

PROPELLER SHAFT AND AXLE

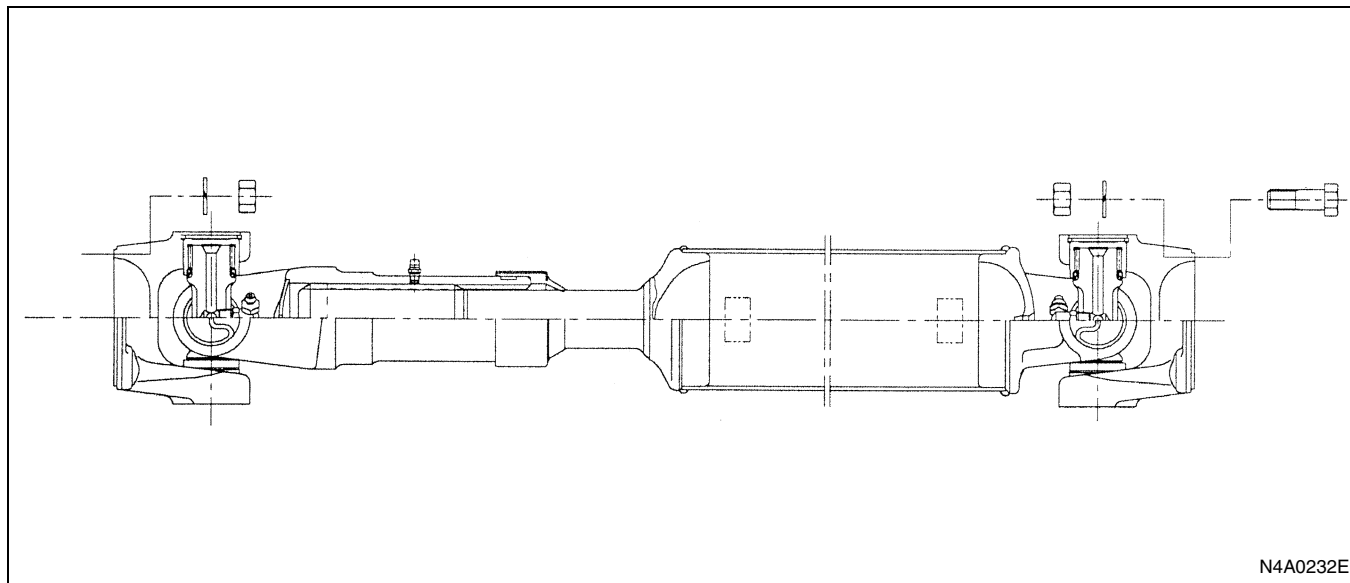
SECTION 4A PROPELLER SHAFT

Contents

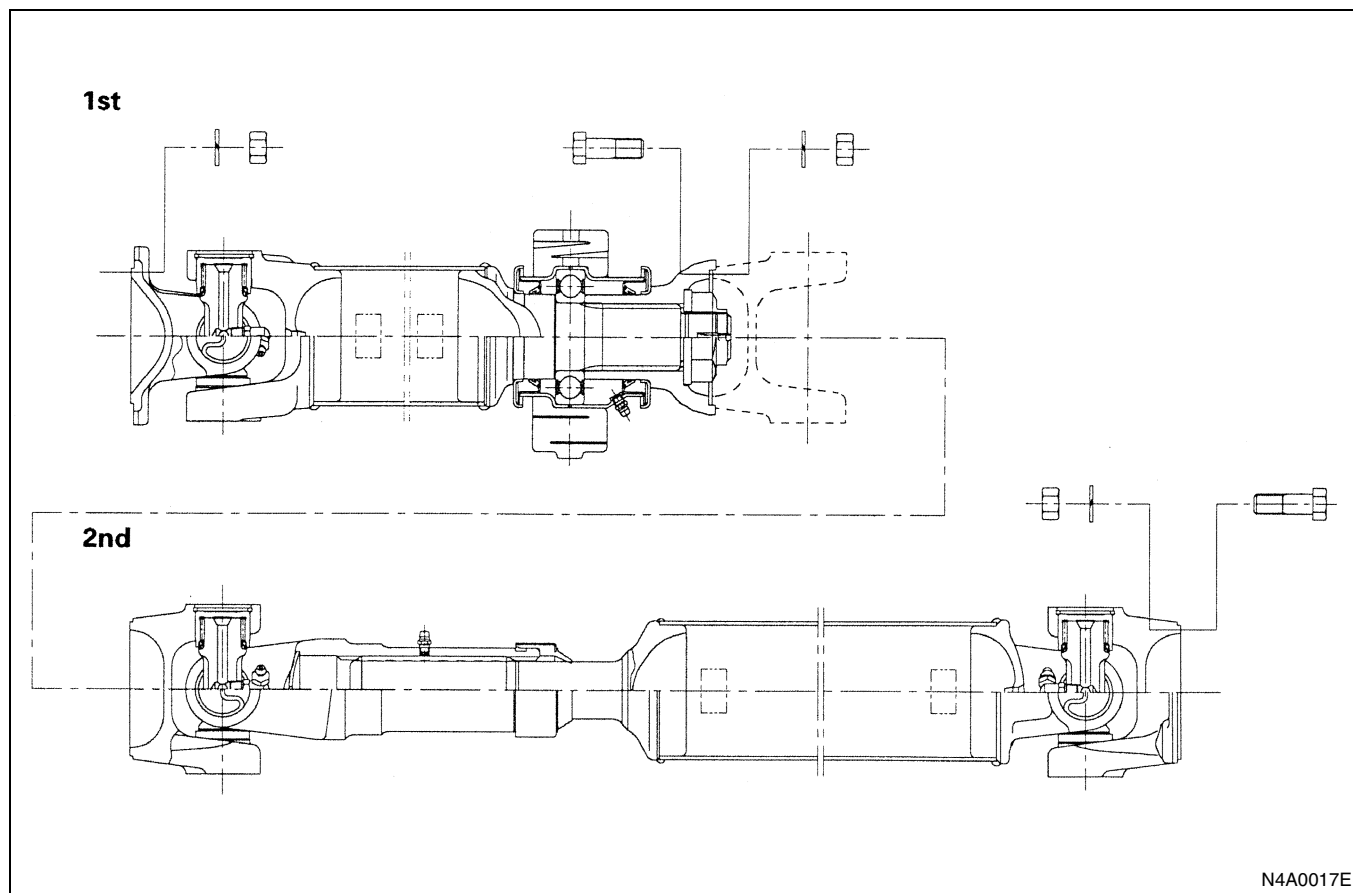
GENERAL DESCRIPTION	4A-2
Rear Drive Propeller Shaft.....	4A-2
Front Drive Propeller Shaft	4A-3
ON-VEHICLE SERVICE	4A-4
Rear Drive Propeller Shaft (Long Wheel Base Models)	4A-4
Rear Drive Propeller Shaft (Short Wheel Base Models)	4A-5
Front Drive Propeller Shaft	4A-7
UNIT REPAIR	4A-9
Universal Joint	4A-9
Center Bearing	4A-15

GENERAL DESCRIPTION

Rear Drive Propeller Shaft Short Wheel Base Models

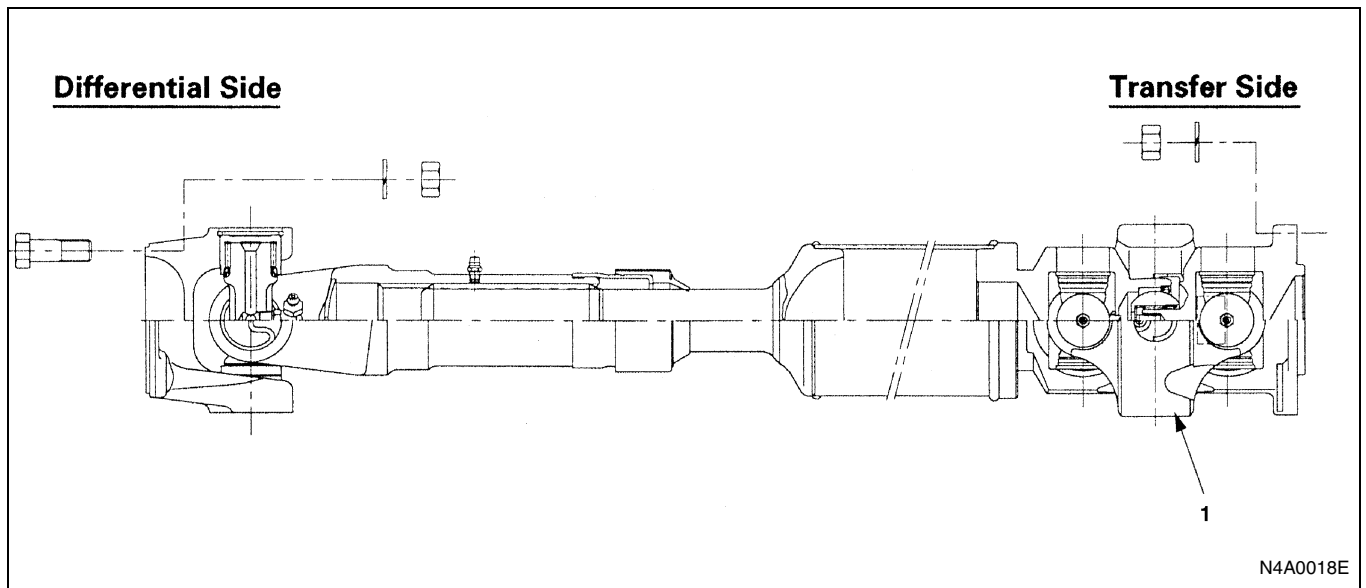


Long Wheel Base Models



Front Drive Propeller Shaft

NPS Model

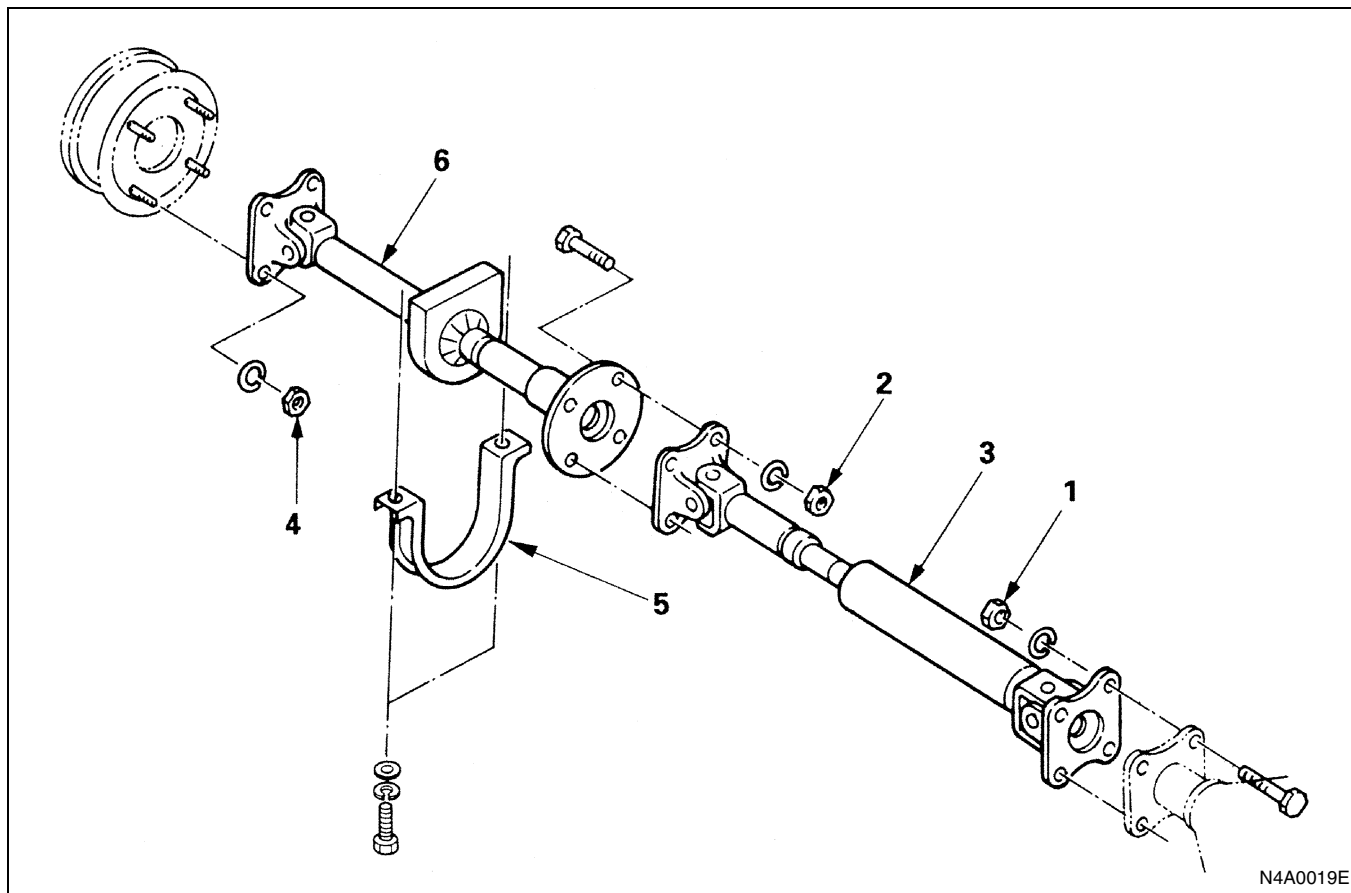


Legend

- 1. Double cardan joint

ON-VEHICLE SERVICE

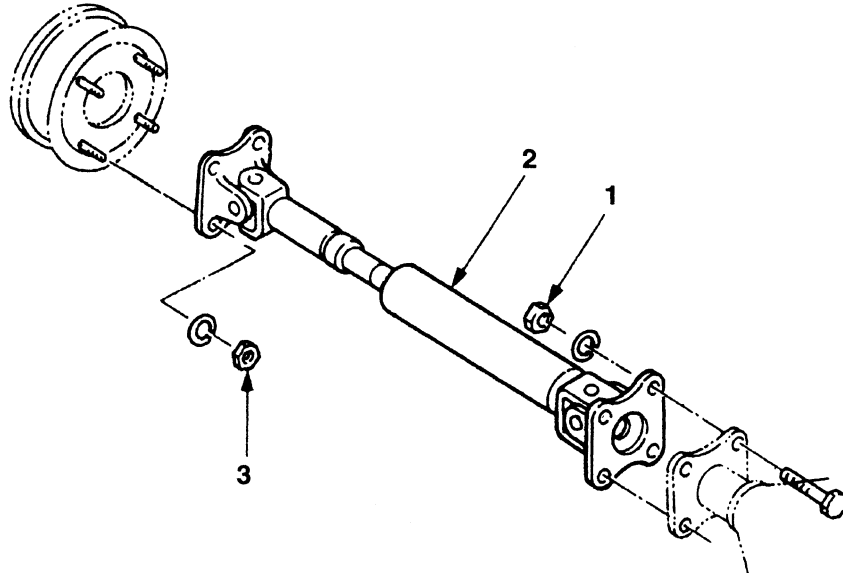
Rear Drive Propeller Shaft (Long Wheel Base Models)



Legend

- | | |
|----------------------------|---------------------------|
| 1. Differential side nut | 4. Transmission side nut |
| 2. Center bearing side nut | 5. Center bearing bracket |
| 3. 2nd propeller shaft | 6. 1st propeller shaft |

Rear Drive Propeller Shaft (Short Wheel Base Models)



N4A0414E

Legend

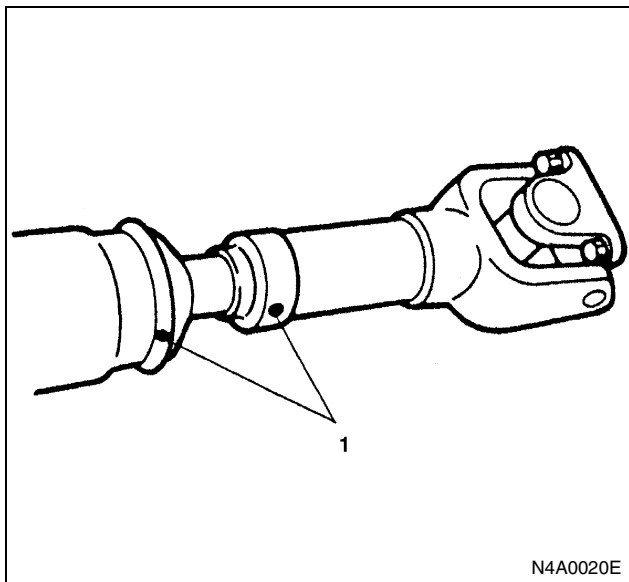
- | | |
|-----------------------------|--------------------------|
| 1. Differential side nut | 3. Transmission side nut |
| 2. Propeller shaft assembly | |

4A-6 PROPELLER SHAFT

Removal

Preparation:

- Since the propeller shaft assembly is carefully balanced, a setting mark (1) should be applied to the joints (1st propeller shaft and parking brake drum, 1st propeller shaft and 2nd propeller shaft, 2nd propeller shaft and final drive flange), before removal in to original position.



1. Differential Side Nut
2. Center Bearing Side Nut
3. 2nd Propeller Shaft
4. Transmission Side Nut
5. Center Bearing Bracket
6. 1st Propeller Shaft

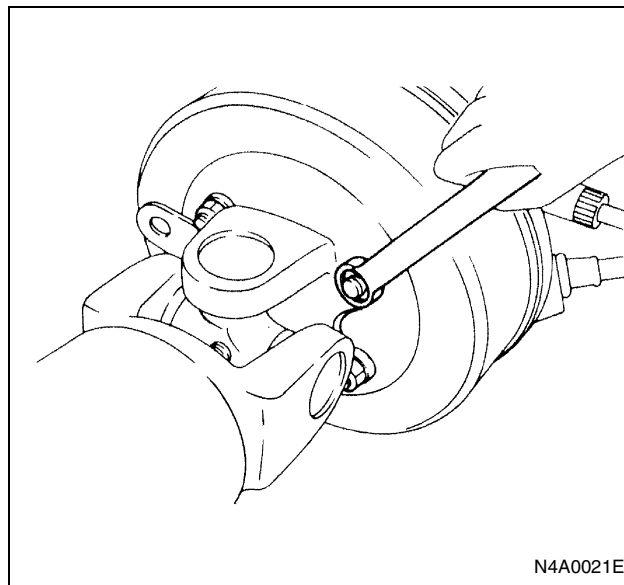
Installation

1. 1st Propeller Shaft
2. Center Bearing Bracket
3. Transmission Side Nut

Tighten:

Transmission side nut to

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

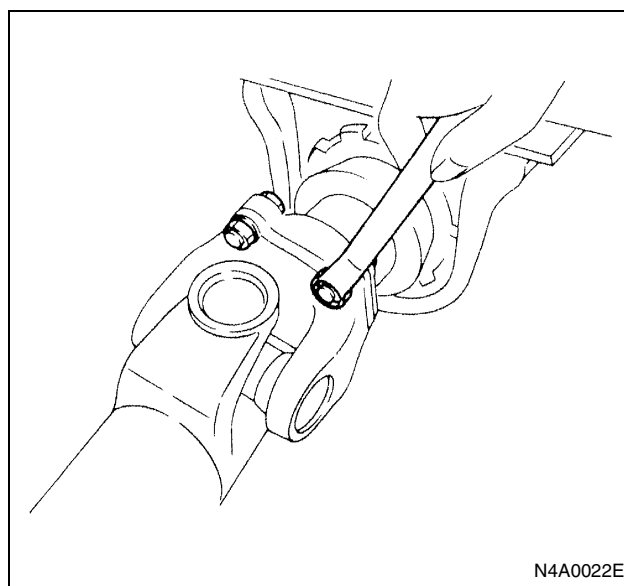


4. 2nd Propeller Shaft

Tighten:

Center bearing side nut to

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



5. Center Bearing Side Nut

Tighten:

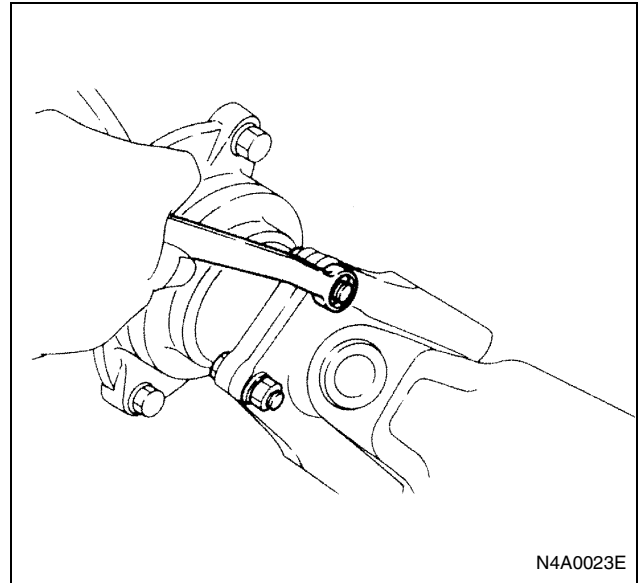
Center bearing bracket bolt to 40 N·m (4.1 kg·m / 30 lb·ft)

6. Differential Side Nut

Tighten:

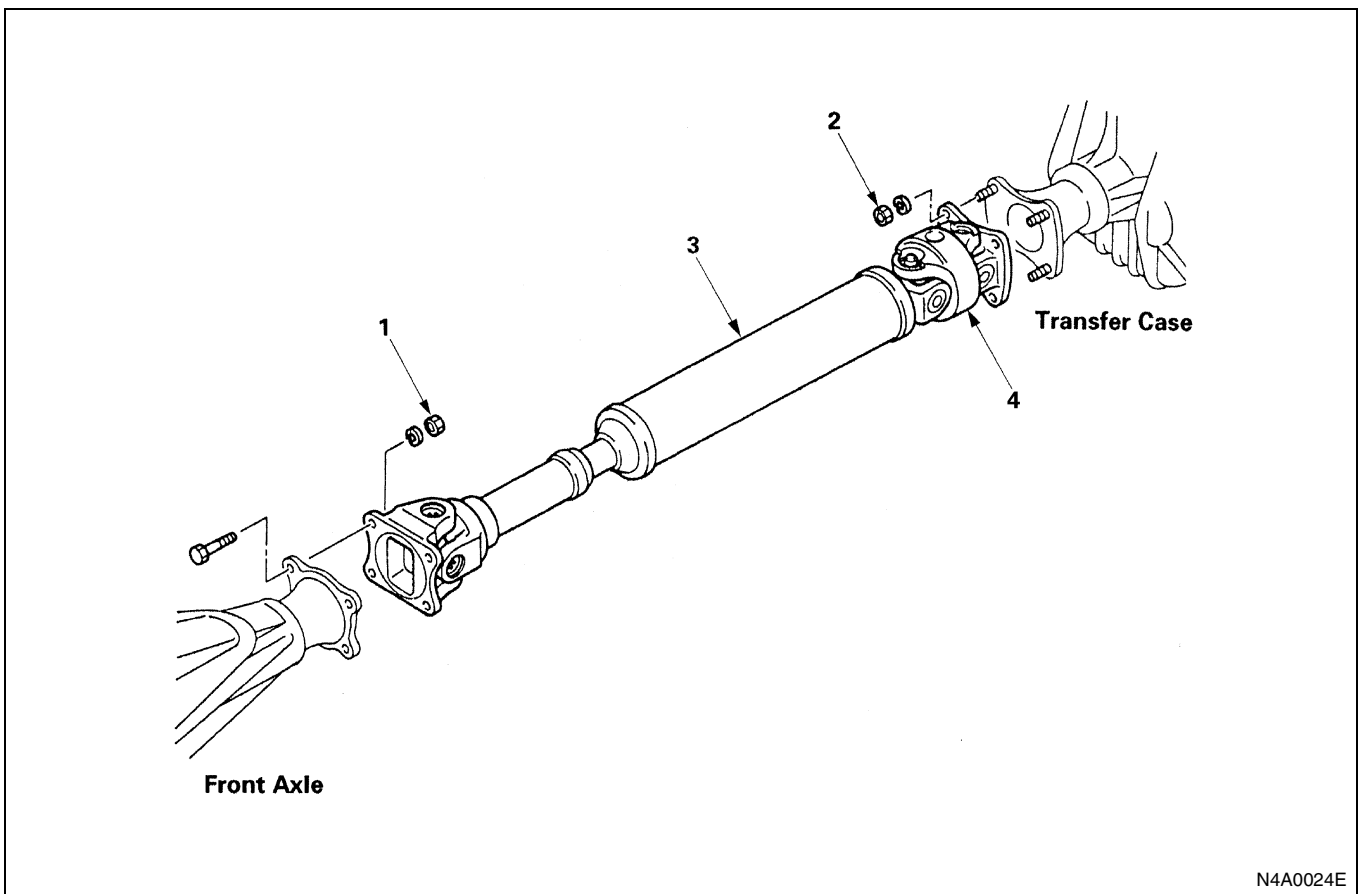
Differential side nut to

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



N4A0023E

Front Drive Propeller Shaft



N4A0024E

Legend

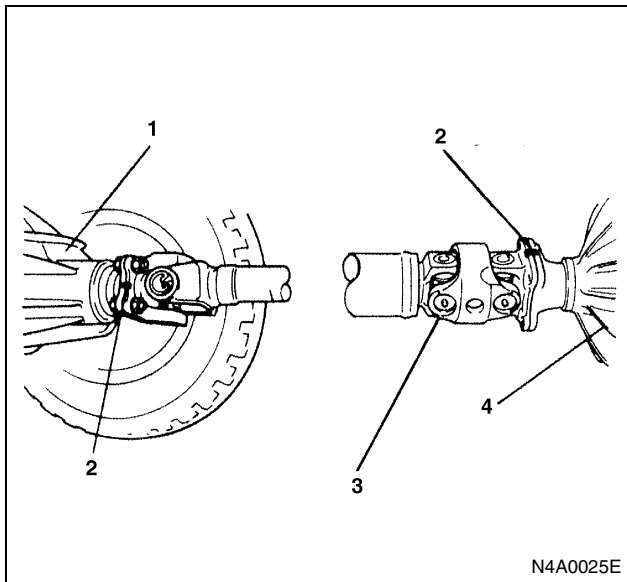
- | | |
|---------------------------|-----------------------------|
| 1. Differential side nut | 3. Propeller shaft assembly |
| 2. Transfer case side nut | 4. Double cardan joint |

4A-8 PROPELLER SHAFT

Removal

Preparation:

Since the propeller shaft assembly is carefully balanced, a setting mark should be applied to the joints, before removal in to original position.



Legend

1. Front differential
2. Setting mark
3. Double cardan joint
4. Transfer

-
1. Differential Side Nut
 2. Transfer Case Side Nut
 3. Propeller Shaft Assembly

Notice:

- The double cardan joint can not be disassembled. When it is defective, replace it as a propeller shaft assembly.
- Be sure not to bend double cardan joint at an angle of 25° or more. Further, be careful removing or carrying the assembly not to shock the double cardan joint.

Installation

1. Propeller Shaft Assembly
2. Transfer Case Side Nut

Tighten:

Transfer case side nut to

- M10: 62.7 N·m (6.4 kg·m / 46.3 lb·ft)

3. Differential Side Nut

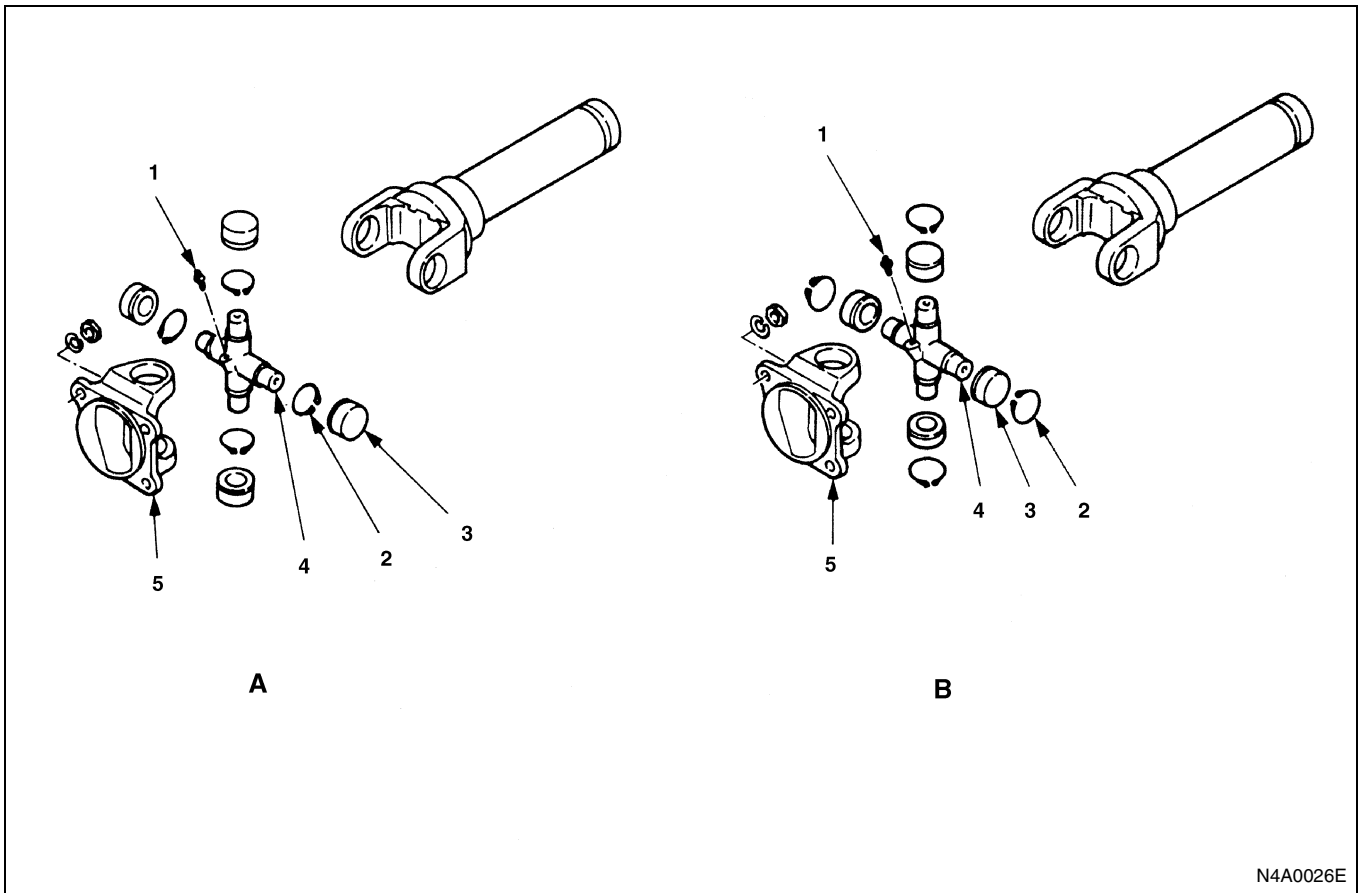
Tighten:

Differential side nut to

- M10: 62.7 N·m (6.4 kg·m / 46.3 lb·ft)

UNIT REPAIR

Universal Joint



N4A0026E

Legend

A. Inside Type

NHR

NKR 55

B. Outside Type

NKR 66,71,77

NPR 66,70,77

NQR 66

NPS 71

1. Grease fitting

2. Snap ring

3. Needle roller bearing

4. Spider

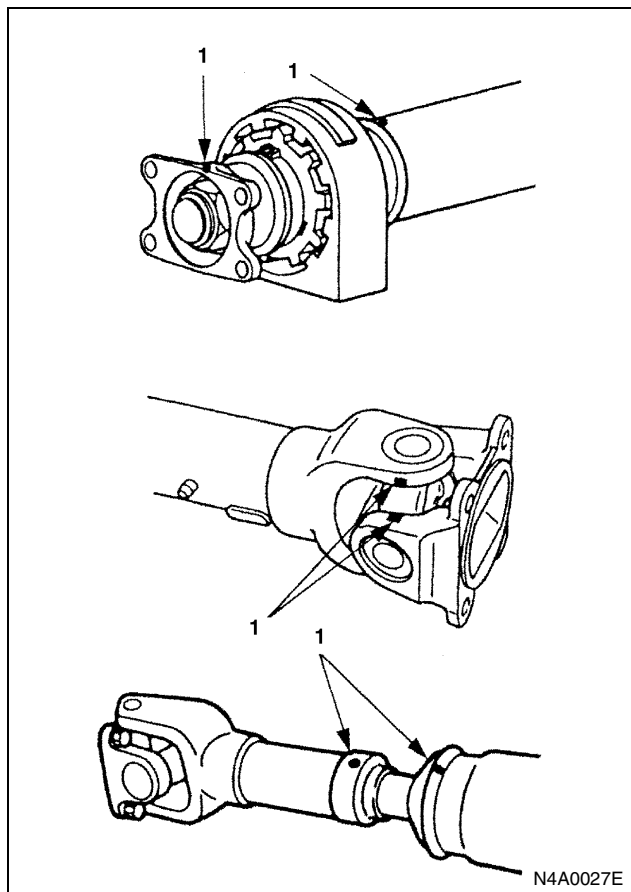
5. Flange yoke

4A-10 PROPELLER SHAFT

Disassembly

Preparation:

Since the propeller shaft assembly is carefully balanced, a setting mark (1) should be applied to the joints, before disassembly.

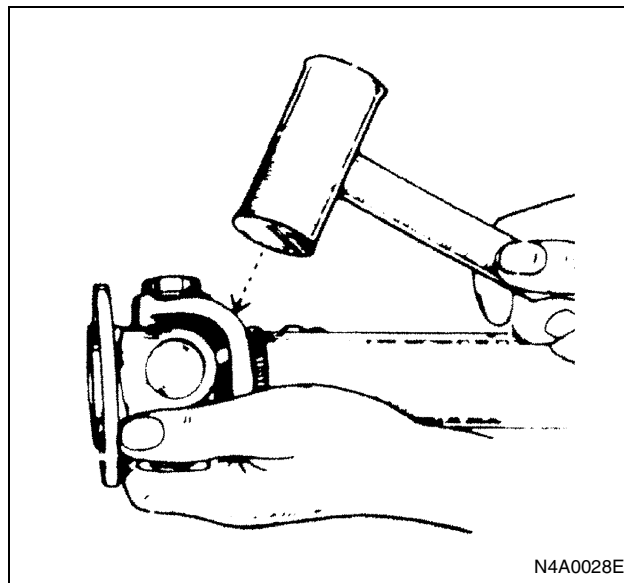


1. Grease Fitting
2. Snap Ring
3. Needle Roller Bearing

Tap out the bearing by applying a shock to the shoulder of the yoke, using a copper hammer.

Remove the needle roller bearings remaining in position by tapping lightly on the spider.

Remove the remaining bearings in the similar manner.



4. Spider
5. Flange Yoke

Inspection and Repair

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

Visual Check

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

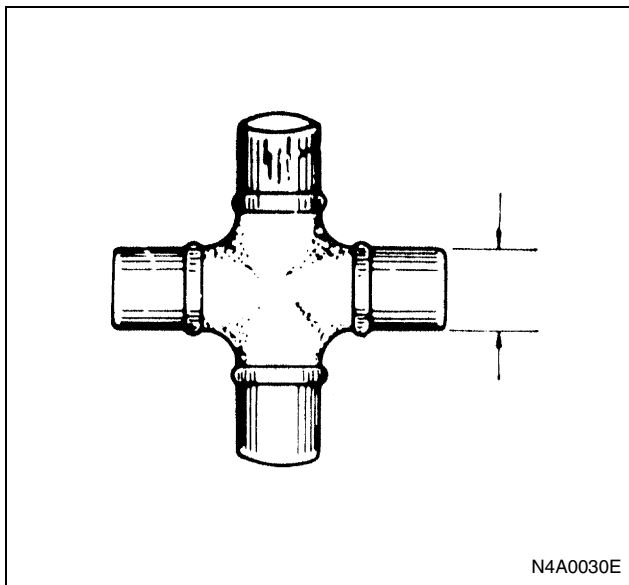
Notice:

When any part of the journal assembly requires replacement, be sure to replace the entire assembly.

- Spider
- Needle roller bearing
- Yoke
- Flange
- Center bearing
- Cushioning rubber
- Bracket

Outside Diameter of Spider Pins

mm (in.)		
	Standard	Limit
NHR, NKR55	18.46 (0.73)	18.36 (0.72)
NKR 66,71,77 NPR 66, 70,77 NQR66, 71,NPS 71	21.94 (0.86)	21.84 (0.8598)
NQR70, 75 NPR75 NPS75	24.00 (0.945)	23.9 (0.941)



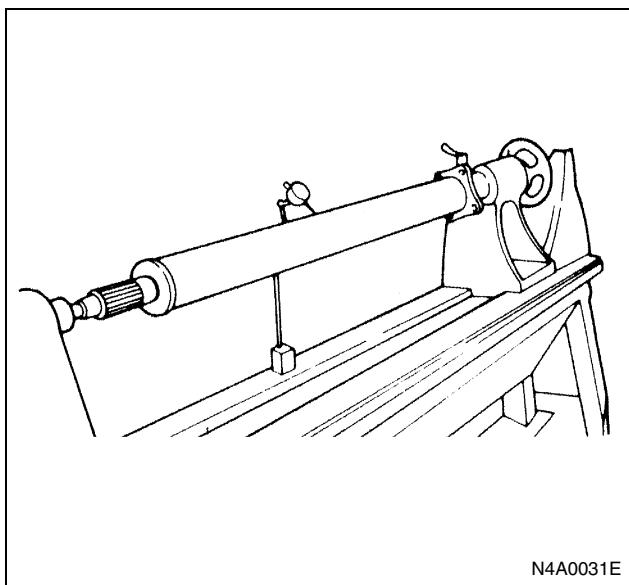
Propeller Shaft Run-Out

Support the propeller shaft at its ends and check for run-out by holding the probe of a dial indicator against the center part of the shaft.

If the amount of run-out is beyond the standard value for assembly, correct with a bench press or replace with a new one.

Standard: 0.5 mm (0.02 in) or less

Limit: 1.0 mm (0.039 in)

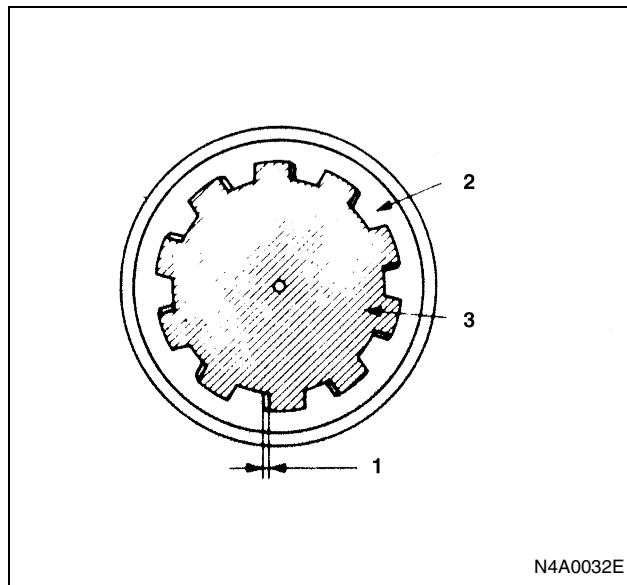


Play in Splines in Normal Direction of Rotation

Check the amount of play (1) in the sleeve yoke (2) and propeller shaft (3) splines in direction of rotation using a pointed feeler gauge.

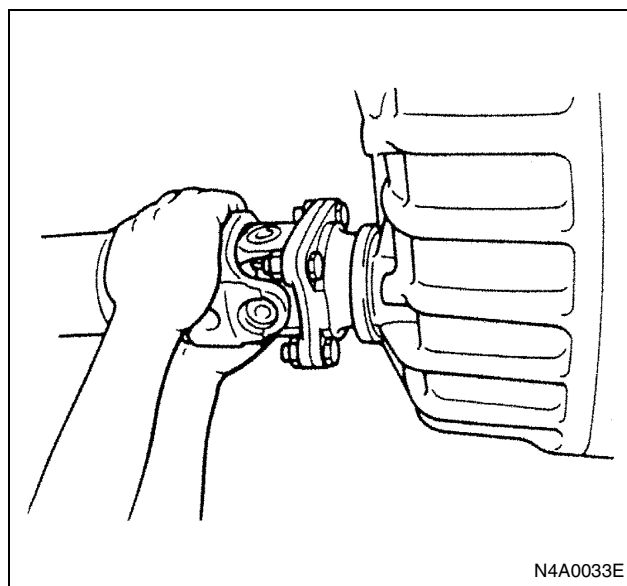
Standard: 0.1 mm (0.0039 in)

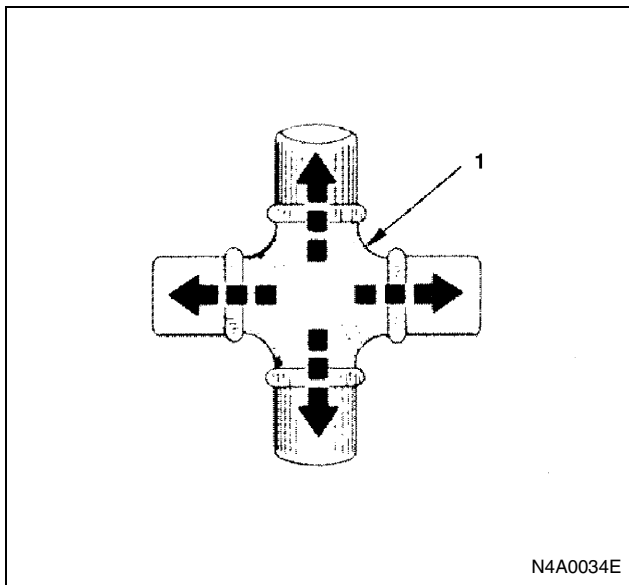
Limit: 0.3 mm (0.012 in)



Checking of Play of Double Cardan Joint (Front Propeller Shaft Only)

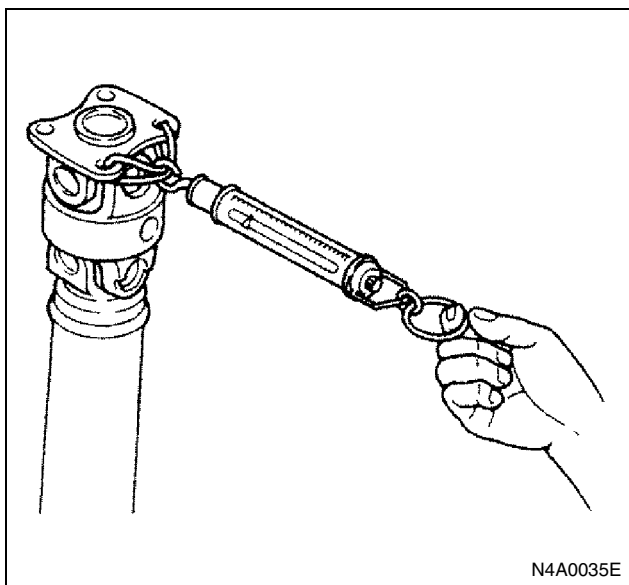
1. Check the double cardan joint for play in the direction of the spider (1) shaft. When there is an excessive play found, replace it as a propeller shaft assembly.





Preload Checking of The Double Cardan Joint (Front Propeller Shaft Only)

- 1) As shown in the illustration, tie a wire firmly by passing it through the bolt holes which are in the same direction with the flange yoke shaft.



- 2) Hook a spring balance at the center of the wire, and pull the spring balance in the direction of a right angle.
- 3) Measure the value and check if the reading of the spring balance is within the specified value at the moment when the flange starts to move.

Preload, 52 N (5.3 kg / 11.7 lb)

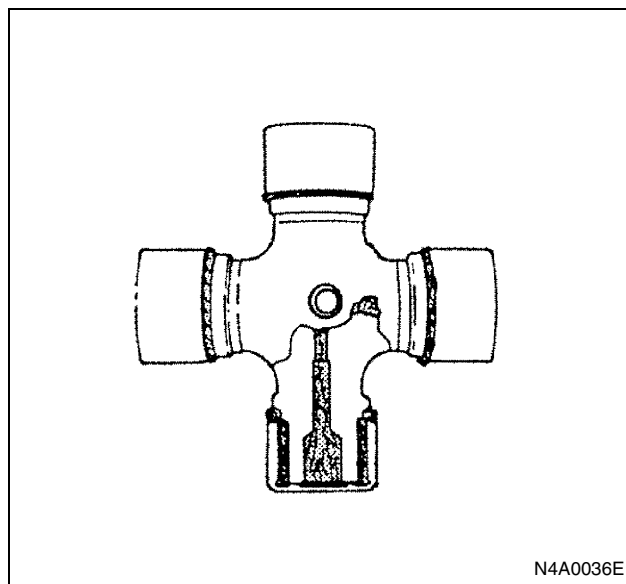
Lubrication

Universal Joints

Universal joints are drilled and provided with a lubrication fitting through which the lubricant travels to all four bearing caps, direct to the needle bearing. Needle bearings are protected against lubricant leakage and the entrance of foreign matter by seals.

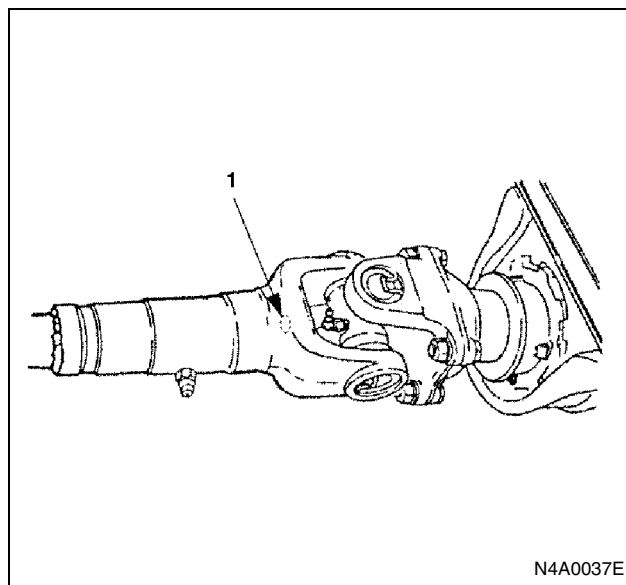
- 1) Lubricate with a chassis lubricant.

- 2) When greasing the joint, a flow of grease at all four trunnion seals must be visible to ensure lubrication of the U-joint. If grease does not appear at all four trunnion seals, the universal joint should be rotated while applying lubricant under pressure to relieve any air lock inside the joint which would prevent lubricant from reaching the bearing area.



Sliding Spline Sections

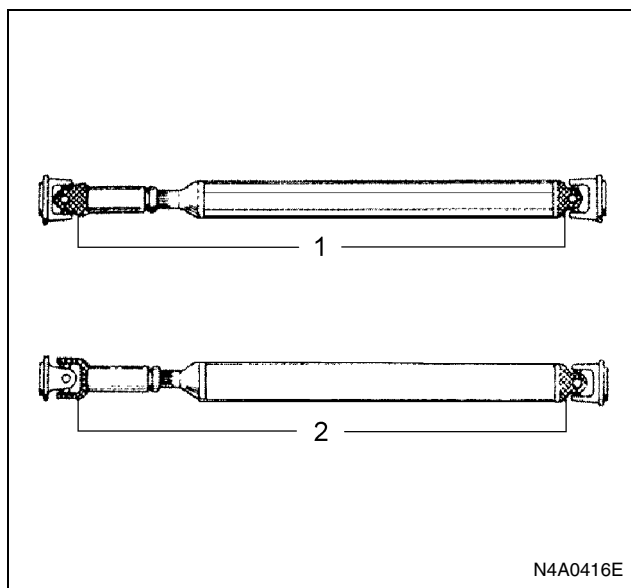
Apply grease gun pressure to the lubrication fitting until lubricant appears at the pressure relief hole (1) as shown in the figure. Now cover the pressure relief hole with your finger and continue to apply pressure until grease appears at the sleeve yoke seal as shown in the figure.



Reassembly

1. Flange Yoke

The flange yoke at end of the propeller shaft should be in alignment with the spline yoke as illustrated. The direction of the flange yoke at each end of the propeller shafts (setting mark) are in alignment.



Legend

1. Correct
2. Incorrect

2. Spider

3. Needle Roller Bearing

Apply MoS₂ grease to lip of the oil seal and needle roller bearing.

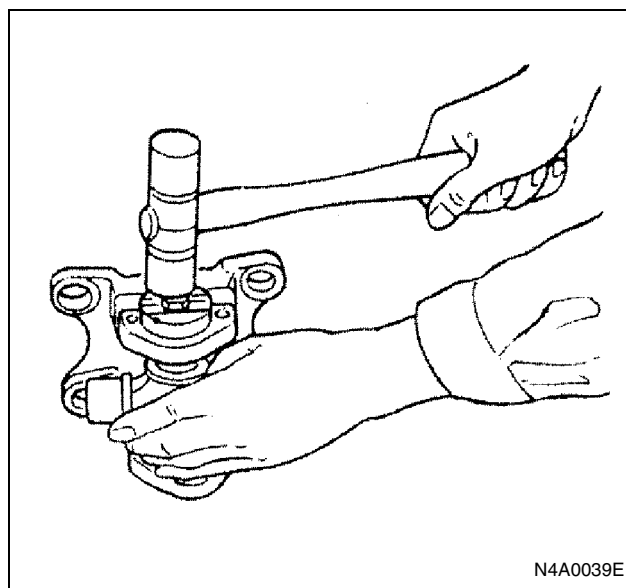
Notice:

Excessive greasing could make the bearing difficult to install or make accurate data unobtainable for the selection of the right snap ring.

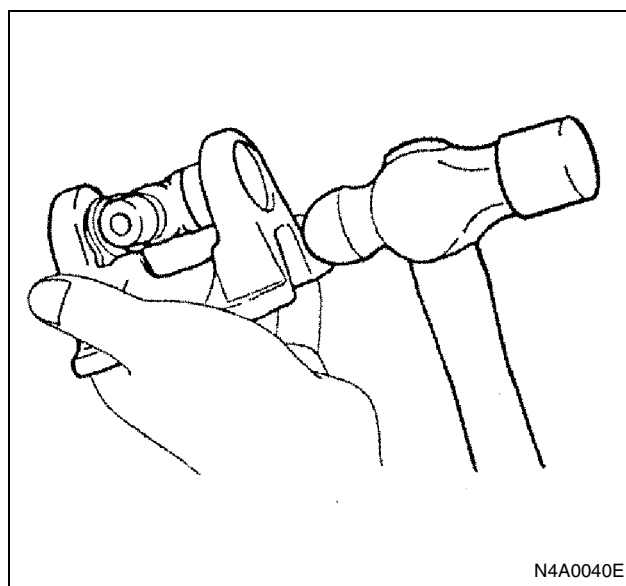
Assemble the spider to the flange yoke. Using the spider as a guide, install the needle roller bearing into the hole in the arm of the flange yoke by press or tapping with a soft-faced hammer.

Caution:

- The needle roller bearing cannot be installed smoothly if it is set at an incorrect angle with the flange.
- Excessive hammering will damage the needle roller bearing.

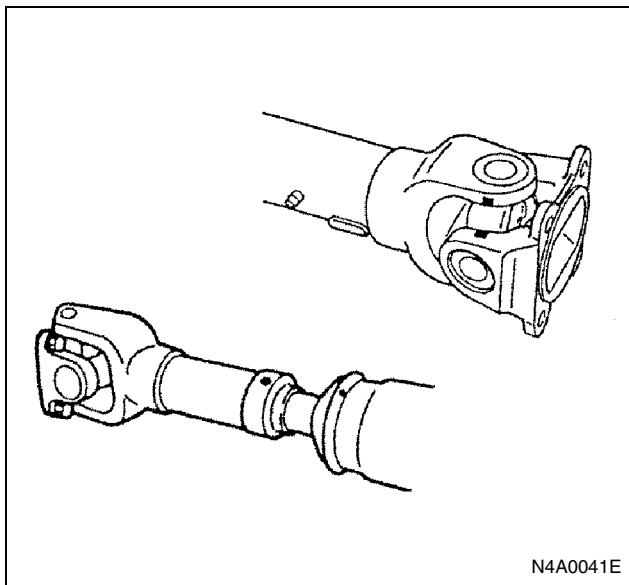


Eliminate the clearance between snap ring and bearing by striking the yoke with a hammer.



Align setting marks and join the yokes.

4A-14 PROPELLER SHAFT



4. Snap Ring

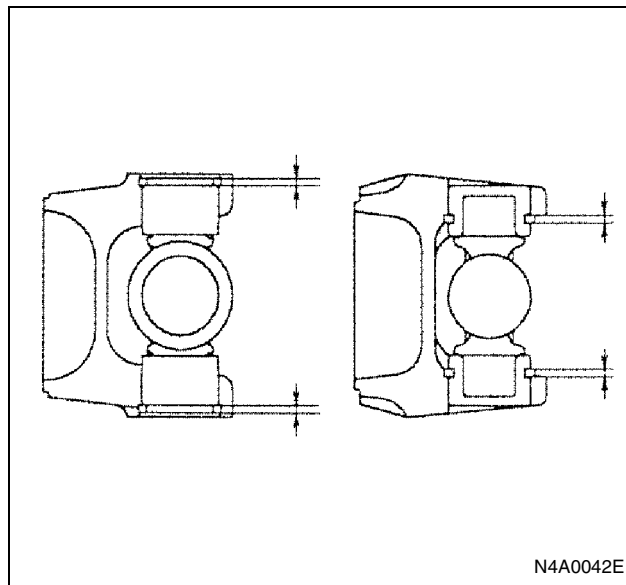
Discard used snap ring and install new one. When the bearing is fitted into position, select and install the snap ring of suitable thickness so that the end play of the spider pin is held within 0.1 mm.

Thickness of Snap Ring Available		mm (in.)
NHR, NKR55		
Snap ring thickness	Identification color	
1.5 (0.059)	Blue	
1.53 (0.060)	White	
1.59 (0.063)	Yellow	
1.62 (0.064)	Green	
1.68 (0.066)	Not colored	

NKR 66, 71, 77, NPR 66, 70, 77, NQR66, 71, NPS 71		
Snap ring thickness	Identification color	
1.95 (0.077)	Blue	
2.00 (0.079)	White	
2.05 (0.081)	Yellow or Not colored	

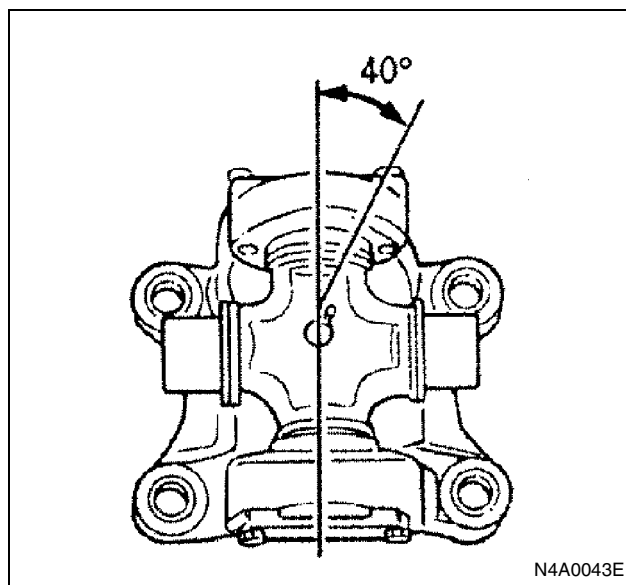
Notice:

Be sure to use snap rings of the same thickness on both sides.



5. Grease Fitting

Install the grease fitting at an angle of approximately 40 degrees to the spider. The parts should be so installed that all grease fittings are pointed upward.



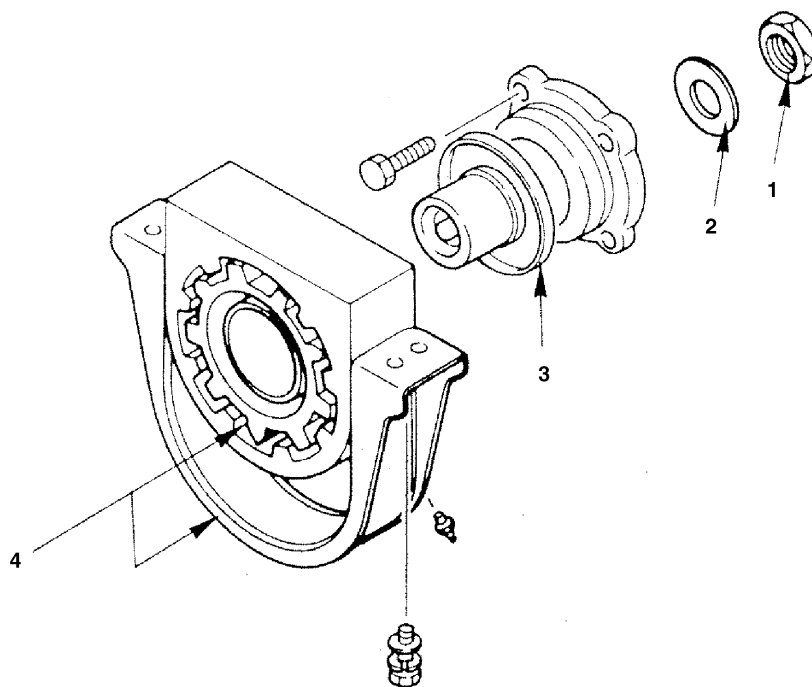
Center Bearing

NKR 66, 71, 77

NPR 66, 70, 71

NQR 66, 70, 71

NPS 71



N4A0044E

Legend

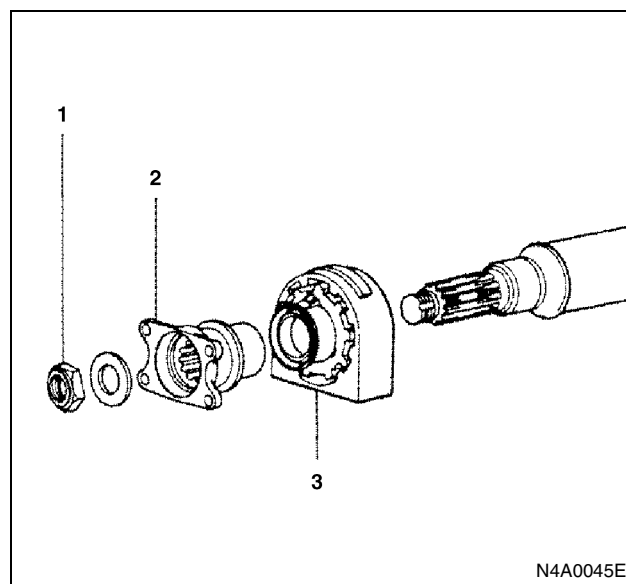
- | | |
|------------------------|----------------------------|
| 1. Lock nut | 3. Coupling driver |
| 2. Washer (NQR70 only) | 4. Center bearing assembly |

Disassembly

1. Lock Nut
2. Washer (NQR70 only)
3. Coupling Driver
Apply alignment marks on the flange and tube assembly.
4. Center Bearing Assembly

Notice:

The center bearing can not be disassembled.



N4A0045E

4A-16 PROPELLER SHAFT

Legend

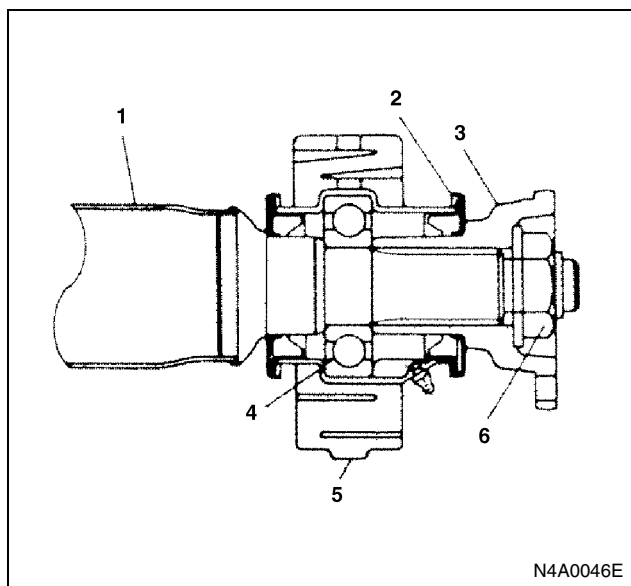
1. Coupling driver lock nut
2. Coupling driver
3. Center bearing assembly

Reassembly

1. Center Bearing Assembly

Install the center bearing assembly so that the grease fitting side is faced toward the coupling driver side.

When pressing in the center bearing, the bearing should be pressed through a coupling driver to avoid bearing damage.



Legend

1. Propeller shaft
2. Oil seal
3. Coupling driver
4. Center bearing
5. Rubber
6. Lock nut

Apply bearing grease to lip of the oil seal and center bearings.

Amount of grease required,

Except NQR70: 20 — 25 g (0.7 — 0.9 oz)

NQR70: 40 — 50 g (1.4 — 1.8 oz)

2. Coupling Driver

Be sure to align the setting marks described before disassembling.

3. Washer

4. Lock Nut

Set a special tool into a vice then attach the propeller shaft assembly.

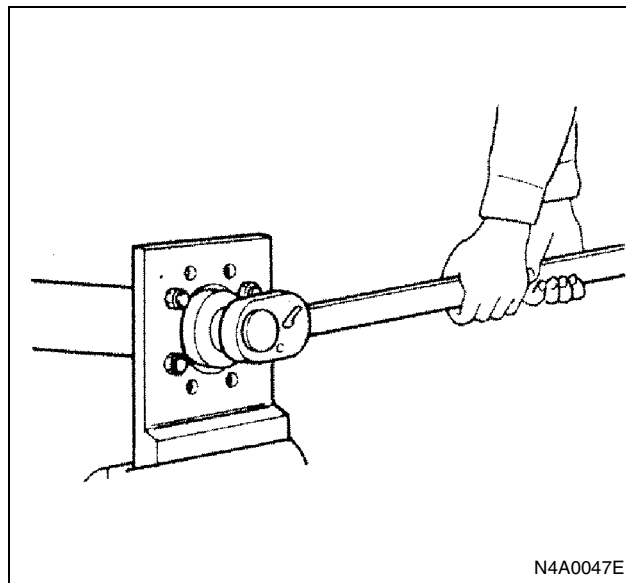
Flange bracket: 9-8529-2101-0

Discard used flange nut and install new one.

Tighten:

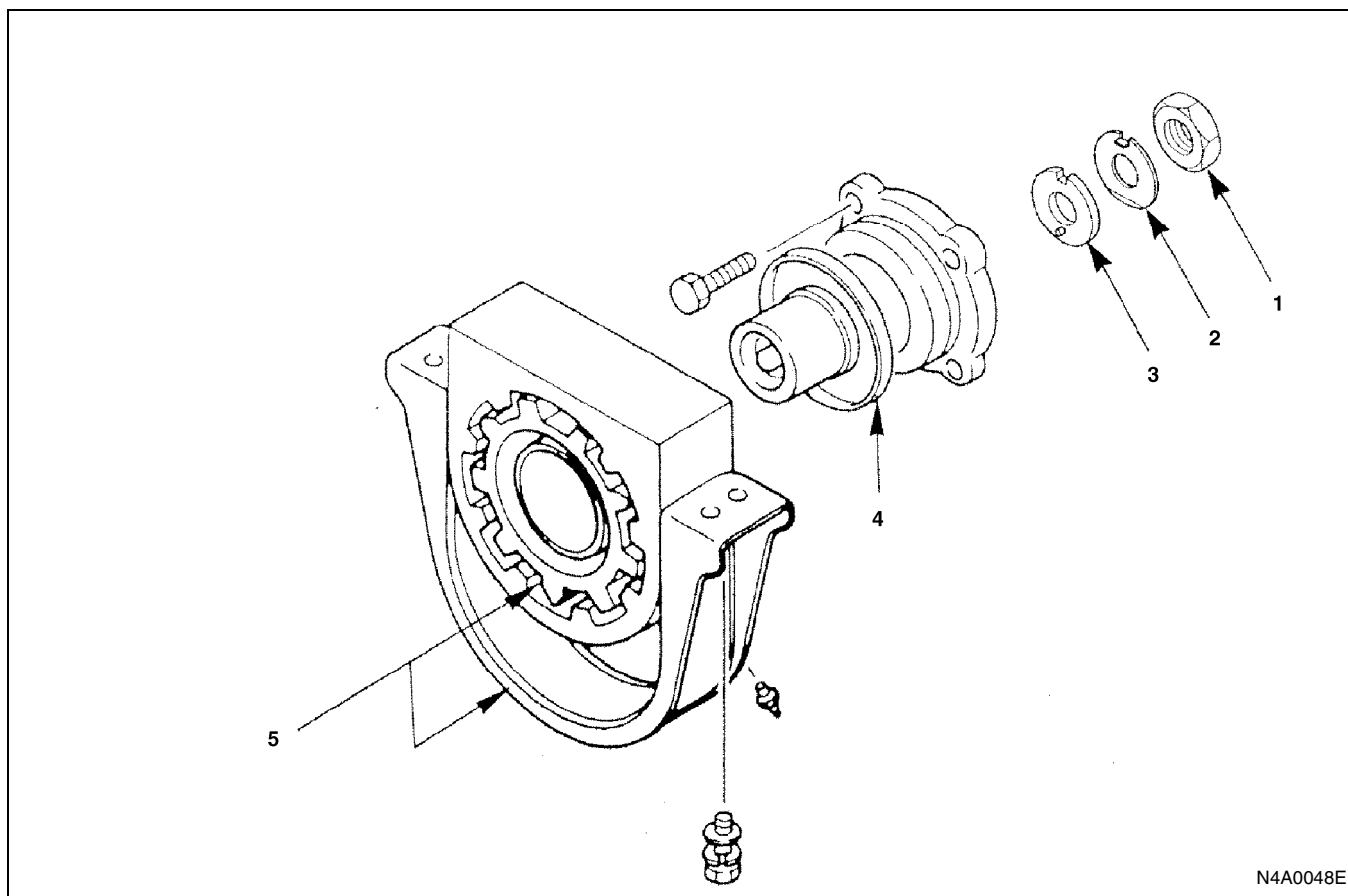
Lock nut to

- NHR55, 69, NKR55: 118 N·m (12 kg·m / 87 lb·ft)
- NQR70: 441 N·m (45 kg·m / 325 lb·ft)
- Other models: 539 N·m (55 kg·m / 398 lb·ft)



Caulk the lock nut at the V-shaped groove portion of the shaft.

NKR 55



N4A0048E

Legend

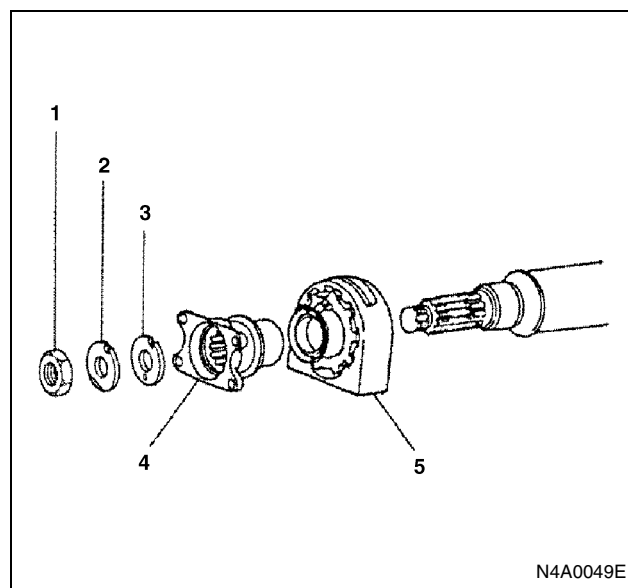
- | | |
|--------------------|----------------------------|
| 1. Lock nut | 4. Coupling driver |
| 2. Lock washer | 5. Center bearing assembly |
| 3. Washer assembly | |

Disassembly

1. Lock Nut
2. Lock Washer
3. Washer Assembly
4. Coupling Driver
Apply alignment marks on the flange and tube assembly.
5. Center Bearing Assembly

Notice:

The center bearing can not be disassembled.



N4A0049E

4A-18 PROPELLER SHAFT

Legend

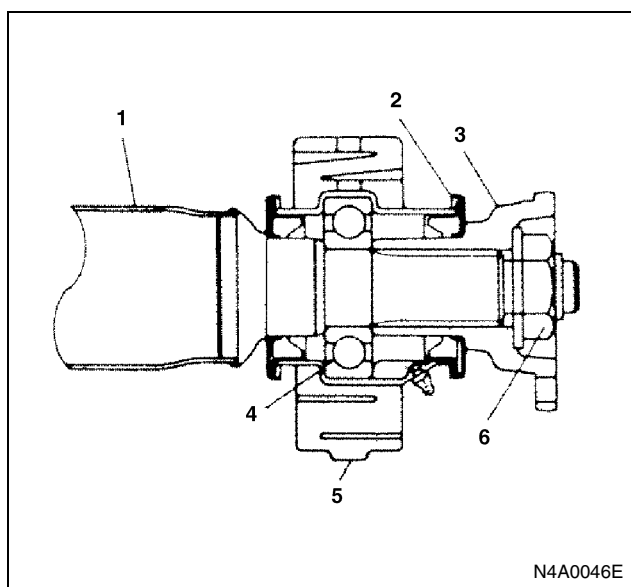
1. Lock nut
2. Lock washer
3. Washer assembling
4. Coupling driver
5. Center bearing assembly

Reassembly

1. Center Bearing Assembly

Install the center bearing assembly so that the grease fitting side is faced toward the coupling driver side.

When pressing in the center bearing, the bearing should be pressed through a coupling driver to avoid bearing damage.



Legend

1. Propeller shaft
2. Oil seal
3. Coupling driver
4. Center bearing
5. Rubber
6. Lock nut

Apply bearing grease to lip of the oil seal and center bearing.

Amount of grease required, 20 — 25 g (0.7 — 0.9 oz)

2. Coupling Driver

Be sure to align the setting marks described before disassembling.

3. Washer Assembly

4. Lock Washer

Discard used lock washer and install new one.

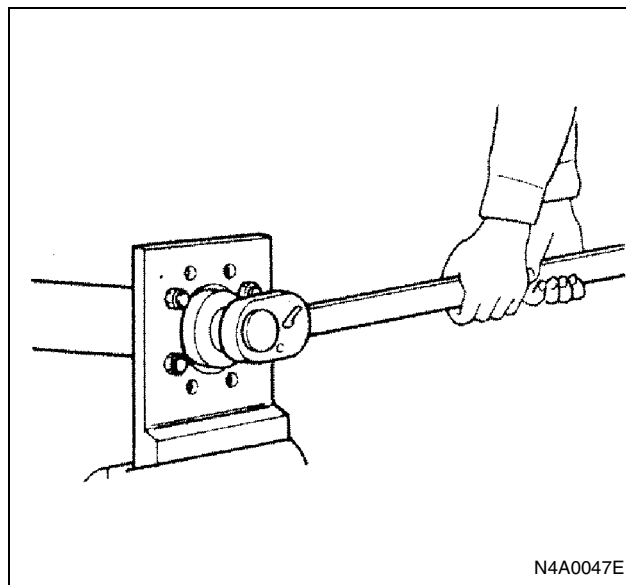
5. Lock Nut

Set a special tool into a vice then attach the propeller shaft assembly.

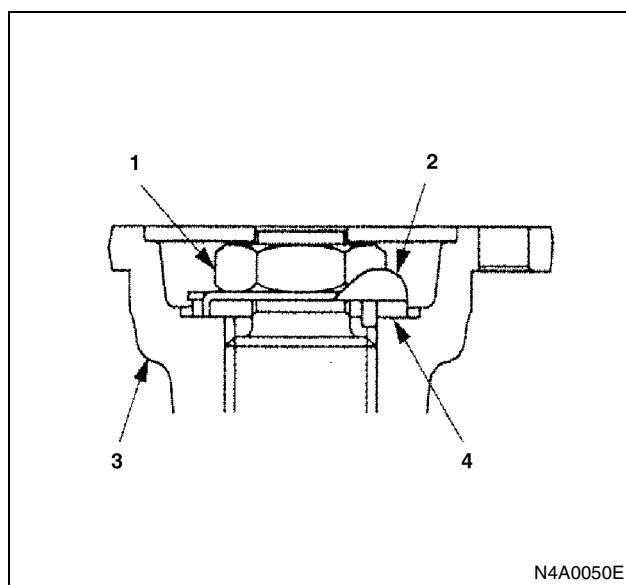
Flange bracket: 9-8529-2101-0

Tighten:

Lock nut to 118 N·m (12 kg·m / 87 lb·ft)



After tightening the lock nut to specified torque, bend a part of the lock washer to the nut side.



Legend

1. Lock nut
2. Lock washer
3. Coupling driver
4. Washer assembly