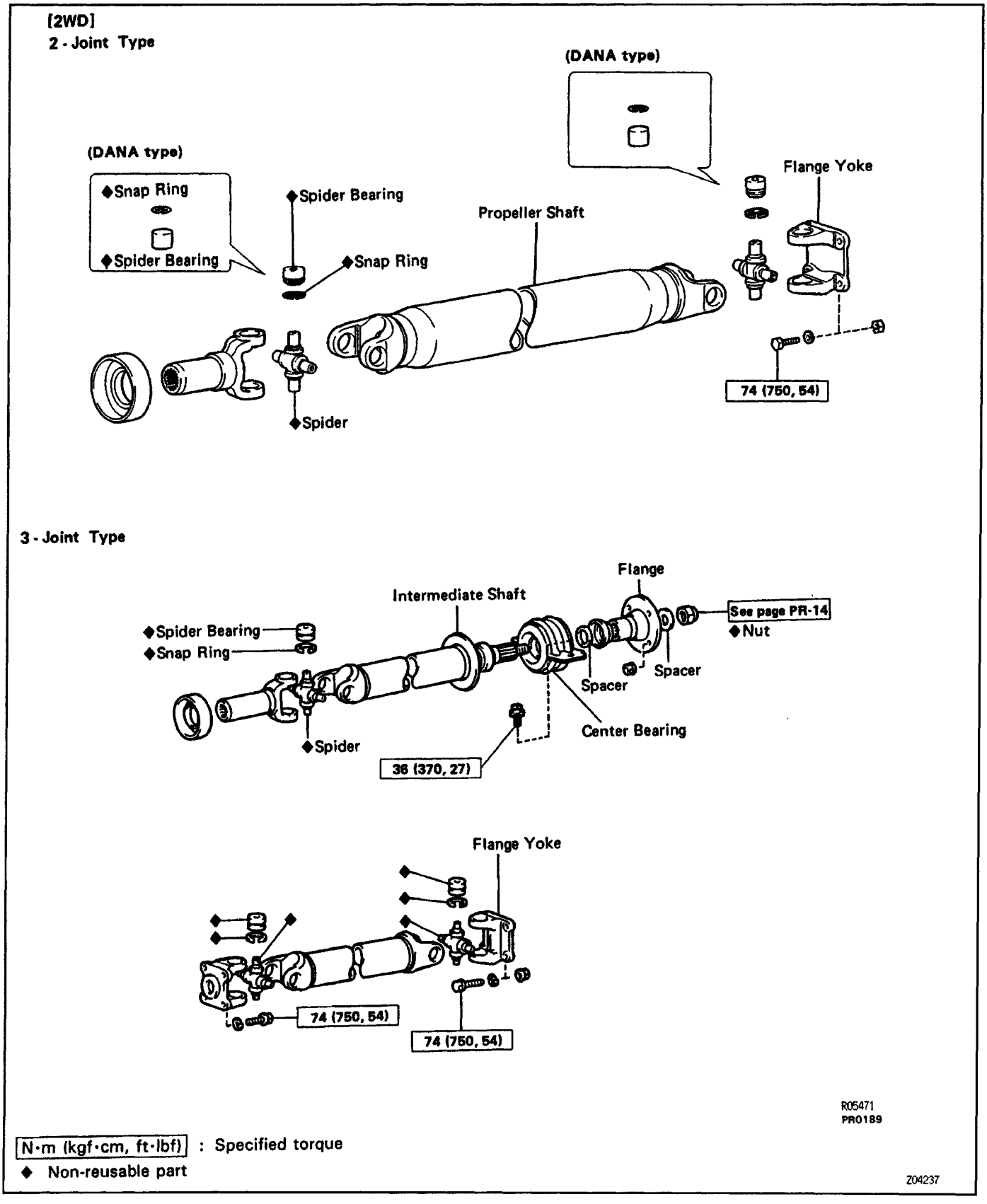
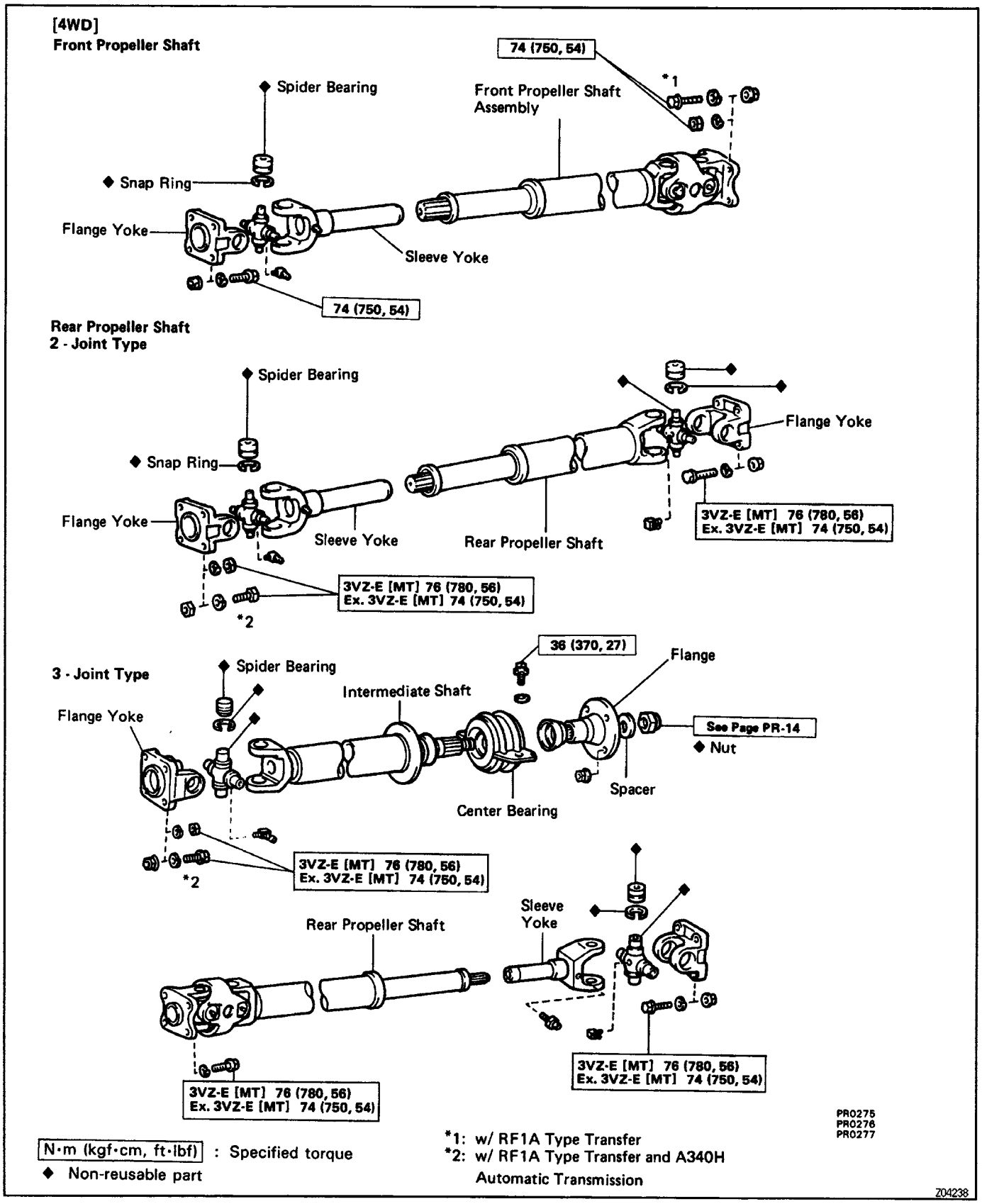
PROPELLER SHAFT

PR020–01

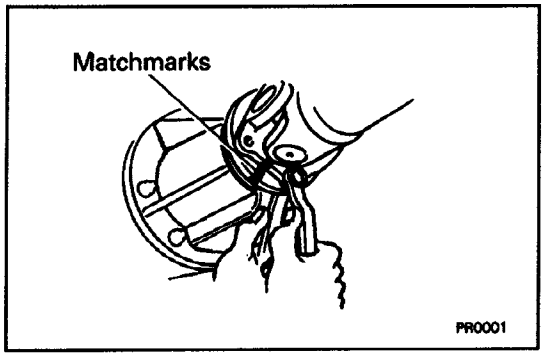
COMPONENTS




[4WD]
Front Propeller Shaft
74 (750, 54)
*1
Spider Bearing
Front Propeller Shaft Assembly
Snap Ring
Flange Yoke
Sleeve Yoke
74 (750, 54)
Rear Propeller Shaft
2 - Joint Type
Spider Bearing
Flange Yoke
Snap Ring
Flange Yoke
Sleeve Yoke
Rear Propeller Shaft
3VZ-E [MT] 76 (780, 56)
Ex. 3VZ-E [MT] 74 (750, 54)
3VZ-E [MT] 76 (780, 56)
Ex. 3VZ-E [MT] 74 (750, 54)
*2
3 - Joint Type
36 (370, 27)
Flange
Spider Bearing
Intermediate Shaft
Flange Yoke
See Page PR-14
Nut
Spacer
Center Bearing
3VZ-E [MT] 76 (780, 56)
Ex. 3VZ-E [MT] 74 (750, 54)
*2
Sleeve Yoke
Rear Propeller Shaft
3VZ-E [MT] 76 (780, 56)
Ex. 3VZ-E [MT] 74 (750, 54)
3VZ-E [MT] 76 (780, 56)
Ex. 3VZ-E [MT] 74 (750, 54)
PR0275
PR0276
PR0277
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
Z04238

PR021–01

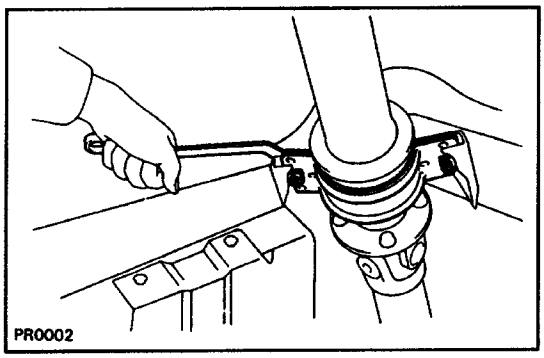
PROPELLER SHAFT REMOVAL (2WD)



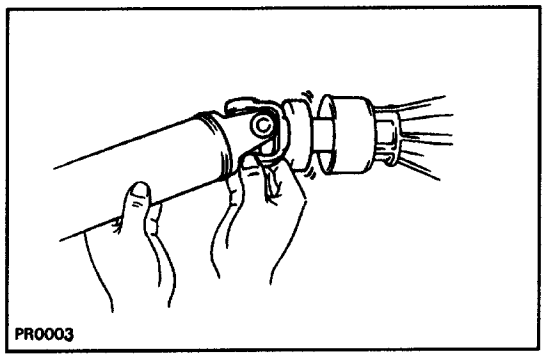
1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON DIFFERENTIAL

(a) Put matchmarks on the flanges.

(b) Remove the four and nuts.

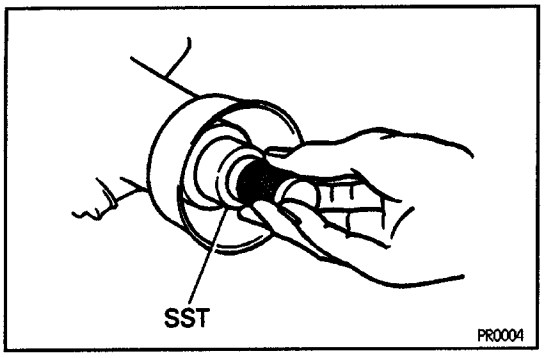


2. REMOVE CENTER SUPPORT BEARING FROM FRAME CROSSMEMBER (3–JOINT TYPE)



3. REMOVE PROPELLER SHAFT FROM TRANSMIS–SION

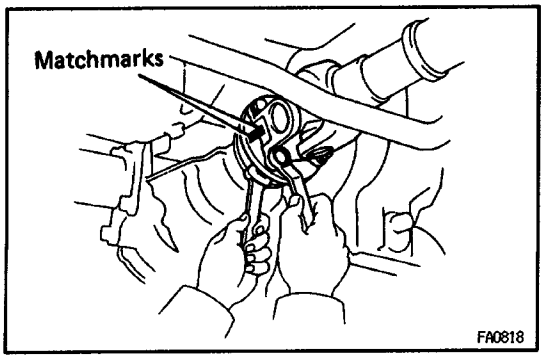
(a) Pull the yoke from the transmission.



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

PR022–01

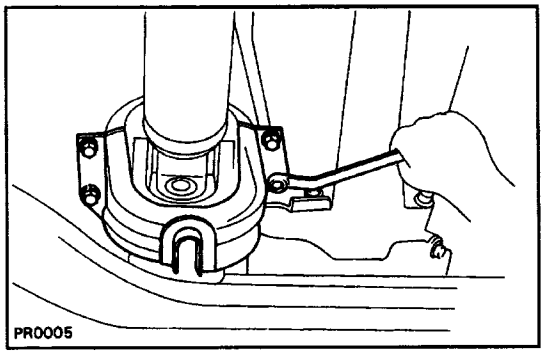
PROPELLER SHAFT REMOVAL (4WD)



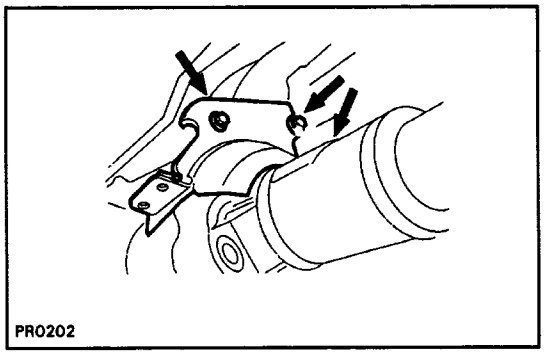
1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON FRONT DIFFERENTIAL

(a) Put matchmarks on the flanges.

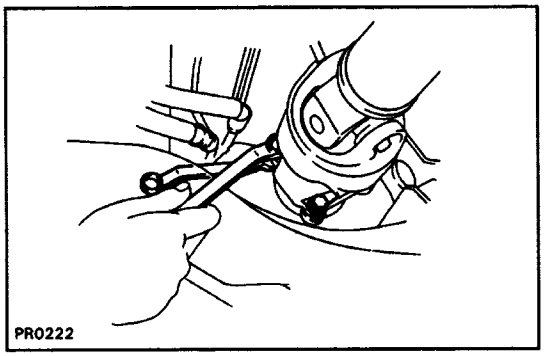
(b) Remove the four bolts and nuts.



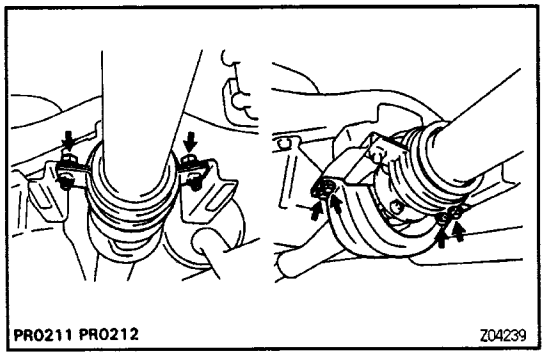
2. REMOVE FRONT PROPELLER SHAFT NO.2 DUST COVER
(W/RF1 A Type Transfer)
Remove the two bolts and two nuts and cover.
(w/VF1 A Type Transfer and A340H)
Remove the four bolts and cover.



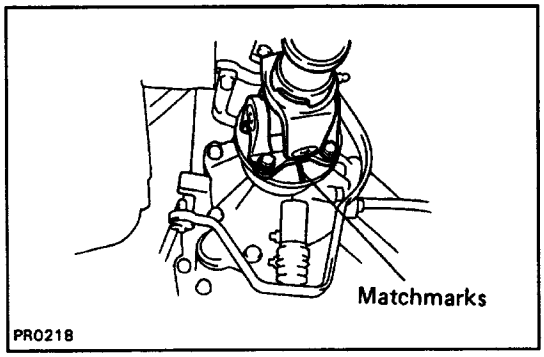
3. REMOVE FRONT PROPELLER SHAFT DUST COVER SUBASSEMBLY
(w/VF1 a Type Transfer and A340H)
Remove the three bolts and cover.



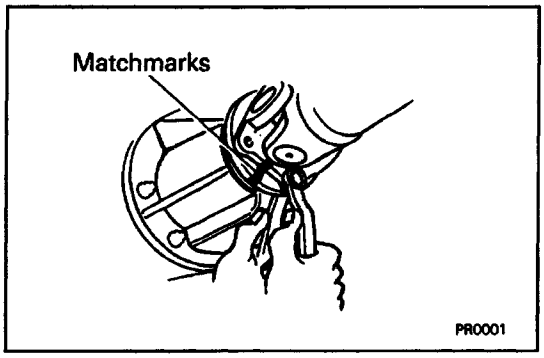
4. REMOVE FRONT PROPELLER SHAFT
(a) Suspend the front side of the propeller shaft.
(b) Put matchmarks on the flanges.
(c) Remove the four nuts or four bolts and nuts.
(d) Remove the front propeller shaft.



5. REMOVE CENTER SUPPORT BEARING FROM FRAME CROSSMEMBER
(3–JOINT TYPE)
(a) Remove propeller shaft protector set bolts and pro–peller shaft protector.
(b) Remove center support bearing mount bolts.

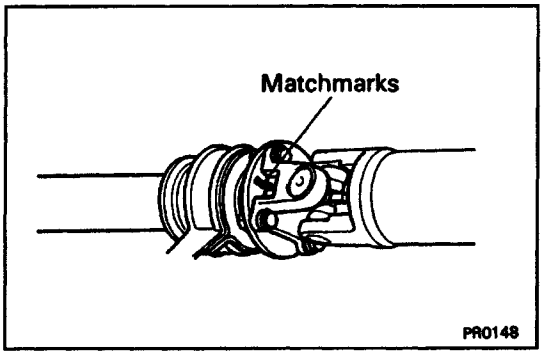


6. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON TRANSFER
(a) Put matchmarks on the flanges.
(b) Remove the four bolts and nuts or four nuts.



7. REMOVE REAR PROPELLER SHAFT

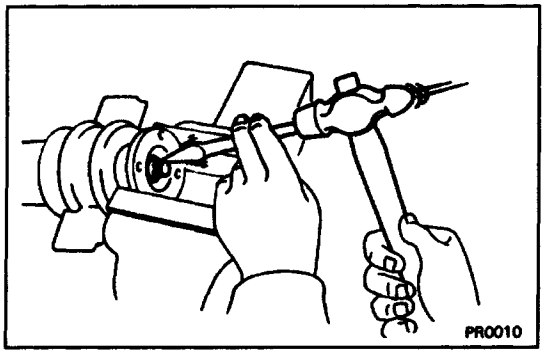
(a) Put matchmarks on the flanges.
(b) Remove the four and nuts.
(c) Remove the rear propeller shaft.



PROPELLER SHAFT DISASSEMBLY PR023-01

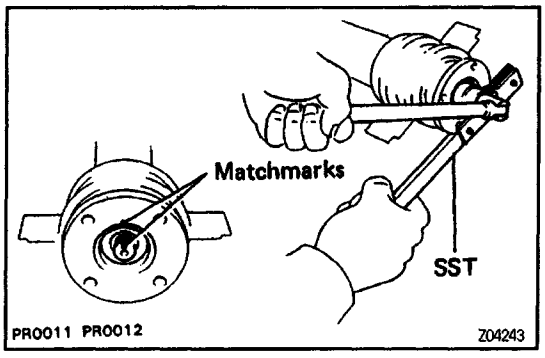
1. SEPARATE PROPELLER SHAFT AND INTERMEDIATE SHAFT

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

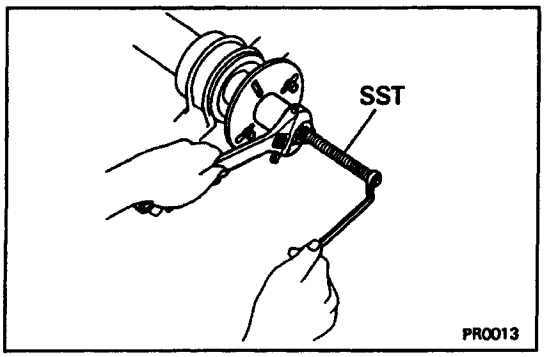


2. REMOVE CENTER SUPPORT BEARING FROM INTERMEDIATE SHAFT

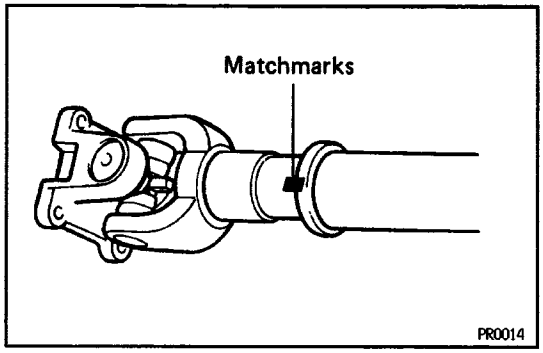
(a) Using a hammer and chisel, loosen the staked part of the nut.



(b) Using SST to hold the flange, remove the nut.
SST 09930–00021
(c) Put matchmarks on the flange and shaft.

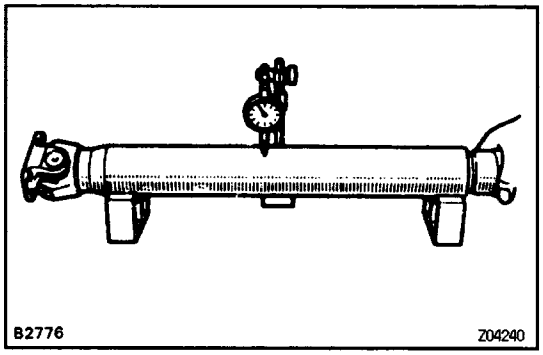


(d) Using SST, remove the flange from the intermediate shaft.
SST 09557–22022 (09557–22030)



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

(a) Place matchmarks on the sleeve yoke and shaft.
(b) Pull out the sleeve yoke from the shaft.



PROPELLER SHAFT INSPECTION COMPONENTS

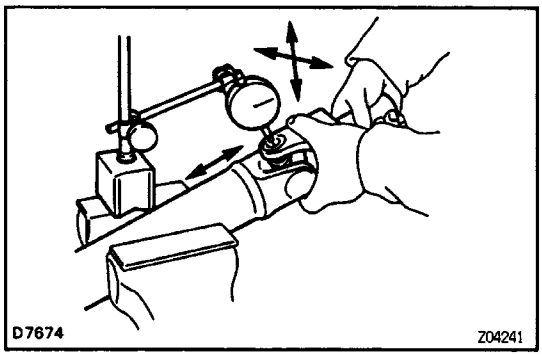
PR624–01

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

(a) Inspect the spider bearings for wear or damage.
(b) 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.)

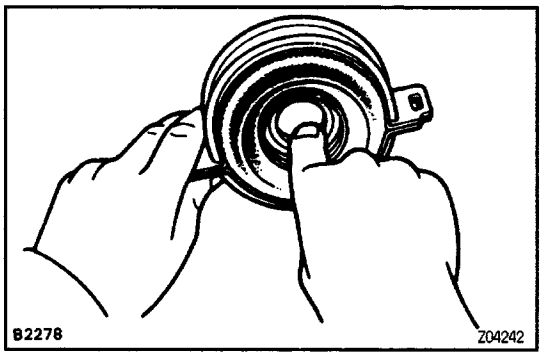
If necessary, replace the spider bearing.

Bearing axial play:

w/ double cardan joint propeller shaft

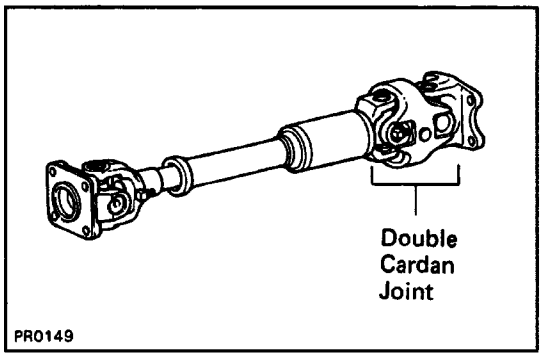
Less than 0.05 mm (0.0020 in.)

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.



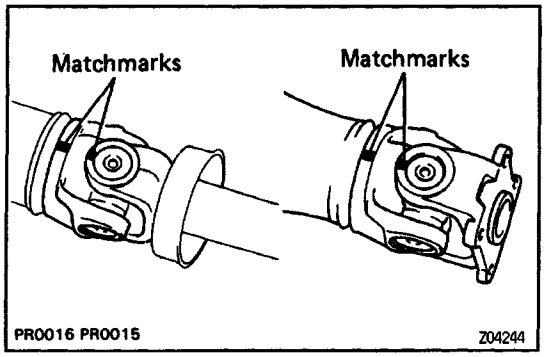
4. INSPECT WITH DOUBLE CARDAN JOINT PROPEL–LER SHAFT

(a) Inspect the shaft for wear or damage.
(b) 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.

PR025–01

SPIDER BEARING REPLACEMENT

1. PLACE MATCHMARKS ON SHAFT AND YOKE

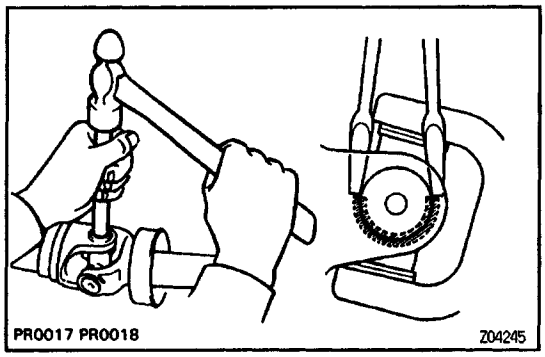


2. REMOVE SNAP RINGS

(TOYOTA type)

(a) Slightly tap in the bearing outer races.

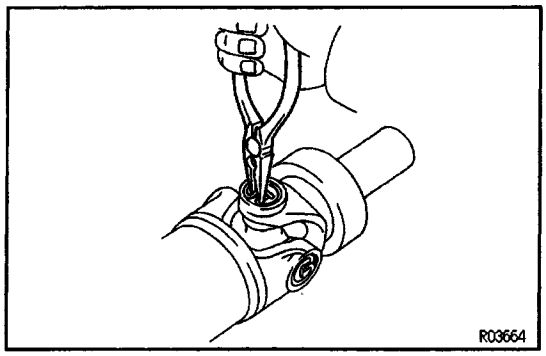
(b) Using two screwdrivers, remove the four snap rings from the grooves.



(DANA type)

(a) Slightly tap in the bearing outer races.

(b) Using snap ring pliers, remove the four snap rings from the grooves.

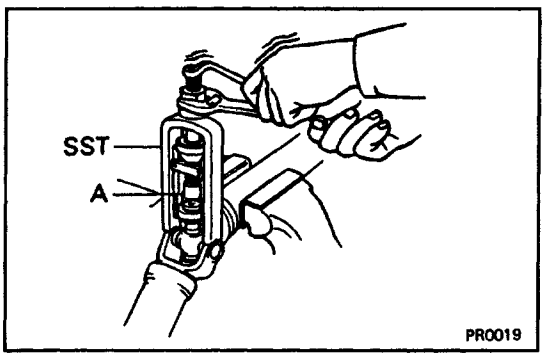


3. REMOVE SPIDER BEARINGS

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

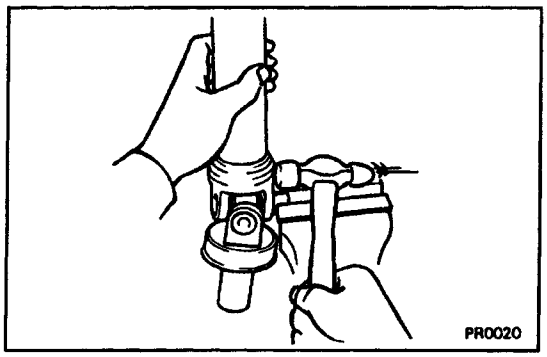
SST 09332–25010

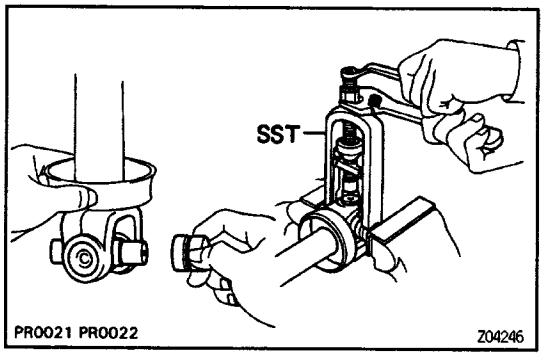
HINT: Sufficiently raise the part indicated by A so that it does not come into contact with the bearing.



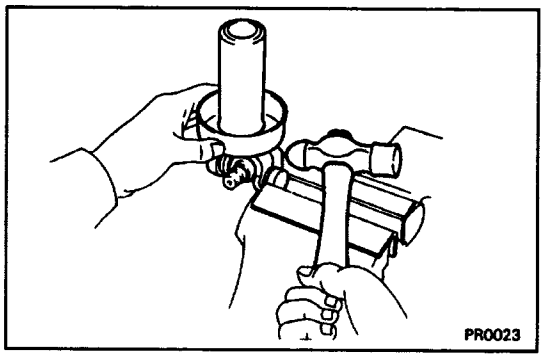
(b) Clamp the bearing outer race in a vise and tap off the propeller shaft with a hammer.

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

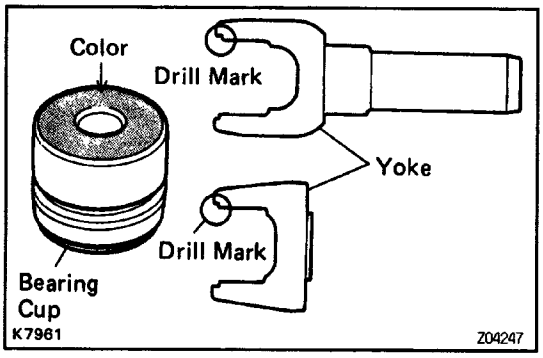




(c) Install the two removed bearing outer races to the spider.
(d) Using SST, push out the bearing from the yoke.
SST 09332 – 25010

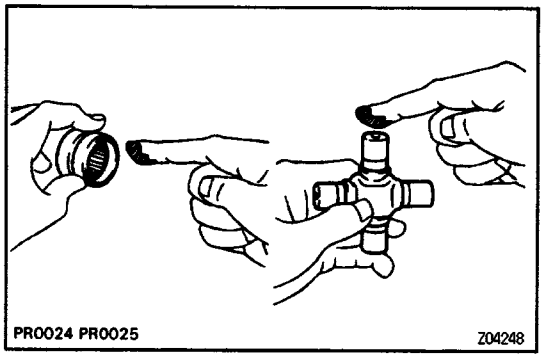


(e) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.
HINT: Remove the bearing on the opposite side in the same procedure.

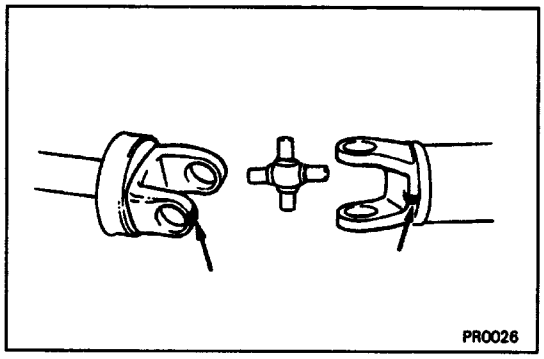


4. SELECT THE SPIDER BEARING
Select the bearing according to whether or not there is a drill mark on the yoke section.

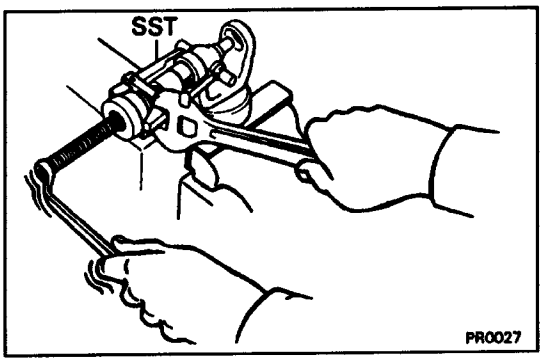
Yoke	Bearing
With drill mark	With color mark (Red)
No drill mark	No color mark



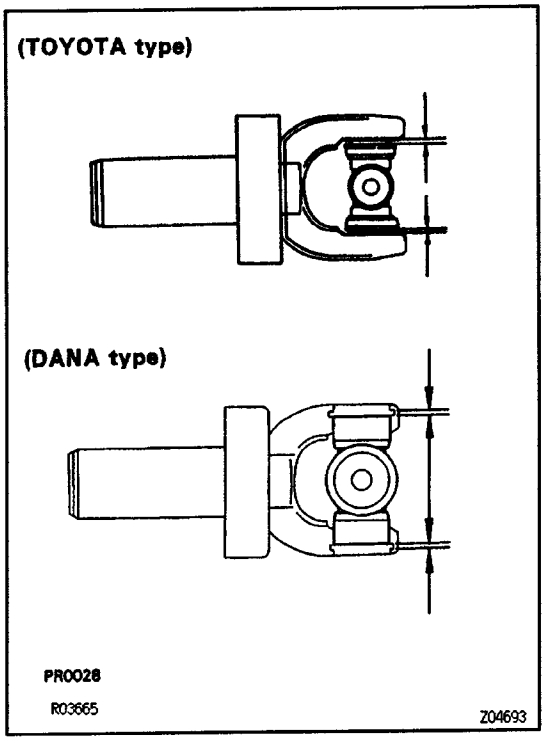
5. INSTALL SPIDER BEARINGS
(a) Apply MP grease to the spider and bearings.
HINT: Be careful not to apply too much grease.



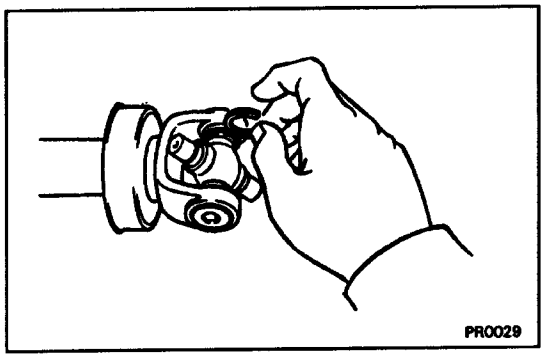
(b) Align the matchmarks on the yoke and shaft.



(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.



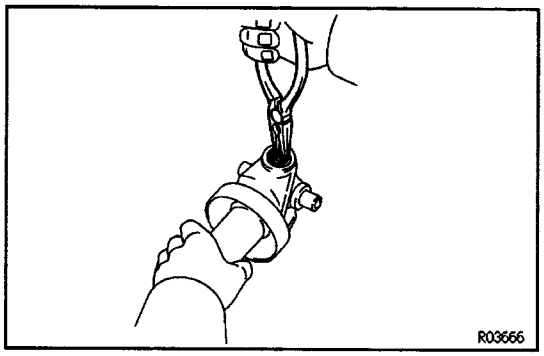
6. INSTALL SNAP RINGS

(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)

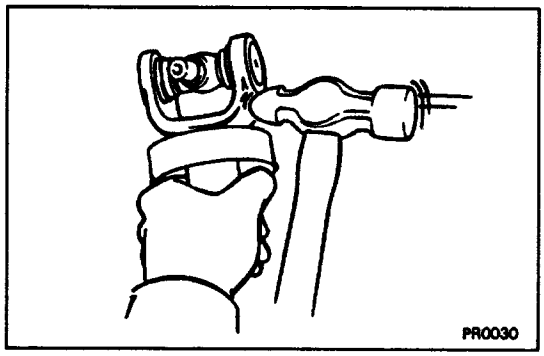
Color	Mark	Thickness mm (in.)
–	1	2.100 – 2.150 (0.0827 – 0.0846)
–	2	2.150 – 2.200 (0.0846 – 0.0866)
–	3	2.200 – 2.250 (0.0866 – 0.0886)
Brown	–	2.250 – 2.300 (0.0886 – 0.0906)
Blue	–	2.300 – 2.350 (0.0906 – 0.0925)
–	6	2.350 – 2.400 (0.0925 – 0.0945)
–	7	2.400 – 2.450 (0.0945 – 0.0965)
–	8	2.450 –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

V01997

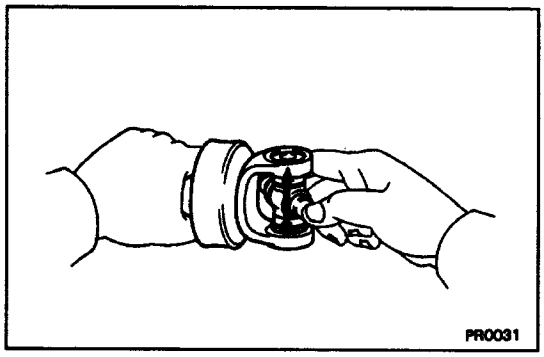


(DANA type)

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.

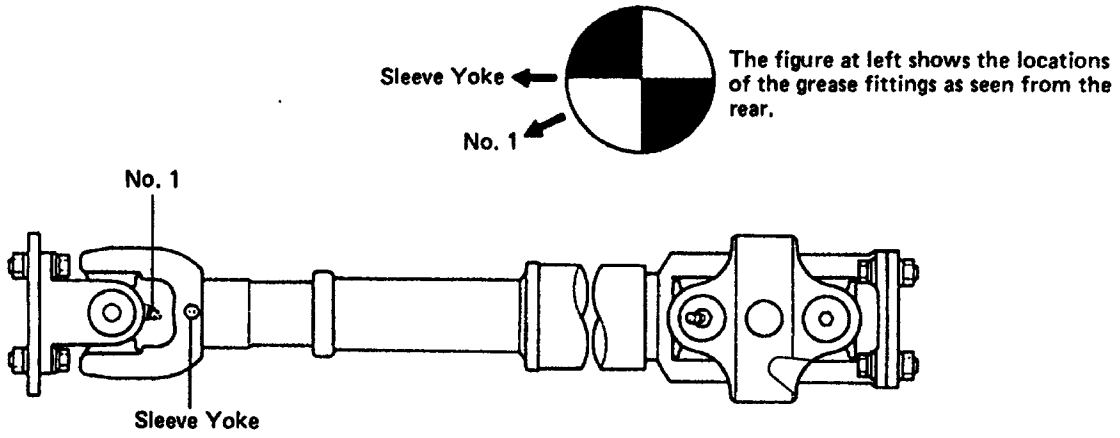
Bearing axial play:

Less than 0.05 mm (0.020 in.)

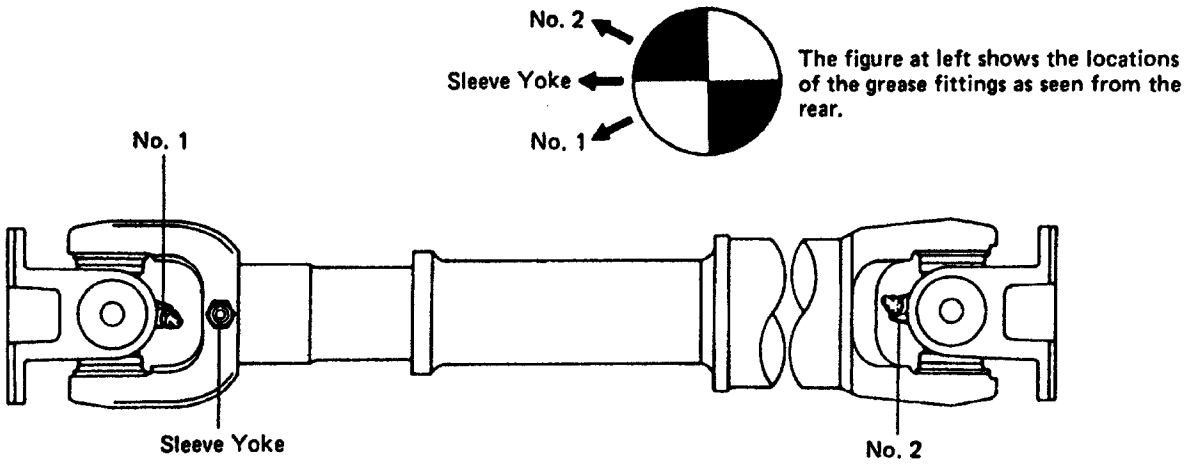
HINT: Install new spider bearings on the shaft side in the procedure described above.

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.

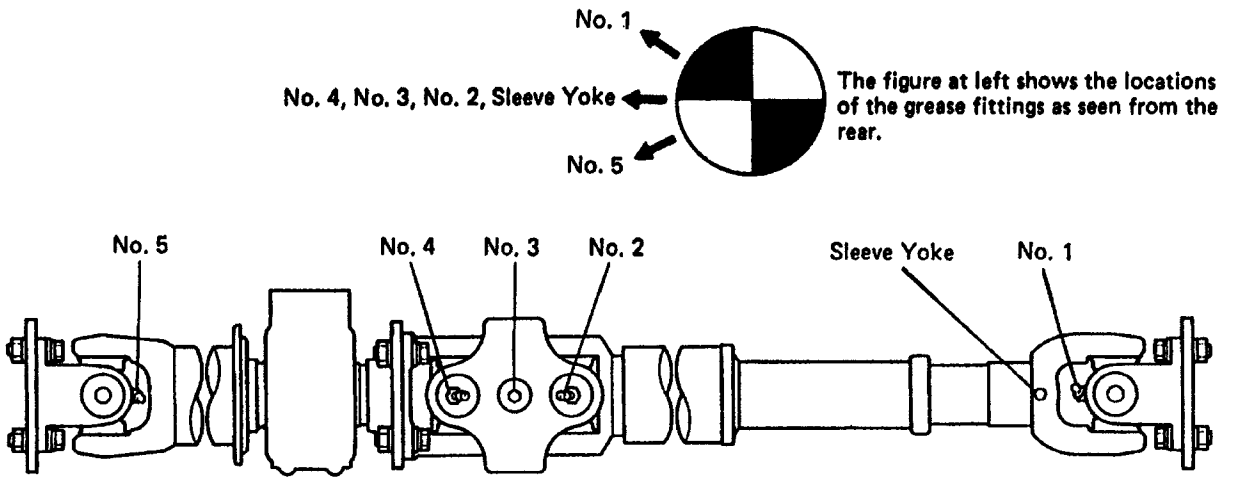
SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR 4WD FRONT PROPELLER SHAFT



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)



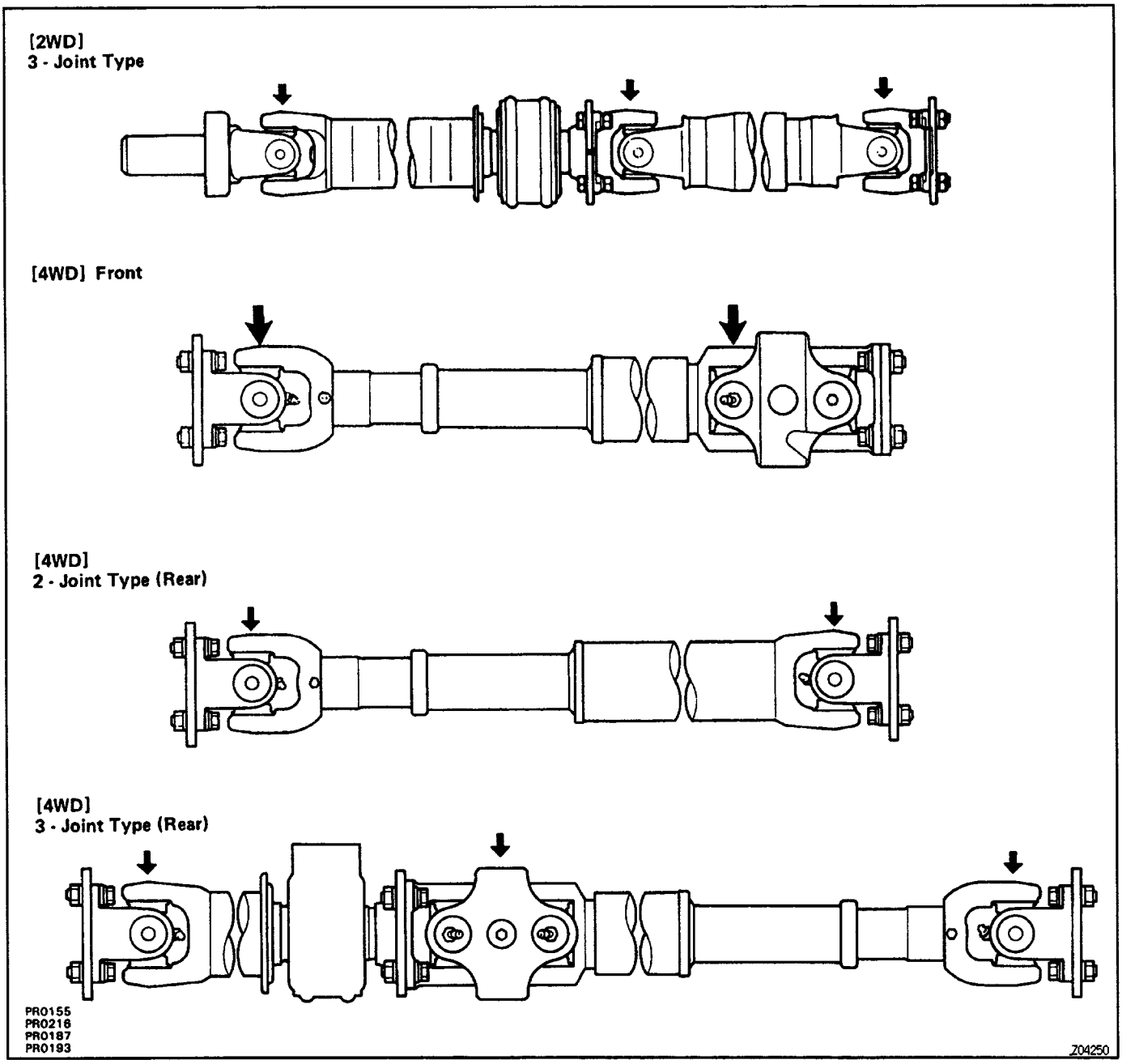
PR0216
PR0194
PR0193

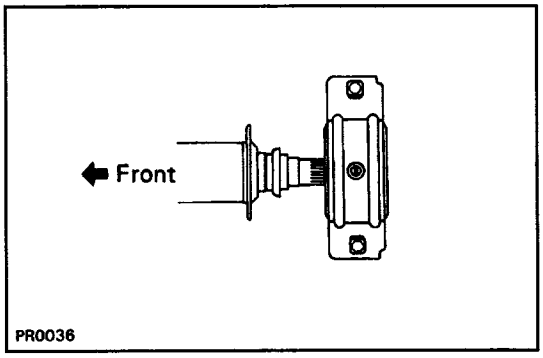
Z04249

PR026–01

PROPELLER SHAFT ASSEMBLY

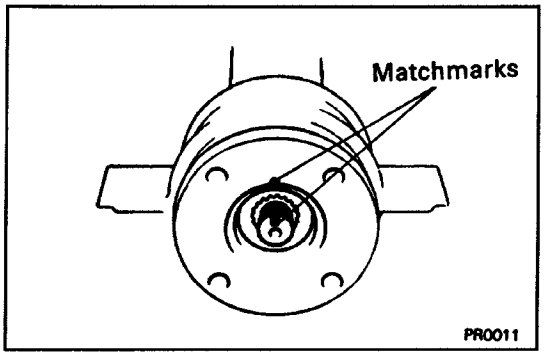
HINT: When replacing the propeller shaft, install the new parts facing as shown in the illustration.





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 match–marks.

HINT: If replacing either the center flange or inter–mediate 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

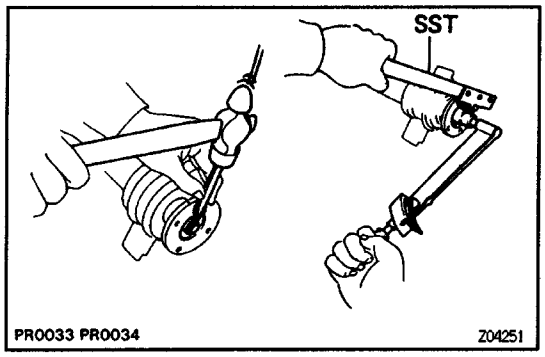
Torque: 181 N–m (1,850 kgf–cm. 134 ft–lbf)

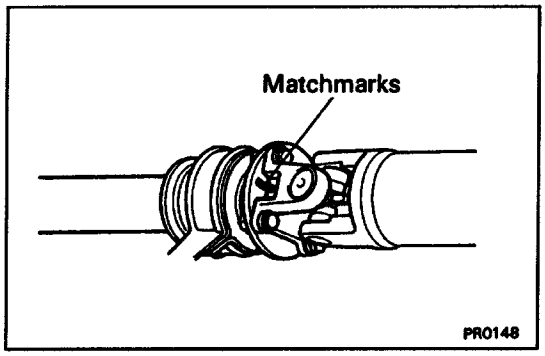
(d) Loosen the nut.

(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 inter–mediate 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.

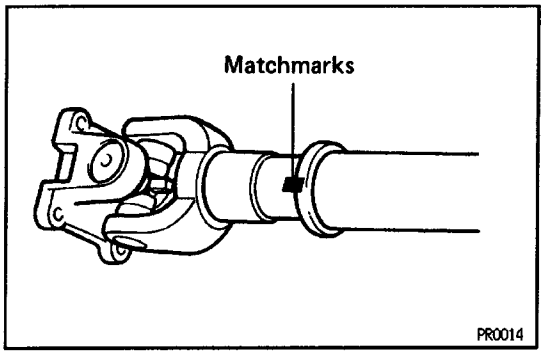
Torque:

4WD 3–joint Type 3VZ–E [MT]

76 N–m (780 kgf–cm, 56 ft–lbf)

Others

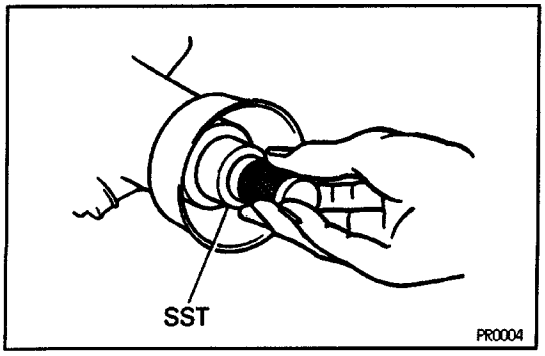
74 N–m (750 kgf–cm, 54 ft–lbf)



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

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

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

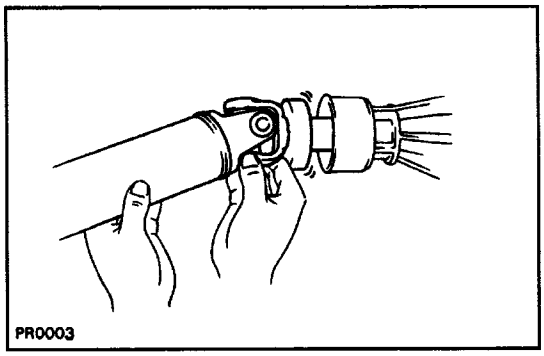


PROPELLER SHAFT INSTALLATION (2WD) PR027–01

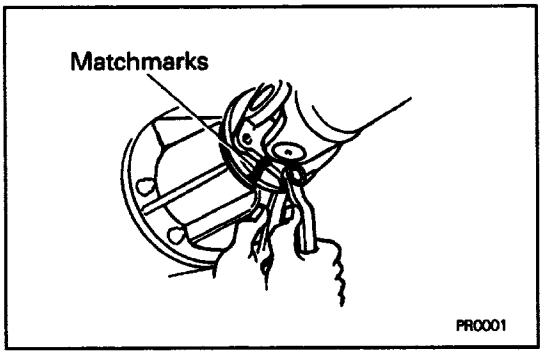
1. INSERT YOKE IN TRANSMISSION

(a) Remove SST.

SST 09325–20010 or 09325–40010



(b) Push the yoke into the transmission.



2. CONNECT PROPELLER SHAFT FLANGE TO CON–PANION FLANGE ON DIFFERENTIAL

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

(b) Torque the bolts and nuts.

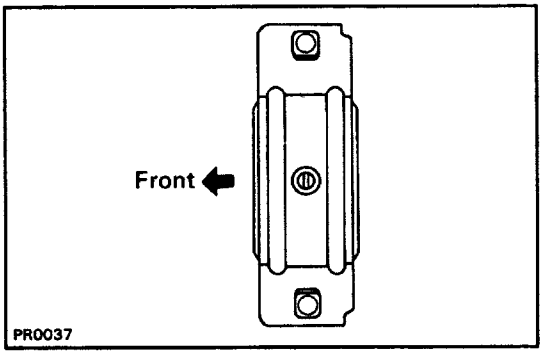
Torque:

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)

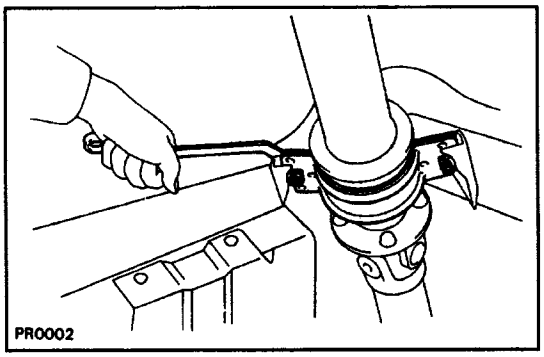


3. INSTALL CENTER SUPPORT BEARING TO FRAME CROSSMEMBER (3–JOINT TYPE)

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

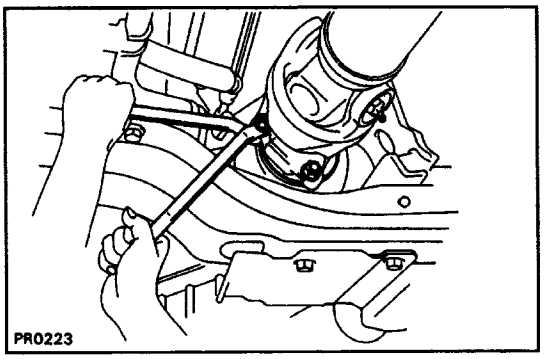
(b) Check that the bearing bracket is at right angle to the propeller shaft. Adjust the bracket if necessary.

(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)



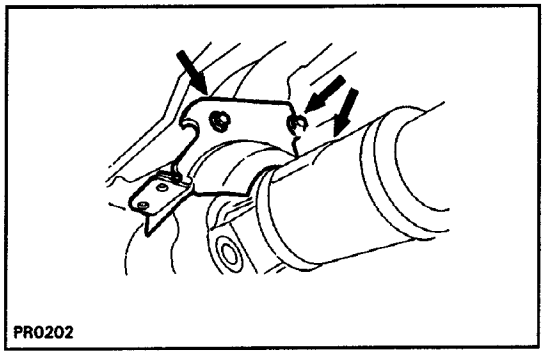
PROPELLER SHAFT INSTALLATION (4WD) PR028–01

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

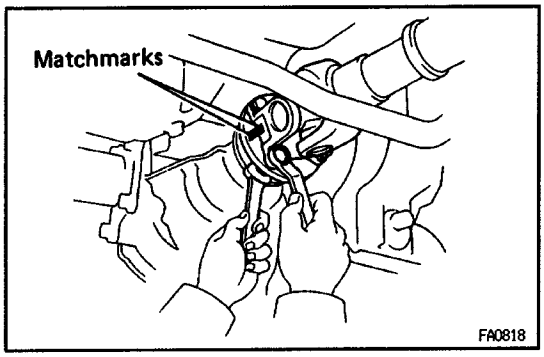
(a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.

(b) Torque the bolts and nuts.

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

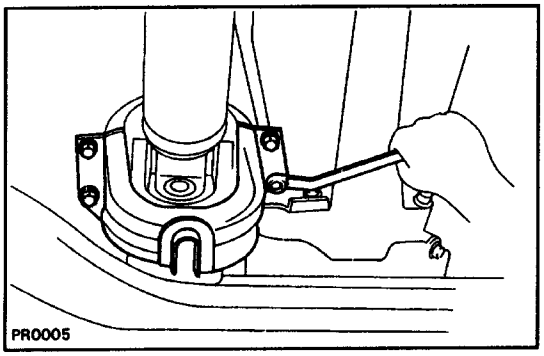

PR0202

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)

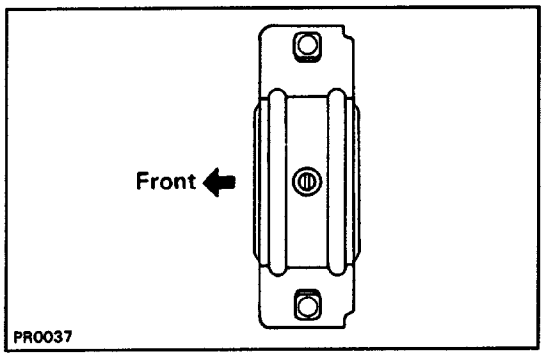


FA0818

3. CONNECT PROPELLER SHAFT FLANGE TO COM–PANION 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)

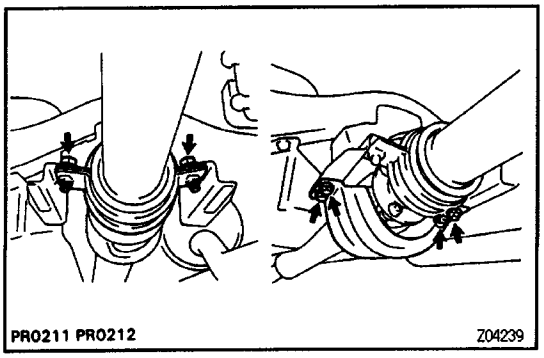

PR0005

4. INSTALL FRONT PROPELLER SHAFT NO. 2 DUST COVER
(a) Install the cover.
(6) 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)

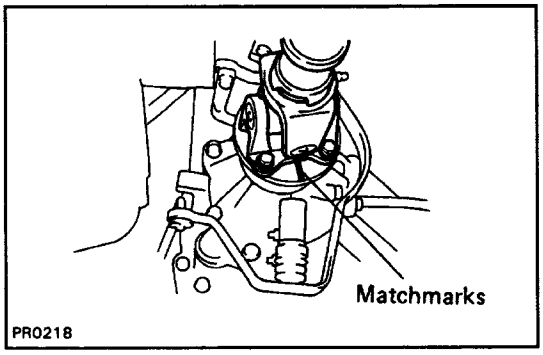


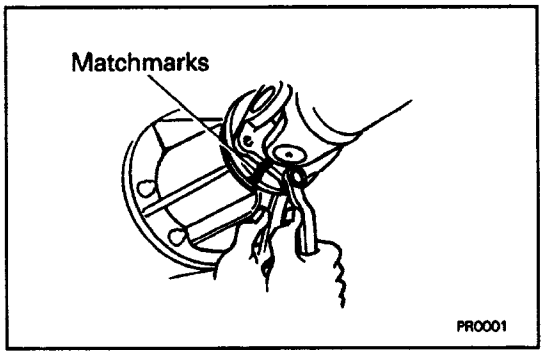
PR0037

5. INSTALL CENTER SUPPORT BEARING TO FRAME CROSSMEMBER (3–JOINT TYPE)
(a) Install the center support bearing to the frame cro–ssmember with two mount bolts finger tight.
(b) Check that the bearing bracket is at right angle to the propeller shaft. Adjust the 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.


PR0211 PR0212 Z04239

(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)