

PROPELLER SHAFT

PRECAUTIONS

Be careful not to grip the propeller shaft tube too tightly in the vise as this will cause deformation.

TROUBLESHOOTING

You will find the cause of trouble more easily by properly using the table shown below. In this table, the numbers indicate the priority of the probable cause of trouble. Check each part in the order shown. If necessary, repair or replace the part.

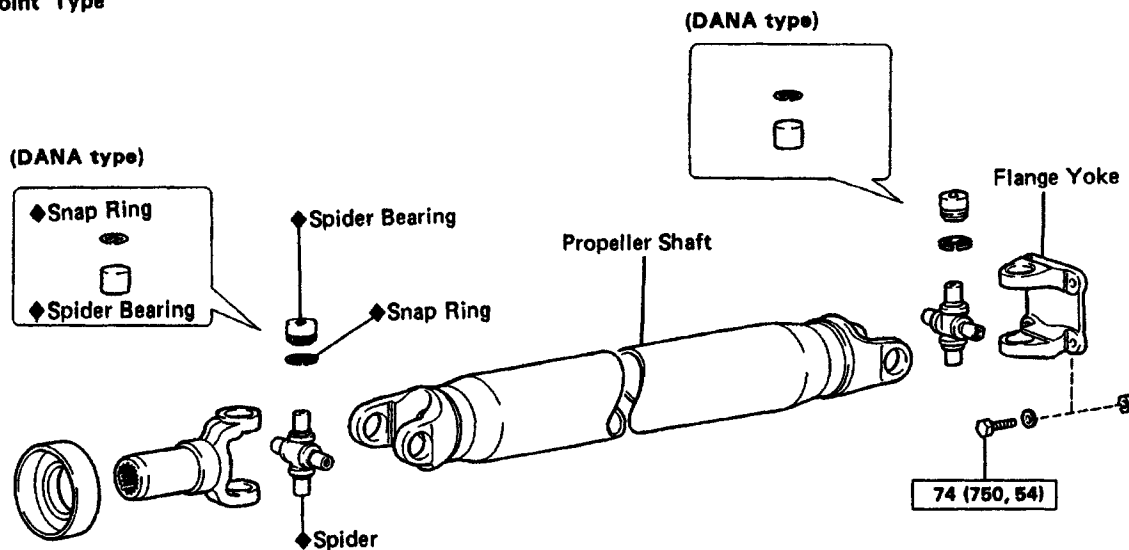
	See Page						
	PR-7 PR-9	PR-8	PR-8	PR-8	PR-7 PR-9	PR-9	(G 58, R 150, R150F) MT-91 (W55, W56) MT-40
	Parts Name						
	Trouble						
Noise	2	1				3	
Vibration			3	4	2		1

PROPELLER SHAFT COMPONENTS

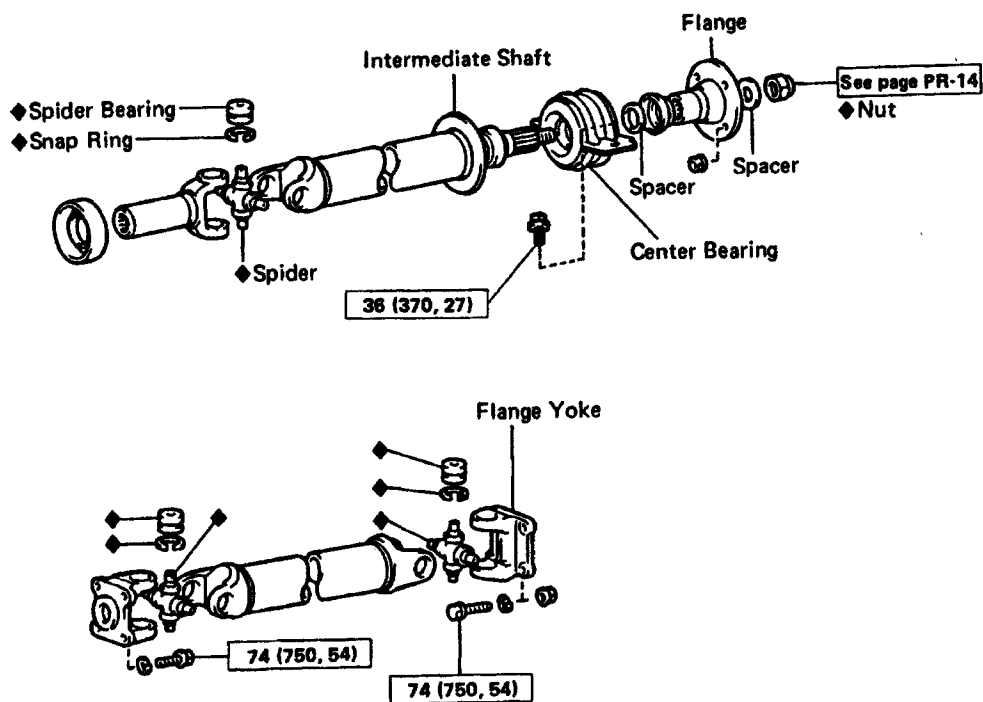
PR020-01

[2WD]

2 - Joint Type



3 - Joint Type

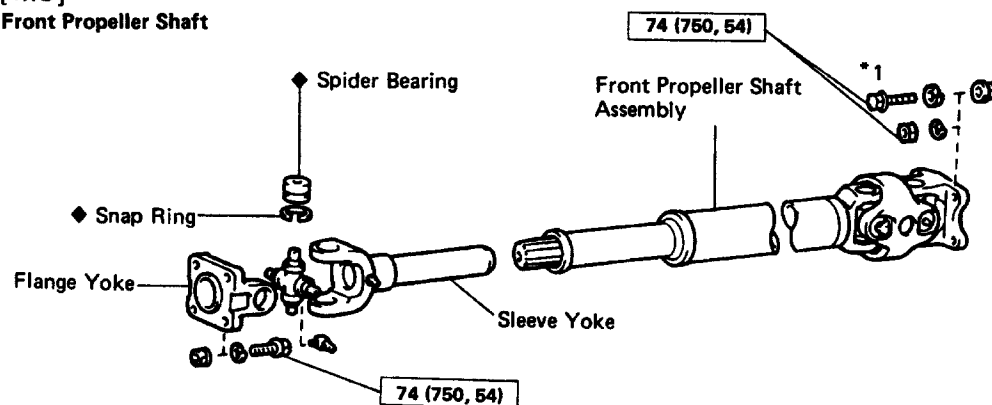
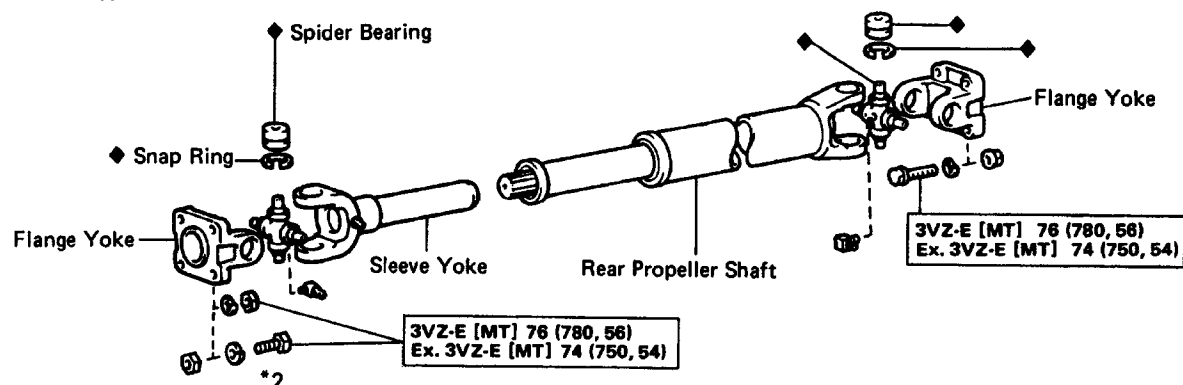
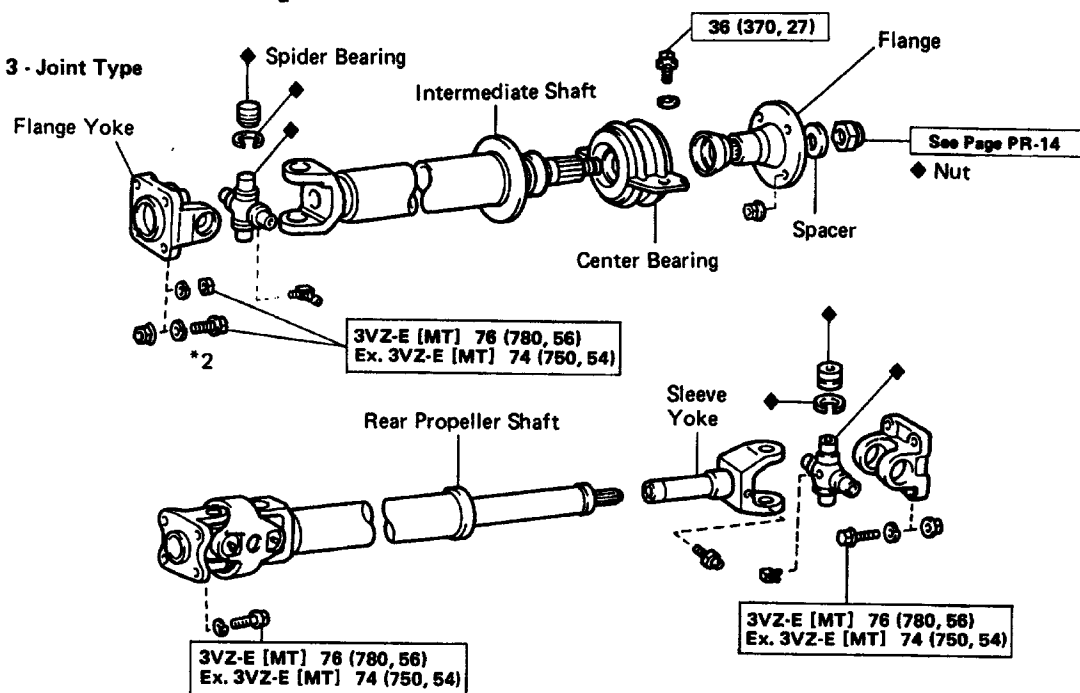


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

R05471
PR0189

Z04237

[4WD]**Front Propeller Shaft****Rear Propeller Shaft
2 - Joint Type****3 - Joint Type**

[N·m (kgf·cm, ft·lbf)] : Specified torque

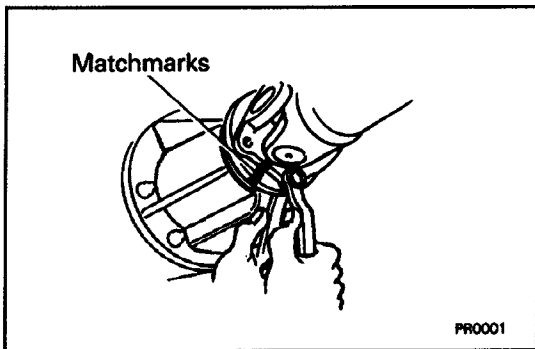
◆ Non-reusable part

*1: w/ RF1A Type Transfer

*2: w/ RF1A Type Transfer and A340H
Automatic Transmission

PR0275
PR0276
PR0277

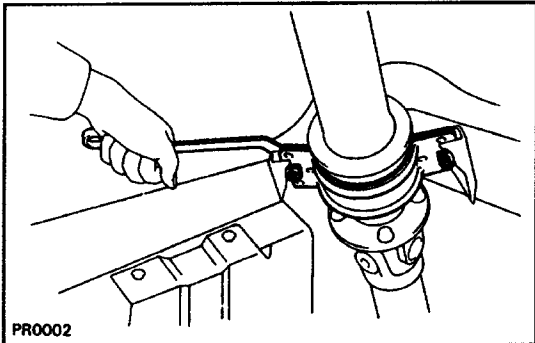
PR021-01



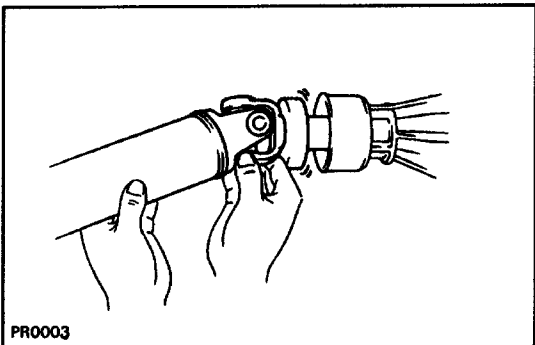
PROPELLER SHAFT REMOVAL (2WD)

1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON DIFFERENTIAL

- (a) Put matchmarks on the flanges.
- (b) Remove the four nuts.

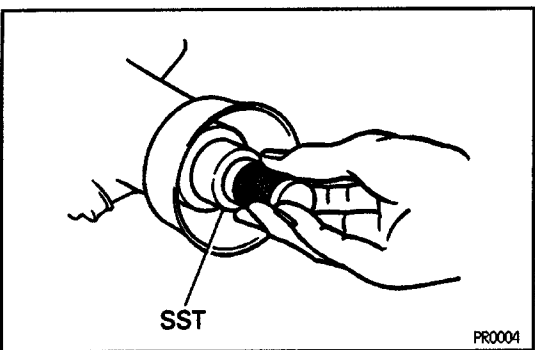


2. REMOVE CENTER SUPPORT BEARING FROM FRAME CROSSMEMBER (3-JOINT TYPE)



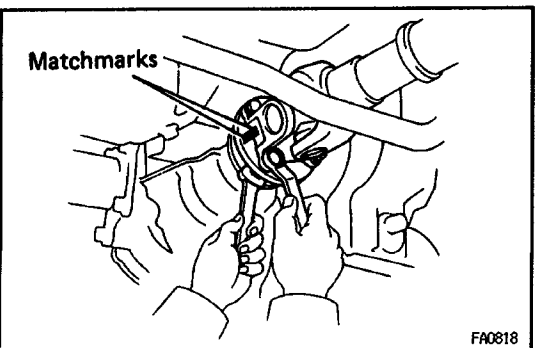
3. REMOVE PROPELLER SHAFT FROM TRANSMIS- SION

- (a) Pull the yoke from the transmission.



- (b) Insert SST in the transmission to prevent oil leakage.
SST 09325-20010 (22R-E engine)
09325-40010 (3VZ-E engine)

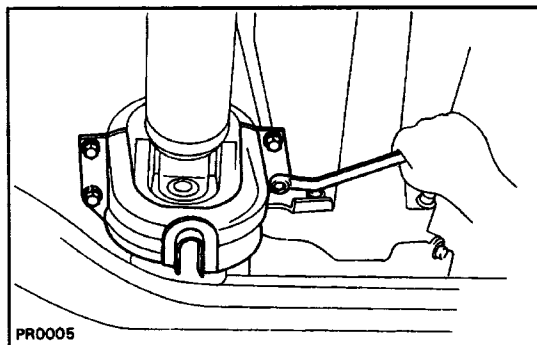
PR022-01



PROPELLER SHAFT REMOVAL (4WD)

1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON FRONT DIFFERENTIAL

- (a) Put matchmarks on the flanges.
- (b) Remove the four bolts and nuts.



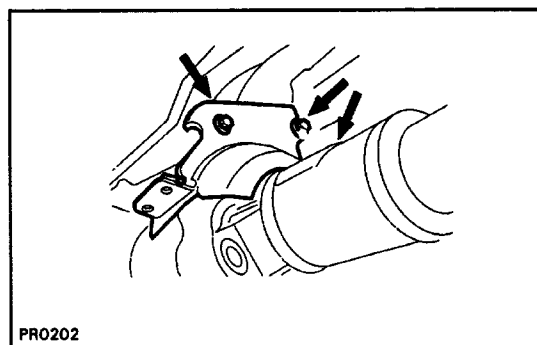
2. REMOVE FRONT PROPELLER SHAFT NO.2 DUST COVER

(W/RF1 A Type Transfer)

Remove the two bolts and two nuts and cover.

(w/VF1 A Type Transfer and A340H)

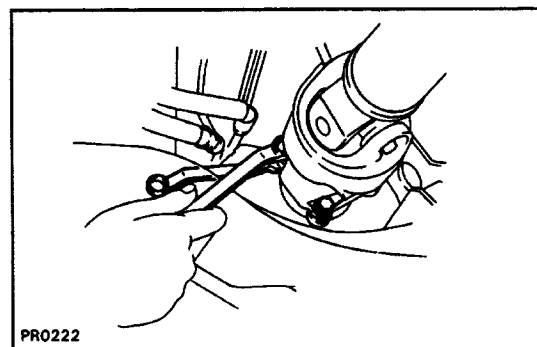
Remove the four bolts and cover.



3. REMOVE FRONT PROPELLER SHAFT DUST COVER SUBASSEMBLY

(w/VF1 a Type Transfer and A340H)

Remove the three bolts and cover.



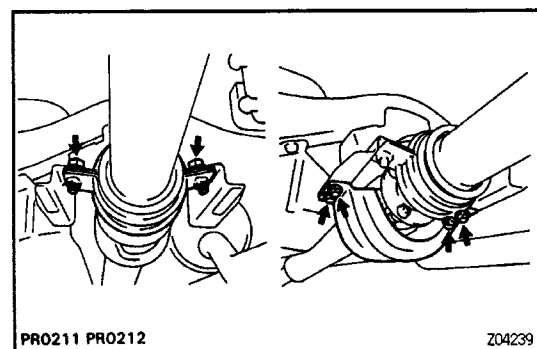
4. REMOVE FRONT PROPELLER SHAFT

(a) Suspend the front side of the propeller shaft.

(b) Put matchmarks on the flanges.

(c) Remove the four nuts or four bolts and nuts.

(d) Remove the front propeller shaft.

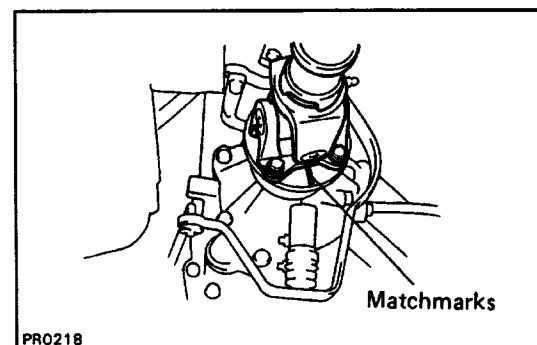


5. REMOVE CENTER SUPPORT BEARING FROM FRAME CROSSMEMBER

(3-JOINT TYPE)

(a) Remove propeller shaft protector set bolts and propeller shaft protector.

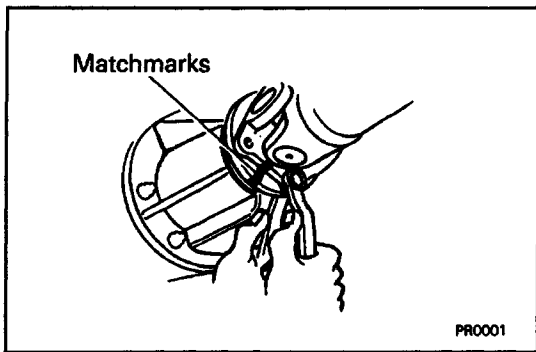
(b) Remove center support bearing mount bolts.



6. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON TRANSFER

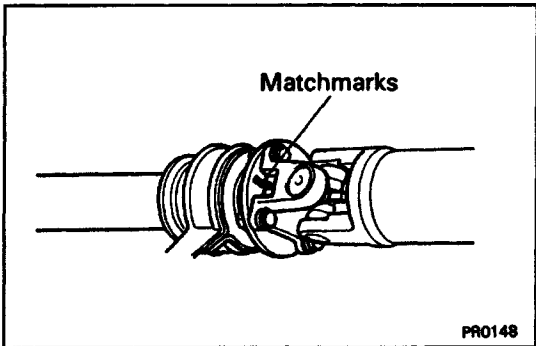
(a) Put matchmarks on the flanges.

(b) Remove the four bolts and nuts or four nuts.



7. REMOVE REAR PROPELLER SHAFT

- (a) Put matchmarks on the flanges.
- (b) Remove the four nuts.
- (c) Remove the rear propeller shaft.

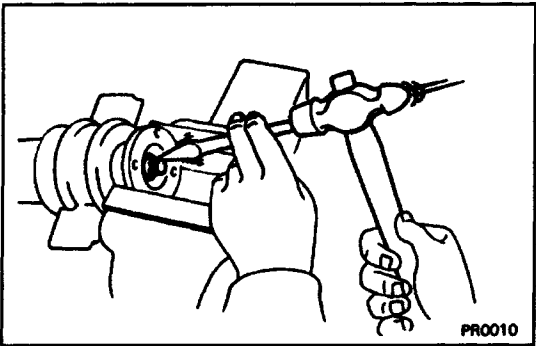


PROPELLER SHAFT DISASSEMBLY

PR028-01

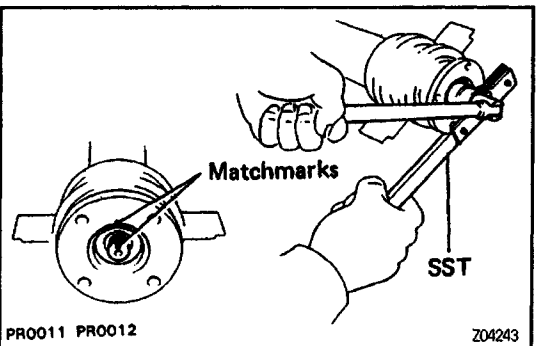
1. SEPARATE PROPELLER SHAFT AND INTERMEDIATE SHAFT

- (a) Put matchmarks on the flanges.
- (b) Remove the four bolts and nuts.



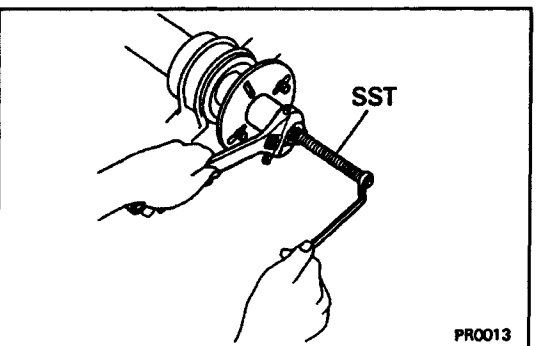
2. REMOVE CENTER SUPPORT BEARING FROM INTERMEDIATE SHAFT

- (a) Using a hammer and chisel, loosen the staked part of the nut.



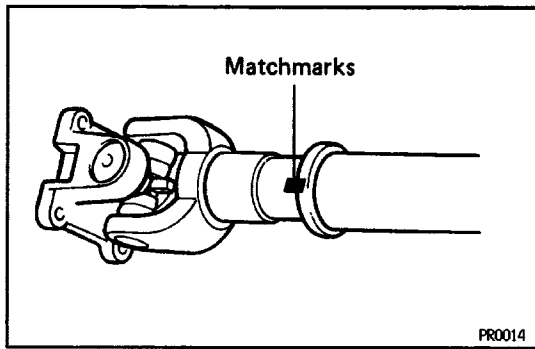
- (b) Using SST to hold the flange, remove the nut.
SST 09930-00021

- (c) Put matchmarks on the flange and shaft.



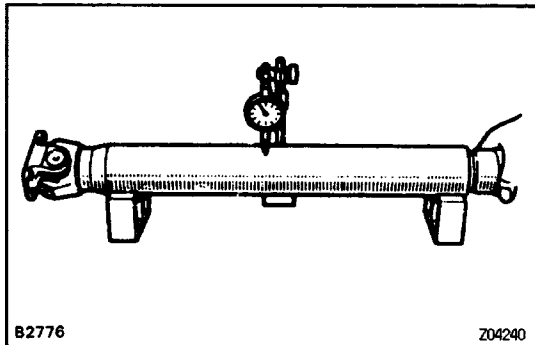
- (d) Using SST, remove the flange from the intermediate shaft.

SST 09557-22022 (09557-22030)



3. REMOVE SLEEVE YOKE FROM PROPELLER SHAFT (4WD)

- Place matchmarks on the sleeve yoke and shaft.
- Pull out the sleeve yoke from the shaft.



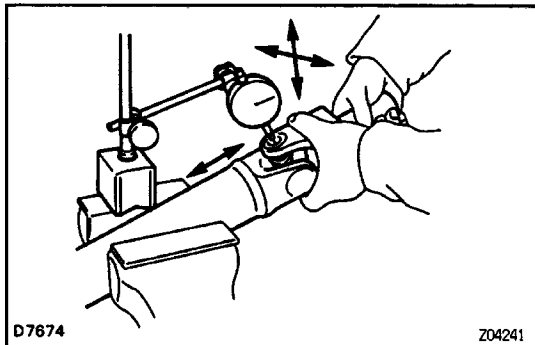
PROPELLER SHAFT INSPECTION COMPONENTS

1. INSPECT PROPELLER AND INTERMEDIATE SHAFTS FOR DAMAGE OR RUNOUT

If shaft runout is greater than maximum, replace the shaft.

Maximum runout:

0.8 mm (0.031 in.)



2. INSPECT SPIDER BEARINGS

- Inspect the spider bearings for wear or damage.
- Check the spider bearing axial play by turning the yoke while holding the shaft tightly.

Bearing axial play:

w/o double cardan joint propeller shaft

Less than 0.05 mm (0.0020 in.)

If necessary, replace the spider bearing.

Bearing axial play:

w/ double cardan joint propeller shaft

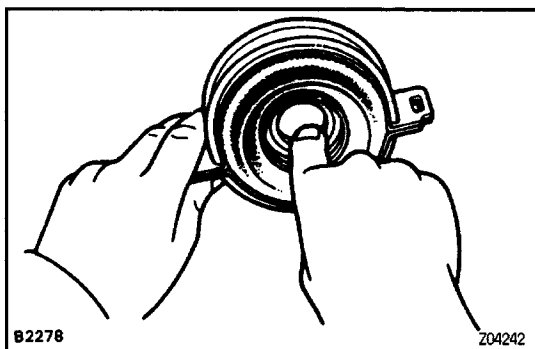
Less than 0.05 mm (0.0020 in.)

If necessary, replace the propeller shaft.

3. INSPECT CENTER SUPPORT BEARING FOR WEAR OR DAMAGE

Check that the bearing turns freely.

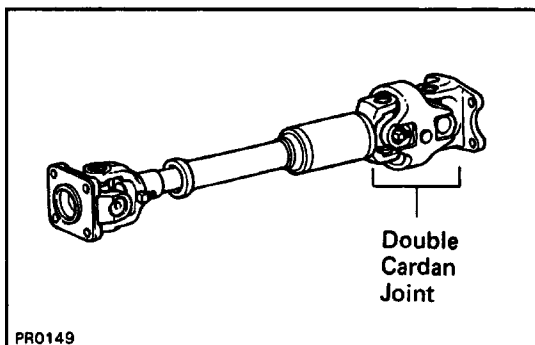
If the bearing is damaged, worn, or does not turn freely, replace it.

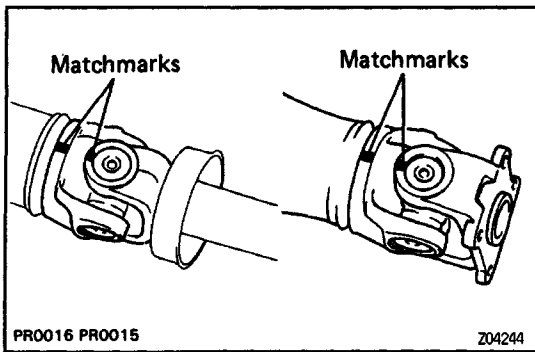


4. INSPECT WITH DOUBLE CARDAN JOINT PROPELLER SHAFT

- Inspect the shaft for wear or damage.
 - Inspect the double cardan joint for wear or damage.
- If any problem is found replace the propeller shaft assembly.

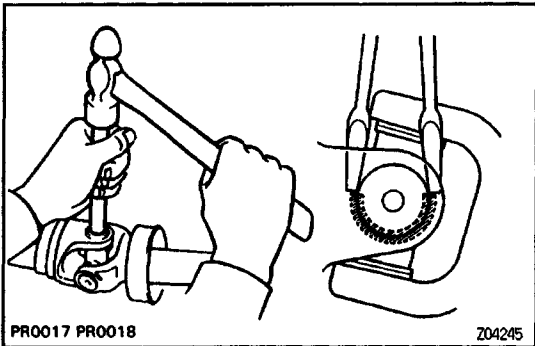
HINT: Front propeller shaft and 4WD three joint type rear propeller shafts.





SPIDER BEARING REPLACEMENT

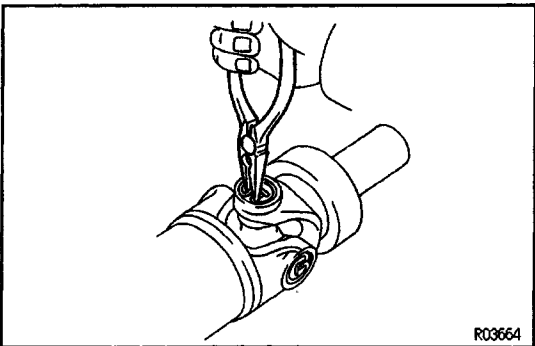
1. PLACE MATCHMARKS ON SHAFT AND YOKE



2. REMOVE SNAP RINGS

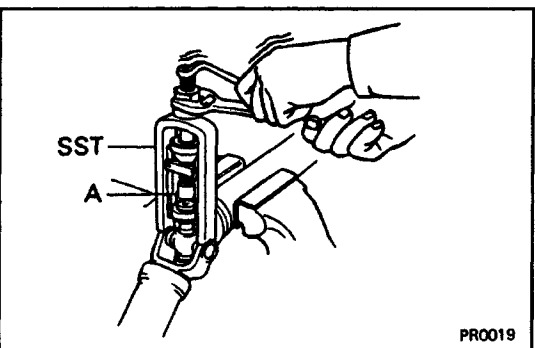
(TOYOTA type)

- (a) Slightly tap in the bearing outer races.
- (b) Using two screwdrivers, remove the four snap rings from the grooves.



(DANA type)

- (a) Slightly tap in the bearing outer races.
- (b) Using snap ring pliers, remove the four snap rings from the grooves.

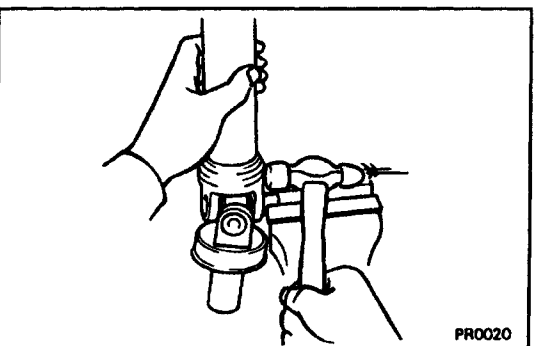


3. REMOVE SPIDER BEARINGS

- (a) Using SST, push out the bearing from the propeller shaft.

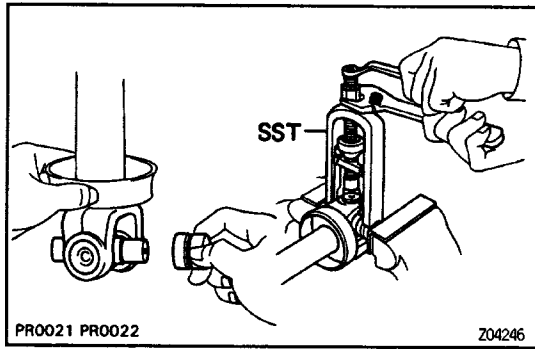
SST 09332-25010

HINT: Sufficiently raise the part indicated by A so that it does not come into contact with the bearing.



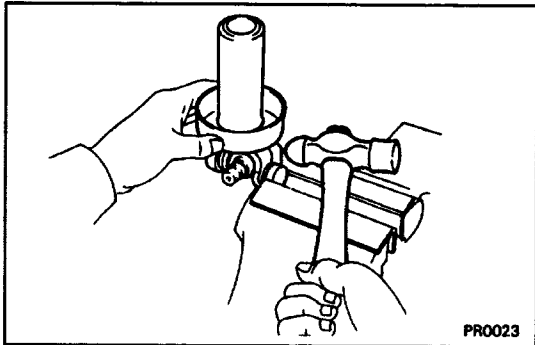
- (b) Clamp the bearing outer race in a vise and tap off the propeller shaft with a hammer.

HINT: Remove the bearing on opposite side in the same procedure.



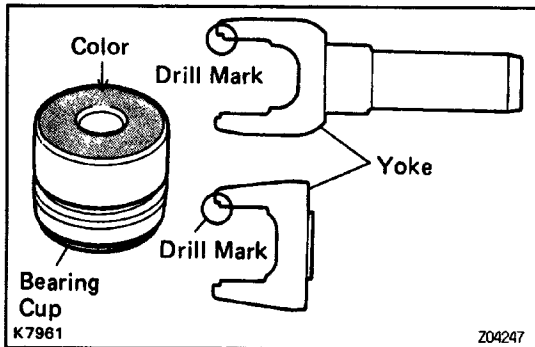
(c) Install the two removed bearing outer races to the spider.

(d) Using SST, push out the bearing from the yoke.
SST 09332 – 25010



(e) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.

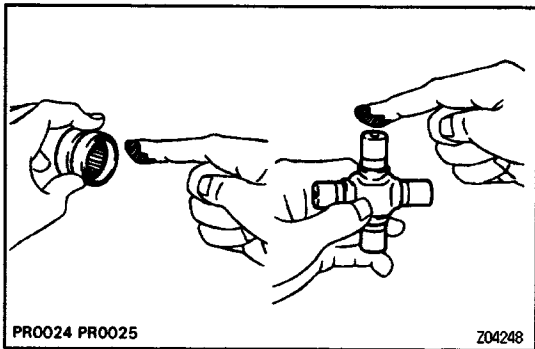
HINT: Remove the bearing on the opposite side in the same procedure.



4. SELECT THE SPIDER BEARING

Select the bearing according to whether or not there is a drill mark on the yoke section.

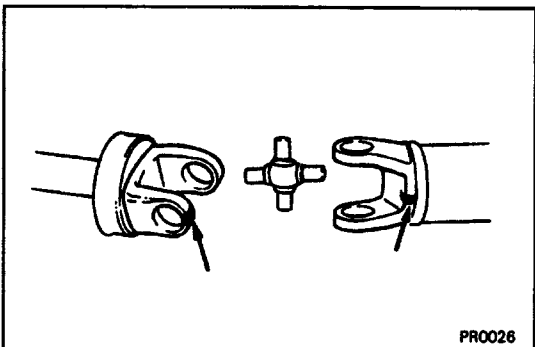
Yoke	Bearing
With drill mark	With color mark (Red)
No drill mark	No color mark



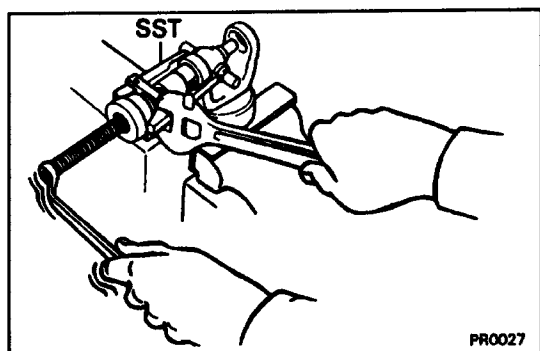
5. INSTALL SPIDER BEARINGS

(a) Apply MP grease to the spider and bearings.

HINT: Be careful not to apply too much grease.



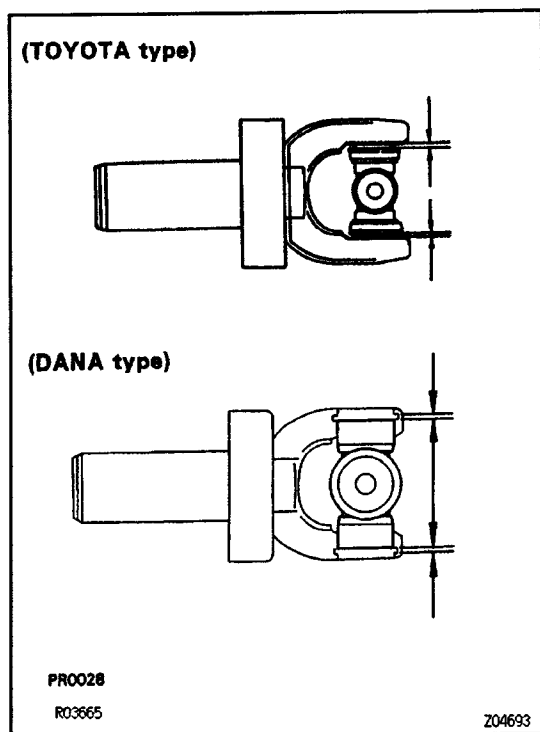
(b) Align the matchmarks on the yoke and shaft.



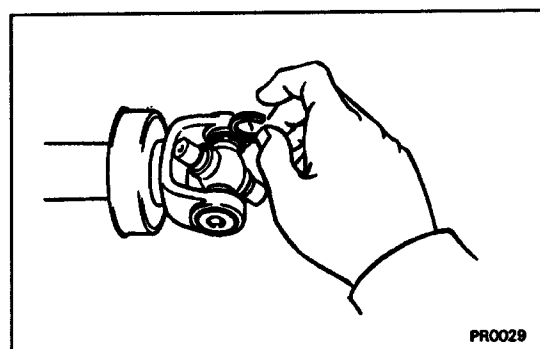
(c) Fit the new spider into the yoke.

(d) Using SST, install the new bearings on the spider.

SST 09332-25010



(e) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal widths.



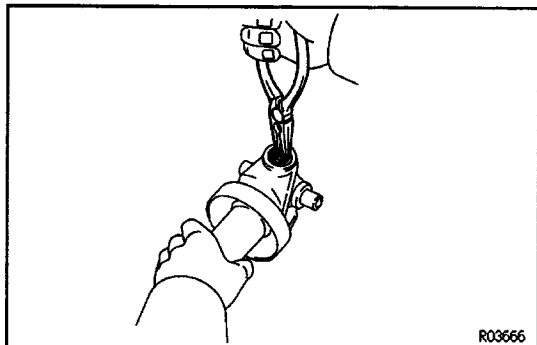
6. INSTALL SNAP RINGS

(a) Install two snap rings of equal thickness which will allow 0–0.05 mm (0–0.0020 in.) axial play.

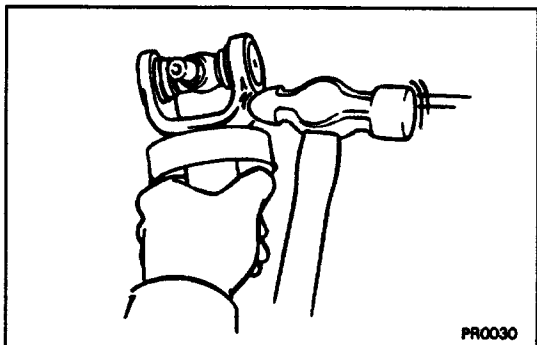
HINT: Do not reuse the snap rings.

(TOYOTA type)

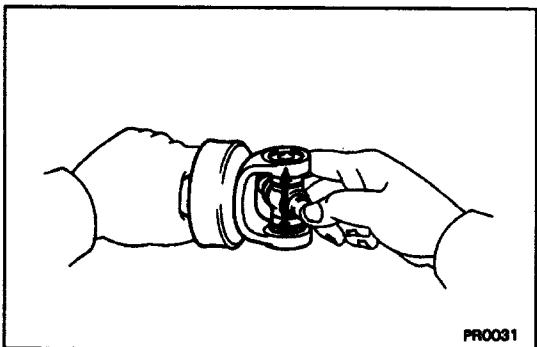
Color	Mark	Thickness mm (in.)
—	1	2.100 – 2.150 (0.0827 – 0.0846)
—	2	2.150 – 2.200 (0.0846 – 0.0866)
—	3	2.200 – 2.250 (0.0866 – 0.0886)
Brown	—	2.250 – 2.300 (0.0886 – 0.0906)
Blue	—	2.300 – 2.350 (0.0906 – 0.0925)
—	6	2.350 – 2.400 (0.0925 – 0.0945)
—	7	2.400 – 2.450 (0.0945 – 0.0965)
—	8	2.450 – 2.500 (0.0965 – 0.0984)

**(DANA type)**

Color	Thickness mm (in.)
Blue	1.638 (0.0645)
Yellow	1.588 (0.0625)
Silver	1.537 (0.0605)
Copper	1.511 (0.0595)
Black	1.486 (0.0585)
Red	1.435 (0.0565)
Green	1.384 (0.0545)



(b) Using a hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.

**7. CHECK SPIDER BEARING**

- (a) Check that the spider bearing moves smoothly.
- (b) Check the spider bearing axial play.

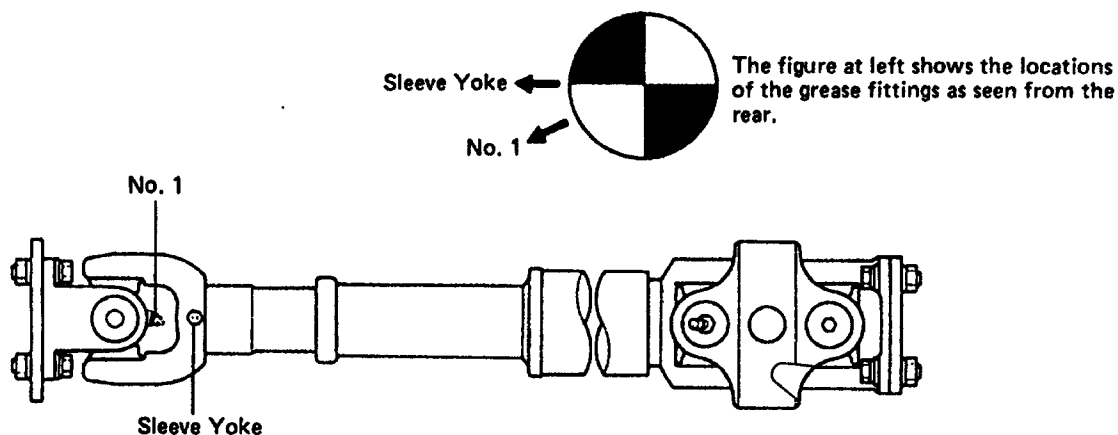
Bearing axial play:

Less than 0.05 mm (0.020 in.)

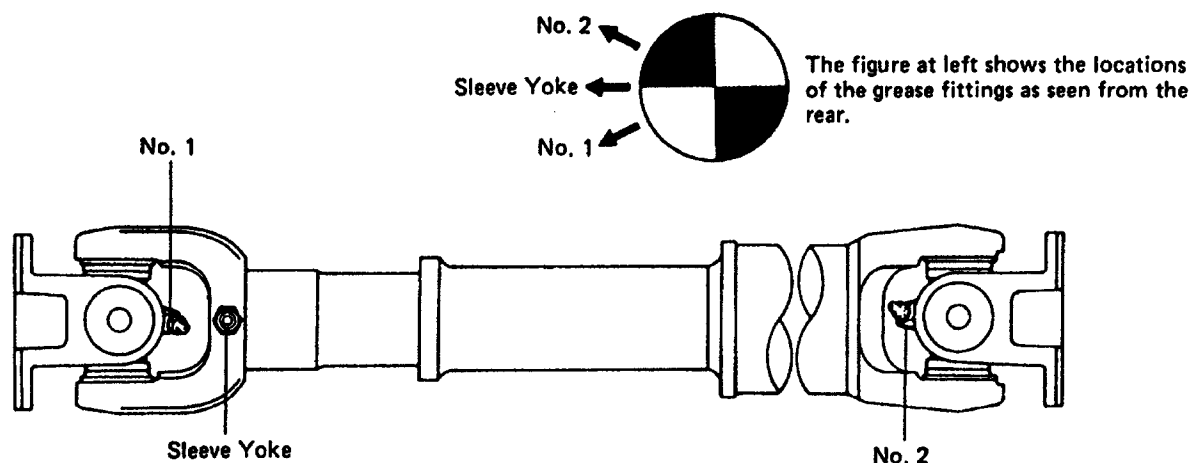
HINT: Install new spider bearings on the shaft side in the procedure described above.

HINT: When replacing the rear propeller shaft spider on 4WD vehicles, be sure that the grease fitting assembly hole is facing in the direction shown in the figure.

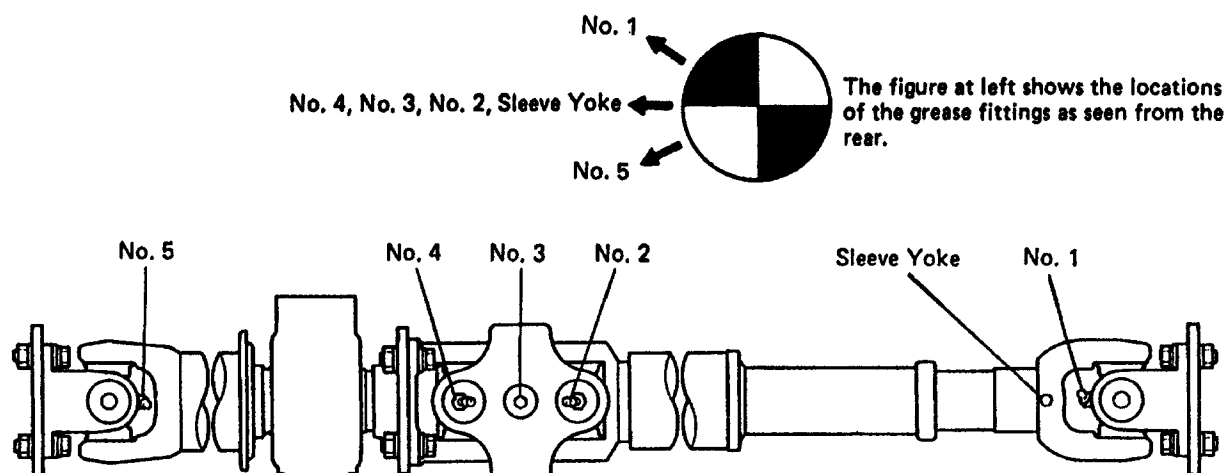
SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR 4WD FRONT PROPELLER SHAFT



SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR 4WD REAR PROPELLER SHAFT (2-JOINT TYPE)



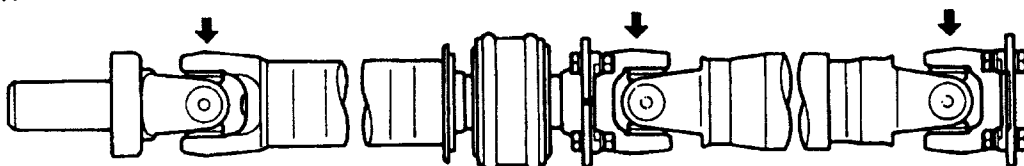
SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR 4WD REAR PROPELLER SHAFT (3-JOINT TYPE)



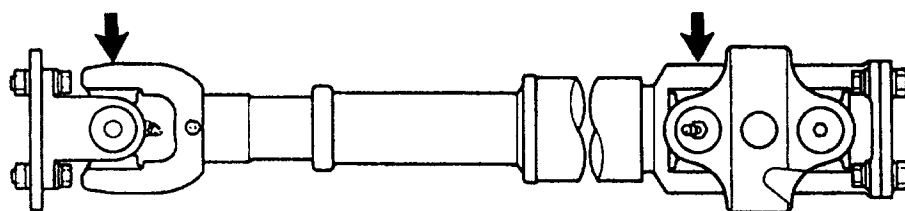
PROPELLER SHAFT ASSEMBLY

HINT: When replacing the propeller shaft, install the new parts facing as shown in the illustration.

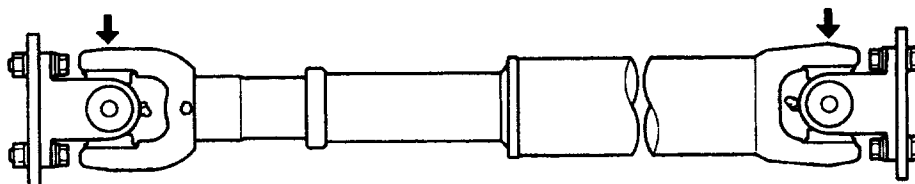
[2WD]
3 - Joint Type



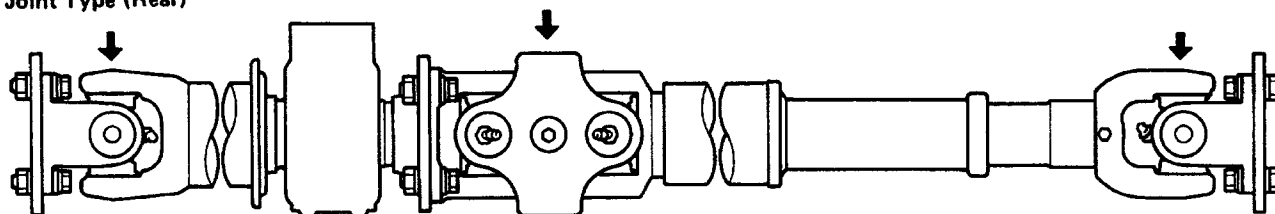
[4WD] Front



[4WD]
2 - Joint Type (Rear)

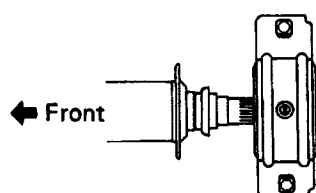


[4WD]
3 - Joint Type (Rear)



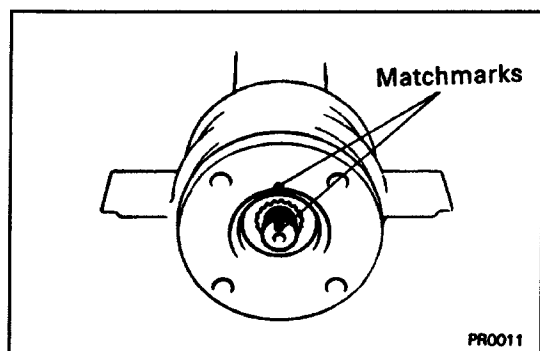
PR0155
PR0216
PR0187
PR0193

204250



1. INSTALL CENTER SUPPORT BEARING ON INTER-MEDIATE SHAFT

HINT: Install the center support bearing with the cutout toward the rear.



2. INSTALL FLANGE ON INTERMEDIATE SHAFT

(a) Coat the splines of the intermediate shaft with MP grease.

(b) Place the flange on the shaft and align the matchmarks.

HINT: If replacing either the center flange or intermediate shaft, reassemble them so that the front yoke of the intermediate shaft and the rear yoke of the propeller shaft are facing in the same direction.

(c) Using SST to hold the flange, press the bearing into position by tightening down a new nut.

SST 09930-00021

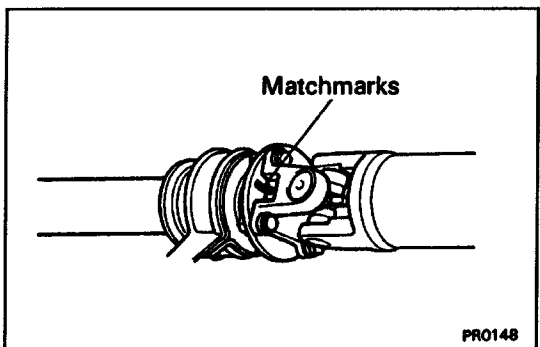
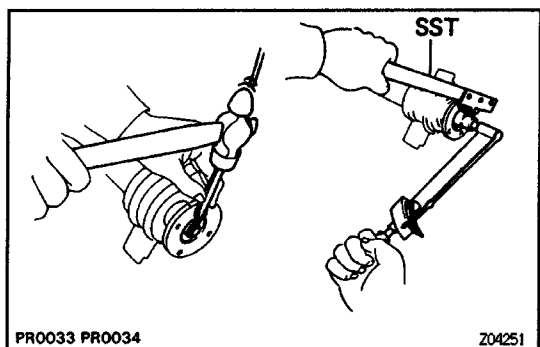
Torque: 181 N-m (1,850 kgf-cm, 134 ft-lbf)

(d) Loosen the nut.

(e) Torque the nut again.

Torque: 69 N-m (700 kgf-cm, 51 ft-lbf)

(f) Using a hammer and punch, stake the nut.



3. INSTALL PROPELLER SHAFT

(a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.

HINT: If replacing either the center flange or intermediate shaft, reassemble them so that the front yoke of the intermediate shaft and the rear yoke of the propeller shaft are facing in the same direction.

(d) Torque the bolts and nuts.

Torque:

4WD 3-joint Type 3VZ-E [MT]

76 N-m (780 kgf-cm, 56 ft-lbf)

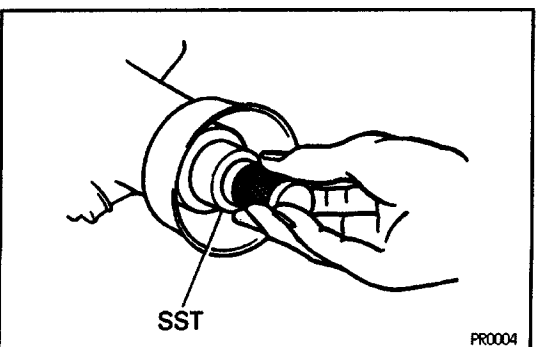
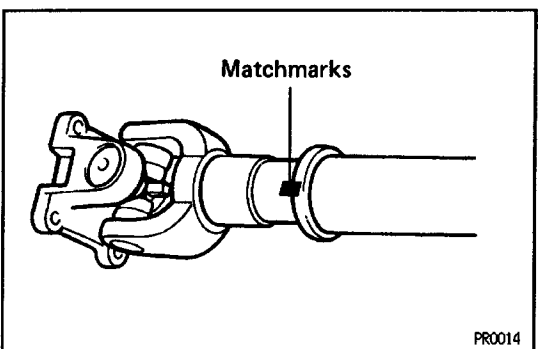
Others

74 N-m (750 kgf-cm, 54 ft-lbf)

4. INSERT SLEEVE YOKE INTO PROPELLER SHAFT (4WD)

(a) Apply Mp grease to the propeller shaft spline and sleeve yoke sliding surface.

(b) Align the matchmarks on the yoke and propeller shaft.

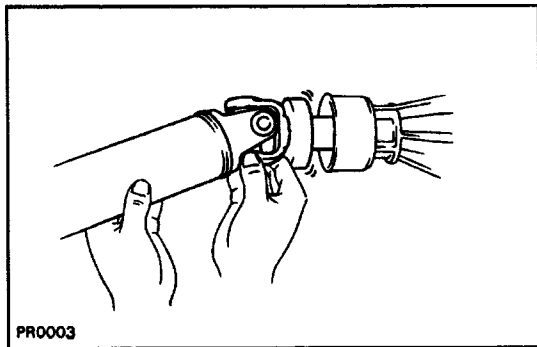


PROPELLER SHAFT INSTALLATION (2WD)

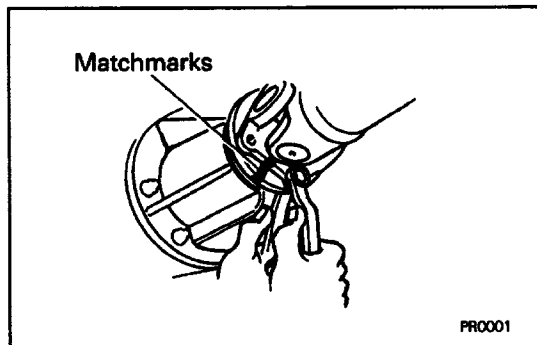
1. INSERT YOKE IN TRANSMISSION

(a) Remove SST.

SST 09325-20010 or 09325-40010



(b) Push the yoke into the transmission.



2. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFERENTIAL

(a) Align the matchmarks on the flanges with four bolts and nuts.

(b) Torque the bolts and nuts.

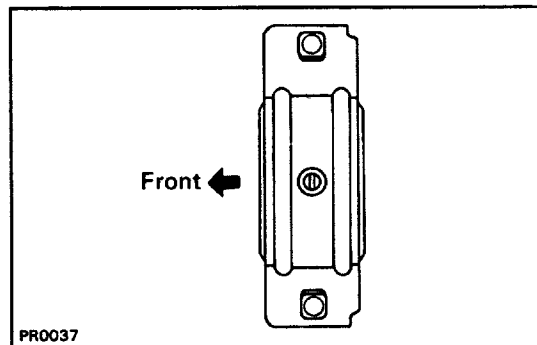
Torque:

4WD 3VZ-E [MT]

76 N-m (780 kgf-cm, 56 ft-lbf)

Ex. 4WD 3VZ-E [MT]

74 N-m (750 kgf-cm, 54 ft-lbf)



3. INSTALL CENTER SUPPORT BEARING TO FRAME CROSSMEMBER (3-JOINT TYPE)

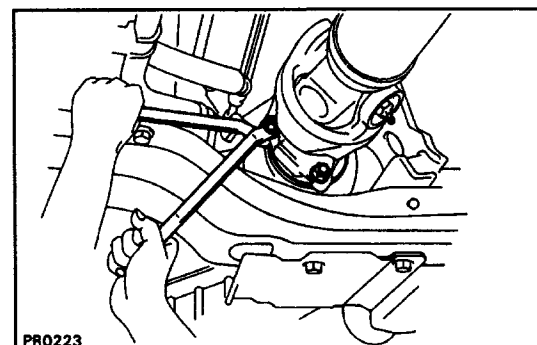
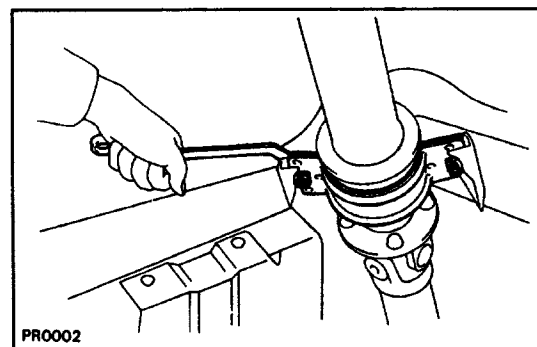
(a) Install the center support bearing to the frame crossmember with two mount bolts finger tight.

(b) Check that the bearing bracket is at right angle to the propeller shaft. Adjust the bracket if necessary.

(c) Check that the center line of the center bearing is set to the center line of the bracket when the vehicle is in a no-load condition. Adjust the bracket if necessary.

(d) Torque the mount bolts.

Torque: 36 N-m (370 kgf-cm, 27 ft-lbf)



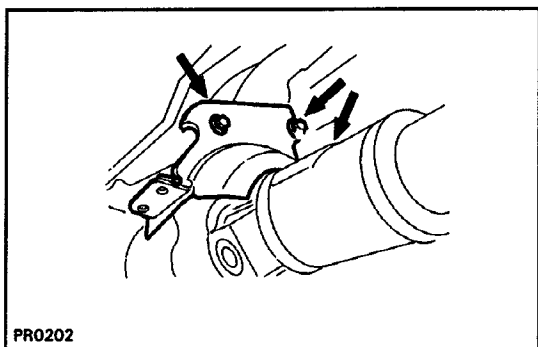
PROPELLER SHAFT INSTALLATION (4WD)

1. CONNECT FRONT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON TRANSFER

(a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.

(b) Torque the bolts and nuts.

Torque: 41 N-m (750 kgf-cm, 54 ft-lbf)



2. INSTALL FRONT PROPELLER SHAFT DUST COVER SUBASSEMBLY

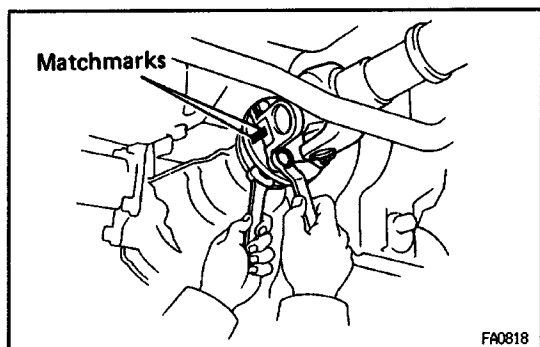
(W/VF1 A Type Transfer and A340H)

- (a) Install the cover.
- (b) Install and torque the three bolts.

Torque:

A bolts 36 N-m (370 kgf-cm, 27 ft-lbf)

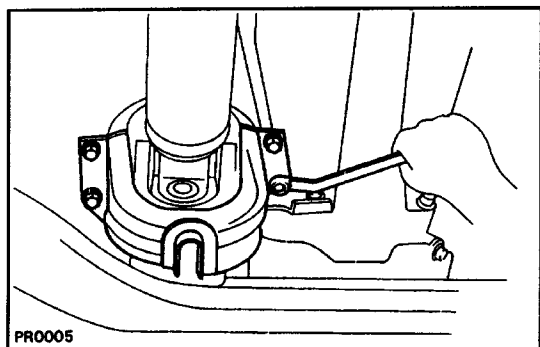
B bolts 23 N-m (230 kgf-cm, 17 ft-lbf)



3. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON FRONT DIFFERENTIAL

- (a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.
- (b) Torque the bolts and nuts.

Torque: 74 N-m (750 kgf-cm, 54 ft-lbf)



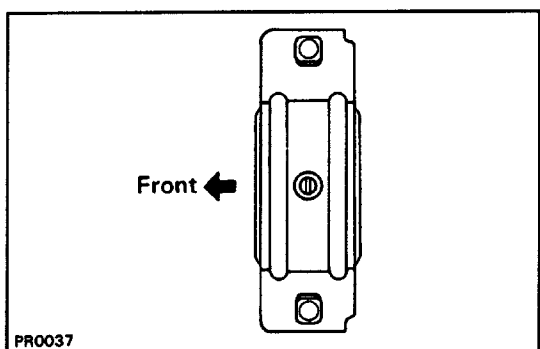
4. INSTALL FRONT PROPELLER SHAFT NO. 2 DUST COVER

- (a) Install the cover.
- (b) Install and torque the bolts and nuts.

Torque:

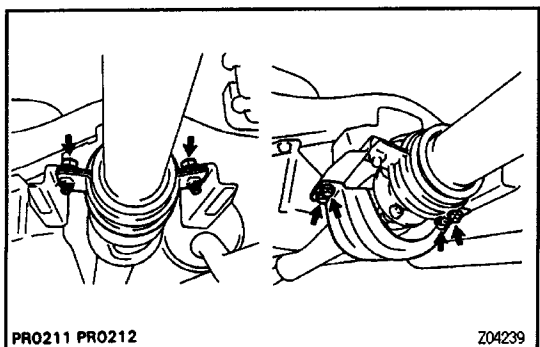
Bolt 17 N-m (175 kgf-cm, 13 ft-lbf)

Nut 13 N-m (135 kgf-cm, 10 ft-lbf)



5. INSTALL CENTER SUPPORT BEARING TO FRAME CROSSMEMBER (3-JOINT TYPE)

- (a) Install the center support bearing to the frame crossmember with two mount bolts finger tight.
- (b) Check that the bearing bracket is at right angle to the propeller shaft. Adjust the bracket if necessary.
- (c) Check that the center line of the center bearing is set to the center line of the bracket when the vehicle is in a no-load condition. Adjust the bracket if necessary.



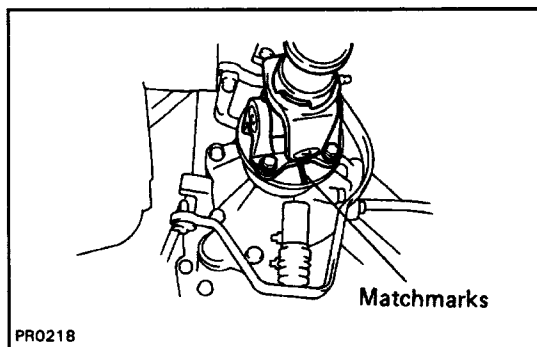
- (d) Torque the mount bolts.

Torque: 36 N-m (370 kgf-cm, 27 ft-lbf)

- (e) Install propeller shaft protector and four set bolts.

- (f) Torque the set bolts.

Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)



6. CONNECT REAR PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON TRANSFER

- (a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.
- (b) Torque the bolts and nuts.

Torque:

3VZ-E [MT]

76 N-m (780 kgf-cm, 56 ft-lbf)

Ex. 3VZ-E [MT]

74 N-m (760 kgf-cm, 54 ft-lbf)

7. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON REAR DIFFERENTIAL

- (a) Align the matchmarks on the flanges and connect the flanges with bolts and nuts.
- (b) Torque the bolts and nuts.

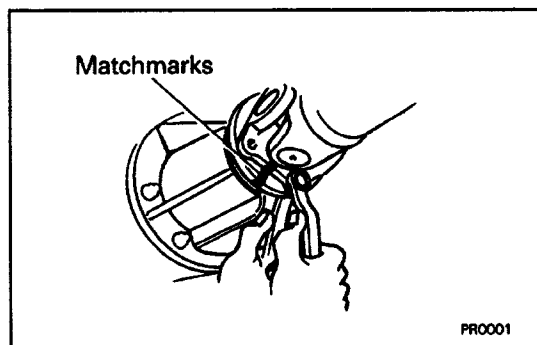
Torque:

3VZ-E [MT]

76 N-m (780 kgf-cm, 56 ft-lbf)

Ex. 3VZ-E [MT]

74 N-m (760 kgf-cm, 54 ft-lbf)



SERVICE SPECIFICATIONS

SERVICE DATA

PR013-04

Propeller shaft runout	Limit	0.8 mm (0.031 in.)
Spider bearing axial play		0.05 mm (0.0020 in.)
Spider bearing selection	Mark	
Bearing cup outer diameter	None	29.008 – 29.021 mm (1.1420 – 1.1426 in.)
	Red	29.028 – 29.041 mm (1.1428 – 1.1433 in.)
Bearing hole inner diameter	None	29.000 – 29.020 mm (1.1417 – 1.1425 in.)
	Drill	29.021 – 29.042 mm (1.1426 – 1.1434 in.)
Snap ring thickness	TMC – made	mark color
	1	– 2.100 – 2.150 mm (0.0827 – 0.0846 in.)
	2	– 2.150 – 2.200 mm (0.0846 – 0.0866 in.)
	3	– 2.200 – 2.250 mm (0.0866 – 0.0886 in.)
	–	Brown 2.250 – 2.300 mm (0.0886 – 0.0906 in.)
	–	Blue 2.300 – 2.350 mm (0.0906 – 0.0925 in.)
	6	– 2.350 – 2.400 mm (0.0925 – 0.0945 in.)
	7	– 2.400 – 2.450 mm (0.0945 – 0.0965 in.)
	8	– 2.450 – 2.500 mm (0.0965 – 0.0984 in.)
	DANA–made	color
		Blue 1.638 mm (0.0645 in.)
		Yellow 1.588 mm (0.0625 in.)
		Silver 1.537 mm (0.0605 in.)
		Copper 1.511 mm (0.0595 in.)
		Black 1.486 mm (0.0585 in.)
		Red 1.435 mm (0.0565 in.)
		Green 1.384 mm (0.0545 in.)

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Front differential x Front propeller shaft (4WD)	74	750	54
Front propeller shaft x Transfer (4WD)	74	750	54
Propeller shaft x Rear differential	76	780	56
3VZ – E (M/T)	74	750	54
Ex. 3VZ – E (M/T)	74	750	54
Propeller shaft x Transfer	76	780	56
3VZ – E (M/T)	74	750	54
Ex. 3VZ – E (M/T)	74	750	54
Intermediate shaft x Propeller shaft (4WD)			
3VZ – E (M/T)	76	780	56
Ex. 3VZ – E (M/T)	74	750	54
Propeller shaft x Differential (2WD)	74	750	54
Intermediate shaft x Propeller shaft (2WD)	74	750	54
Center support bearing x Frame	36	370	27
Intermediate shaft x Center bearing x Joint flange			
1st	181	1,850	134
2nd		Loosen nut	
3rd	69	700	51
Front propeller shaft No.2 dust cover set bolts	17	175	13
Front propeller shaft No.2 dust cover set nut (w/VF1 A type transfer and A340H)	13	135	10
Front propeller shaft dust cover subassembly x Bracket	23	230	17
Front propeller shaft dust cover subassembly x Transfer	37	370	27
Propeller shaft protector x Frame	29	300	22