
MANUAL TRANSAXLE (S50, S54)

TROUBLESHOOTING	MX-1
MANUAL TRANSAXLE UNIT	
(Diesel Engine)	MX-2
MANUAL TRANSAXLE UNIT	
(Gasoline Engine)	MX-8
MANUAL TRANSAXLE ASSEMBLY	MX-14
INPUT SHAFT	MX-25
OUTPUT SHAFT	MX-33
SHIFT AND SELECT LEVER SHAFT	MX-40
DIFFERENTIAL CASE	MX-41
SHIFT LEVER AND CONTROL CABLE	MX-48

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MX030-03

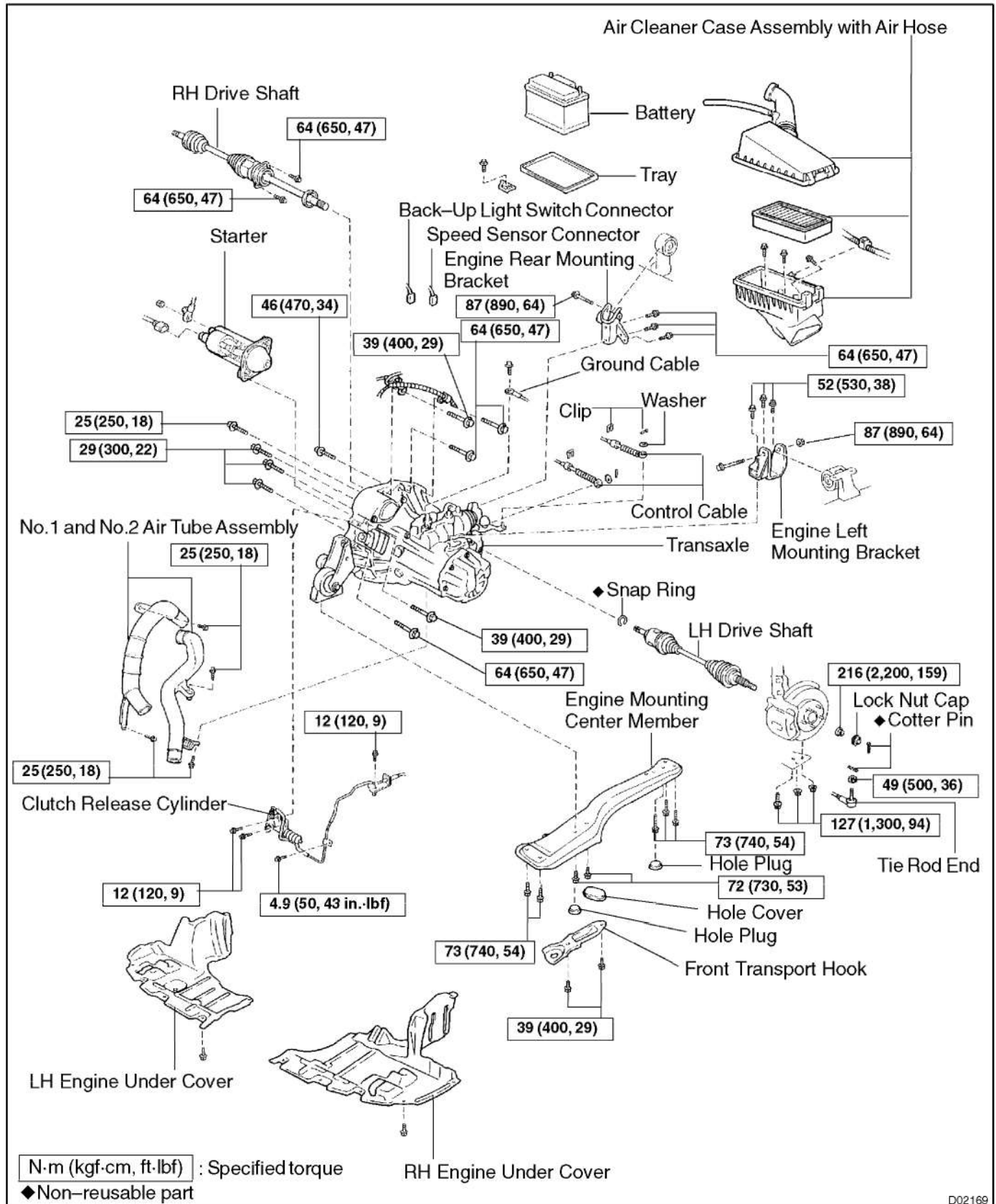
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace parts.

Symptom	Suspect Area	See page
Noise	1. Oil (Level low) 2. Oil (Wrong) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged)	MX-3 MX-9 MX-3 MX-9 MX-14 MX-14
Oil leakage	1. Oil (Level too high) 2. Gasket (Damaged) 3. Oil seal (Worn or damaged) 4. O-ring (Worn or damaged)	MX-3 MX-9 MX-14 MX-14 MX-14
Hard to shift or will not shift	1. Control cable (Faulty) 2. Synchronizer ring (Worn or damaged) 3. Shift key spring (Damaged)	MX-48 MX-14 MX-25 MX-33 MX-14 MX-25 MX-33
Jumps out of gear	1. Locking ball spring (Damaged) 2. Shift fork (Worn) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged)	MX-14 MX-14 MX-14 MX-14

MANUAL TRANSAXLE UNIT (Diesel Engine)

COMPONENTS

MX06J-01



D02169

REMOVAL

1. REMOVE BATTERY AND AIR CLEANER CASE ASSEMBLY WITH AIR HOSE

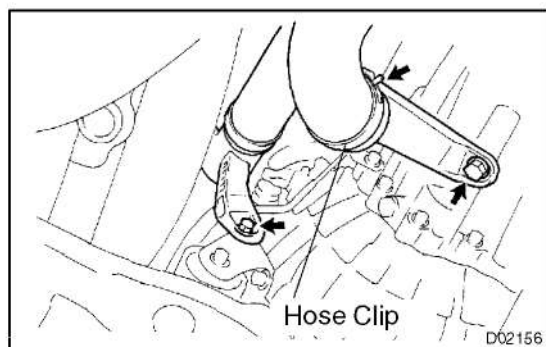
2. REMOVE NO.1 AND NO.2 AIR TUBE ASSEMBLY

- (a) Raise the vehicle.

NOTICE:

Make sure that the vehicle is securely supported.

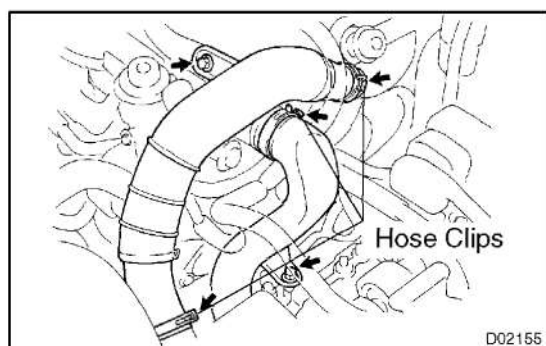
- (b) Remove LH and RH engine under covers.



- (c) Remove 2 lower side bolts of the No.1 and No.2 air tube assembly and disconnect the hose clip.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

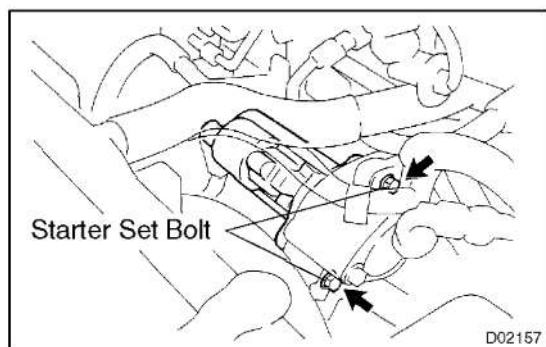
- (d) Lower the vehicle.



- (e) Remove the 2 upper side bolts of the No.1 and No.2 air tube assembly and disconnect 3 hose clips.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

- (f) Remove the No.1 and No.2 air tube assembly.

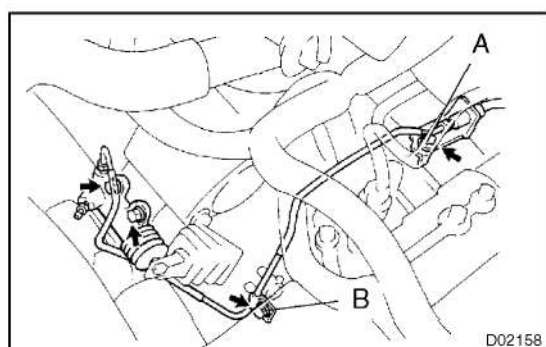


3. REMOVE STARTER

- (a) Disconnect the connector and wire from the starter.

- (b) Remove the 2 bolts and starter.

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



4. DISCONNECT CLUTCH RELEASE CYLINDER AND LINE

- (a) Remove the 2 set bolts of the clutch line bracket.

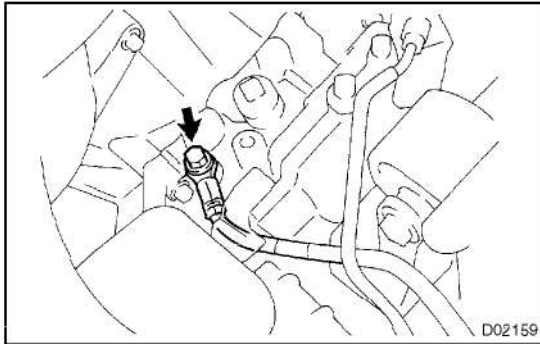
Torque:

Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)

Bolt B: 4.9 N·m (50 kgf·cm, 43 in·lbf)

- (b) Remove the 2 bolts and disconnect the clutch release cylinder and line.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



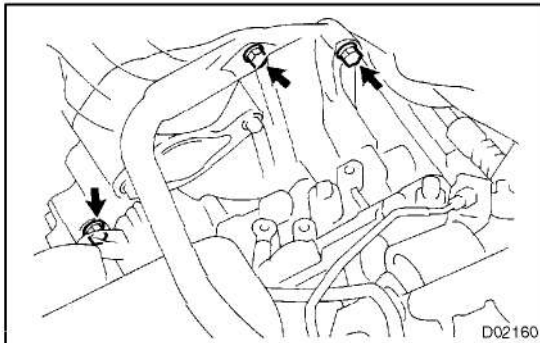
5. DISCONNECT GROUND CABLE

Remove the set bolt of the ground cable from the transaxle.

6. DISCONNECT CONTROL CABLE

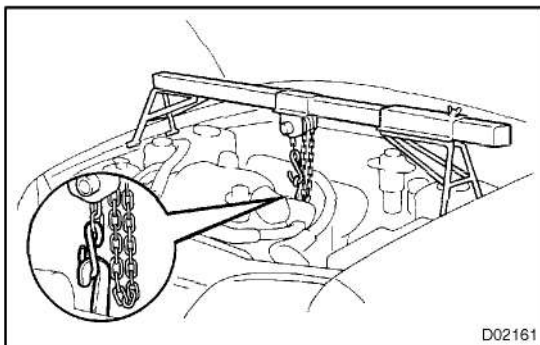
- Remove the 2 clips and washers.
- Remove the 2 clips from the cables.
- Disconnect the 2 control cables from the transaxle.

7. DISCONNECT BACK-UP LIGHT SWITCH AND SPEED SENSOR CONNECTORS

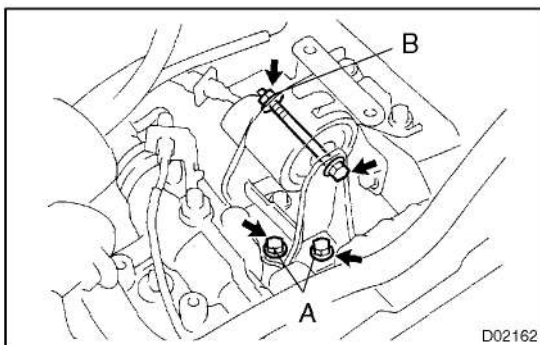


8. REMOVE 3 TRANSAXLE UPPER SIDE MOUNTING BOLTS

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



9. INSTALL ENGINE SUPPORT FIXTURE

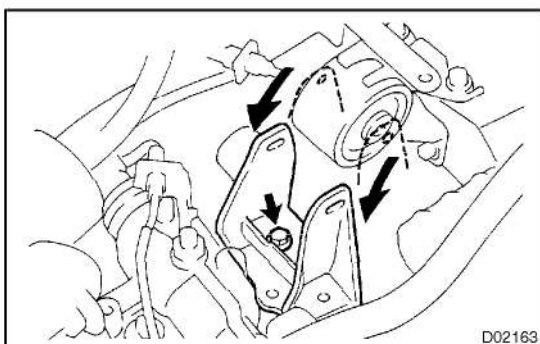


10. REMOVE ENGINE LEFT MOUNTING BRACKET 3 SET BOLTS AND NUT

Torque:

Bolt A: 52 N·m (530 kgf·cm, 38 ft·lbf)

Nut B: 87 N·m (890 kgf·cm, 64 ft·lbf)



11. REMOVE ENGINE LEFT MOUNTING BRACKET

Lower the transaxle side and remove the bolt and bracket.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

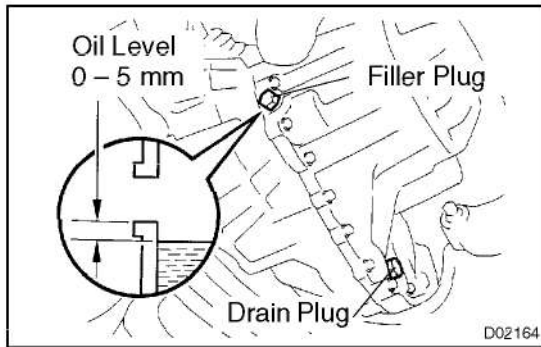
12. REMOVE FRONT WHEEL

Torque: 216 N·m (2,200 kgf·cm, 159 ft·lbf)

13. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

**14. DRAIN TRANSAXLE OIL**

Oil grade: API GL-4 or GL-5

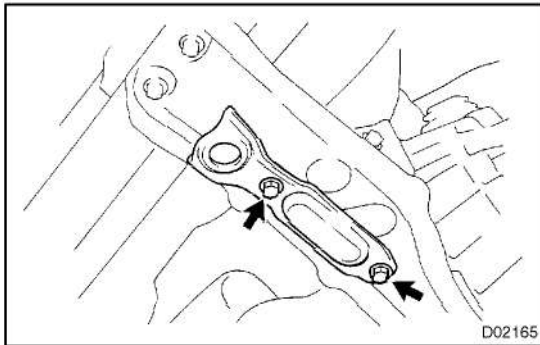
Viscosity: SAE 75W-90

Capacity: 2.2 liters (2.3 US qts, 1.9 Imp. qts)

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

15. REMOVE LH AND RH DRIVE SHAFTS

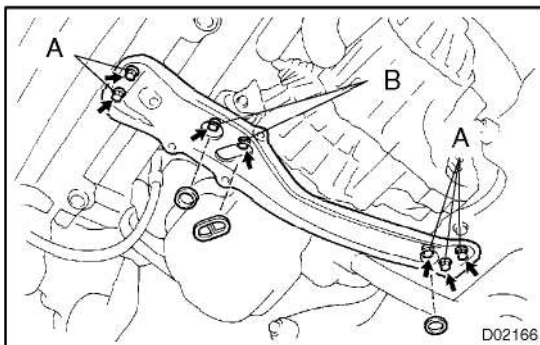
(See page SA-36)

**16. REMOVE ENGINE MOUNTING CENTER MEMBER**

(a) Remove the 2 bolts and front transport hook.

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

(b) Support the suspension crossmember with a jack.



(c) Remove the 2 hole plugs and hole cover.

(d) Remove the 7 bolts and center member.

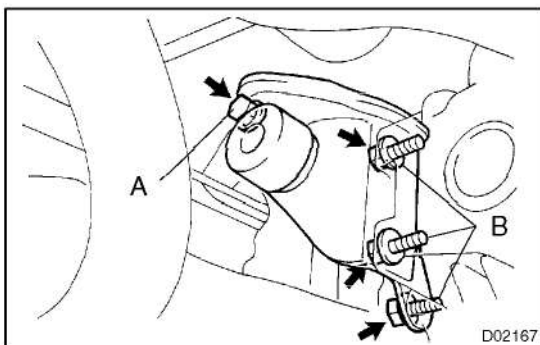
Torque:

Bolt A: 73 N·m (740 kgf·cm, 54 ft·lbf)

Bolt B: 72 N·m (730 kgf·cm, 53 ft·lbf)

17. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.

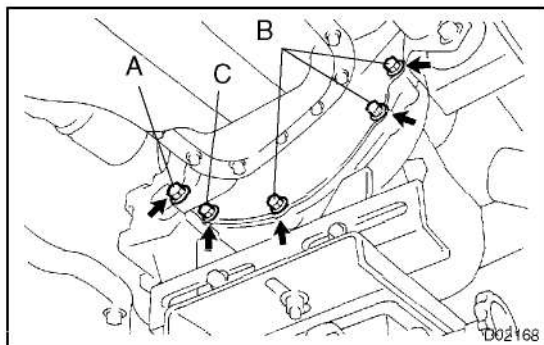
**18. REMOVE ENGINE REAR MOUNTING BRACKET**

Remove the 4 bolts and bracket.

Torque:

Bolt A: 87 N·m (890 kgf·cm, 64 ft·lbf)

Bolt B: 64 N·m (650 kgf·cm, 47 ft·lbf)



19. REMOVE TRANSAXLE LOWER SIDE MOUNTING BOLT

Remove the 5 bolts.

Torque:

Bolt A: 46 N·m (470 kgf·cm, 34 ft·lbf)

Bolt B: 29 N·m (300 kgf·cm, 22 ft·lbf)

Bolt C: 25 N·m (250 kgf·cm, 18 ft·lbf)

20. REMOVE TRANSAXLE

Lower engine left side and remove the transaxle from the engine.

HINT:

At the time of installation, please refer to the following items.

- Align the input shaft with the clutch disc and install the transaxle to the engine.
- Temporarily tighten the transaxle mounting bolts.

INSTALLATION

Installation is in the reverse order of removal (See page MX-3).

HINT:

After installation, check and inspect items as follows.

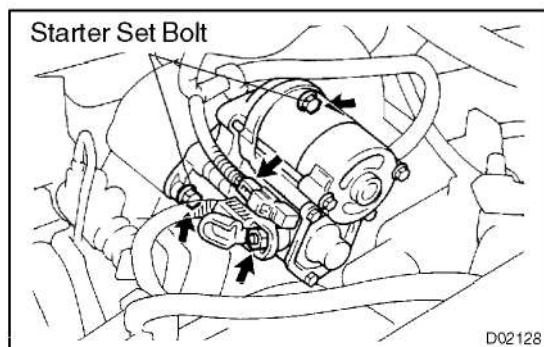
- Front wheel alignment (See page SA-4).
- Do the road test.

MYDSM-01



REMOVAL

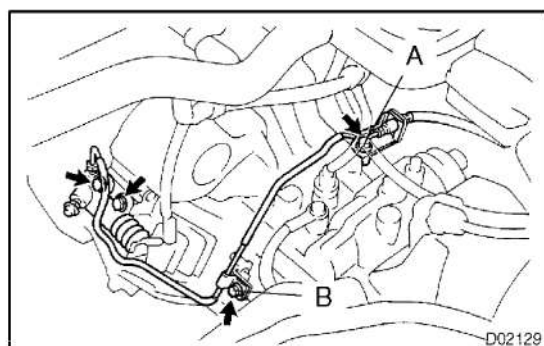
1. REMOVE BATTERY AND AIR CLEANER CASE ASSEMBLY WITH AIR HOSE



2. REMOVE STARTER

- (a) Disconnect the connector and wire from the starter.
- (b) Remove the 2 bolts and starter.

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



3. DISCONNECT CLUTCH RELEASE CYLINDER AND LINE

- (a) Remove the 2 set bolts of the clutch line bracket.

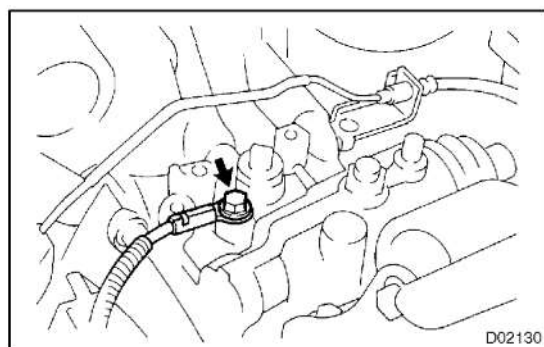
Torque:

Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)

Bolt B: 4.9 N·m (50 kgf·cm, 43 in·lbf)

- (b) Remove the 2 bolts and disconnect the clutch release cylinder and line.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



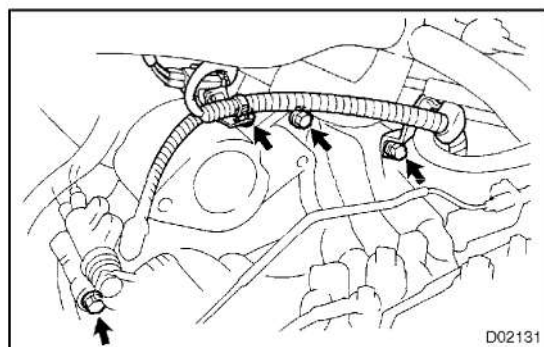
4. DISCONNECT GROUND CABLE

Remove the set bolt of the ground cable from the transaxle.

5. DISCONNECT CONTROL CABLE

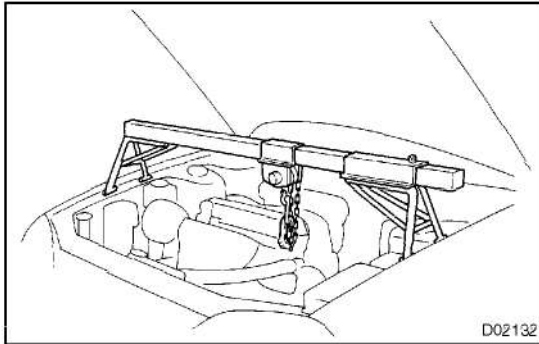
- (a) Remove the 2 clips and washers.
- (b) Remove the 2 clips from the cables.
- (c) Disconnect the 2 control cables from the transaxle.

6. DISCONNECT BACK-UP LIGHT SWITCH AND SPEED SENSOR CONNECTORS

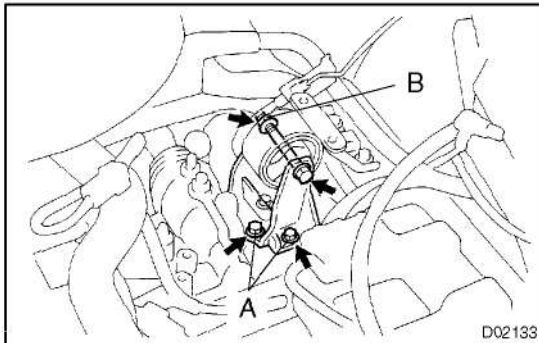


7. REMOVE 4 TRANSAXLE UPPER SIDE MOUNTING BOLTS

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



8. INSTALL ENGINE SUPPORT FIXTURE

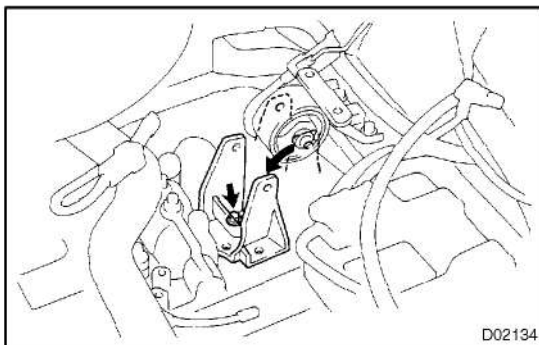


9. REMOVE ENGINE LEFT MOUNTING BRACKET 3 SET BOLTS AND NUT

Torque:

Bolt A: 52 N·m (530 kgf·cm, 38 ft·lbf)

Nut B: 87 N·m (890 kgf·cm, 64 ft·lbf)



10. REMOVE ENGINE LEFT MOUNTING BRACKET

Lower the transaxle side and remove the bolt and bracket.

Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

11. REMOVE FRONT WHEEL

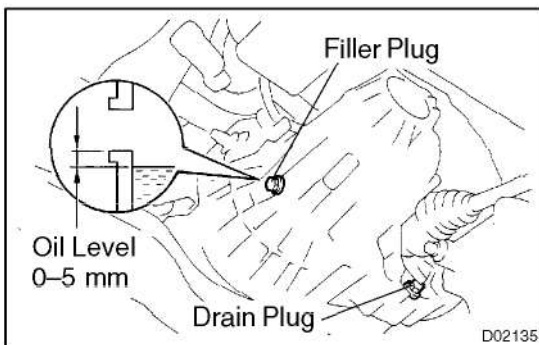
Torque: 216 N·m (2,200 kgf·cm, 159 ft·lbf)

12. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

13. REMOVE LH AND RH ENGINE UNDER COVERS



14. DRAIN TRANSAXLE OIL

Oil grade: API GL-4 or GL-5

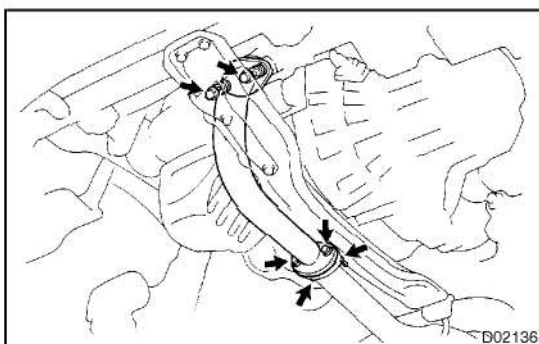
Viscosity: SAE 75W-90

Capacity: 2.2 liters (2.3 US qts, 1.9 Imp. qts)

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

15. REMOVE LH AND RH DRIVE SHAFTS

(See page SA-36)



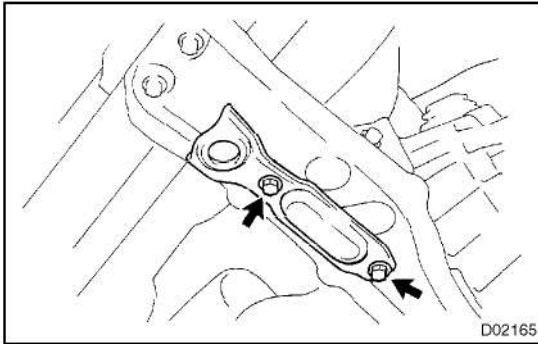
16. REMOVE FRONT EXHAUST PIPE

(a) Remove the 2 bolts, springs and gasket from the exhaust manifold.

Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

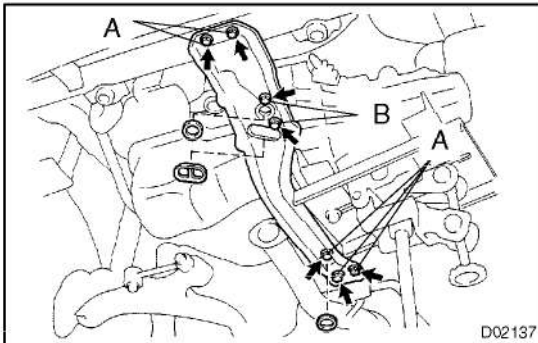
(b) Remove the 2 bolts, nuts, gasket and front exhaust pipe.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



17. REMOVE ENGINE MOUNTING CENTER MEMBER

- (a) Remove the 2 bolts and front transport hook.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (b) Support the suspension crossmember with a jack.



- (c) Remove the 2 hole plugs and hole cover.
- (d) Remove the 7 bolts and center member.

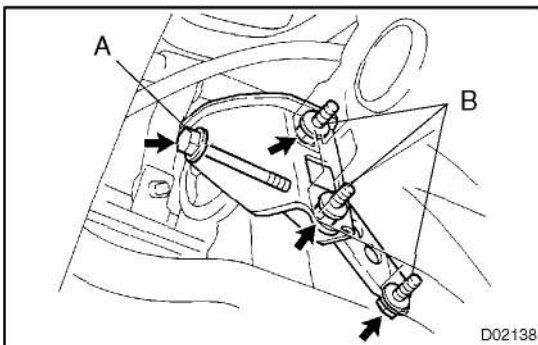
Torque:

Bolt A: 73 N·m (740 kgf·cm, 54 ft·lbf)

Bolt B: 72 N·m (730 kgf·cm, 53 ft·lbf)

18. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.



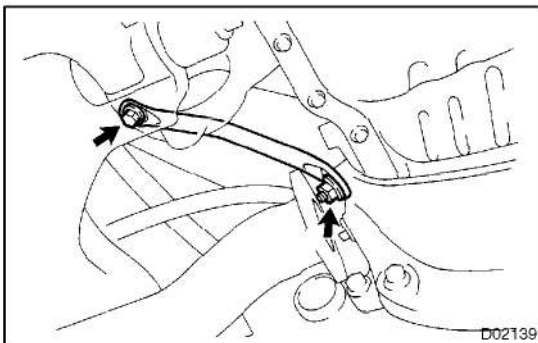
19. REMOVE ENGINE REAR MOUNTING BRACKET

Remove the 4 bolts and bracket.

Torque:

Bolt A: 87 N·m (890 kgf·cm, 64 ft·lbf)

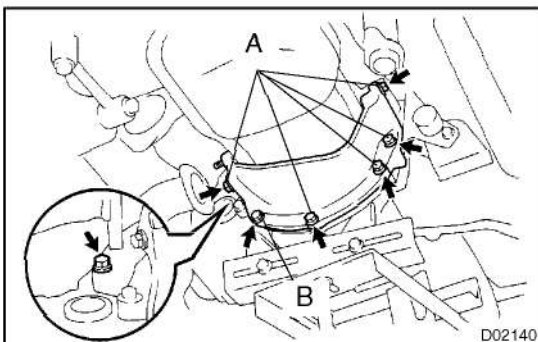
Bolt B: 64 N·m (650 kgf·cm, 47 ft·lbf)



20. REMOVE INTAKE MANIFOLD STAY

Remove the bolt, nut and intake manifold stay.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



21. REMOVE STIFFENER PLATE AND TRANSAXLE LOWER SIDE MOUNTING BOLT

- (a) Remove the 6 bolts and stiffener plate.

Torque:

Bolt A: 43 N·m (440 kgf·cm, 32 ft·lbf)

Bolt B: 21 N·m (210 kgf·cm, 15 ft·lbf)

- (b) Remove the bolt of transaxle lower side.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

22. REMOVE TRANSAXLE

Lower engine left side and remove the transaxle from the engine.

HINT:

At the time of installation, please refer to the following items.

- Align the input shaft with the clutch disc and install the transaxle to the engine.
- Temporarily tighten the transaxle mounting bolts.

INSTALLATION

Installation is in the reverse order of removal (See page MX-9).

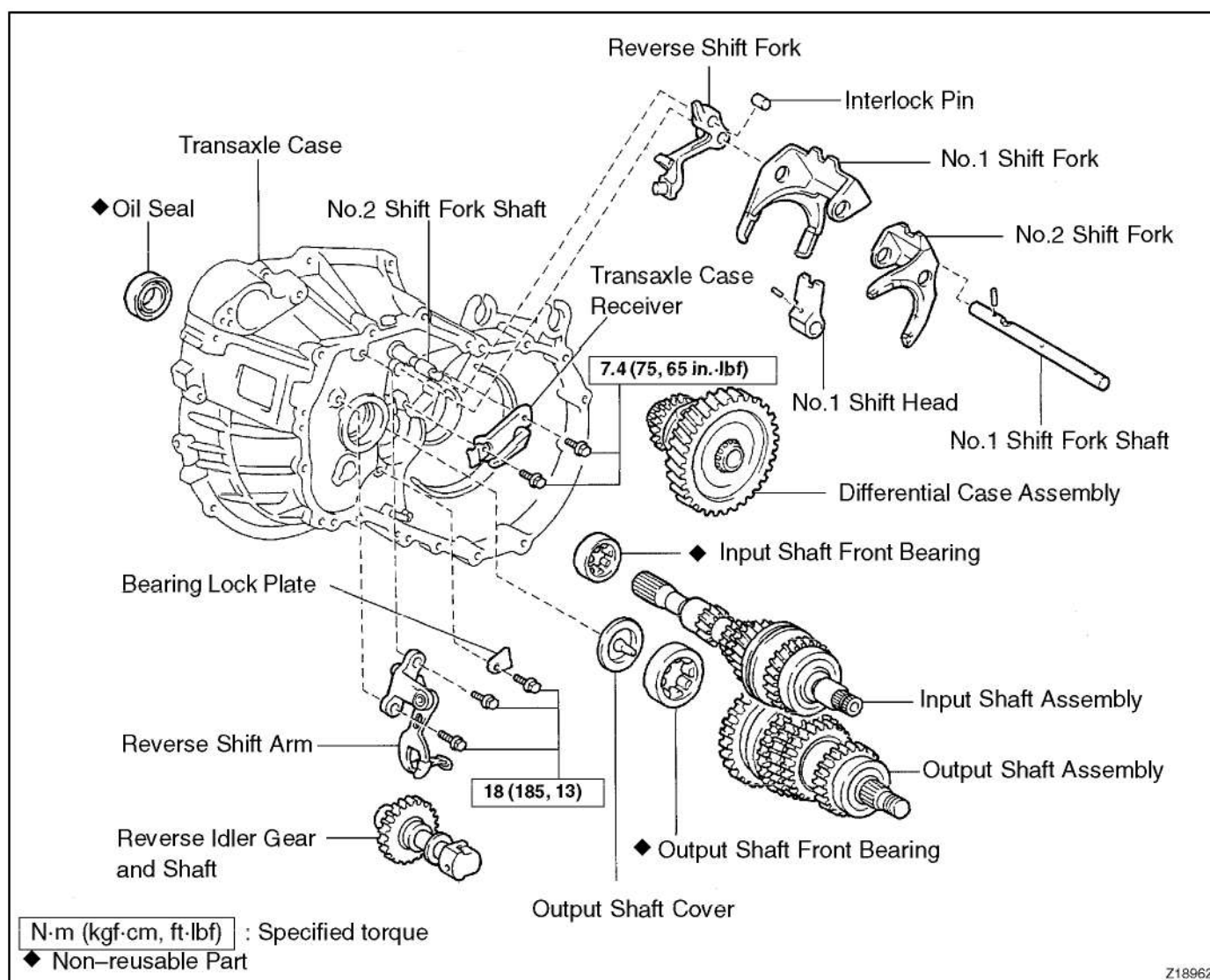
HINT:

After installation, check and inspect items as follows.

- Front wheel alignment (See page SA-4).
- Do the road test.

MY034-09





DISASSEMBLY

1. REMOVE RELEASE FORK AND BEARING

2. REMOVE BACK-UP LIGHT SWITCH

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

3. REMOVE BOLT AND SPEED SENSOR

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

4. REMOVE RELEASE BEARING RETAINER

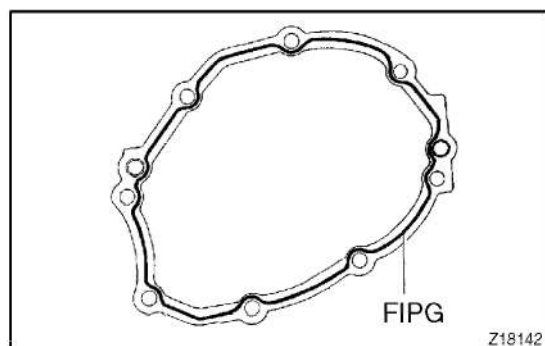
Remove the 3 bolts and retainer.

Torque: 7.4 N·m (75 kgf·cm, 65 in·lbf)

5. REMOVE SELECTING BELLCRANK

Remove the 2 bolts and selecting bellcrank.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



6. REMOVE TRANSMISSION CASE COVER

(a) Remove the 8 bolts.

Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

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

(b) Using a plastic hammer, tap the transmission case cover and remove it.

FIPG:

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

7. REMOVE LOCK BALL ASSEMBLY

Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

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

8. REMOVE SHIFT AND SELECT LEVER ASSEMBLY

HINT:

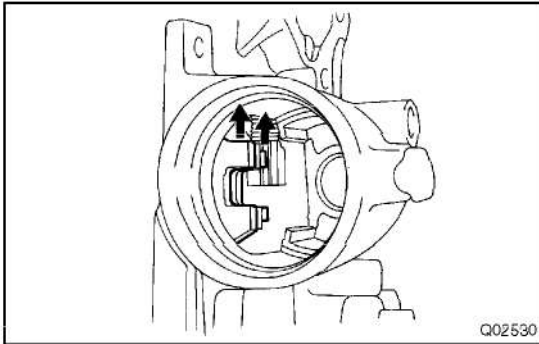
At the time of reassembly, please refer to the following item.

Apply FIPG to the underside of the flanged portion of the control shaft cover.

FIPG:

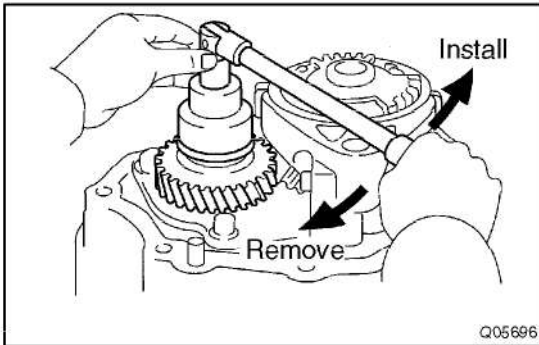
Part No. 08826-00090, THREE BOND 1281 or equivalent

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)



9. REMOVE OUTPUT SHAFT LOCK NUT

- Unstake the nut.
- Engage the gear to the double meshing, with the gear into 1st and 3rd or 2nd and 4th.



- Remove the lock nut clockwise and remove it.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

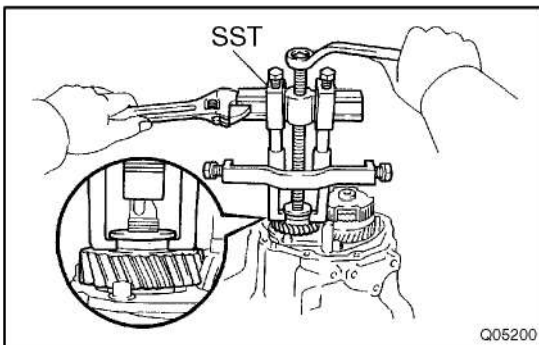
HINT:

The lock nut has LH threads.

- Disengage the double meshing of the gear.

10. REMOVE NO.3 HUB SLEEVE AND NO.3 SHIFT FORK

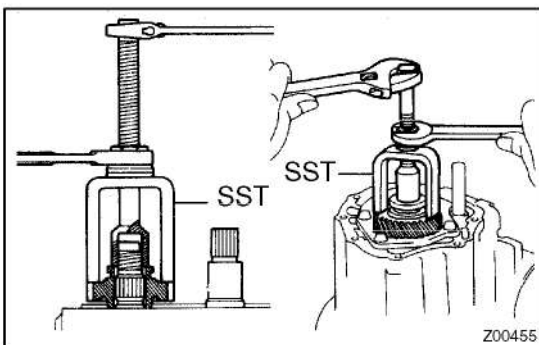
- Remove the No.3 shift fork set bolt.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
- Remove the No.3 hub sleeve and No.3 shift fork.



11. REMOVE 5TH DRIVEN GEAR

Using SST, remove the 5th driven gear.

SST 09950-40011

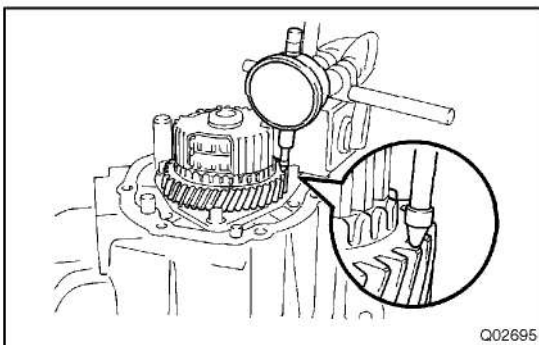


HINT:

At the time of installation, please refer to the following item.

Using SST, install the 5th driven gear.

SST 09309-12020



12. MEASURE 5TH GEAR THRUST CLEARANCE

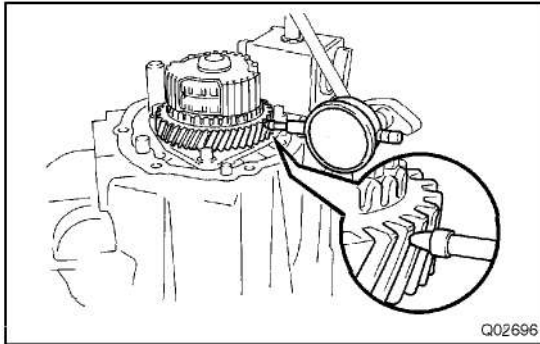
Using a dial indicator, measure the thrust clearance.

Standard clearance:

0.20–0.40 mm (0.0079–0.0157 in.)

Maximum clearance:

0.45 mm (0.0177 in.)

**13. MEASURE 5TH GEAR RADIAL CLEARANCE**

Using a dial indicator, measure the radial clearance.

Standard clearance:

0.009–0.050 mm (0.0004–0.0020 in.)

Maximum clearance:

0.070 mm (0.0028 in.)

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

14. REMOVE NO.3 CLUTCH HUB AND 5TH GEAR

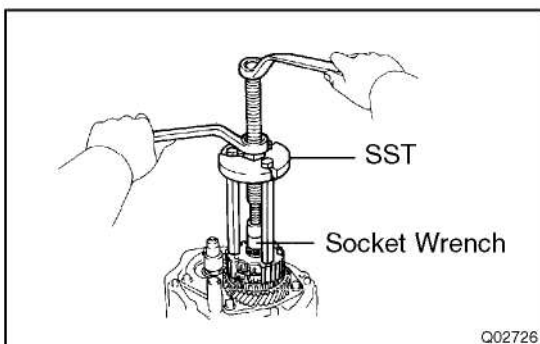
- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

At the time of reassembly, please refer to the following item.

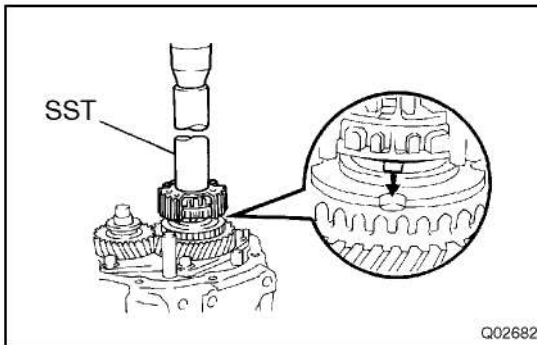
Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
13	2.20–2.25 (0.0866–0.0886)	21	2.60–2.65 (0.1024–0.1043)
14	2.25–2.30 (0.0886–0.0906)	22	2.65–2.70 (0.1043–0.1063)
15	2.30–2.35 (0.0906–0.0925)	23	2.70–2.75 (0.1063–0.1083)
16	2.35–2.40 (0.0925–0.0945)	24	2.75–2.80 (0.1083–0.1102)
17	2.40–2.45 (0.0945–0.0965)	25	2.80–2.85 (0.1102–0.1122)
18	2.45–2.50 (0.0965–0.0984)	26	2.85–2.90 (0.1122–0.1142)
19	2.50–2.55 (0.0984–0.1004)	27	2.90–2.95 (0.1142–0.1161)
20	2.55–2.60 (0.1004–0.1024)	–	–



- (b) Using SST and a socket wrench, remove the No.3 clutch hub with the synchronizer ring.

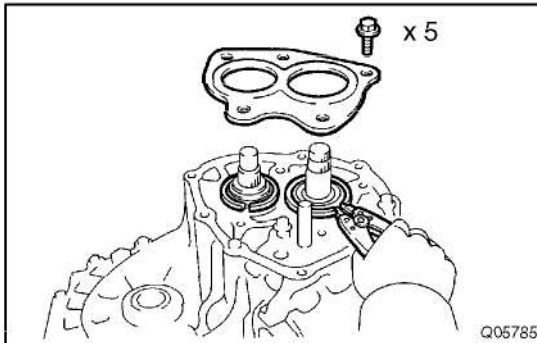
SST 09950-30010

**HINT:**

At the time of reassembly, please refer to the following item.
Using SST and a press, install the No.3 clutch hub assembly.

SST 09612-22011

(c) Remove the 5th gear.

15. REMOVE NEEDLE ROLLER BEARING**16. REMOVE REAR BEARING RETAINER**

Remove the 5 bolts and retainer.

Sealant:

Part No.08833-00070, THREE BOND 1324 or equivalent

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

17. REMOVE SNAP RING

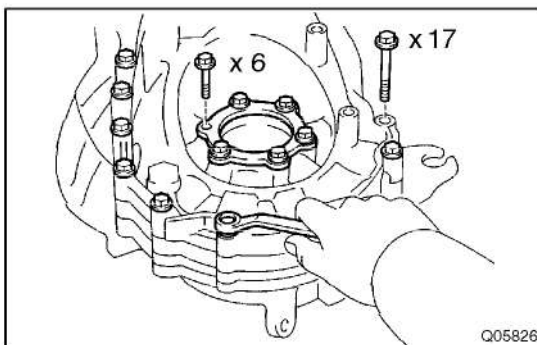
Using a snap ring expander, remove the 2 snap rings.

HINT:

If it is difficult to remove and install the snap rings, pull up the shafts.

18. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT AND GASKET

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

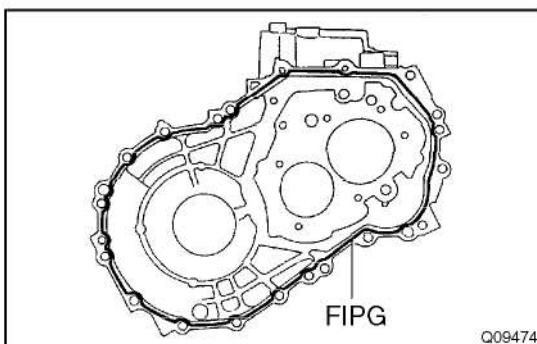
**19. REMOVE DIFFERENTIAL SIDE BEARING RETAINER AND SHIM**

Remove the 6 bolts, retainer and shim.

Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

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

**20. REMOVE TRANSMISSION CASE**

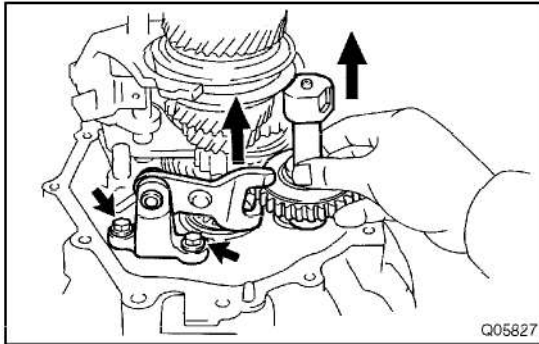
(a) Remove the 17 bolts.

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

(b) Using a plastic hammer, tap the transmission case and remove it.

FIPG:

Part No. 08833-00090, THREE BOND 1281 or equivalent

**21. REMOVE REVERSE IDLER GEAR AND SHAFT**

- (a) Pull out the shaft.
- (b) Remove the idler gear and thrust washer.

22. REMOVE REVERSE SHIFT ARM

- (a) Shift the fork shaft into reverse.
- (b) Remove the 2 bolts and pull off the reverse shift arm.

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

23. REMOVE NO.1 SHIFT FORK SHAFT, NO.1 SHIFT HEAD, NO.1 AND NO.2 SHIFT FORKS, REVERSE SHIFT FORK WITH INTERLOCK PIN, INPUT AND OUTPUT SHAFTS ASSEMBLY**24. REMOVE DIFFERENTIAL CASE ASSEMBLY****25. REMOVE MAGNET FROM TRANSAXLE CASE****26. REMOVE NO.2 FORK SHAFT**

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

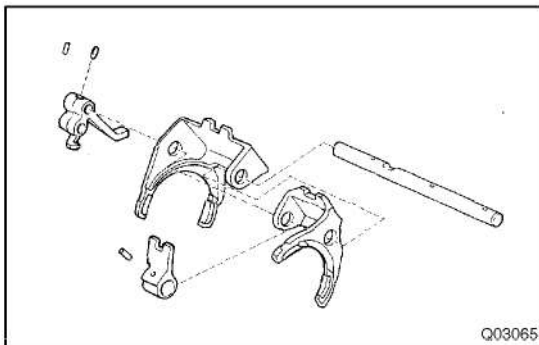
Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

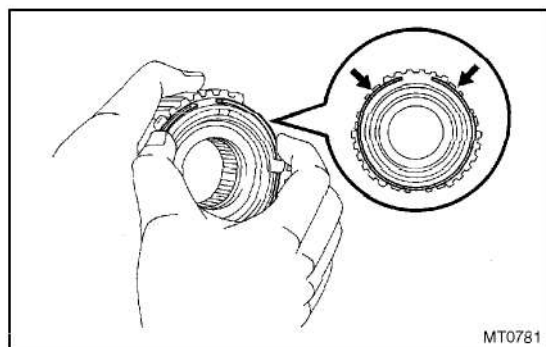
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

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

- (c) Pull out the shaft.

**27. SEPARATE NO.1 SHIFT FORK SHAFT, NO.1 SHIFT HEAD, NO.1, NO.2 SHIFT FORKS AND REVERSE SHIFT FORK**

- (a) Mount the shift forks to the vise.
- (b) Using a pin punch and hammer, drive out the slotted spring pin from the No.1 fork shaft.
- (c) Using a pin punch and hammer, drive out the slotted spring pin from the No.1 fork shaft, as shown in the illustration.
- (d) Separate the No.1 shift fork shaft, No.1 shift head, No.1 and No.2 shift forks and reverse shift fork.

**28. REMOVE NO.5 SYNCHRONIZER RING WITH KEY SPRING FROM NO.3 CLUTCH HUB**

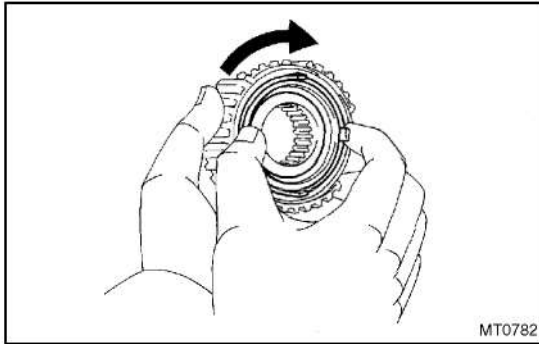
(a) Remove the No.5 synchronizer ring with the key spring from the No.3 clutch hub.

(b) Using a screwdriver, remove the snap ring.

HINT:

Wrap vinyl tape on the screwdriver to prevent damaging the synchronizer ring.

(c) Remove the synchronizer rings.



INSPECTION

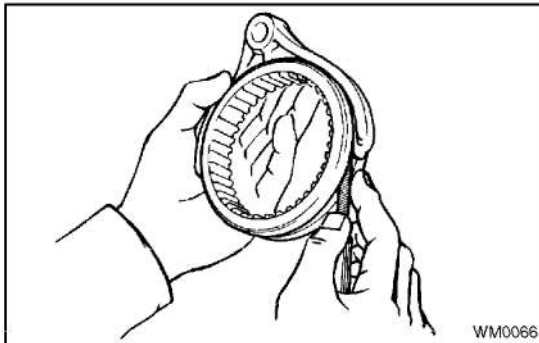
1. INSPECT NO.5 SYNCHRONIZER RING

(a) Check wear or damage.

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

Turn the middle No.5 synchronizer ring in one direction while pushing it to the outer No.5 synchronizer ring. Check that the ring locks.

If the braking effect is insufficient, replace the synchronizer ring.

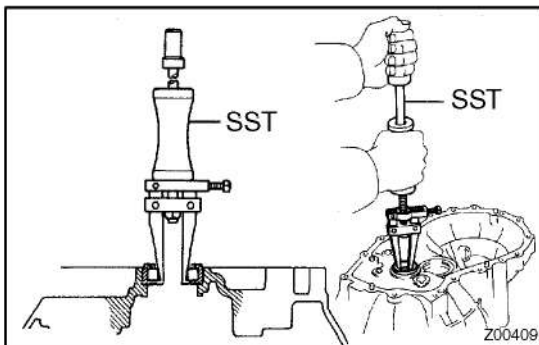


2. INSPECT NO.3 SHIFT FORK AND NO.3 HUB SLEEVE CLEARANCE

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.

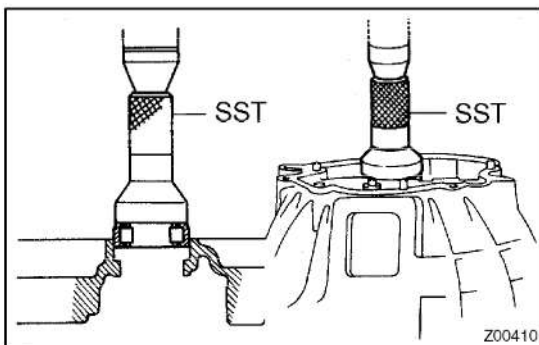


3. IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING

(a) Remove the 2 bolts and transaxle case receiver.

(b) Using SST, pull out the bearing.

SST 09308-00010

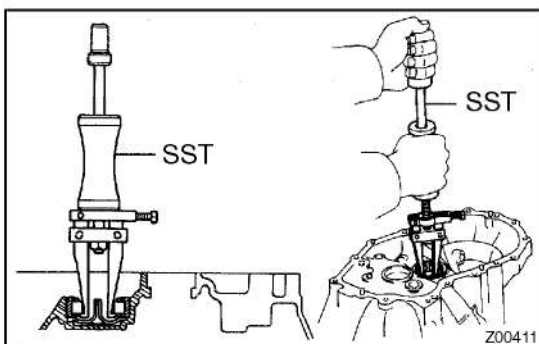


(c) Using SST and a press in a new bearing.

SST 09310-35010

(d) Install the transaxle case receiver and torque the 2 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

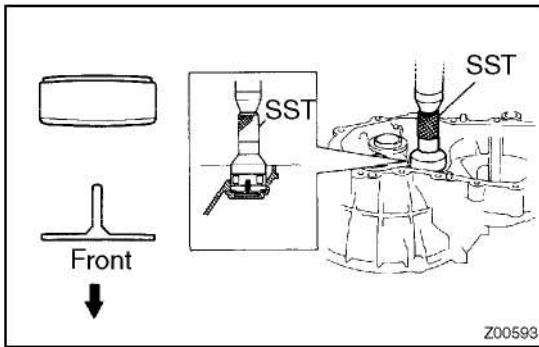


4. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING

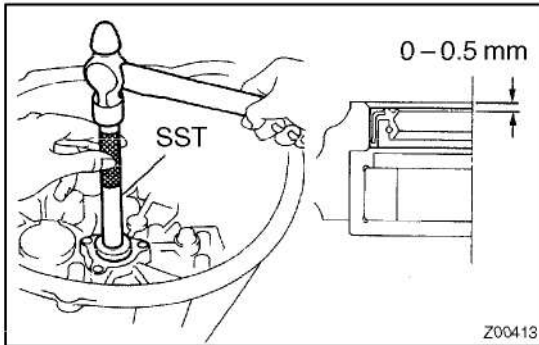
(a) Remove the bolt and bearing lock plate.

(b) Using SST, pull out the bearing.

SST 09308-00010

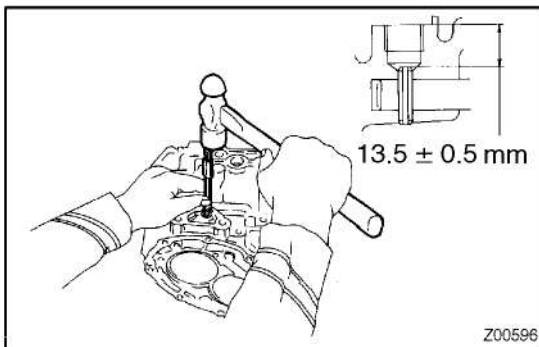


- (c) Using SST and a press in a new bearing.
SST 09310-35010
- (d) Install the bearing lock plate and torque the bolt.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



5. IF NECESSARY, REPLACE INPUT SHAFT FRONT OIL SEAL

- (a) Using a screwdriver, pry out the oil seal.
- (b) Using SST and a hammer, drive in a new oil seal.
SST 09608-00081, 09950-70010 (09951-07150)
Drive in depth: 0-0.5 mm (0-0.020 in.)
- (c) Coat the lip of the oil seal with MP grease.



6. 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 slotted spring pin.
- (c) Replace the reverse restrict pin.
- (d) Using a pin punch and hammer, drive in the slotted spring pin.

Drive in depth: 13.5±0.5 mm (0.531±0.020 in.)

- (e) Apply sealant to the plug threads.

Sealant:

Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

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

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page MX-16).

HINT:

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

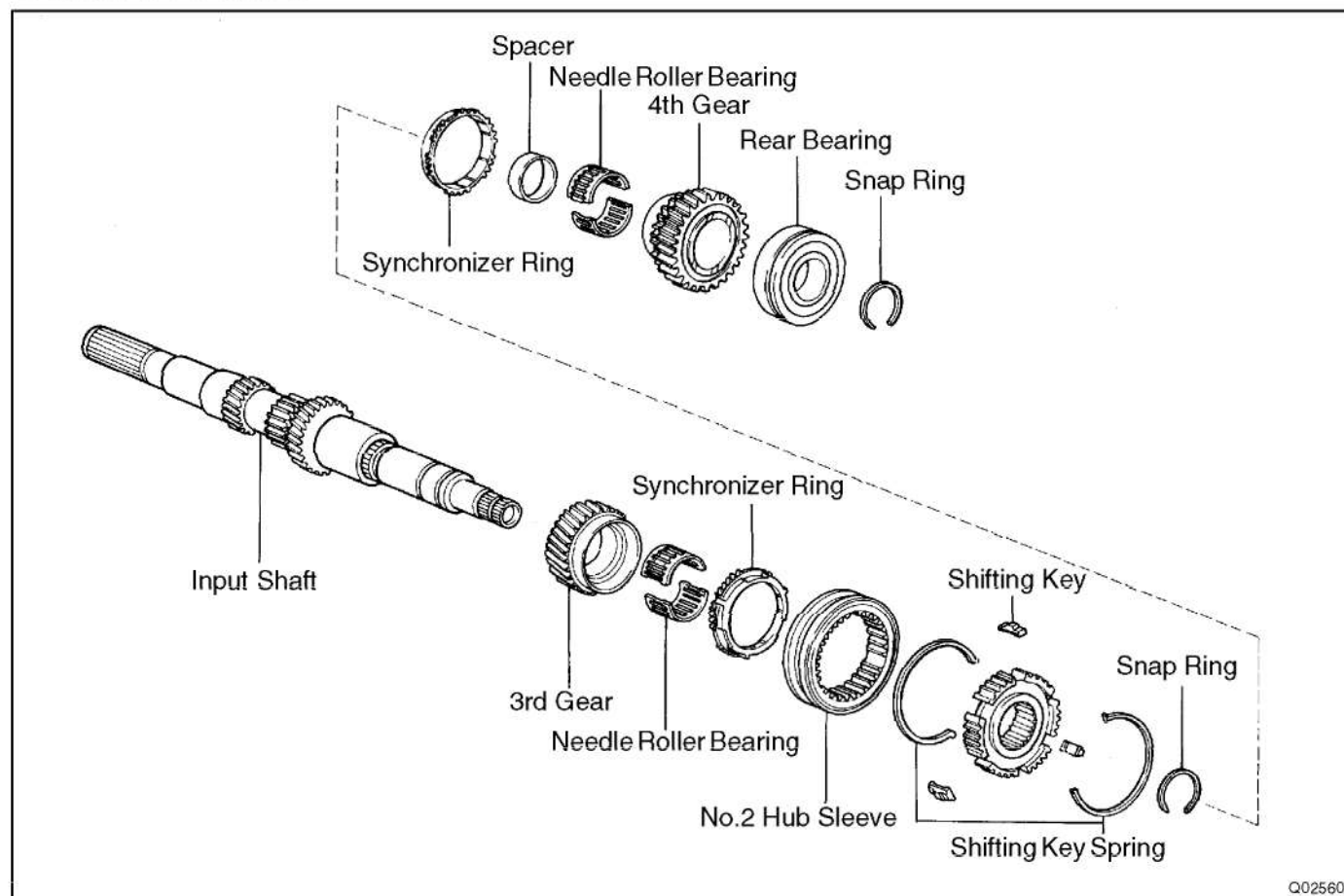
NOTICE:

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

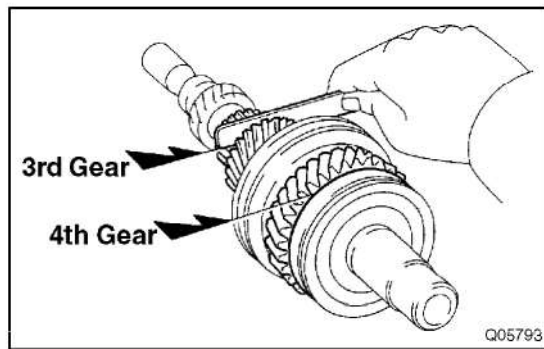
- Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.
- Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.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

INPUT SHAFT COMPONENTS

MX008-03



Q02560



DISASSEMBLY

1. INSPECT 3RD AND 4TH GEARS THRUST CLEARANCES

Using a feeler gauge, measure each thrust clearance.

Standard clearance:

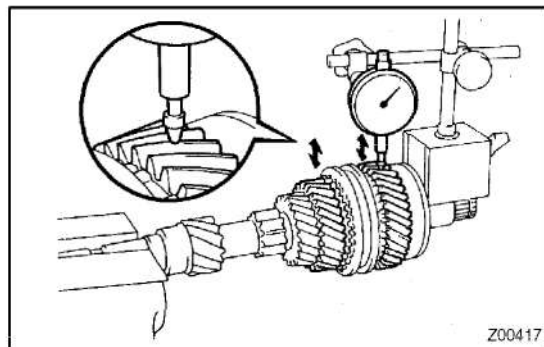
3rd gear: 0.10–0.25 mm (0.0039–0.0098 in.)

4th gear: 0.20–0.45 mm (0.0079–0.0177 in.)

Maximum clearance:

3rd gear: 0.30 mm (0.0118 in.)

4th gear: 0.50 mm (0.0197 in.)



2. INSPECT 3RD AND 4TH GEARS RADIAL CLEARANCES

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

Standard clearance:

0.009–0.053 mm (0.0004–0.0021 in.)

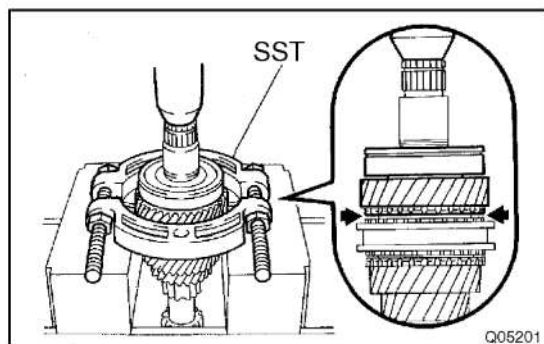
Maximum clearance:

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 BEARING, 4TH GEAR, NEEDLE ROLLER BEARING, SPACER AND SYNCHRONIZER RING FROM INPUT SHAFT

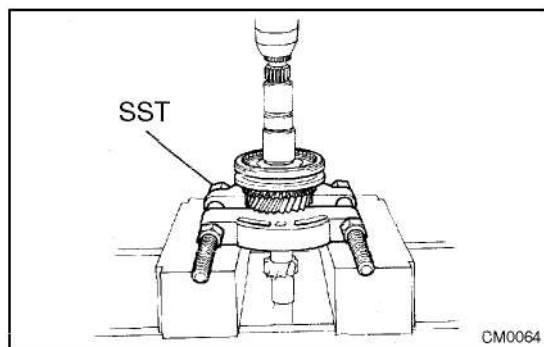
(a) Using SST and a press, remove the 4th gear and rear bearing.

SST 09950-00020

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

5. REMOVE SNAP RING

Using a snap ring expander, remove the snap ring.



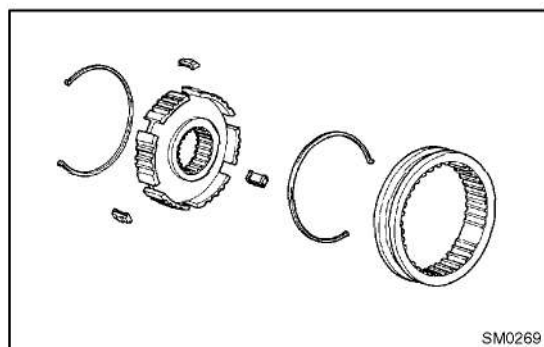
6. REMOVE NO.2 HUB SLEEVE ASSEMBLY, 3RD GEAR SYNCHRONIZER RING AND NEEDLE ROLLER BEARING

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

SST 09950-00020

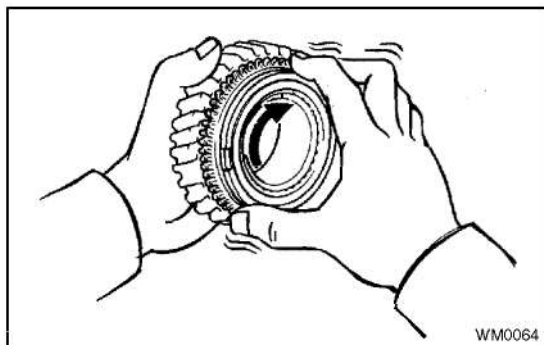
NOTICE:

Be careful not to mistake the 3rd gear synchronizer ring for the 4th gear synchronizer ring.



7. REMOVE NO.2 HUB SLEEVE, SHIFTING KEY AND SPRING FROM NO.2 CLUTCH HUB

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



INSPECTION

1. INSPECT SYNCHRONIZER RING

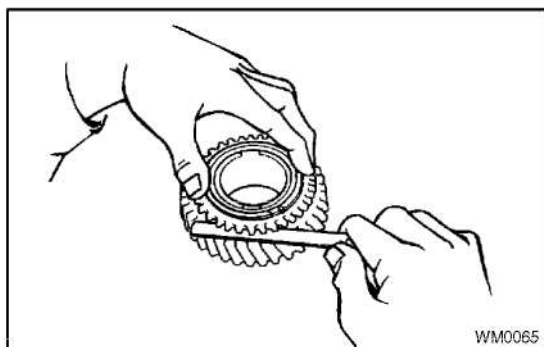
- (a) Check wear or damage.
- (b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the 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.

- (c) Check again the braking effect of the synchronizer ring.



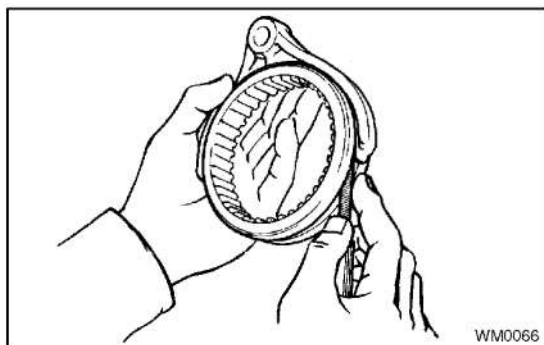
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

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

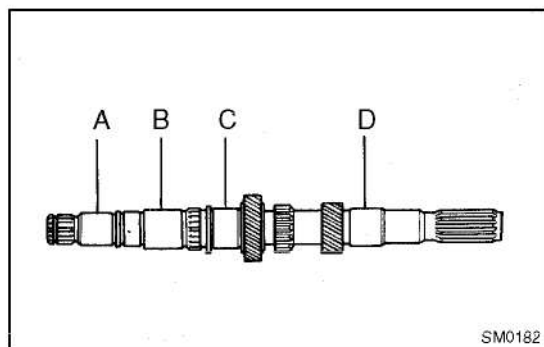


2. INSPECT NO.2 SHIFT FORK AND HUB SLEEVE CLEARANCE

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:

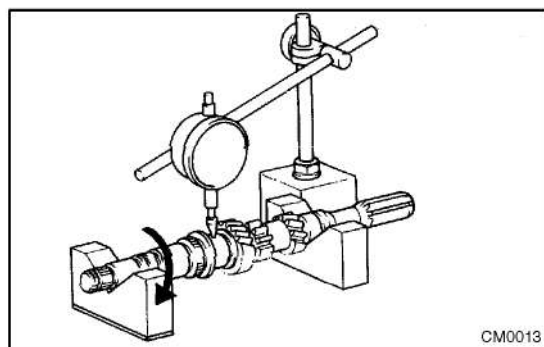
Part A: 26.970 mm (1.0618 in.)

Part B: 32.470 mm (1.2783 in.)

Part C: 33.090 mm (1.3028 in.)

Part D: 29.970 mm (1.1799 in.)

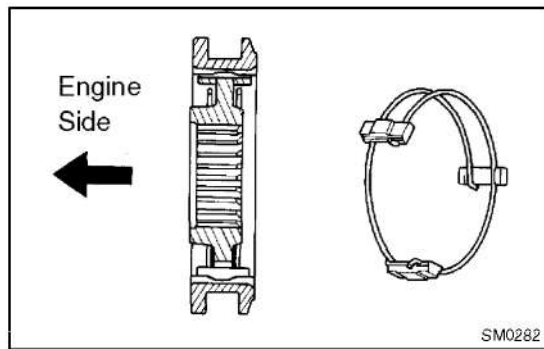
If the outer diameter is less than the minimum, replace the input shaft.



- (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.



REASSEMBLY

HINT:

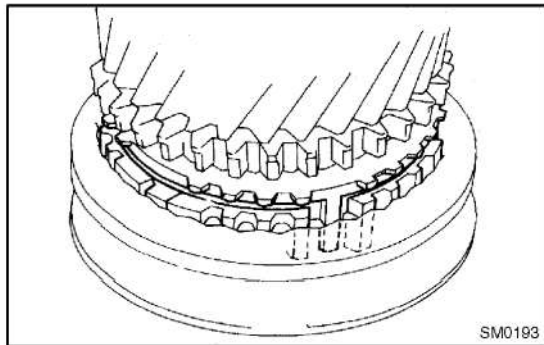
Coat all of the sliding and rotating surfaces with gear oil before reassembly.

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.

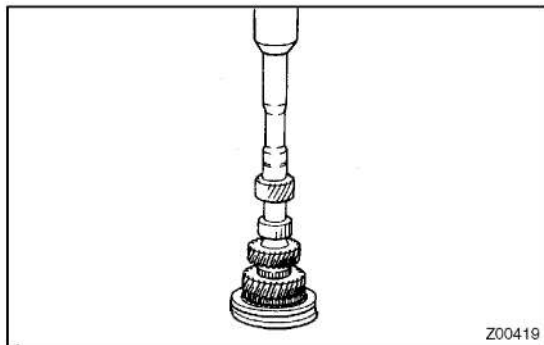


2. INSTALL 3RD GEAR, NEEDLE ROLLER BEARING, SYNCHRONIZER RING AND NO.2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

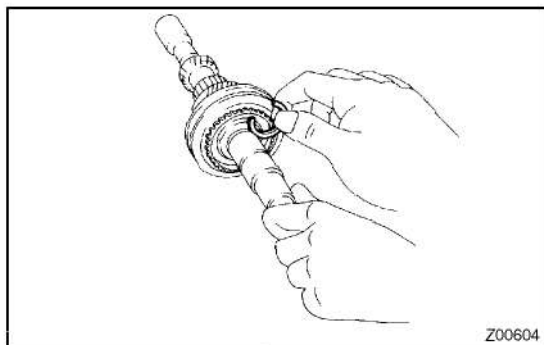
- (a) Apply gear oil to the needle roller bearings.
- (b) Place the synchronizer ring (for the 3rd gear) on the gear and align the ring slots with the shifting keys.

NOTICE:

Do not install the synchronizer ring for 4th gear.



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



Z00604

3. INSTALL SNAP RING

- (a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
1	1.95–2.00 (0.0768–0.0787)
2	2.00–2.05 (0.0787–0.0807)
3	2.05–2.10 (0.0807–0.0827)
4	2.10–2.15 (0.0827–0.0846)
5	2.15–2.20 (0.0846–0.0866)
6	2.20–2.25 (0.0866–0.0886)

- (b) Using a snap ring expander, install the snap ring.

4. INSPECT 3RD GEAR THRUST CLEARANCE

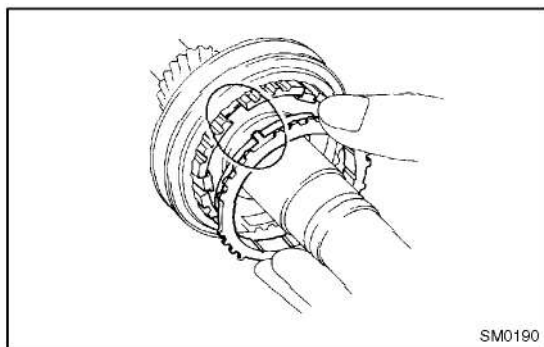
(See page MX-26)



SM0189

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

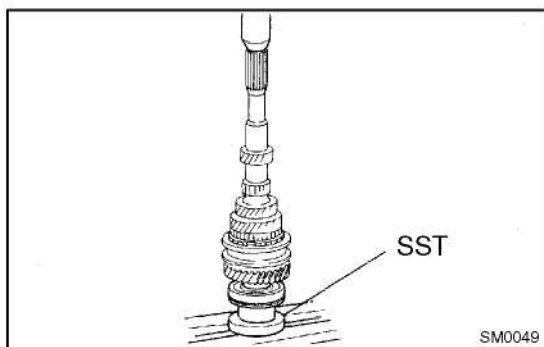
- (a) Apply gear oil to the needle roller bearings.
 (b) Install the spacer and needle roller bearings.
 (c) Place the synchronizer ring on the gear.



SM0190

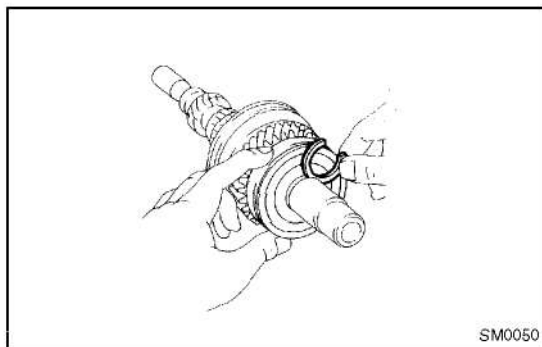
HINT:

Align the ring slots with the shifting keys and the ring projections with the hub slots.



SM0049

- (d) Using SST and a press, install the rear ball bearing.
 SST 09608-00071

**6. INSTALL SNAP RING**

- (a) Select a snap ring that allows the minimum axial play.

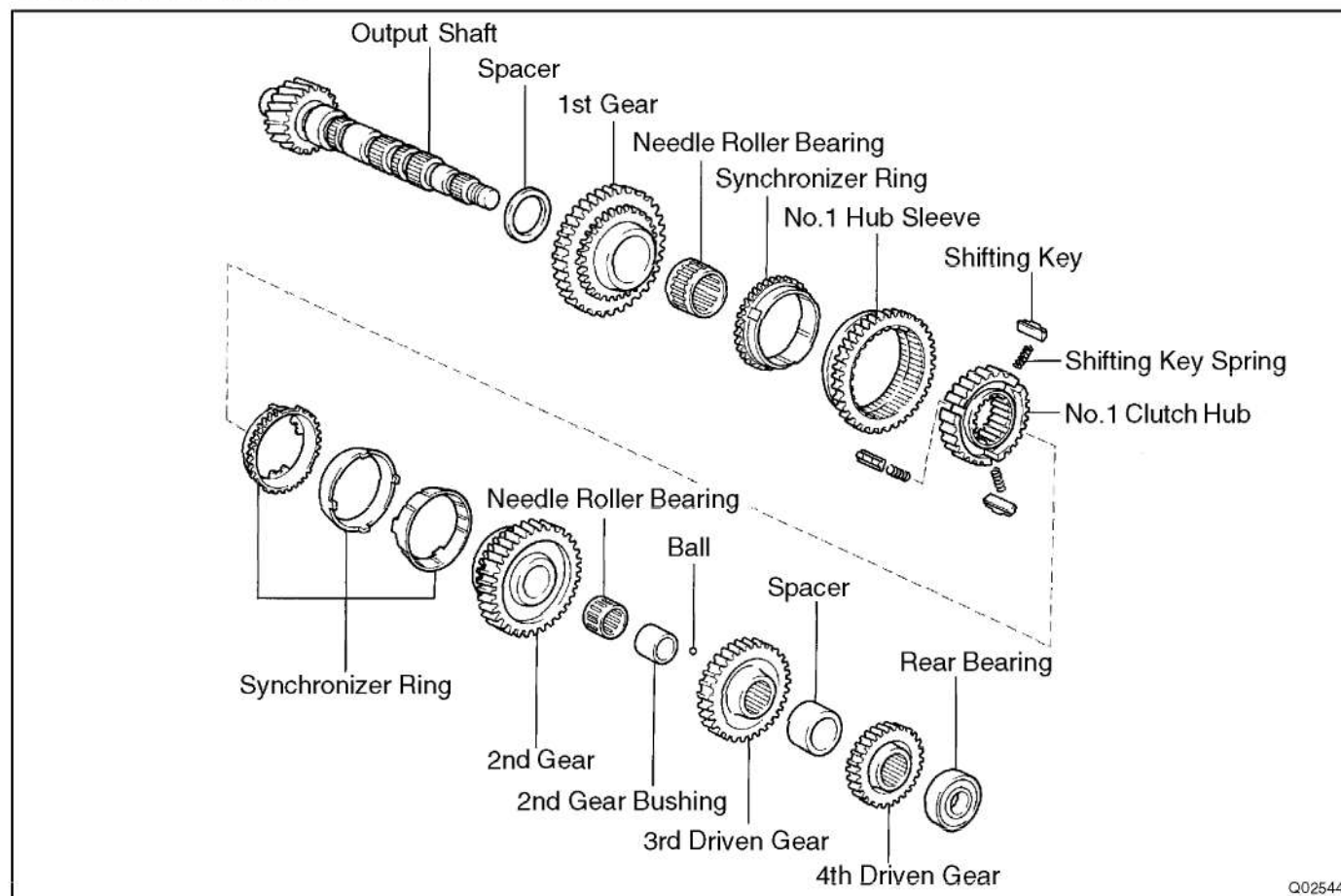
Mark	Thickness mm (in.)
A	2.15–2.20(0.0846–0.0866)
B	2.20–2.25(0.0866–0.0886)
C	2.25–2.30(0.0886–0.0906)
D	2.30–2.35(0.0906–0.0925)
E	2.35–2.40(0.0925–0.0945)

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

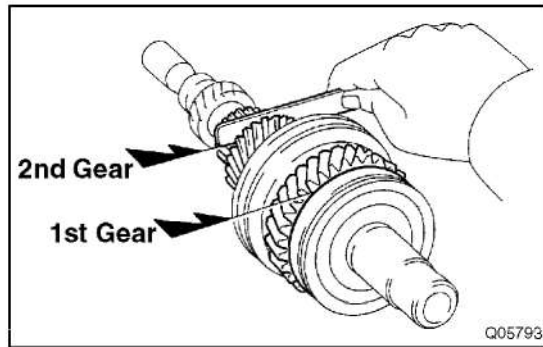
7. INSPECT 4TH GEAR THRUST CLEARANCE
(See page MX-26)

OUTPUT SHAFT COMPONENTS

MX03C-03



Q02544



DISASSEMBLY

1. INSPECT 1ST AND 2ND GEARS THRUST CLEARANCES

Using a feeler gauge, measure each thrust clearance.

Standard clearance:

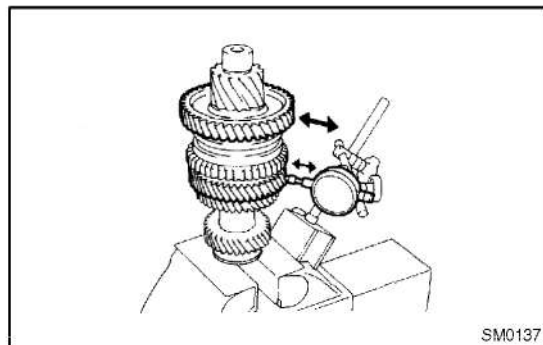
1st gear: 0.10–0.29 mm (0.0039–0.0114 in.)

2nd gear: 0.20–0.44 mm (0.0079–0.0173 in.)

Maximum clearance:

1st gear: 0.35 mm (0.0138 in.)

2nd gear: 0.50 mm (0.0197 in.)



2. INSPECT 1ST AND 2ND GEARS RADIAL CLEARANCES

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

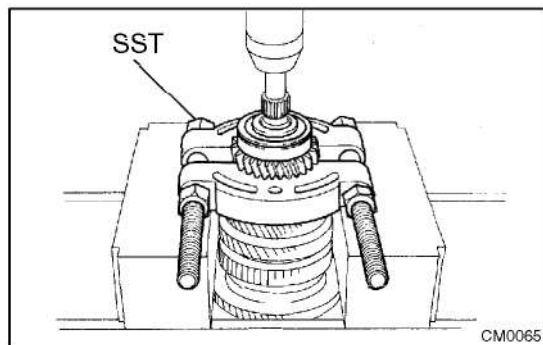
Standard clearance:

0.009–0.053 mm (0.0004–0.0021 in.)

Maximum clearance:

0.070 mm (0.0028 in.)

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

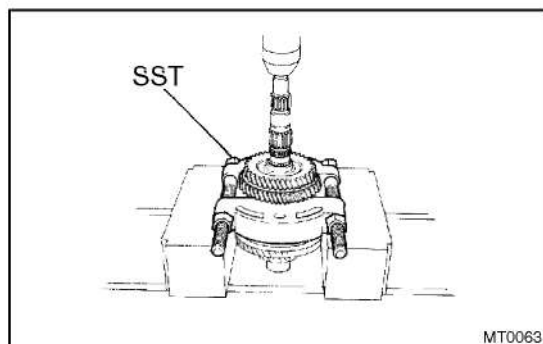


3. REMOVE REAR BALL BEARING, 4TH DRIVEN GEAR AND OUTPUT GEAR SPACER

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

SST 09950-00020

- (b) Remove the output gear spacer and ball.



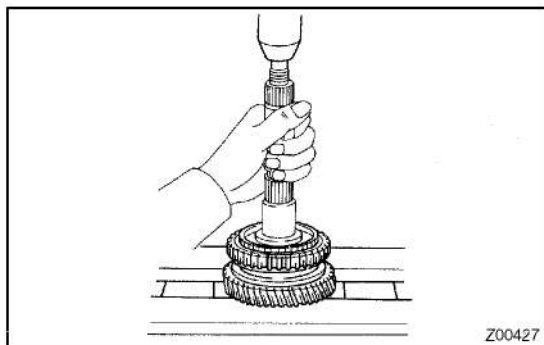
4. REMOVE 3RD DRIVEN GEAR, 2ND GEAR, NEEDLE ROLLER BEARING AND SYNCHRONIZER RING

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

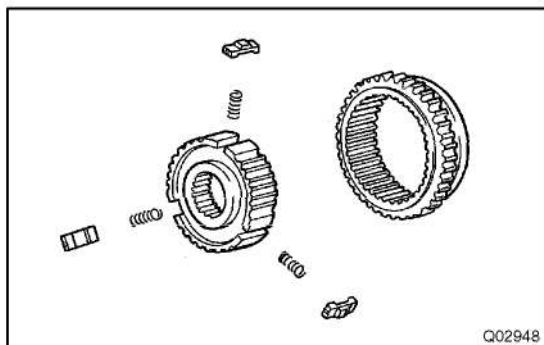
- (b) Using SST and a press, remove the 3rd driven gear and 2nd gear.

SST 09950-00020

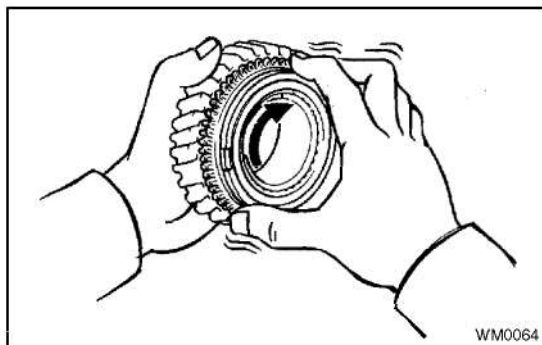
- (c) Remove the needle roller bearing and synchronizer rings.



5. **REMOVE NO.1 HUB SLEEVE ASSEMBLY, 1ST GEAR, SYNCHRONIZER RING, NEEDLE ROLLER BEARING, THRUST WASHER AND LOCKING BALL**
- (a) Using a press, remove the No.1 hub sleeve, 1st gear and synchronizer ring.
 - (b) Remove the needle roller bearing and locking ball.
 - (c) Using a screwdriver and hammer, drive out the thrust washer.



6. **REMOVE NO.1 HUB SLEEVE, 3 SHIFTING KEYS AND SPRINGS FROM NO.1 CLUTCH HUB**



INSPECTION

1. INSPECT 1ST GEAR SYNCHRONIZER RING

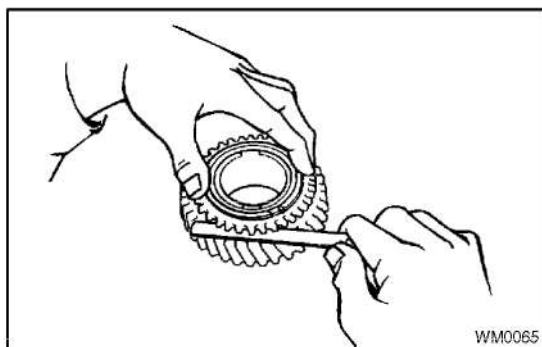
- (a) Check wear or damage.
- (b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the 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.

- (c) Check again the braking effect of the synchronizer ring.



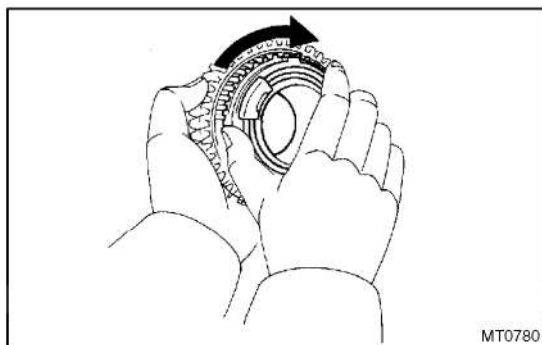
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance: 0.6 mm (0.024 in.)

If the clearance is less than the minimum, replace the synchronizer ring, and apply a small amount of the fine lapping compound on gear cone.

NOTICE:

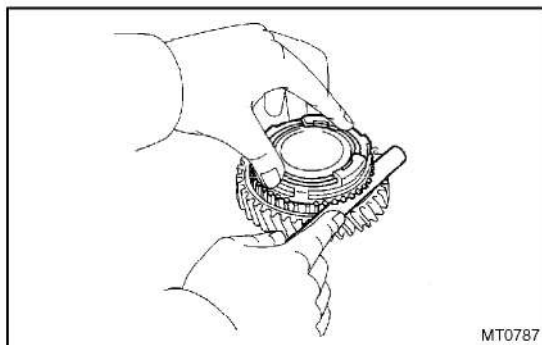
Ensure the fine lapping compound is completely washed off after rubbing.



2. INSPECT 2ND GEAR SYNCHRONIZER RING

- (a) Check 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.

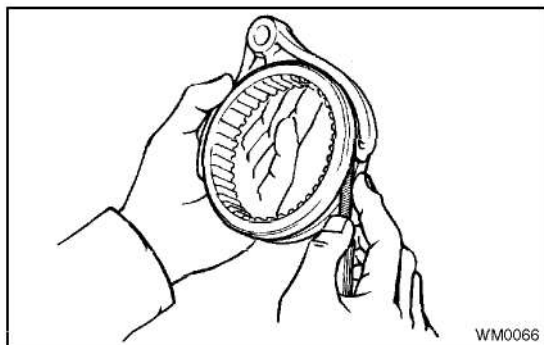
If the braking effect is insufficient, replace the synchronizer ring.



- (c) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.7 mm (0.028 in.)

If the clearance is less than the minimum, replace the synchronizer ring.

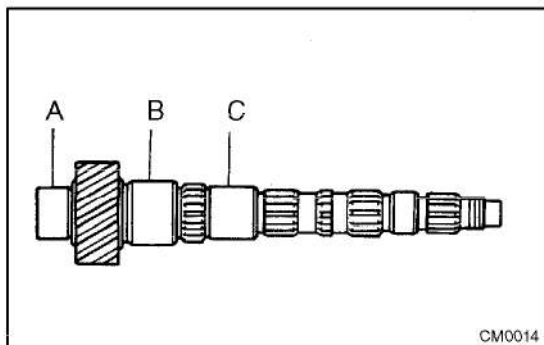


3. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

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.



4. INSPECT OUTPUT SHAFT

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

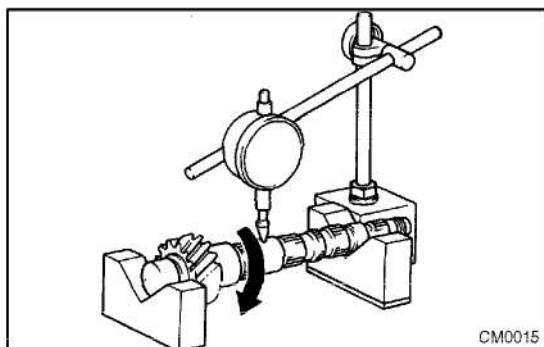
Minimum outer diameter:

Part A: 31.970 mm (1.2587 in.)

Part B: 37.970 mm (1.4949 in.)

Part C: 31.990 mm (1.2594 in.)

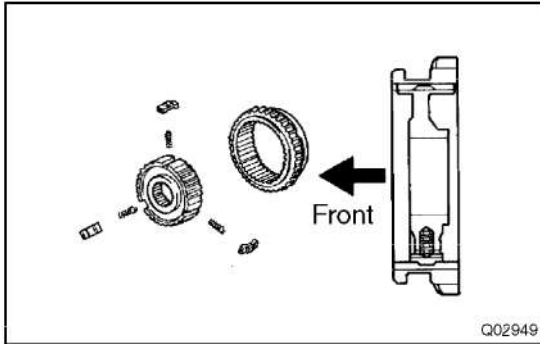
If the outer diameter is less than the minimum, replace the output shaft.



- (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.



REASSEMBLY

HINT:

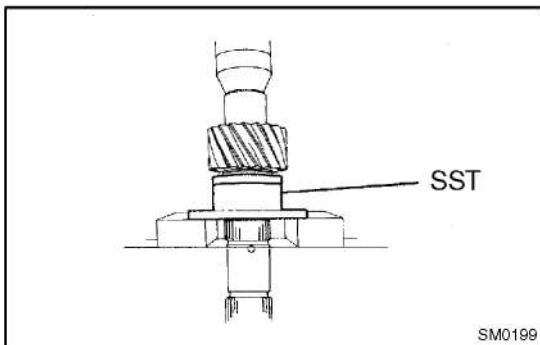
Coat all of the sliding and rotating surfaces with gear oil before reassembly.

1. INSTALL NO.1 CLUTCH HUB INTO HUB SLEEVE

- (a) Install the 3 springs and shifting keys to the clutch hub.
- (b) Install the hub sleeve to the clutch hub.

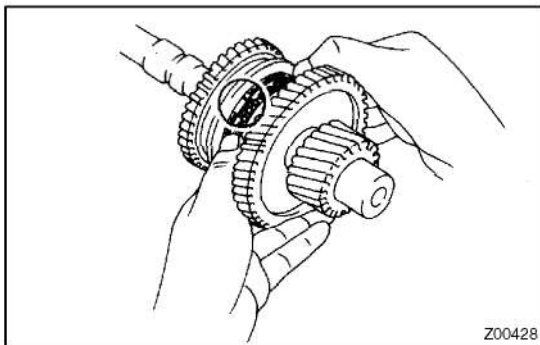
HINT:

Position the identification groove of the hub sleeve to the front of the transmission.

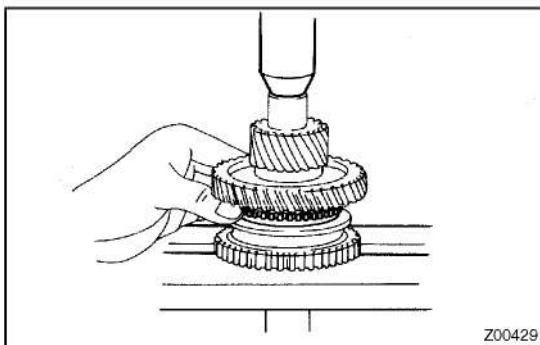


2. INSTALL THRUST WASHER, 1ST GEAR, NEEDLE ROLLER BEARING, SYNCHRONIZER RING AND NO.1 HUB SLEEVE TO OUTPUT SHAFT

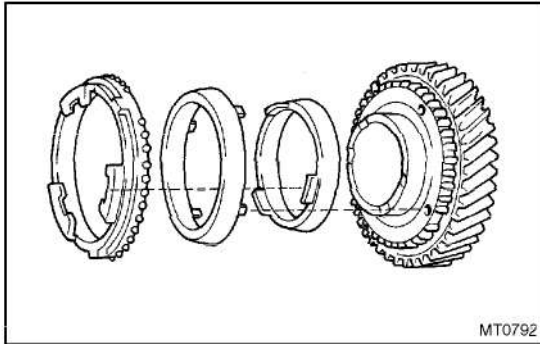
- (a) Using SST and a press, install the thrust washer.
SST 09316-60011 (09316-00041)
- (b) Apply gear oil to the needle roller bearing.



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



- (d) Using a press, install the 1st gear and No.1 hub sleeve.
- ### 3. INSPECT 1ST GEAR THRUST CLEARANCE
- (See page MX-34)

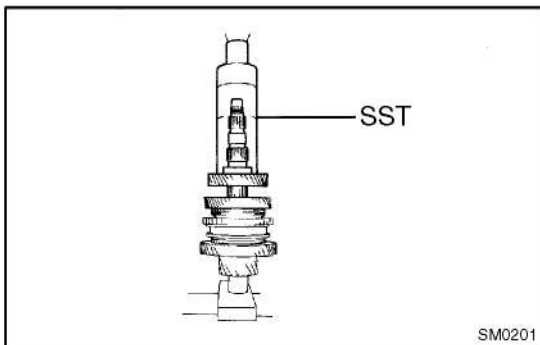


4. INSTALL SYNCHRONIZER RING, 2ND GEAR, NEEDLE ROLLER BEARING AND 3RD DRIVEN GEAR

- (a) Install the ball.
- (b) Fit the 2nd gear bushing groove securely over the ball when installing the 2nd gear bushing on the shaft.
- (c) Place the synchronizer rings on the 2nd gear.
- (d) Apply gear oil to the needle roller bearing and install it.
- (e) Install the 2nd gear.

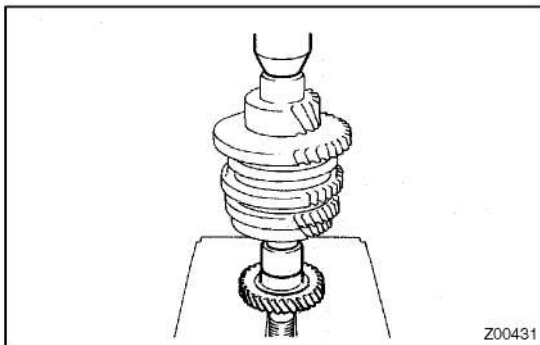
NOTICE:

Align the clutch hub grooves with the projections on the synchronizer ring.



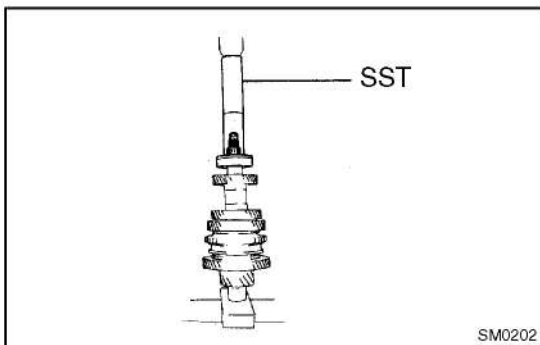
- (f) Using SST and a press, install the 3rd driven gear.
SST 09316-60011 (09316-00011)

5. INSPECT 2ND GEAR THRUST CLEARANCE (See page MX-34)



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

- (a) Install the outer gear spacer.
- (b) Using a press, install the 4th driven gear and bearing.

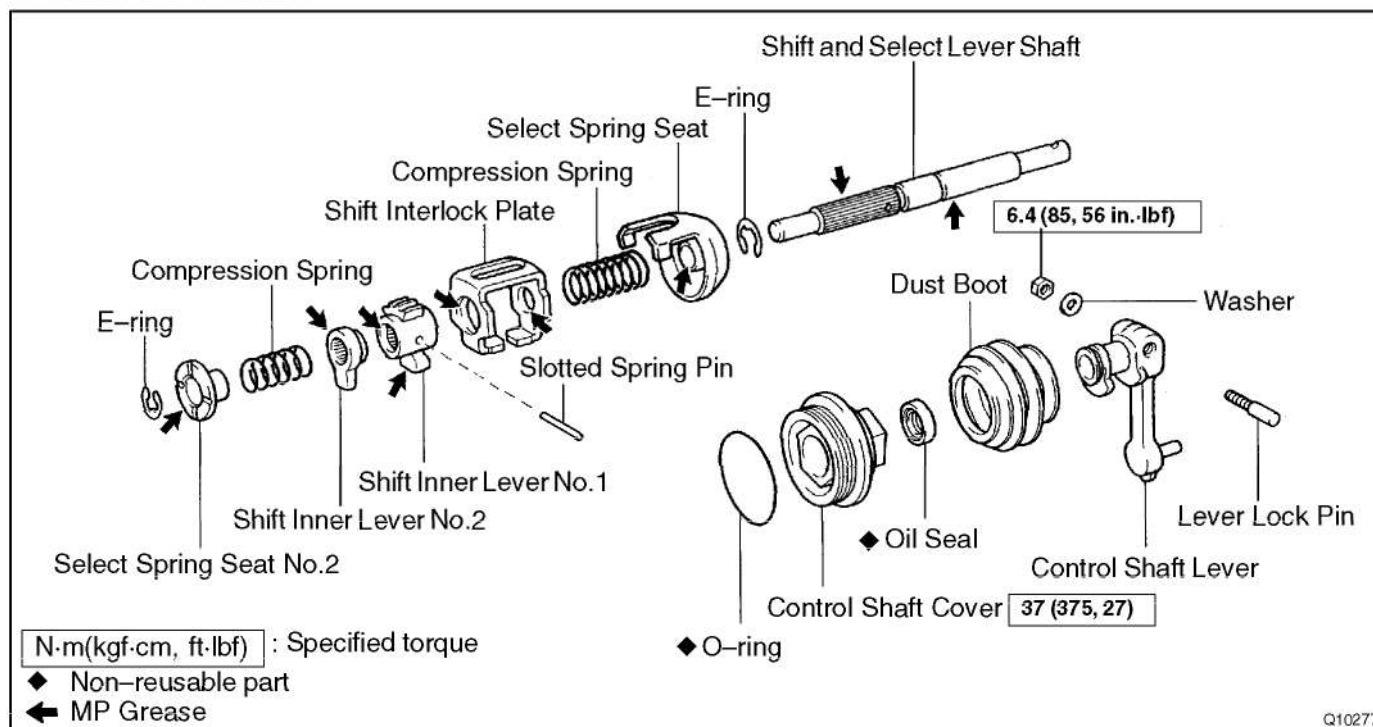


7. INSTALL REAR BEARING

Using SST and a press, install the rear bearing.
SST 09612-22011

SHIFT AND SELECT LEVER SHAFT COMPONENTS

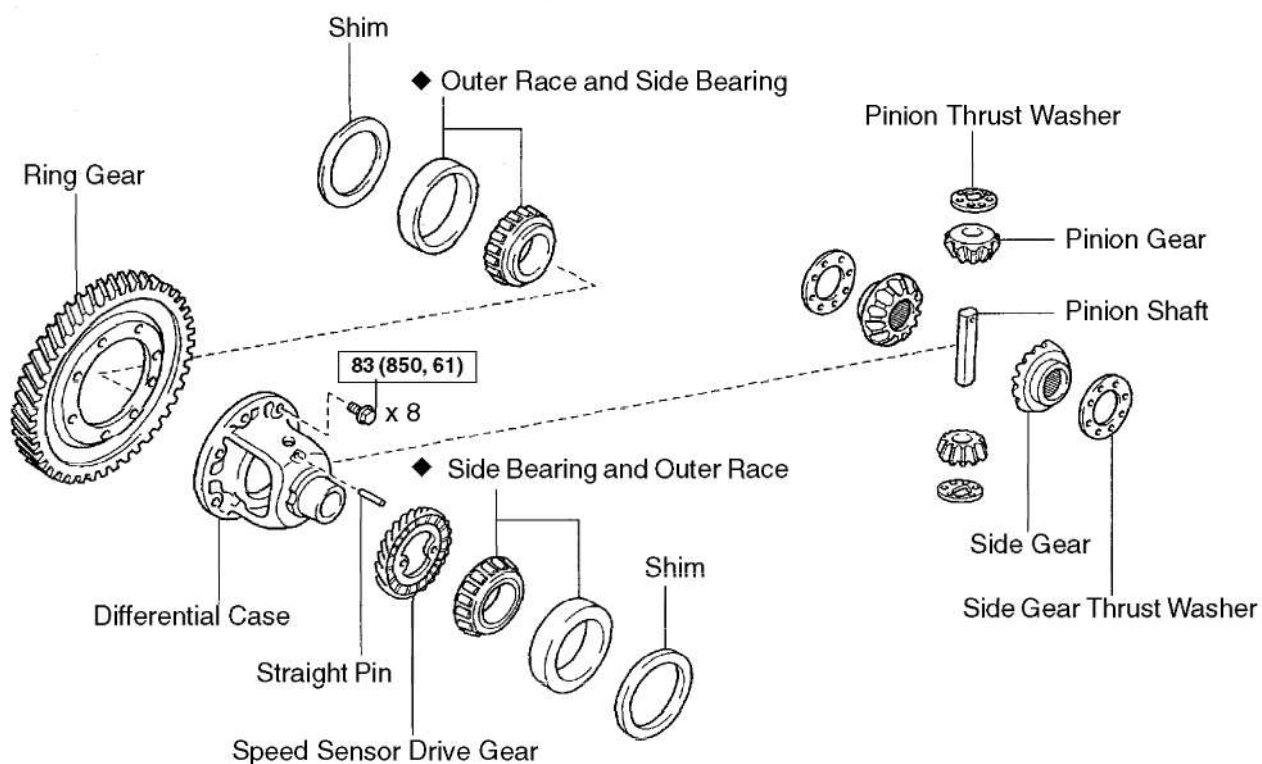
MX03G-03



Q10277

DIFFERENTIAL CASE COMPONENTS

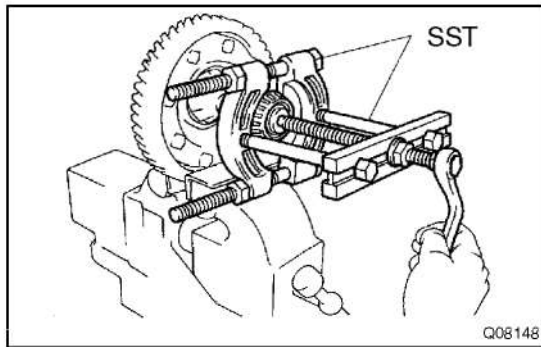
MX03H-03



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

◆ Non-reusable part

Z19302



DISASSEMBLY

1. Speed Sensor Drive Gear Side:

REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

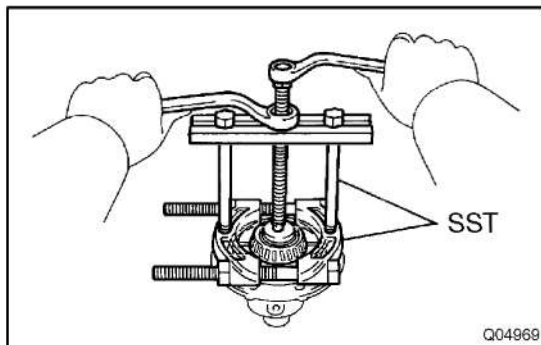
- (a) Using SST, remove the bearing from the drive gear side of the case.

SST 09950-00020, 09950-00030

- (b) Remove the speed sensor drive gear.

2. REMOVE RING GEAR

- (a) Place matchmarks on the ring gear and case.
 (b) Remove the 8 bolts.
 (c) Using a copper hammer, tap on the ring gear to remove it from the case.

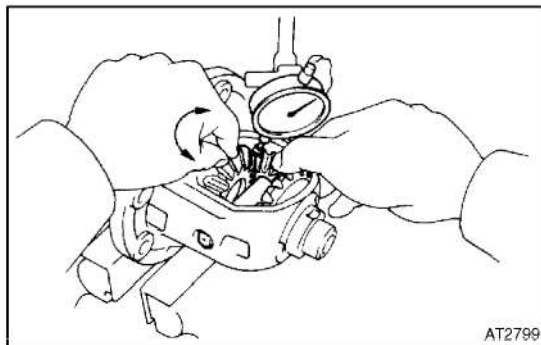


3. Ring Gear Side:

REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

Using SST, remove the bearing from the ring gear side of the case.

SST 09950-00020, 09950-00030



4. INSPECT SIDE GEAR BACKLASH

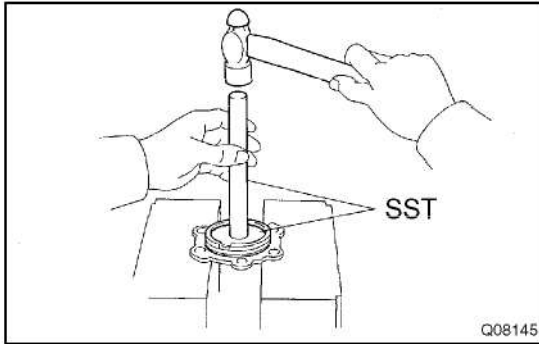
Using a dial indicator, measure the backlash of one side gear while holding one pinion toward the case.

Standard backlash: 0.05–0.20 mm (0.0020–0.0079 in.)

If the backlash is not within the specification, install the correct thrust washer to the side gears.

5. DISASSEMBLE DIFFERENTIAL CASE

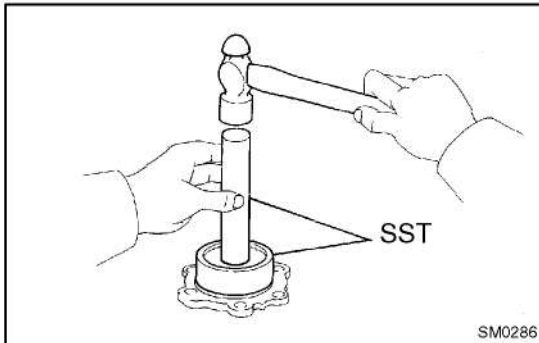
- (a) Using a pin punch and hammer, drive out the straight pin.
 (b) Remove the pinion shaft from the case.
 (c) Remove the 2 pinions and side gears with the 4 thrust washers from each gear.



**6. Transmission Case Side:
IF NECESSARY, REPLACE DIFFERENTIAL SIDE
BEARING RETAINER OIL SEAL**

- (a) Using SST and a hammer, drive out the oil seal from the retainer.

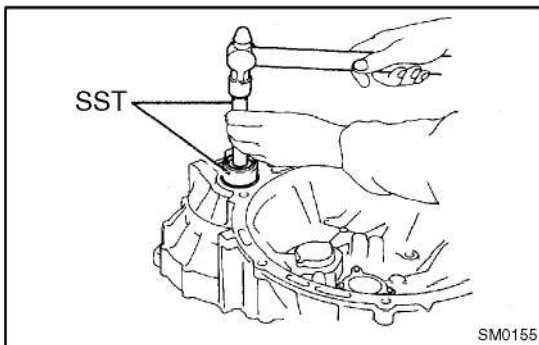
SST 09950-60020 (09951-00680), 09950-70010
(09951-07150)



- (b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case surface.

SST 09350-32014 (09351-32130, 09351-32150)

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

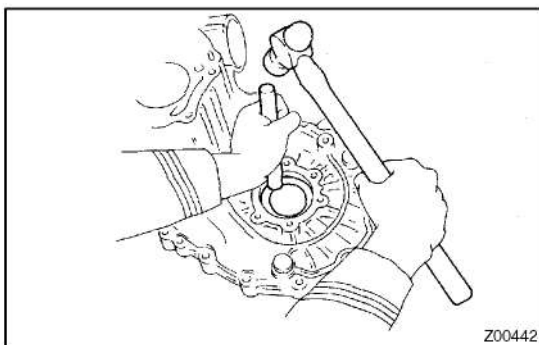


**7. Transaxle Case Side:
IF NECESSARY, REPLACE SIDE OIL SEAL**

- (a) Using a screwdriver and hammer, drive out the oil seal.
(b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case surface.

SST 09350-32014 (09351-32130, 09351-32150)

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

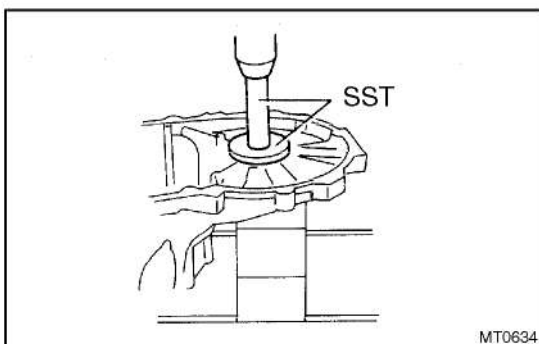


**8. Transmission Case Side:
IF NECESSARY, REPLACE SIDE BEARING OUTER
RACE**

- (a) Using a brass bar and hammer, drive out the bearing outer race.
(b) Install the bearing retainer without an O-ring.
(c) Install and torque the 6 bolts.

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

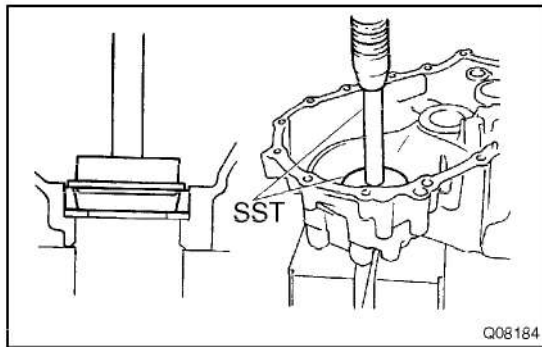
- (d) Place the thinnest shim into the case.



- (e) Using SST and a press, install a new bearing outer race.
SST 09950-60020 (09951-00680), 09950-70010
(09951-07150)

- (f) Remove the 6 bolts.

- (g) Remove the bearing retainer and shim.



- 9. Transaxle Case Side:**
IF NECESSARY, REPLACE SIDE BEARING OUTER RACE
- (a) Using a brass bar and hammer, drive out the bearing outer race and shim.
 - (b) Place the shim into the case.
 - (c) Using SST and a press, install a new bearing outer race.
SST 09950-60020 (09951-00680), 09950-70010 (09951-07150)

REASSEMBLY

1. ASSEMBLE DIFFERENTIAL CASE

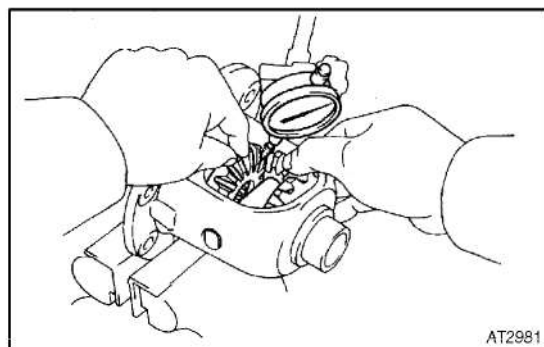
- (a) Install the correct thrust washers and side gears. Refer to the table below, select thrust washers which will allow that the backlash is within the specification. Try to select washers of the same size for both sides.

Standard backlash: 0.05–0.20 mm (0.0020–0.0079 in.)

Thickness mm (in.)	Thickness mm (in.)
0.95 (0.0374)	1.10 (0.0433)
1.00 (0.0394)	1.15 (0.0453)
1.05 (0.0413)	1.20 (0.0472)

Install the thrust washers and side gears in the differential case.

- (b) Install the pinion shaft.



AT2981

- (c) Inspect the side gear backlash. Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05–0.20 mm (0.0020–0.0079 in.)

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

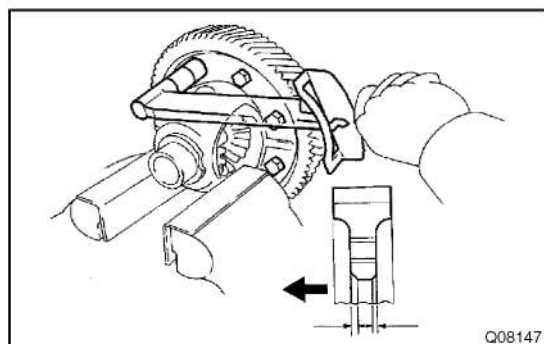
- (d) Using a pin punch and hammer, drive in the straight pin through the case and hole in the pinion shaft.
(e) Stake the differential case.

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) Carefully remove the ring gear from the water.
(d) After moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:

Align the matchmark on the differential case with the one on the ring gear.



Q08147

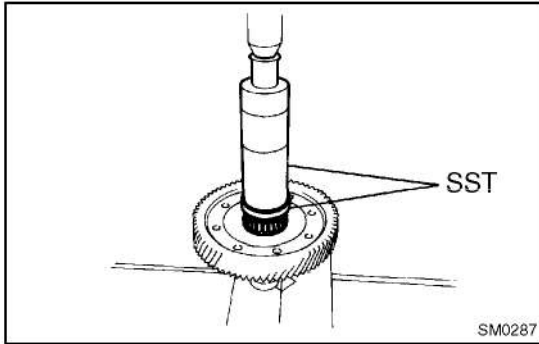
- (e) Temporarily install the 8 bolts.

NOTICE:

The ring gear set bolts should not be torqued until the ring gear has cooled sufficiently.

- (f) After the ring gear has cooled sufficiently, torque the ring gear set bolts.

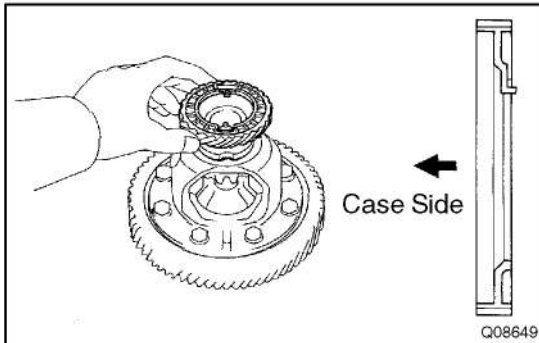
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



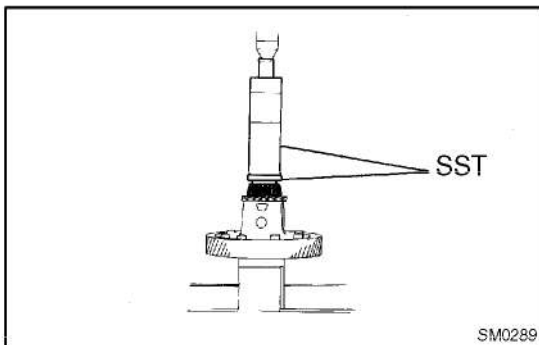
3. INSTALL SIDE BEARING TO DIFFERENTIAL CASE

- (a) Using SST and a press, install a new side bearing to the transmission case side.

SST 09316-60011 (09316-00011), 09350-32014 (09351-32120)



- (b) Install the speed sensor drive gear to the transaxle case side.



- (c) Using SST and a press, install a new side bearing to the transaxle case side.

SST 09316-60011 (09316-00011), 09350-32014 (09351-32120)

NOTICE:

Install the black cage bearing on the speed sensor drive gear side.

4. ADJUST DIFFERENTIAL CASE SIDE BEARING PRE-LOAD

- (a) Install the differential to the transaxle case.

- (b) Install the transmission case.

- (c) Install and torque the case bolts.

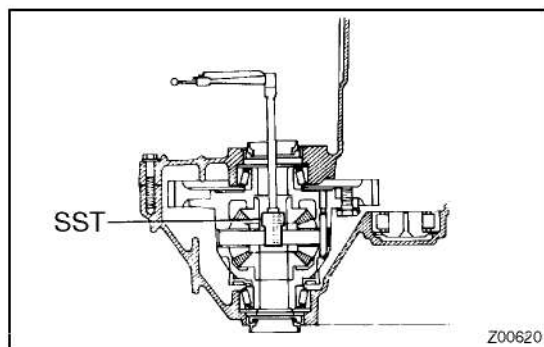
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

- (d) Install the shim into the transmission case.

- (e) Install the bearing retainer without an O-ring.

- (f) Install and torque the 6 bolts.

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



- (g) Using SST and a torque wrench, measure the preload.
SST 09564-32011

Preload (at starting):

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

If the preload is not within the specification, remove the transmission case side bearing retainer. Select another shim.

HINT:

The preload will change by approx. 0.3–0.4 N·m (3–4 kgf·cm, 2.6–3.5 in.-lbf) corresponding to a change of 0.05 mm in shim thickness.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	1.90 (0.0748)	11	2.40 (0.0945)
2	1.95 (0.0768)	12	2.45 (0.0965)
3	2.00 (0.0787)	13	2.50 (0.0984)
4	2.05 (0.0807)	14	2.55 (0.1004)
5	2.10 (0.0827)	15	2.60 (0.1024)
6	2.15 (0.0846)	16	2.65 (0.1043)
7	2.20 (0.0866)	17	2.70 (0.1063)
8	2.25 (0.0886)	18	2.75 (0.1083)
9	2.30 (0.0906)	19	2.80 (0.1102)
10	2.35 (0.0925)	—	—

- (h) Remove the 6 bolts.
(i) Remove the bearing retainer and shim.
(j) Remove the 17 bolts.
(k) Remove the transmission case.

3D-MEXAM

