

# MANUAL TRANSAXLE

## DESCRIPTION

MX00F-07

## PRECAUTIONS

When working with FIPG material, you must observe the following.

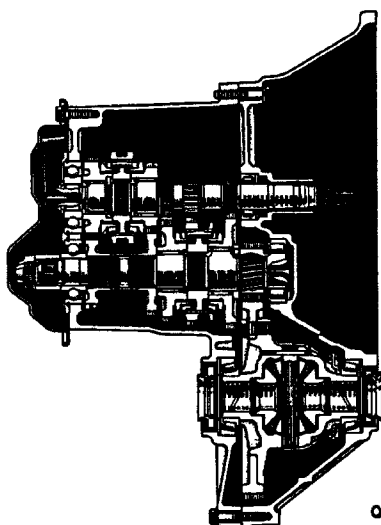
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply the seal packing in an approx.1 mm (0.04 in.) wide bead along the sealing surface.
- Parts must be assembled within 10 minutes of application. Otherwise, the packing (FIPG) material must be removed and reapplied.

MX00G-06

## DESCRIPTION

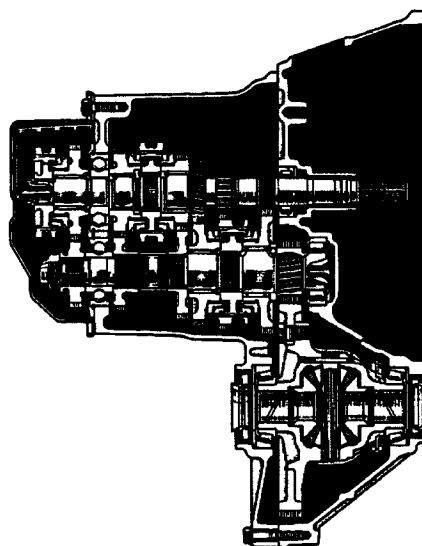
- Transaxle types C141 use C150 are constant mesh synchronizers for the forward gears, and a sliding mesh reverse gear.
- The input shaft is composed of the 1st and 2nd speed gears and the reverse drive gear, and the output shaft is composed of the drive gear (for use with the ring gear).

C141



Q04734

C150



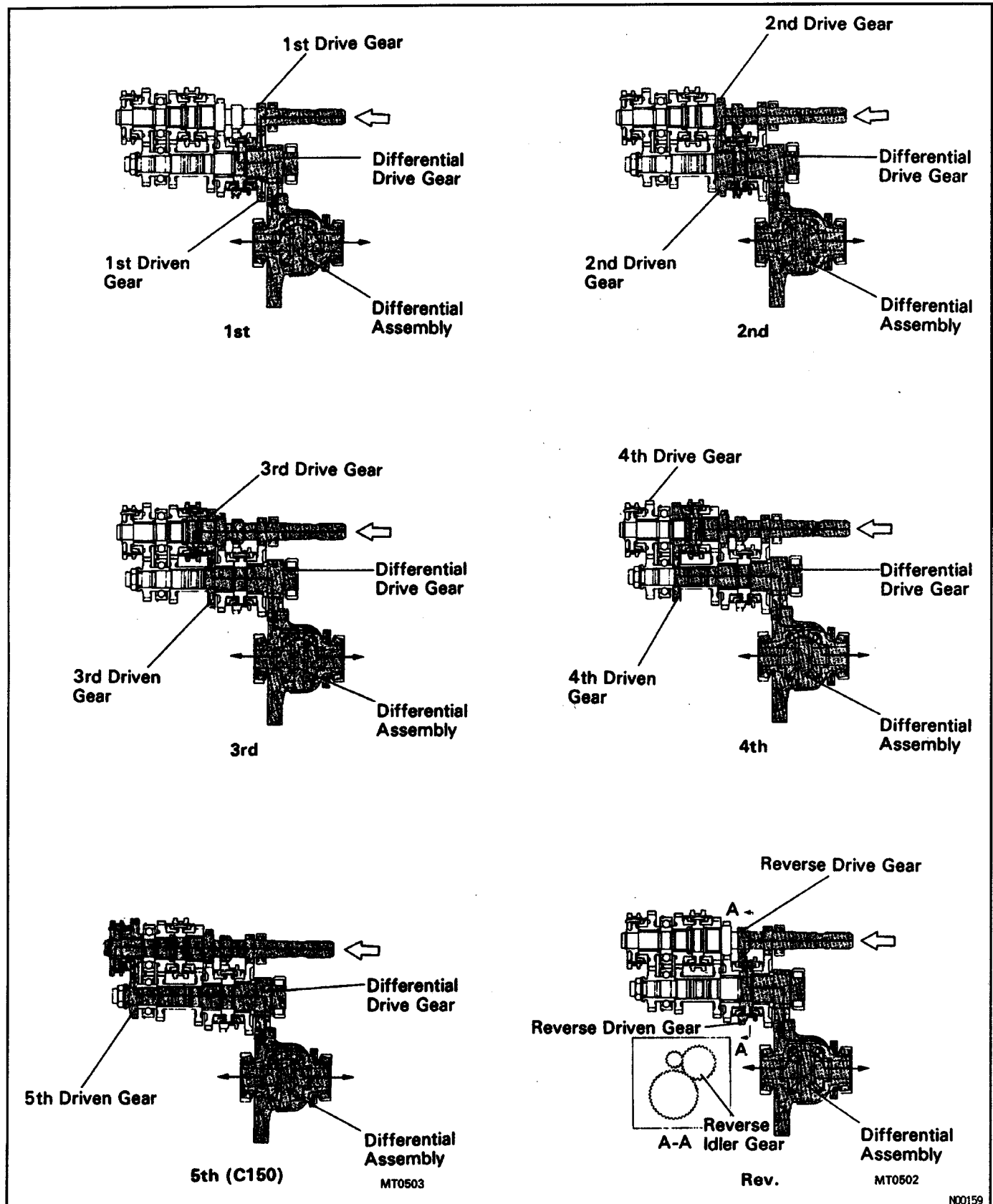
Q04735

Type of Transaxle		C141	C150
Type of Engine		3E-E	←
Gear Ratio	1st	3.545	←
	2nd	1.904	←
	3rd	1.233	←
	4th	0.885	1.310
	5th	—	0.969
	Reverse	3.250	0.815
Differential Gear Ratio		3.526	←
Oil Capacity		2.4 liters (2.5 US qts, 2.1 imp. qts)	
Oil viscosity		SAE 75W-90	
Oil Grade		API GL-4 or GL-5	

# OPERATION

- The illustrations below show the engagements of transaxle gears.




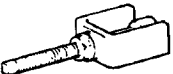
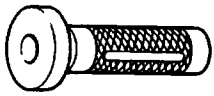
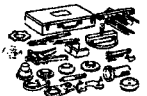



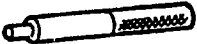

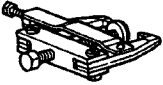
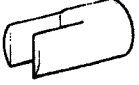
MX00E-01






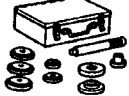










# PREPARATION

## SST(SPECIAL SERVICE TOOLS)

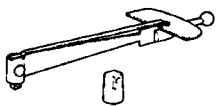
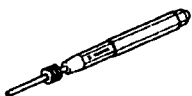

MX00H-08

	09201 -60011 Valve Guide Bushing Remover & Replacer	Speedometer driven gear oil seal
	09213-36020 Timing Gear Remover	No.3 clutch hub 5th driven gear
	09308-00010 Oil Seal Puller	
	09309-12020 5th Driven Gear Replacer	
	09310-35010 Countershaft Bearing Replacer	Output shaft front bearing
	09350-32014 TOYOTA Automatic Transmission Tool Set	
	(09351-32090) Oil Seal Remover & Replacer	Differential side bearing
	(09351-32111) Side Bearing Race Replacer	Differential side bearing oil seal (Transmission case side)
	(09351-32120) Overdrive Bearing Replacer	Differential side bearing
	(09351-32130) Handle	
	(09351-32150) Oil Seal Replacer	Differential side bearing oil seal (Transaxle case side)
	09502-10012 Differential Side Bearing Puller	
	09564-32011 Differential Preload Adaptor	

	09608-12010 Front Hub & Drive Pinion Bearing Replacer Set	
	(09608-00020) Remover & Replacer Handle	
	(09608-00030) Replacer	Input shaft front bearing
	(09608-00040) Replacer	Input shaft front oil seal
	(09608-00070) Drive Pinion Rear Bearing Cone Replacer	Input shaft rear bearing 4th driven gear and rear bearing
	09608-20012 Front Hub & Drive Pinion Bearing Tool Set	
	(09608-03020) Handle	
	(09608-03060) Replacer	Differential taper roller bearing outer race (Transaxle case side)
	(09608-03090) Replacer	Differential taper roller bearing outer race (Transmission case side)
	09612-2201 1 Tilt Handle Bearing Replacer	
	09612-65014 Steering Worm Bearing Puller	Input shaft bearing Differential taper roller bearing outer race
	09921-00010 Spring Tension Tool	Speedometer driven gear oil seal
	09950-00020 Bearing Remover	
	09950-00030 Bearing Remover Attachment	

MX00J-03

## RECOMMENDED TOOLS

	09025-00010 Small Torque Wrench	Differential preload
	09031-00030 Pin Punch	
	09905-00012 Snap Ring No. 1 Expander	

MX00K-01

## EQUIPMENT

Dial indicator	
Torque wrench	

MX00L-03

## LUBRICANT

Item	Capacity	Classification
Manual transaxle oil (w/Differential oil)	2.4 liters (2.5 US qts, 2.1 Imp.qts)	API GL-4 or GL-5 SAE 75W-90

MX00M-01

## SSM(SPECIAL SERVICE MATERIALS)

08826-00090 Seal Packing 1281, THREE BOND 1281 or equivalent	Transmission case x Transaxle case Transmission case x Case cover
08833-00080 Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Straight screw plug Control shaft cover bolt

## TROUBLESHOOTING

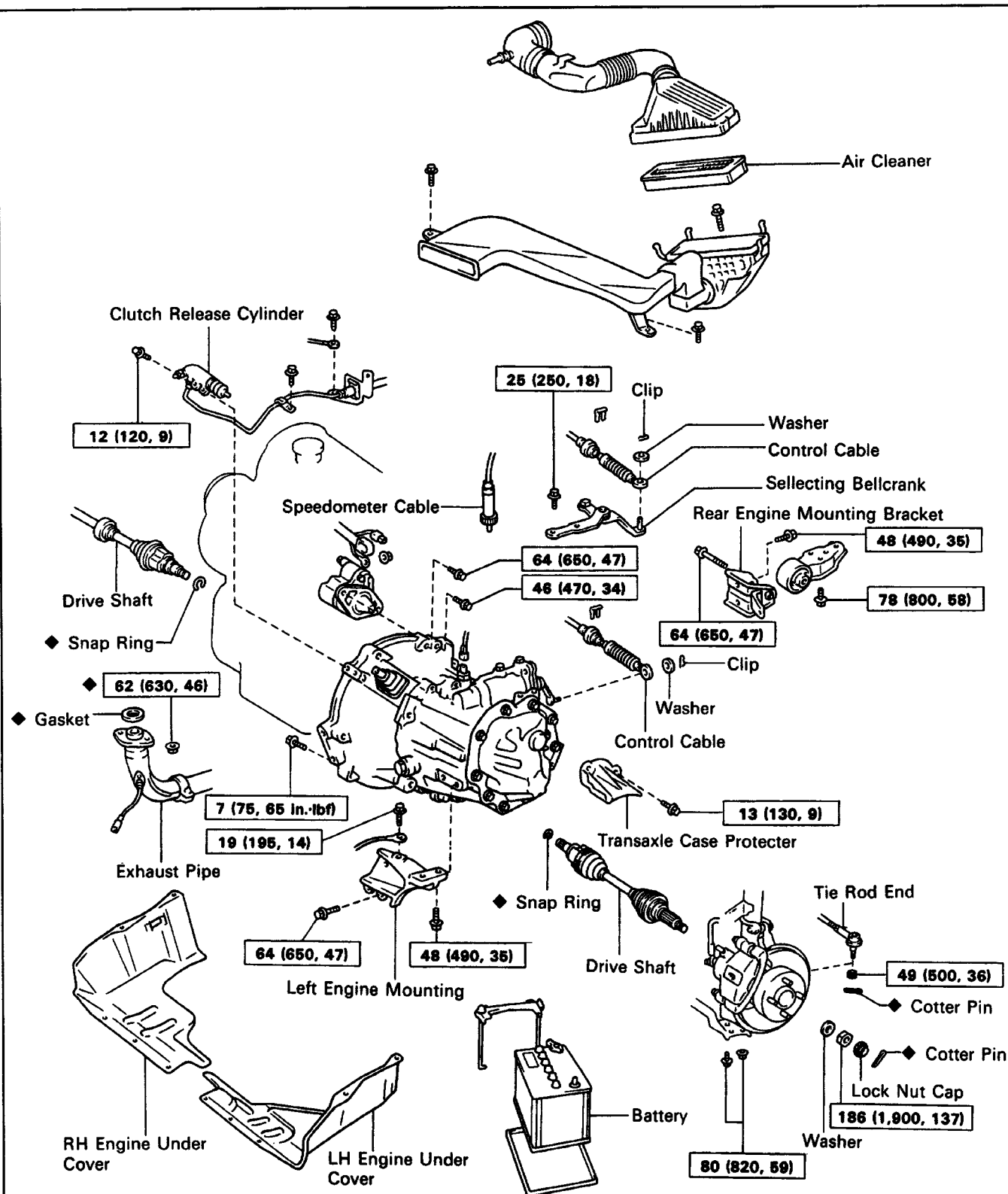
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

See Page	Parts Name	Trouble
-	Oil (Level low)	Noise 1
MX-2	Oil (Wrong)	Oil leakage 2
-	Oil (Level too high)	Hard to shift or will not shift 1
MX-13	Gasket (Damaged)	Jumps out of gear 2
MX-13	Oil seal (Worn or damaged)	
MX-13	O-Ring (Worn or damaged)	
MX-59	Control cable (Faulty)	
MX-13	Locking ball spring (Damaged)	
MX-14	Shift fork (Worn)	
MX-14	Gear (Worn or damaged)	
MX-13	Bearing (Worn or damaged)	
MX-27 MX-33	Synchronizer ring (Worn or damaged)	
MX-27 MX-33	Shifting key spring (Damaged)	

# ASSEMBLY REMOVAL AND INSTALLATION

Remove and install the parts, as shown below.

MX00P-02

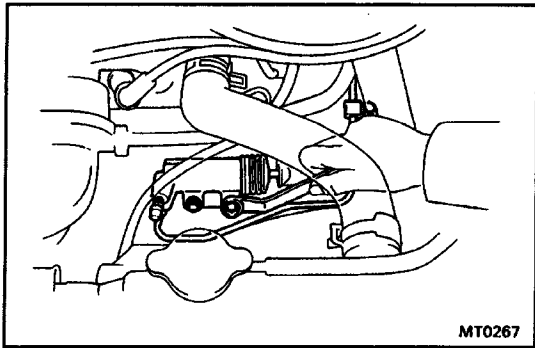


**N·m (kgf·cm, ft·lbf)** : Specified torque

◆ Non-reusable part

CM0130

MX900-06



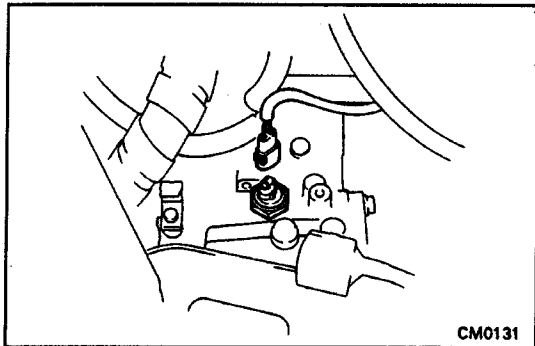
## TRANSAXLE REMOVAL

### 1. REMOVE NEGATIVE (-) TERMINAL CABLE FROM BATTERY

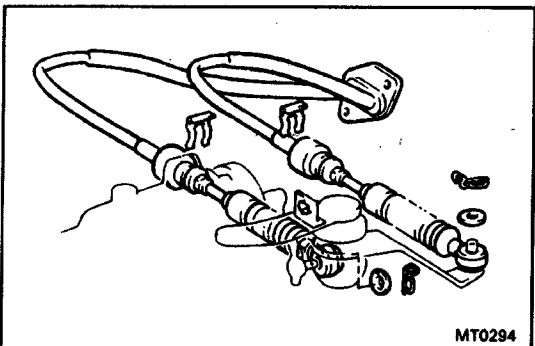
**CAUTION:** Work must be started after 90 seconds from the time the ignition switch is turned to the 'LOCK' position and the negative (-) terminal cable is disconnected from the battery.

### 2. REMOVE AIR CLEANER CASE ASSEMBLY WITH AIR HOSE

### 3. REMOVE CLUTCH RELEASE CYLINDER AND TUBE CLAMP

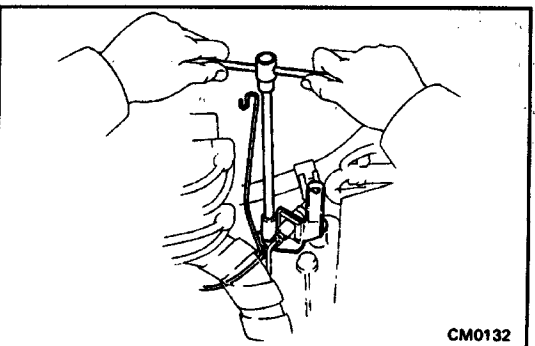


### 4. DISCONNECT BACK-UP LIGHT SWITCH CONNECTOR

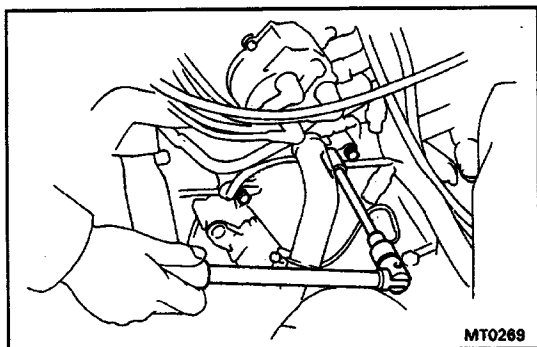


### 5. DISCONNECT CONTROL CABLES

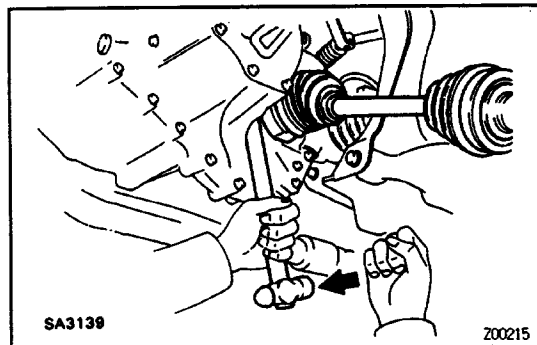
- (a) Remove the clips and washers.
- (b) Remove the retainer from the cables.



### 6. REMOVE CLUTCH RELEASE CYLINDER BRACKET WITH EARTH CABLE

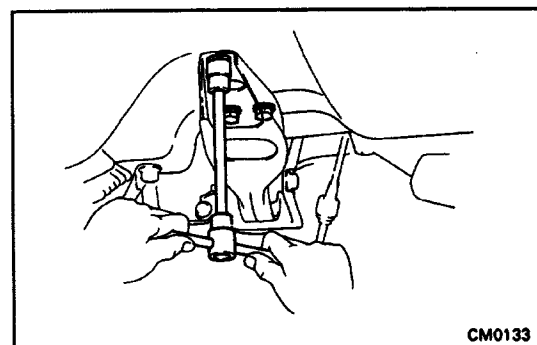
**7. REMOVE TRANSAXLE UPPER MOUNTING BOLTS****8. RAISE VEHICLE**

**NOTICE:** Be sure the vehicle is securely supported.

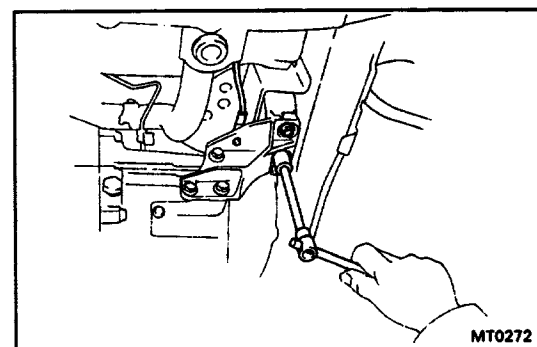
**9. REMOVE UNDER COVERS****10. DRAIN TRANSAXLE OIL****11. DISCONNECT SPEEDOMETER CABLE****12. DISCONNECT BOTH DRIVE SHAFTS**

(See page [SA-21](#) )

**HINT:** Suspend the drive shafts with cord.

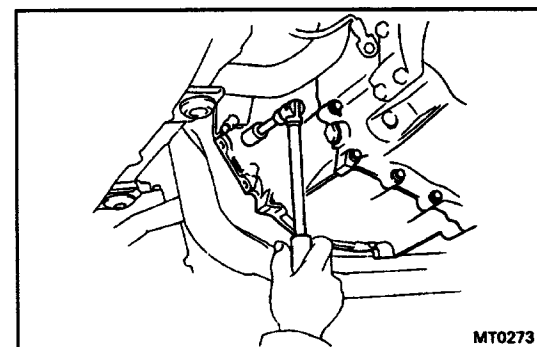
**13. REMOVE REAR ENGINE MOUNTING BRACKET****14. REMOVE STARTER**

Remove the mounting bolts and lay the starter alongside the engine.

**15. DISCONNECT LEFT ENGINE MOUNTING**

(a) Raise the transaxle and engine slightly with a jack and wooden block in between.

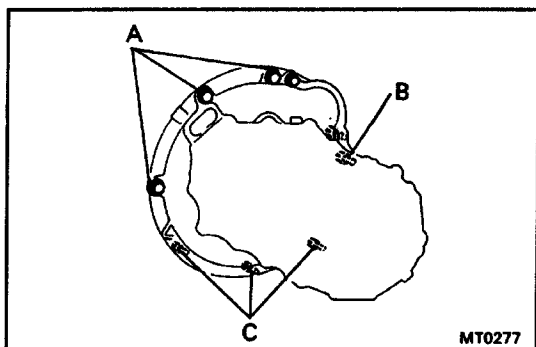
(b) Disconnect the left engine mounting.

**16. REMOVE TRANSAXLE**

(a) Remove the transaxle mounting bolts from the engine

(b) Lower the engine left side and remove the transaxle from the engine.

MX00R-06



MT0277

## TRANSAXLE INSTALLATION

### 1. INSTALL TRANSAXLE TO ENGINE

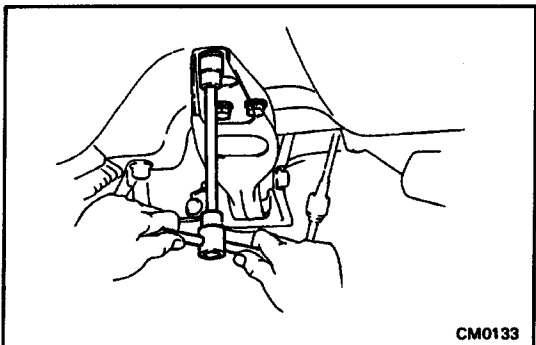
(a) Align the input shaft spline with the clutch disc, and install the transaxle to the engine.

(b) Torque the bolts.

**Torque A:** 64 N-m (650 kgf-cm, 47 ft-lbf)

**Torque B:** 46 N-m (470 kgf-cm, 34 ft-lbf)

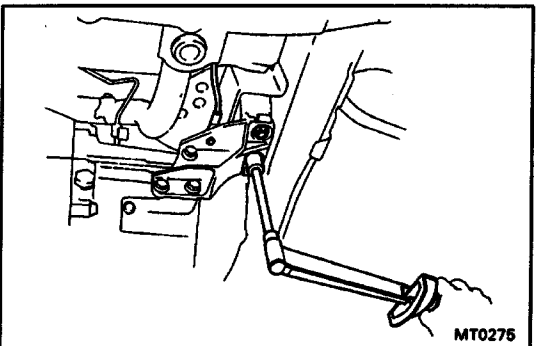
**Torque C:** 7 N-m (75 kgf-cm, 65 in.-lbf)



CM0133

### 2. INSTALL REAR ENGINE MOUNTING BRACKETS

**Torque:** 78 N-m (800 kgf-cm, 58 ft-lbf)



MT0275

### 3. CONNECT LEFT ENGINE MOUNTING

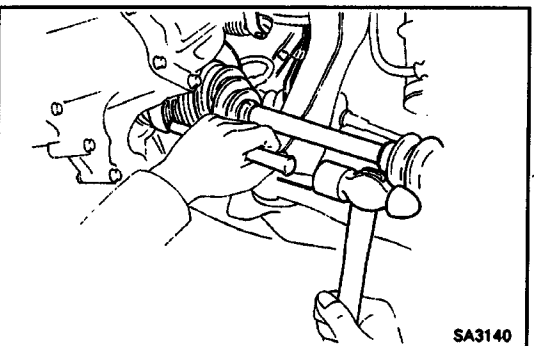
(a) Connect the left engine mounting with the bolts.

(b) Torque the bolts.

**Torque:** 48 N-m (490 kgf-cm, 35 ft-lbf)

### 4. INSTALL STARTER

Install the starter, and torque the bolts.



SA3140

### 5. CONNECT DRIVE SHAFTS

(See page [SA-26](#))

### 6. CONNECT SPEEDOMETER CABLE

### 7. FILL TRANSAXLE WITH GEAR OIL

Oil grade:

API GL-4 or GL-5

Viscosity:

SAE 75W-90 or 80W-90

Capacity:

2.4 liters (2.5 US qts, 2.1 Imp. qts)

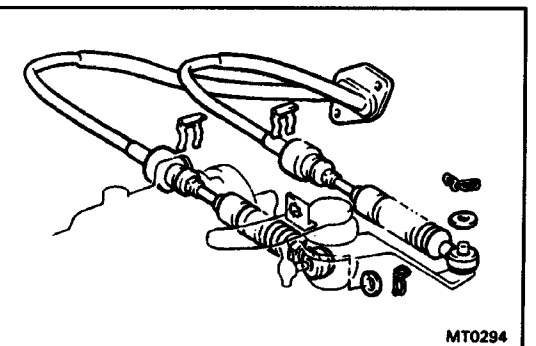
### 8. INSTALL UNDER COVER

### 9. LOWER VEHICLE

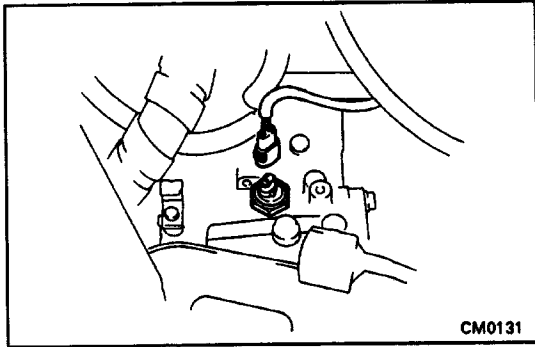
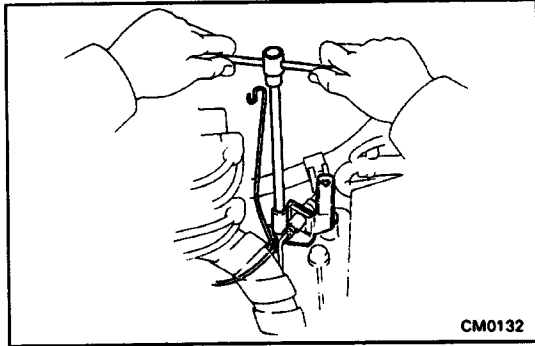
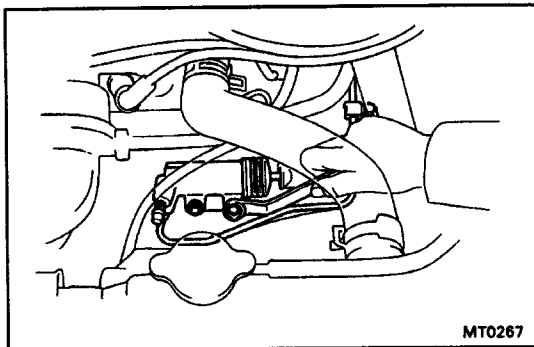
### 10. CONNECT CONTROL CABLES

(a) Install the retainers to the cables.

(b) Connect the cables to the linkage with the washers and clips.



MT0294

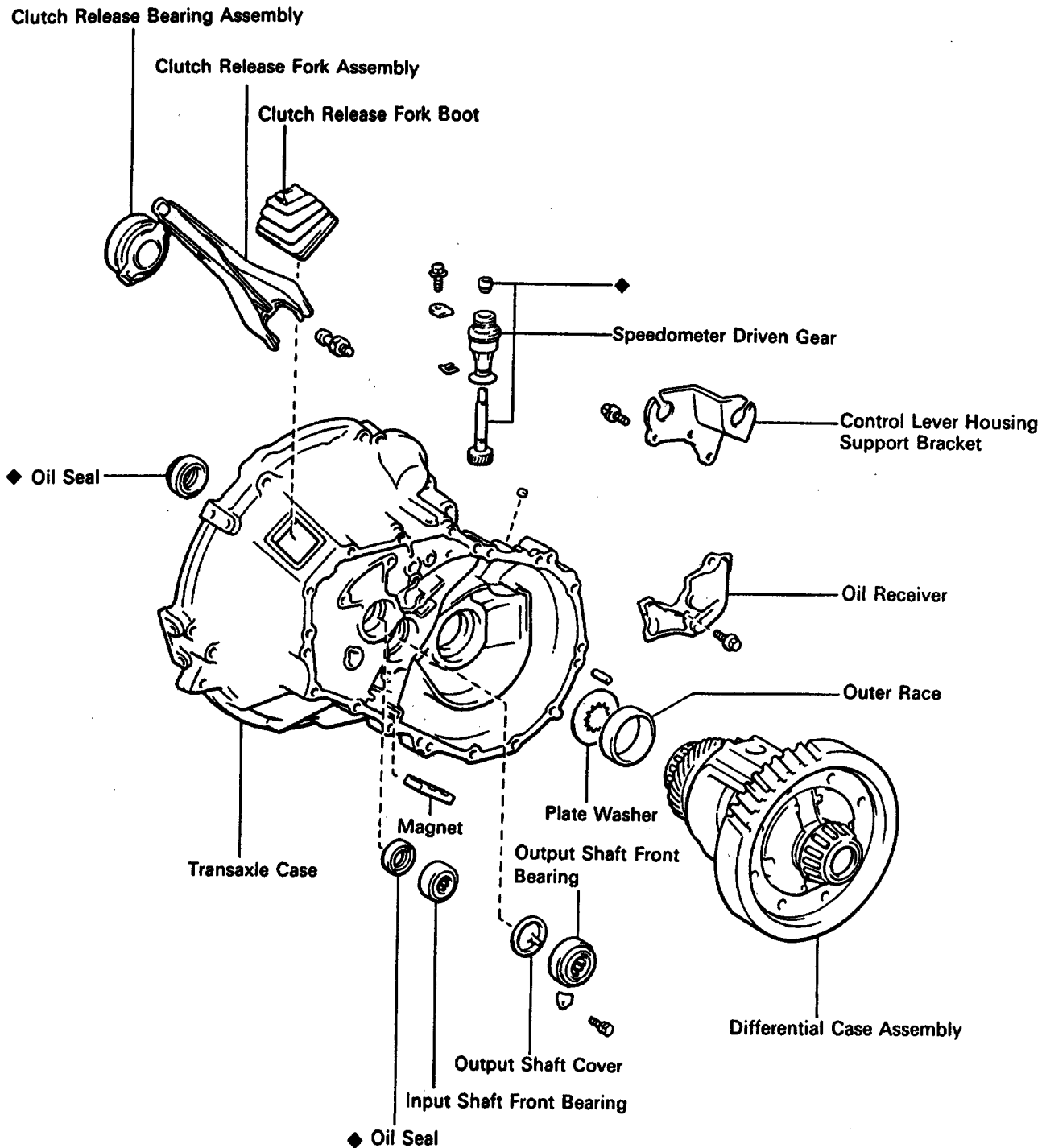
**11. CONNECT BACK-UP LIGHT SWITCH CONNECTER****12. INSTALL CLUTCH RELEASE CYLINDER BRACKET WITH EARTH CABLE****13. INSTALL CLUTCH RELEASE CYLINDER AND TUBE CLAMP****14. INSTALL AIR CLEANER CASE ASSEMBLY WITH AIR HOSE****15. INSTALL NEGATIVE (-) TERMINAL CABLE TO BATTERY****16. PERFORM ROAD TEST**

Check for any abnormal noise or operation.

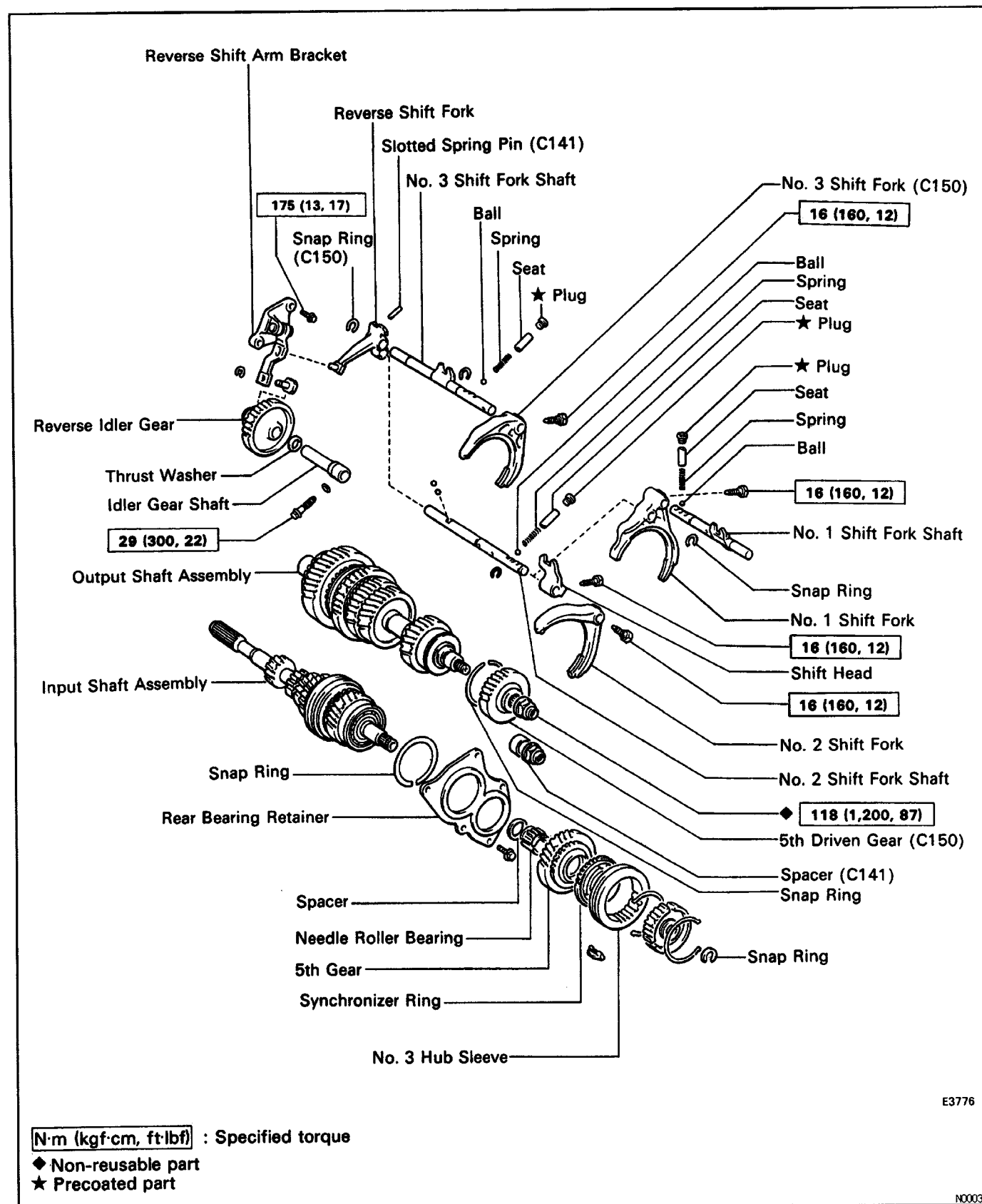
# COMPONENT PARTS REMOVAL

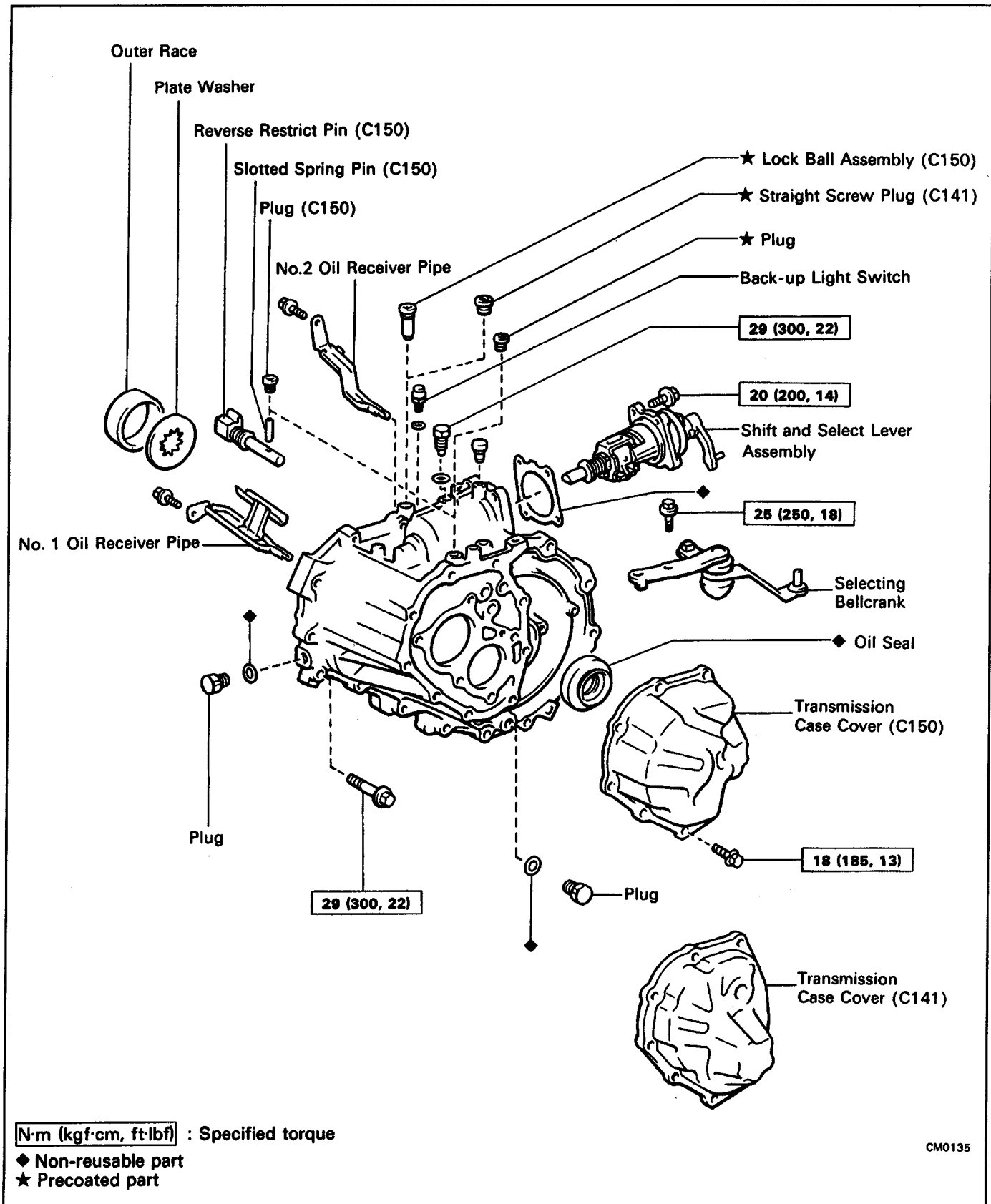
## COMPONENTS

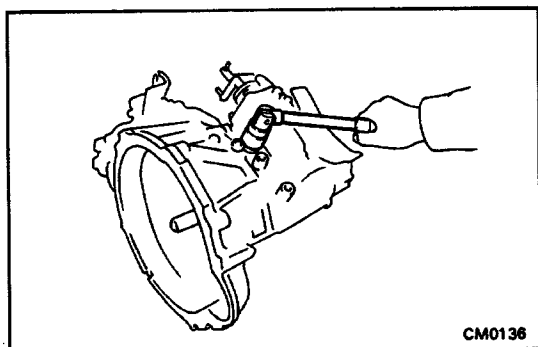
MX008-01



◆ Non-reusable part

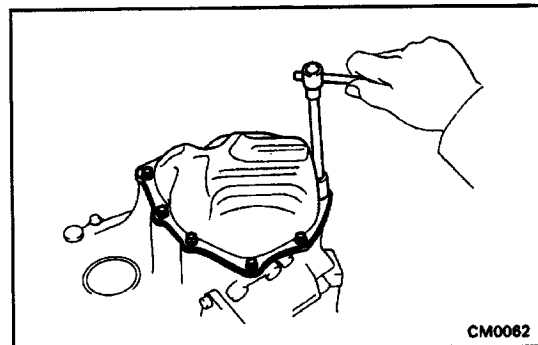




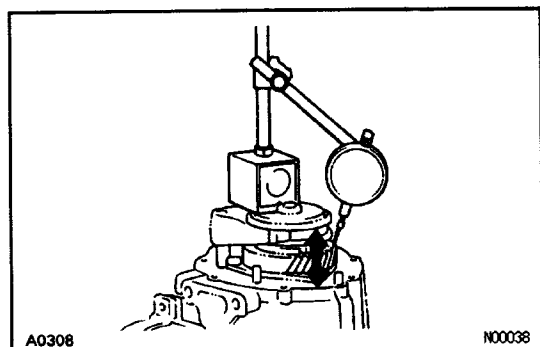


## BASIC SUBASSEMBLY SEPARATION <sup>MX007-06</sup>

1. REMOVE RELEASE FORK, BEARING AND SPEEDOMETER DRIVEN GEAR
2. REMOVE BACK-UP LIGHT SWITCH
3. REMOVE CONTROL LEVER HOUSING SUPPORT BRACKET
4. REMOVE SELECTING BELLCRANK



5. REMOVE TRANSAXLE CASE COVER



### 6. C150: INSPECT 5TH GEAR THRUST CLEARANCE

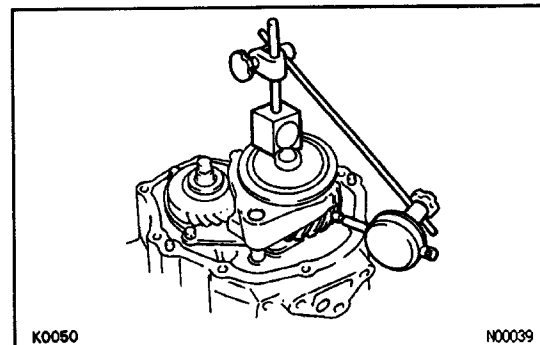
Using a dial indicator, measure the thrust clearance.

**Standard clearance:**

0.10-0.57 mm (0.0039-0.0224 in.)

**Maximum thrust clearance:**

0.65 mm (0.0256 in.)



### 7. C150: INSPECT 5TH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

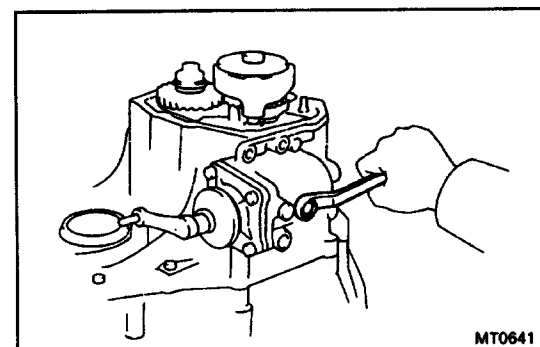
**Standard clearance:**

0.015-0.058 mm (0.0006-0.0023 in.)

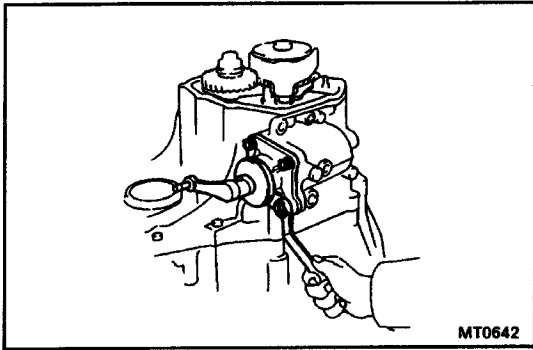
**Maximum clearance:**

0.070 mm (0.0028 in.)

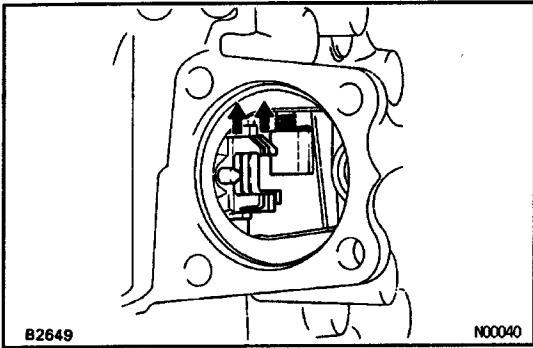
If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



8. REMOVE LOCK BOLT

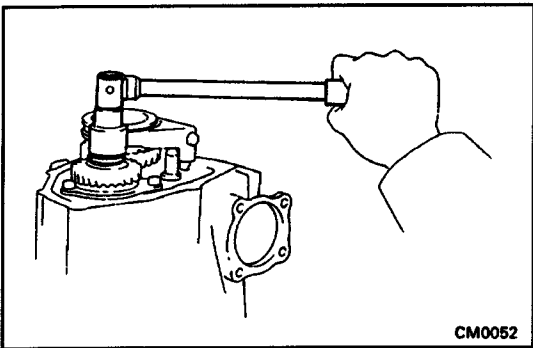


## 9. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

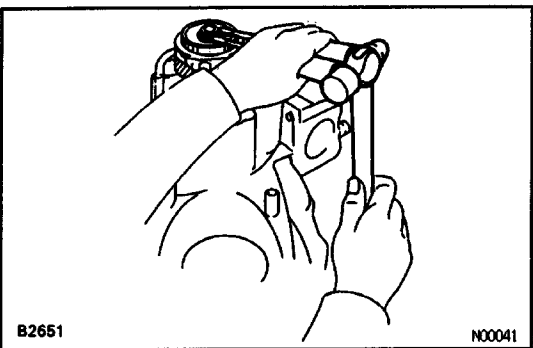


## 10. REMOVE LOCK NUT

- (a) Engage the gear double meshing.
- (b) Using a hammer and chisel, loosen the staked part of the nut.

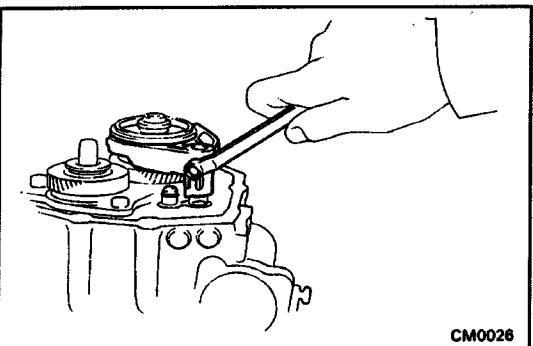


- (c) Remove the lock nut.
- (d) C141:  
Remove the spacer.
- (e) Disengage the gear double meshing.

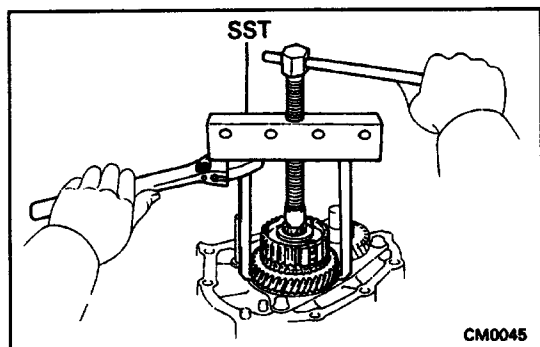


## 11. C150: REMOVE NO.3 HUB SLEEVE ASSEMBLY AND NO.3 SHIFT FORK

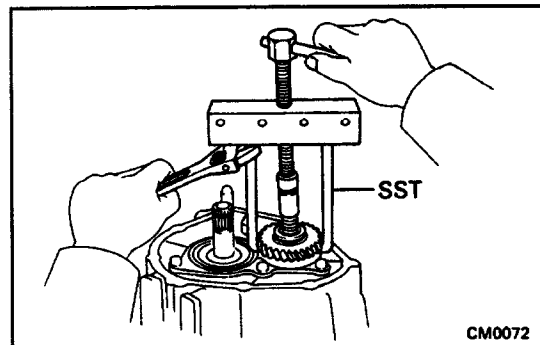
- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.



- (b) Remove the bolt from No.3 shift fork.
- (c) Remove No.3 hub sleeve and shift fork.



(d) Using SST, remove the 5th gear, No. 3 hub, synchronizer ring, needle roller bearings and spacer.  
SST 09213-36020

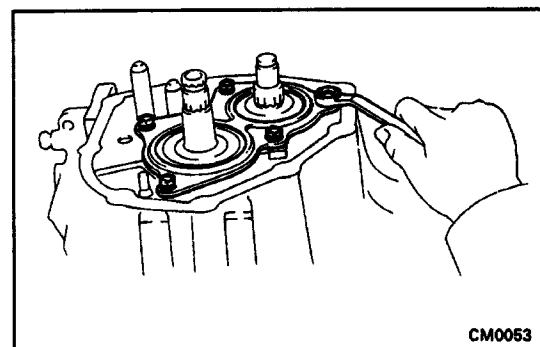


## 12. C150:

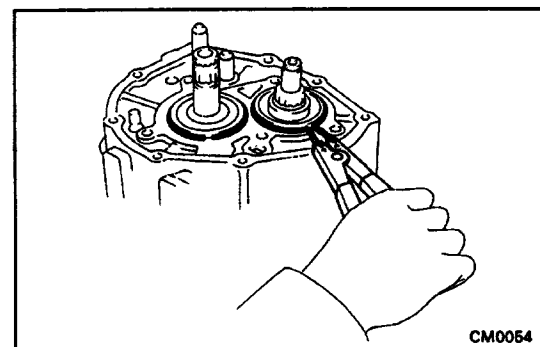
### REMOVE 5TH DRIVEN GEAR

Using SST and a socket wrench, remove the 5th driven gear.

SST 09213-36020

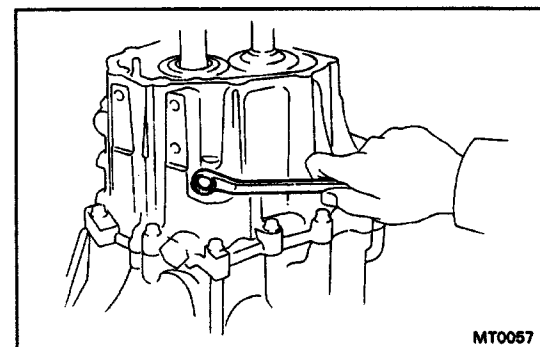


## 13. REMOVE REAR BEARING RETAINER

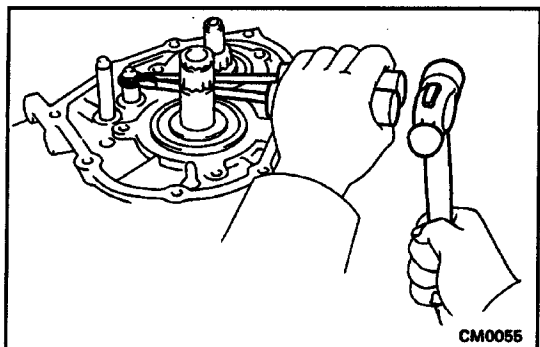


## 14. REMOVE BEARING SNAP RINGS

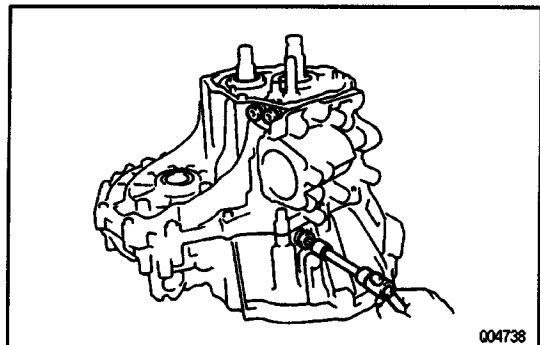
Using a snap ring expander, remove the 2 snap rings.  
HINT: If it is difficult to remove the snap rings, pull up the shafts.



## 15. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT

**16. REMOVE SNAP RING FROM NO. 2 SHIFT FORK SHAFT**

Using 2 screwdriver and a hammer, tap out the snap ring.

**17. REMOVE PLUGS, SEATS, SPRINGS, BALLS AND LOCK BALL ASSEMBLY**

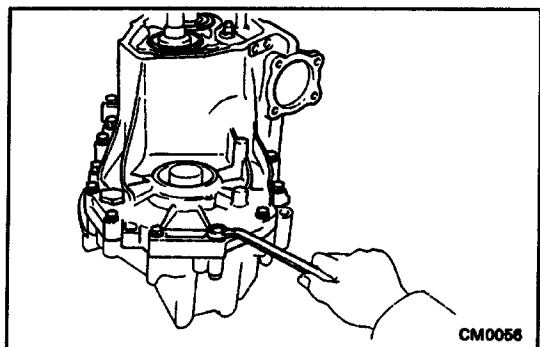
(a) C150:

Using a hexagon wrench, remove the 3 plugs and lock ball assembly.

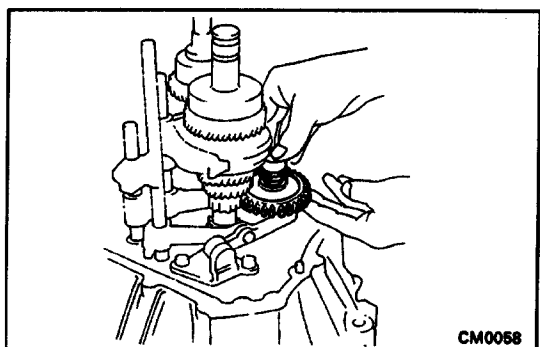
C141:

Using a hexagon wrench, remove the 3 plugs and straight screw plug.

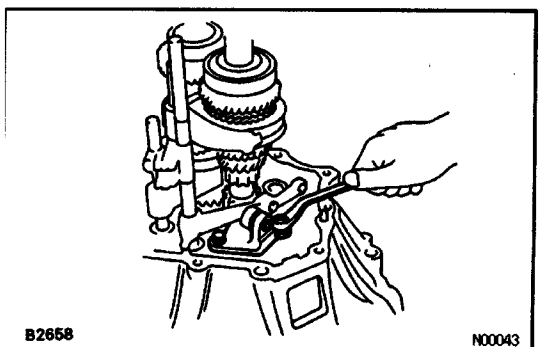
(b) Using a magnetic finger, remove the 3 seats, springs and balls.

**18. REMOVE TRANSMISSION CASE**

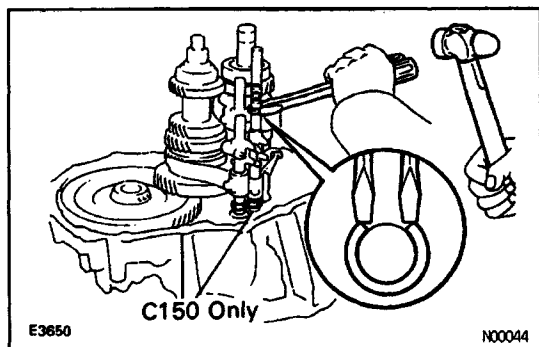
Remove the 16 bolts, and tap off the case with a plastic hammer.

**19. REMOVE REVERSE IDLER GEAR, THRUST WASHER AND SHAFT**

Pull out the shaft.

**20. REMOVE REVERSE SHIFT ARM BRACKET**

Remove the 2 bolts and pull off the bracket.



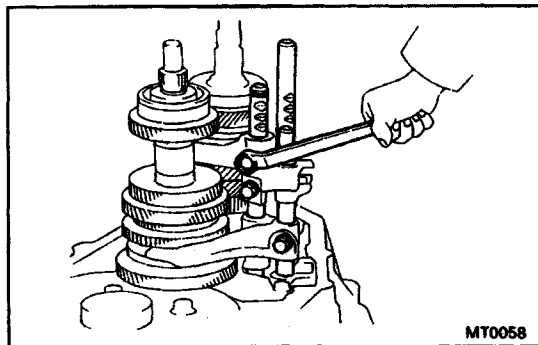
## 21. REMOVE SHIFT FORKS AND SHIFT FORK SHAFTS

(a) C150:

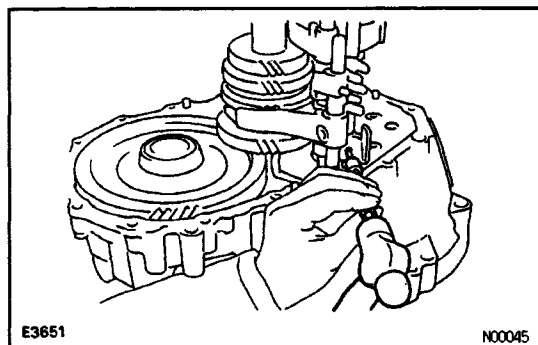
Using 2 screwdrivers and a hammer, tap out the 3 snap rings.

C141:

Using 2 screwdrivers and a hammer, tap out the 2 snap rings.

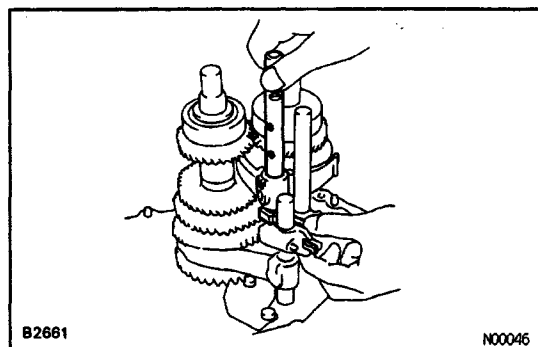


(b) Remove the 3 set bolts.

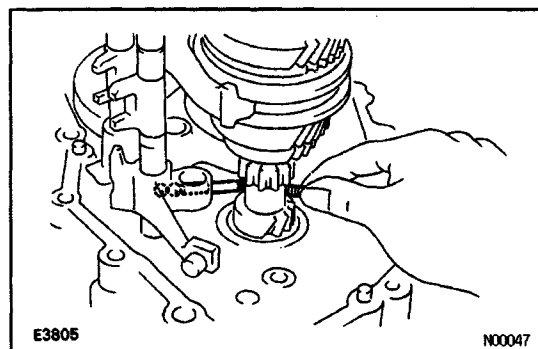


(c) C141:

Using a pin punch and a hammer, drive out the slotted spring pin from the reverse shift fork.

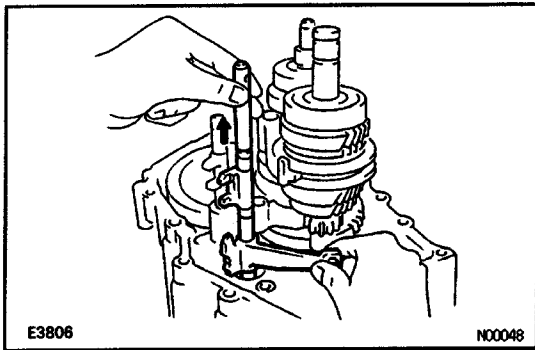


(d) Remove the No.2 fork shaft and the shift head.

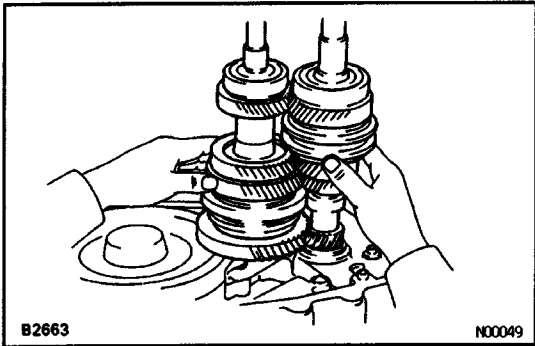


(e) C150:

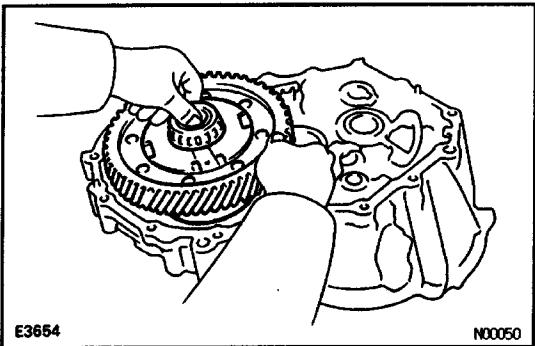
Using a magnetic finger, remove the 2 balls from the reverse shift fork.



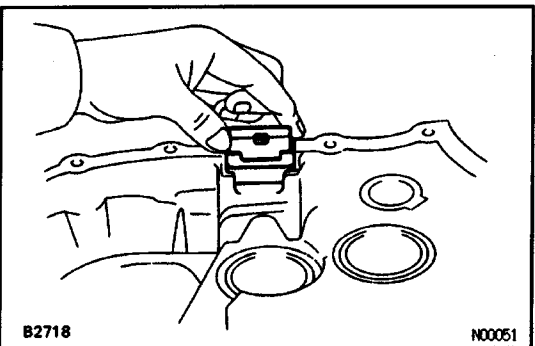
- (f) Remove the No.3 fork shaft and the reverse shift fork.
- (g) Pull out No.1 fork shaft.
- (h) Remove the No.1 and No.2 shift forks.



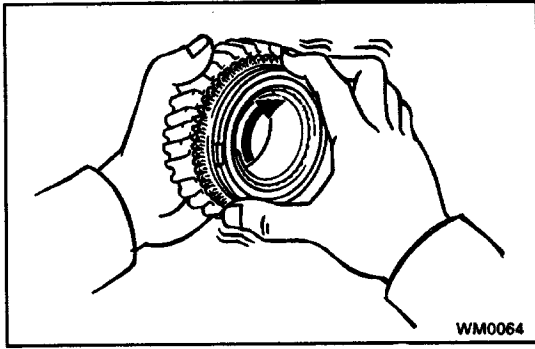
## 22. REMOVE INPUT AND OUTPUT SHAFTS TOGETHER FROM TRANSAXLE CASE



## 23. REMOVE DIFFERENTIAL ASSEMBLY



## 24. REMOVE MAGNET FROM TRANSAXLE CASE



## COMPONENT PARTS INSPECTION

### 1. C150:

#### INSPECTION SYNCHRONIZER RING OF 5TH GEAR

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring.

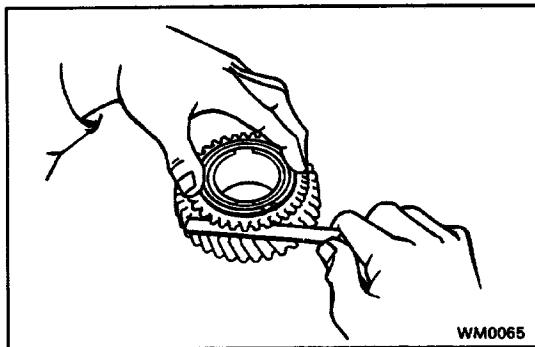
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring is locks.

If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone.

Lightly rub the synchronizer ring and gear cone together.

**NOTICE:** Ensure the fine lapping compound is completely washed off after rubbing.

Check again the braking action of the synchronizer ring.



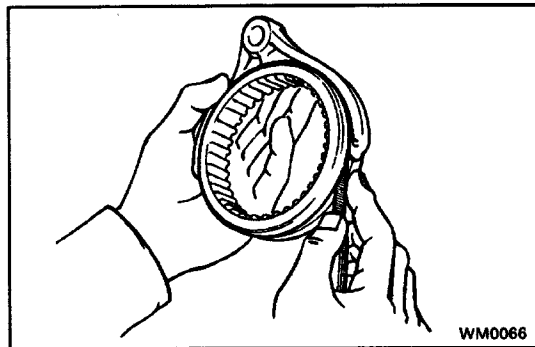
(c) Measure the clearance between the synchronizer ring back and gear spline end.

**Minimum clearance:**

**0.6 mm (0.024 in.)**

If the clearance is less than the limit, replace the synchronizer ring and gear cone by applying a small amount of fine lapping compound.

**NOTICE:** Ensure the fine lapping compound is completely washed off after rubbing.



### 2. C150:

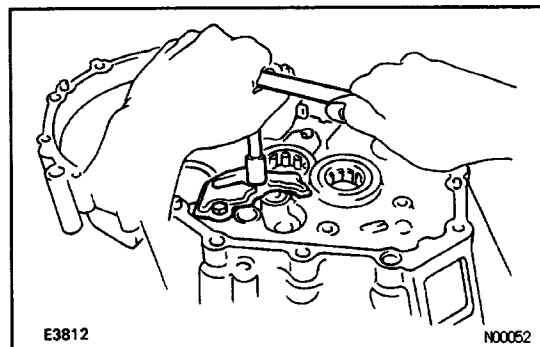
#### INSPECT CLEARANCE OF SHIFT FORK AND HUB SLEEVE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

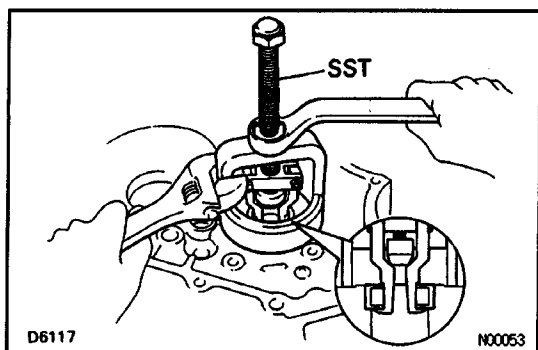
**Maximum clearance:**

**1.0 mm (0.039 in.)**

If the clearance exceeds the maximum, replace the shift fork or hub sleeve.

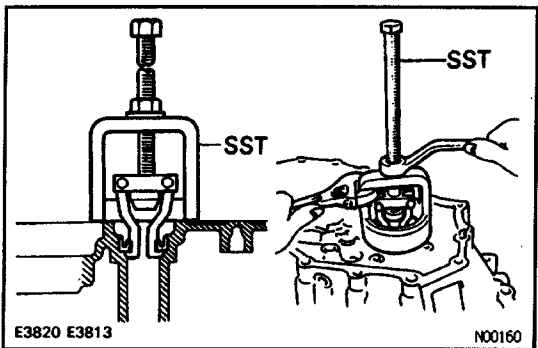


### 3. REMOVE TRANSAXLE CASE RECEIVER

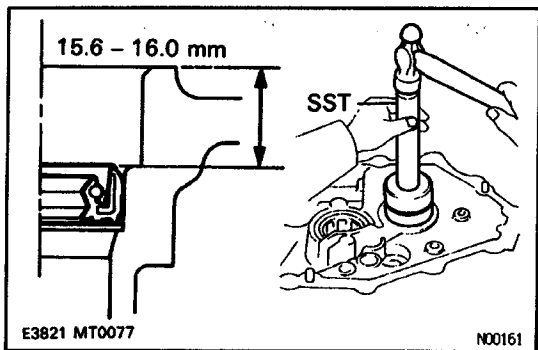


#### 4. IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL

(a) Using SST, remove the bearing.  
SST 09612-65014



(b) Using SST, remove the oil seal.  
SST 09612-65014

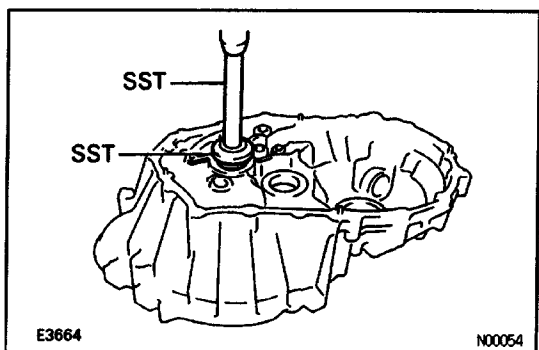


(c) Using SST and a hammer, drive in a new oil seal.  
SST 09608-12010 (09608-00020, 09608-00040)

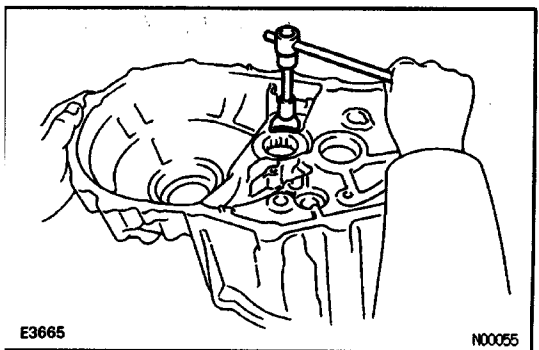
Drive in depth:

15.6-16.0 mm (0.614-0.630 in.)

(d) Coat the lip of the oil seal with MP grease.

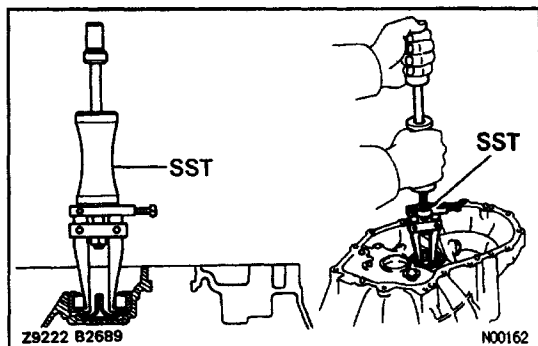


(e) Using SST and a press, install a new bearing.  
SST 09608-12010 (09608-03020, 09608-00030)



#### 5. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT COVER

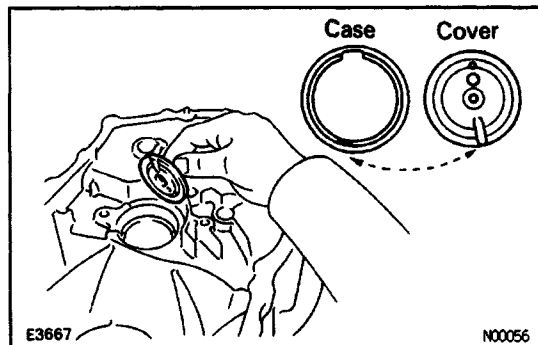
(a) Remove the bolt and bearing lock plate.



(b) Using SST, remove the outer race.

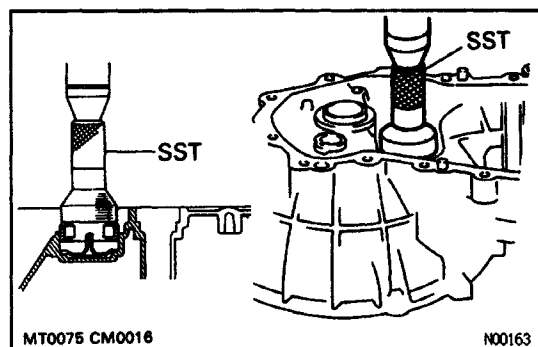
SST 09308-00010

(c) Remove the output shaft front cover.



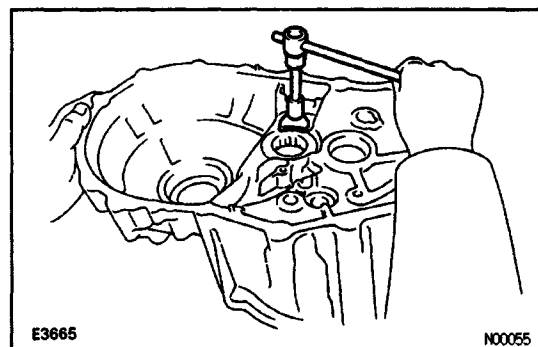
(d) Install the output shaft cover.

HINT: install the output shaft cover projection into the case side groove.



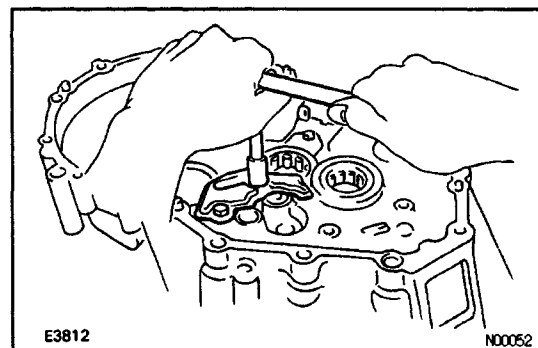
(e) Using SST and a press, install a new bearing.

SST 09310-35010



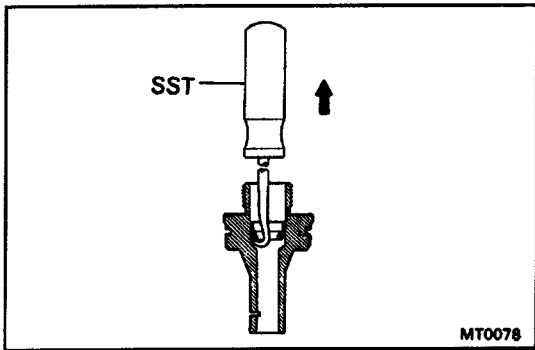
(f) Install the bearing lock plate and torque the bolt.

**Torque: 11 N-m (115 kgf-cm, 8 ft-lbf)**



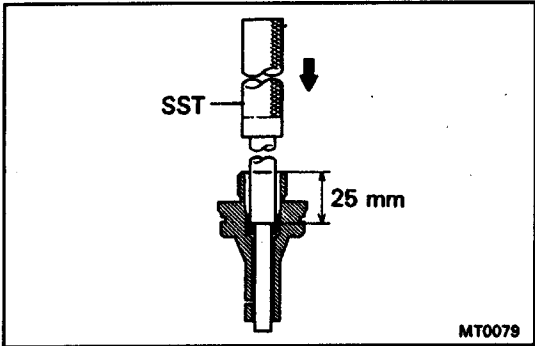
## 6. INSTALL AND TORQUE TRANSAXLE CASE RECEIVER

**Torque: 11 N-m (115 kgf-cm, 8 ft-lbf)**

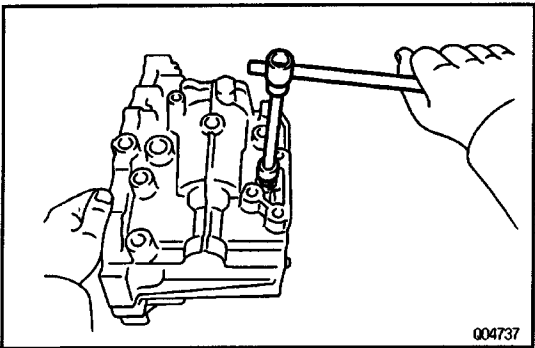


## 7. IF NECESSARY, REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

- (a) Using SST, remove the oil seal.  
SST 09921- 00010



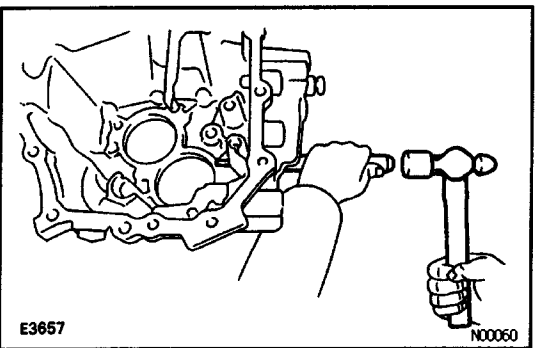
- (b) Coat the lip of oil seal with MP grease.  
(c) Using SST, drive in a new oil seal.  
SST 09201-60011  
Drive in depth:  
25 mm (0.98 in.)



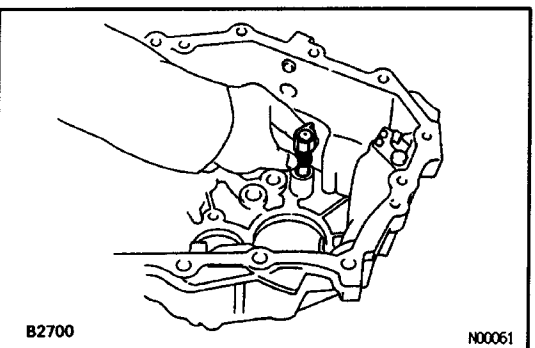
## 8. C150:

### IF NECESSARY, REPLACE REVERSE RESTRICT PIN

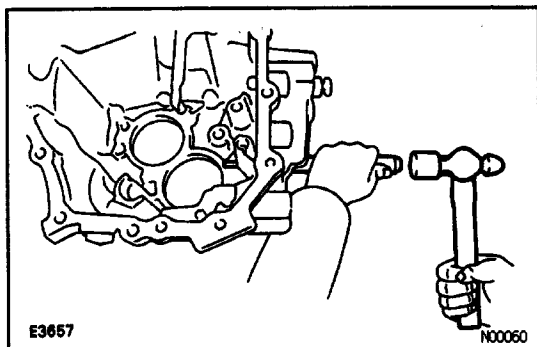
- (a) Using a hexagon wrench, remove the straight screw plug.



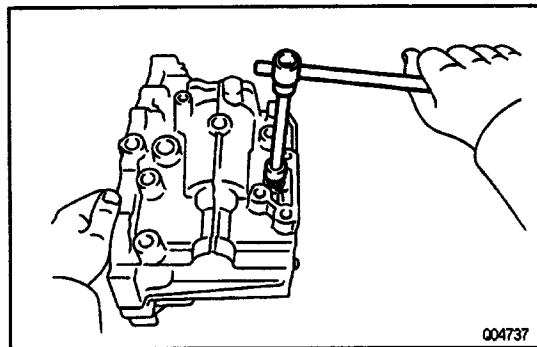
- (b) Using a pin punch and hammer, drive out the slot-spring pin.



- (c) Replace the reverse restrict pin.



(d) Using a pin punch and hammer, drive in the slotted spring pin.



(e) Apply sealant to the plug threads.

**Sealant:**

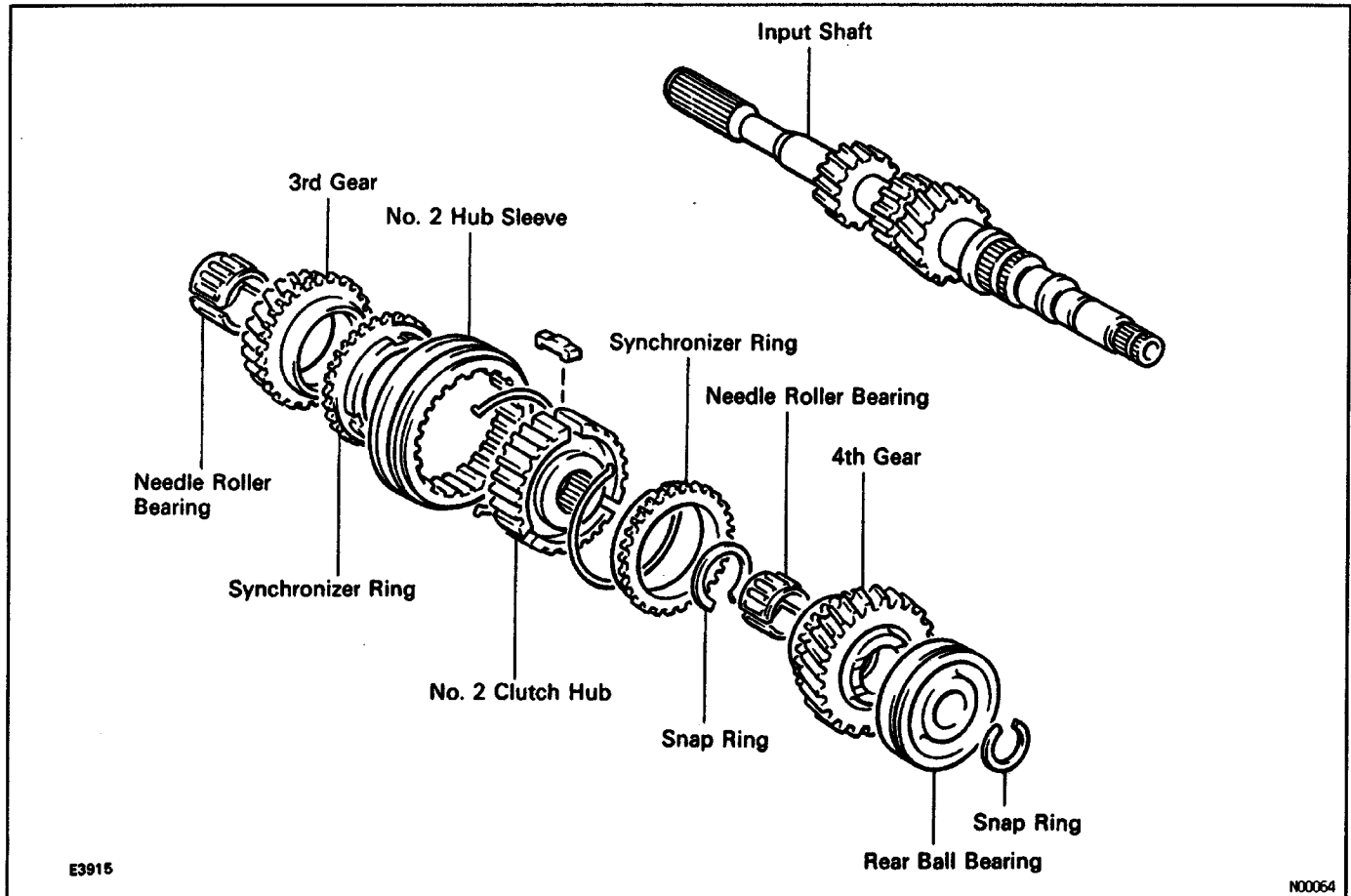
**Part No.08833-00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

(f) Using a hexagon wrench, install the straight screw plug.

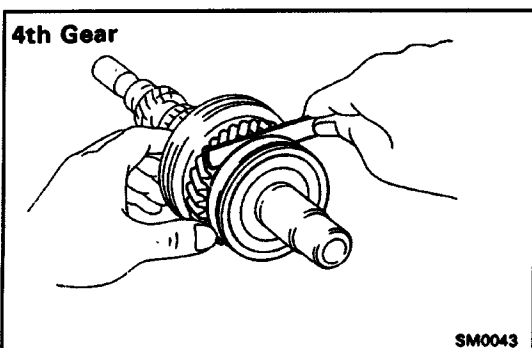
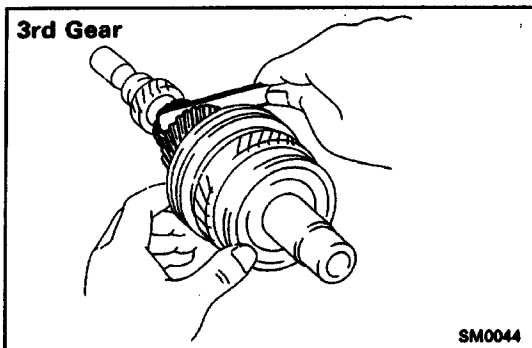
**Torque: 20 N-m (200 kgf-cm, 14 ft-lbt)**

# INPUT SHAFT COMPONENTS

MX002-01



MX002-05



## INPUT SHAFT DISASSEMBLY

### 1. INSPECT 3RD AND 4TH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:

3rd gear

0.10-0.35 mm (0.0039-0.0138 in.)

4th gear

0.10-0.55 mm (0.0039-0.0217 in.)

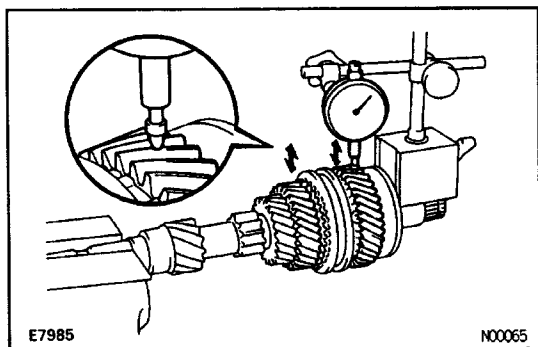
Maximum clearance:

3rd gear

0.40 mm (0.0157 in.)

4th gear

0.60 mm (0.0236 in.)



## 2. INSPECT 3RD AND 4TH GEAR RADIAL CLEAR- ANCE

Using dial indicator, measure the radial clearance between the gear and shaft.

**Standard clearance:**

**0.015-0.058 mm (0.0006-0.0023 in.)**

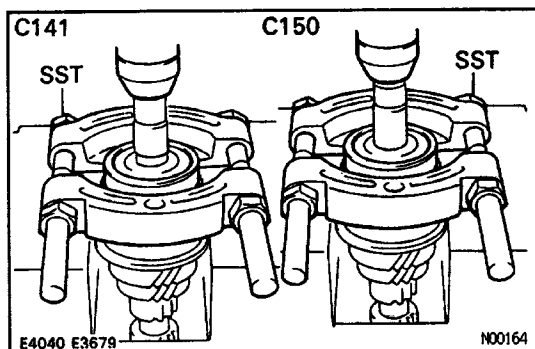
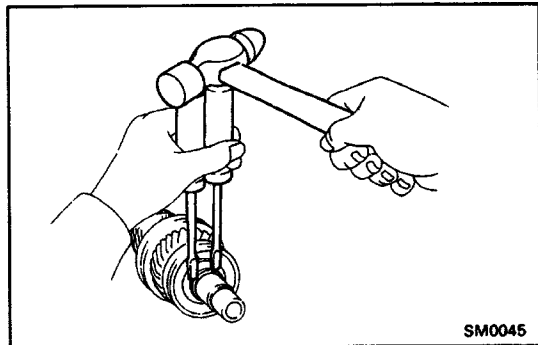
**Maximum clearance:**

**0.070 mm (0.0028 in.)**

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

## 3. REMOVE SNAP RING

Using 2 screwdrivers and a hammer, tap out the snap ring.



## 4. REMOVE REAR BALL BEARING, 4 TH GEAR, NEEDLE ROLLER BEARINGS, SPACER AND SYNCH- RONIZER RING FROM INPUT SHAFT

(a) C150:

Using SST and a press, remove the rear ball bearing.

SST 09950-00020

C141:

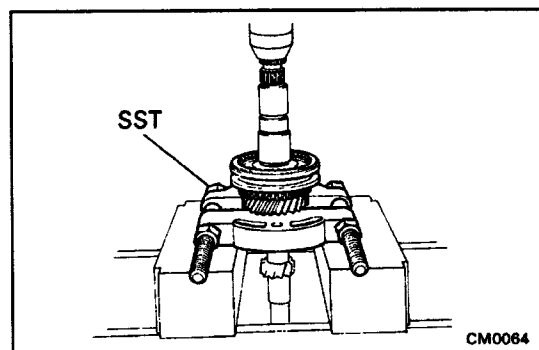
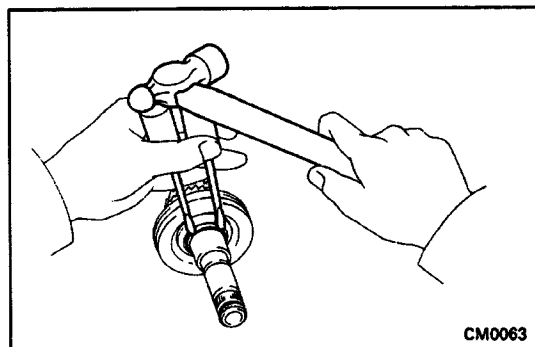
Using SST, a socket wrench and press remove the rear ball bearing.

SST 09950 - 00020

(b) Remove the 4th gear, needle roller bearings, spacer and synchronizer ring.

## 5. REMOVE SNAP RING

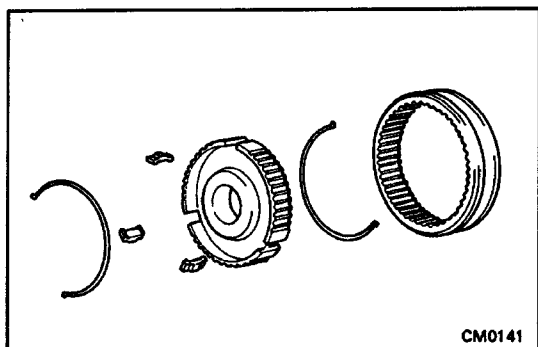
Using 2 screwdrivers and a hammer, tap out the snap ring.



## 6. REMOVE NO.2 HUB SLEEVE ASSEMBLY, 3RD GEAR, SYNCHRONIZER RING AND NEEDLE ROLLER BEARINGS

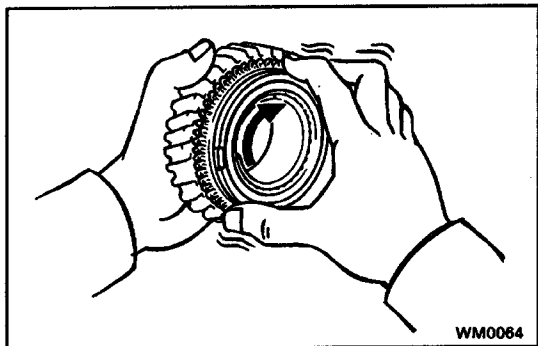
Using SST and a press, remove No.2 hub sleeve, 3rd gear, synchronizer ring and needle roller bearings.

SST 09950-00020



## 7. REMOVE NO.2 HUB SLEEVE, SHIFTING KEYS AND SPRINGS FROM NO.2 CLUTCH HUB

Using a screwdriver, remove the 3 shifting keys and springs from No.2 clutch hub.



## INPUT SHAFT COMPONENT PARTS INSPECTION

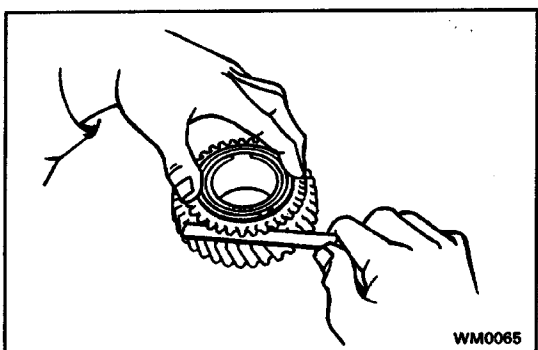
MX004-04

### 1. INSPECT SYNCHRONIZER RINGS

- (a) Check for wear or damage.
- (b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring is locks. If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone.

**NOTICE:** Ensure the fine lapping compound is completely washed off after rubbing.

Check again the braking action of the synchronizer ring.

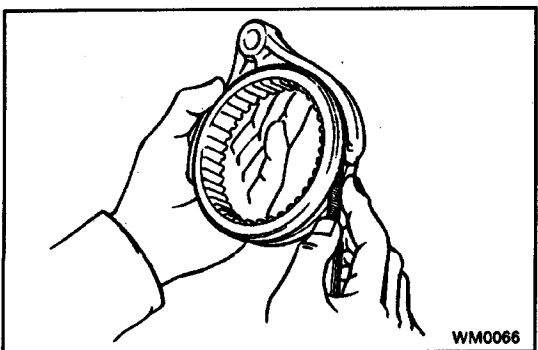


- (c) Measure the clearance between the synchronizer ring back and gear spline end.

**Maximum clearance:**

**0.6 mm (0.024 in.)**

If the clearance is less than the limit, replace the synchronizer ring and gear cone.



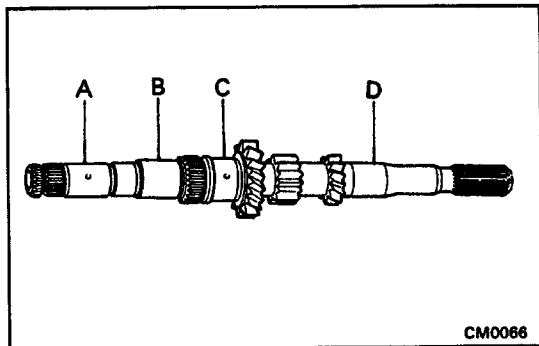
### 2. INSPECT NO.2 SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

**Maximum clearance:**

**1.0 mm (0.039 in.)**

If the clearance exceeds the maximum, replace the shift fork or hub sleeve.



### 3. INSPECT INPUT SHAFT

- (a) Check the input shaft for wear or damage.
- (b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

**Minimum outer diameter:**

**Part A (C150)**

**24.870 mm (0.9791 in.)**

**Part B**

**28.970 mm (1.1405 in.)**

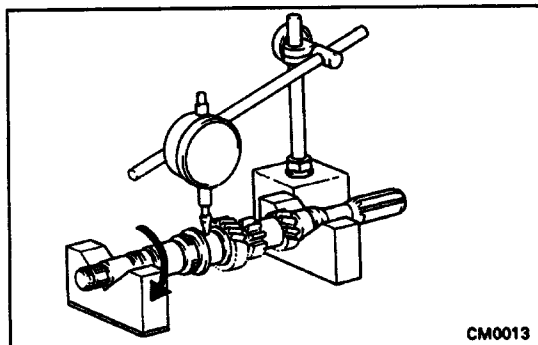
**Part C**

**30.970 mm (1.2193 in.)**

**Part D**

**24.970 mm (0.9831 in.)**

If the outer diameter exceeds the minimum, replace the input shaft.

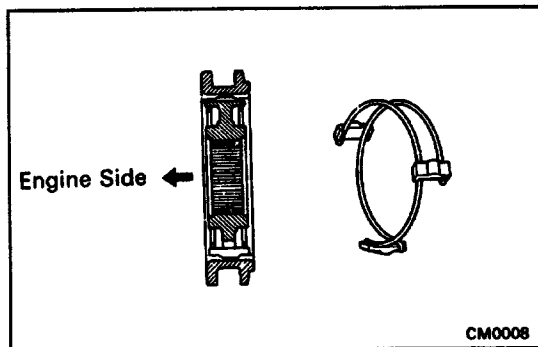


- (c) Using a dial indicator, check the shaft runout.

**Maximum runout:**

**0.05 mm (0.0020 in.)**

If the runout exceeds the maximum, replace the input shaft.



## INPUT SHAFT ASSEMBLY

(See page [MX-27](#))

HINT: Coat all of the sliding and rotating surfaces with gear oil before assembly.

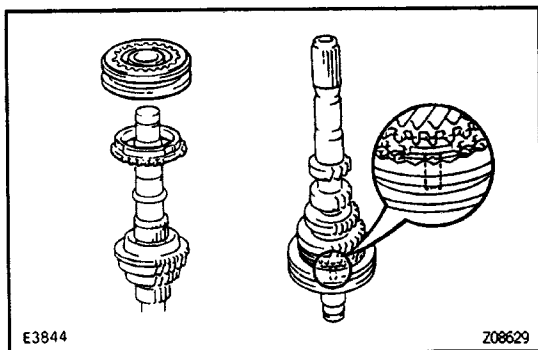
### 1. INSTALL NO.2 CLUTCH HUB INTO HUB SLEEVE

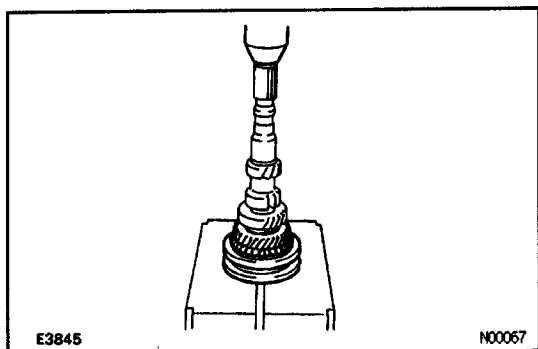
- (a) Install the clutch hub and shifting keys to the hub sleeve.
- (b) Install the shifting key springs under the shifting keys

**NOTICE:** Install the key springs positioned so that their end gaps are not in line.

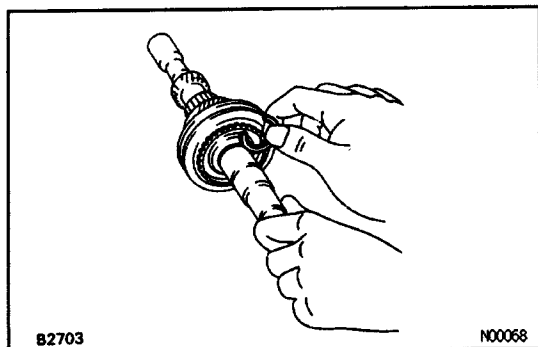
### 2. INSTALL 3RD GEAR, NEEDLE ROLLER BEARINGS SYNCHRONIZER RING AND NO.2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

- (a) Apply gear oil to the needle roller bearings.
- (b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.





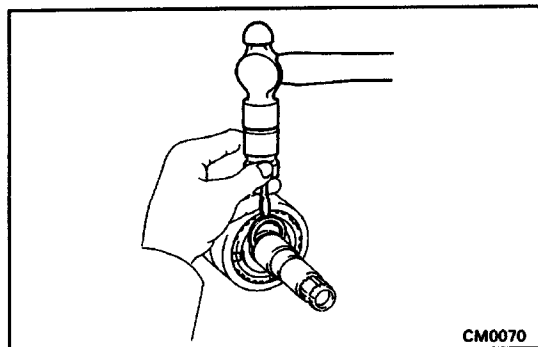
(c) Using a press, install the 3rd gear and No.2 hub sleeve.



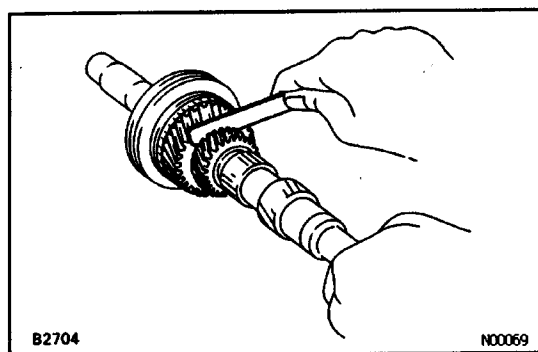
### 3. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
<b>A</b>	2.30 (0.0906)	<b>D</b>	2.48 (0.0976)
<b>B</b>	2.36 (0.0929)	<b>E</b>	2.54 (0.1000)
<b>C</b>	2.42 (0.0953)	<b>F</b>	2.60 (0.1024)



(b) Using a screwdriver and hammer, tap in the snap ring.

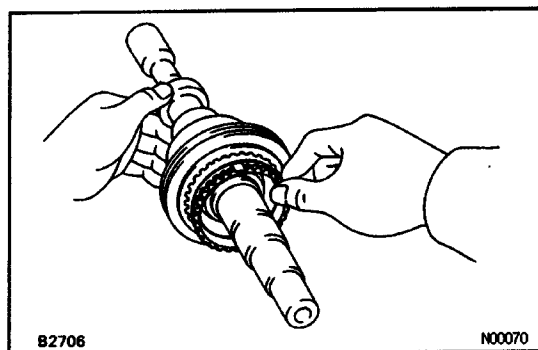


### 4. INSPECT 3RD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

**Standard clearance:**

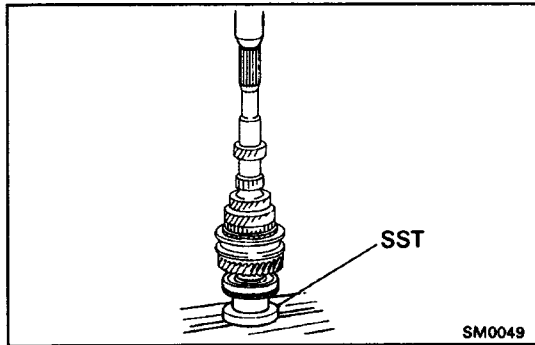
**0.10-0.35 mm (0.0039-0.0138 in.)**



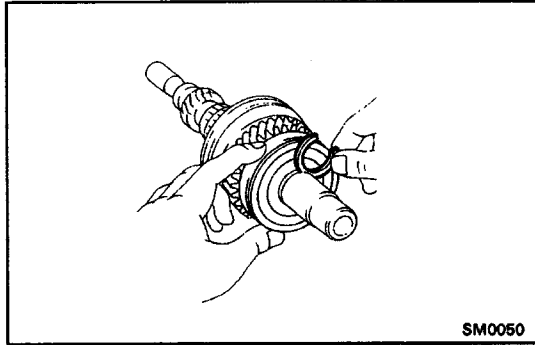
### 5. INSTALL SYNCHRONIZER RING, NEEDLE ROLLER BEARINGS, SPACER, 4TH GEAR AND REAR BALL BEARING

(a) Apply gear oil to the needle roller bearings.

(b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.



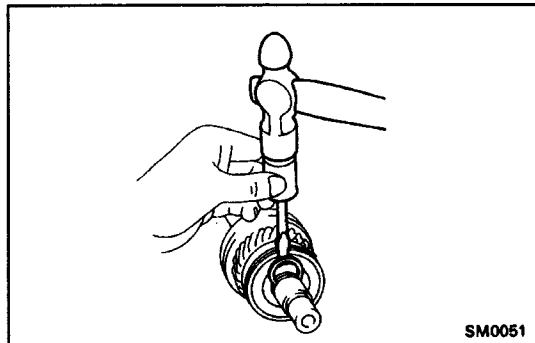
(c) Using SST and a press, install the rear ball bearing.  
SST 09608-12010 (09608-00070)



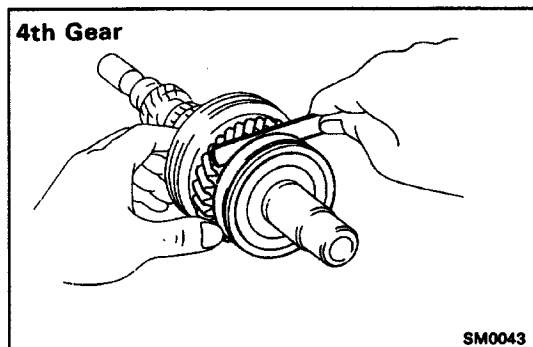
## 6. INSTALL SNAP RING

(a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
<b>A</b>	2.29 (0.0902)	<b>D</b>	2.47 (0.0972)
<b>B</b>	2.35 (0.0925)	<b>E</b>	2.53 (0.0996)
<b>C</b>	2.41 (0.0949)	<b>F</b>	2.59 (0.1020)



(b) Using a screwdriver and hammer, tap in the snap ring.



## 7. MEASURE 4TH GEAR THRUST CLEARANCE

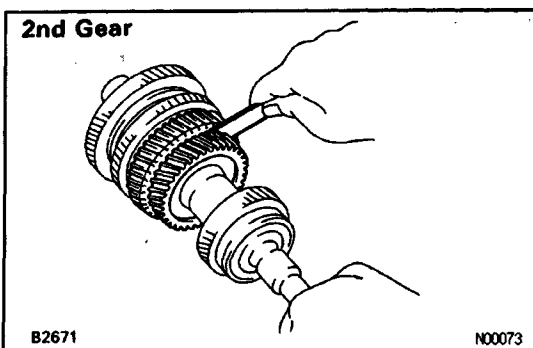
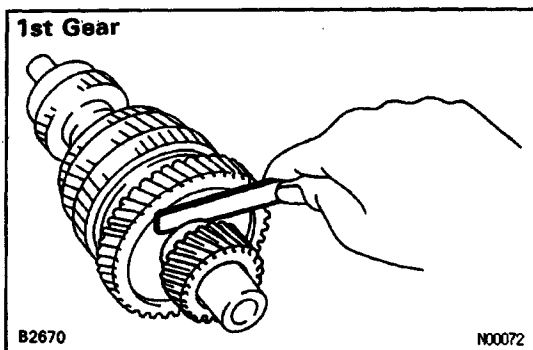
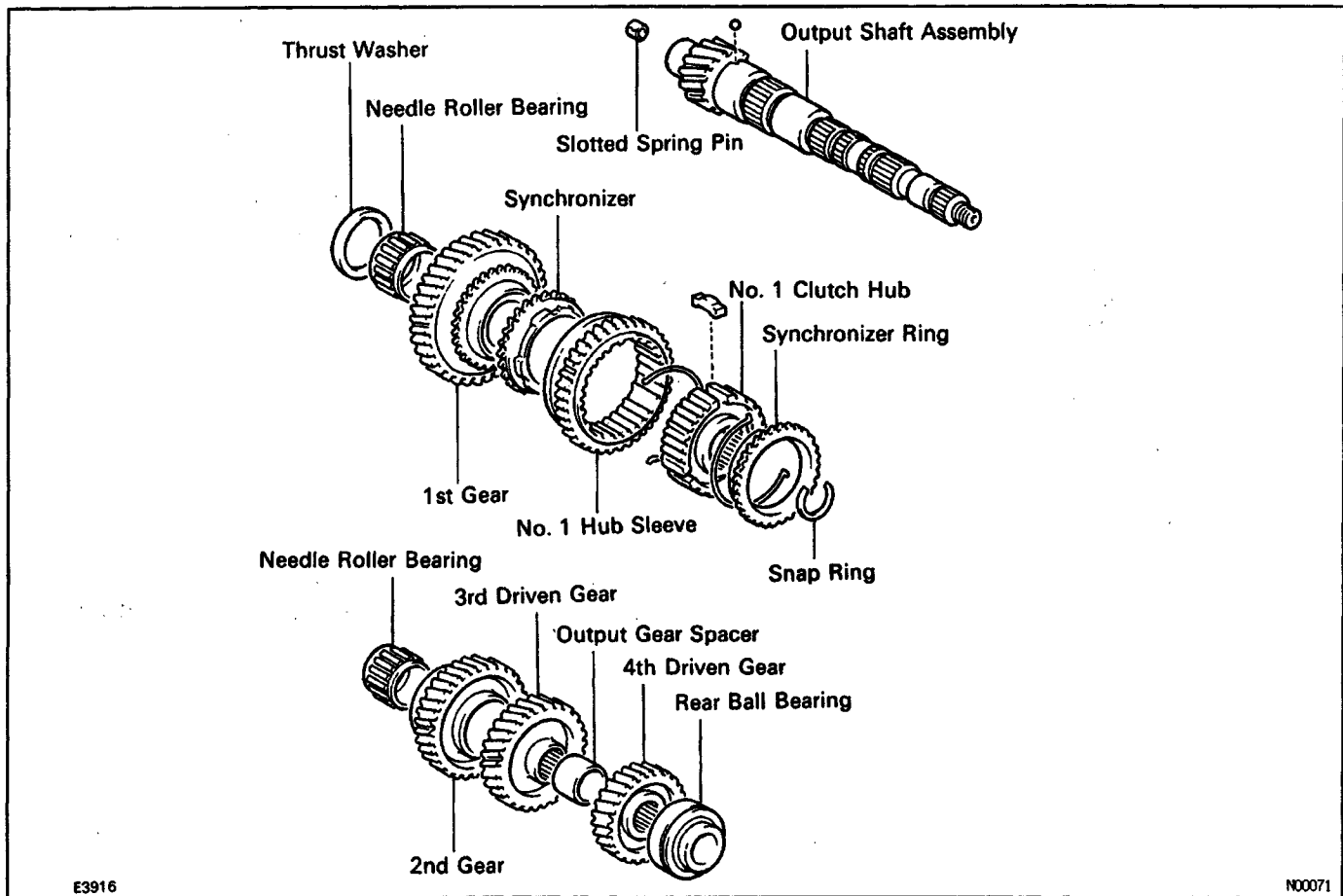
Using a feeler gauge, measure the 4th gear thrust clearance.

**Standard clearance:**

**0.10-0.55 mm (0.0039-0.0217 in.)**

# OUTPUT SHAFT COMPONENTS

MX006-01



## OUTPUT SHAFT DISASSEMBLY

MX007-06

### 1. INSPECT FIRST AND 2ND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:

1st gear

0.10-0.40 mm (0.0039-0.0157 in.)

2nd gear

0.10-0.45 mm (0.0039-0.0177 in.)

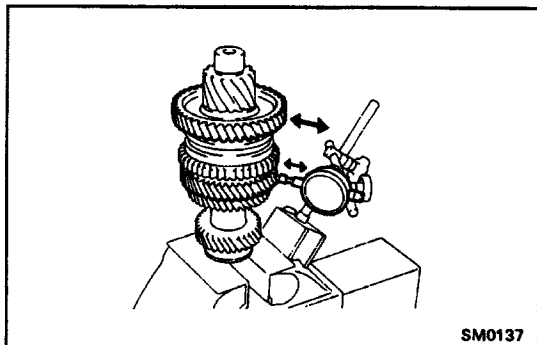
Maximum clearance:

1st gear

0.45 mm (0.0177 in.)

2nd gear

0.50 mm (0.0197 in.)



## 2. INSPECT 1ST AND 2ND GEAR RADIAL CLEARANCE

Using dial indicator, measure the radial clearance between the gear and shaft.

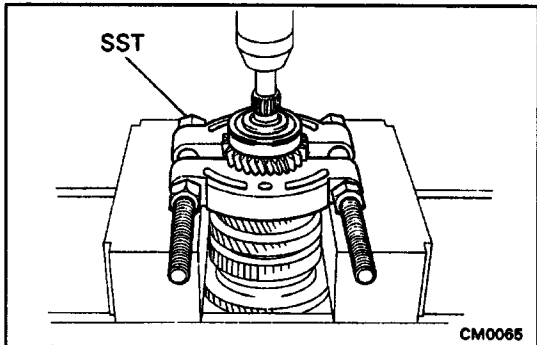
**Standard clearance:**

**0.015-0.058 mm (0.0006-0.0023 in.)**

**Maximum clearance:**

**0.070 mm (0.0028 in.)**

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

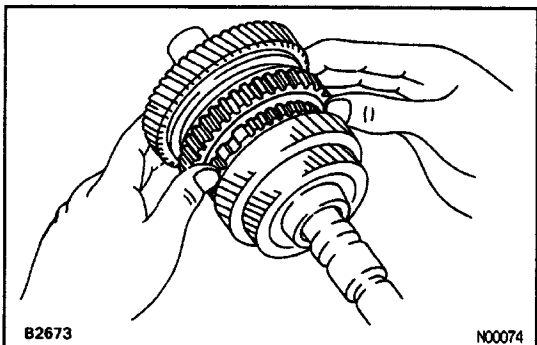


## 3. REMOVE REAR BALL BEARING, 4TH DRIVEN GEAR AND OUTPUT GEAR SPACER FROM OUTPUT SHAFT

(a) Using SST and a press, remove the rear ball bearing and 4th driven gear.

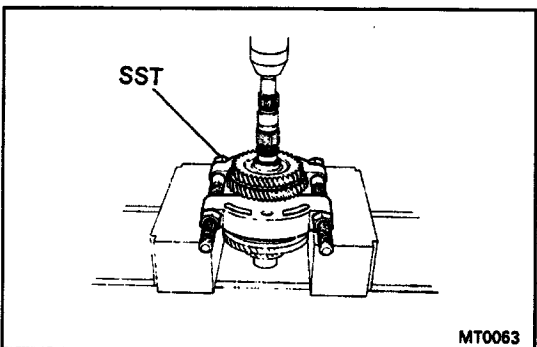
SST 09950-00020

(b) Remove the output gear spacer.



## 4. REMOVE 3RD DRIVEN GEAR, 2ND GEAR, NEEDLE ROLLER BEARING AND SYNCHRONIZER RING

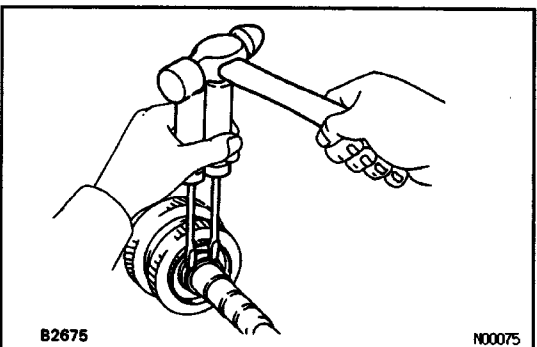
(a) Shift No.1 hub sleeve into the 1st gear.



(b) Using SST and a press, remove the 3rd driven gear and 2nd gear.

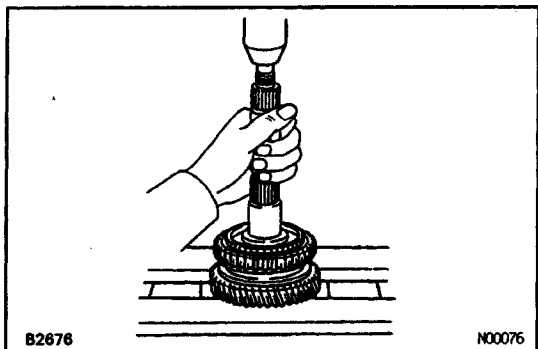
SST 09950-00020

(c) Remove the needle roller bearing and synchronizer ring.



## 5. REMOVE SNAP RING

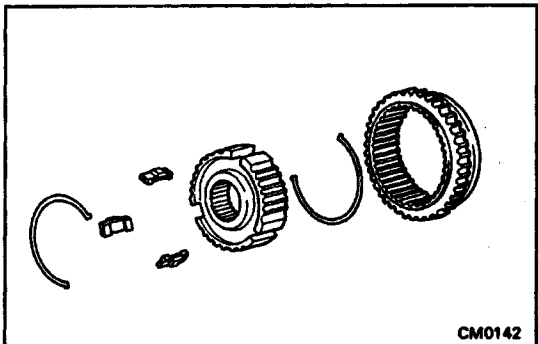
Using 2 screwdrivers and a hammer, tap out the snap ring.



## 6. REMOVE NO. 1 HUB SLEEVE ASSEMBLY, 1ST GEAR, SYNCHRONIZER RING, NEEDLE ROLLER BEARING, THRUST WASHER AND LOCKING BALL

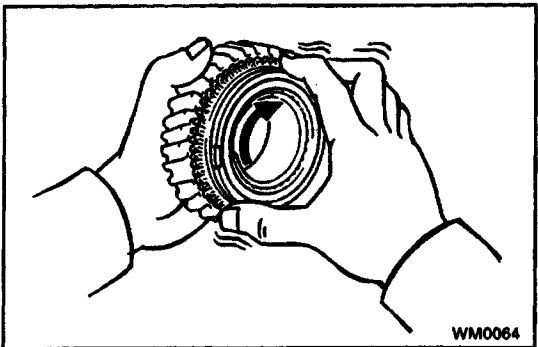
(a) Using a press, remove No.1 hub sleeve, 1st gear and synchronizer ring.

(b) Remove the needle roller bearing, thrust washer and locking ball.



## 7. REMOVE NO.1 HUB SLEEVE, SHIFTING KEYS AND SPRINGS FROM NO.1 CLUTCH HUB

Using a screwdriver, remove the 3 shifting keys and springs from No.1 clutch hub.



## OUTPUT SHAFT COMPONENT PARTS INSPECTION

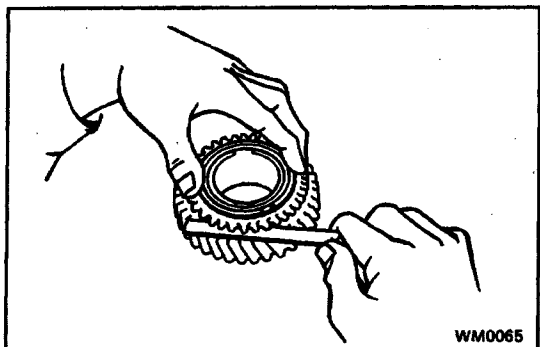
### 1. INSPECT SYNCHRONIZER RINGS

(a) Check for wear or damage.

(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks. If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone.

**NOTICE:** Ensure the fine lapping compound is completely washed off after rubbing.

Check again the braking action of the synchronizer ring.



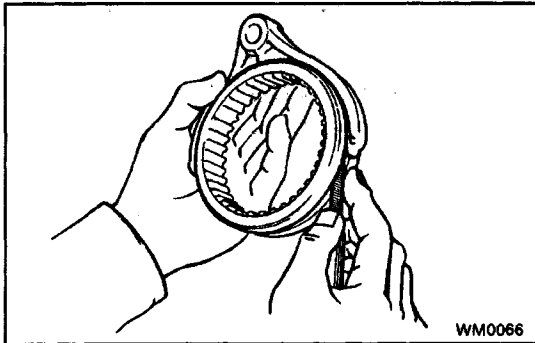
(c) Measure the clearance between the synchronizer ring back and gear spline end.

**Minimum clearance:**

**0.6 mm (0.024 in.)**

If the clearance is less than the limit, replace the synchronizer ring and gear cone.

**NOTICE:** Ensure the fine lapping compound is completely washed off after rubbing.



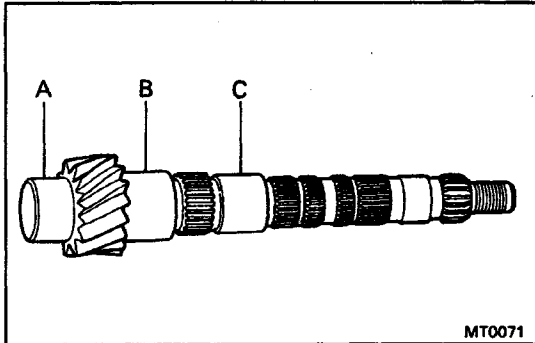
## 2. INSPECT CLEARANCE OF SHIFT FORKS AND HUB SLEEVES

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

**Maximum clearance:**

**1.0 mm (0.039 in.)**

If the clearance exceeds the maximum, replace the shift fork or hub sleeve.



## 3. INSPECT OUTPUT SHAFT

(a) Using a micrometer, measure the outer diameter of the output shaft journal surface.

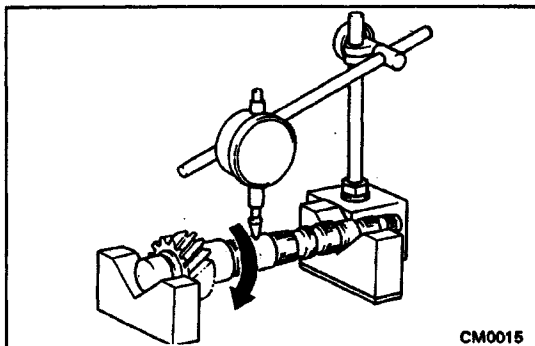
**Minimum outer diameter:**

**Part A 32.970 mm (1.2980 in.)**

**Part B 37.970 mm (1.4949 in.)**

**Part C 31.970 mm (1.2587 in.)**

If the outer diameter exceeds the minimum, replace the output shaft.

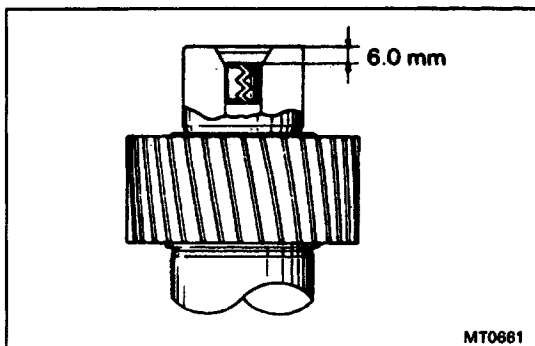


(b) Using a dial indicator, check the shaft runout.

**Maximum runout:**

**0.05 mm (0.0020 in.)**

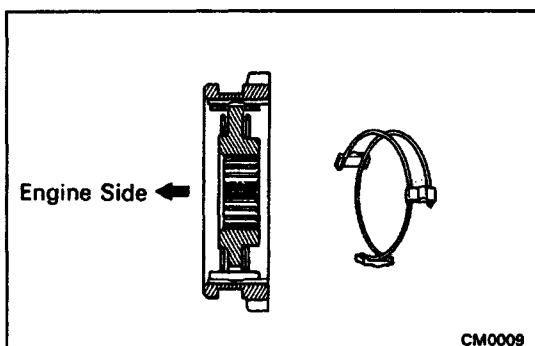
If the runout exceeds the maximum, replace the output shaft.



## OUTPUT SHAFT ASSEMBLY (See page [MX-33](#))

### 1. IF OUTPUT SHAFT WAS REPLACED, DRIVE IN SLOTTED SPRING PIN

If the output shaft was replaced, drive the slotted spring pin in the output shaft to a depth of 6.0 mm (0.236 in.).

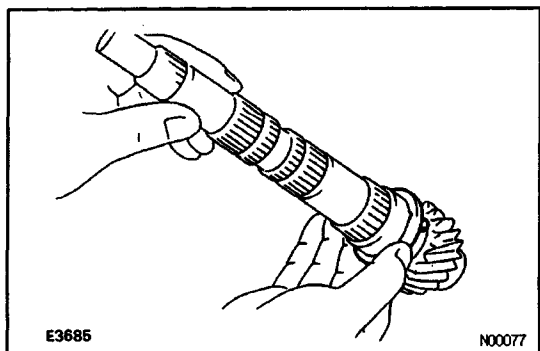


### 2. INSERT NO.1 CLUTCH HUB INTO HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

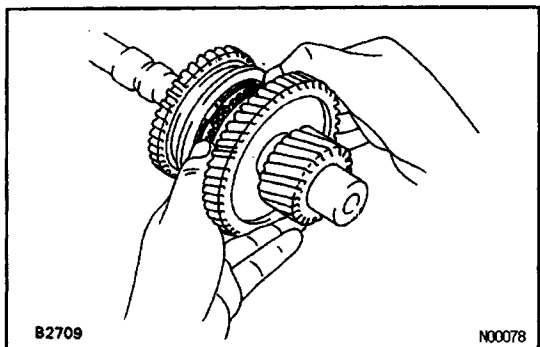
(b) Install the shifting key springs under the shifting keys.

**NOTICE:** Install the key springs positioned so that their end gaps are not in line.

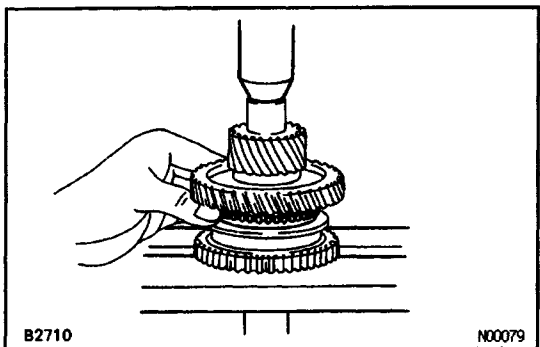


### 3. INSTALL THRUST WASHER, 1ST GEAR, NEEDLE ROLLER BEARING, SYNCHRONIZER RING AND NO. 1 HUB SLEEVE TO OUTPUT SHAFT

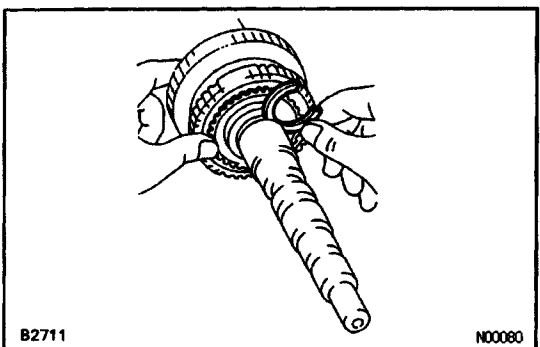
- (a) Install the locking ball in the shaft.
- (b) Fit the thrust washer groove securely over the locking ball when installing the thrust on the shaft.
- (c) Apply gear oil to the needle roller bearing.



- (d) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.



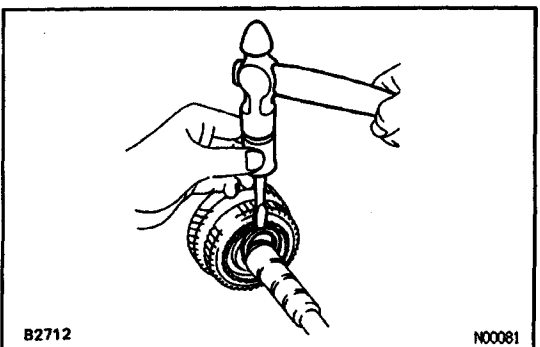
- (e) Using a press, install the 1st gear and No.1 hub sleeve.



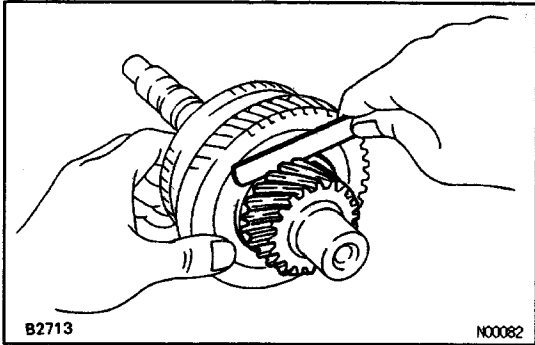
### 4. INSTALL SNAP RING

- (a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
<b>A</b>	2.50 (0.0984)	<b>D</b>	2.68 (0.1055)
<b>B</b>	2.56 (0.1008)	<b>E</b>	2.74 (0.1079)
<b>C</b>	2.62 (0.1031)	<b>F</b>	2.80 (0.1102)



- (b) Using a screwdriver and hammer, tap in the snap ring.

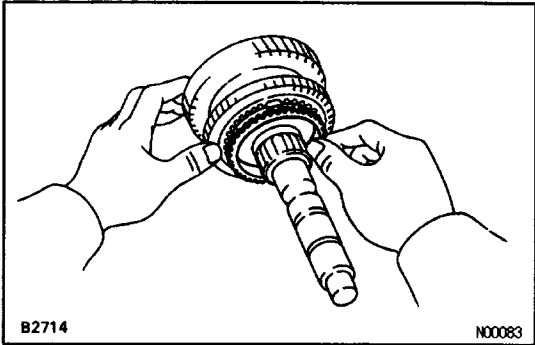


### 5. INSPECT 1ST GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 1st gear thrust clearance.

**Standard clearance:**

**0.10-0.40 mm (0.0039-0.0157 in.)**

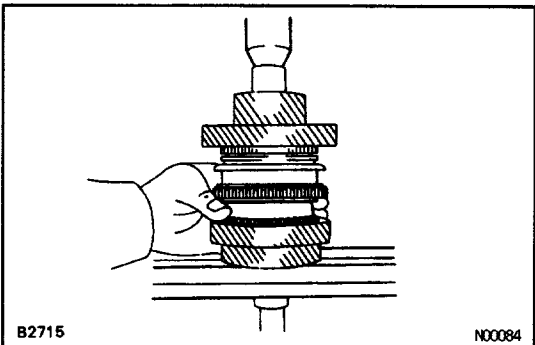


### 6. INSTALL SYNCHRONIZER RING, 2ND GEAR, NEEDLE ROLLER BEARING AND 3RD DRIVEN GEAR

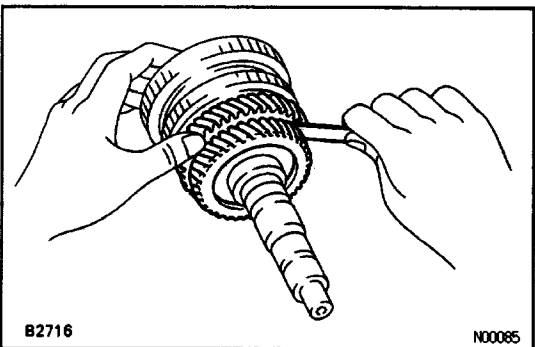
(a) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.

(b) Apply gear oil to the needle roller bearing.

(c) Install the 2nd gear.



(d) Using a press, install the 3rd driven gear.

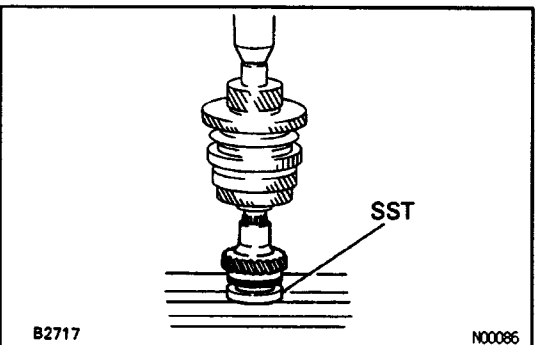


### 7. INSPECT 2ND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 2nd gear thrust clearance.

**Standard clearance:**

**0.10-0.45 mm (0.0039-0.0177 in.)**



### 8. INSTALL OUTPUT GEAR SPACER, 4TH DRIVEN GEAR AND RADIAL BALL BEARING

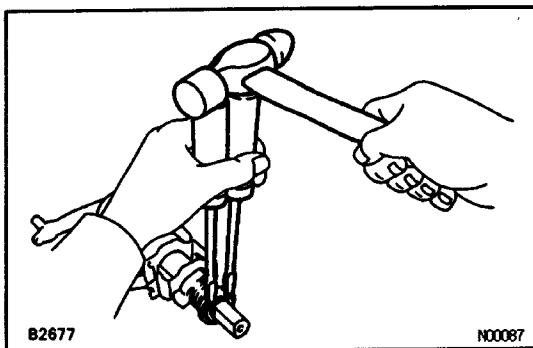
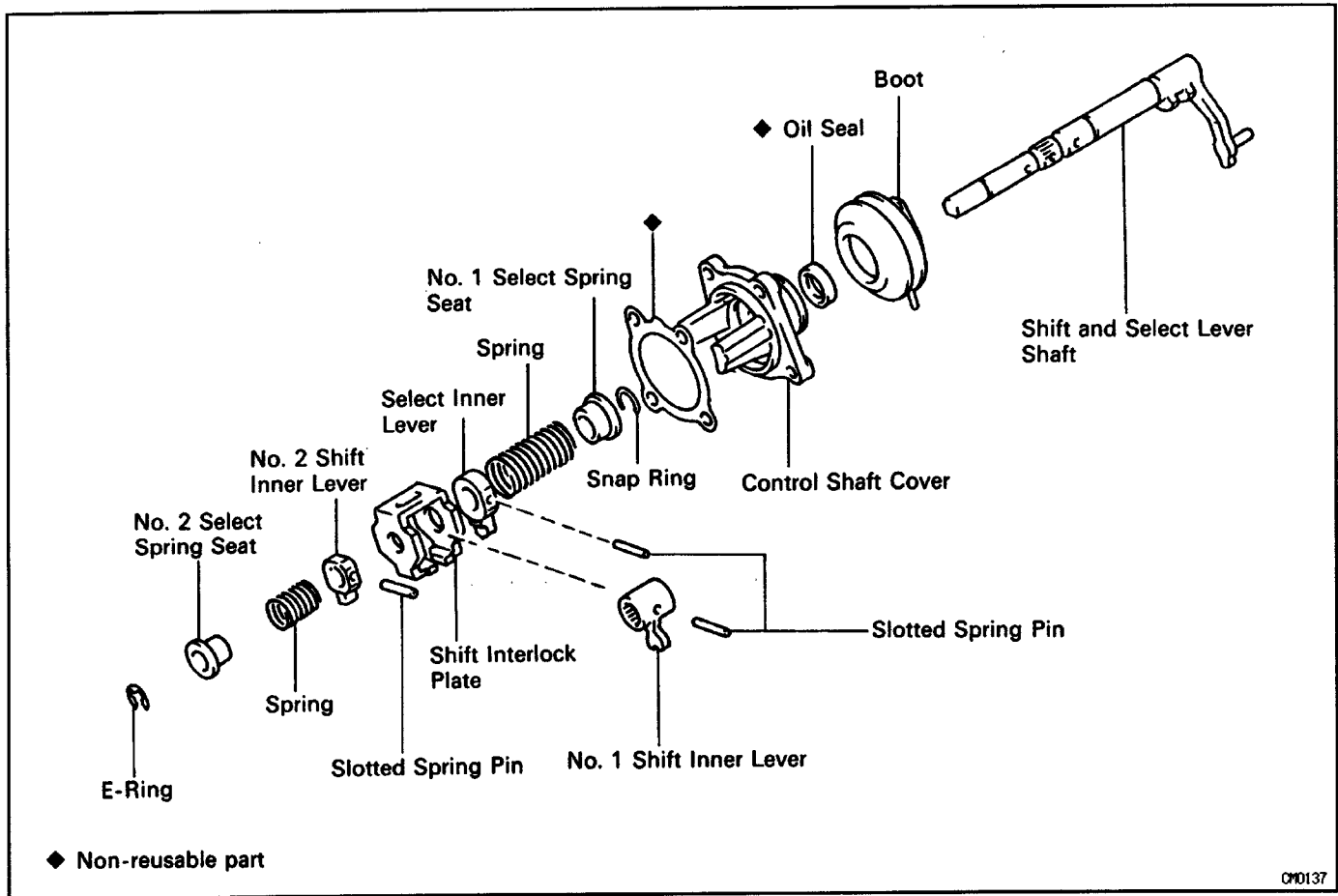
(a) Install the output gear spacer.

(b) Using SST and a press, install the 4th driven gear and bearing.

SST 09608-12010 (09608-00070)

# SHIFT AND SELECT LEVER SHAFT COMPONENTS

MX00A-01

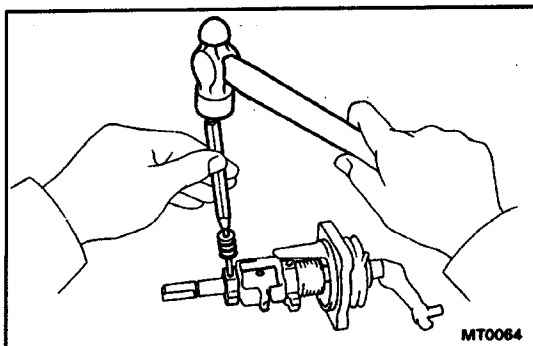


## SHIFT AND SELECT LEVER SHAFT DISASSEMBLY

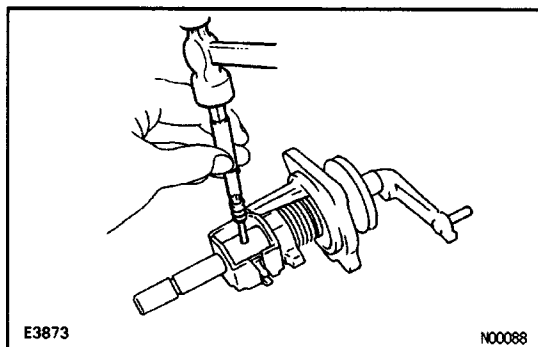
MX00B-06

### 1. REMOVE NO.2 SHIFT INNER LEVER

- Using 2 screwdrivers and hammer, tap out the snap ring.
- Remove the compression spring and seat.

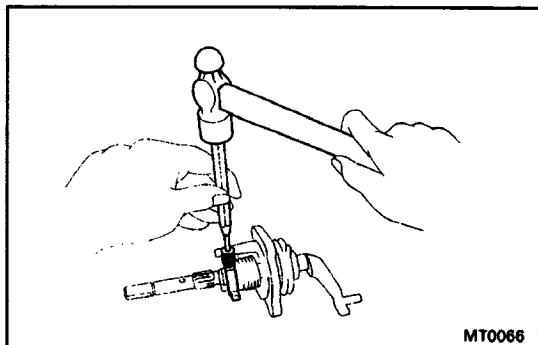


- Using a pin punch and hammer, drive out the slotted spring pin from the No.2 shift inner lever.
- Remove the No.2 shift inner lever.



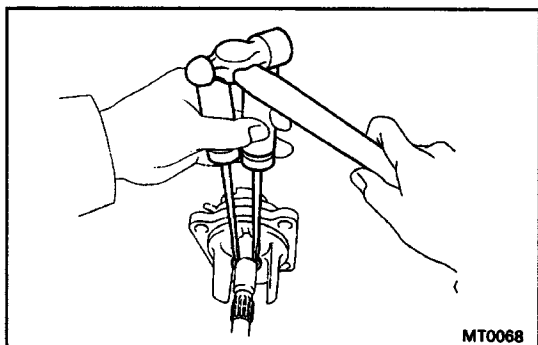
## 2. REMOVE SHIFT INTERLOCK PLATE AND NO. 1 SHAFT INNER LEVER

- (a) Using a pin punch and hammer, drive out the slotted spring pin from the No.1 shaft inner lever.
- (b) Remove the shift interlock plate and No.1 shift inner lever.



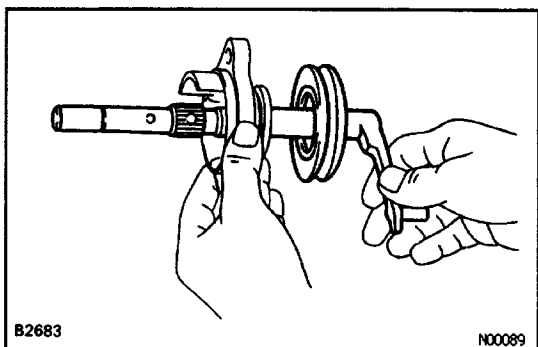
## 3. REMOVE SELECT INNER LEVER

- (a) Using a pin punch and hammer, drive out the slotted spring pin from the select inner lever.
- (b) Remove the select inner lever, No. 1 compression spring and No.1 select spring seat.

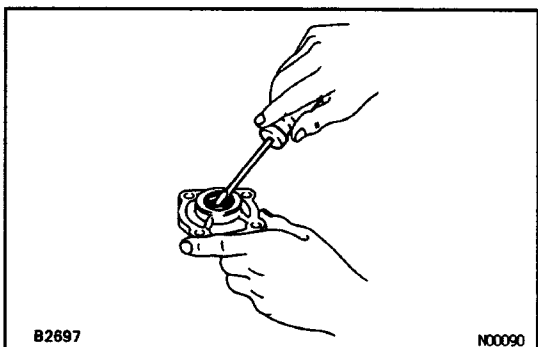


## 4. REMOVE SNAP RING

Using 2 screwdrivers and hammer, tap out the snap ring.

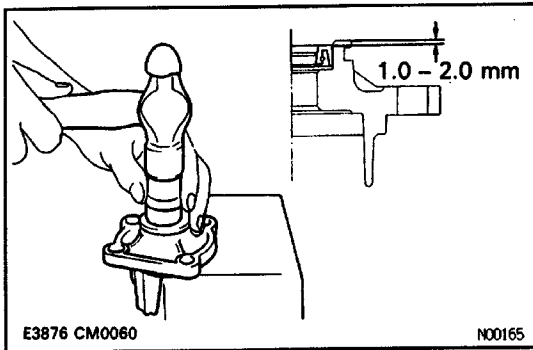


## 5. REMOVE CONTROL SHAFT COVER AND DUST BOOT



## 6. IF NECESSARY, REPLACE CONTROL SHAFT COVER OIL SEAL

- (a) Using a screwdriver, remove the oil seal.



(b) Using a socket wrench and hammer, drive in a new oil seal.

Drive in depth:

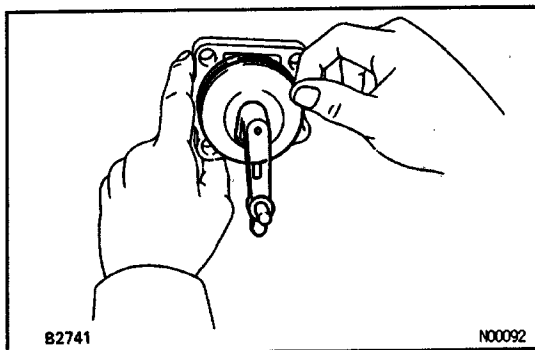
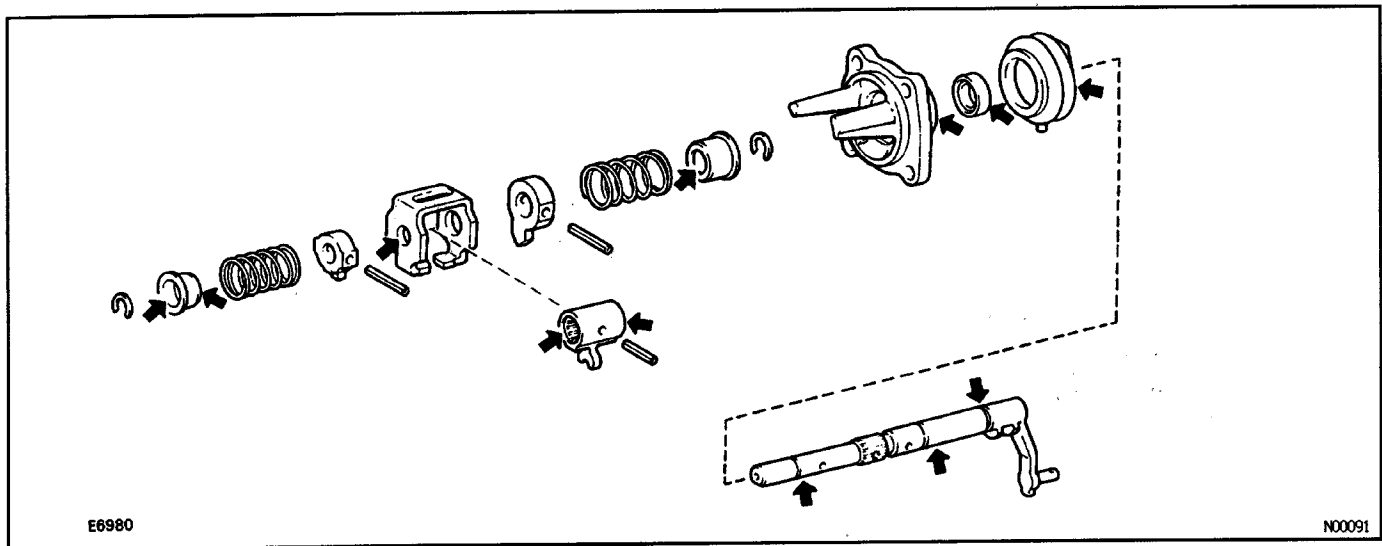
1.0-2.0 mm (0.039-0.079 in.)

(c) Coat the lip of the oil seal with MP grease.

## SHIFT AND SELECT LEVER SHAFT ASSEMBLY

MX00C-01

### 1. APPLY MP GREASE TO PANTS, AS SHOWN

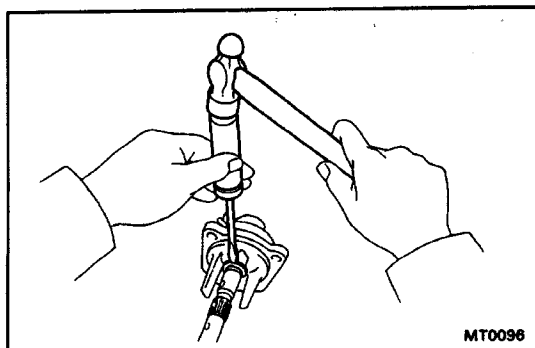


### 2. INSTALL SHIFT AND SELECT LEVER SHAFT

Install the boot and shaft to the control shaft cover.

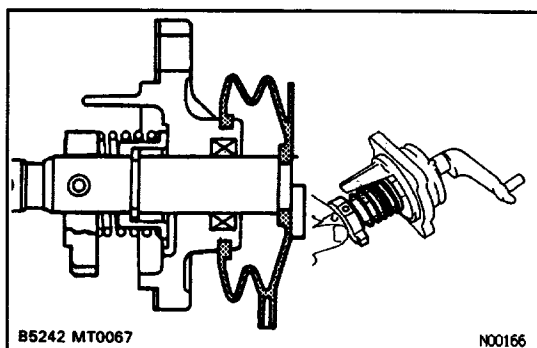
HINT: Make sure to install the boot in correct direction.

Position the air bleed of the boot downward:



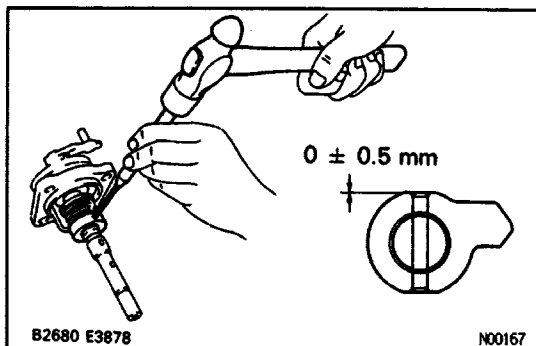
### 3. INSTALL SNAP RING

Using a screwdriver and hammer, tap in the snap ring.



#### 4. INSTALL SELECT INNER LEVER

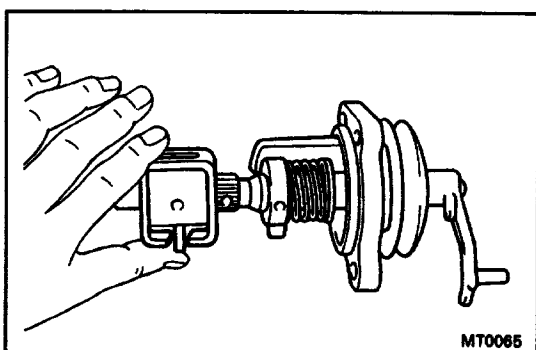
(a) Install the No.1 select spring seat, No.1 select spring and select inner lever.



(b) Using a pin punch and hammer, drive in the slotted spring pin to the select inner lever.

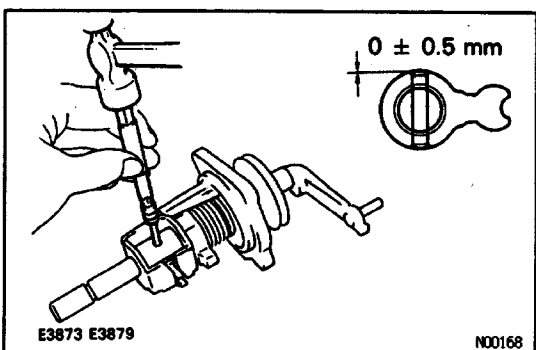
**Drive in depth:**

**0±0.5 mm (0±0.020 in.)**



#### 5. INSTALL SHIFT INTERLOCK PLATE AND NO. 1 SHIFT INNER LEVER

(a) Install the shift interlock plate No.1 shift inner lever.

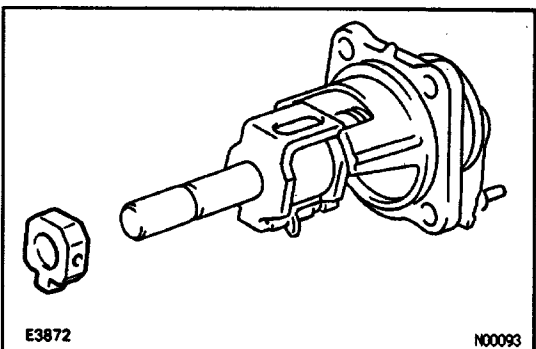


(b) Using a pin punch and hammer, drive in the slotted spring pin to the No.1 shift inner lever.

**Drive In depth:**

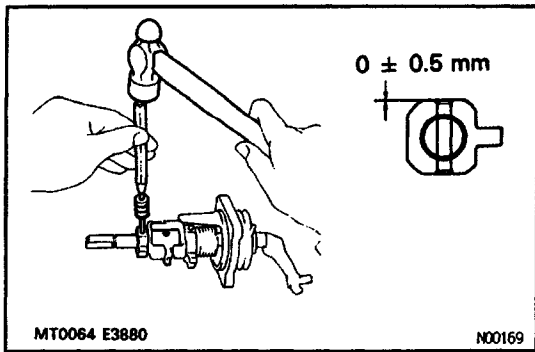
**0±0.5 mm (0±0.020 in.)**

(c) Check that the shift interlock plate turns smoothly.



#### 6. INSTALL NO.2 SHIFT INNER LEVER

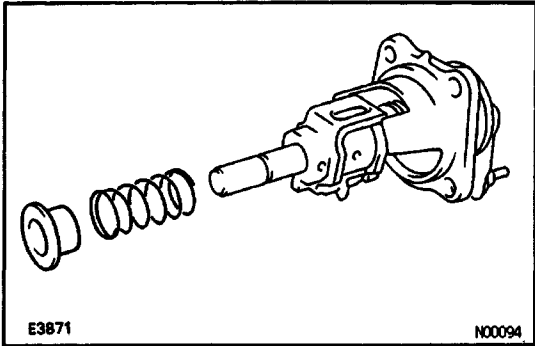
(a) Install the No.2 shift inner lever.



(b) Using a pin punch and hammer, drive in the slotted spring pin to the No.2 shift inner lever.

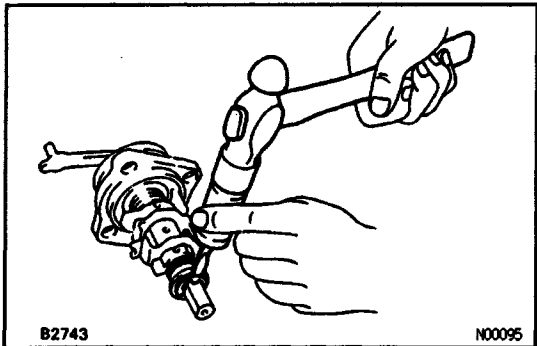
**Drive in depth:**

**0±0.5 mm (0±0.020 in.)**



## 7. INSTALL NO. 2 COMPRESSION SPRING, NO. 2 SELECT SPRING SEAT AND SNAP RING

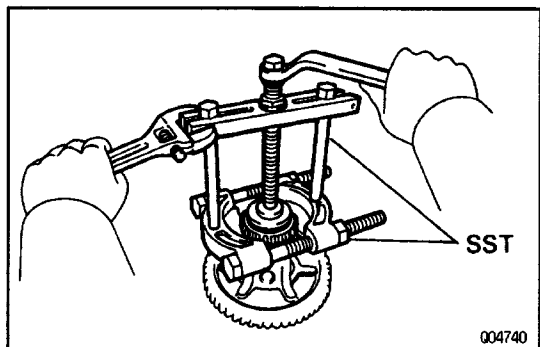
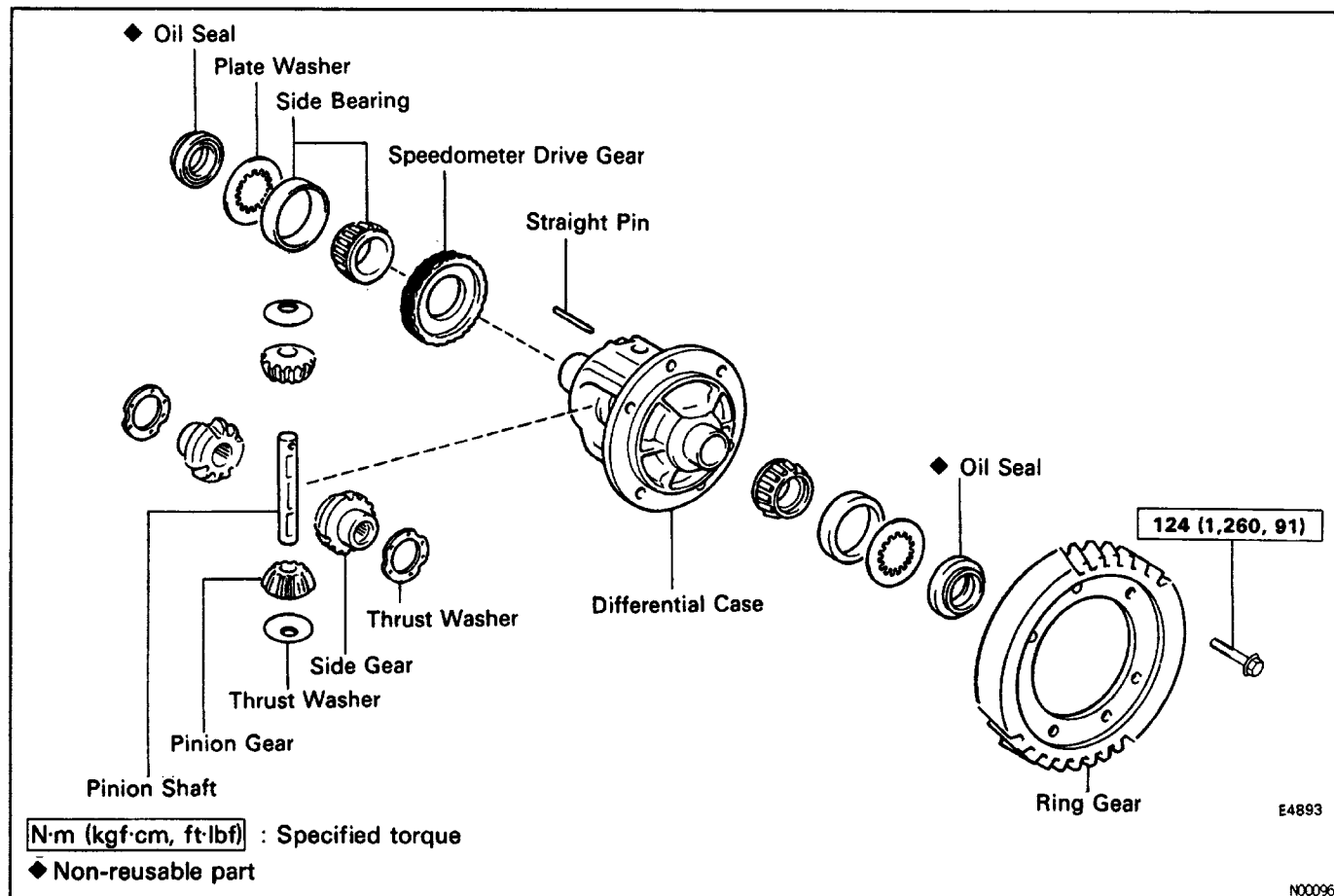
(a) Install the No.2 compression spring and No.2 select spring seat.



(b) Using a screwdriver and hammer, tap in the E-ring.

# DIFFERENTIAL CASE COMPONENTS

MX00V-01



## DIFFERENTIAL CASE DISASSEMBLY

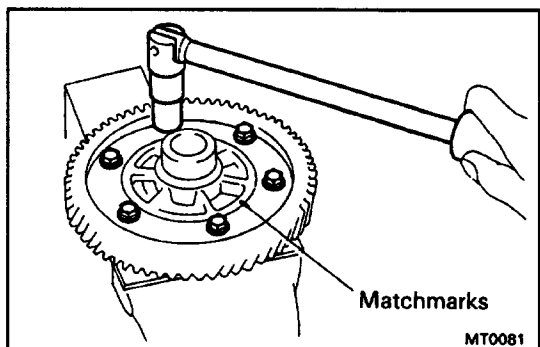
MX00W-06

### 1. REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

(a) Using SST, remove the bearings from both sides of the case.

SST 09950-00020, 09950-00030

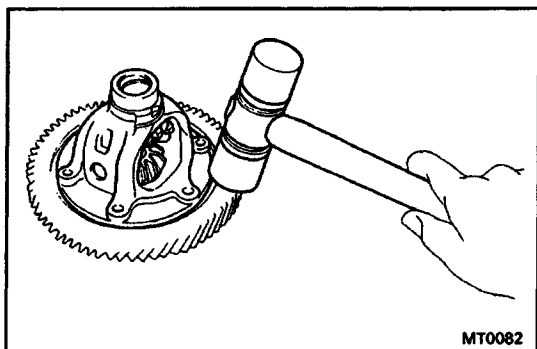
(b) Remove the speedometer drive gear from the RH side.



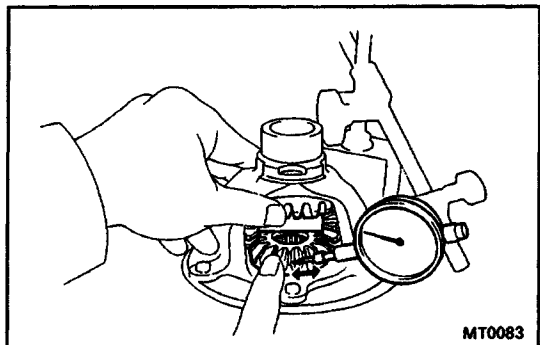
### 2. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and the case.

(b) Remove the 6 bolts.



(c) Using a plastic hammer, tap on the ring gear to remove it from the case.



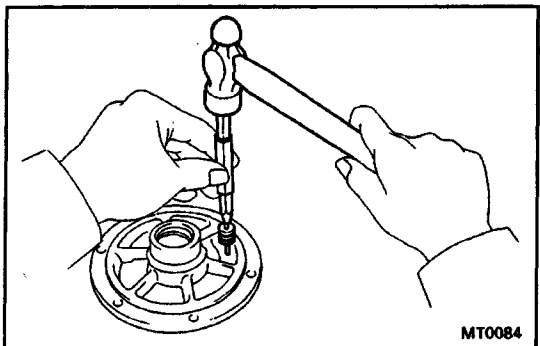
### 3. INSPECT SIDE GEAR BACKLASH

Using a dial indicator, measure the backlash of the side gear while holding a pinion toward the case.

**Standard backlash:**

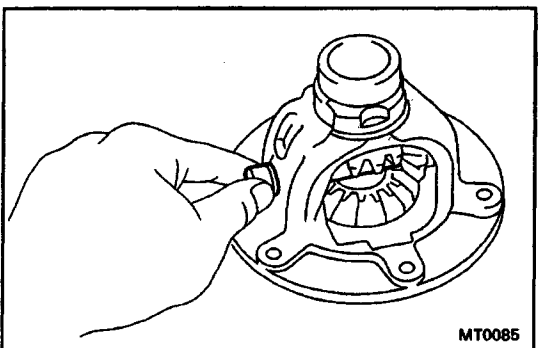
**0.05-0.20 mm (0.0020-0.0079 in.)**

If the backlash does not meet specification, install the correct thrust washer to the side gears.



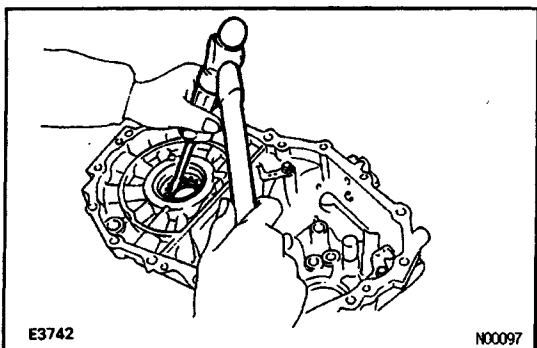
### 4. DISASSEMBLE DIFFERENTIAL CASE

(a) Using a pin punch and hammer, drive out the pinion shaft lock pin.



(b) Remove the pinion shaft from the case.

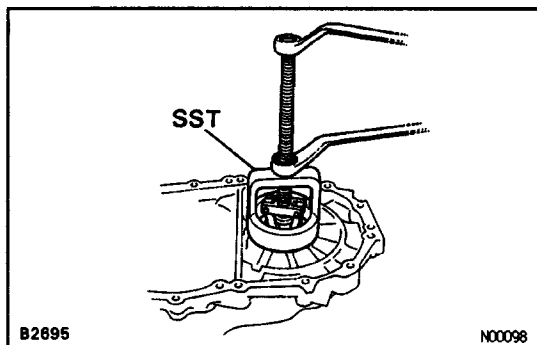
(c) Remove the 2 pinions and 2 side gears with the 4 thrust washers from each gear.



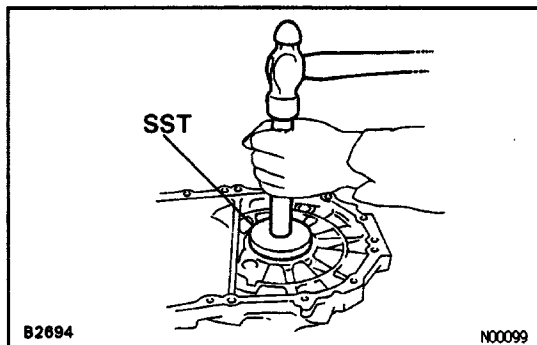
### 5. Transmission Case Side:

#### IF NECESSARY, REPLACE OIL SEAL AND SIDE BEARING OUTER RACE

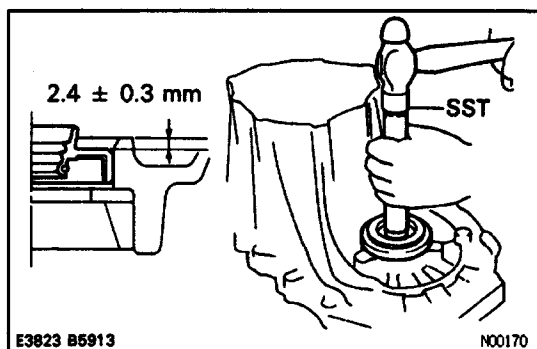
(a) Using a screwdriver and hammer, drive out the oil seal.



- (b) Using SST, pull out the outer race and shim.  
SST 09612-65014  
(c) Place the shim into the case.



- (d) Using SST and a hammer, drive in a new outer race.  
SST 09608-20012 (09608-03020, 09608-03090)

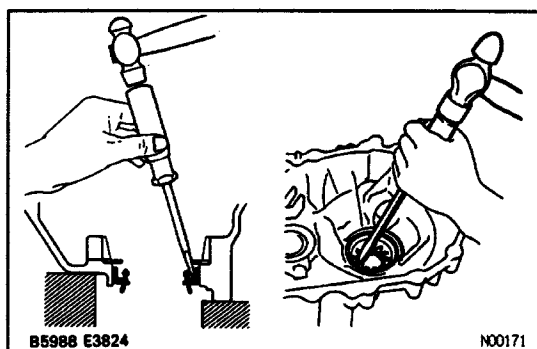


- (e) Using SST and a hammer, drive in a new oil seal.  
SST 09350-32014 (09351 -32111, 09351 -32130)

**Drive in depth:**

**2.1-2.7 mm (0.083-0.106 in.)**

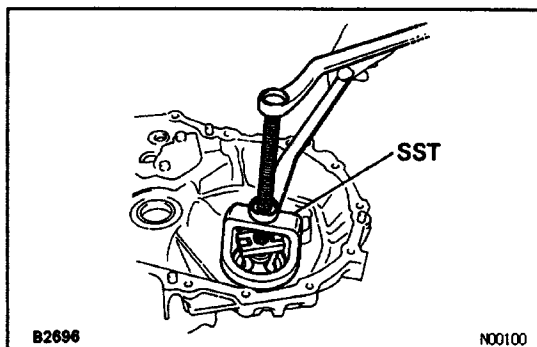
- (f) Coat the lip of the oil seal with MP grease.



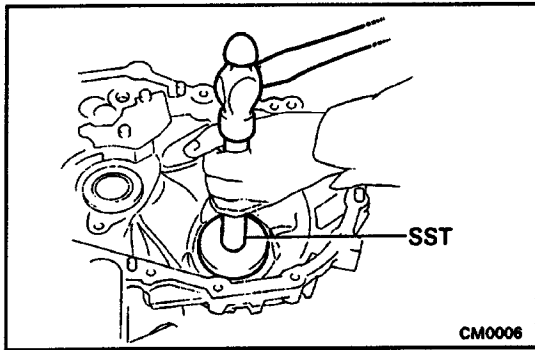
## 6. Transaxle Case Side:

### IF NECESSARY, REPLACE OIL SEAL AND SIDE BEARING OUTER RACE

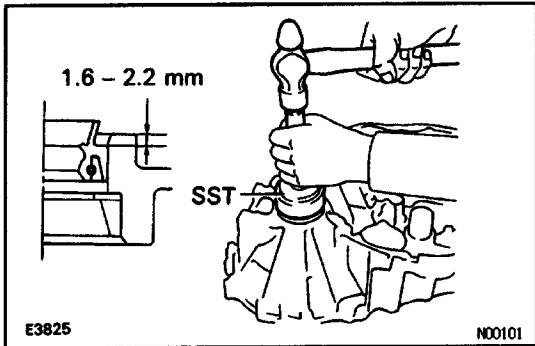
- (a) Using a screwdriver and hammer, drive out the oil seal.



- (b) Using SST, pull out the outer race and shim.  
SST 09612-65014  
(c) Place the shim into the case.



(d) Using SST and a hammer, drive in a new outer race.  
SST 09608 - 20012 (09608 - 03020, 09608 - 03060)

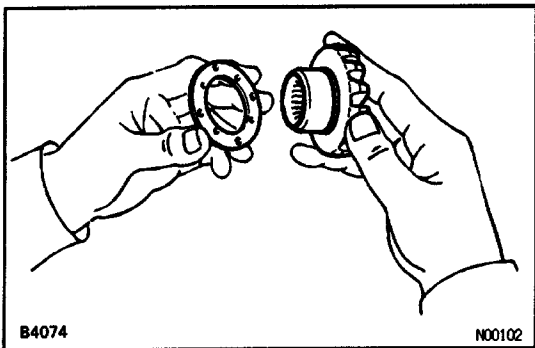


(e) Using SST and a hammer, drive in a new oil seal.  
SST 09350-32014 (09351 -32130, 09351-32150)

**Drive in depth:**

**1.6-2.2 mm (0.063-0.087 in.)**

(f) Coat the lip of the oil seal with IMP grease.



## DIFFERENTIAL CASE ASSEMBLY (See page [MX-44](#))

MX00X-08

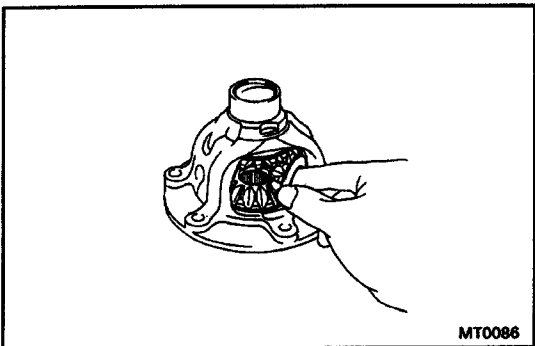
### 1. ASSEMBLE DIFFERENTIAL CASE

(a) Install the correct thrust washers and side gears. Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.

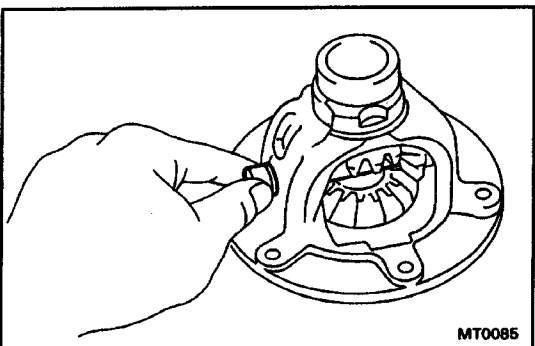
**Standard backlash:**

**0.05-0.20 mm (0.0020-0.0079 in.)**

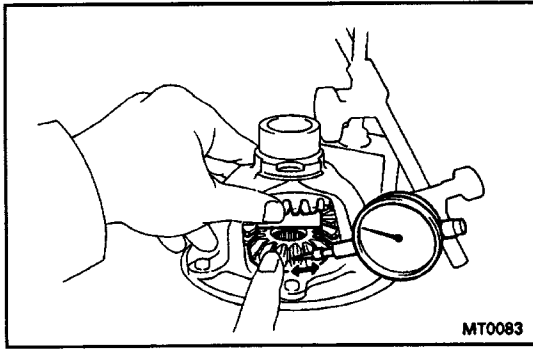
Thickness mm (in.)	Thickness mm (in.)
1.50 (0.0591)	1.65 (0.0650)
1.55 (0.0610)	1.70 (0.0669)
1.60 (0.0630)	1.75 (0.0689)



(b) Install the thrust washers and side gears in the differential case.



(c) Install the pinion shaft.

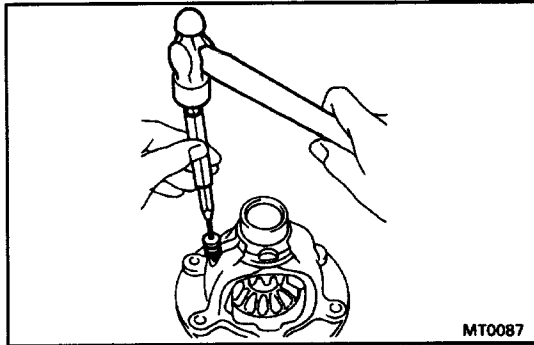


(d) Using a dial indicator, check the side gear backlash. Measure the side gear backlash while holding the pinion gear toward the case.

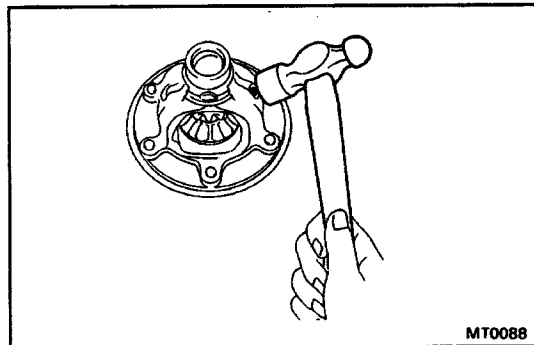
**Standard backlash:**

**0.05-0.20 mm (0.0020-0.0079 in.)**

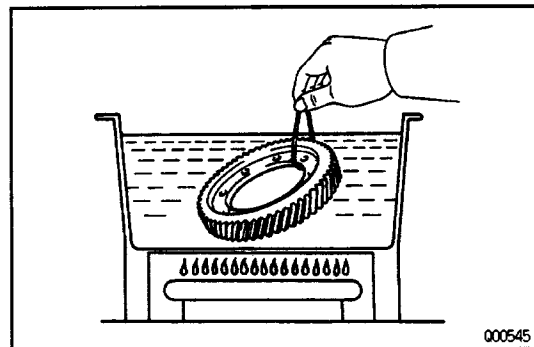
If the backlash is not within specification, install a thrust washer of different thickness.



(e) Using a pin punch and hammer, drive the lock pin through the case and hole in the pinion shaft.



(f) Stake the differential case.

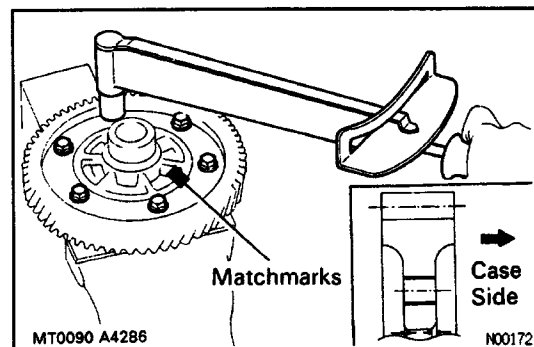


## 2. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surface of the differential case and the threads of the ring gear and differential case.

(b) Heat the ring gear in boiling water.

(c) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

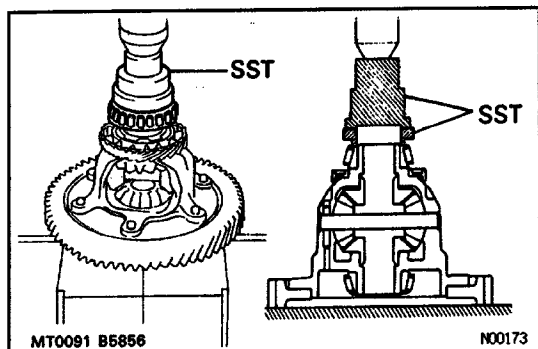


(d) Then quickly install the ring gear on the differential case.

(e) Align the matchmarks on the ring gear and differential case.

(f) Install the 6 set bolts. Tighten the set bolts uniformly and a little at a time in succession. Torque the bolts.

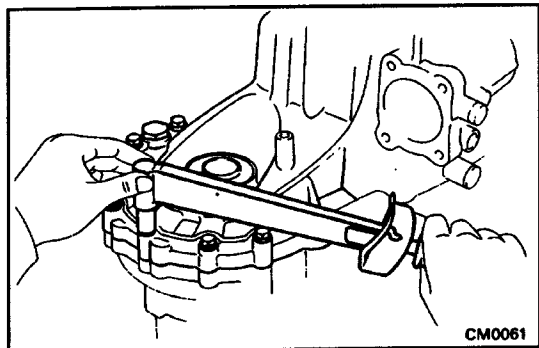
**Torque: 124 N-m (1,260 kgf-cm, 91 ft-lbf)**



### 3. INSTALL SIDE BEARINGS

- Install the speedometer drive gear to the RH side.
- Using SST and a press, press the side bearings to the both sides of the case.

SST 09350-32014 (09351-32090, 09351-32120)



### 4. MEASURE DIFFERENTIAL SIDE BEARING PRE-LOAD

- Install the differential to the transaxle case.
- Install the transmission case.
- Install and torque the case bolts.

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

- Using SST and small torque wrench, measure the preload.

SST 09564-32011

**Preload (at starting):**

**Now bearing**

**0.8-1.6 N-m (8-16 kgf-cm, 6.9-13.9 in.-lbf)**

**Reused bearing**

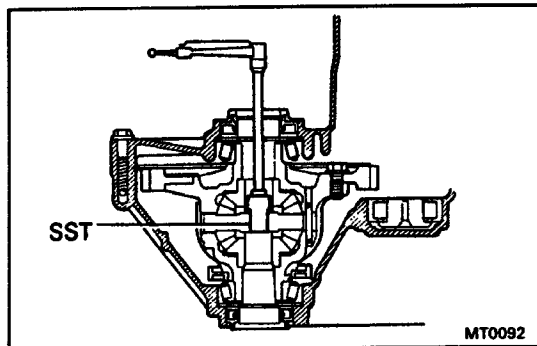
**0.5-1.0 N-m (5-10 kgf-cm, 4.3-8.7 in.-lbf)**

If the preload is not within specification, remove the transmission case side outer race of the side bearing with SST.

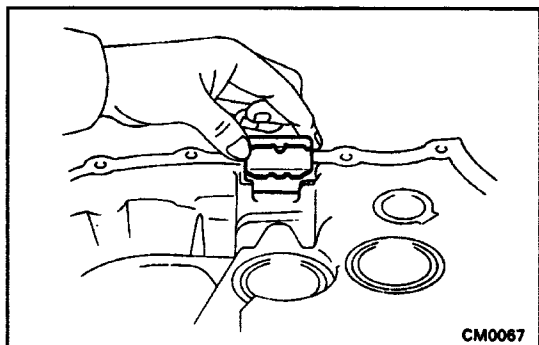
(See step 6 on page [MX-46](#) )

Select another shim.

HINT: The preload will change about 0.3-0.4 N-m (3-4 kgf-cm, 2.6-3.5 in.-lbf) with each shim thickness.



Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
<b>A</b>	2.10 (0.0827)	<b>L</b>	2.80 (0.1024)
<b>B</b>	2.15 (0.0846)	<b>M</b>	2.65 (0.1043)
<b>C</b>	2.20 (0.0866)	<b>N</b>	2.70 (0.1063)
<b>D</b>	2.25 (0.0886)	<b>P</b>	2.75 (0.1083)
<b>E</b>	2.30 (0.0906)	<b>Q</b>	2.80 (0.11083)
<b>F</b>	2.35 (0.0925)	<b>R</b>	2.85 (0.1122)
<b>G</b>	2.40 (0.0945)	<b>S</b>	2.90 (0.1142)
<b>H</b>	2.45 (0.0965)	<b>T</b>	2.95 (0.1161)
<b>J</b>	2.50 (0.0984)	<b>U</b>	3.00 (0.1181)
<b>K</b>	2.55 (0.1004)		



## COMPONENT PARTS INSTALLATION BASIC SUBASSEMBLY REASSEMBLY

(See pages [MX-13](#) to [MX-15](#))

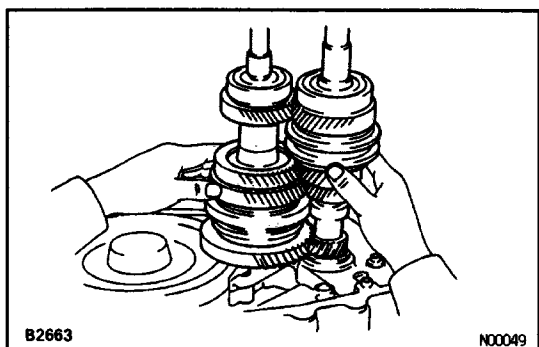
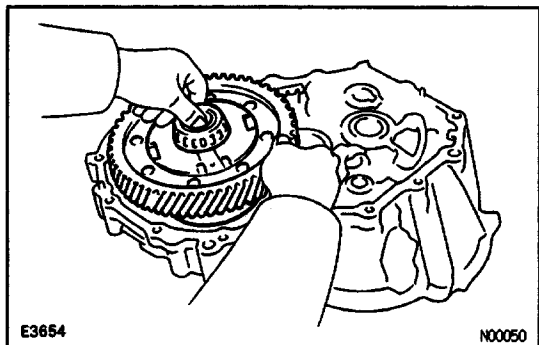
HINT: Coat all of the sliding and rotating surface with gear oil before assembly.

### 1. MEASURE DIFFERENTIAL SIDE BEARING PRE-LOAD

(See page [MX-49](#))

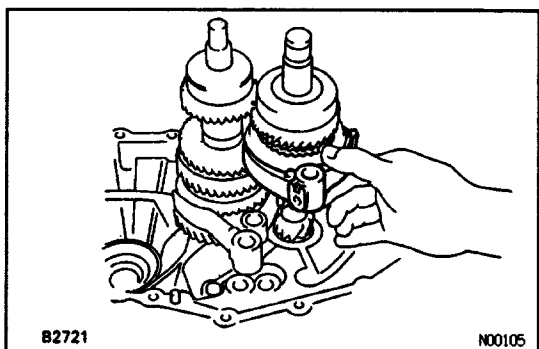
### 2. INSTALL MAGNET TO TRANSAXLE CASE

### 3. INSTALL DIFFERENTIAL CASE ASSEMBLY



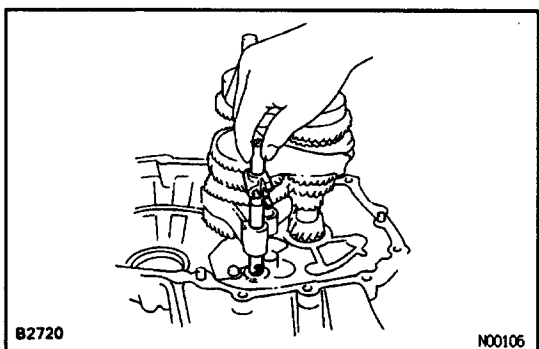
### 4. INSTALL INPUT AND OUTPUT SHAFTS

Install the input and output shafts together.

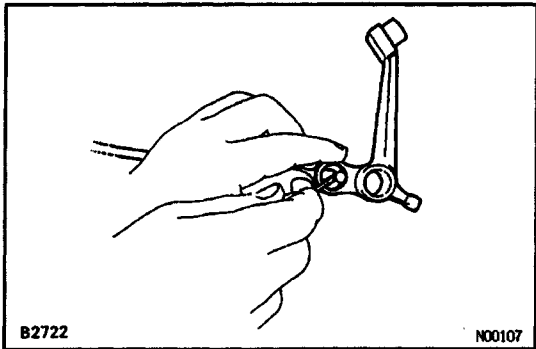


### 5. INSTALL SHIFT FORKS AND SHIFT FORK SHAFTS

(a) Place the No.1 and No.2 shift forks into the groove of No.1 and No.2 hub sleeves.

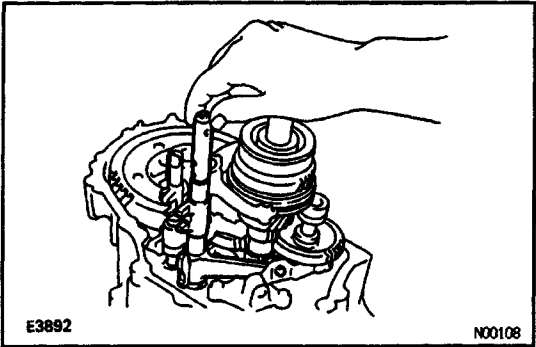


(b) Install the No.1 fork shaft into the No.1 shift fork hole.

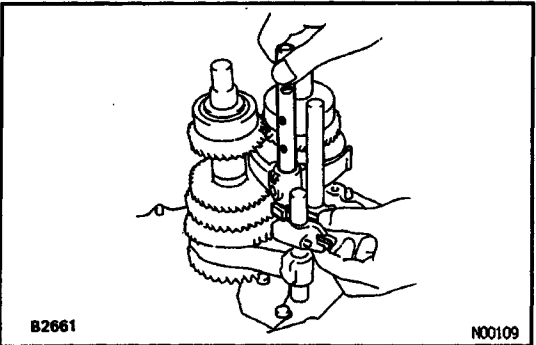


(c) C150:

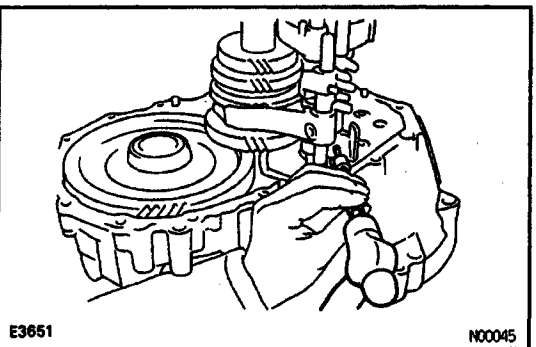
Install the 2 interlock balls into the reverse shift fork hole.



(d) Install the No.3 fork shaft and the reverse shift fork.

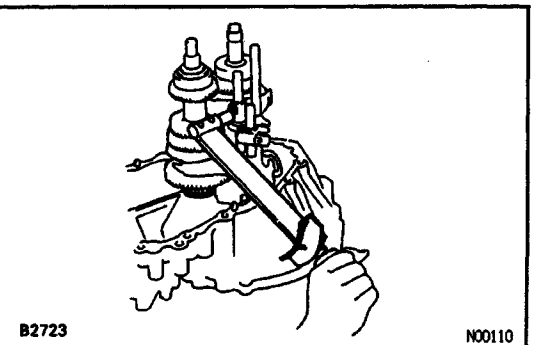


(e) Install the No.2 fork shaft and the shift head.



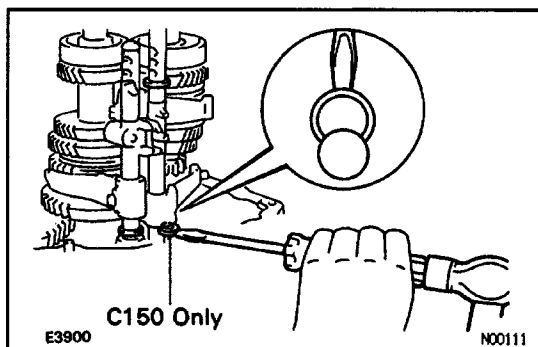
(f) C141:

Using a pin punch and hammer, drive in the slotted spring pin to the reverse shift head.



(g) Install the 3 bolts.

Torque: 16 N-m (160 kgf-cm, 12 ft-lbf)



(h) C150:

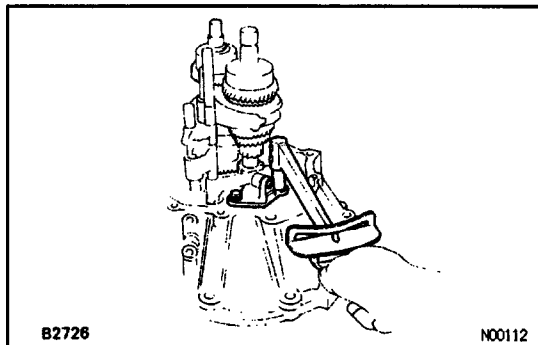
Using a screwdriver and hammer, tap in the 3 snap rings.

C141:

Using a screwdriver and hammer, tap in the 2 snap rings.

(i) C141:

Using a pin punch and hammer, drive in the slotted spring pin into the reverse shift fork.

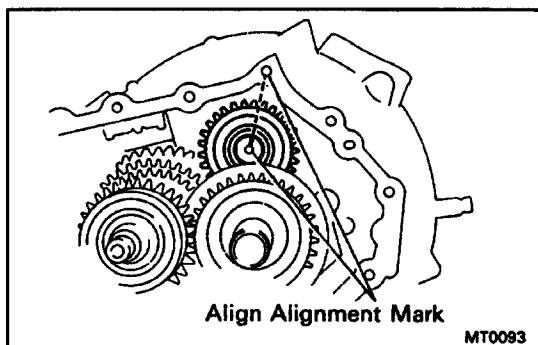


## 6. INSTALL REVERSE SHIFT ARM BRACKET

(a) Put the reverse shift fork pivot into the reverse shift arm and install the reverse shift arm bracket to the transaxle case.

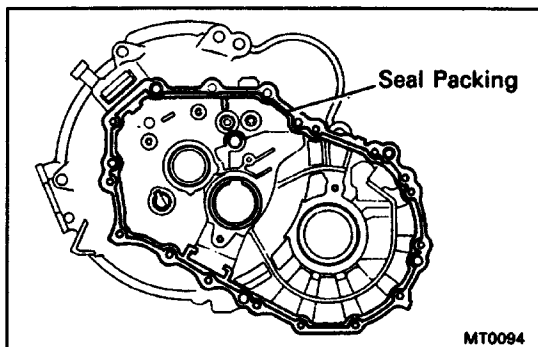
(b) Install and torque the bolts.

**Torque: 17 N-m (175 kgf-cm, 13 ft-lbf)**



## 7. INSTALL REVERSE IDLER GEAR, THRUST WASHER AND SHAFT

Install the reverse idler gear, thrust washer and shaft, as shown.



## 8. INSTALL TRANSMISSION CASE

(a) Remove any packing material and be careful not to drop oil on the contacting surface of the transaxle case or transmission case.

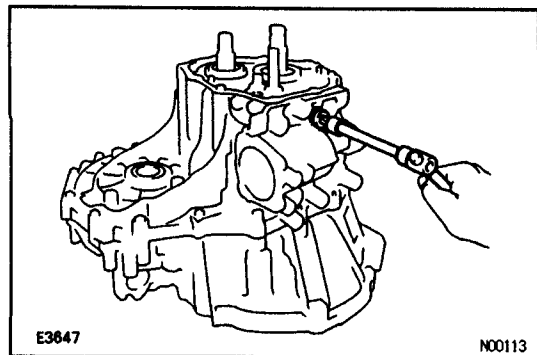
(b) Apply seal packing to the transaxle case, as shown in the figure.

**Seal packing:**

**Part No.08826-00090, THREE BOND 1281 or equivalent**

(c) Install and torque the 16 bolts.

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



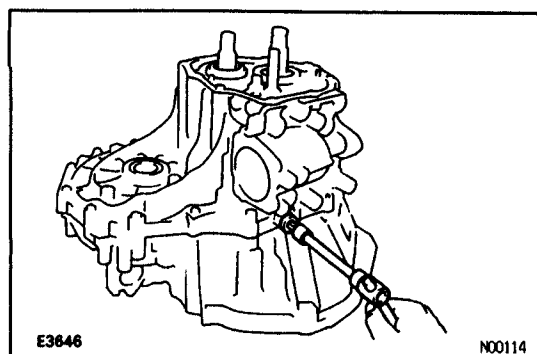
**9. C141:**  
**INSTALL PLUG**

- (a) Apply sealant to the plug thread.

**Sealant:**

**Part No.08833 - 00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

- (b) Using a hexagon wrench, tighten the plug.  
**Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)**



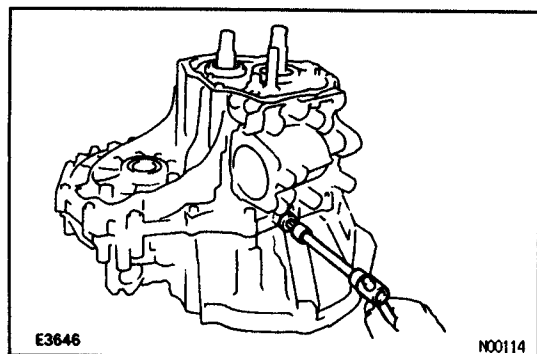
**10. C150:**  
**INSTALL LOCK BALL ASSEMBLY**

- (a) Apply sealant to the lock ball assembly thread.

**Sealant:**

**Part No.08833-00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

- (b) Using a hexagon wrench, tighten the lock ball assembly.



**11. C141:**  
**INSTALL STRAIGHT SCREW PLUG**

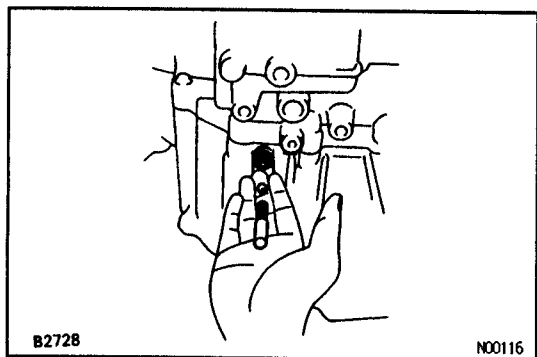
- (a) Apply sealant to the straight screw plug thread.

**Sealant:**

**Part No.08833-00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

- (b) Using a hexagon wrench, tighten the straight screw plug.

**Torque: 39 N-m (400 kgf-cm, 29 ft-lbf)**

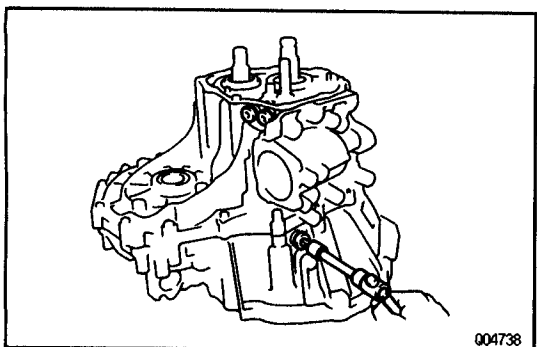


**12. INSTALL BALLS, SPRINGS, SEATS AND PLUGS**

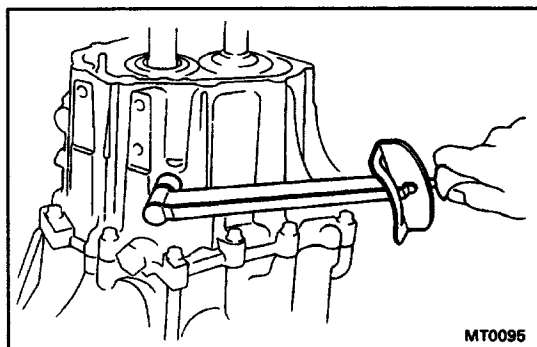
- (a) Install the balls, springs and seats into the holes.  
 (b) Apply sealant to the plugs threads.

**Sealant:**

**Part No.08833-00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

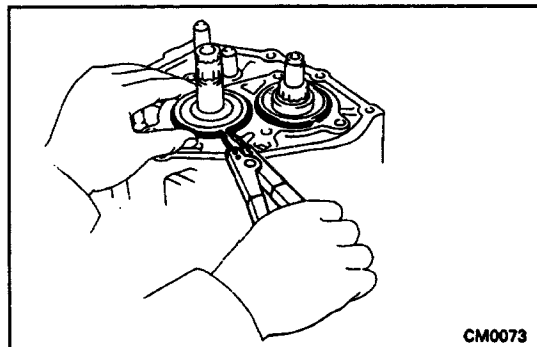


- (c) Using a hexagon wrench, tighten the 3 plugs.  
**Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)**



### 13. INSTALL AND TORQUE REVERSE IDLER GEAR SHAFT LOCK BOLT

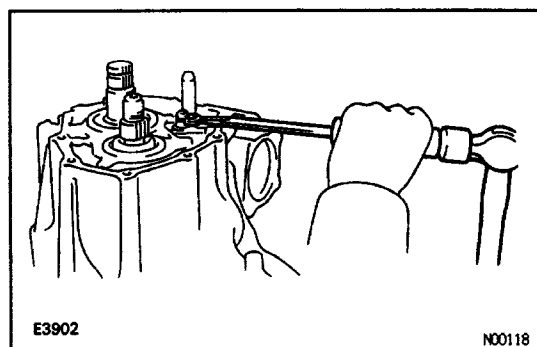
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)



### 14. INSTALL BEARING SNAP RINGS

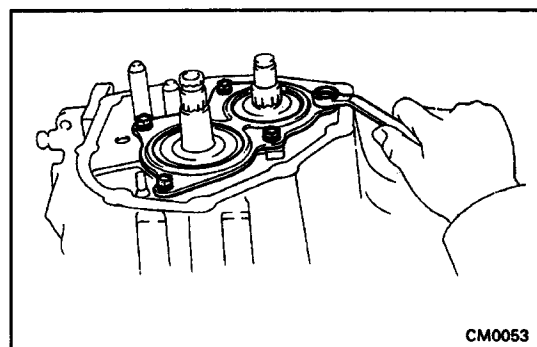
Using a snap ring expander, install the 2 snap rings.

HINT: If it is difficult to install the snap rings, pull up the shafts.



### 15. INSTALL SNAP RING TO NO.2 FORK SHAFT

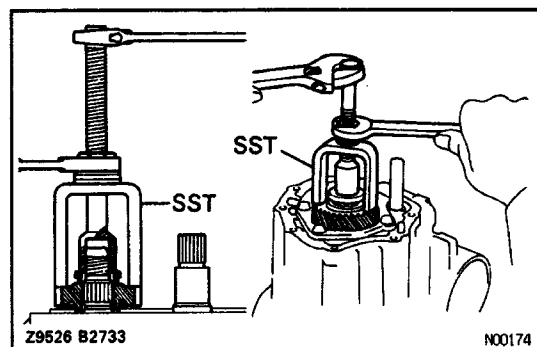
Using a screwdriver and hammer, tap in the snap ring.



### 16. INSTALL REAR BEARING RETAINER

Install and torque the 5 bolts.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

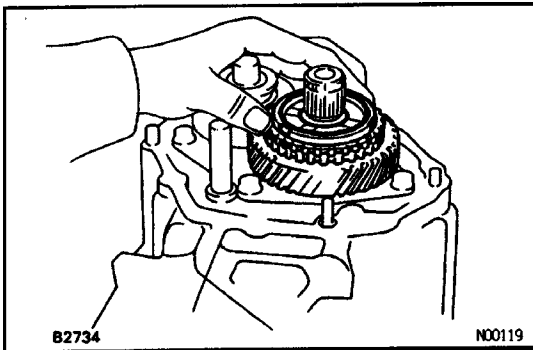


### 17. C150:

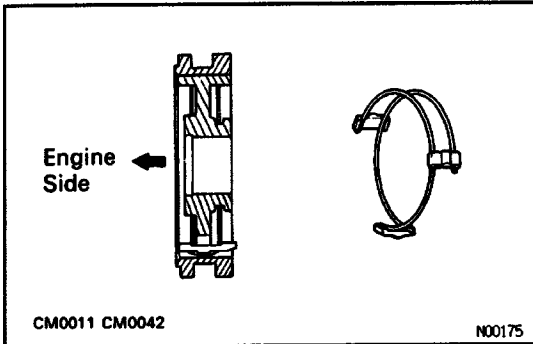
#### INSTALL 6TH DRIVEN GEAR

Using SST, install the 5th driven gear.

SST 09309-12020

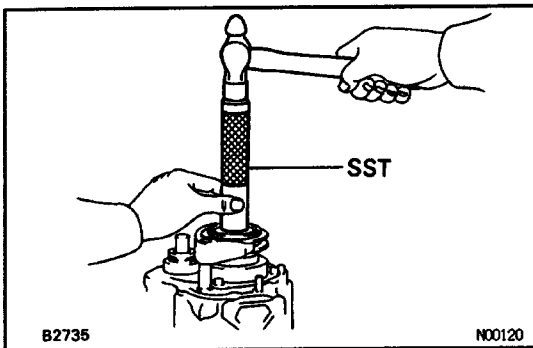
**18. C150:****INSTALL SPACER, NEEDLE ROLLER BEARINGS, 5 TH GEAR AND SYNCHRONIZER RING**

- (a) Install the spacer.
- (b) Apply gear oil to the needle roller bearings.
- (c) Install the 5th gear with the needle roller bearings and synchronizer ring.

**18. C150:****INSERT NO.3 CLUTCH HUB INTO HUB SLEEVE**

- (a) Install the clutch hub and shifting keys to the hub sleeve.
- (b) Install the shifting key springs under the shifting keys.

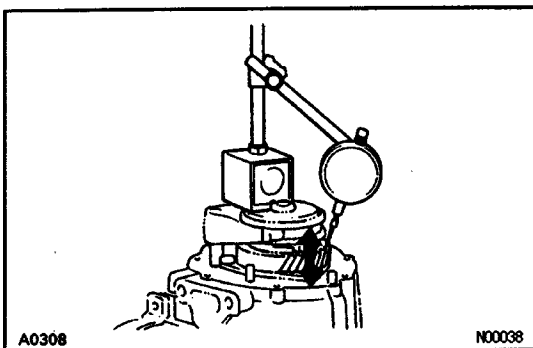
**NOTICE:** Install the key springs positioned so that their end gaps are not in line.

**20. C150:****INSTALL NO.3 HUB SLEEVE ASSEMBLY WITH NO. 3 SHIFT FORK**

- (a) Support the tip of the input shaft with a spacer or such to raise the transaxle assembly.
- (b) Using SST and a hammer, drive in No.3 hub sleeve with shift fork.

SST 09612 - 22011

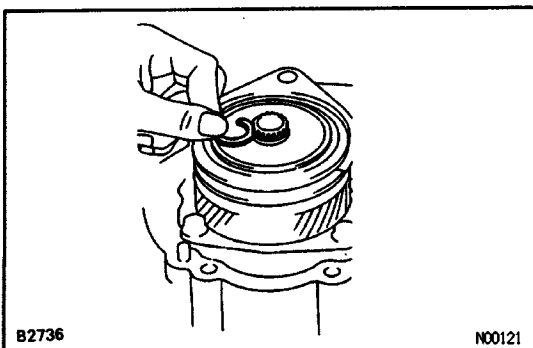
**NOTICE:** Align the synchronizer ring slots with the shifting keys.

**21. C150:****MEASURE 5TH GEAR THRUST CLEARANCE**

Using a dial indicator, measure the thrust clearance.

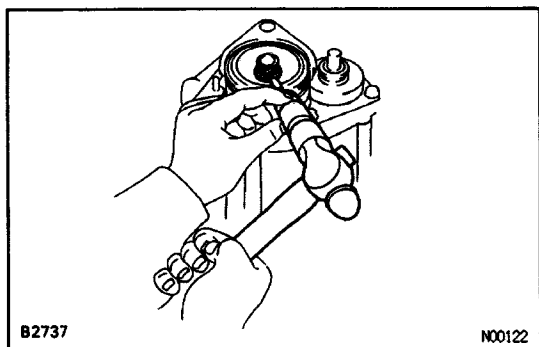
**Standard clearance:**

0.10-0.57 mm (0.0039-0.0224 in.)

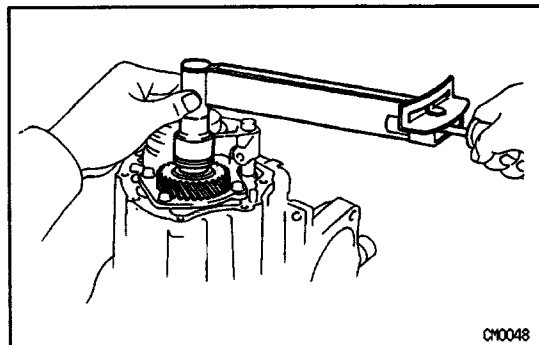
**22. C150:****INSTALL SNAP RING**

- (a) Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
<b>A</b>	2.25 (0.0886)	<b>E</b>	2.49 (0.0980)
<b>B</b>	2.31 (0.0909)	<b>F</b>	2.55 (0.1004)
<b>C</b>	2.37 (0.0933)	<b>G</b>	2.61 (0.1028)
<b>D</b>	2.43 (0.0957)		



(b) Using a screwdriver and hammer, tap in the snap ring.



### 23. INSTALL LOCK NUT

(a) Engage the gear double meshing.

(b) C141:

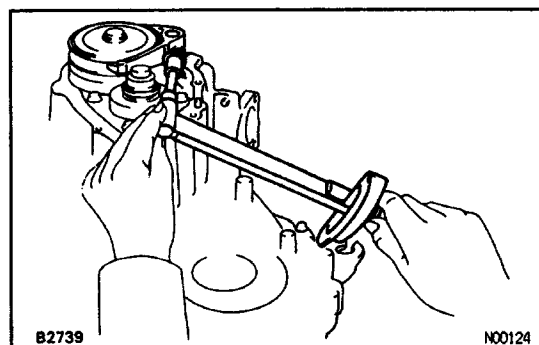
Install the spacer.

(c) Install and torque the nut.

**Torque: 118 N-m (1,200 kgf-cm, 87 ft-lbf)**

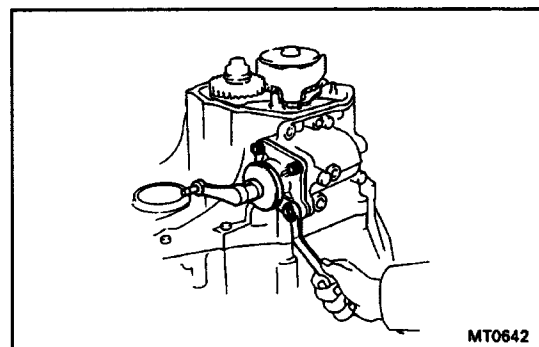
(d) Disengage the gear double meshing.

(e) Stake the lock nut.



### 24. C150: INSTALL BOLT

**Torque: 16 N-m (160 kgf-cm, 12 ft-lbf)**



### 25. INSTALL SHIFT AND SELECT LEVER SHAFT ASSEMBLY

(a) Place a new gasket in position on the control shaft cover.

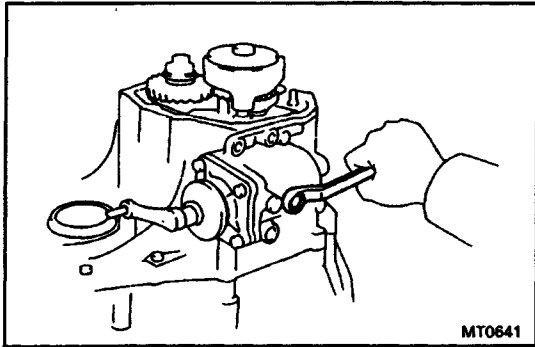
(b) Apply sealant to the bolt threads.

**Sealant:**

**Part No.08833-00080, THREE BOND 1344, LOC-TITE 242 or equivalent**

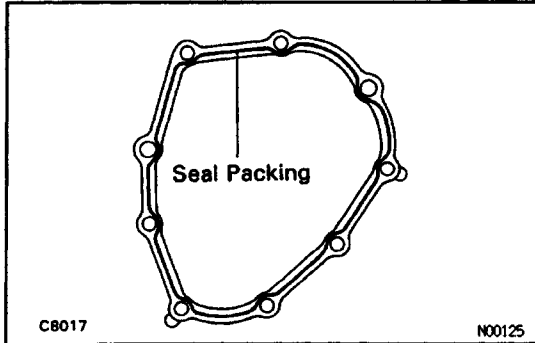
(c) Install the shift and select lever shaft and torque the bolts.

**Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)**

**26. INSTALL LOCK BOLT**

Install and torque the lock bolt.

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

**27. INSTALL TRANSMISSION CASE COVER**

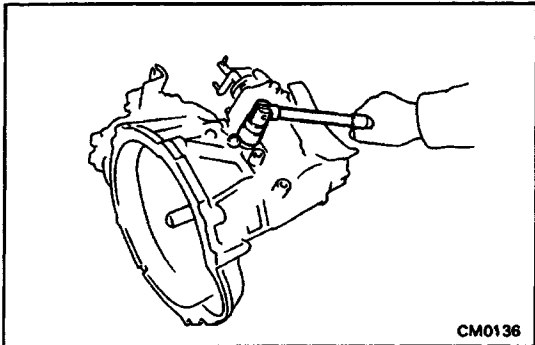
(a) Apply seal packing to the transmission case, as shown in the figure.

**Seal packing:**

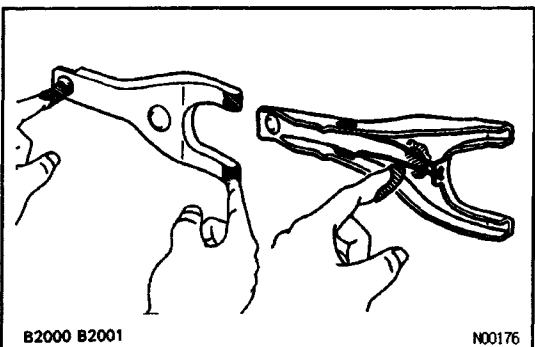
**Part No.08826-00090, THREE BOND 1281 or equivalent**

(b) Install and torque the 9 bolts.

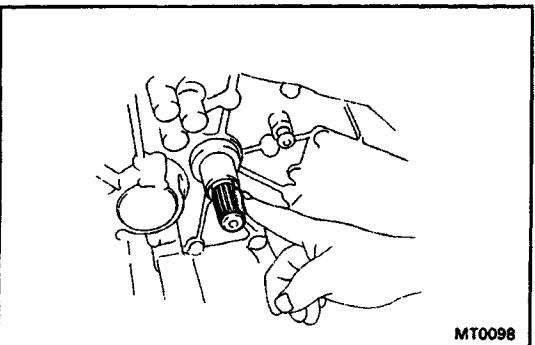
**Torque: 18 N-m (185 kgf-cm, 13 ft-lbf)**

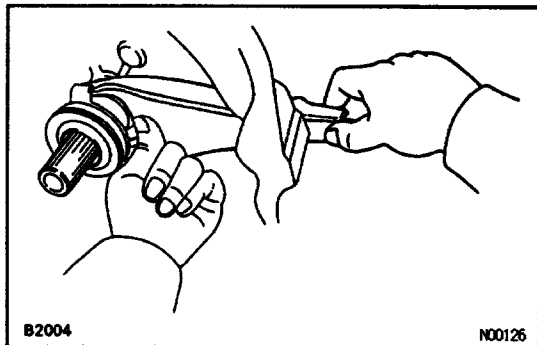
**28. INSTALL SELECTING BELLCRANK****29. INSTALL CONTROL LEVER HOUSING SUPPORT BRACKET****30. INSTALL BACK-UP LIGHT SWITCH**

**Torque: 40 N-m (410 kgf-cm, 30 ft-lbf)**

**31. INSTALL SPEEDOMETER DRIVEN GEAR****32. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) TO FOLLOWING PARTS:**

- (a) Release fork and hub contact point.
- (b) Release fork and push rod contact point.
- (c) Release fork pivot point.

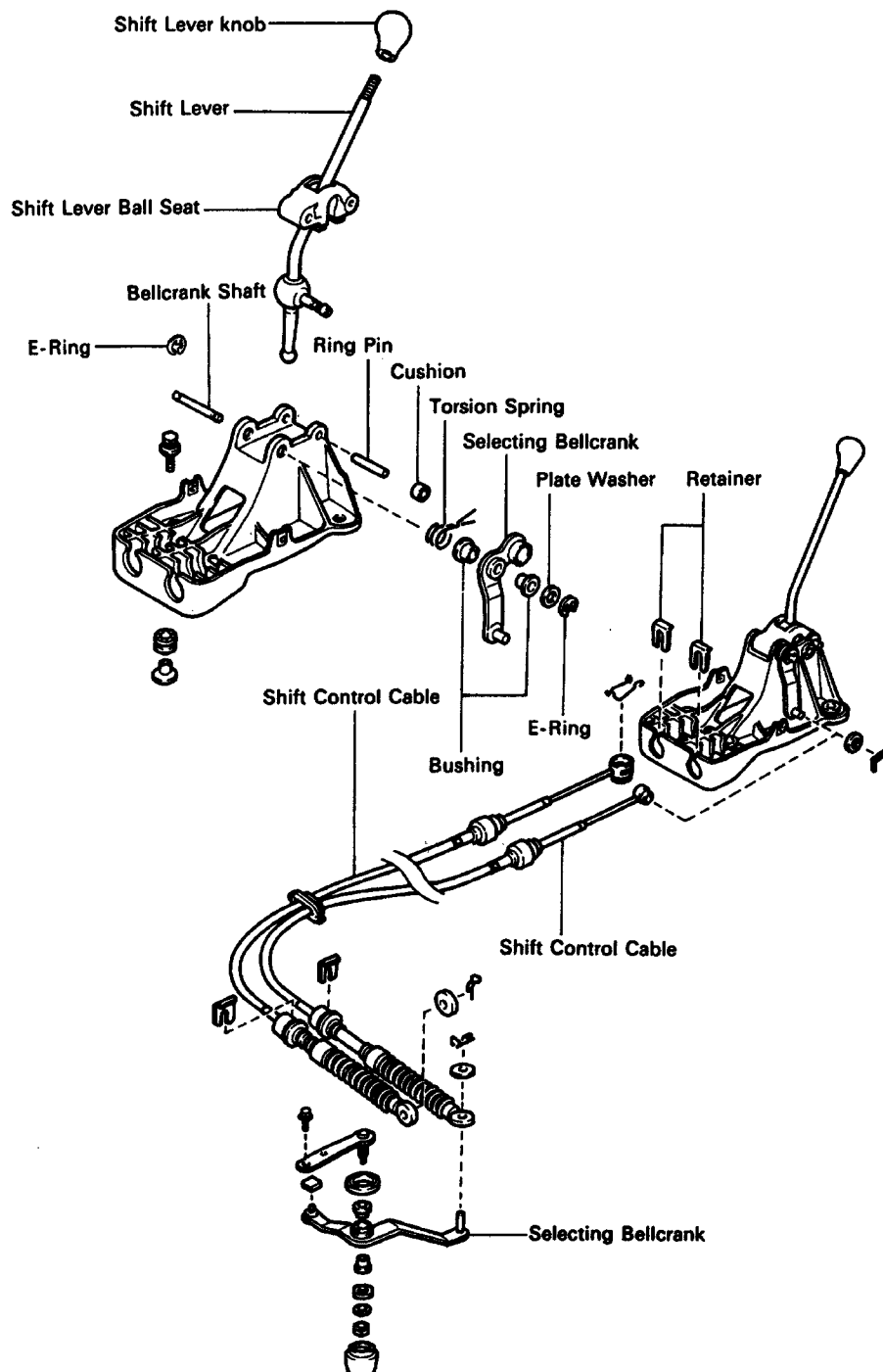
**33. APPLY SPLINE GREASE TO CLUTCH DISC SPLINE**

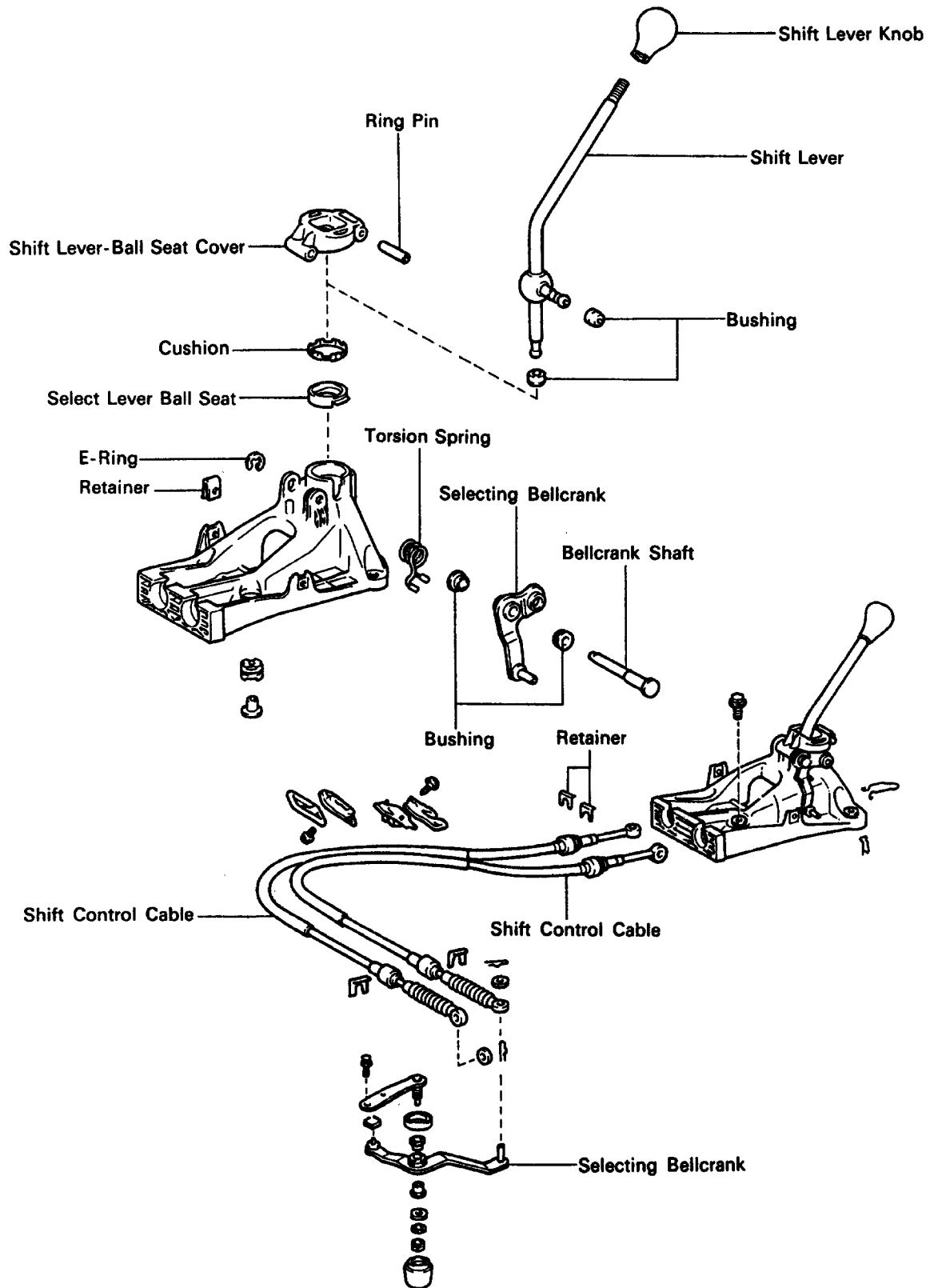


### 34. INSTALL RELEASE BEARING AND FORK TO TRANSAXLE

## SHIFT LEVER AND CONTROL CABLE COMPONENTS

HINT: There are 2 types of shift lever assembly.  
Refer to the illustrations below when performing repairs.





# SERVICE SPECIFICATIONS

MX011-04

## SERVICE DATA

Input shaft roller bearing journal diameter	
Limit	24.970 mm (0.9831 in.)
Input shaft 3rd gear journal diameter	
Limit	30.970 mm (1.2193 in.)
Input shaft 4th gear journal diameter	
Limit	28.970 mm (1.1405 in.)
Input shaft 5th gear journal diameter (for C150)	
Limit	24.870 mm (0.9791 in.)
Input shaft runout	
Limit	0.05 mm (0.0020 in.)
Output shaft roller bearing journal diameter	
Limit	32.970 mm (1.2980 in.)
Output shaft 1st gear journal diameter	
Limit	37.970 mm (1.4949 in.)
Output shaft 2nd gear journal diameter	
Limit	31.970 mm (1.2587 in.)
Output shaft runout	
Limit	0.05 mm (0.0020 in.)
Gear thrust clearance 1st	
STD	0.10-0.40 mm (0.0039-0.0157 in.)
Limit	0.45 mm (0.0177 in.)
Gear thrust clearance 2nd	
STD	0.10-0.45 mm (0.0039-0.0177 in.)
Limit	0.50 mm (0.0197 in.)
Gear thrust clearance 3rd	
STD	0.10-0.35 mm (0.0039-0.0138 in.)
Limit	0.40 mm (0.0157 in.)
Gear thrust clearance 4th	
STD	0.10-0.55 mm (0.0039-0.0217 in.)
Limit	0.60 mm (0.0236 in.)
Gear thrust clearance 5th (for C150)	
STD	0.10-0.57 mm (0.0039-0.0224 in.)
Limit	0.65 mm (0.0256 in.)
1 st, 2nd, 3rd, 4th and 5th (for C150) gear radial clearance	
STD	0.015-0.058 mm (0.006-0.0023 in.)
Limit	0.070 mm (0.0028 in.)
Shift fork to hub sleeve clearance	
Limit	1.0 mm (0.039 in.)
Synchronizer ring to gear clearance	
Limit	0.6 mm (0.024 in.)

Input shaft snap ring thickness		
No.2 clutch hub	Mark A	2.30 mm (0.0906 in.)
No.2 clutch hub	Mark B	2.36 mm (0.0929 in.)
No.2 clutch hub	Mark C	2.42 mm (0.0953 in.)
No.2 clutch hub	Mark D	2.48 mm (0.0976 in.)
No.2 clutch hub	Mark E	2.54 mm (0.1000 in.)
No.2 clutch hub	Mark F	2.60 mm (0.1024 in.)
No.3 clutch hub (for C150)	Mark A	2.25 mm (0.0886 in.)
No.3 clutch hub (for C150)	Mark B	2.31 mm (0.0909 in.)
No.3 clutch hub (for C150)	Mark C	2.37 mm (0.0933 in.)
No.3 clutch hub (for C150)	Mark D	2.43 mm (0.0957 in.)
No.3 clutch hub (for C150)	Mark E	2.49 mm (0.0980 in.)
No.3 clutch hub (for C150)	Mark F	2.55 mm (0.1004 in.)
No.3 clutch hub (for C150)	Mark G	2.61 mm (0.1028 in.)
Input shaft rear bearing	Mark A	2.29 mm (0.0902 in.)
Input shaft rear bearing	Mark B	2.35 mm (0.0925 in.)
Input shaft rear bearing	Mark C	2.41 mm (0.0949 in.)
Input shaft rear bearing	Mark D	2.47 mm (0.0972 in.)
Input shaft rear bearing	Mark E	2.53 mm (0.0996 in.)
Input shaft rear bearing	Mark F	2.59 mm (0.1020 in.)
Output shaft snap ring thickness		
No.1 clutch hub	Mark A	2.50 mm (0.0984 in.)
No.1 clutch hub	Mark B	2.56 mm (0.1008 in.)
No.1 clutch hub	Mark C	2.62 mm (0.1031 in.)
No.1 clutch hub	Mark D	2.68 mm (0.1055 in.)
No.1 clutch hub	Mark E	2.74 mm (0.1079 in.)
No.1 clutch hub	Mark F	2.80 mm (0.1102 in.)
Differential side gear backlash		0.05-0.20 mm (0.0020-0.0079 in.)
Differential side gear thrust washer thickness		
	None Mark	1.50 mm (0.0591 in.)
	None Mark	1.55 mm (0.0610 in.)
	None Mark	1.60 mm (0.0630 in.)
	None Mark	1.65 mm (0.0650 in.)
	None Mark	1.70 mm (0.0669 in.)
	None Mark	1.75 mm (0.0689 in.)
Differential side bearing preload (at starting)		
	New bearing	0.8-1.6 N-m 8-18 kgf-cm 6.9-13.9 in.-lbf
	Reused bearing	0.5-1.0 N-m 5-10 kgf-cm 4.3-8.7 in.-lbf

Side bearing adjusting shim thickness	
Mark A	2.10 mm (0.0827 in.)
Mark B	2.15 mm (0.0846 in.)
Mark C	2.20 mm (0.0866 in.)
Mark D	2.25 mm (0.0886 in.)
Mark E	2.30 mm (0.0906 in.)
Mark F	2.35 mm (0.0925 in.)
Mark G	2.40 mm (0.0945 in.)
Mark H	2.45 mm (0.0965 in.)
Mark J	2.50 mm (0.0984 in.)
Mark K	2.55 mm (0.1004 in.)
Mark L	2.60 mm (0.1024 in.)
Mark M	2.65 mm (0.1043 in.)
Mark N	2.70 mm (0.1063 in.)
Mark P	2.75 mm (0.1083 in.)
Mark Q	2.80 mm (0.1092 in.)
Mark R	2.85 mm (0.1122 in.)
Mark S	2.90 mm (0.1142 in.)
Mark T	2.95 mm (0.1161 in.)
Mark U	3.00 mm (0.1181 in.)
Shift lever vertical play	0.15 mm (0.0059 in.)

## TORQUE SPECIFICATIONS

Part tightened	N-m	kgf-cm	ft-lbf
Output shaft front bearing lock plate	<b>11</b>	115	<b>8</b>
Straight screw plug (reverse restrict pin)	<b>20</b>	200	<b>14</b>
Transmission case x Transaxle case	<b>29</b>	300	<b>22</b>
Reverse shift arm bracket	<b>17</b>	175	<b>13</b>
Straight screw plug (shift fork shaft)	<b>25</b>	250	<b>18</b>
Lock ball assembly	<b>39</b>	400	<b>29</b>
Straight screw plug (lock ball assembly)	<b>39</b>	400	<b>29</b>
Reverse idler shaft lock bolt	<b>29</b>	300	<b>22</b>
Rear bearing retainer	<b>19</b>	195	<b>14</b>
5th driven gear lock nut	<b>188</b>	1,200	<b>87</b>
Shift fork x Shift fork shaft	<b>16</b>	160	<b>12</b>
Shift and select lever assembly	<b>20</b>	200	<b>14</b>
Shift interlock plate lock bolt	<b>29</b>	300	<b>39</b>
Transmission case x Case cover	<b>18</b>	185	<b>13</b>
Back-up light switch	<b>40</b>	410	<b>30</b>
Transmission case protector	<b>13</b>	130	<b>9</b>
Filler plug	<b>39</b>	400	<b>29</b>
Drain plug	<b>39</b>	400	<b>29</b>
Ring gear x Differential case	<b>124</b>	1,260	<b>91</b>