

## ARTICLE BEGINNING

## APPLICATION

### TRANSMISSION APPLICATION

Vehicle Application	Transmission Model
Camry	
1984-85	S50
1986-92	S51
1993-94 2.2L (5S-FE)	S51
Celica	
1986-92	S53
1993 (FWD)	S53
1994 (2.2L)	S54
Corolla	
1984-85	S50
MR2	
1991-92	S54
1993-94 2.2L (Non Turbo)	S54

## IDENTIFICATION

Transmission type is notated on ID label. ID label is located on driver-side door post.

## LUBRICATION & ADJUSTMENTS

See appropriate TRANSMISSION SERVICING - M/T article in MANUAL TRANS SERVICE section. See menu below.

## ON-VEHICLE SERVICE

### DRIVE AXLE SHAFTS

See appropriate AXLE SHAFT - FRONT article in the DRIVE AXLES section.

## TROUBLE SHOOTING

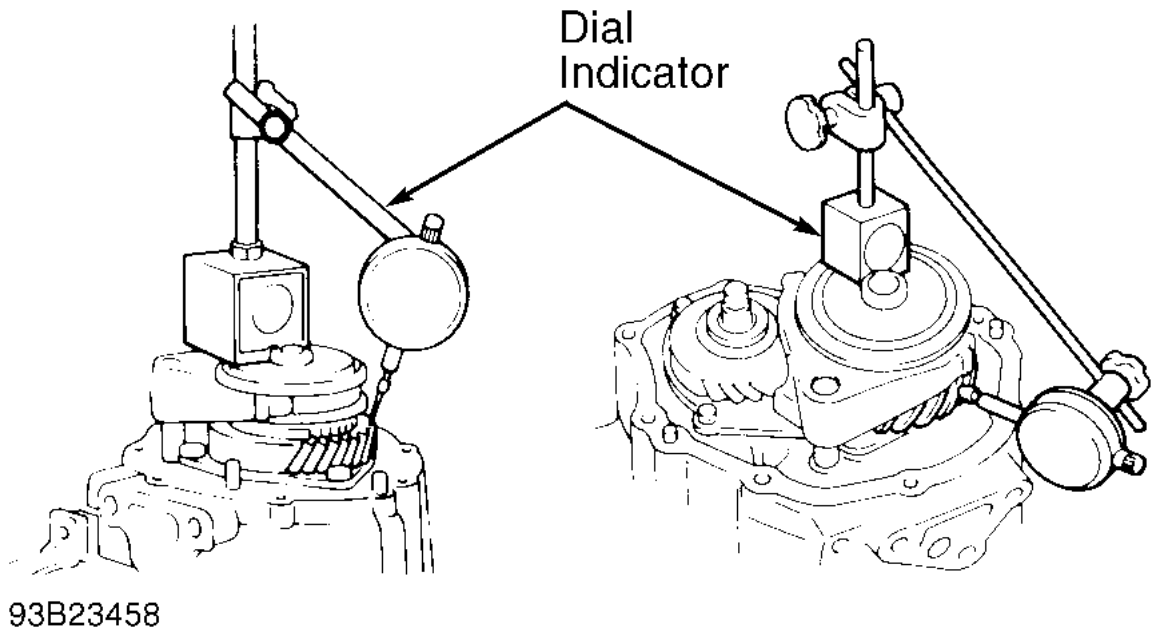
See [TRUBLE SHOOTING - BASIC PROCEDURES](#) article in the GENERAL TROUBLE SHOOTING section.

## REMOVAL & INSTALLATION

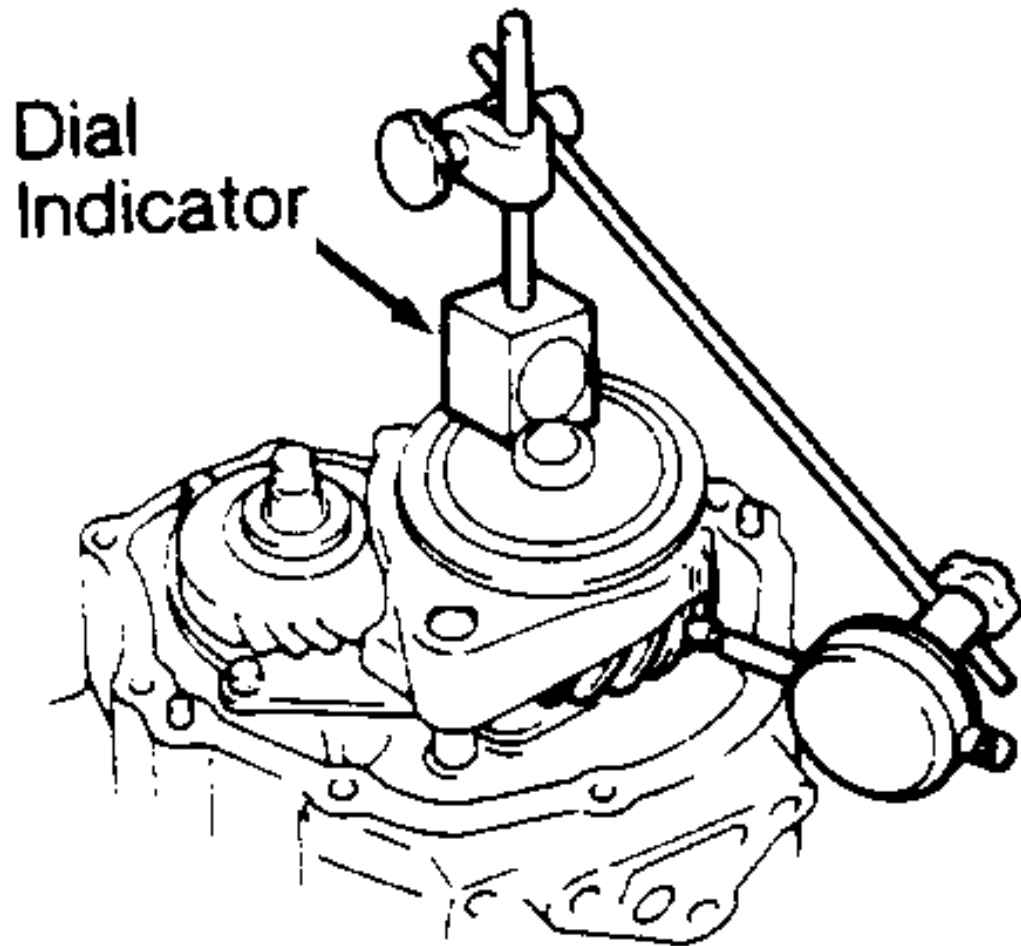
See appropriate TRANSMISSION REMOVAL & INSTALLATION - M/T article in MANUAL TRANS SERVICE section.

## TRANSAXLE DISASSEMBLY

1. Remove speedometer driven gear. Using Socket (09817-16011), remove back-up light switch. Remove front bearing retainer. Remove selecting bellcrank. Remove lever housing support bracket. Remove transmission case cover. Remove shift and select lever shaft assembly lock bolt. Unbolt and remove shift and select lever assembly. See [Fig. 3](#) through [Fig. 5](#).
2. Lock transmission in 2 gears. Using a chisel, lift staked section of output shaft lock nut. Remove lock nut. Lock nut has left-hand threads. Unlock transmission gears. Measure 5th gear clearance. See [Fig. 1](#) and [Fig. 2](#). Using a dial indicator, measure thrust clearance. Standard clearance should be .008-.016" (.20-.40 mm). Service limit is .018" (.45 mm). Record for reassembly reference. Remount dial indicator to measure lateral movement (gear oil clearance) of 5th gear. See [Fig. 1](#) and [Fig. 2](#). Standard clearance should be .0004-.0020" (.009-.050 mm). Service limit is .0028" (.070 mm).
3. Remove input shaft snap ring. Remove shifting key spring. Remove No. 3 shift fork. Thread 3 case bolts into hub sleeve. Tighten bolts to lift hub from input shaft. Remove shift fork at same time. Remove synchro ring, 5th gear and needle bearing. Using 2-jaw puller, remove 5th driven gear from output shaft. Remove rear bearing retainer. Remove input and output shaft rear bearing snap rings. Pull up on both shafts to assist removing snap rings.
4. Remove reverse idler gear shaft lock bolt. Remove snap ring from No. 2 shift fork shaft. Remove all plugs, lock balls, seats and springs. Remove differential side bearing retainer and shim. Remove attaching bolts from transmission housing. Use soft-faced hammer to loosen and remove housing. Remove reverse idler gear, thrust washer and shaft. Remove reverse shift arm bracket. Remove input and output shafts with shift forks as single assembly. Remove differential assembly. Remove magnet and oil receiver.

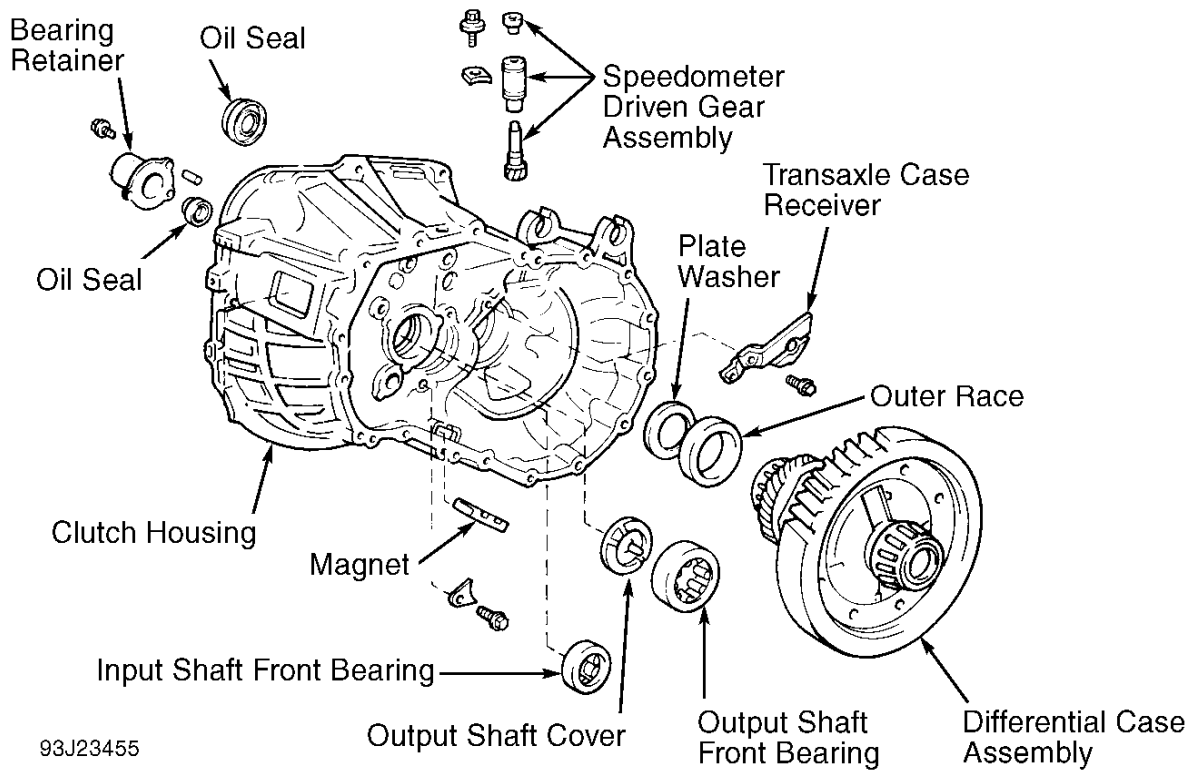


**Fig. 1: Measuring 5th Gear Clearances (1 Of 2)**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

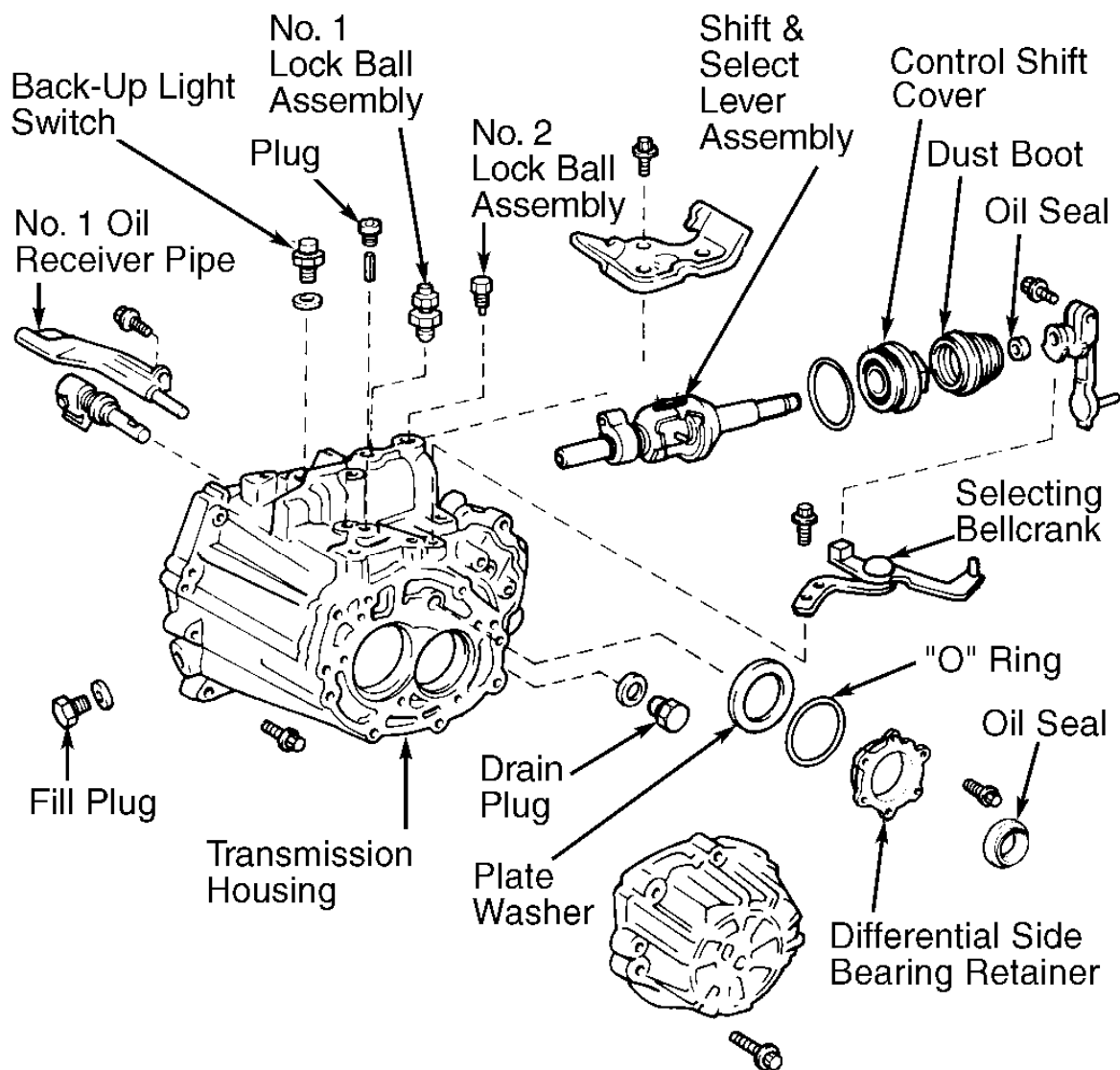


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**Fig. 2: Measuring 5th Gear Clearances (2 Of 2)**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

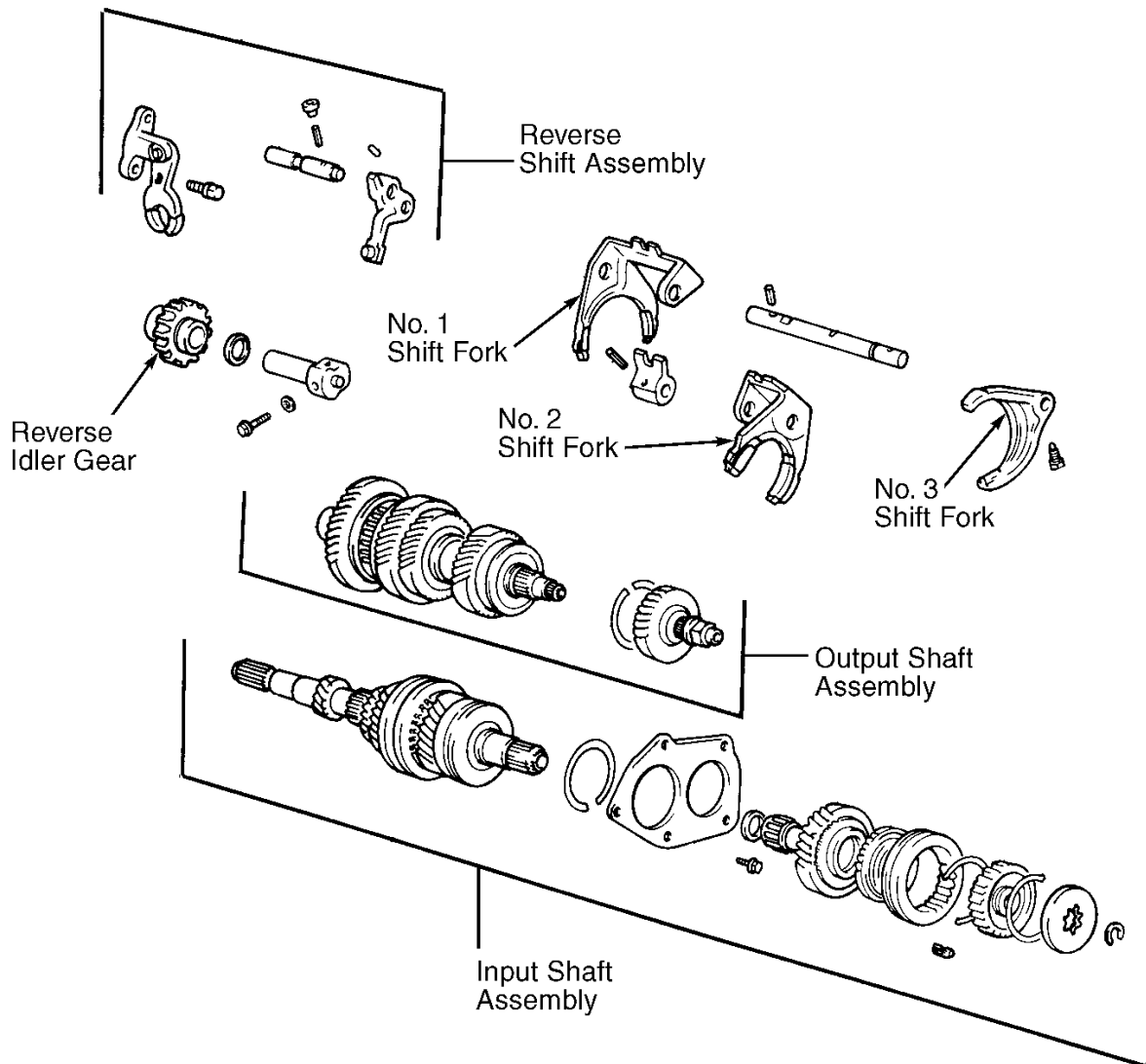


**Fig. 3: Exploded View Of Transmission Assembly (1 Of 3)**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 4: Exploded View Of Transmission Assembly (2 Of 3)**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 5: Exploded View Of Transmission Assembly (3 Of 3)**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## COMPONENT DISASSEMBLY & REASSEMBLY

**NOTE:** On S51 (1992-94 Camry), S53 (1992-94 Celica) and S54 transaxles, use gear oil during reassembly. On S50 (1984-85 Camry & Corolla) S51 (1988-91 Camry) and S53 (1988-91 Celica) transaxles, use ATF fluid during reassembly.

### INPUT SHAFT (MAINSHAFT)

## Disassembly

1. For all measurement specifications, refer to INPUT SHAFT SPECIFICATIONS table. Using feeler gauge, measure 3rd and 4th gear thrust clearances. Secure input shaft in soft-jawed vise. Using dial indicator, measure 3rd and 4th gear lateral movement (gear oil clearance). If clearance exceeds maximum, replace gear, needle bearing and/or shaft.

### INPUT SHAFT SPECIFICATIONS

Application	In. (mm)
3rd Gear Thrust Clearance	
Standard Clearance	.004-.010 (.10-.25)
Service Limit	.012 (.30)
4th Gear Thrust Clearance	
Standard Clearance	.008-.018 (.20-.45)
Service Limit	.020 (.50)
3rd & 4th Gear Lateral Movement	
Standard Clearance	.0004-.002 (.009-.06)
Service Limit	.003 (.07)

2. Remove input shaft snap ring. Using bearing splitter or appropriate blocks, press off ball bearing. Remove 4th gear, needle bearing, spacer and synchronizer ring from input shaft. Remove No. 2 hub sleeve snap ring. Support 3rd gear and press No. 2 hub and sleeve, 3rd gear, synchronizer ring and needle bearing from input shaft. See [Fig. 6](#) through [Fig. 9](#).

## Inspection

1. Inspect all parts for damage and wear. Replace if necessary. Clean all parts in new solvent, dry and lubricate all parts. Ensure oil passages are free of contamination.
2. Measure input shaft at points "A", "B", "C" and "D". See [Fig. 6](#) through [Fig. 9](#). Support input shaft on "V" blocks. Using dial indicator to measure runout, rotate input shaft 2 complete revolutions. Replace input shaft if runout or any part of shaft is not within service limit. See [INPUT SHAFT BEARING SURFACE SPECIFICATIONS](#).

### INPUT SHAFT BEARING SURFACE SPECIFICATIONS

Application <sup>(1)</sup>	Minimum Diameter In. (mm)
"A" Ball Bearing Surface	1.062 (26.97)
"B" Needle Bearing Surface	1.278 (32.47)
"C" Needle Bearing Surface	1.303 (33.09)
"D" Ball Bearing Surface	1.180 (29.97)
Runout Limits	.002 (.05)
(1) "A", "B", "C" and "D" refer to measuring points indicated in <a href="#">Fig. 3</a> .	

## Reassembly



1. Reassemble components in reverse order of disassembly. If input shaft was replaced, install NEW roll pin in shaft end. Roll pin is installed at a depth of .197" (5.0 mm) to end of shaft. Support No. 2 hub assembly when pressing input shaft into 3rd gear and hub. Ensure synchro slots are properly aligned to shifting keys. Select snap ring that allows minimum axial movement. See SNAP RING APPLICATION CHART NO. 1

### SNAP RING APPLICATION CHART NO. 1

Snap Ring Thickness In. (mm)	Stamped Number
.077-.079 (1.95-2.00)	1
.079-.081 (2.00-2.05)	2
.081-.083 (2.05-2.10)	3
.083-.085 (2.10-2.15)	4
.085-.087 (2.15-2.20)	5
.087-.089 (2.20-2.25)	6

2. Recheck 3rd gear thrust clearance. See INPUT SHAFT SPECIFICATIONS table for clearance. Install remaining components. Use press to install ball bearing. Select snap ring that allows minimum axial movement. See [SNAP RING APPLICATION CHART NO. 2](#).

### SNAP RING APPLICATION CHART NO. 2

Snap Ring Thickness In. (mm)	Stamped Letter
.085-.087 (2.15-2.20)	A
.087-.089 (2.20-2.25)	B
.089-.091 (2.25-2.30)	C
.091-.093 (2.30-2.35)	D
.093-.095 (2.35-2.40)	E

## OUTPUT SHAFT (COUNTERSHAFT)

### Disassembly

1. For all measurement specifications, refer to OUTPUT SHAFT SPECIFICATIONS table. Using feeler gauge, measure 1st and 2nd gear thrust clearances. Secure output shaft in soft-jawed vise. Using dial indicator, measure 1st and 2nd gear lateral movement (gear oil clearance). If clearance exceeds maximum, replace gear, needle bearing and/or shaft.

### OUTPUT SHAFT SPECIFICATIONS

Application	In. (mm)
1st Gear Thrust Clearance	
Standard Clearance	.004-.012 (.10-.29)
Service Limit	.014 (.35)
2nd Gear Thrust Clearance	
Standard Clearance	.008-.016 (.20-.40)

<b>Application</b>	<b>In. (mm)</b>
Service Limit	.020 (.50)
<b>1st &amp; 2nd Gear Lateral Movement</b>	
Standard Clearance	.0004-.002 (.009-.06)
Service Limit	.003 (.07)

- Using bearing splitter or appropriate blocks, support 4th gear and press output shaft out of ball bearing and 4th driven gear. Remove spacer. Shift No. 1 hub sleeve into 1st gear. Support 2nd gear and press output shaft out of 3rd driven gear and 2nd gear. Remove needle bearing and synchronizer ring. See [Fig. 6](#) through [Fig. 9](#).
- Support 1st gear and press output shaft out of No. 1 hub sleeve, 1st gear and synchronizer ring from output shaft. Remove needle roller bearing, thrust washer and locking ball.

### Inspection

- Inspect all parts for damage and wear. Replace if necessary. Clean all parts in new solvent, dry and lubricate all parts. Ensure oil passages are free of contamination.
- Measure output shaft at points "A", "B", and "C". See [Fig. 6](#) through [Fig. 9](#). Support output shaft on "V" blocks. Using dial indicator to measure runout, rotate output shaft 2 complete revolutions. Replace output shaft if runout or any part of shaft is not within service limit. See OUTPUT SHAFT BEARING SURFACE SPECIFICATIONS table.

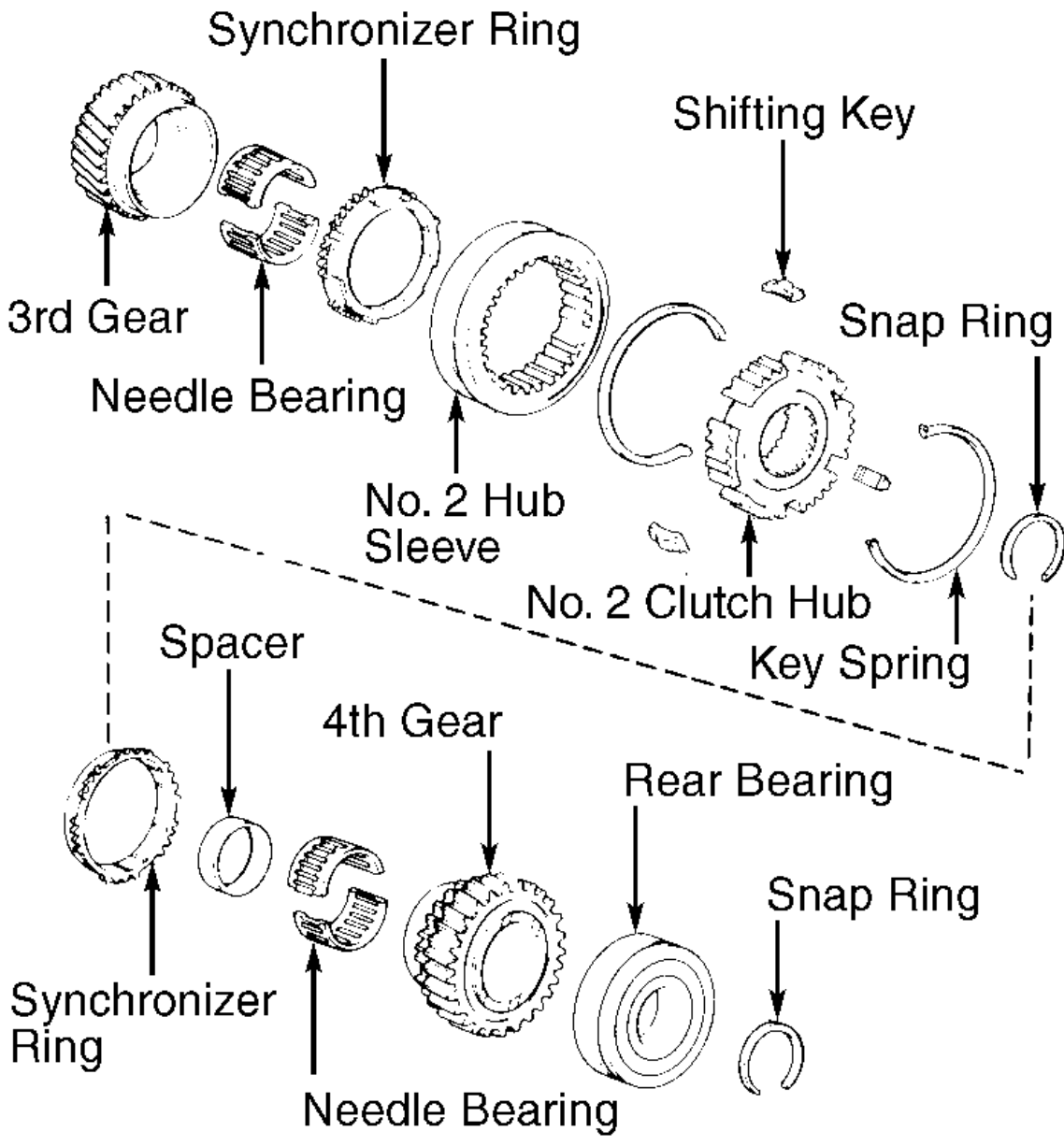
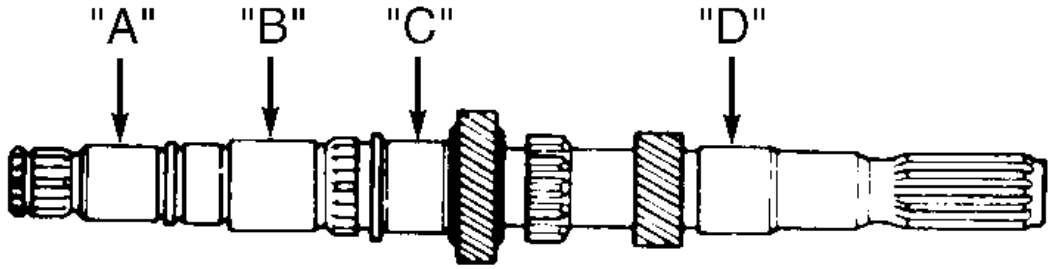
### OUTPUT SHAFT BEARING SURFACE SPECIFICATIONS

<b>Application <sup>(1)</sup></b>	<b>Minimum Diameter In. (mm)</b>
"A" Ball Bearing Surface	1.259 (31.97)
"B" Needle Bearing Surface	1.495 (37.97)
"C" Needle Bearing Surface	1.259 (31.99)
Runout Limits	.002 (.05)
<sup>(1)</sup> "A", "B", and "C" refer to measuring points indicated in <a href="#">Fig. 3</a> .	

### Reassembly

- If output shaft was replaced, drive roll pin in NEW output shaft to a depth of .236" (6.0 mm) from end of shaft. Apply gear oil to needle bearings. Assemble components in reverse order of disassembly. Support No. 1 hub and press output shaft into 1st gear and No. 1 hub sleeve onto output shaft. See [Fig. 3](#).
- Recheck 1st gear thrust clearance. Refer to OUTPUT SHAFT SPECIFICATIONS table. Install 2nd gear. Press 3rd driven gear onto output shaft. Recheck 2nd gear thrust clearance. Install spacer. Press on 4th driven gear and ball bearing. See [Fig. 3](#).



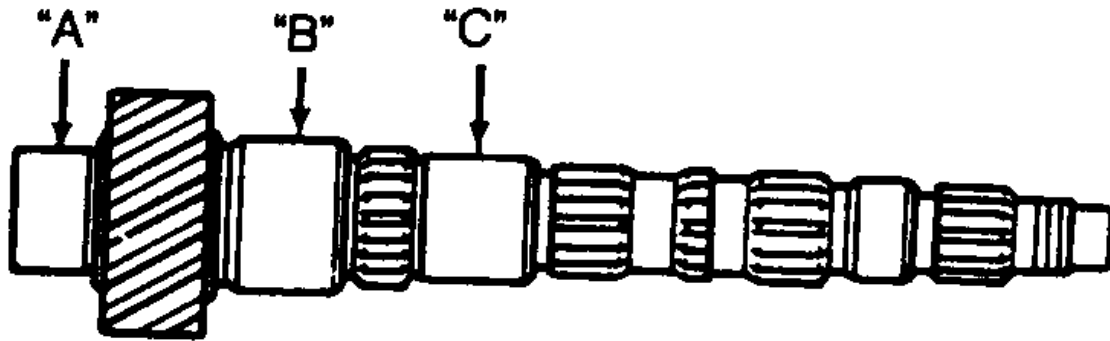


INPUT SHAFT

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**Fig. 6: Identifying Input & Output Shaft Components (1 Of 4)**

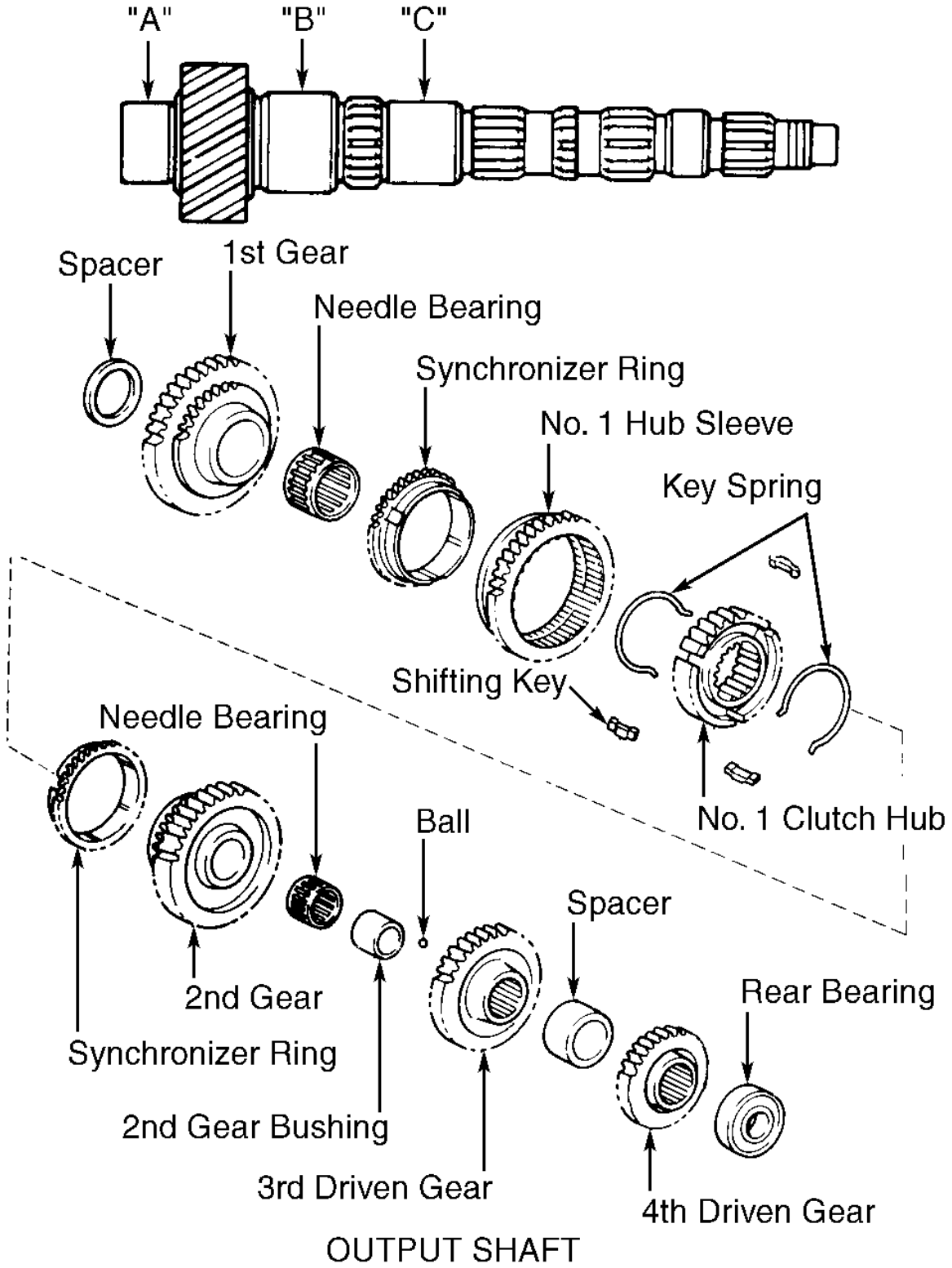
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 7: Identifying Input & Output Shaft Components (1 Of 4)**

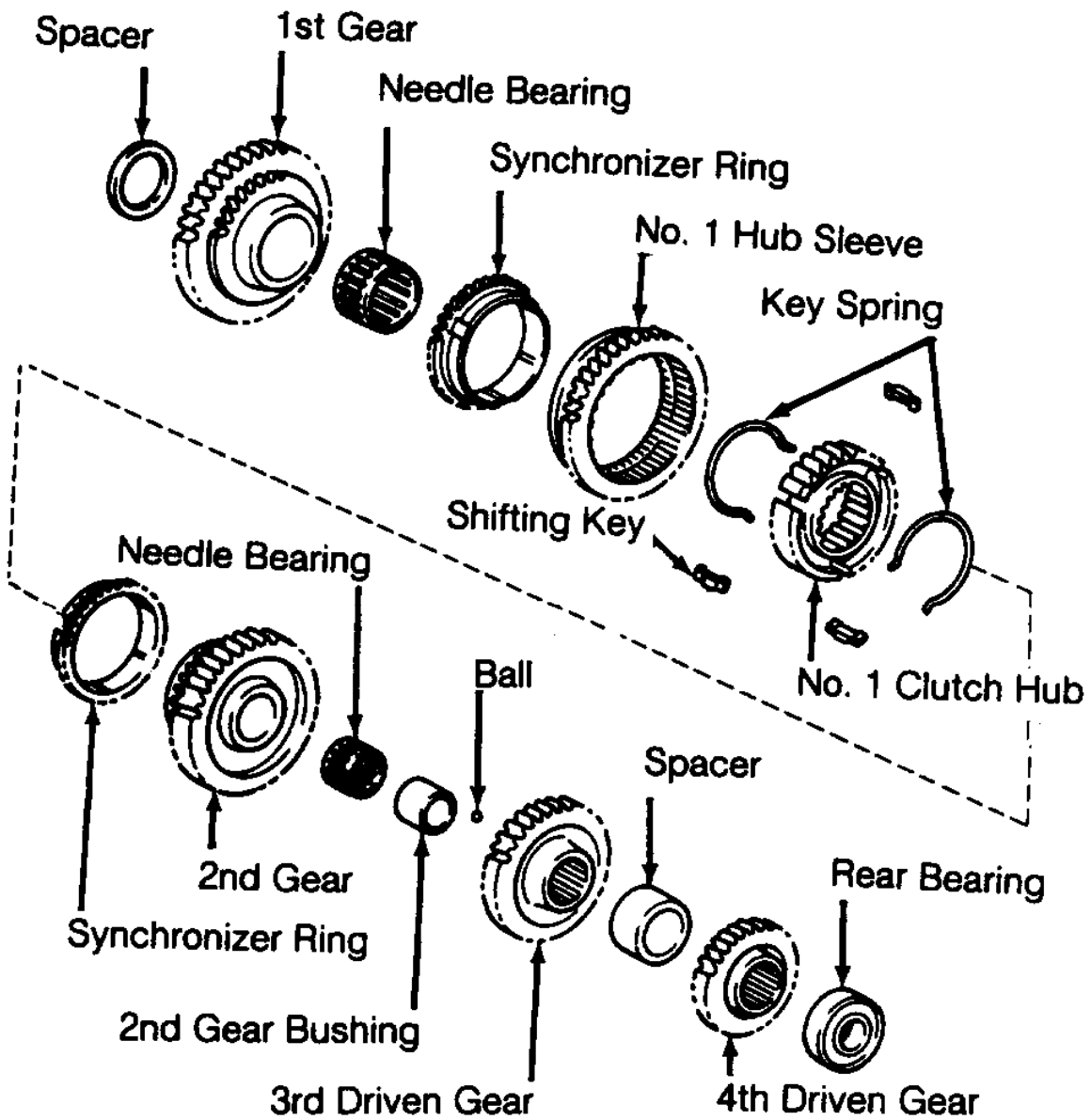
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**Fig. 8: Identifying Input & Output Shaft Components (1 Of 4)**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



OUTPUT SHAFT

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**Fig. 9: Identifying Input & Output Shaft Components (1 Of 4)**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## SHIFT FORK ASSEMBLY

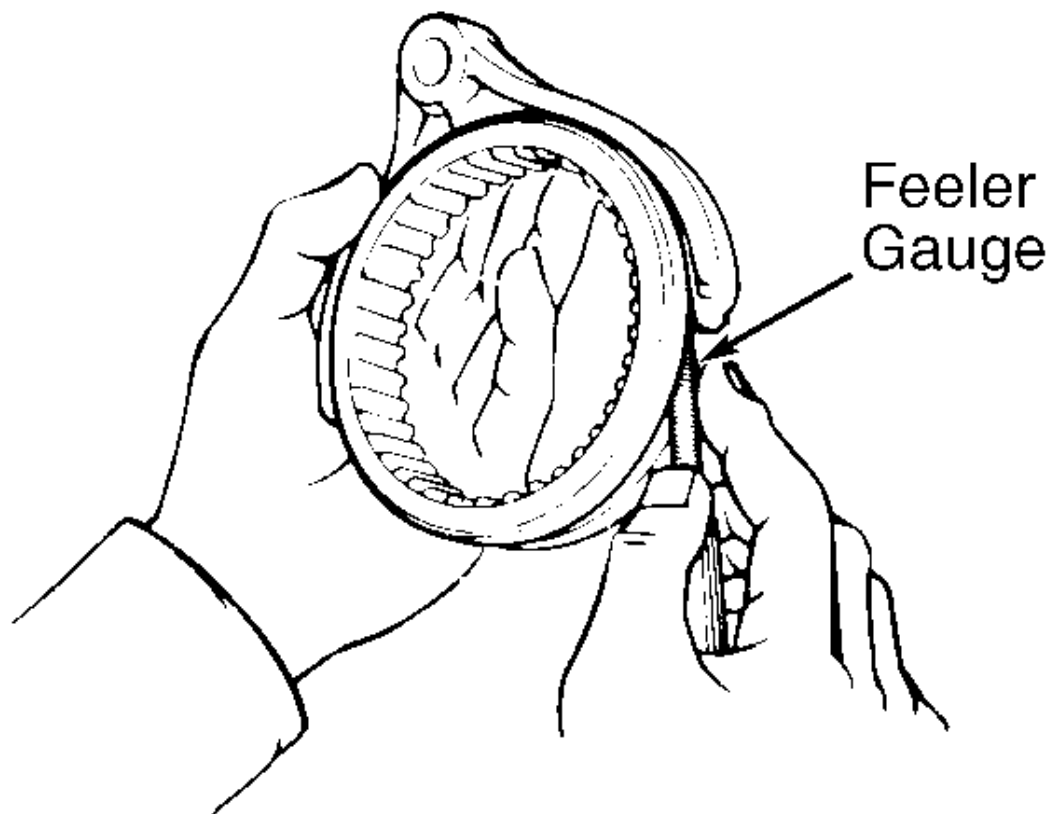
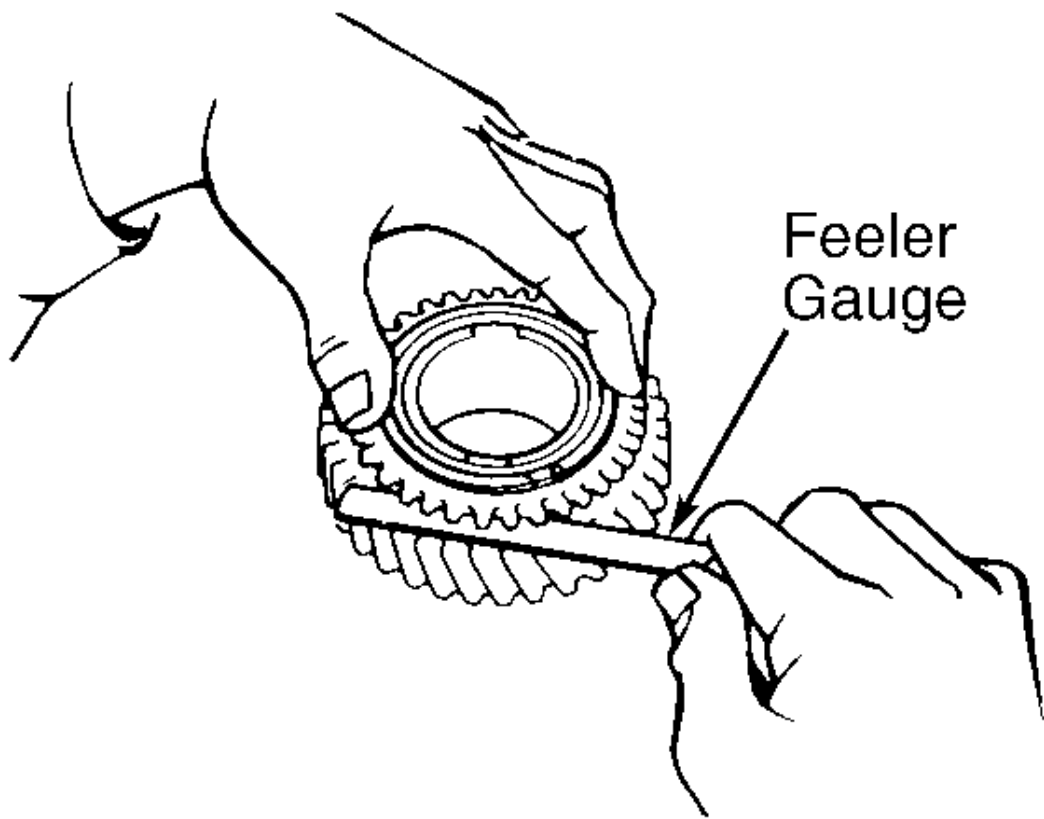
Measure clearance between hub sleeve and shift fork. Maximum clearance is .039" (1.00 mm). If clearance exceeds specification, replace shift fork or hub sleeve. See [Fig. 10](#) and [Fig. 11](#) .

## SYNCHRO RING & GEAR

Check synchronizer rings for wear or damage. Turn and push ring to check braking action. Measure clearance between synchronizer ring back and gear spline end. Minimum clearance is .024" (.60 mm). If clearance is less than specification, replace synchronizer ring. See [Fig. 10](#) and [Fig. 11](#) .







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Fig. 10: Measuring Shift Fork & Synchro Ring Assemblies (1 Of 2)  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

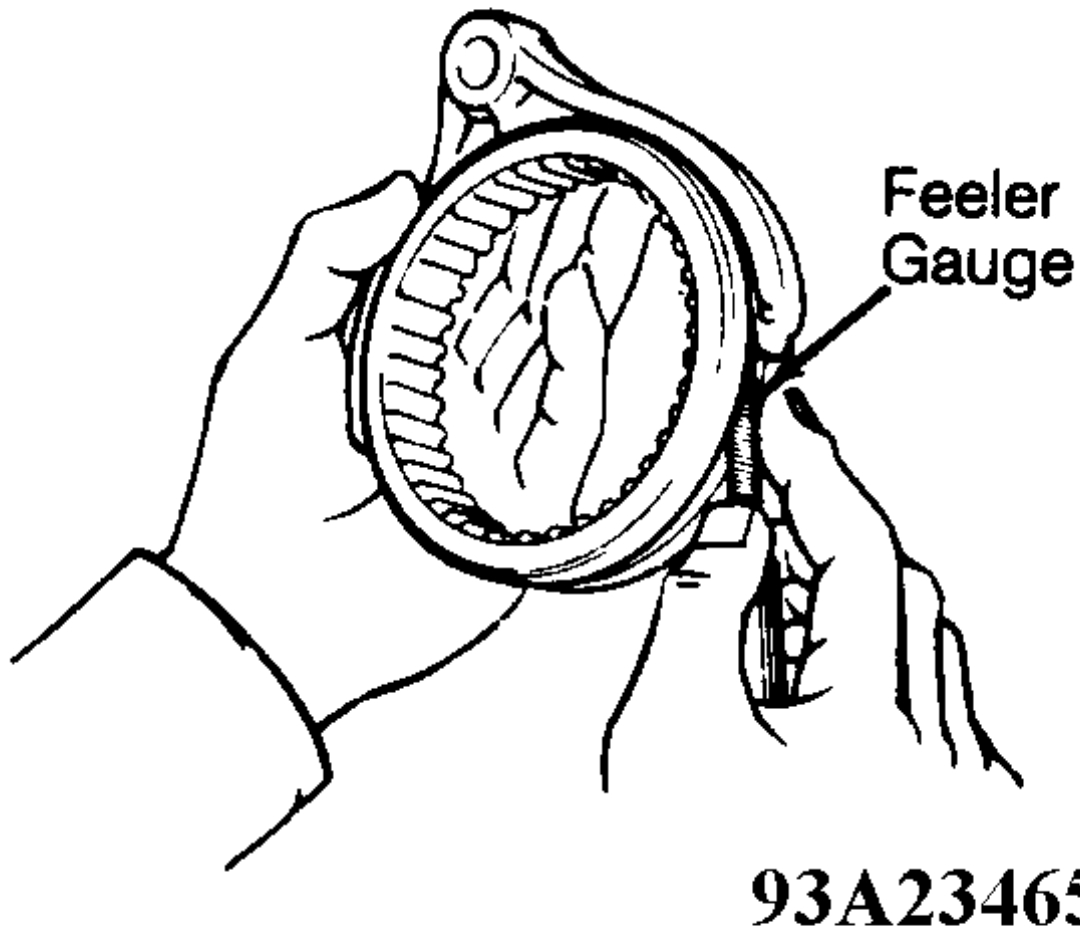


Fig. 11: Measuring Shift Fork & Synchro Ring Assemblies (2 Of 2)  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**SHIFT & SELECT LEVER** 

## Disassembly



1. Unbolt and remove control shift lever lock bolt. Remove lever. Remove dust boot and control shaft cover. On opposite end of shaft, remove "E" ring. Remove reverse restrict pin holder, spring and No. 2 shift inner lever. See [Fig. 12](#) .
2. Drive out roll pin from shift inner lever No.1. Remove shift inner lever, shift fork lock plate, spring and shift interlock plate. Remove snap ring from lever shaft. See [Fig. 12](#) .

## Inspection

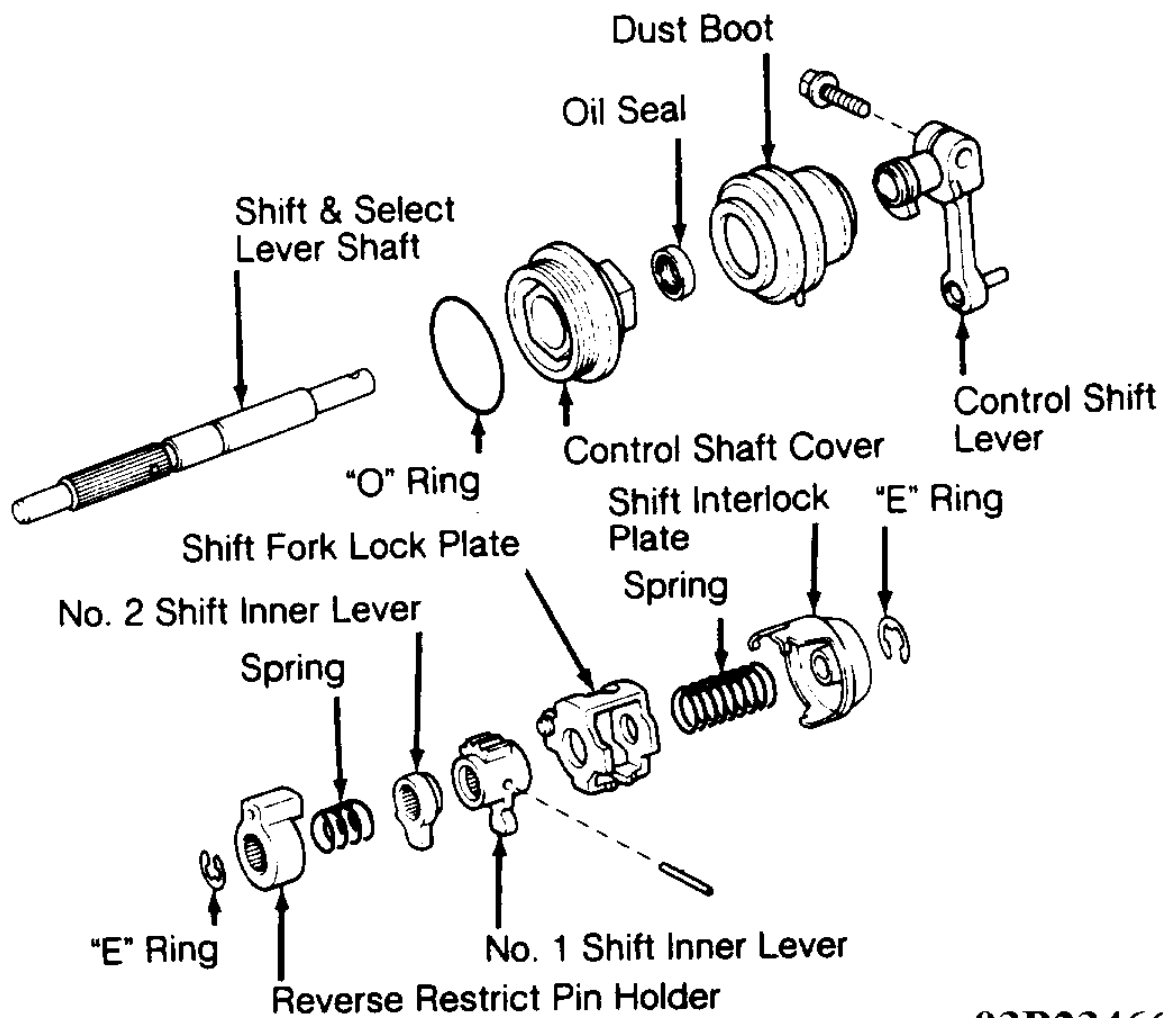


If necessary, replace control shaft cover oil seal. Pry oil seal out of cover. Using socket or appropriate drive adapter and hammer, drive in NEW oil seal. Install seal flush with surface of cover. Coat lip of oil seal with grease.

## Reassembly



Apply grease to shaft. Install components in reverse order of disassembly.



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**Fig. 12: Exploded View Of Shift & Select Lever Assembly**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## DIFFERENTIAL

### DISASSEMBLY

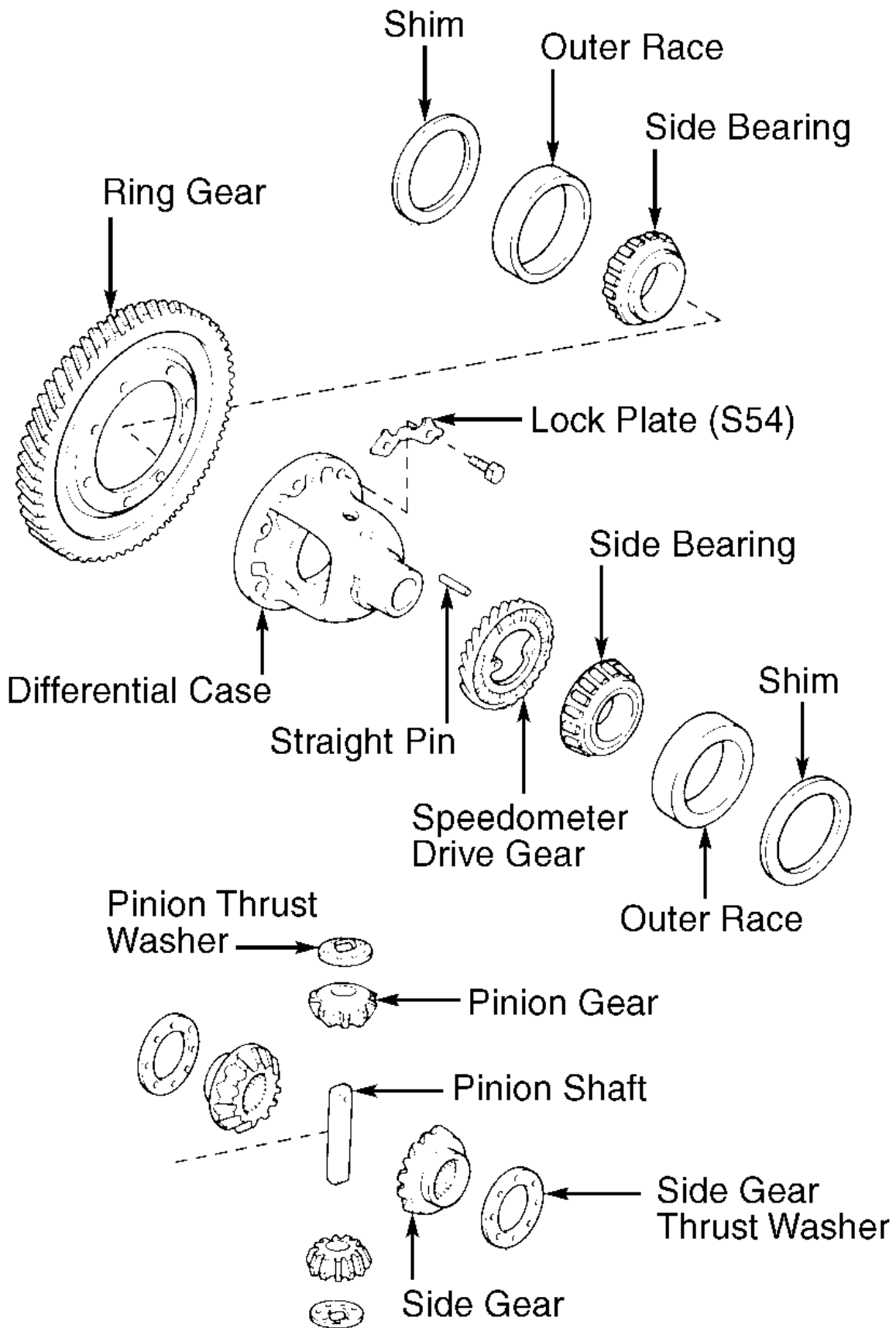
1. Fasten 2-jaw puller under bearing above cutouts on speedometer drive gear. Remove bearing from front differential case. Remove bearing from opposite side of differential case. Mark ring gear and differential case for reassembly reference. Unstake lock plates. Remove ring gear bolts. Using a copper hammer, tap ring gear and remove from differential case.
2. Measure backlash of one side gear while holding one pinion toward case. See [Fig. 14](#). Backlash should be .002-.008" (.05-.20 mm). If backlash is incorrect, drive out pinion shaft

roll pin from ring gear side of case. Remove pinion shaft from case. Remove pinion gears, side gears and thrust washers from case. See [Fig. 13](#) .

## REASSEMBLY

1. If backlash is incorrect, select thrust washer that ensure correct backlash. Install washers of equal thickness. Install thrust washers to side gears. Install side gear thrust washers, pinion thrust washers and pinion gears. Install pinion shaft. If backlash is correct, use thrust washers removed during disassembly.
2. Recheck side gear backlash while holding one pinion gear toward case. See [Fig. 14](#) . Backlash should be .002-.008" (.20-.50 mm). If backlash is incorrect, disassemble case and install new thrust washers. Install washer of equal size. Side gear thrust washers are available in .05 mm increments. Washers range in thickness from .037" (.95 mm) to .047" (1.20 mm).
3. Drive lock pin through case and into pinion shaft. Stake differential case to hold pin in place. Clean ring gear contact surface of case. Heat ring gear to 212°F (100°C) in boiling water.
4. Clean contact surface of ring gear with cleaning solvent. Align ring gear with differential case and install. Install bolts. Tighten bolts to specifications. See [TORQUE SPECIFICATIONS](#) . Press NEW bearing on differential case.

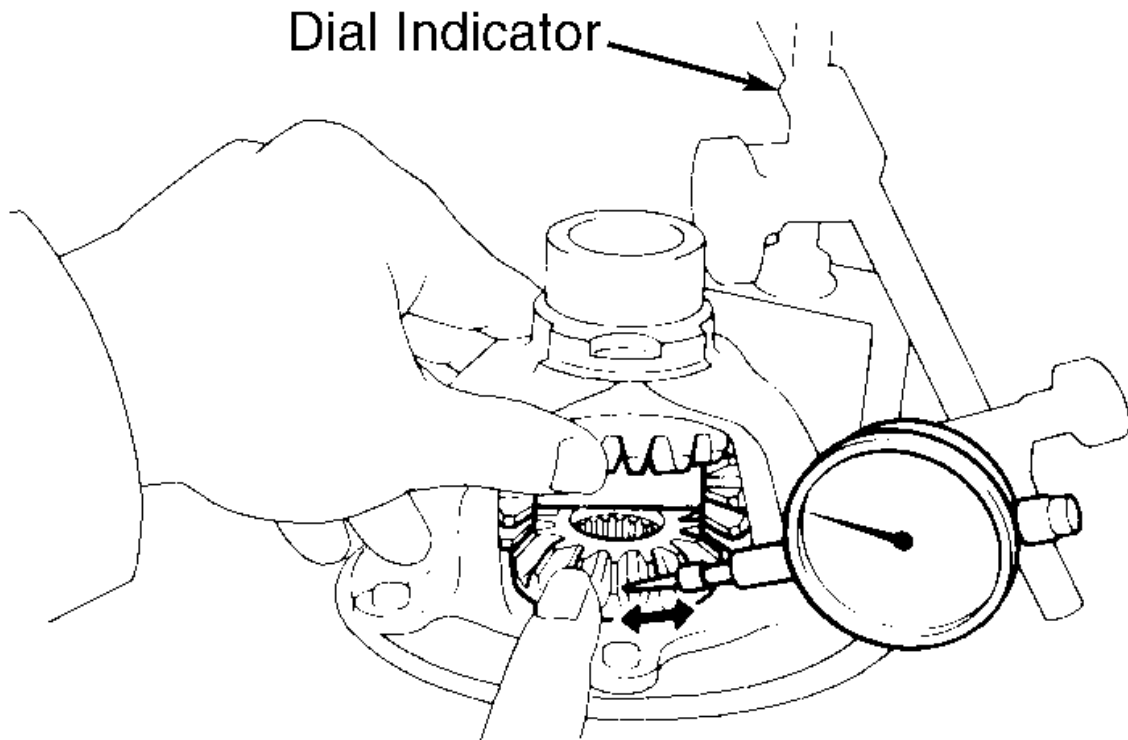






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**Fig. 13: Exploded View Of Differential Assembly**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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**Fig. 14: Measuring Differential Backlash**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## TRANSMISSION REASSEMBLY

### DIFFERENTIAL BEARING PRELOAD

1. Install magnet. Install oil receiver. Install differential in transmission housing. Install clutch housing and tighten bolts to 21 ft. lbs. (29 N.m). Install original side bearing shim. Install bearing retainer without "O" ring. Tighten bolts to 13 ft. lbs. (18 N.m).

2. Using Differential Preload Adapter (09564-32011) and an INCH lb. torque wrench, measure differential side bearing starting torque. See [Fig. 15](#) . Starting torque preload should be 7-14 INCH lbs. (.8-1.6 N.m) for a new bearing. Torque should be 4-9 INCH lbs. (.5-1.0 N.m) for a used bearing. If preload is incorrect, remove case side bearing retainer and select a NEW adjusting shim.
3. Preload will change about 3-4 INCH lbs. (.3-.4 N.m) with each shim thickness. Shims are available in .05 mm increments. Shims range in thickness from .075" (1.90 mm) to .110" (2.80 mm). Shims are marked "1" through "19" depending on thickness.

## REASSEMBLY

1. Disassemble transmission case. Remove bearing retainer and install NEW "O" ring. Reverse disassembly procedure. Install input and output shafts with shift fork assemblies as a single unit.
2. Assemble reverse fork pivot and reverse shift arm. Install reverse shift arm bracket into transaxle case. Install and torque bolts to 13 ft. lbs. (18 N.m). Install reverse idler gear, thrust washer and shaft. Align marking on reverse idler gear shaft with marking on case. Apply Three Bond (1281) sealant to transaxle case. Install transmission housing.

**NOTE:**      **This transmission uses no gasket between major housings; use Three Bond (1281) sealant. Assemble housing within 20 minutes after applying liquid gasket. Allow 30 minutes curing time before filling with oil.**

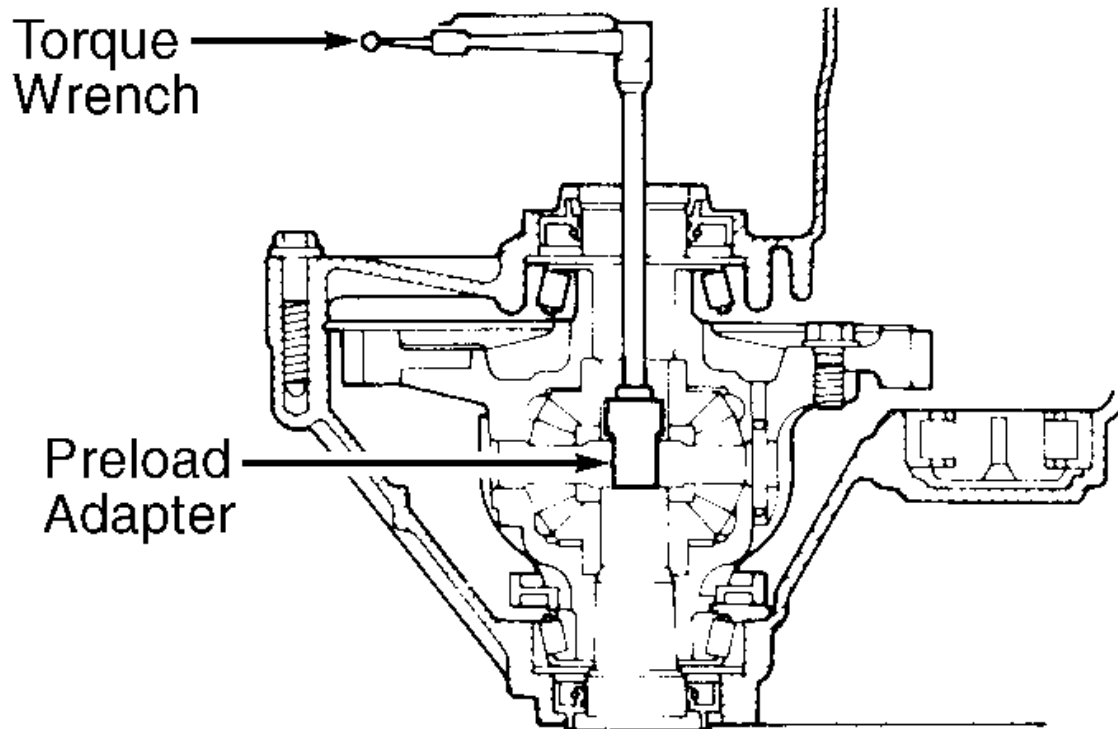
3. Insert balls, springs and seats into holes. Apply Three Bond (1281) sealant to plugs and lock ball assembly threads. See [Fig. 3](#) through [Fig. 5](#) . Using socket, install 3 plugs and lock ball assembly.
4. Install reverse idler gear shaft lock bolt. Install bearing snap rings. Install snap ring on No. 2 fork shaft. Install rear bearing retainer. Using Installer (09309-32050), install 5th driven gear onto shaft. Install spacer. Apply gear oil to needle bearings. Install 5th gear, needle bearing and synchronizer ring.
5. Install No. 3 clutch hub and shifting keys to No. 3 hub sleeve. Install shifting key springs under shifting keys. Ensure that key spring end-gaps are not in line. Support tip of input shaft with spacer to raise transaxle assembly. Using Installer (09612-22011), drive in No. 3 hub sleeve with shift fork. Align synchronizer ring slots with shifting keys. Tighten No. 3 shift fork bolt to 13 ft. lbs. (18 N.m).
6. Measure 5th gear thrust clearance. Standard clearance should be .009-.016" (.20-.40 mm). Select 5th gear snap ring that will allow minimum axial play and install snap ring. See SNAP RING APPLICATION CHART.

### SNAP RING APPLICATION CHART

Snap Ring Thickness In. (mm)	Stamped Number
.087-.089 (2.20-2.25)	13
.089-.091 (2.25-2.30)	14
.091-.093 (2.30-2.35)	15
.093-.095 (2.35-2.40)	16

<b>Snap Ring Thickness In. (mm)</b>	<b>Stamped Number</b>
.095-.097 (2.40-2.45)	17
.097-.098 (2.45-2.50)	18
.098-.100 (2.50-2.55)	19
.100-.102 (2.55-2.60)	20
.102-.104 (2.60-2.65)	21
.104-.106 (2.65-2.70)	22
.106-.108 (2.70-2.75)	23
.108-.110 (2.75-2.80)	24
.110-.112 (2.80-2.85)	25
.112-.114 (2.85-2.90)	26
.114-.116 (2.90-2.95)	27

7. Lock transmission in 2 gears. Install and tighten lock nut to 91 ft. lbs. (123 N.m). Disengage gears. Stake lock nut. Install shift and select lever shaft assembly with new gasket. Install shift and select lever lock bolt.
8. Apply Three Bond (1281) sealant to transmission case cover. Install transmission case cover. Using Socket (09817-16010), install back-up light switch. Install speedometer driven gear. Install engine mount bracket and selecting bellcrank.



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**Fig. 15: Measuring Bearing Preload**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Back-Up Light Switch	32 (44)
Differential Ring Gear	66 (90)
Drain & Fill Plugs	29 (39)
Engine Mount Bracket	38 (52)
Lock Ball Assembly	27 (37)
Lock Ball (No. 2) Assembly	17 (23)
Rear Bearing Retainer	31 (42)
Reverse Idler Shaft Lock Bolt	21 (29)
Reverse Shift Arm Bracket	13 (18)
Shift & Select Lever Assembly	27 (37)

<b>Application</b>	<b>Ft. Lbs. (N.m)</b>
Side Gear Bearing Retainer	13 (18)
Transaxle Case	21 (29)
Transaxle Case Cover	21 (29)
5th Gear Driven Gear Lock Nut	91 (123)
	<b>INCH Lbs. (N.m)</b>
Release Bearing Retainer	62 (7)

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