SECTION PR
PROPELLER SHAFT

CONTENTS

2WD

AWD

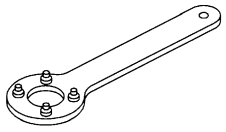
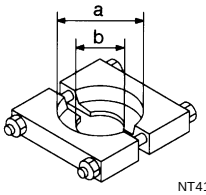
PREPARATION

PFP:00002

Special Service Tools

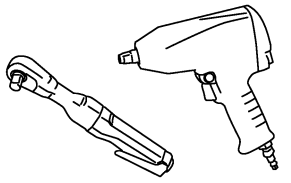
ADS0010A

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

Tool number (Kent-Moore No.) Tool name	Description
ST38060002 (J34311) Companion flange wrench  NT113	Removing and installing lock nut
ST30031000 (J22912–01) Puller a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.  NT411	Remove rear propeller shaft center bearing

Commercial Service Tools

ADS0010B

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS0010C

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

Reference page			—	PR-4	—	—	—	PR-4	—	NVH in RFD section	NVH in FAX, RAX, FSU, and RSU section	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in BR section	NVH in PS section
Possible cause and suspected parts			Uneven rotation torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Propeller shaft	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
		Shake		×			×				×	×	×	×	×	×
		Vibration	×	×	×	×	×	×	×		×	×		×		×

×: Applicable

REAR PROPELLER SHAFT

PFP:37000

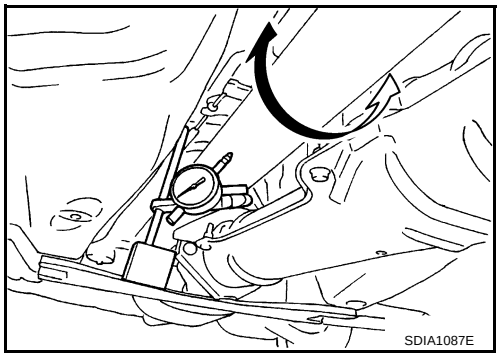
On-Vehicle Service

ADS000R6

PROPELLER SHAFT VIBRATION

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

1. Measure propeller shaft runout at several points by rotating final drive companion flange with hands.



Propeller shaft runout limit

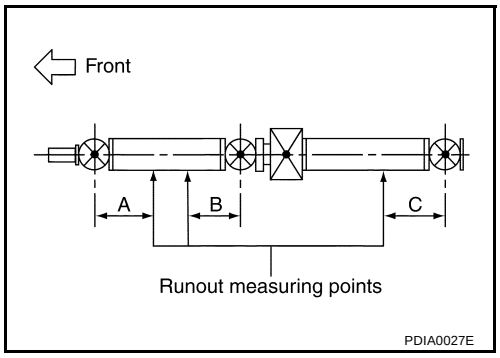
: 0.6 mm (0.024 in) or less

Propeller shaft runout measuring points

Distance **A: 192 mm (7.56 in)**

B: 172 mm (6.77 in)

C: 170 mm (6.69 in)



2. If runout still exceeds specifications, disconnect propeller shaft at final drive companion flange; then rotate companion flange 90, 180, 270 degrees and reconnect propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving the vehicle.

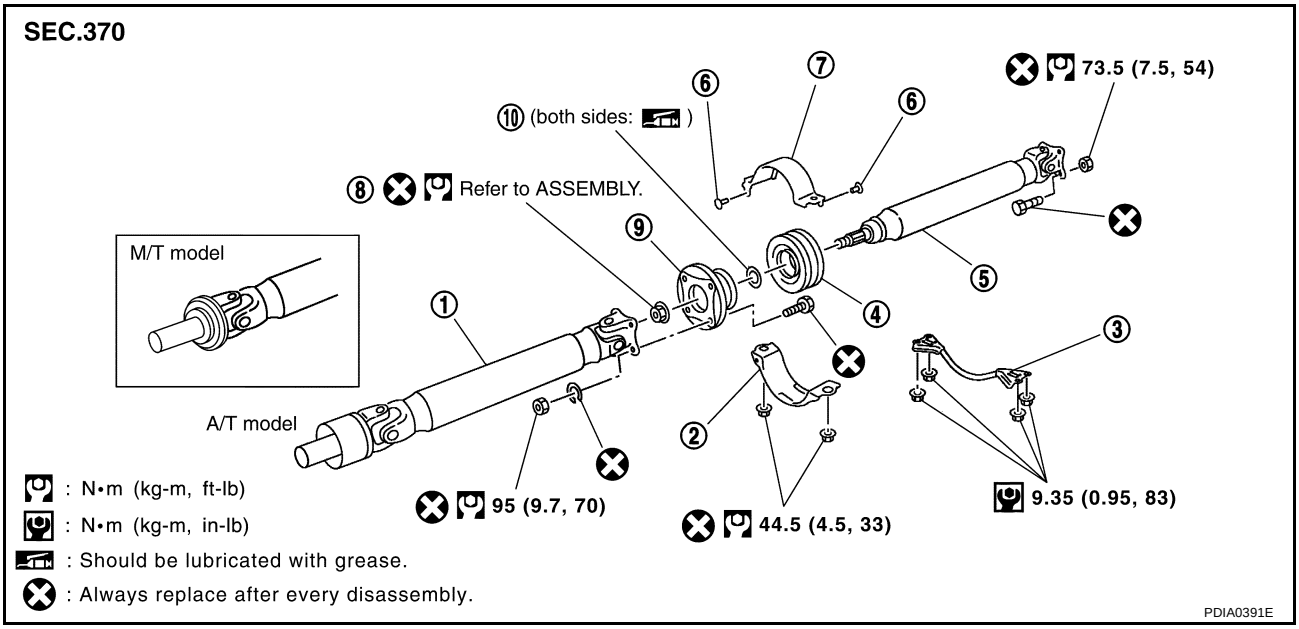
APPEARANCE CHECKING

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

Removal and Installation

ADS000R7

COMPONENTS

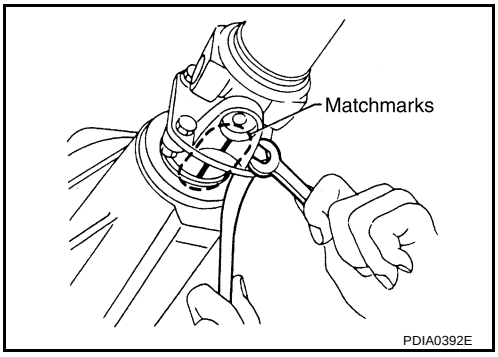


1.	1st shaft	2.	Center bearing mounting bracket (lower)	3.	Floor rain force
4.	Center bearing	5.	2nd shaft	6.	Clip
7.	Center bearing mounting bracket (upper)	8.	Lock nut	9.	Center flange
10.	Washer				

REMOVAL

1. Move A/T select lever to N range position, set M/T shift lever to neutral position.
2. Release parking brake.
3. Remove the center muffler with power tool. Refer to EX-3, "EXHAUST SYSTEM" .
4. Loosen the center bearing mounting bracket fixing nuts with power tool.
5. Put matchmarks on flange and rear propeller shaft.

   CAUTION:
   For matchmark, use paint. Do not damage the propeller shaft flange and companion flange on the rear final drive.
6. Remove the propeller shaft fixing bolts and nuts.
7. Remove the center bearing mounting bracket fixing nuts.
8. Remove propeller shaft.

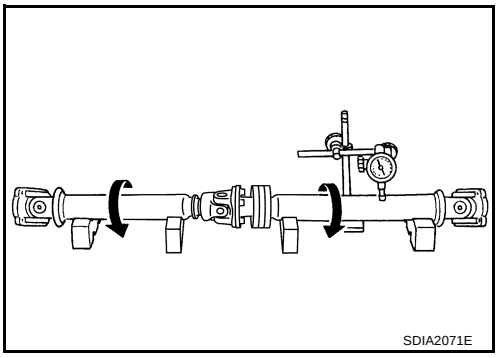


INSPECTION

- Inspect propeller shaft runout. If runout exceeds specifications, replace propeller shaft assembly.

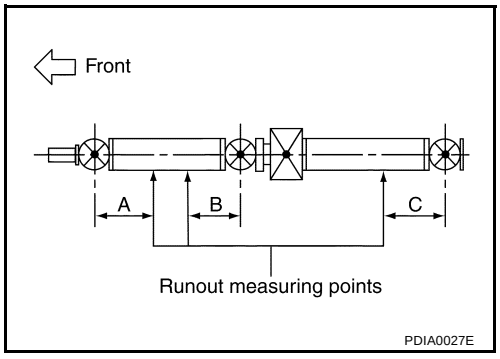
  Propeller shaft runout limit

  : 0.6 mm (0.024 in) or less



Propeller shaft runout measuring points

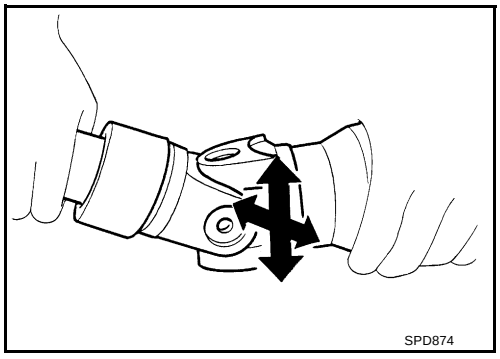
Distance **A: 192 mm (7.56 in)**
B: 172 mm (6.77 in)
C: 170 mm (6.69 in)



- Inspect journal axial play. If the play exceeds specifications, replace propeller shaft assembly.

  Journal axial play : 0 mm (0 in)

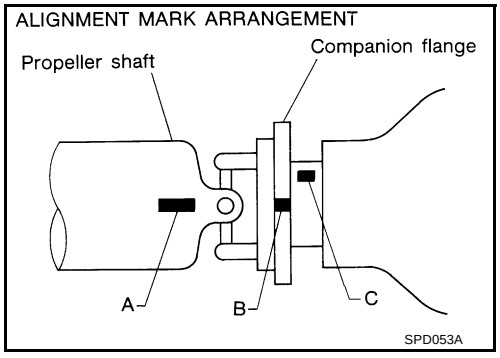
- Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.



INSTALLATION

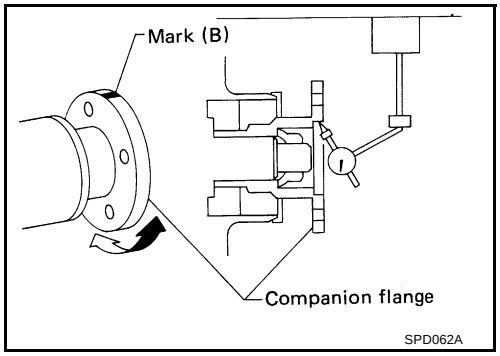
Companion Flange Installation

If companion flange has been removed, put new alignment mark B and C on it. Then, reassemble using the following procedure. (Perform step 4 when final drive and propeller shaft are separated from each other. Also perform step 4 when either of these parts is replaced with a new one.)



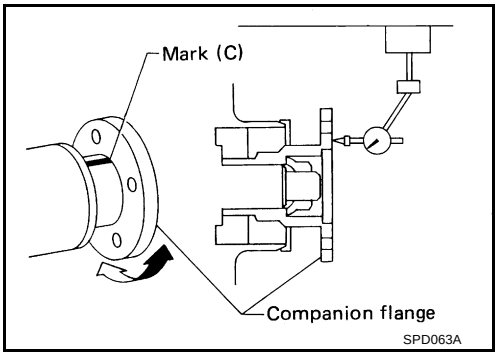
1. Erase original marks B and C from companion flange with suitable solvent.
2. Put mark B on flange perimeter.

- Measure companion flange vertical runout.
- Determine the position where maximum runout is read on dial gauge. Put mark (shown by B in figure) on flange perimeter corresponding to maximum runout position.

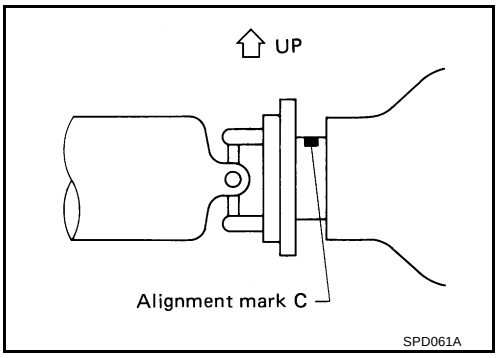


3. Put mark C on flange perimeter.

- Measure companion flange surface runout.
- Determine the position where maximum runout is read on dial gauge. Put mark (shown by C in figure) on flange perimeter corresponding to maximum runout position.



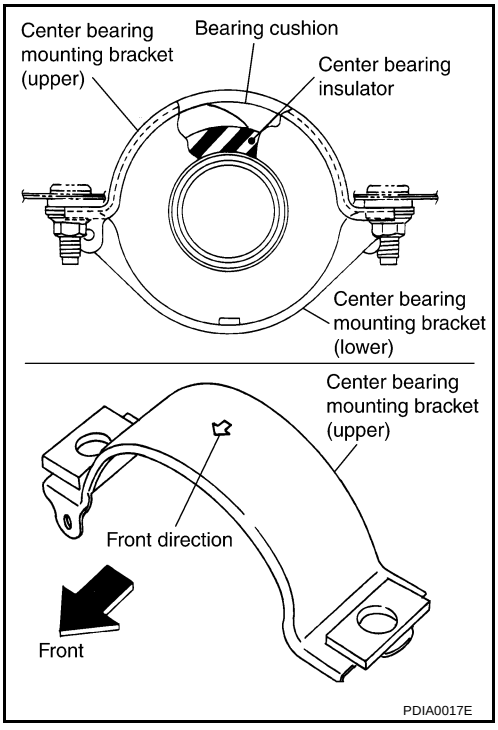
4. Position companion flange and propeller shaft using alignment marks A and B. Set the marks A and B as close to each other as possible. Temporarily attach bolts and nuts.
5. Press down propeller shaft with alignment mark C facing upward. Then tighten the lower nut to specified torque.
6. Tighten remaining nuts to specified torque.



Center Bearing Bracket Installation

- Adjust position of the bearing cushion so as not to apply thrust play to the center bearing insulator.
- Position the bearing cushion overlap as shown in the figure.
- Install the center bearing mounting bracket (upper) with its arrow mark facing forward.
- Tighten the center bearing mounting bracket fixing nuts to specified torque. Refer to PR-5, "COMPONENTS" .

CAUTION:
Do not reuse the nuts.



Disassembly and Assembly

ADS000R8

DISASSEMBLY

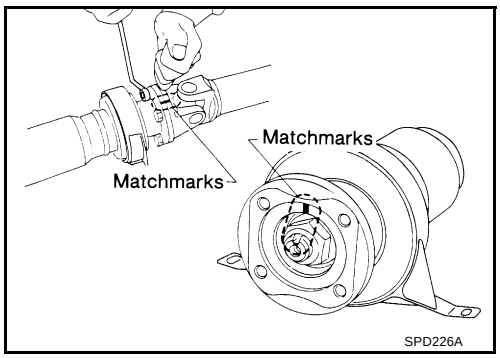
Center Bearing

NOTE:

- The joint cannot be disassembled.
- The center bearing can be disassembled.

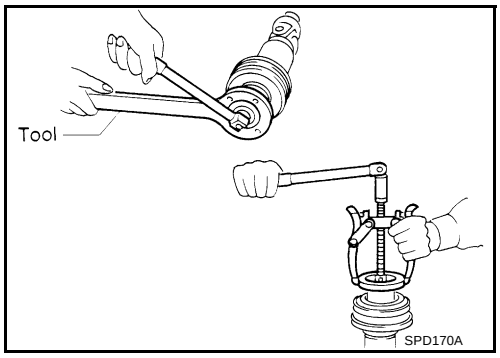
1. Put matchmarks on flanges, and separate 2nd shaft from 1st shaft.

   CAUTION:
   For matchmark, use paint. Do not damage the propeller shaft flange and center flange.
2. Put matchmarks onto the center flange and propeller shaft end as shown.
3. Stake center flange lock nut with a punch.



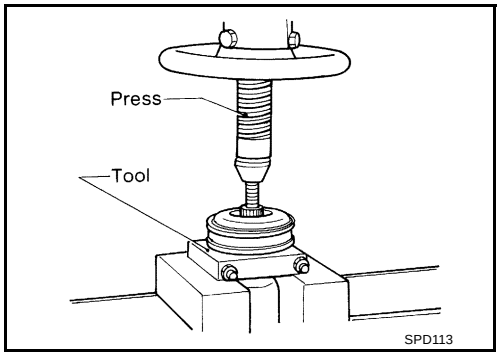
4. Remove locking nut with tool.

   Tool number :ST38060002 (J34311)
5. Remove companion flange with puller.



6. Remove center bearing with tool and press.

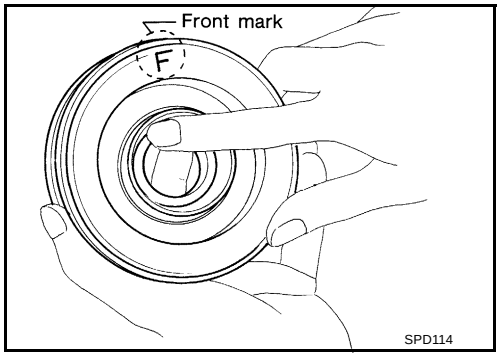
   Tool number :ST30031000 (J22912–01)



ASSEMBLY

Center Bearing

1. When installing center bearing, position the “F” mark on center bearing toward rear of vehicle.
2. Apply a coat of multi–purpose lithium grease containing molybdenum disulfide to the end face of the center bearing and both sides of the washer.



3. The lock nut is tightened according to the following.

- Using a suitable torque wrench and tighten lock nut.

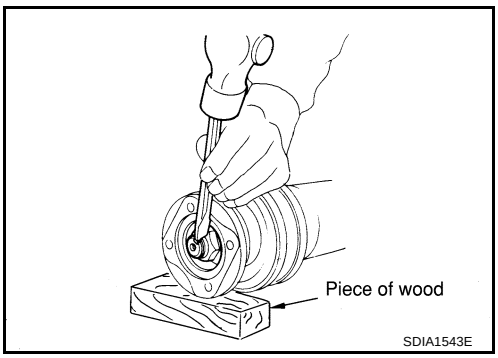
  : 294 N·m (30 kg-m, 217ft-lb)

- Loosen lock nut and tighten specified torque again.

  : 83 N·m (8.5kg-m, 61 ft-lb)

4. Place a piece of wood under the center flange, stake the lock nut against the propeller shaft groove.

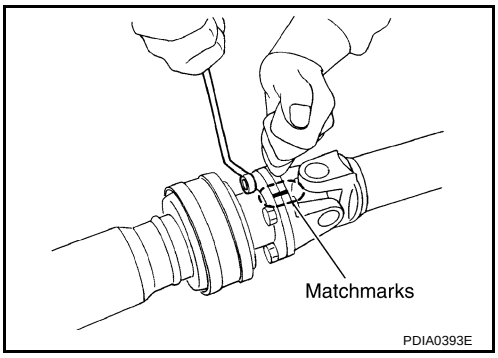
CAUTION:
Do not use the lock nut.



5. Assemble the 1st and 2nd shaft propeller shafts while align the matchmarks that are marked during removal.
6. Install and tighten the bolts/nuts and tighten them to specified torque. Refer to PR-5, "COMPONENTS" .

CAUTION:
Do not reuse the bolts, nuts and washers.

7. Recheck the tightening torque using a torque wrench.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS0010D

Unit: mm (in)

Applied model		VQ35DE	
		M/T	A/T
Propeller shaft model		3S80A	
Number of joints		3	
Coupling method with transfer		Sleeve type	
Shaft length (spider to spider)	1st	619 (24.37)	581 (22.87)
	2nd	902 (35.51)	
Shaft outer diameter	1st	82.6 (3.25)	
	2nd	82.6 (3.25)	

JOURNAL AXIAL PLAY

Model	3F80A-1VL107
Journal axial play	0 mm (0 in)

PROPELLER SHAFT RUNOUT LIMIT

Model	3F80A-1VL107
Propeller shaft runout limit	0.6 mm (0.024 in) or less

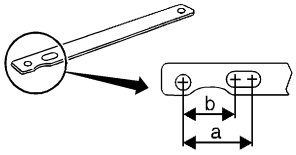
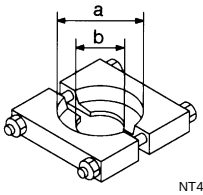
PREPARATION

PFP:00002

Special Service Tools

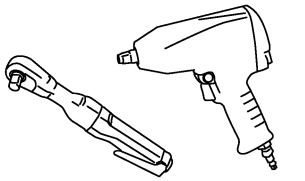
ADS00107

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

Tool number (Kent-Moore No.) Tool name	Description
KV40104000 (—) Flange wrench a: 100 mm (3.94 in) dia. b: 54 mm (2013 in) dia.  NT659	Removing and installing lock nut
ST30031000 (J22912–01) Puller a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.  NT411	Remove rear propeller shaft center bearing

Commercial Service Tools

ADS00108

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS00109

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

Reference page			—	PR-16	—	—	—	PR-16	—	NVH in RFD section	NVH in FAX, RAX, FSU, and RSU section	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in BR section	NVH in PS section
Possible cause and suspected parts			Uneven rotation torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERIING
Symptom	Propeller shaft	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
		Shake		×			×				×	×	×	×	×	×
		Vibration	×	×	×	×	×	×	×		×	×		×		×

×: Applicable

FRONT PROPELLER SHAFT

PFP:37200

On-Vehicle Service

ADS000ZO

PROPELLER SHAFT VIBRATION

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

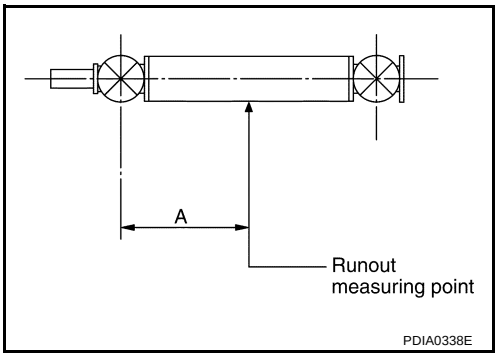
1. Measure propeller shaft runout at measuring point by rotating final drive companion flange with hands.

   Propeller shaft measuring point

   Distance A : 381.5mm (15.01 in)

   Propeller shaft runout limit

   : 0.6 mm (0.024 in) or less



2. If runout still exceeds specifications, disconnect propeller shaft at final drive companion flange; then rotate companion flange 90, 180, 270 degrees and reconnect propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving the vehicle.

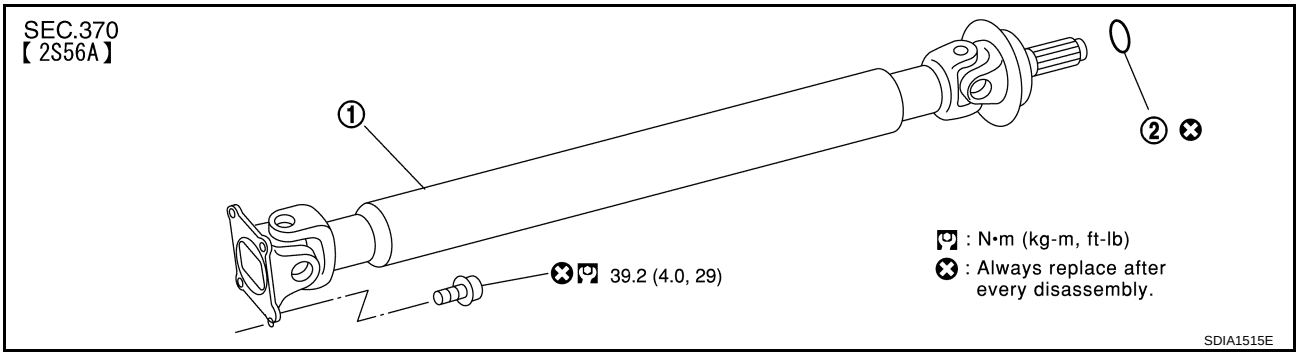
APPEARANCE CHECKING

- Inspect propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.

Removal and Installation

ADS000ZP

COMPONENTS



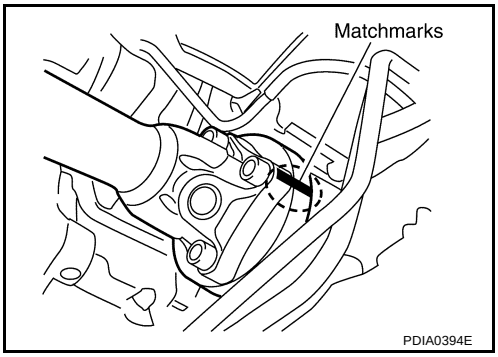
1. Propeller shaft assembly
2. O-ring

REMOVAL

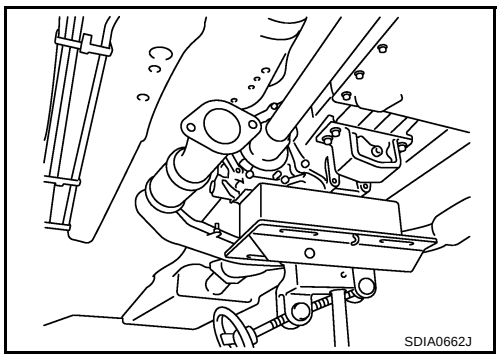
1. Remove engine undercover with power tool.
2. Remove three way catalyst (right bank) with power tool. Refer to EM-26, "Removal and Installation" .
3. Put matchmarks on flanges and separate propeller shaft from final drive.

   CAUTION:

   For matchmark, use paint. Do not damage the propeller shaft flange and companion flange on the front final drive.



4. Set the transmission jack at the transfer, remove rear engine mounting bolts, and then lower transmission jack about 40-50 mm (0.16 - 0.21 in).
5. Remove the propeller shaft fixing bolts.
6. Remove propeller shaft from the front final drive and transfer.

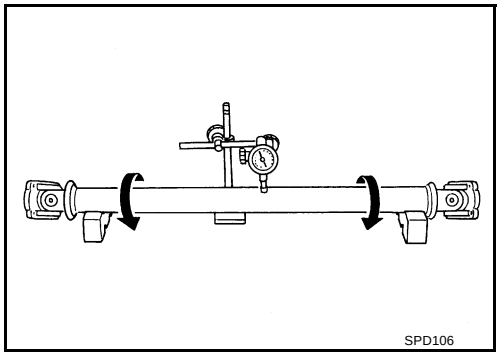

SDIA0662J

INSPECTION

- Inspect propeller shaft runout. If runout exceeds specifications, replace propeller shaft assembly.

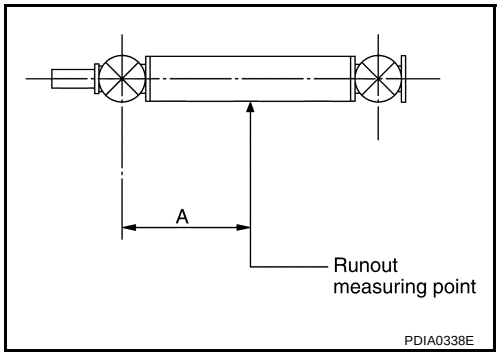
Propeller shaft runout limit

: 0.6 mm (0.024 in) or less


SPD106

Propeller shaft measuring point

Distance A : 381.5mm (15.01 in)

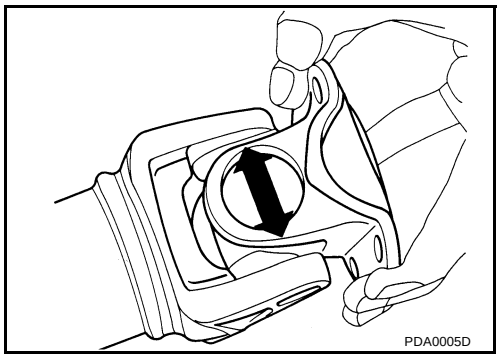


PDIA0338E

- As shown in the figure, while fixing yoke on one side, check axial play of joint. If outside the standard, replace propeller shaft assembly.

Journal axial play : 0 mm (0 in)

- Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

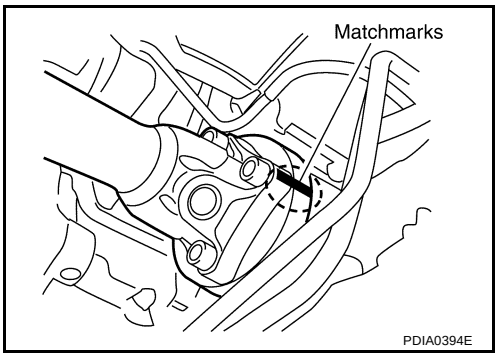

PDA0005D

INSTALLATION

Note the following, install in the reverse order of removal.

- Install the propeller shaft into the transfer.
- Install the propeller shaft onto the front final drive companion flange while matchmarks that are marked during removal.
- Tighten the drive flange bolts to specified torque. Refer to PR-17, "COMPONENTS" .

  CAUTION:
  Do not reuse the bolts.
- After installation, check the vibration by driving the vehicle. If the vibration is present, remove the propeller shaft from the final drive companion flange and turn the propeller shaft 90, 180 or 270 degrees and reinstall the propeller shaft to the companion flange.
  Recheck the vibration by driving the vehicle.



REAR PROPELLER SHAFT

PFP:37000

On-Vehicle Service

ADS000ZR

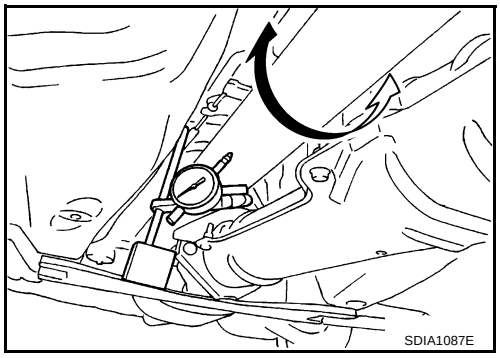
PROPELLER SHAFT VIBRATION

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

1. Measure propeller shaft runout at several points by rotating final drive companion flange with hands.

Propeller shaft runout limit

: 0.6 mm (0.024 in) or less

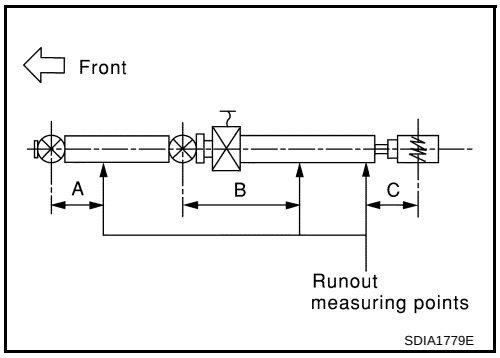


Propeller shaft runout measuring points

Distance **A: 162 mm (6.38 in)**

B: 245 mm (9.65 in)

C: 185 mm (7.28 in)



2. If runout still exceeds specifications, disconnect propeller shaft at final drive companion flange 60, 120, 180, 240 or 300 degrees and reconnect propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving the vehicle.

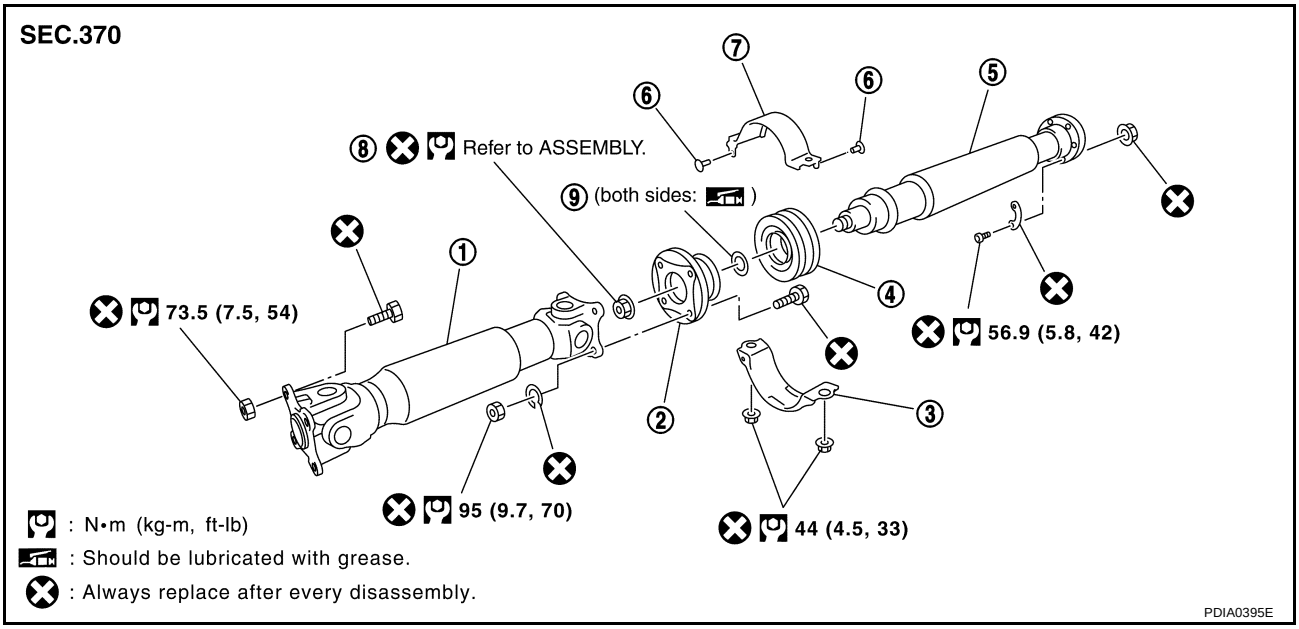
APPEARANCE CHECKING

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

Removal and Installation

ADS000ZS

COMPONENTS

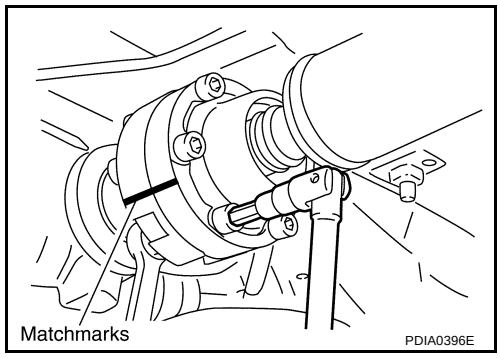


1. 1st shaft
2. Center flange
3. Center bearing mounting bracket (lower)
4. Center bearing
5. 2nd shaft
6. Clip
7. Center bearing mounting bracket (upper)
8. Lock nut
9. Washer

REMOVAL

1. Move the A/T select lever to N position and release the parking brake.
2. Remove the center muffler with power tool. Refer to EX-3, "EXHAUST SYSTEM" .
3. Loosen the center bearing mounting bracket fixing nuts with power tool.
4. Put matchmarks on flange and rear propeller shaft.

   CAUTION:
   For matchmark, use paint. Do not damage the propeller shaft flange and companion flange on the rear final drive.
5. Remove the propeller shaft fixing bolts and nuts.
6. Remove the center bearing mounting bracket fixing nuts.
7. Remove propeller shaft from the vehicle.

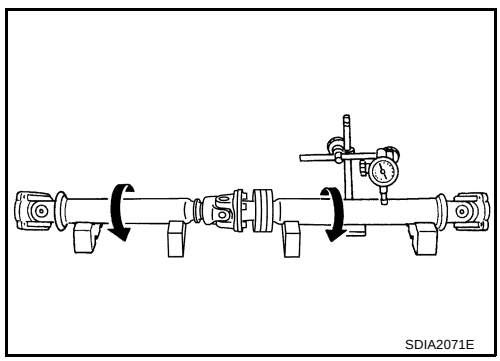


INSPECTION

- Inspect propeller shaft runout. If runout exceeds specifications, replace propeller shaft assembly.

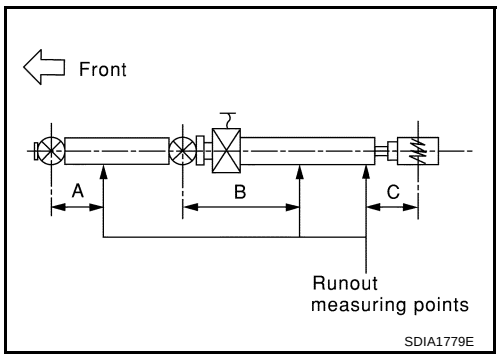
  Propeller shaft runout limit

  : 0.6 mm (0.024 in) or less



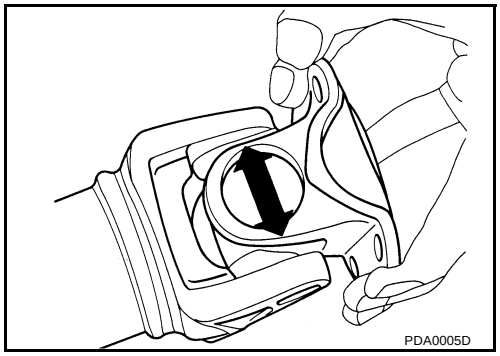
Propeller shaft runout measuring point

Distance **A: 162 mm (6.38 in)**
B: 245 mm (9.65 in)
C: 185 mm (7.28 in)



- As shown in the figure, while fixing yoke on one side, check axial play of joint. If outside the standard, replace propeller shaft assembly.

Journal axial play **: 0 mm (0 in)**



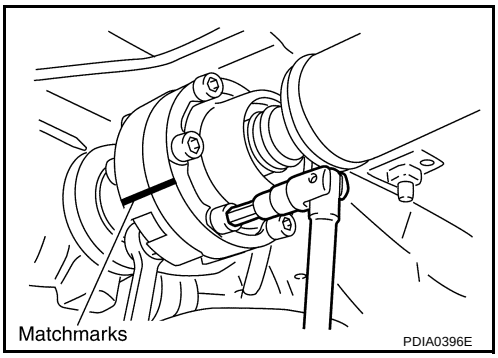
- Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

INSTALLATION

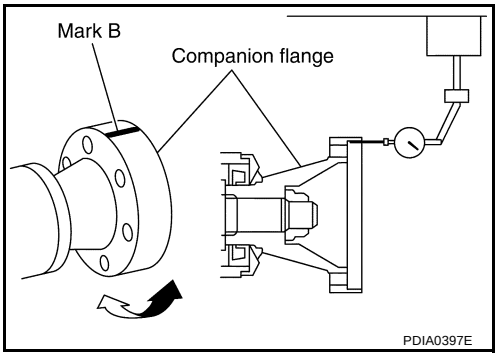
Companion Flange Installation

Note the following, install in the reverse order of removal.

- Install the propeller shaft onto the rear final drive companion flange while align the matchmarks that are marked during removal.



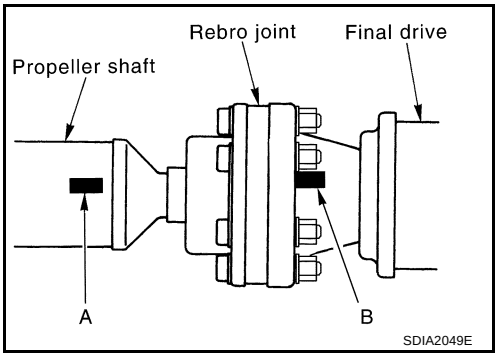
- If companion flange has been removed, put new alignment mark B on it. Then, reassemble using the following procedure.
  Perform these steps when either of final drive and propeller shaft is replaced with a new one.
  - Erase original mark B from companion flange with suitable solvent.
  - Measure companion flange vertical runout.
  - Determine the position where maximum runout is read on dial gauge. Put mark (shown by B in figure) on flange perimeter corresponding to maximum runout position.



- If the propeller shaft or final drive has been replaced, connect the propeller shaft and final drive as follows:

  NOTE:
  Avoid damaging the rebro joint boot, protect it with a shop towel or equivalent.
  - Install the propeller shaft while aligning its mark A with the mark B on the joint as close as possible.
- Tighten the joint bolts/nuts to specified torque. Refer to PR-17, "COMPONENTS" .

  CAUTION:
  Do not reuse the bolts, nut and washers.

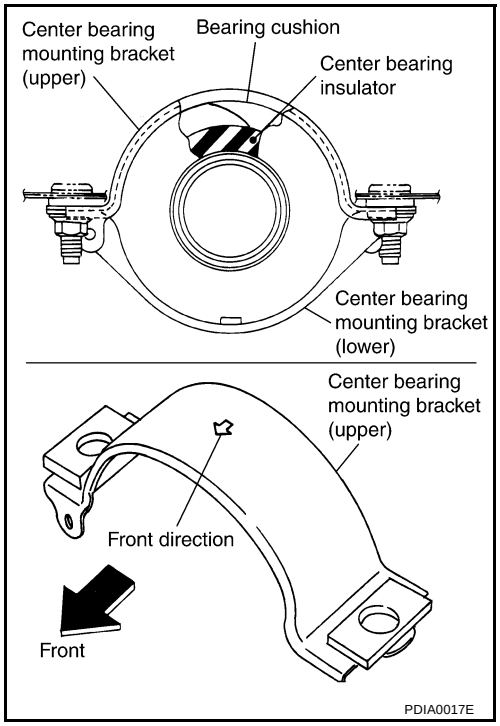


- After installation, check the vibration by driving the vehicle. If the vibration is present, remove the propeller shaft from the final drive companion flange.
- Turn the propeller shaft 60, 120, 180, 240 or 300 degrees and reinstall the propeller shaft to the companion flange, then measure the runout again by driving the vehicle on each angle position.

Center Bearing Bracket Installation

- Adjust position of the bearing cushion so as not to apply thrust play to the center bearing insulator.
- Position the bearing cushion overlap as shown in the figure.
- Install the center bearing mounting bracket (upper) with its arrow mark facing forward.
- Tighten the center bearing mounting bracket fixing nuts to specified torque. Refer to PR-17, "COMPONENTS" .

CAUTION:
Do not reuse the nuts.



Disassembly and Assembly

ADS000ZT

DISASSEMBLY

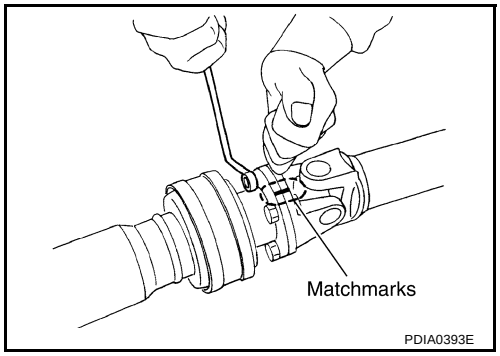
Center Bearing

NOTE:

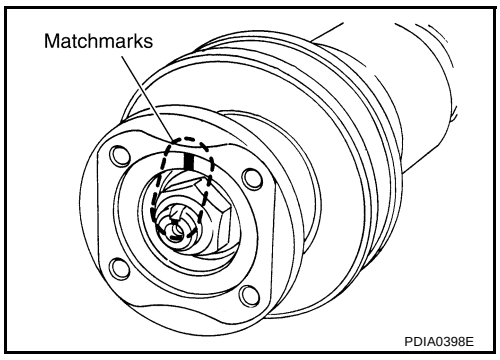
- The joint cannot be disassembled.
- The center bearing can be disassembled.

1. Put matchmarks on flange, and separate 2nd shaft from 1st shaft.

CAUTION:
For matchmark, use paint. Do not damage the propeller shaft flange and center flange.



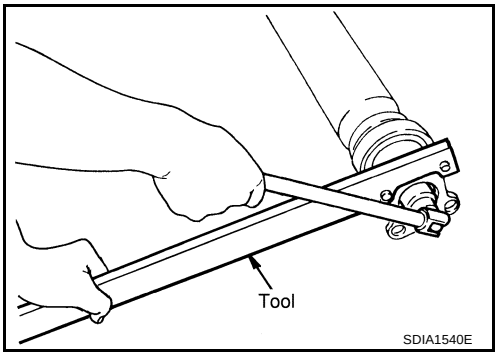
2. Put matchmarks onto the center flange and propeller shaft end as shown.



3. Remove locking nut with tool.

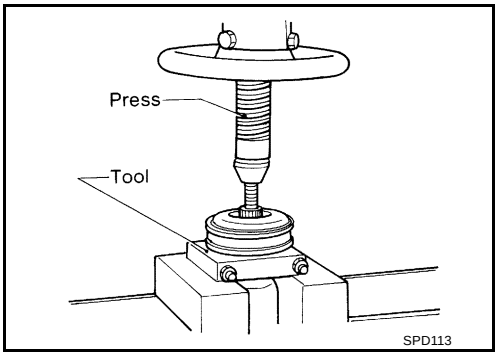
Tool number : KV40104000 (—)

4. Remove companion with puller.



5. Remove center bearing with tool and press.

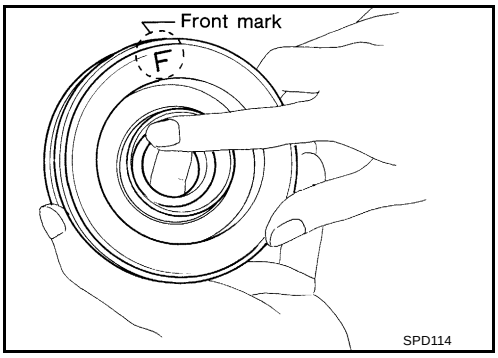
Tool number : ST30031000 (J22912-01)



ASSEMBLY

Center Bearing

1. When installing center bearing, position the “F” mark on center bearing toward rear of vehicle.
2. Apply a coat of multi–purpose lithium grease containing molybdenum disulfide to the end face of the center bearing and both sides of the washer.



3. The lock nut is tightened according to the following.

- Using a suitable torque wrench and tighten lock nut.

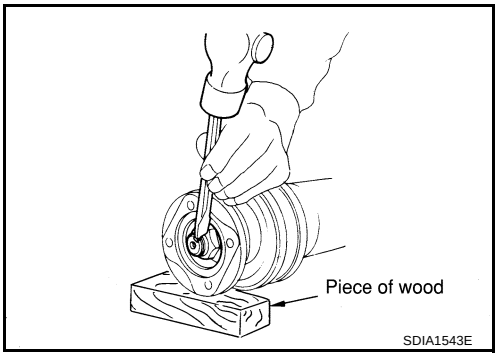
: 294 N·m (30 kg-m, 217ft-lb)

- Loosen lock nut and tighten specified torque again.

: 83 N·m (8.5kg-m, 61 ft-lb)

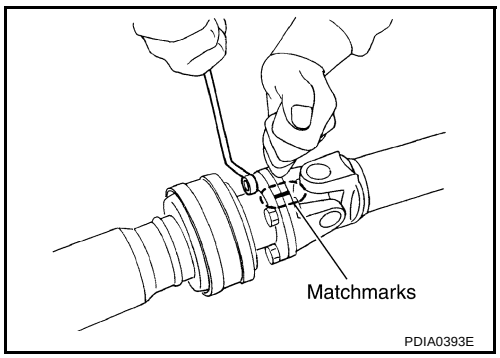
4. Place a piece of wood under the center flange, stake the lock nut against the propeller shaft groove.

CAUTION:
Do not use the lock nut.



5. Assemble the 1st and 2nd shaft propeller shafts while align the matchmarks that are marked during removal.
6. Install and tighten the bolts/nuts and tighten them to specified torque. Refer to PR-17, "COMPONENTS" .

   CAUTION:
   Do not reuse the bolts, nuts and washers.
7. Recheck the tightening torque using a torque wrench.
8. Install the propeller shaft assembly. Refer to PR-19, "INSTALLATION" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS000ZU

Unit: mm (in)

Applied model			VQ35DE
			A/T
Front propeller shaft	Propeller shaft model		2S56A
	Number of joints		2
	Coupling method with transfer		Sleeve type
	Shaft length (spider to spider)		763 (30.04)
	Shaft outer diameter		42.7 (1.68)
Rear propeller shaft	Propeller shaft model		3F80A-1VL107
	Number of joints		3
	Coupling method with transfer		Flange type
	Shaft length (spider to spider)	1st	399 (15.70)
		2nd	753 (29.64)
	Shaft outer diameter	1st	82.6 (3.25)
		2nd	82.6 (3.25)

Front Propeller Shaft

ADS000ZV

JOURNAL AXIAL PLAY

Model	2S56A
Journal axial play	0 mm (0 in)

PROPELLER SHAFT RUNOUT LIMIT

Model	2S56A
Propeller shaft runout limit	0.6 mm (0.024 in) or less

Rear Propeller Shaft

ADS000ZW

JOURNAL AXIAL PLAY

Model	3F80A-1VL107
Journal axial play	0 mm (0 in)

PROPELLER SHAFT RUNOUT LIMIT

Model	3F80A-1VL107
Propeller shaft runout limit	0.6 mm (0.024 in) or less