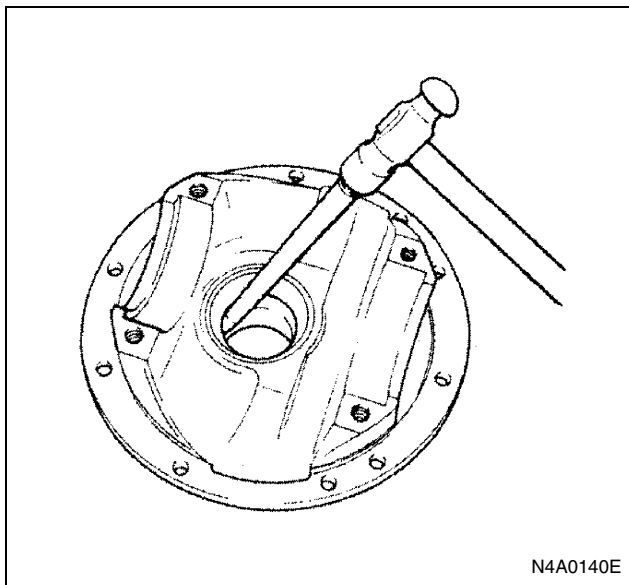
14. Pinion Depth Adjusting Shim

15. Oil Seal

16. Outer Bearing Inner Race

17. Outer Bearing Outer Race

Drive out the inner bearing outer race or the outer bearing outer race together with the outer bearing inner race and oil seal by using a proper bar through two notches.



Reassembly

Measurement of ring gear run-out

Install dummy bearing into the differential assembly, then install these parts in the differential carrier.

Install and tighten the bearing cap.

Dummy bearing: 9-8522-1137-0

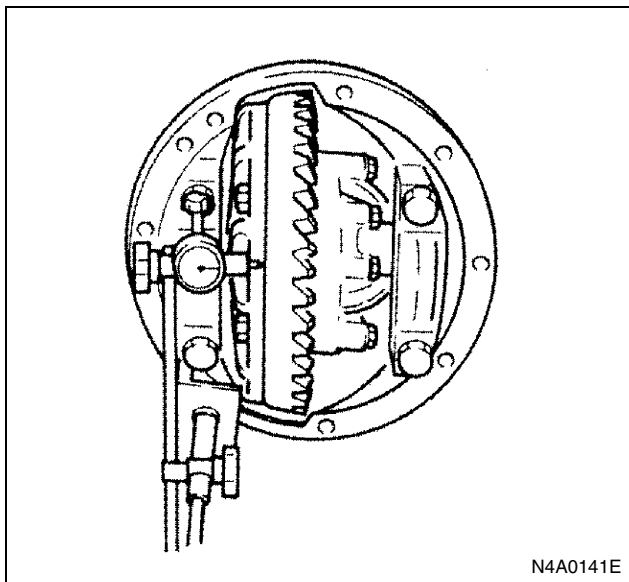
Tighten:

Bearing cap bolt to 108 N·m (11.0 kg·m / 80 lb·ft)

Ring gear run-out,

Standard: 0.05 mm (0.002 in)

Limit: 0.2 mm (0.008 in)



1. Outer Bearing Outer Race
2. Pinion Depth Adjusting Shim
3. Inner Bearing Outer Races

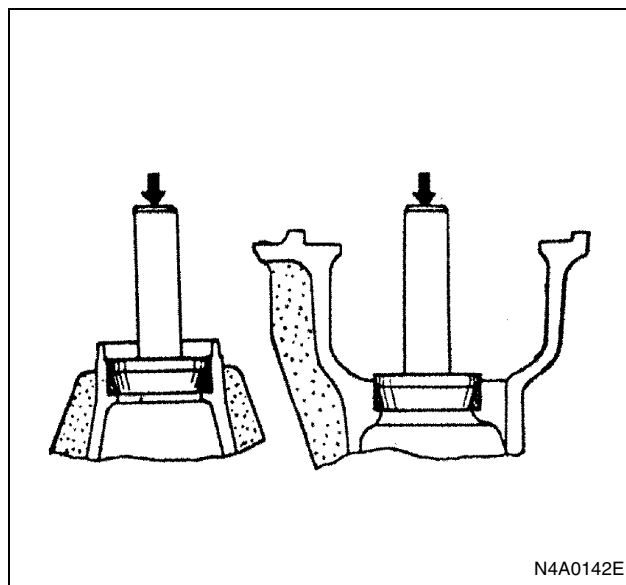
Adjustment of drive pinion engagement depth.

Install the inner and outer bearing outer races without shims into the differential carrier using a bench press.

Installer (inner): 9-8522-1196-0

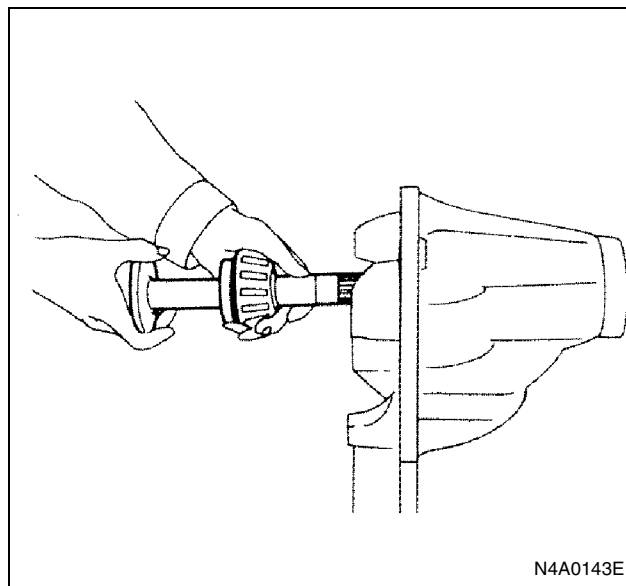
(Outer): 9-8522-1197-0

Grip: 9-8522-1148-0



Assemble the inner bearing inner race to the dummy pinion shaft, then install these parts into the carrier.

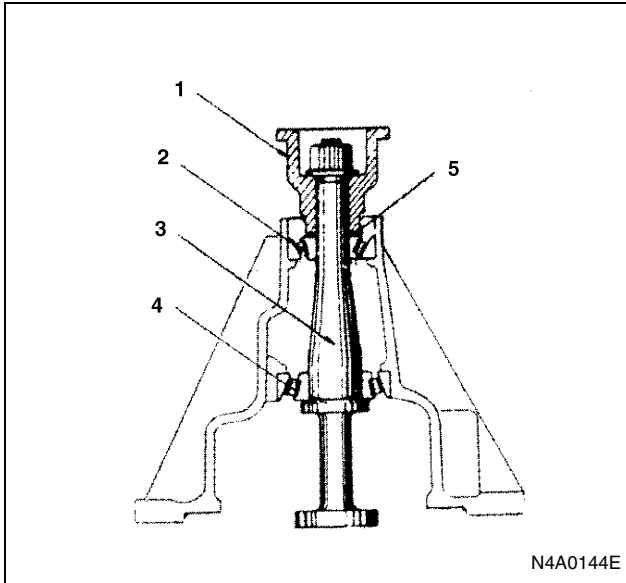
Dummy Pinion Shaft: 9-8522-1603-0



Install the outer bearing inner race, flange, washer and dummy nut.

Lubricate the bearing before tighten the dummy nut.

Dummy Nut: 9-8522-1624-0



Legend

1. Coupling driver
2. Outer bearing
3. Dummy pinion shaft
4. Inner bearing
5. Shim

Tighten the dummy nut until specified preload are required to rotate the bearing.

Bearing preload

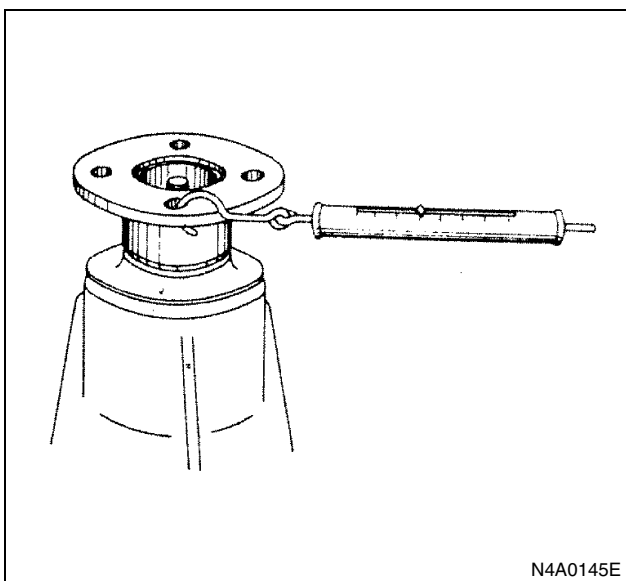
New bearing: 16 — 29 N (1.6 — 3.0 kg / 3.5 — 6.6 lb)

Used bearing: 8 — 14.5 N (0.8 — 1.5 kg / 1.8 — 3.3 lb)

Tighten:

Starting to

- New bearing: 0.69 — 1.27 N·m (7.0 — 13.0 kg·cm / 6.1 — 11.3 lb·in)
- Used bearing: 0.35 — 0.64 N·m (3.5 — 6.5 kg·cm / 3.1 — 5.7 lb·in)



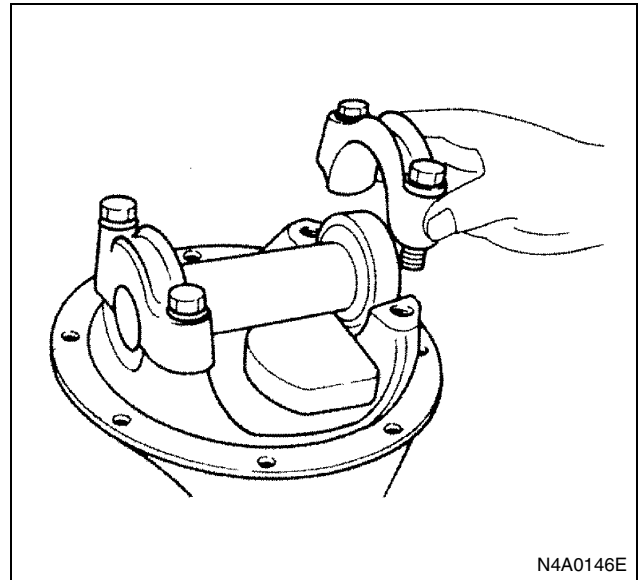
Install dummy bearing on dummy shaft and install these parts into the carrier. Install and tighten the bearing cap.

Dummy Shaft: 9-8522-1138-0

Dummy Bearing: 8-8522-1137-0

Tighten:

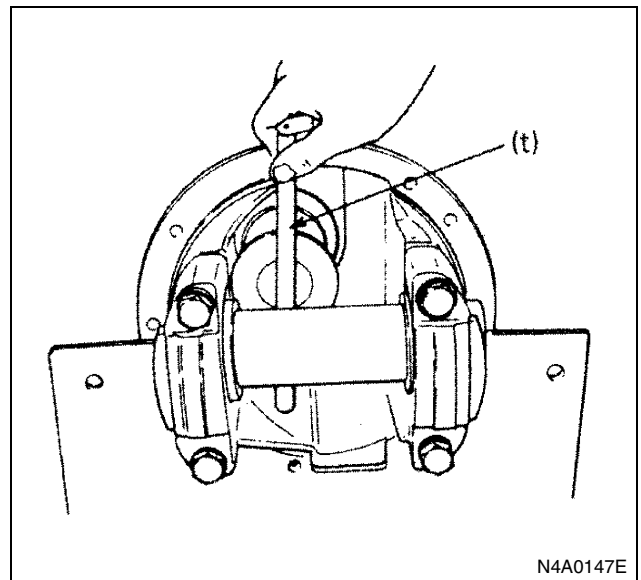
Bearing cap bolt to 108 N·m (11.0 kg·m / 80 lb·ft)



Measure the clearance (t) with a feeler gauge.

The clearance (t) is equal to the shim in thickness.

Thickness of shim available, 2.12, 2.16 ... 2.52, 2.56 mm (0.083, 0.085 ... 0.099, 0.100 in)

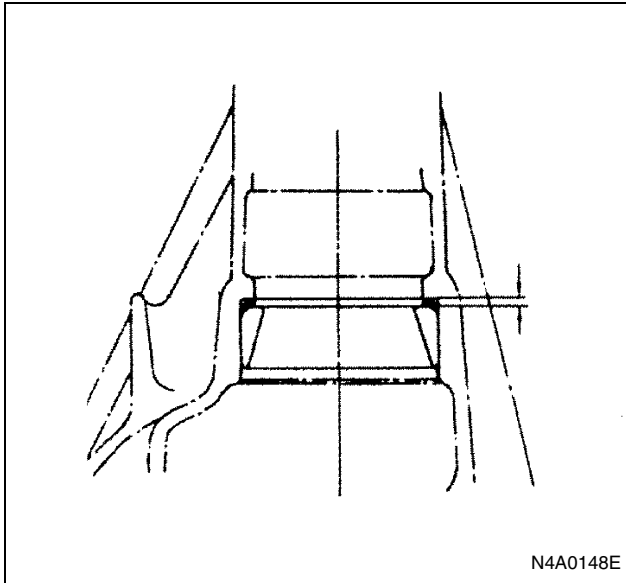


Remove dummy pinion, dummy shaft, dummy bearing and inner bearing outer race.

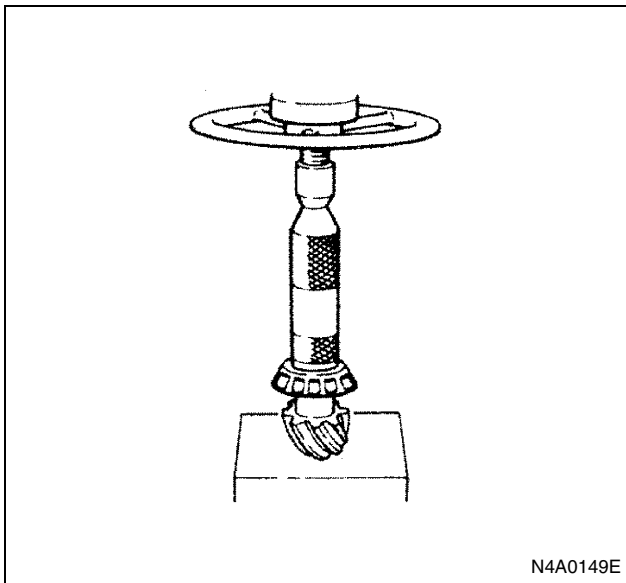
Install pinion depth adjusting shim of specified thickness in position between the inner bearing outer race and the carrier, then install the inner bearing outer race.

Installer: 9-8522-1196-0

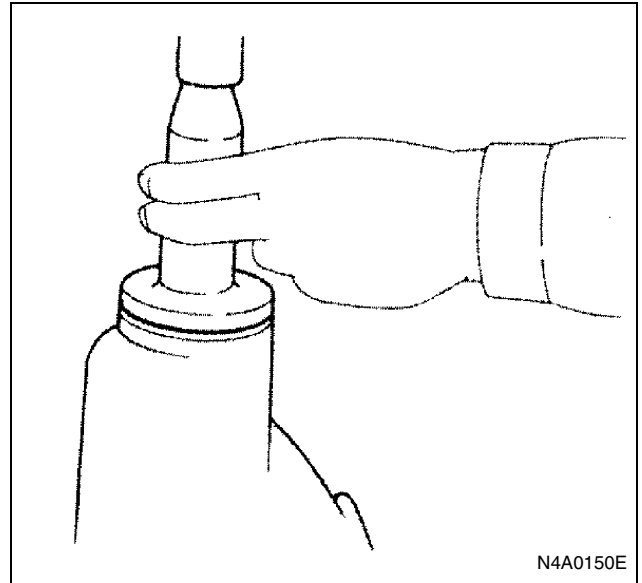
Grip: 9-8522-1148-0



4. Inner Bearing Inner Race
Installer: 9-8522-0018-0
Apply gear oil to the pinion shaft before installing final drive pinion assembly into carrier.



5. Outer Bearing Inner Race
6. Oil seal
Installer: 5-8840-2047-0



7. Drive Pinion
8. Collapsible Spacer (NHR model)
Discard used collapsible spacer and install a new one.
9. Distance Piece (NKR model)
10. Bearing Preload Adjusting Shim (NKR model)
Use a dummy nut until specified bearing preload is obtained.

Bearing preload

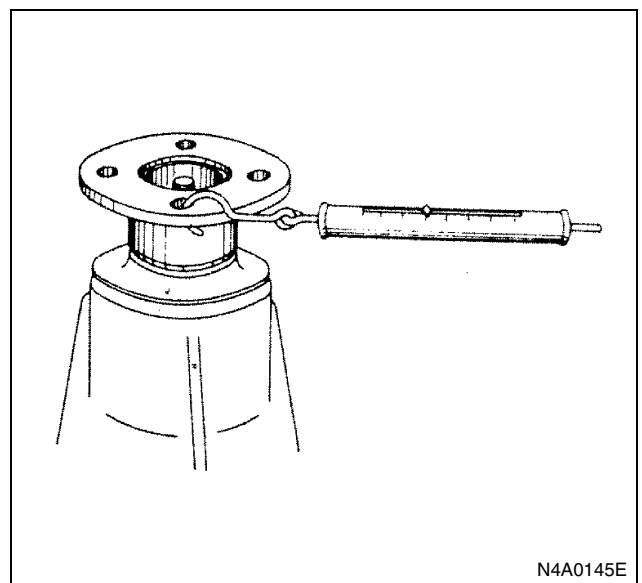
New bearing: 16 — 29 N (1.6 — 3.0 kg / 3.5 — 6.6 lb)

Used bearing: 8 — 14.5 N (0.8 — 1.5 kg / 1.8 — 3.3 lb)

Tighten:

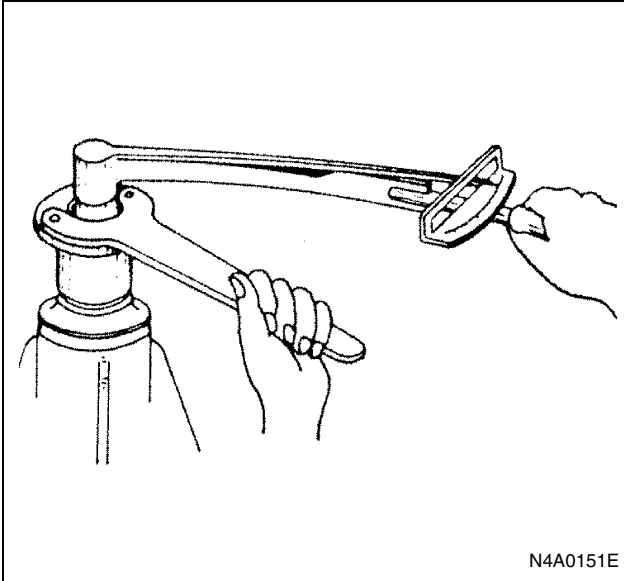
Starting to

- New bearing: 0.69 — 1.27 N·m (7.0 — 13.0 kg·cm / 6.1 — 11.3 lb·in)



Tighten:

Dummy nut to 270 N·m (27.5 kg·m / 199 lb·ft)



Thickness of shim available, 1.53, 1.56 ... 2.07, 2.10 mm (0.060, 0.061 ... 0.081, 0.082 in)

11. Flange

12. Flange Nut

(NHR only for collapsible spacer)

1) Tighten the flange nut to a torque of 245 N·m (25 kg·m/181 lb·ft).

2) Make an adjustment by tightening the flange nut until specified bearing pre-load is obtained.

Bearing preload

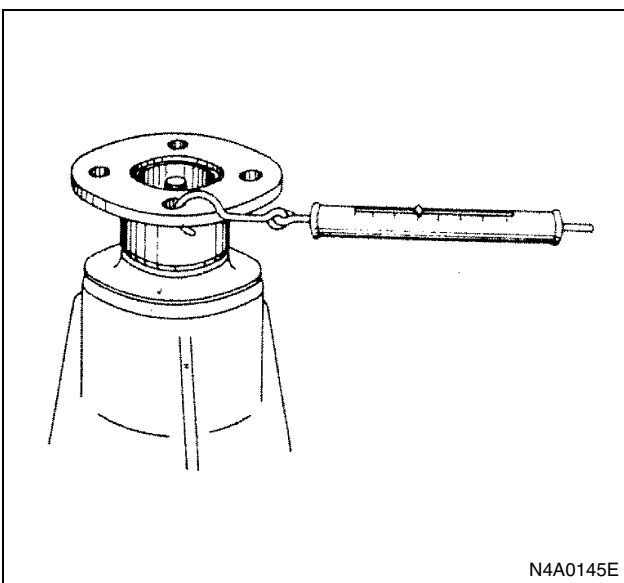
New bearing: 16 — 29 N (1.6 — 3.0 kg / 3.5 — 6.6 lb)

Used bearing: 8 — 14.5 N (0.8 — 1.5 kg / 1.8 — 3.3 lb)

Tighten:

Starting to

- New bearing: 0.69 — 1.27 N·m (7.0 — 13.0 kg·cm / 6.1 — 11.3 lb·in)
- Used bearing: 0.35 — 0.64 N·m (3.5 — 6.5 kg·cm / 3.1 — 5.7 lb·in)



- 3) The flange nut should be within the specified range when specified bearing preload is obtained.

Tighten:

Flange nut to 245 — 294 N·m (25 — 30 kg·m / 181 — 217 lb·ft)

Discard used flange nut and install new one.

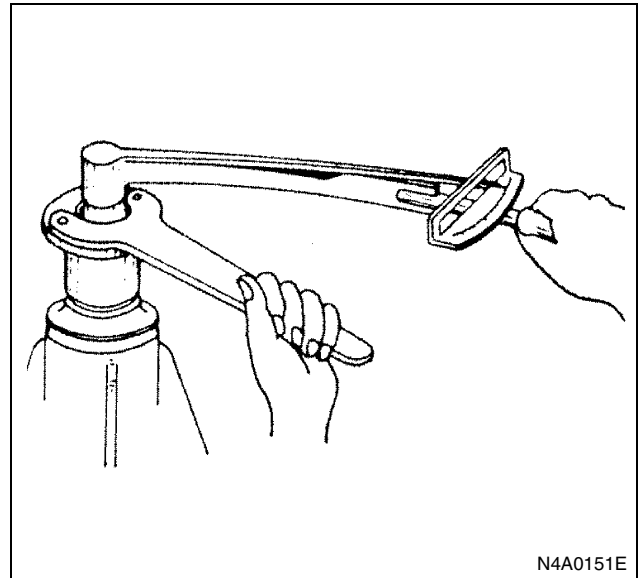
(NKR only for distance piece)

Once specified bearing preload is obtained by dummy nut, remove dummy nut and replace with flange nut.

Tighten the flange nut until specified bearing preload and nut torque.

Using special tool, stake the flange nut at two points.

Punch: 5-8840-2293-0



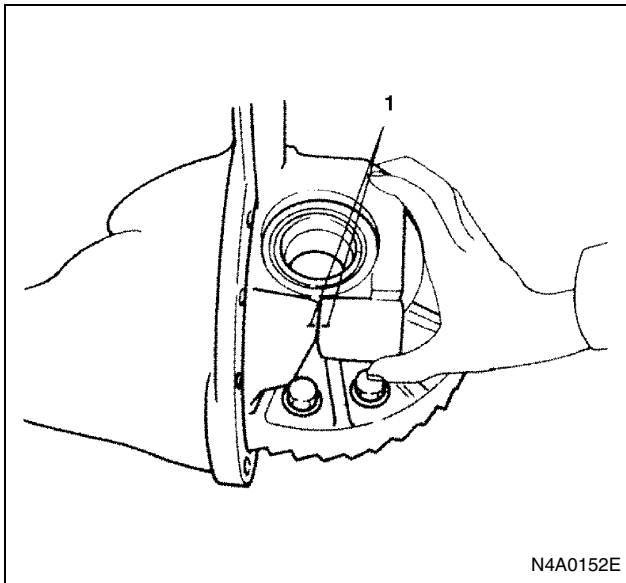
13. Backlash and Preload Adjusting Shim

1) Adjustment of Backlash

- Install dummy bearing in the differential cage assembly, then install differential cage assembly and ring gear into the differential carrier. Install the bearing caps after checking to make certain setting marks (1) applied at disassembly are in alignment.

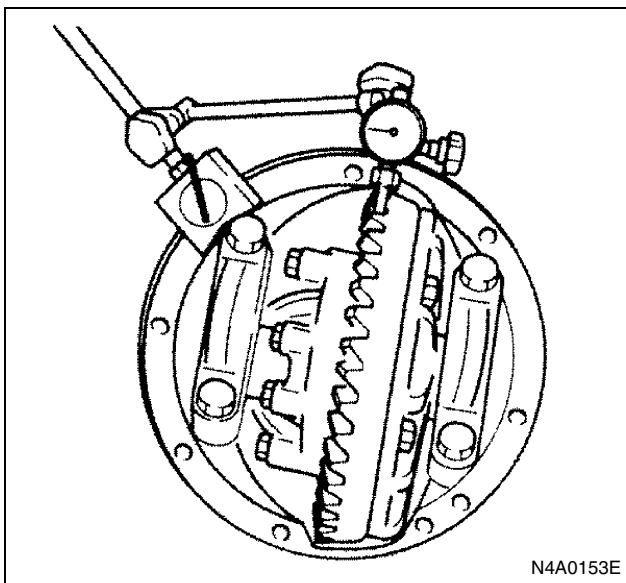
Tighten:

Bearing cap bolt to 108 N·m (11.0 kg·m / 80 lb·ft)



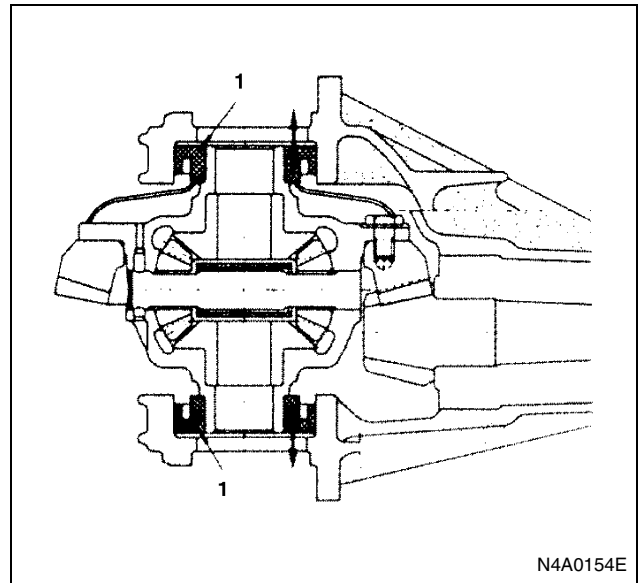
- Set the dial indicator and measure the backlash between the drive pinion and ring gear at the foot portion of the ring gear.

Backlash, 0.15 — 0.20 mm (0.006 — 0.008 in)



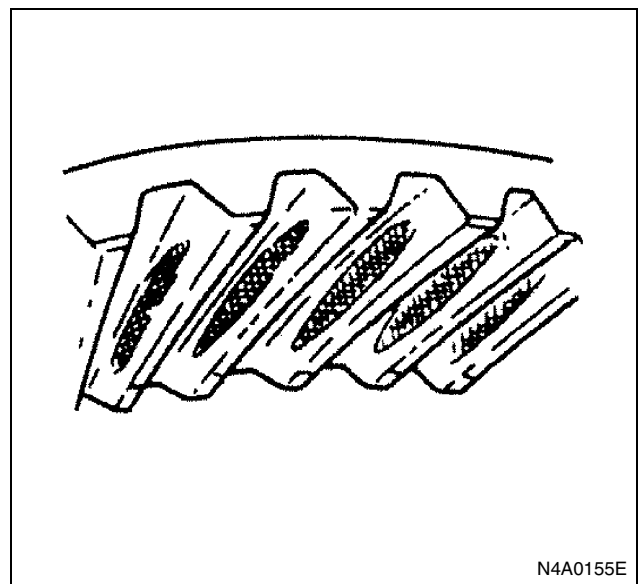
- To adjust backlash, loosen bearing cap bolts slightly and move the dummy bearing (1) as necessary.

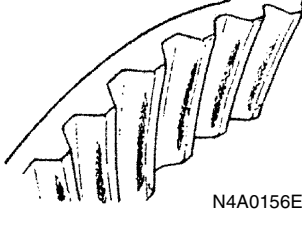
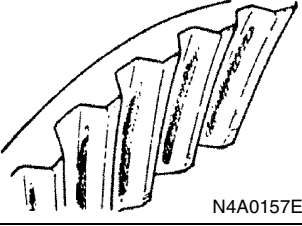
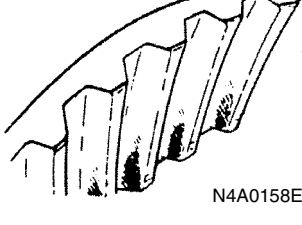
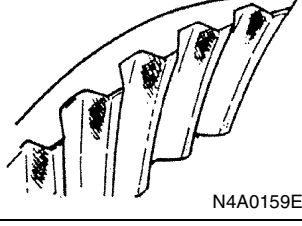
A clearance should not be provided between dummy bearing and bearing fitting face of the differential cage.



- 2) Inspection of drive pinion and ring gear tooth contact.

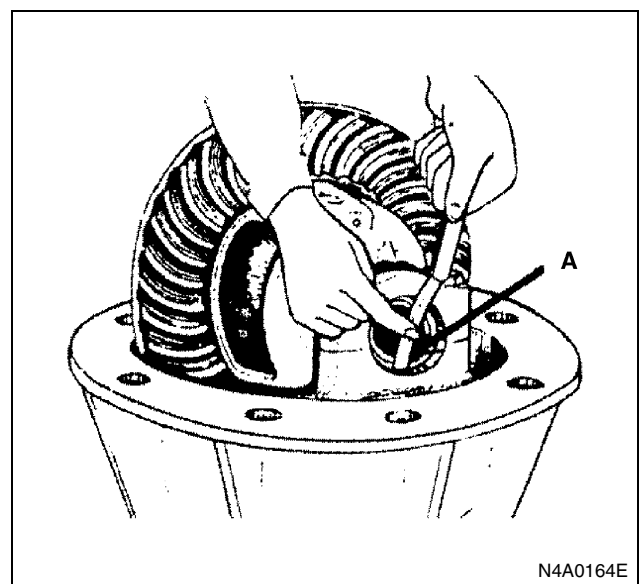
- Apply a thin coat of red check to faces of the 7 — 8 teeth of the ring gear.
- Check the impression of contact (Right contact) obtained on the ring gear teeth and make necessary adjustment as described below if the contact is abnormal.



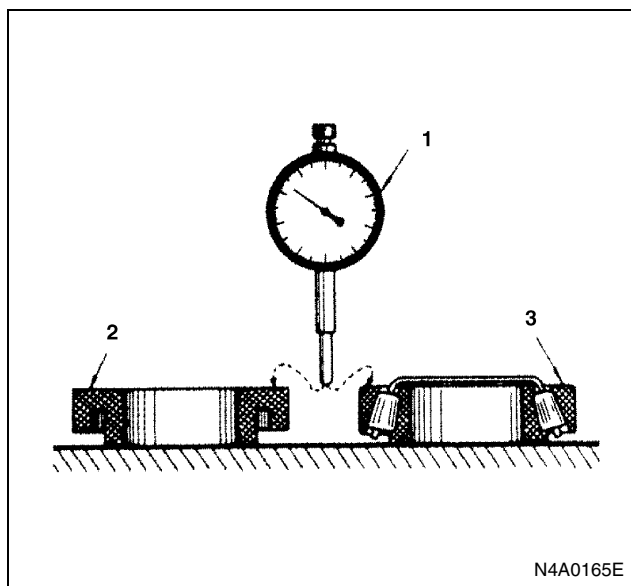
TOOTH CONTACT	CASE	ADJUSTMENT PROCEDURE
 N4A0156E	Drive pinion is too far away from ring gear.	1. Move the drive pinion in toward the ring gear by decreasing the thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear away from the drive pinion.  N4A0160E
 N4A0157E	Drive pinion is too close to the ring gear.	1. Move the drive pinion away from the ring gear by increasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear in toward the drive pinion.  N4A0161E
 N4A0158E	Ring gear is too close to the drive pinion.	1. Move the drive pinion in toward the ring gear by decreasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear away from the drive pinion.  N4A0162E
 N4A0159E	Ring gear is too far away from drive pinion.	1. Move the drive pinion away from the ring gear by increasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear in toward the drive pinion.  N4A0163E

3) Selection of Preload Adjusting Shim

- Measure the clearance (A) between the differential carrier and right and left side (dummy) bearings by using a feeler gauge. Carefully note the relationship between the values obtained through measurement at each side and dummy bearings.



- Measure the thickness of dummy bearing and side bearing. Comparison should be made between the thicknesses of dummy bearing and side bearing installed in the same position.

**Legend**

1. Dial gauge
2. Dummy bearing
3. Side bearing

When side bearing is thinner:

$A + (\text{dummy bearing thickness} - \text{side bearing thickness}) = (X)$

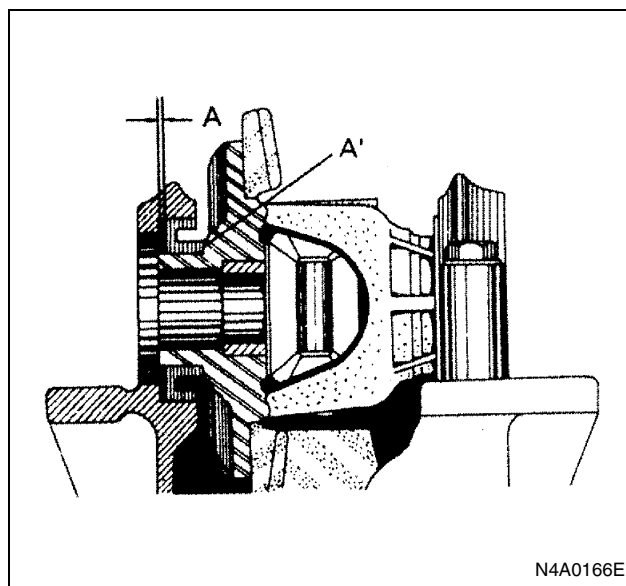
When side bearing is thicker:

$A - (\text{side bearing thickness} - \text{dummy bearing thickness}) = (X)$

- $(X) + 0.025 = \text{Shim thickness}$
Allowance for bearing preload at one side = 0.025

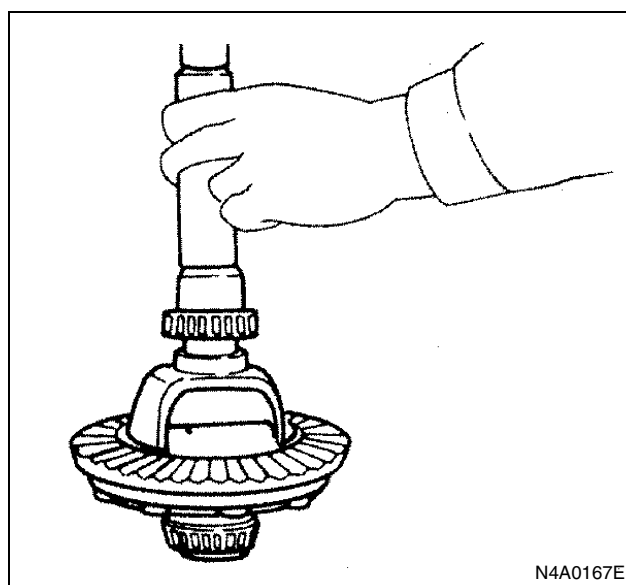
Example of calculation		mm (in.)
Measured Clearance A:		+0.85 (+0.033)
Suppose that the side bearing is thicker [thinner] than dummy bearing by 0.05 mm		-0.05 (-0.002) [+0.05 (+0.002)]
An allowance for bearing preload:		+0.025 (+0.0009)
Thickness of shims to be installed:		0.825 (0.032) [0.925 (0.036)]

Thickness of shim available, 0.25, 0.30, 0.35, 0.5 mm (0.009, 0.012, 0.014, 0.019 in)

**Legend**

- A. Measured clearance
A'. Shim installed position

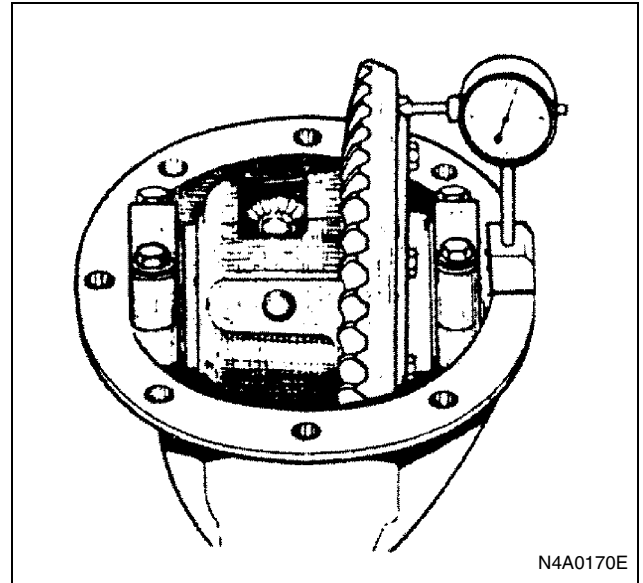
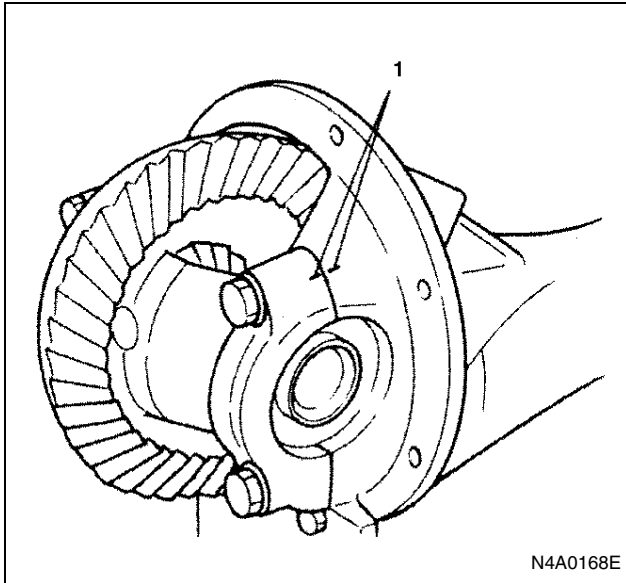
14. Side Bearing Inner Race
Installer: 5-8840-2050-0
Grip: 9-8522-1608-0



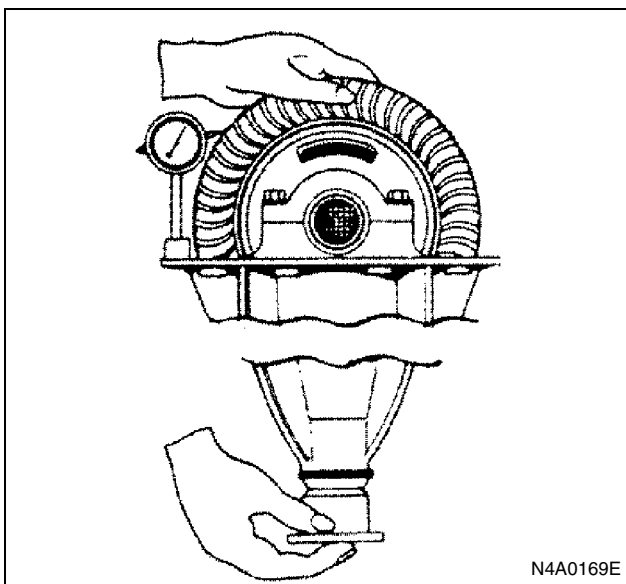
15. Differential Cage Assembly
16. Side Bearing Outer Race
17. Bearing Cap
 - 1) Install bearing caps by aligning setting marks (1) applied at disassembly.

Tighten:

Bearing cap bolt to 108 N·m (11.0 kg·m / 80 lb·ft)



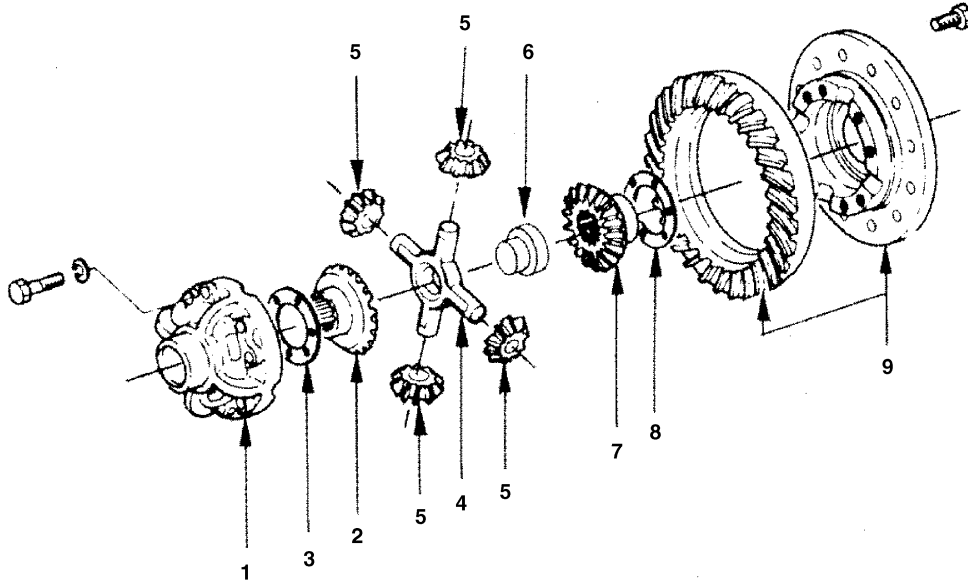
- 2) Recheck the backlash. If measurement indicates that the backlash deviates from the specified range, make an adjustment by shifting the position of shims in use without varying the total thickness.



Recheck the ring gear for run-out at the rear face. If the amount of run-out is excessive, repeat the disassembly and reassembly steps.

Ring gear run-out,
Standard: 0.05 mm (0.002 in)
Limit: 0.2 mm (0.008 in)

Differential Cage Assembly



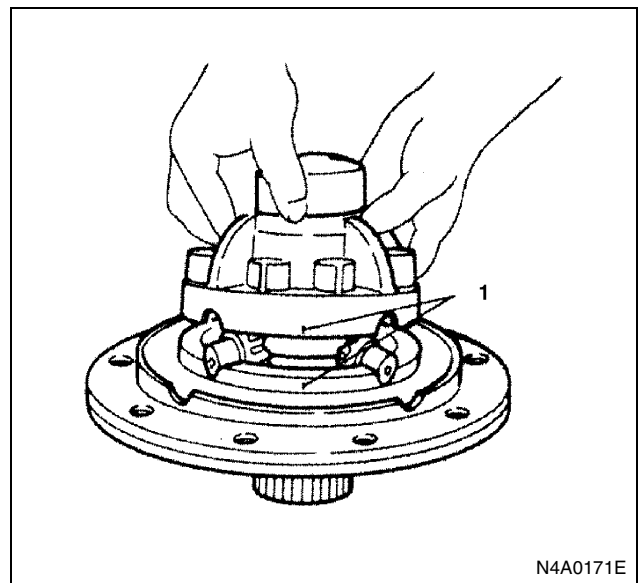
N4A0381E

Legend

- | | |
|-----------------------------|--------------------------------------|
| 1. Differential cage B | 6. Thrust piece |
| 2. Side gear | 7. Side gear |
| 3. Thrust washer | 8. Thrust washer |
| 4. Spider | 9. Differential cage A and ring gear |
| 5. Differential pinion gear | |

Disassembly

1. Differential Cage B
Apply a setting mark (1) to the differential cage assembly.
2. Side Gear
3. Thrust Washer
4. Spider
5. Differential Pinion Gear
6. Thrust Piece
7. Side Gear
8. Thrust Washer
9. Differential Cage A and Ring Gear



N4A0171E

Inspection and Repair

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.

Visual Check

Inspect the following parts for wear, damage or other abnormal conditions.

- Gear
- Bearing
- Oil seal
- Differential cage
- Drive pinion cage
- Parts organizing limited slip differential assembly

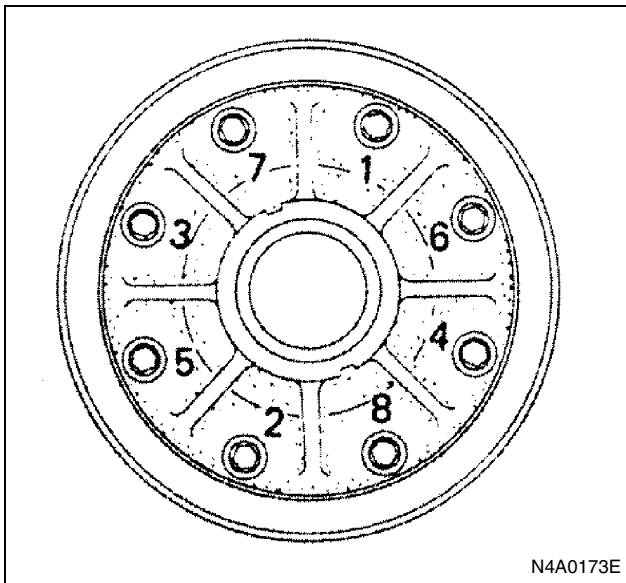
Ring Gear Replacement

The ring gear should always be replaced with drive pinion as a set.

When installing ring gear, apply stud lock to the threaded holes and bolts after treatment of the bolts with primer N.

Tighten:

Ring gear bolt to 127 N·m (13.0 kg·m / 94 lb·ft)

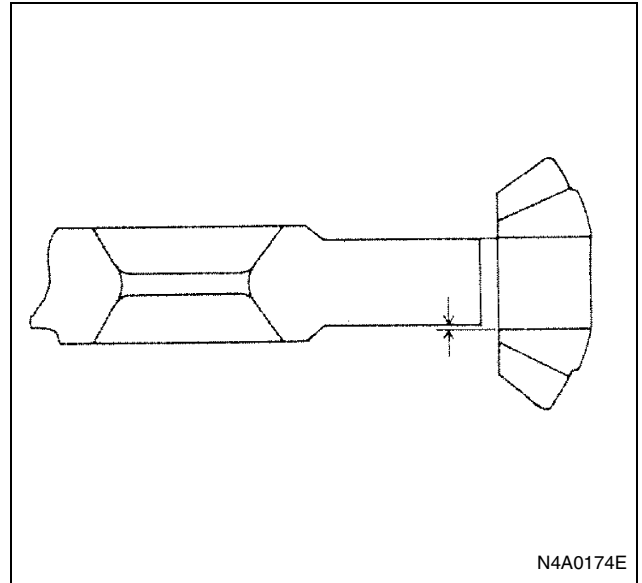


N4A0173E

Clearance between Differential Pinion and Spider

Standard: 0.07 — 0.13 mm (0.003 — 0.005 in)

Limit: 0.2 mm (0.008 in)

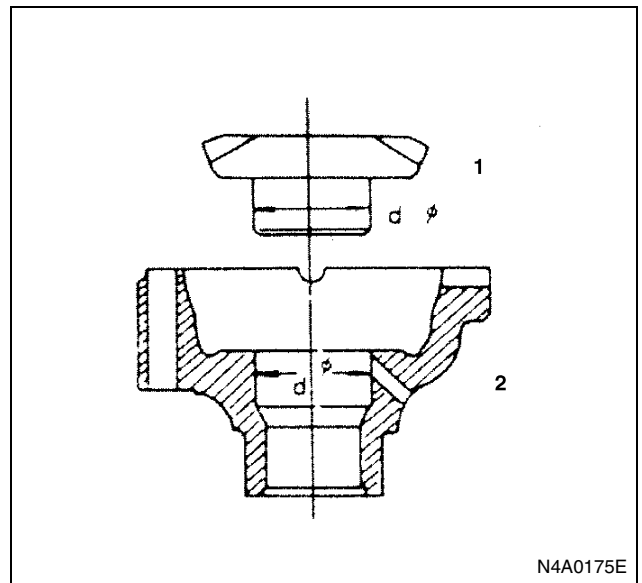


N4A0174E

Clearance between Side Gear and Differential Cage

Standard: 0.05 — 0.11 mm (0.002 — 0.004 in)

Limit: 0.25 mm (0.01 in)



N4A0175E

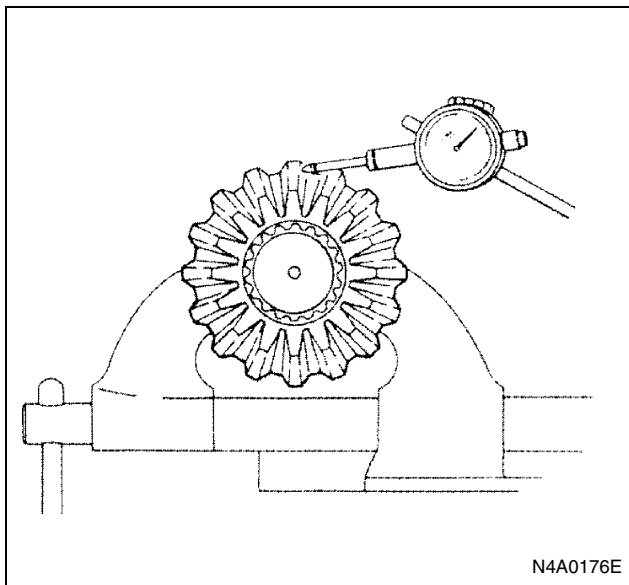
Legend

1. Side gear
2. Differential cage

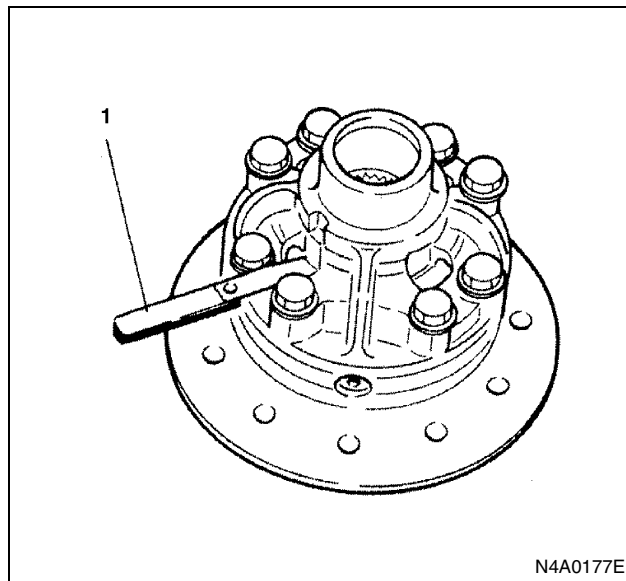
Play in Splines between Side Gear and Axle Shaft

Standard: 0.02 — 0.12 mm (0.0008 — 0.005 in)

Limit: 0.25 mm (0.01 in)



inserting a feeler gauge (1) through the hole on the cage B.
Clearance, 0.13 — 0.18 mm (0.005 — 0.007 in)



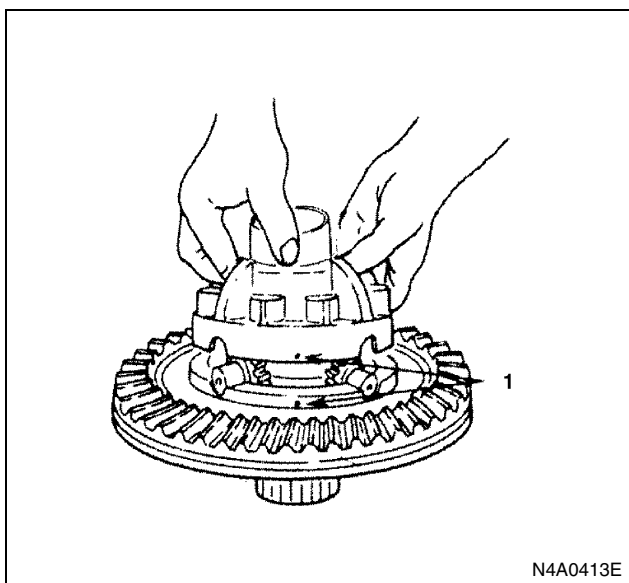
When the clearance exceed a limit, replace the thrust washer or side gear.

Reassembly

1. Differential Cage A and Ring Gear
2. Thrust Washer
3. Side Gear
4. Thrust Piece
5. Differential Pinion Gear
6. Spider
7. Thrust Washer
8. Side Gear
9. Differential Cage B
 - 1) Apply oil to the threaded portion of the bolts before installation.
 - 2) Fasten the differential cages A and B so that the setting marks (1) are correctly aligned.

Tighten:

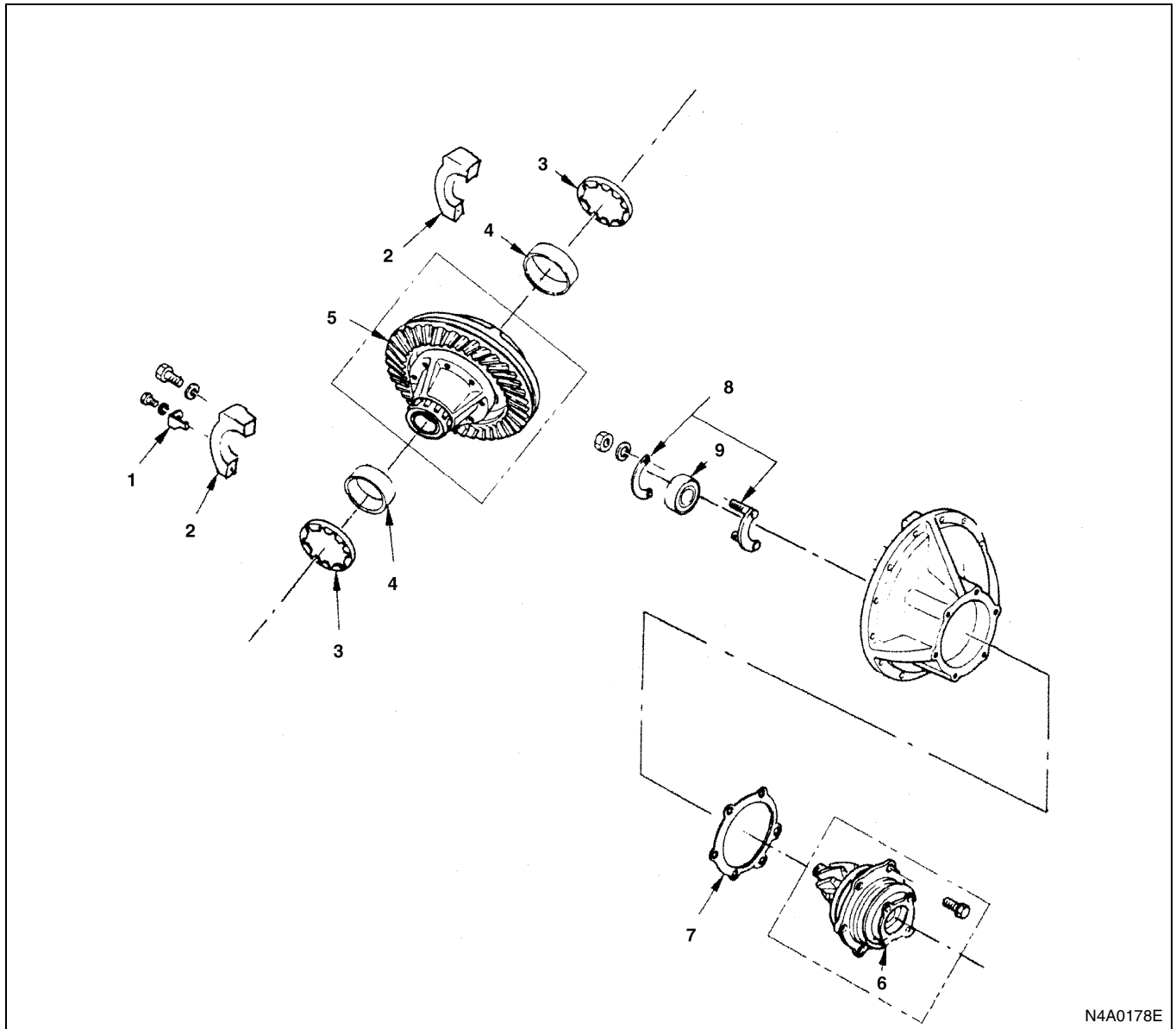
Differential cage bolt to 78 N·m (8.0 kg·m / 58 lb·ft)



- 3) Measure the clearance between the back face of the side gear and the differential cage B by

292 mm/320 mm Rear Differential

Major Components



N4A0178E

Legend

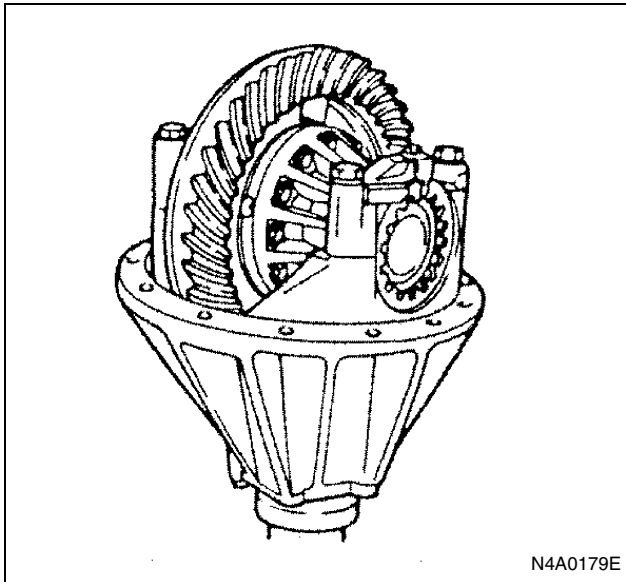
- | | |
|-------------------------------|-------------------------------|
| 1. Lock plate | 6. Drive pinion cage assembly |
| 2. Bearing cap | 7. Shim |
| 3. Adjust nut | 8. Pilot bearing retainer |
| 4. Side bearing outer race | 9. Pilot bearing |
| 5. Differential cage assembly | |

This illustration is based on the 292 mm differential.

Disassembly

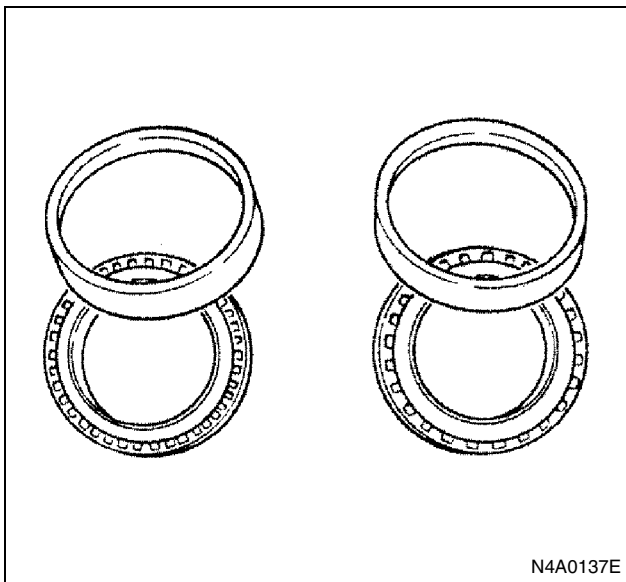
1. Lock Plate
2. Bearing Cap

Set the differential assembly onto a special fixture.
Apply a setting mark to the right and left side bearing caps to prevent interchanging.

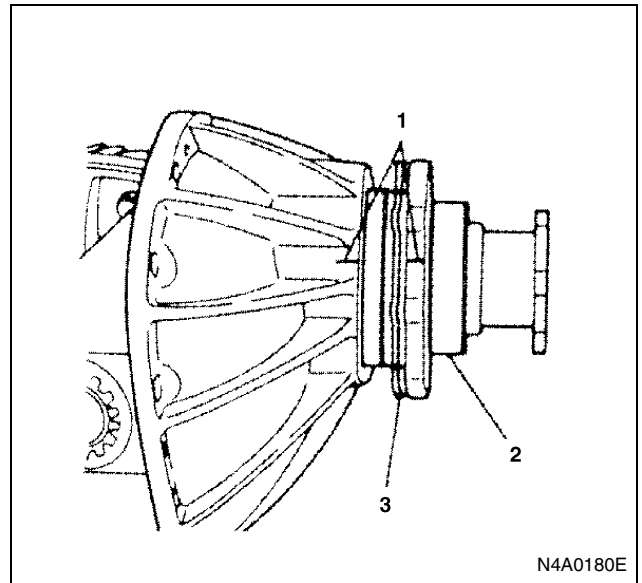


3. Adjust Nut
4. Side Bearing Outer Race

Keep the side bearing outer race and inner races separate to prevent interchanging.
5. Differential Cage Assembly



6. Drive Pinion Cage Assembly



Legend

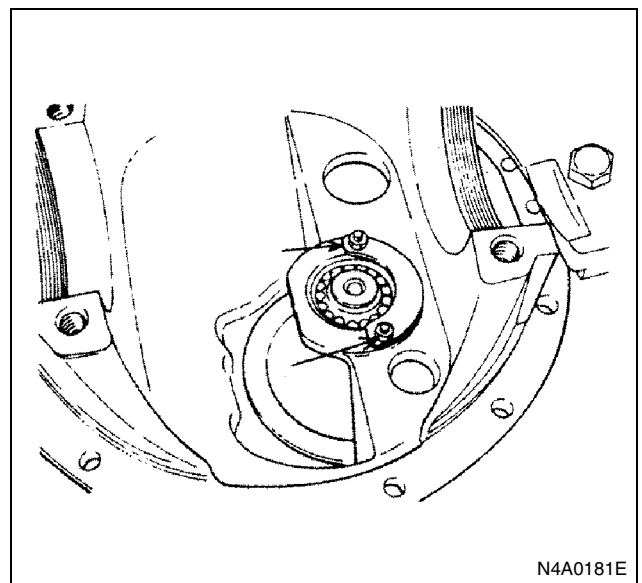
1. Setting mark
2. Pinion cage
3. Shim

7. Shim
8. Pilot Bearing Retainer
9. Pilot Bearing

Reassembly

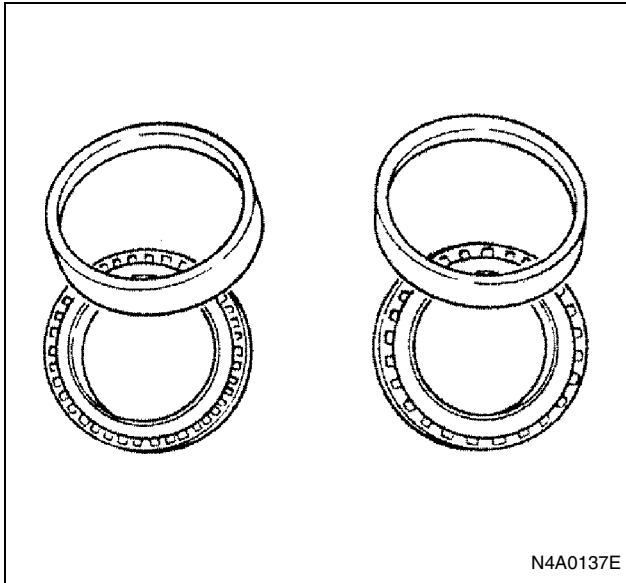
1. Pilot Bearing
2. Pilot Bearing Retainer

The fixing nut should be on the inboard side of the case.



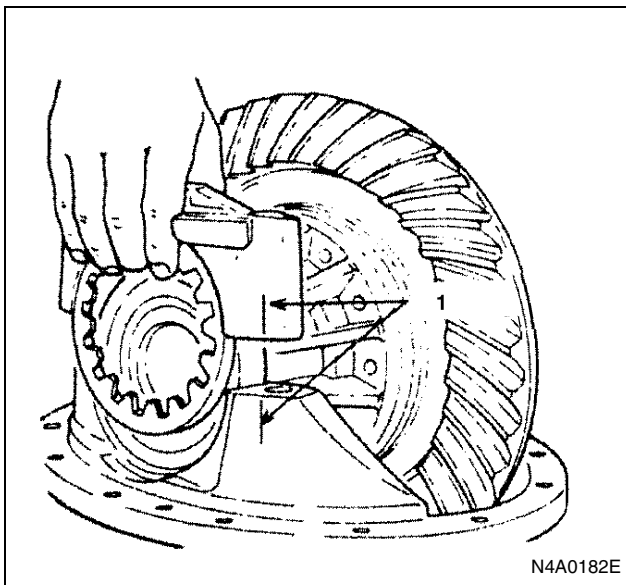
3. Differential Cage Assembly
4. Side Bearing Outer Race

Install the outer and inner races, so that original combination is maintained.



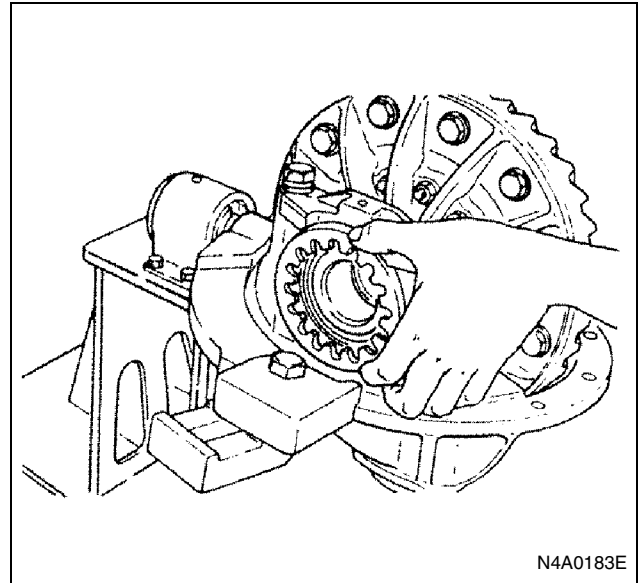
5. Bearing Cap

Install the bearing caps by aligning setting marks (1) applied at disassembly.



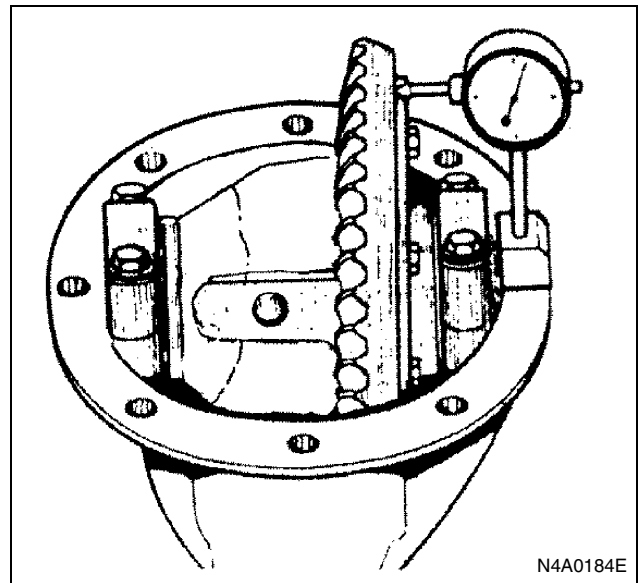
6. Adjust Nut

- 1) Threaded groove in nut should be properly aligned with threaded groove in the carrier.
- 2) Tighten the adjust nuts so that they can be turned after installing and semi-tightening bearing caps.



Inspection of Ring Gear for Run-Out

- 292 mm differential
Standard: 0.05 mm (0.002 in)
Limit: 0.2 mm (0.008 in)
- 320 mm differential
Standard: 0.08 mm (0.003 in)
Limit: 0.25 mm (0.010 in)



7. Shim

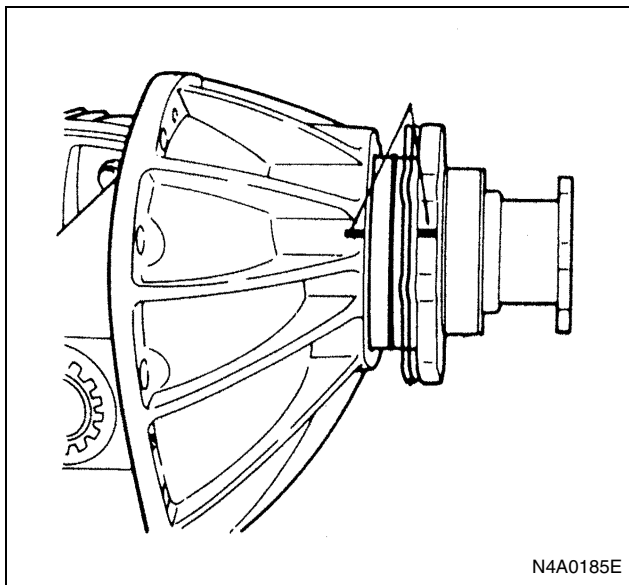
8. Drive Pinion Cage Assembly

Install the shim removed and pinion aligning the oil hole or setting mark applied on removal.

Tighten:

Drive pinion cage bolt to

- 292 mm differential: M12 bolt to 69 N·m (7.0 kg·m / 51 lb·ft), M14 bolt to 78 N·m (8.0 kg·m / 58 lb·ft)
- 320 mm differential: 72 N·m (7.3 kg·m / 53 lb·ft)

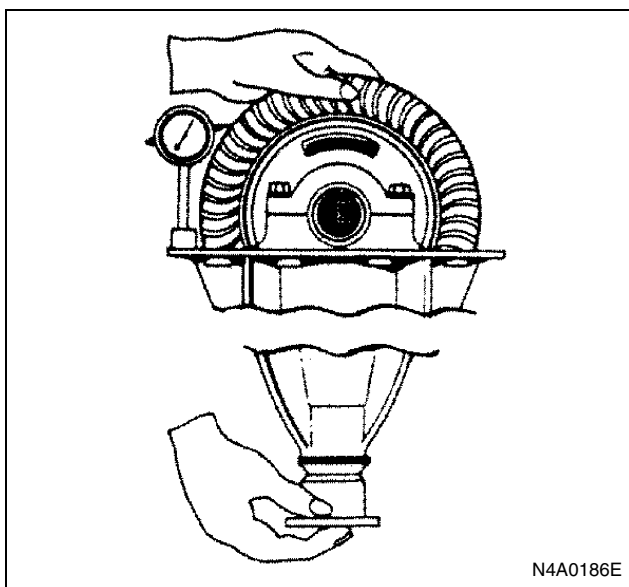


Backlash between Drive Pinion and Ring Gear

Backlash,

292 mm differential: 0.18 — 0.23 mm (0.007 — 0.009 in)

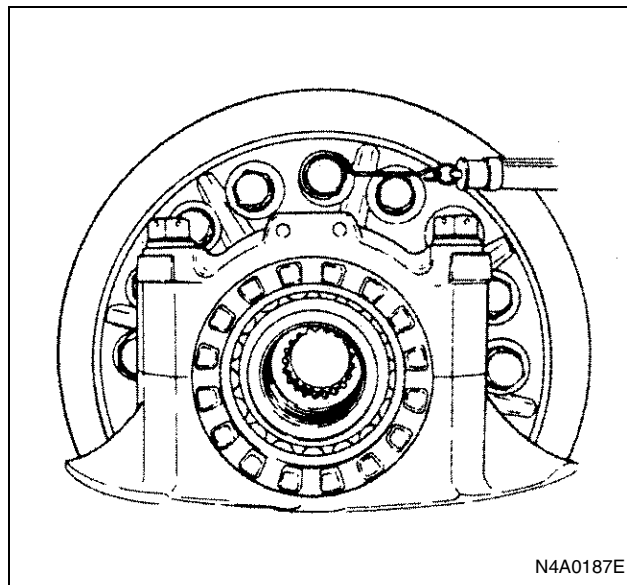
320 mm differential: 0.19 — 0.29 mm (0.007 — 0.011 in)



Bearing preload,

N.S.K. bearing: 5.7 — 13.0 N (0.58 — 1.33 kg / 1.3 — 2.9 lb)

Koyo bearing 11.5 — 17.9 N (1.17 — 1.83 kg / 2.6 — 4.0 lb)



Side Bearing Preload Adjustment

Thread the adjust nut on the ring gear side into 2 notches to give a proper bearing preload when correct backlash and tooth contact are obtained.

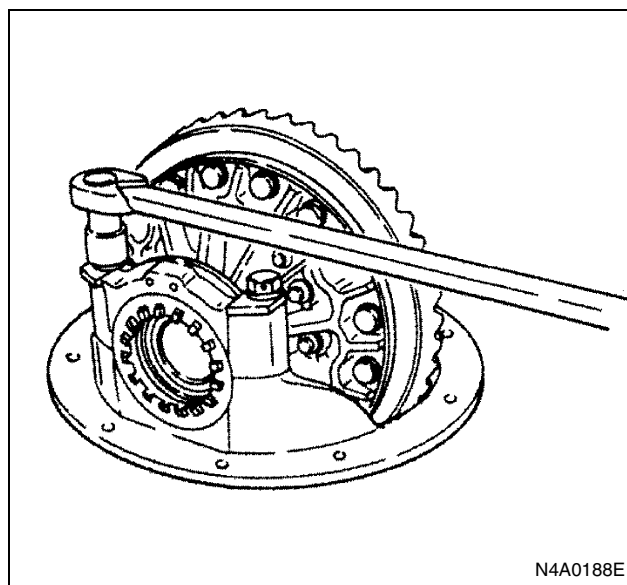
Fully tighten the bearing cap bolts.

Tighten:

Bearing cap bolt to

- 292 mm differential: 108 N·m (11 kg·m / 80 lb·ft)
- 320 mm differential: 157 N·m (16 kg·m / 116 lb·ft)

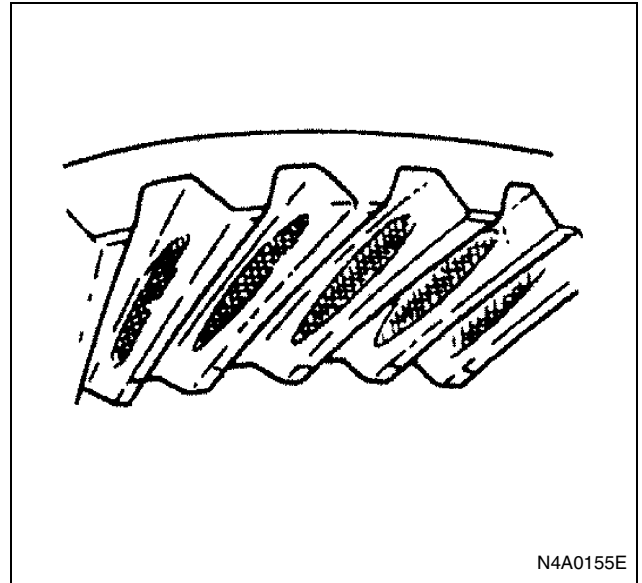
Recheck the backlash after tightening the bearing cap bolts.



Inspection of Drive Pinion and Ring Gear Tooth Contact

- Apply a thin coat of red check to the faces of the 7 — 8 teeth of the ring gear.
- Check the impression of contact (Right contact) obtained on the ring gear teeth and make necessary adjustment as described below if the contact is abnormal.

Adjusting shims available,
0.10, 0.12, 0.14, 0.16, 0.18, 0.20 mm (0.004, 0.0047,
0.0055, 0.0063, 0.0071, 0.0079 in)



TOOTH CONTACT	CASE	ADJUSTMENT PROCEDURE
N4A0156E	Drive pinion is too far away from ring gear.	1. Move the drive pinion in toward the ring gear by decreasing the thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear away from the drive pinion. N4A0160E
N4A0157E	Drive pinion is too close to the ring gear.	1. Move the drive pinion away from the ring gear by increasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear in toward the drive pinion. N4A0161E
N4A0158E	Ring gear is too close to the drive pinion.	1. Move the drive pinion in toward the ring gear by decreasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear away from the drive pinion. N4A0162E
N4A0159E	Ring gear is too far away from drive pinion.	1. Move the drive pinion away from the ring gear by increasing thickness of pinion depth adjusting shims. 2. Adjust the backlash by moving ring gear in toward the drive pinion. N4A0163E

4B-50 REAR AXLE

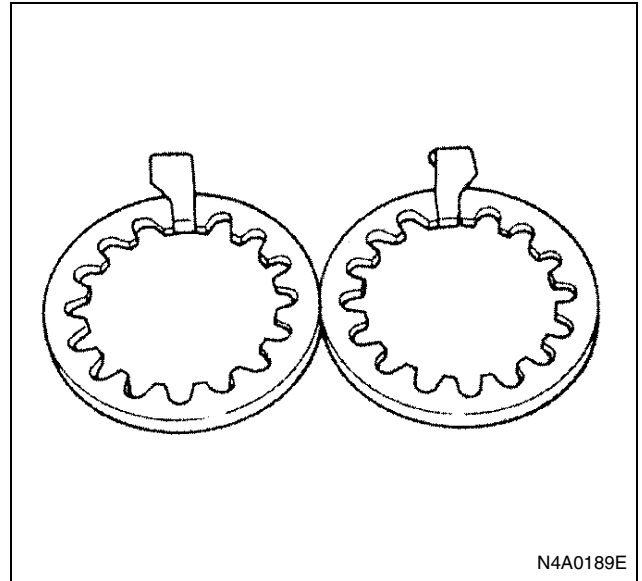
9. Lock Plate

Tighten:

Lock plate bolt to

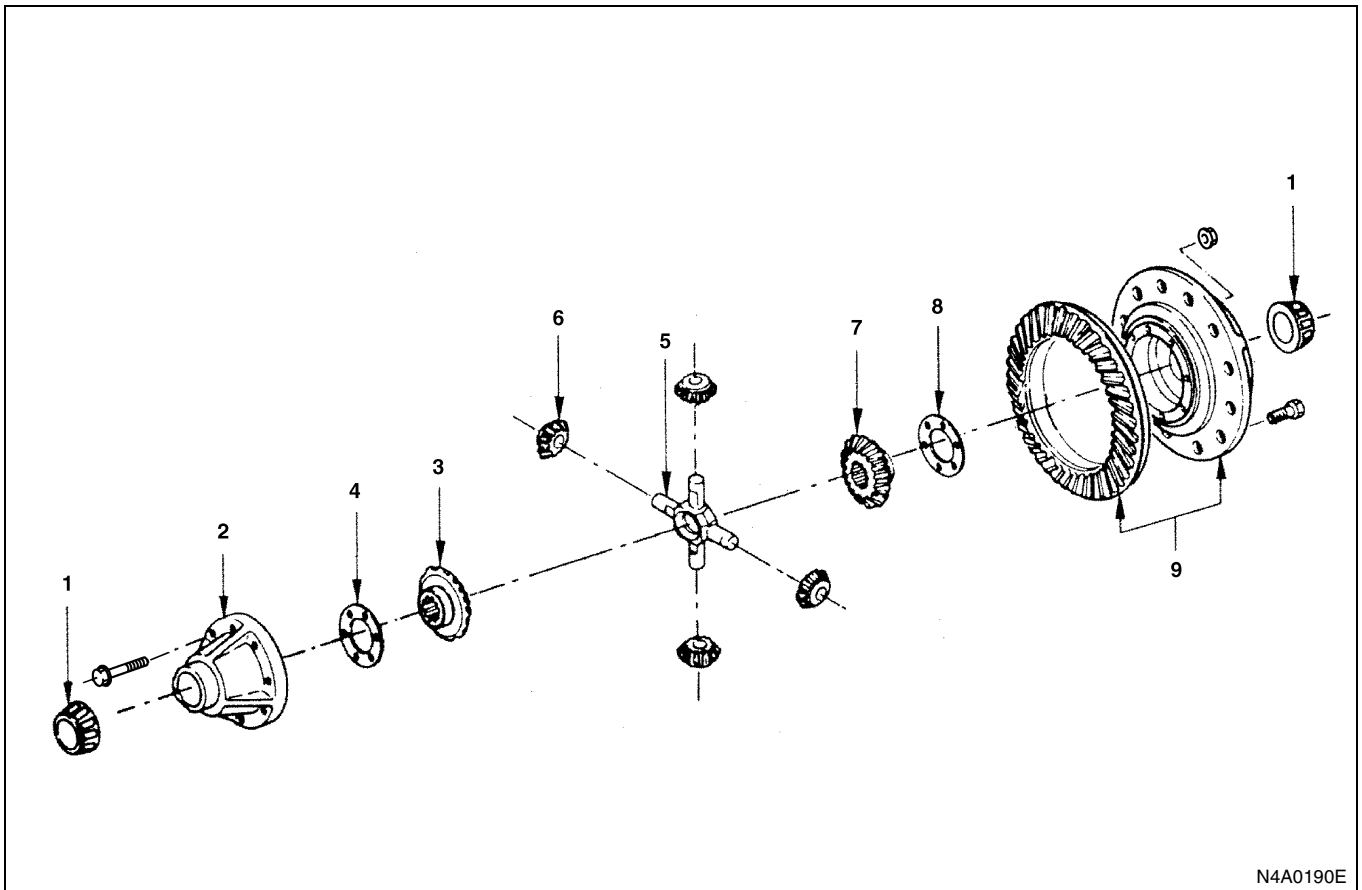
- 292 mm differential: 29 N·m (3.0 kg·m / 22 lb·ft)
- 320 mm differential: 13 N·m (1.3 kg·m / 9 lb·ft)

The lock plates are available in 2 different kinds to permit gradual adjustment by 1/2 notch of the adjust nut.



N4A0189E

Differential Cage Assembly



N4A0190E

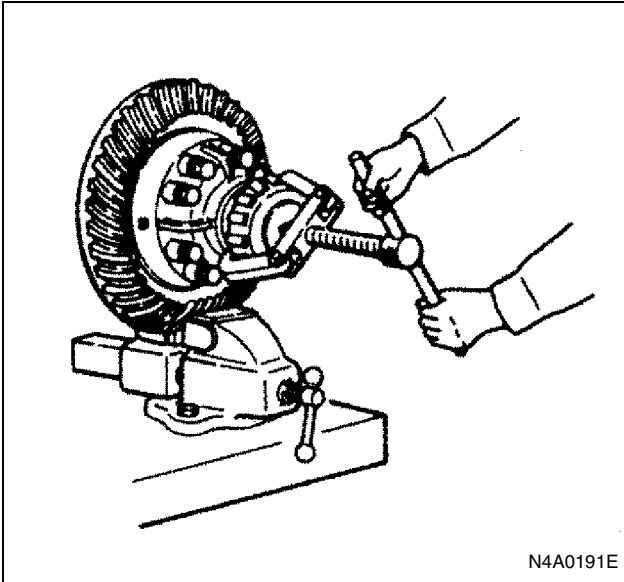
Legend

- | | |
|----------------------------|--------------------------------------|
| 1. Side bearing inner race | 6. Differential pinion |
| 2. Differential cage B | 7. Side gear |
| 3. Side gear | 8. Thrust washer |
| 4. Thrust washer | 9. Differential cage A and ring gear |
| 5. Spider | |

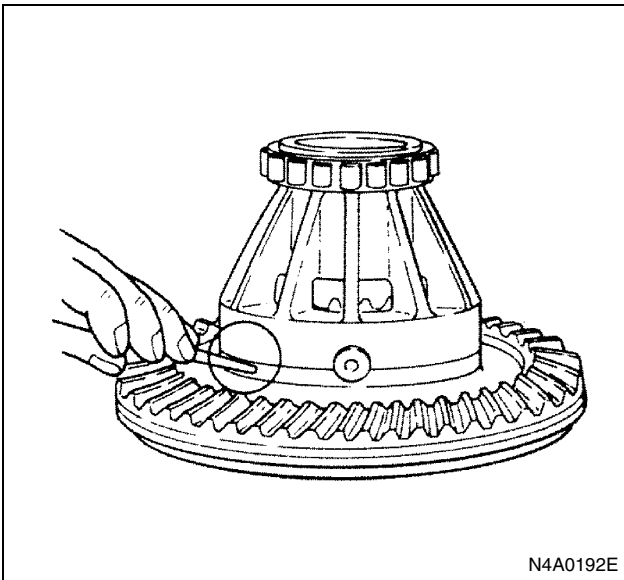
This illustration is based on the 292 mm differential

Disassembly

1. Side Bearing Inner Race
Remover:
9-8521-0061-0 (292 mm)
5-8840-2373-0 (320 mm)
Adapter:
9-8521-2701-0



2. Differential Cage B
Apply a setting mark before removing the differential cage B to ensure reassembly into original position.



3. Side Gear
4. Thrust Washer
5. Spider
6. Differential Pinion
7. Side Gear
8. Thrust Washer
9. Differential Cage A and Ring Gear

Inspection and Repair

Make necessary correction or parts replacement if wear, damage or any other abnormal conditions are found through inspection.

Visual Check

Inspect the following parts for wear, damage or other abnormal conditions.

- Gear
- Bearing
- Oil seal
- Differential cage
- Drive pinion

Ring Gear Replacement

The ring gear should always be replaced together with the drive pinion as a matched set.

When installing ring gear, apply stud lock to the thread holes and bolts after treatment of the bolts with primer N.

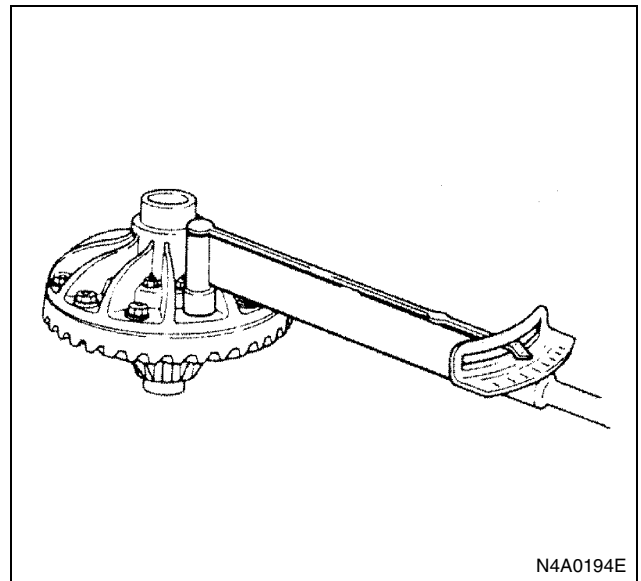
Ring gear bolt wrench;

5-8840-2830-0 (for 292 mm differential)

Tighten:

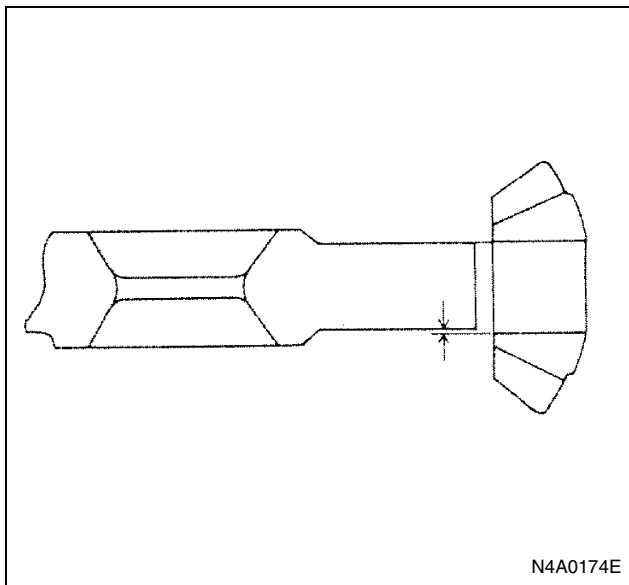
Ring gear bolt to

- 292 mm differential: M12 bolt (E12) to 127 N·m (13 kg·m / 94 lb·ft), M14 bolt to 181 N·m (18.5 kg·m / 133 lb·ft)
- 320 mm differential: 333 N·m (34 kg·m / 246 lb·ft)



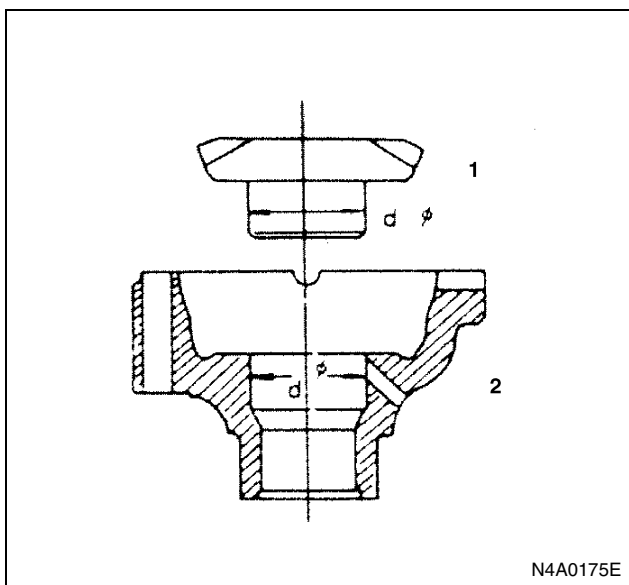
Clearance between Spider and Differential Pinion

- 292 mm differential
Standard: 0.07 — 0.13 mm (0.003 — 0.005 in)
Limit: 0.2 mm (0.008 in)
- 320 mm differential
Standard: 0.05 — 0.13 mm (0.002 — 0.005 in)
Limit: 0.2 mm (0.008 in)



Clearance between Side Gear and Differential Cage

- 292 mm differential
Standard: 0.05 — 0.11 mm (0.002 — 0.004 in)
Limit: 0.25 mm (0.01 in)
- 320 mm differential
Standard: 0.13 — 0.20 mm (0.005 — 0.008 in)
Limit: 0.25 mm (0.01 in)

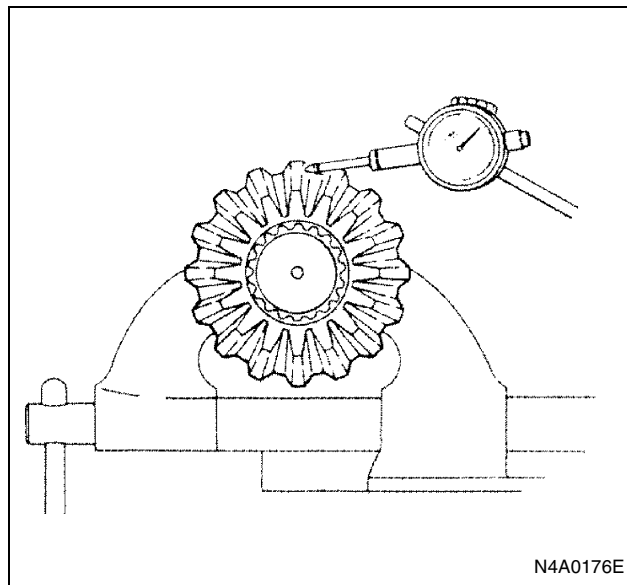


Legend

1. Side gear
2. Differential gear

Play in Spline between Side Gear and Axle Shaft

- 292 mm differential
Standard: 0.08 — 0.15 mm (0.003 — 0.006 in)
Limit: 0.3 mm (0.012 in)
- 320 mm differential
Standard: 0.2 mm (0.008 in)
Limit: 0.5 mm (0.02 in)



REASSEMBLY

1. Differential Cage A and Ring Gear
2. Thrust Washer
3. Side Gear
4. Differential Pinion
5. Spider
6. Thrust Washer
7. Side Gear
8. Differential Cage B
 - 1) Install by aligning setting marks.
 - 2) Apply oil to threaded portion of bolts before installation.

Tighten:

Differential cage B nut to

- 292 mm differential: 54 N·m (5.5 kg·m / 39.8 lb·ft)
- 320 mm differential: 74 N·m (7.5 kg·m / 54.6 lb·ft)

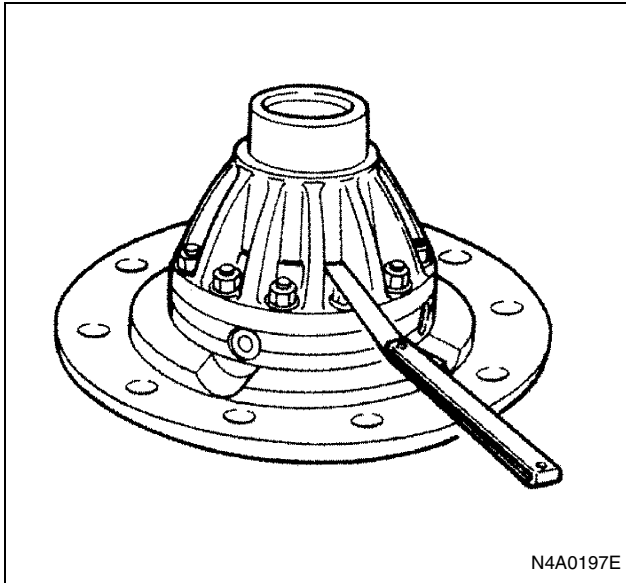
- 3) Measure the clearance between the back face of the side gear and the differential cage B by inserting a feeler gauge through the hole on the cage B.

Clearance,

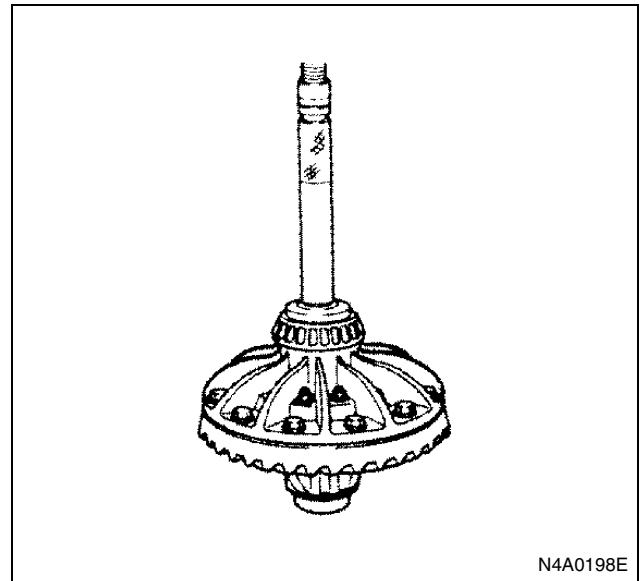
292 mm differential: 0.21 — 0.28 mm (0.008 — 0.011 in)

320 mm differential: 0.10 — 0.38 mm (0.004 — 0.015 in)

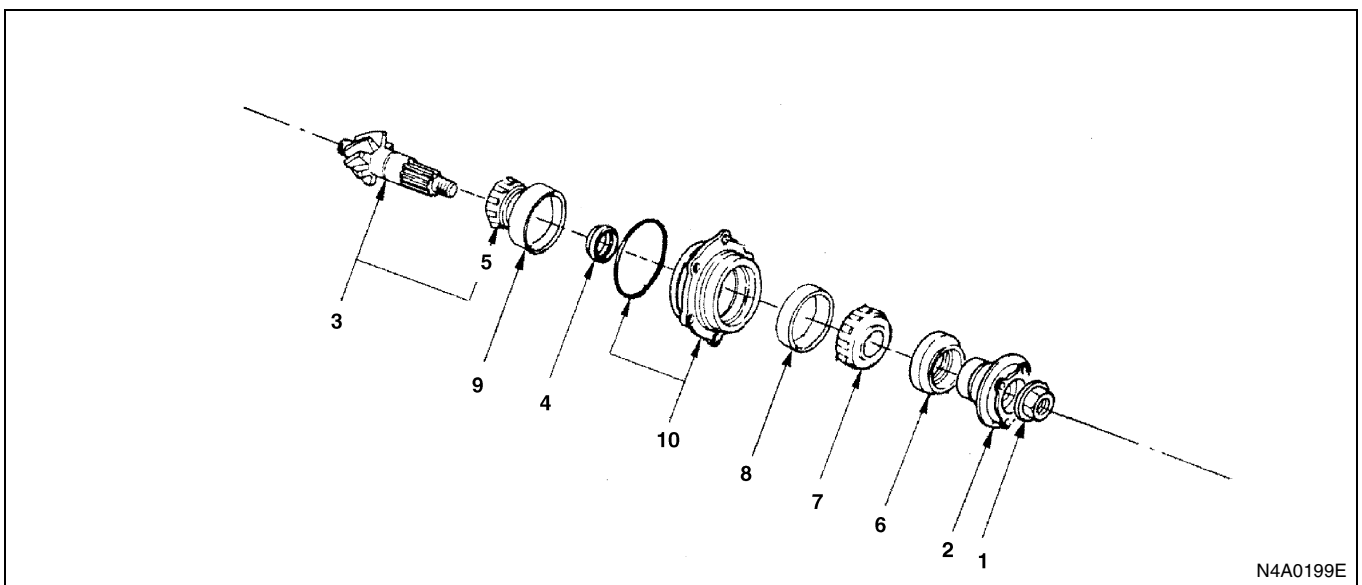
When the clearance exceed a limit, replace the thrust washer or side gear.



9. Side Bearing Inner Race
 Installer: 9-8522-1614-0
 Grip: 9-8522-1148-0



Drive Pinion Cage Assembly



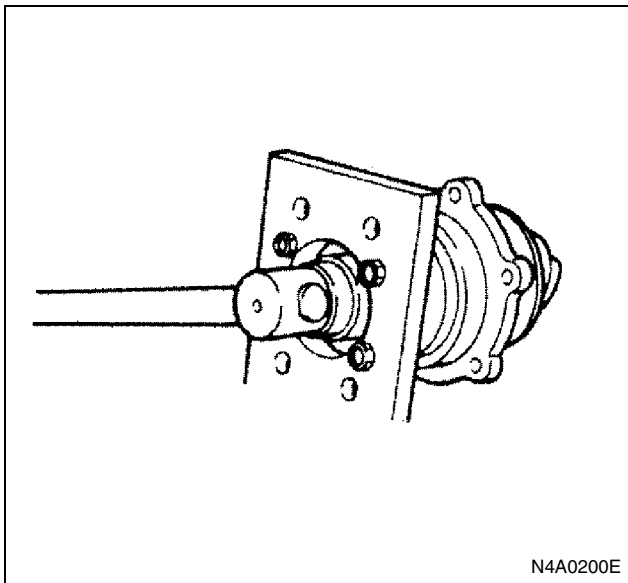
Legend

- | | |
|-----------------------------|-----------------------------|
| 1. Flange nut | 6. Oil seal |
| 2. Flange | 7. Outer bearing inner race |
| 3. Drive pinion | 8. Outer bearing outer race |
| 4. Collapsible spacer | 9. Inner bearing outer race |
| 5. Inner bearing inner race | 10. Pinion cage and O-ring |

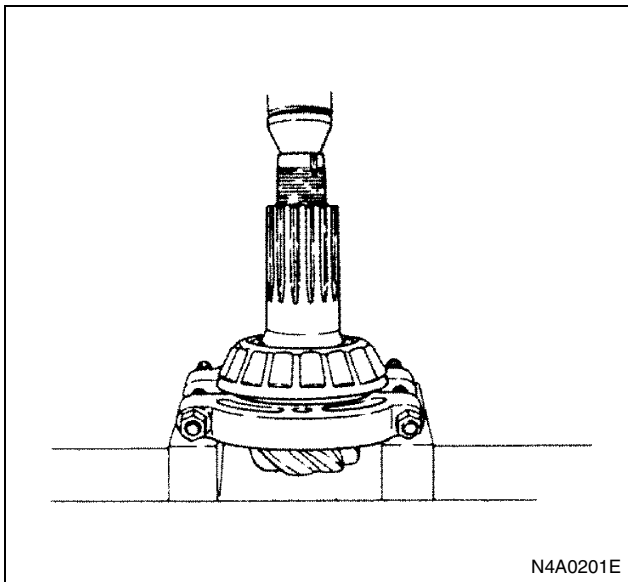
This illustration is based on the 292 mm differential.

Disassembly

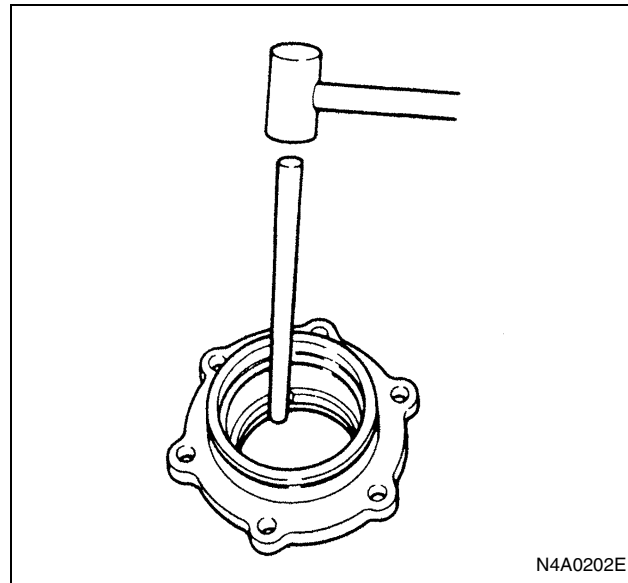
1. Flange Nut
Flange Bracket: 9-8529-2101-0



2. Flange
3. Drive Pinion
4. Collapsible Spacer
5. Inner Bearing Inner Race
Remover: 5-8840-0015-0



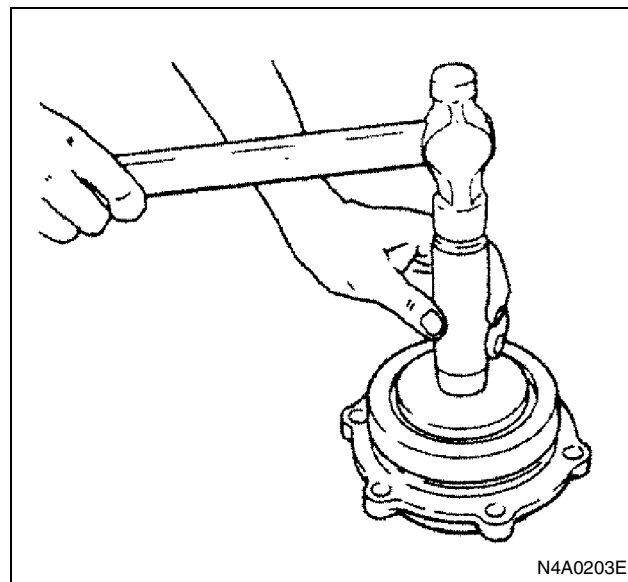
6. Oil Seal
7. Outer Bearing Inner Race
8. Outer Bearing Outer Race
Drive out the outer bearing outer race together with the outer bearing inner race and oil seal or the inner bearing outer race by using a proper bar through the two notches.



9. Inner Bearing Outer Race
10. Pinion Cage and O-ring

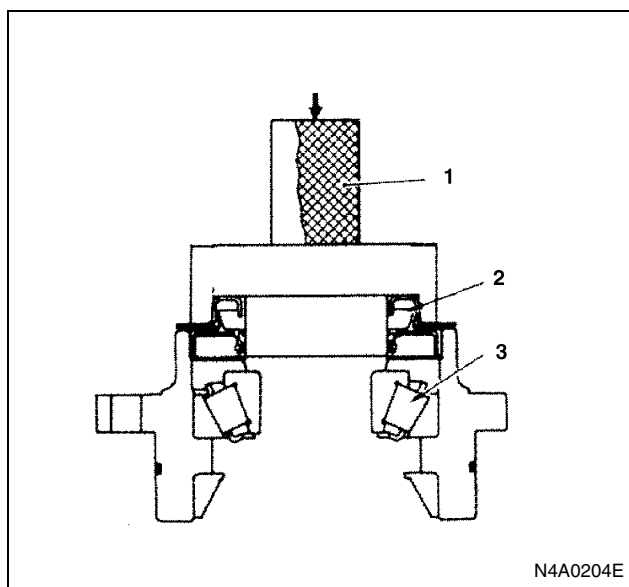
Reassembly

1. Pinion Cage and O-ring
Discard used O-ring and install a new one.
2. Inner Bearing Outer Race
Installer:
5-8840-2046-0 (292 mm)
5-8840-2379-0 (320 mm)
Grip:
9-8522-1608-0



3. Outer Bearing Outer Race
Installer:
9-8522-1613-0 (292 mm)
5-8840-2376-0 (320 mm)
Grip:
9-8522-1608-0
4. Outer Bearing Inner Race

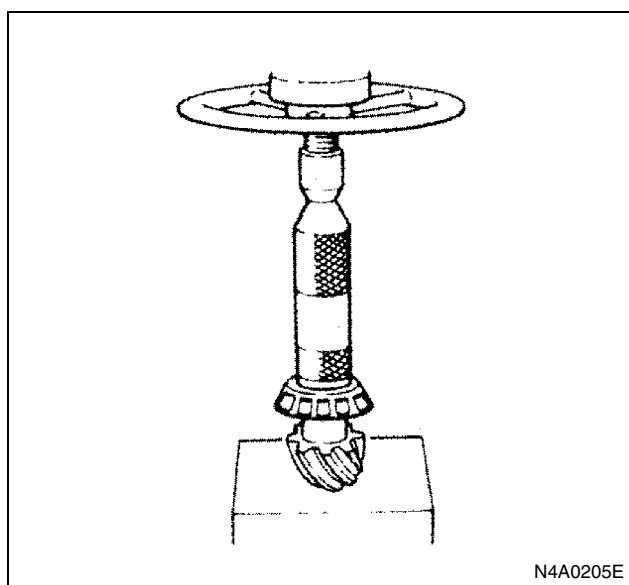
5. Oil Seal
 Installer:
 9-8522-1607-0 (292 mm)
 5-8840-2377-0 (320 mm)
 Grip:
 9-8522-1608-0



Legend

1. Installer
 2. Oil seal
 3. Outer bearing

6. Inner Bearing Inner Race
 Installer:
 9-8522-1615-0



7. Collapsible Spacer
 Discard used collapsible spacer and install a new one.
 8. Drive Pinion
 9. Flange

10. Flange Nut
 Discard used flange nut and install a new one at re-assembly.

Adjustment of bearing preload.

- 1) Tighten the flange nut to a torque of 245 N·m (25 kg·m/181lb·ft).
- 2) Adjust bearing preload by tightening the flange nut until specified preload is obtained.
- 3) The flange nut should be within the specified range when specified preload is obtained.

Tighten:

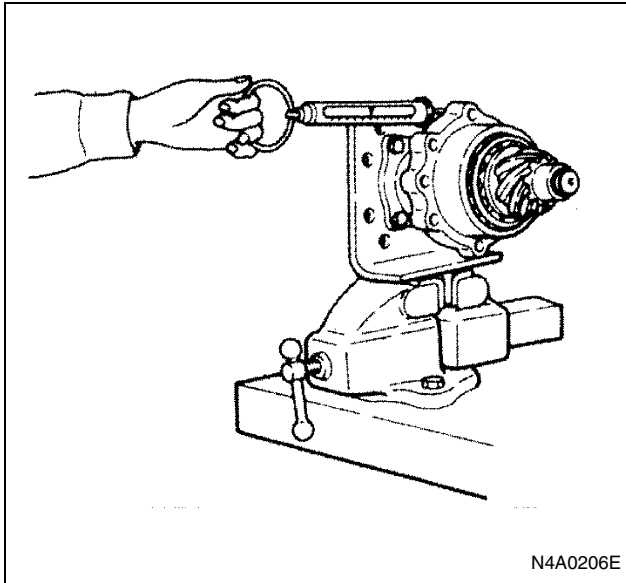
Flange nut to

- 292 mm differential: 324 — 480 N·m (33 — 49 kg·m / 238 — 354 lb·ft)
- 320 mm differential: 441 — 598 N·m (45 — 61 kg·m / 325 — 441 lb·ft)

Apply oil to seated surface of nut when tightening.

Preload at Cage Fixing Hole		N (kg/lb)
292 mm	New bearing	13 — 25 (1.3 — 2.6/2.9 — 5.7)
	Used bearing	6.5 — 12.5 (0.65 — 1.3/1.5 — 2.9)
320 mm	New bearing	26 — 38 (2.7 — 3.9/6.0 — 8.6)
	Used bearing	13 — 19 (1.35 — 1.95/3.0 — 4.3)

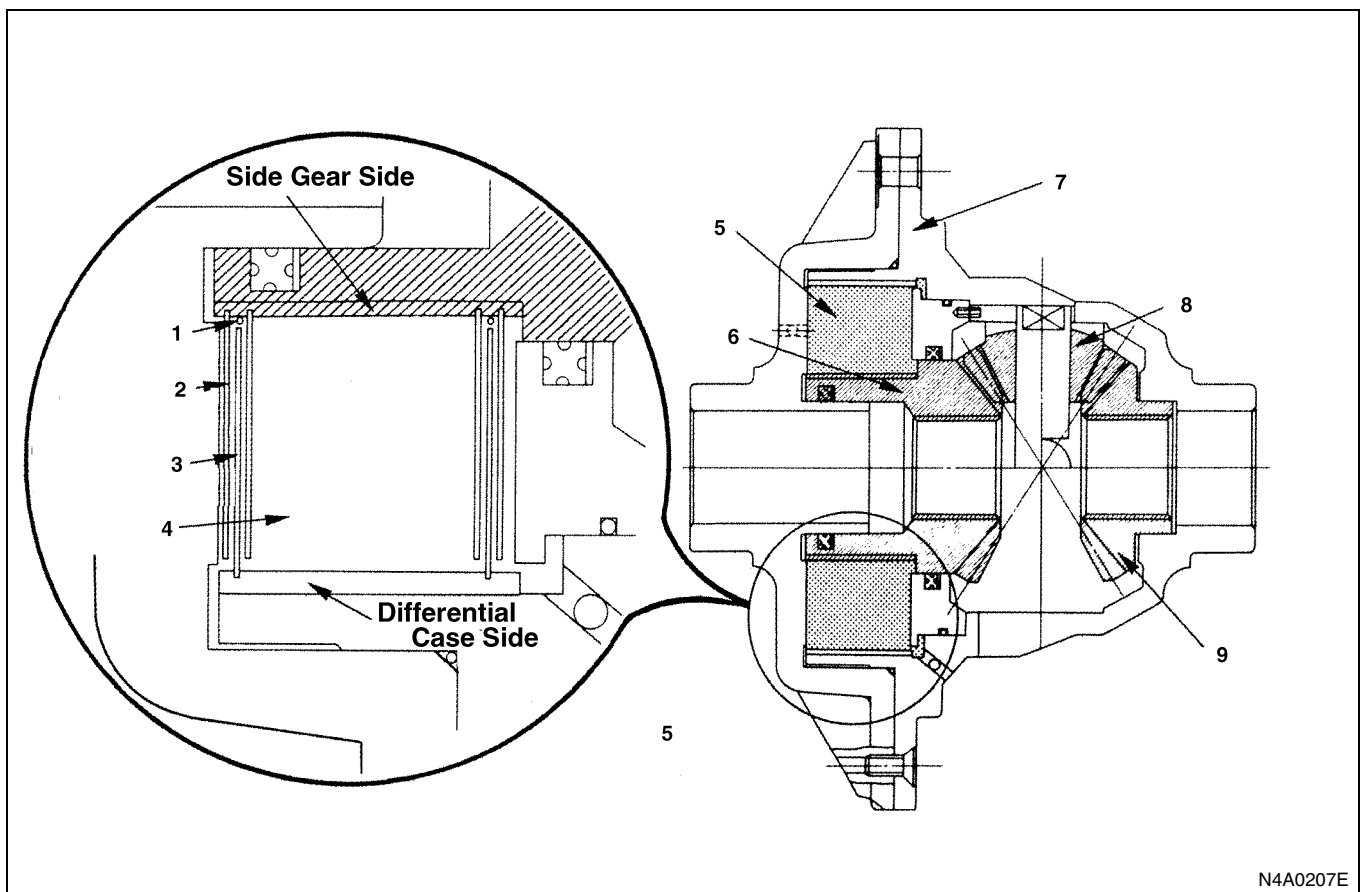
Starting Torque		N·m (kg·cm/lb·in)
292 mm	New bearing	0.98 — 1.96 (10.0 — 20.0/8.7 — 17.4)
	Used bearing	0.49 — 0.98 (5.0 — 10.0/4.3 — 8.7)
320 mm	New bearing	2.3 — 3.2 (23.0 — 33.0/20 — 28.6)
	Used bearing	1.2 — 1.6 (12.0 — 16.0/10.4 — 13.9)



- 4) Using special tool, stake the flange nut at two points.
Punch: 5-8840-2293-0

Limited Slip Differential (LSD); Viscous Type

Function (NPS Model Only) <Except Taiwan, Australia and GCC>



Legend

- | | |
|-----------------------------------|----------------------|
| 1. Spacer ring | 6. Side gear (LH) |
| 2. Inner plates (20 plate in all) | 7. Differential case |
| 3. Outer plates (19 plate in all) | 8. Spider pinion |
| 4. Silicon oil | 9. Side gear (RH) |
| 5. Viscous coupling | |

The viscous-type limited slip differential is of the structure filled with viscous (high viscosity silicone oil) between the outer plates connected to the differential case and the inner plates connected to the side gear on the left side. While driving, the difference in the number of revolutions between the right and left wheels causes the difference in the number of revolutions also between the differential case and the side gear on the left side. This difference in the number of revolutions results in shearing of silicone oil to generate viscous torque between the plates.

When either one of the wheels is caught up in muddy or snow melting road and starts racing while driving, the operation of the viscous torque mentioned above makes it facilitate to drive the vehicle by providing a driving force to the other wheel on the road where the road condition is better.

Caution:

The LSD assembly cannot be disassembled. When there occurs anything abnormal with the LSD assembly, replace it as an assembly. (Please note that when the silicone oil which has been sealed inside drains out while in disassembly, the LSD assembly will fail to display its intrinsic performance.)

Performance Check (Except Taiwan, Australia and GCC)

Check the performance by following the procedure given below.

1. Set the transmission gearshift lever to the neutral position.
2. Lift up the rear axle.
3. Rotate with a gathered momentum either one of the wheels on the rear axle in the forward direction.

When the wheel on the opposite side rotates in the forward direction while in the operation of (3) above, it is considered that the performance of viscous coupling functions normally, and otherwise, that the viscous coupling has a lowered performance.

WARNING:

WHEN EITHER ONE OF THE REAR WHEELS IS LIFTED UP AND A DRIVING FORCE IS APPLIED TO THE REAR AXLE, THE VEHICLE IS IN DANGER OF STARTING ABRUPTLY. BE SURE NOT TO APPLY A DRIVING FORCE TO THE REAR AXLE IN THIS CONDITION.

For detailed information of disassembling, assembling, checking and servicing of parts other than the LSD assembly, refer to "292 MM DIFFERENTIAL".

Rear Axle Shaft (Except 2003 year model)

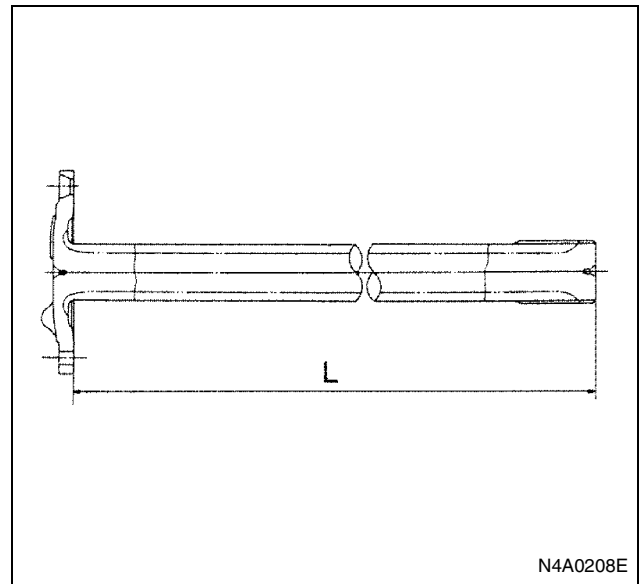
Notice:

For vehicles provided with the LSD assembly, the length of the rear axle shafts is different from each other on the right and left sides. Be careful not to confuse one with another when replacing the rear axle shaft.

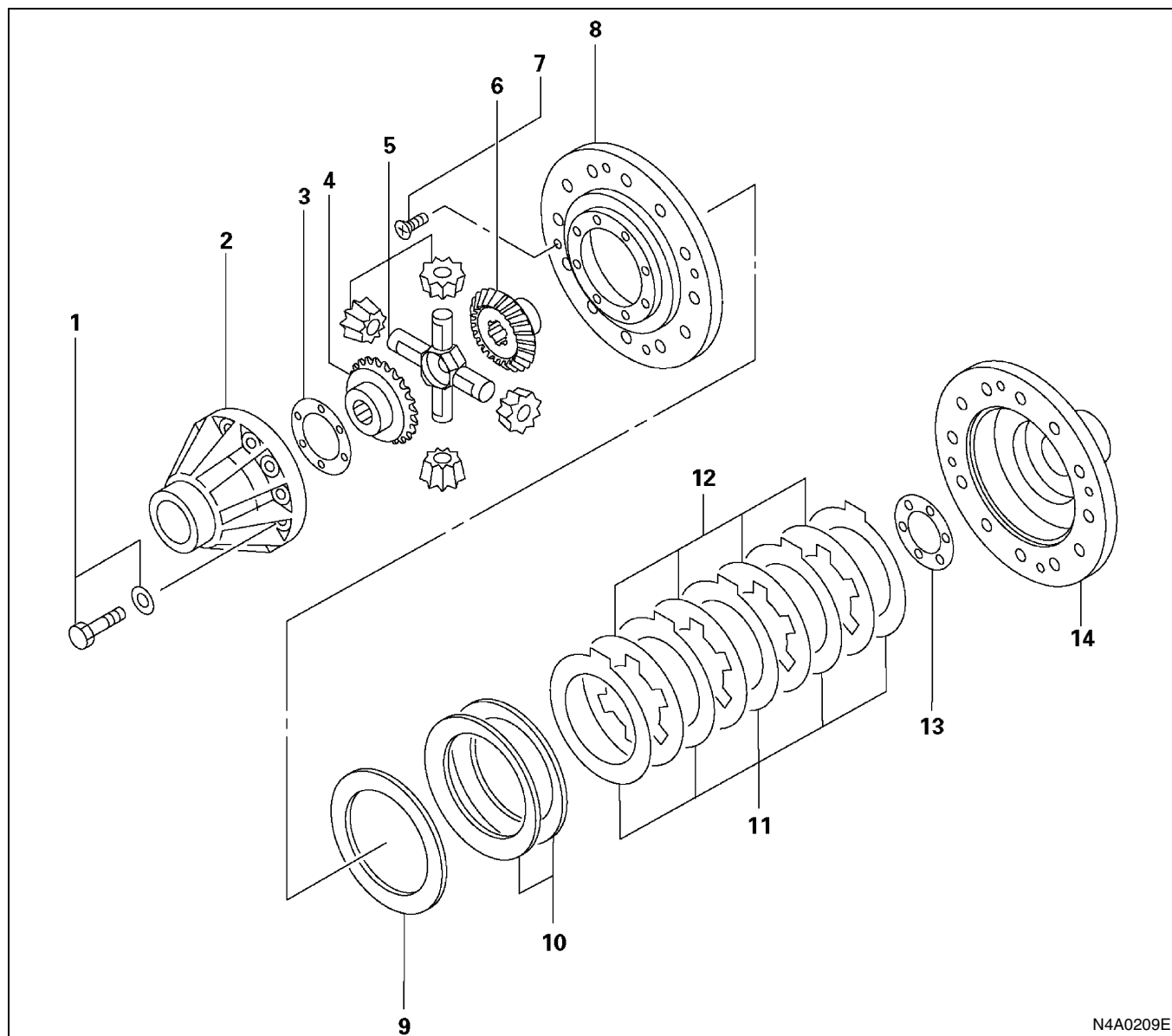
L (in the illustration)

Right side: 800 ± 2 mm (31.5 ± 0.08 in)

Left side: 856 ± 2 mm (33.7 ± 0.08 in)



Limited Slip Differential (LSD); Friction Type
Disassembled View

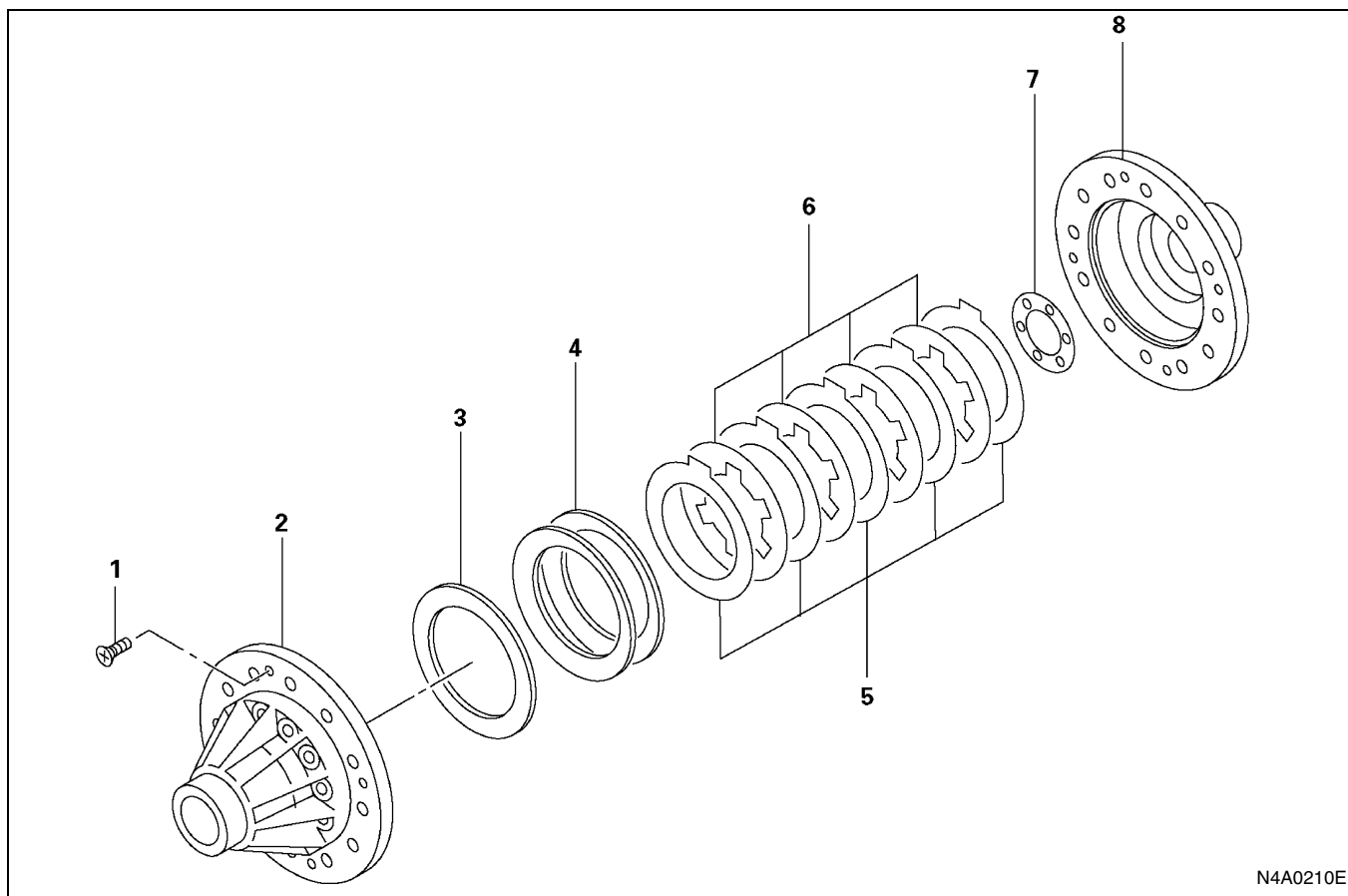


N4A0209E

Legend

- | | |
|-----------------------------------|-------------------------|
| 1. Bolt and washer | 8. Differential cage A' |
| 2. Differential cage B | 9. Spacer |
| 3. Thrust washer | 10. Spring disc |
| 4. Side gear | 11. Friction plate |
| 5. Spider and differential pinion | 12. Friction disc |
| 6. Side gear | 13. Thrust washer |
| 7. Screw | 14. Differential cage A |

Limited Slip Differential (LSD)



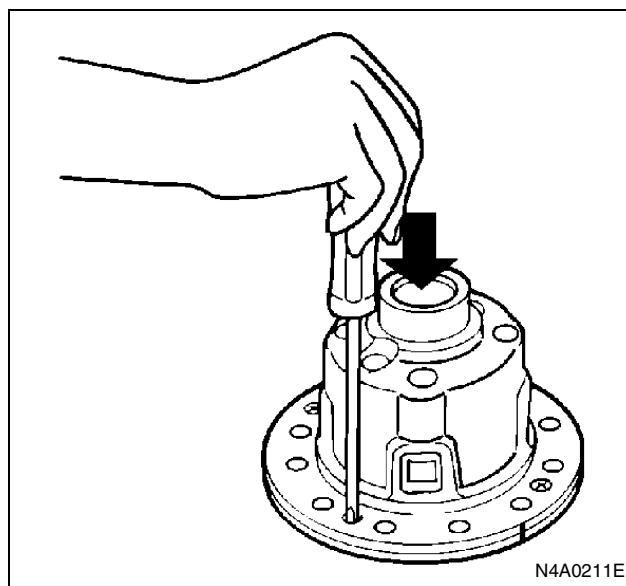
N4A0210E

Legend

- | | |
|------------------------|------------------------|
| 1. Screw | 5. Friction plate |
| 2. Differential cage B | 6. Friction disc |
| 3. Spacer | 7. Thrust washer |
| 4. Spring disc | 8. Differential cage A |

Disassembly

1. Screw
Apply a setting mark before removing the differential cages A and B.
Press the differential cage B and hold it.
Gradually and evenly loosen the fixing screws of the differential cages.



N4A0211E

2. Differential cage B
3. Spacer

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4. Spring disc
When removing the spring disc, friction plate, friction disc, place them in order for clear.
5. Friction plate
6. Friction disc
7. Thrust washer and side gear
8. Differential cage A

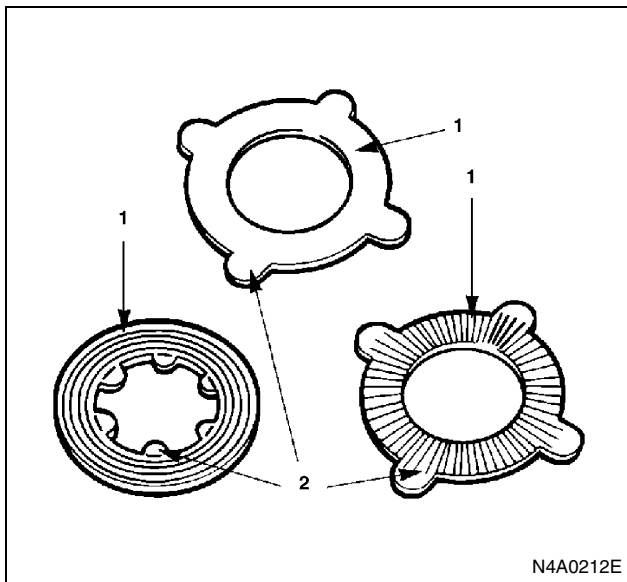
Inspection and Repair

Make necessary correction or parts replacement if wear, damage, corrosion or any other abnormal condition is found through inspection.

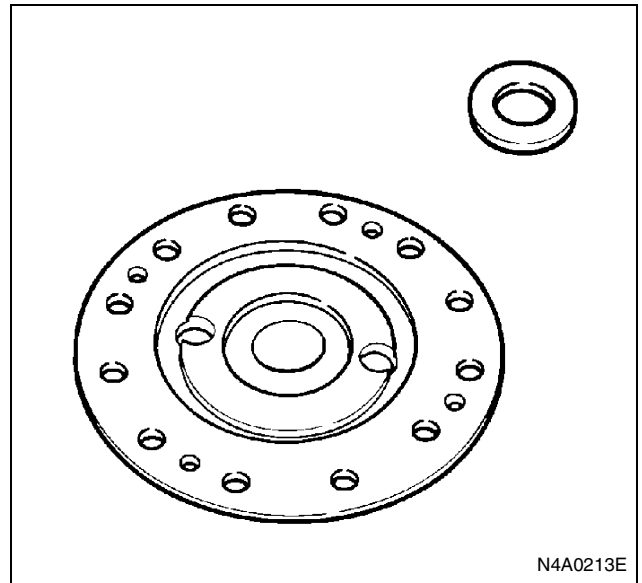
Visual Check

Check the following parts for wear, damage, noise or any other abnormal conditions.

- Friction disc, friction plate and spring disc.
 - 1) Sliding surfaces
 - 2) Projections

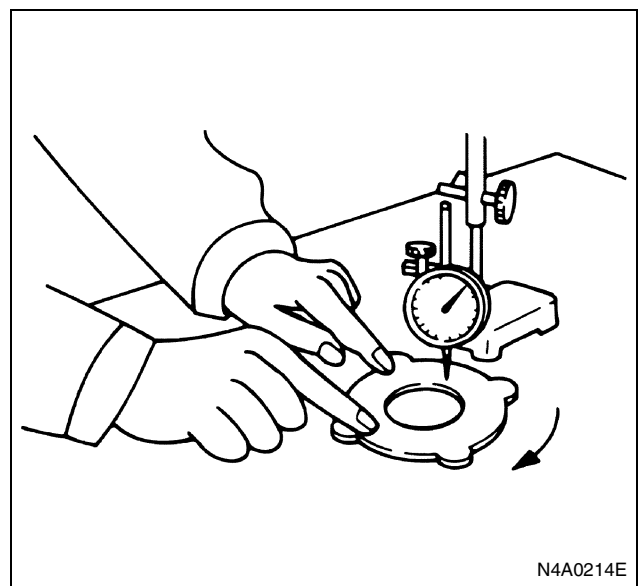


- Differential cage
Inner groove of the differential cages. Repair light nicks and burrs using an oil stone.



Deformation of the Friction Disc & Plate

Deformation of the friction disc & plate: 0.2 mm (0.008 in)



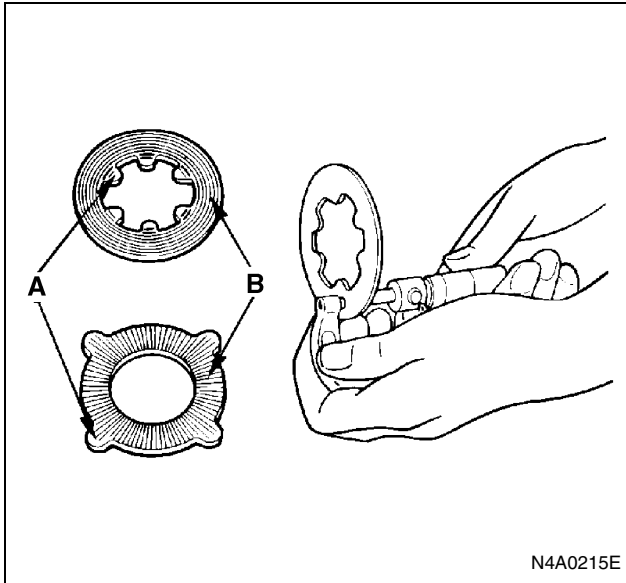
Wear of the Friction Plate & Disc

Wear of the friction plate & disc: 0.1 mm (0.004 in)

Remarks:

A = Inner or outer projections

B = Sliding surface subject to abrasion



Reassembly

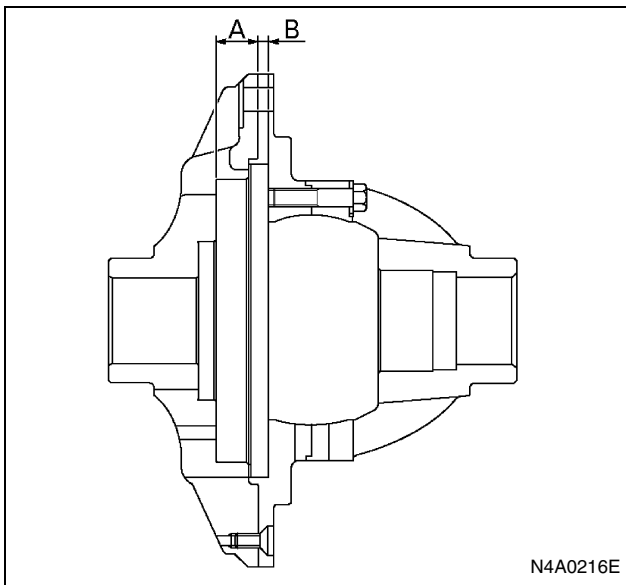
Clearance adjustment

- 1) Measuring the depth of the differential cages.

Depth of the differential cage,

Standard (A): 23.0 mm (0.9 in)

Standard (B): 5.8 mm (0.23 in)



- 2) Measuring the Combined thickness of the spring disc (C), friction disc (D) and friction plate (E).

- 3) Select and install the appropriate spacer (F) to create the specified clearance.

$$\text{Clearance} = (A+B) - (C+D+E+F)$$

Clearance,

Standard: 2.4 — 2.7 mm (0.094 — 0.106 in)

Thickness of spacer available: 2.85, 3.0, 3.15, 3.3, 3.45, 3.6, 3.75 mm

Notice:

When assembling the parts, apply recommended gear oil sufficiently to each of the parts, especially, to the contact surfaces and sliding surface.

Recommended oil:

Gear oil 5 LSD (limited slip differential) or equivalent

1. Differential Cage A

2. Thrust Washer

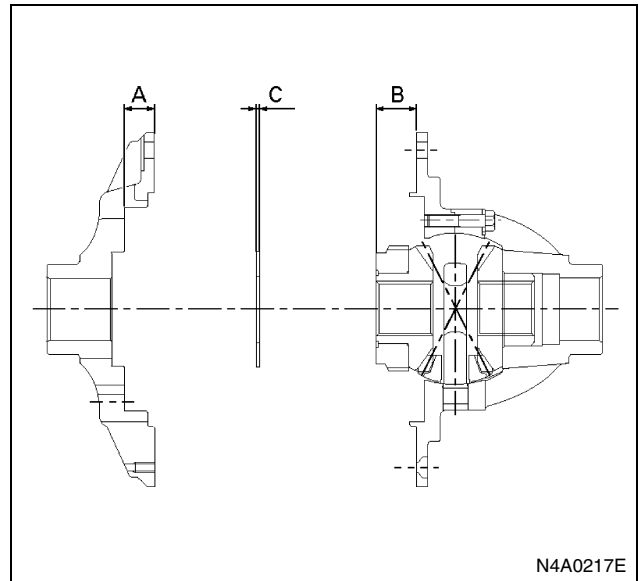
Measure the clearance the back face of the side gear and the differential cage A.

$$\text{Clearance} = A - B - C,$$

Standard: 0–0.235 mm (0–0.09 in)

C: Thrust washer thickness

Thickness of thrust washer available: 1.3, 1.4, 1.5, 1.6 mm



3. Friction plate and Friction Disc

4. Spring Disc

5. Spacer

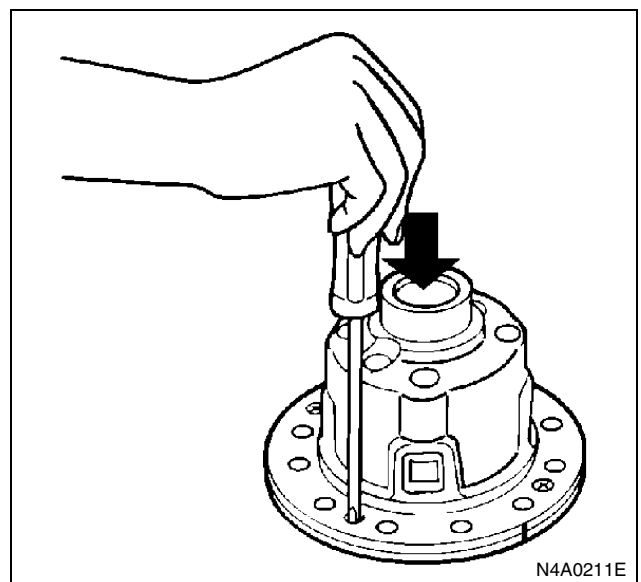
6. Differential Cage B

7. Screw

Matching the guide marks of the differential cages.

Press the differential cage B and hold it.

Tighten the screws evenly in the diagonal order.

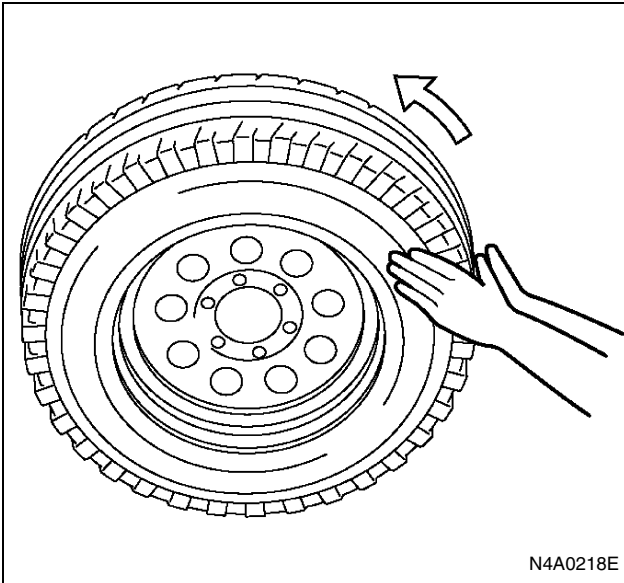


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Inspection (After installation to the vehicle)

Check parking brake function.

- 1) Make sure the vehicle is empty.
- 2) Set the parking brake.
- 3) Jack up the rear of the vehicle.
- 4) Check that the rear wheels do not turn when force is applied to them.



Road test

Drive the vehicle on the open road. Check that the limited slip differential operates when the vehicle is driven in a circular pattern and during cornering.

