
MANUAL TRANSAXLE (E351)

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TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MX01Z-07

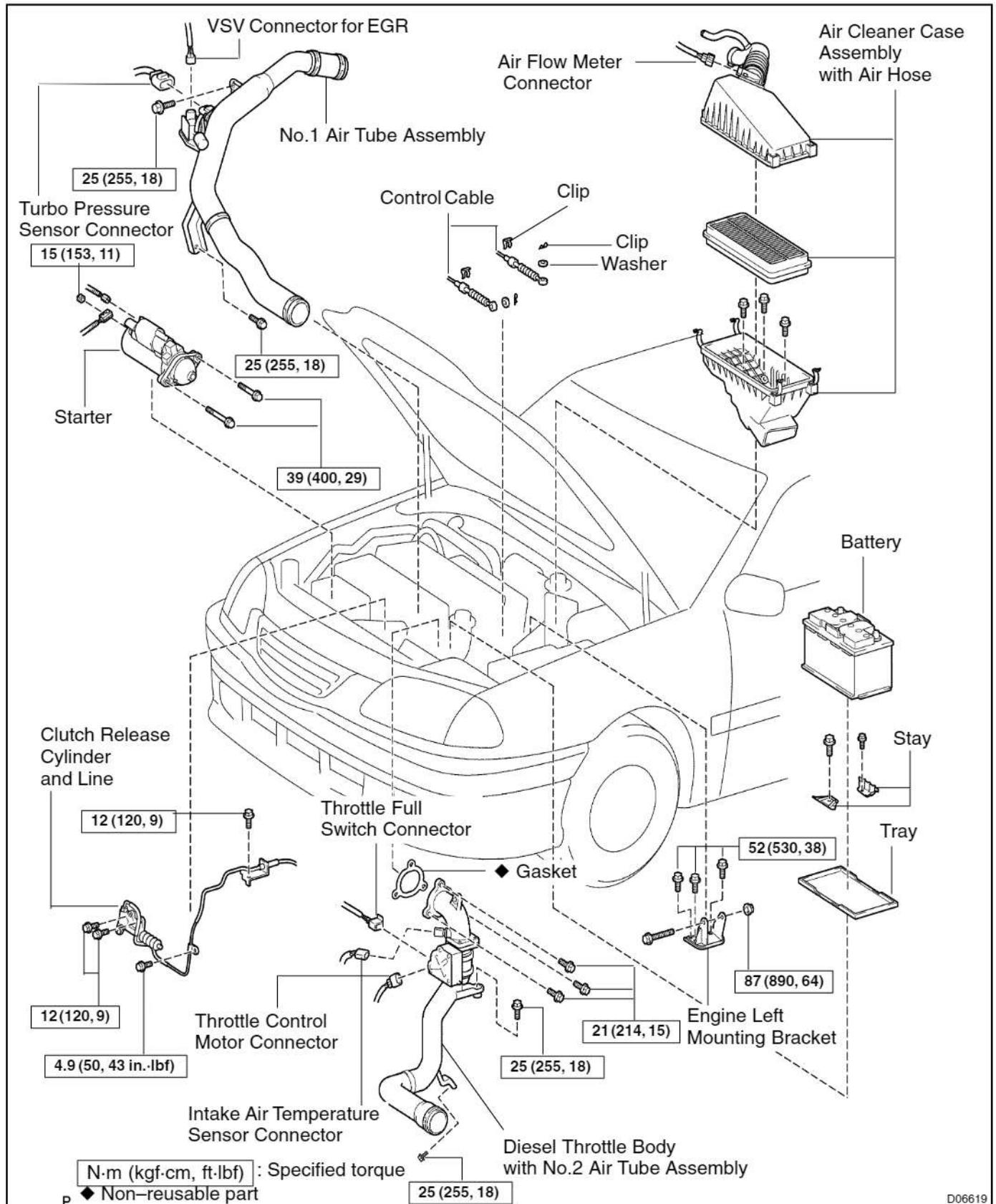
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	1. Oil (Level low) 2. Oil (Wrong) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged)	MX-4 MX-4 MX-9 MX-9
Oil leakage	1. Oil (Level too high) 2. Gasket (Damaged) 3. Oil seal (Worn or damaged) 4. O-Ring (Worn or damaged)	MX-4 MX-9 MX-9 MX-9
Hard to shift or will not shift	1. Control cable (Faulty) 2. Synchronizer ring (Worn or damaged) 3. Shift key spring (Damaged)	MX-45 MX-9 MX-23 MX-29 MX-9 MX-23 MX-29
Jumps out of gear	1. Locking ball spring (Damaged) 2. Shift fork (Worn) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged)	MX-9 MX-9 MX-9 MX-9

MANUAL TRANSAXLE UNIT

COMPONENTS

MX096-03

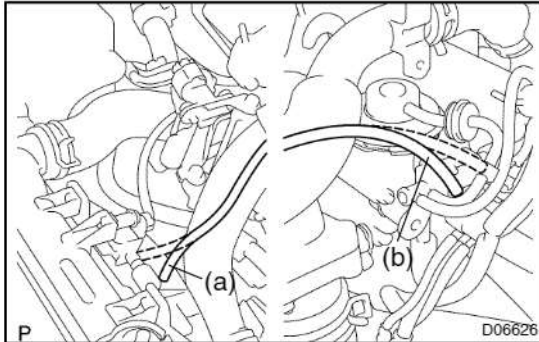


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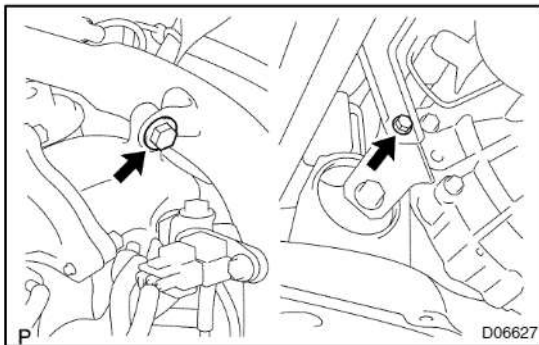


REMOVAL

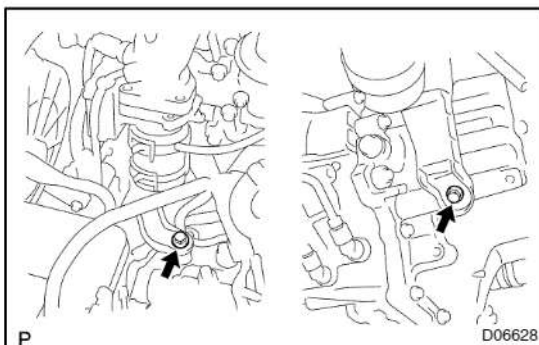
1. REMOVE BATTERY AND TRAY
2. REMOVE AIR CLEANER CASE ASSEMBLY WITH AIR HOSE
3. REMOVE LH AND RH ENGINE UNDER COVERS



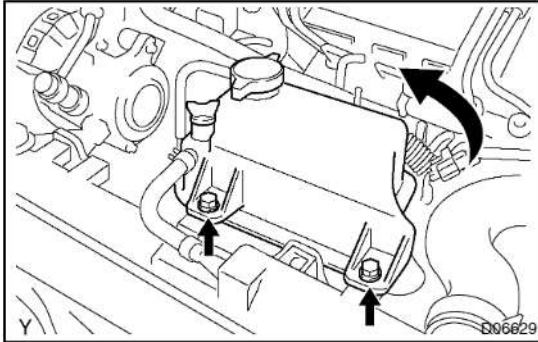
4. REMOVE NO.1 AIR TUBE ASSEMBLY
 - (a) Disconnect the No.2 vacuum hose from the E-VRV for EGR.
 - (b) Disconnect the No.2 vacuum hose from the VSV for EGR.
 - (c) Disconnect the VSV connector for EGR.
 - (d) Disconnect the turbo pressure sensor connector and vacuum hose.



- (e) Remove the 2 bolts as shown in the illustration.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (f) Disconnect the 2 hose clips, and remove the No.1 air tube assembly.
5. REMOVE DIESEL THROTTLE BODY WITH NO.2 AIR TUBE ASSEMBLY
 - (a) Disconnect the intake air temperature sensor connector.
 - (b) Disconnect the throttle control motor connector.
 - (c) Disconnect the full opener switch connector.
 - (d) Remove the 3 bolts from the diesel throttle body.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)



- (e) Remove the 2 bolts as shown in the illustration.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (f) Disconnect the 2 hose clips, and remove the diesel throttle body assembly with the No.2 air tube assembly.

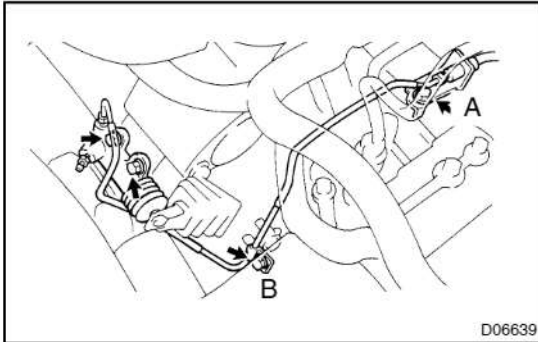
**6. REMOVE STARTER**

- (a) Remove the 2 bolts and disconnect the radiator reservoir from the radiator.
- (b) Disconnect the starter connector.
- (c) Remove the nut, and disconnect the starter wire.

Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

- (d) Remove the 2 bolts and starter.

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

**7. DISCONNECT CLUTCH RELEASE CYLINDER AND LINE**

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

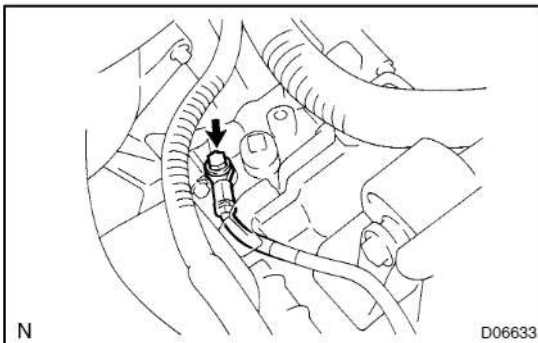
Torque:

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 release cylinder and line.

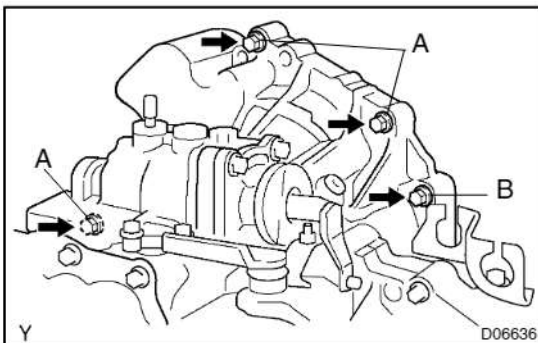
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

**8. DISCONNECT GROUND CABLE**

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

9. DISCONNECT VEHICLE SPEED SENSOR AND BACK-UP LIGHT SWITCH CONNECTORS**10. DISCONNECT CONTROL CABLE**

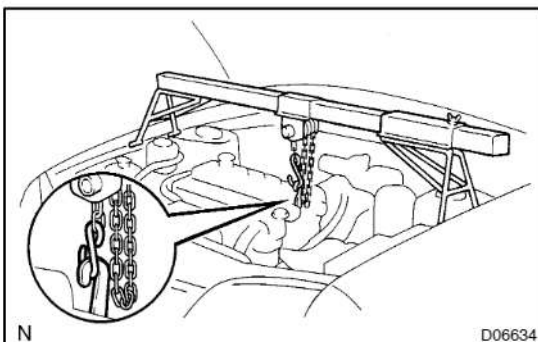
- (a) Remove the 2 clips and washers.
- (b) Remove the 2 clips from the cables.

**11. REMOVE 4 TRANSAXLE UPPER SIDE MOUNTING BOLTS**

Torque:

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

Bolt B: 29 N·m (296 kgf·cm, 21 ft·lbf)

**12. INSTALL ENGINE SUPPORT FIXTURE**

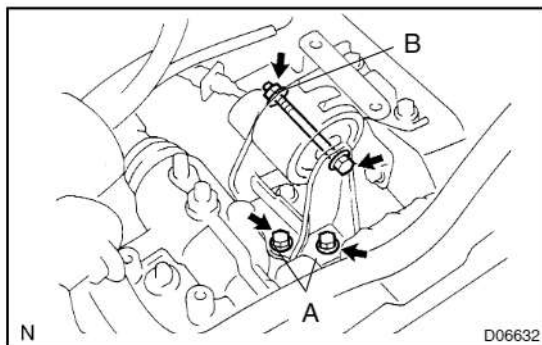
Install the engine hanger in the correct direction.

Parts No.:

Engine hanger: 12281-27010

Bolt: 96122-61020

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

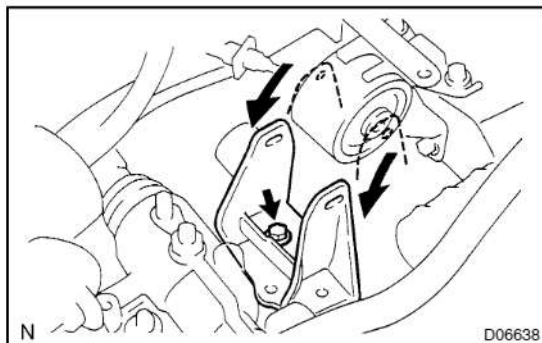


13. REMOVE ENGINE LEFT MOUNTING BRACKET 3 SET BOLTS AND NUT

Torque:

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

Nut B: 87 N·m (890 kgf·cm, 64 ft·lbf)



14. 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)

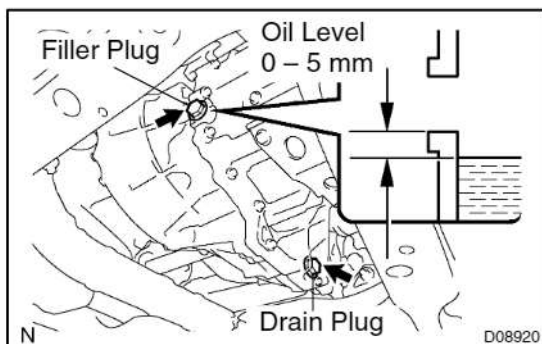
15. REMOVE FRONT WHEEL

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

16. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.



17. DRAIN TRANSAXLE OIL

Oil grade: API GL-4 or GL-5

Viscosity: SAE 75W-90

Capacity: 2.5 liters (2.6 US qts, 2.2 Imp. qts)

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

18. REMOVE FRONT EXHAUST PIPE

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

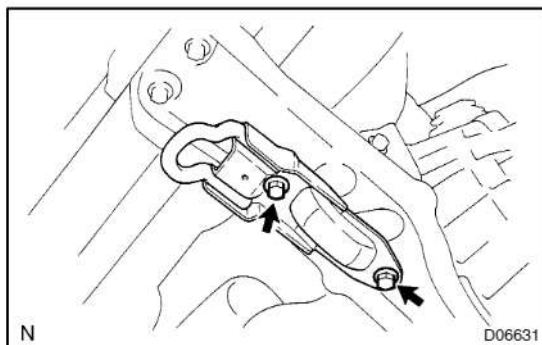
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

(b) Remove the 2 bolts, 2 springs, gasket and pipe.

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

19. REMOVE LH AND RH FRONT DRIVE SHAFTS

(See page SA-1)



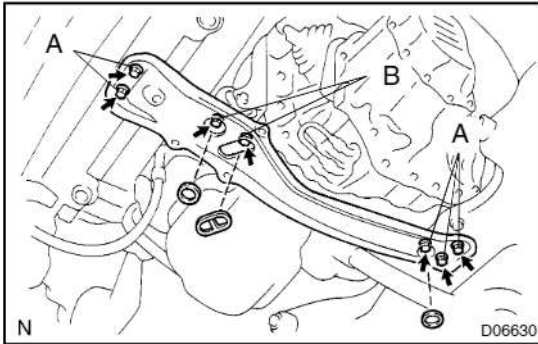
20. REMOVE ENGINE MOUNTING CENTER MEMBER

(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 nuts, and disconnect the suction pipe.



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

(e) Remove the 7 bolts and center member.

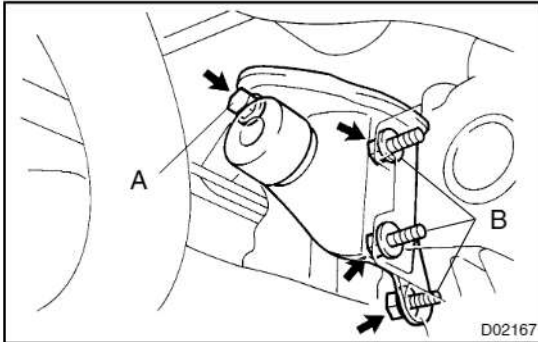
Torque:

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

Bolt B: 52 N·m (540 kgf·cm, 38 ft·lbf)

21. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.



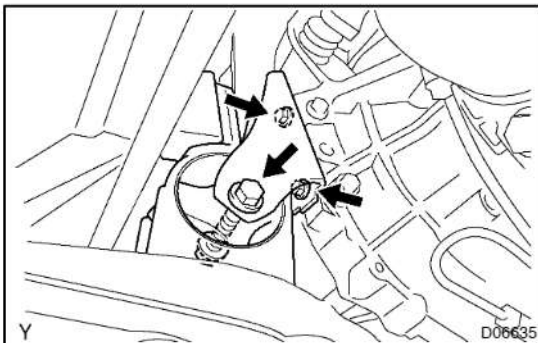
22. REMOVE ENGINE REAR MOUNTING BRACKET

Remove the 4 bolts and bracket.

Torque:

Bolt A: 98 N·m (1,000 kgf·cm, 72 ft·lbf)

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



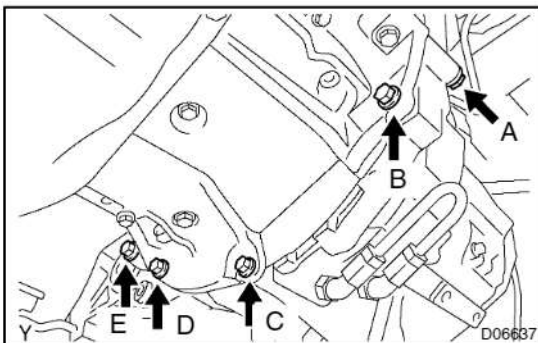
23. REMOVE ENGINE FRONT MOUNT AND MOUNTING BRACKET

(a) Remove the bolt and nut.

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

(b) Remove the 2 bolts.

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



24. REMOVE TRANSAXLE LOWER SIDE MOUNTING BOLT

Remove the 5 bolts.

Torque:

Bolt A: 40 N·m (408 kgf·cm, 30 ft·lbf)

Bolt B: 40 N·m (408 kgf·cm, 30 ft·lbf)

Bolt C: 8.0 N·m (82 kgf·cm, 71 in·lbf)

Bolt D: 20 N·m (204 kgf·cm, 15 ft·lbf)

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

25. 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.

26. REMOVE TRANSAXLE CASE PROTECTOR

Remove the 2 bolts and protector.

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

INSTALLATION

Installation is in the reverse order of removal (See page MX-4).

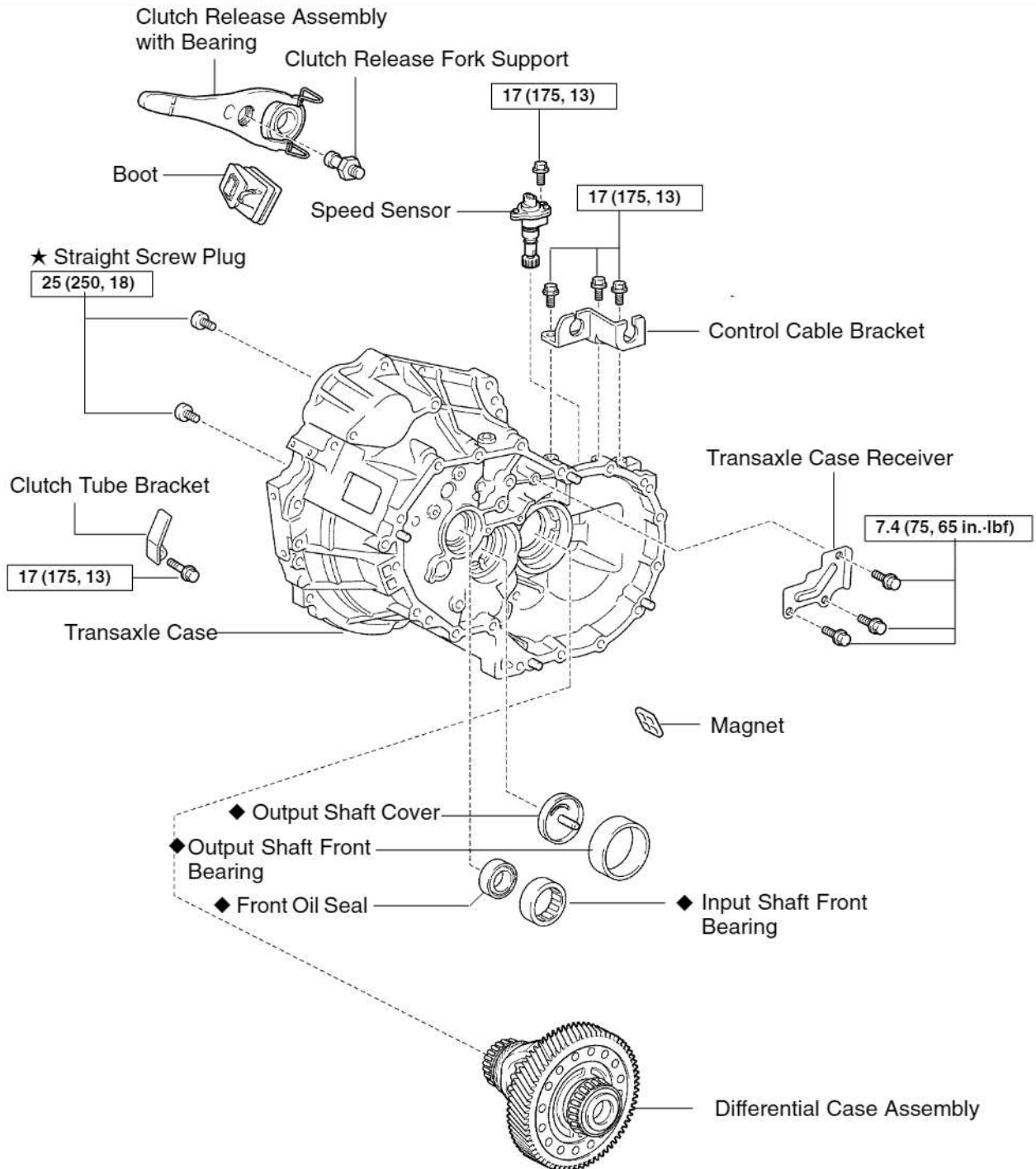
HINT:

After installation, check and inspect items as follows.

- Front wheel alignment (See Pub. No. RM599E on page SA-4).
- Do the road test.

MANUAL TRANSAXLE ASSEMBLY COMPONENTS

MX098-03



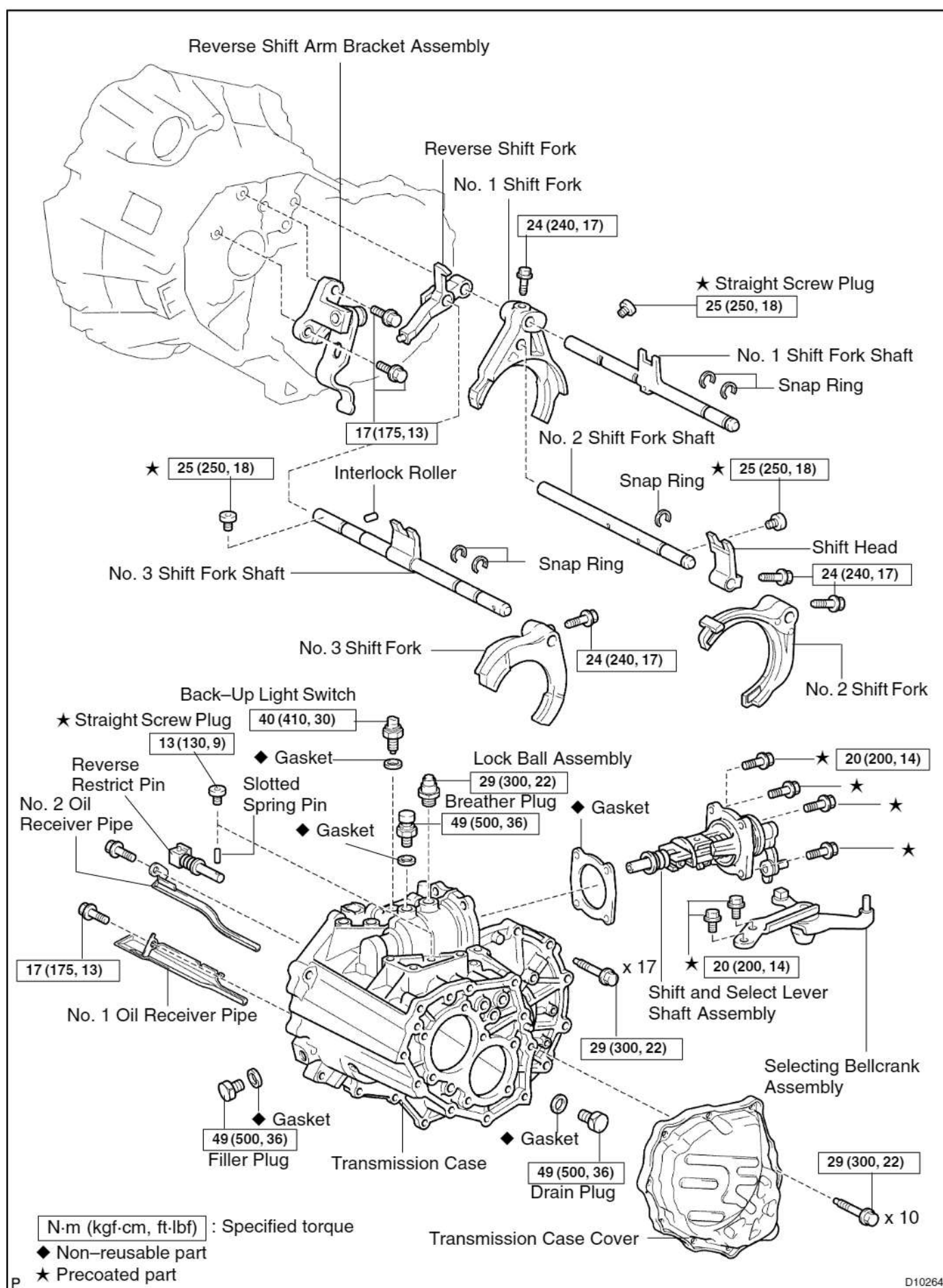
N·m (kgf·cm, ft·lbf) : Specified torque

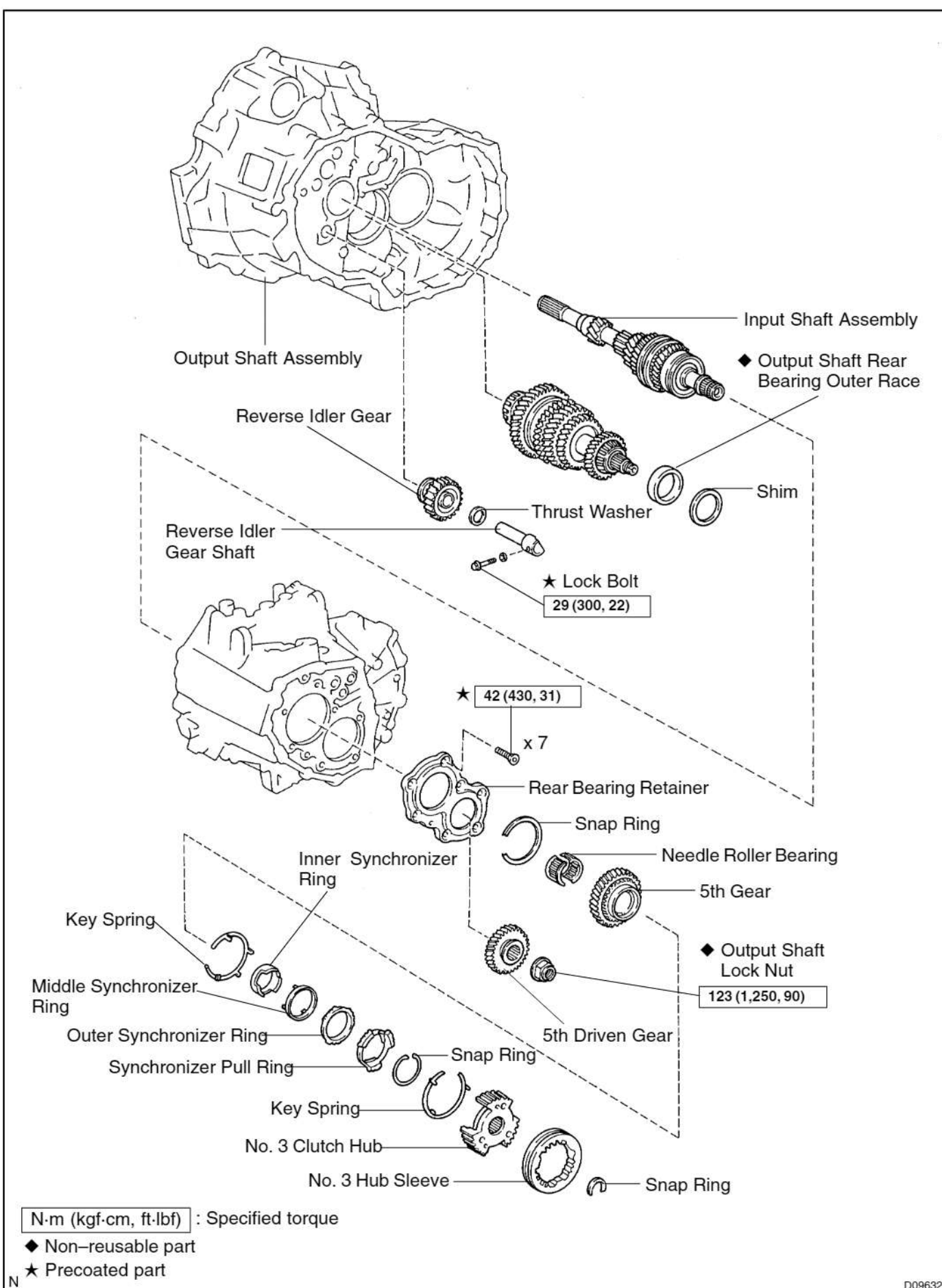
◆ Non-reusable part

★ Precoated part

P

D10263





D09632

DISASSEMBLY

1. REMOVE RELEASE FORK AND BEARING
2. REMOVE BACK-UP LIGHT SWITCH WITH GASKET
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)
3. REMOVE BOLT AND VEHICLE SPEED SENSOR
Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)
4. REMOVE SELECTING BELLCRANK ASSEMBLY
Remove the 2 bolts and No.2 selecting bellcrank with the selecting bellcrank support.

Sealant:

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

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

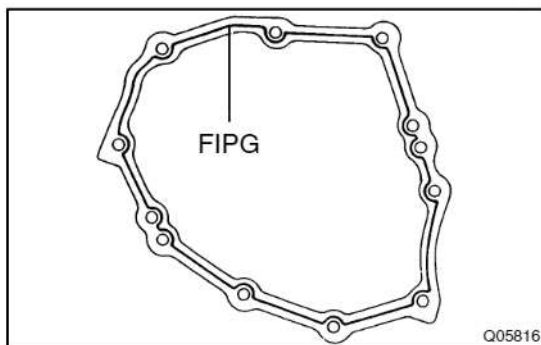
5. REMOVE LOCK BALL ASSEMBLY WITH GASKET
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
6. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY WITH GASKET

Remove the 4 bolts, the shift, select lever shaft assembly and gasket.

Sealant:

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

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



7. REMOVE TRANSMISSION CASE COVER

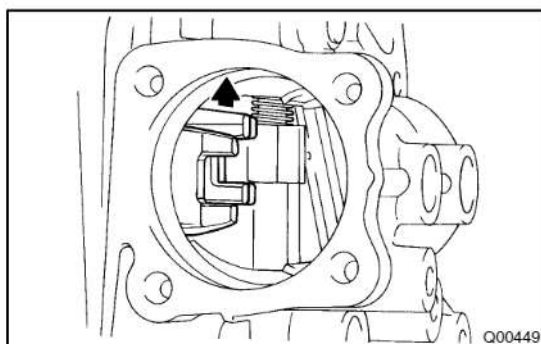
Remove the 10 bolts and transmission case cover.

FIPG:

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

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

8. REMOVE BREATHER PLUG WITH GASKET
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

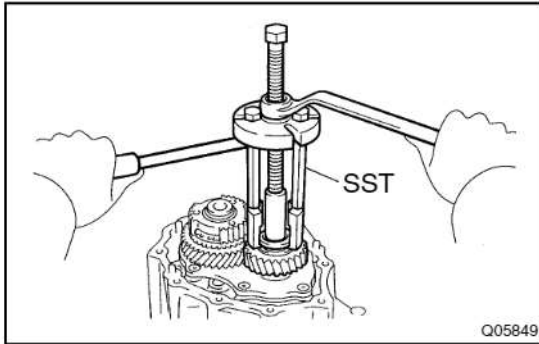


9. REMOVE OUTPUT SHAFT LOCK NUT

- (a) Remove the lock nut.
- (b) Engage the gear double meshing.
- (c) Remove the lock nut.
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)
- (d) Disengage the gear double meshing.

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

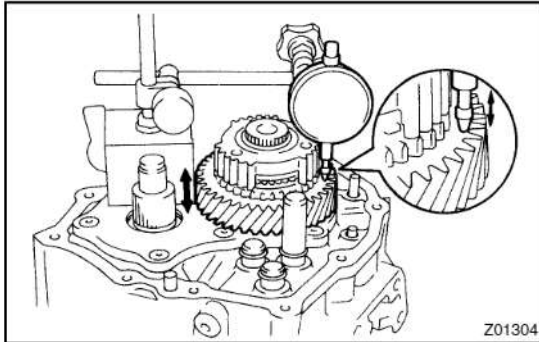
- (a) Remove the No.3 shift fork set bolt.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)
- (b) Remove the No.3 hub sleeve and No.3 shift fork.



11. REMOVE 5TH DRIVEN GEAR

Using SST, remove the 5th driven gear.

SST 09950-30011



12. MEASURE 5TH GEAR THRUST CLEARANCE AND RADIAL CLEARANCE

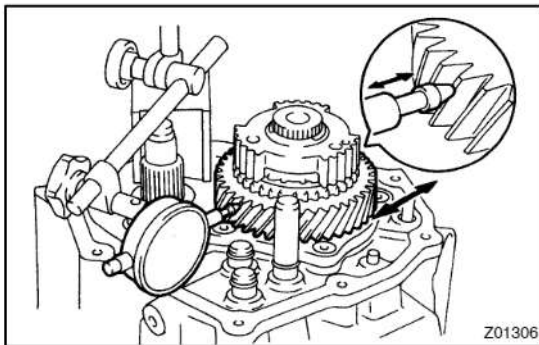
- (a) Using a dial indicator, measure the thrust clearance.

Minimum clearance:

0.10 mm (0.0039 in.)

Maximum clearance:

0.65 mm (0.0256 in.)



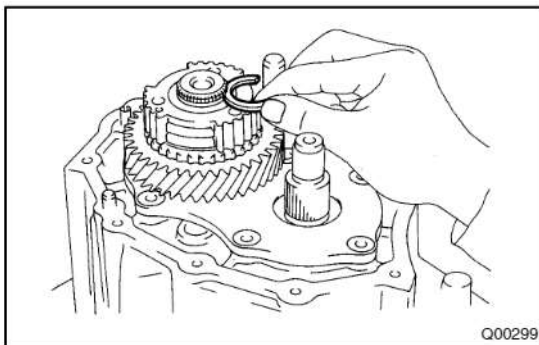
- (b) Using a dial indicator, measure the radial clearance.

Maximum clearance:

0.050 mm (0.0020 in.)

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

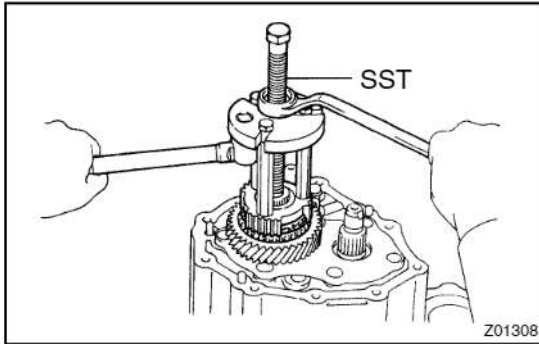
- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.



HINT:

At the time of the 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.)
a	1.75 (0.0689)	f	2.00 (0.0787)
b	1.80 (0.0709)	g	2.05 (0.0807)
c	1.85 (0.0729)	h	2.10 (0.0827)
d	1.90 (0.0748)	j	2.15 (0.0847)
e	1.95 (0.0768)	—	—



- (b) Using SST, remove the No.3 clutch hub with the synchronizer ring and 5th gear.

SST 09950-30011

14. REMOVE NEEDLE ROLLER BEARING AND SPACER

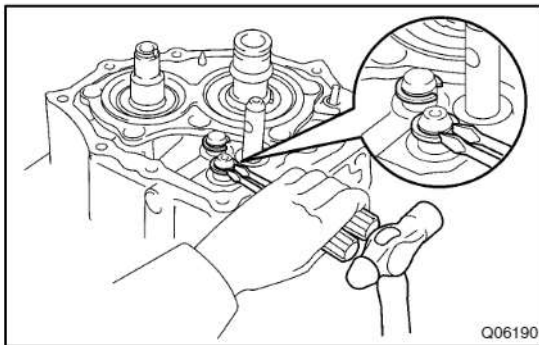
15. REMOVE REAR BEARING RETAINER

Using a torx socket wrench (T45), remove the 7 torx screws and rear bearing retainer.

Sealant:

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

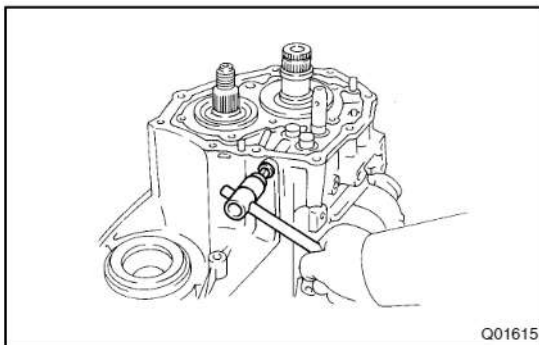
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



16. REMOVE SNAP RING

- (a) Using a snap ring expander, remove the input shaft rear bearing snap ring.

- (b) Using 2 screwdrivers and a hammer, remove the 2 snap rings.



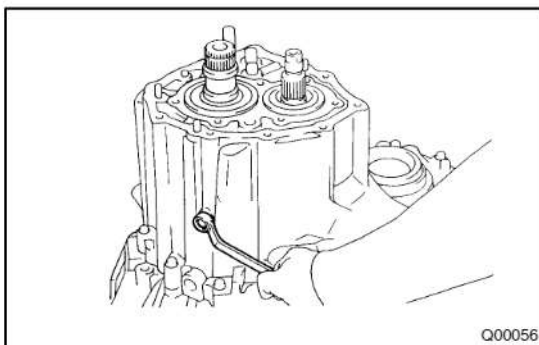
17. REMOVE STRAIGHT SCREW PLUG

Using a hexagon wrench (6 mm), remove the plug.

Sealant:

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

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

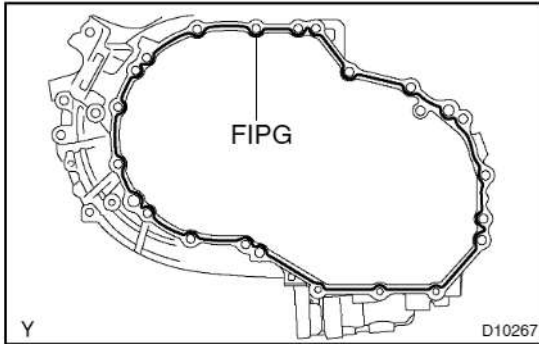


18. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT

Sealant:

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

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



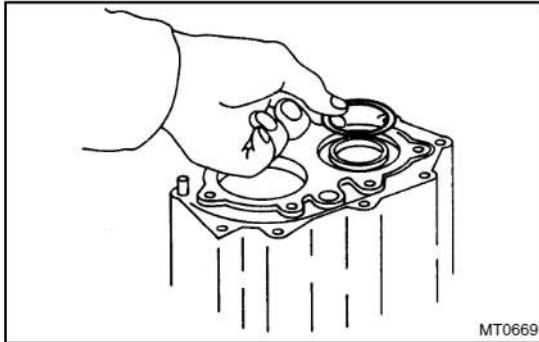
19. REMOVE TRANSMISSION CASE

Remove the 17 bolts and tap the case with a plastic hammer.

FIPG:

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

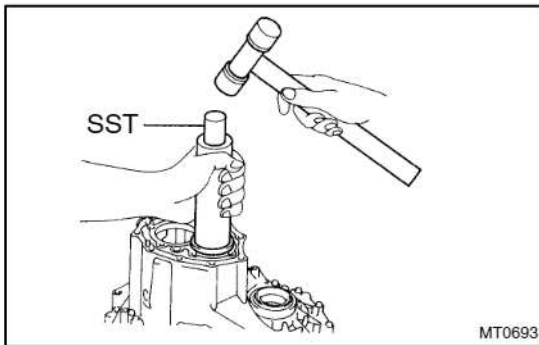
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



20. REMOVE SHIM

HINT:

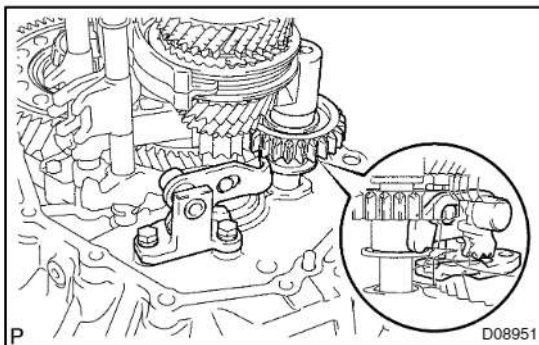
At the time of reassembly, please refer to the following item.
Install the previously selected shim by adjusting output shaft preload. (See page MX-21)



21. REMOVE OUTPUT SHAFT REAR TAPER ROLLER BEARING OUTER RACE

Using SST and a hammer, remove the output shaft rear taper roller bearing outer race.

SST 09316-60011 (09316-00011)



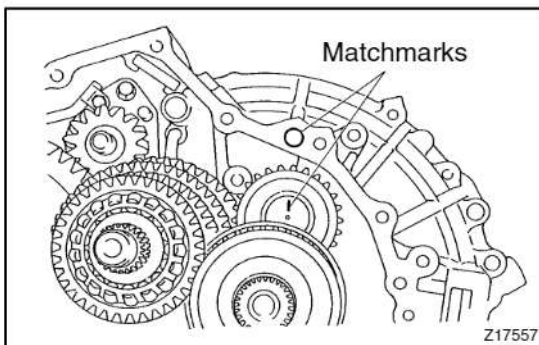
22. REMOVE REVERSE SHIFT ARM BRACKET ASSEMBLY

Remove the bolt and pull off the reverse shift arm and bracket.

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

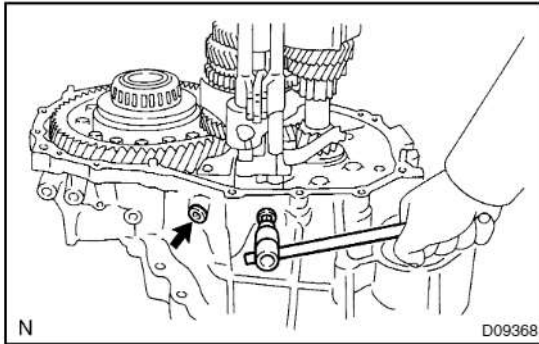
23. REMOVE REVERSE IDLER GEAR AND SHAFT

Pull out the shaft, remove the reverse idler gear and thrust washer.



HINT:

At the time of reassembly, please refer to the following item.
Align the matchmarks, as shown.

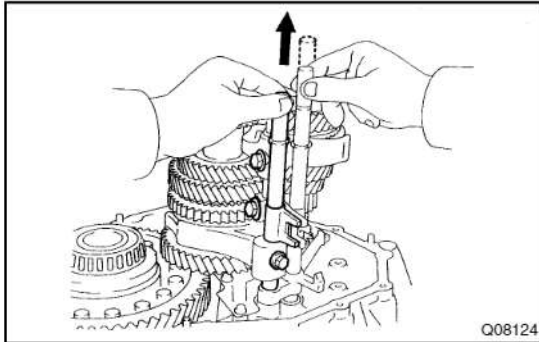
**24. REMOVE STRAIGHT SCREW PLUG**

Using a hexagon wrench (6 mm), remove the 2 plugs.

Sealant:

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

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

**25. REMOVE NO.1, NO.2 SHIFT FORKS AND SHIFT HEAD SET BOLT**

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

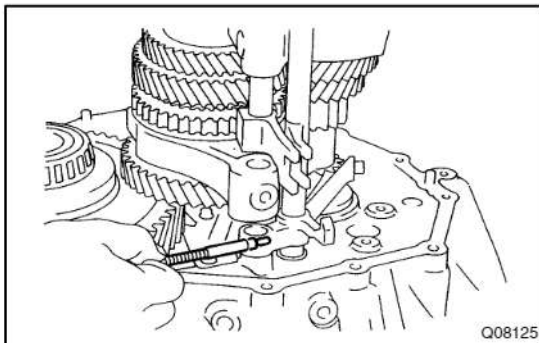
26. REMOVE NO.1 SHIFT FORK SHAFT

Pull up the No.3 shift fork shaft, remove the No.1 shift fork shaft.

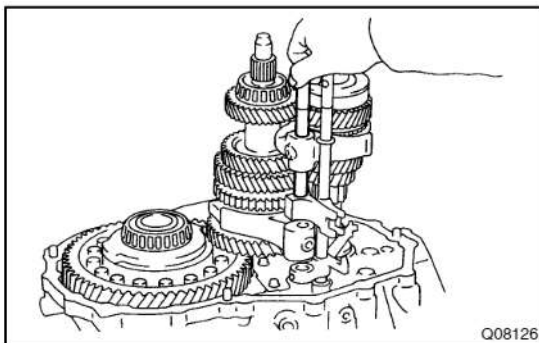
HINT:

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

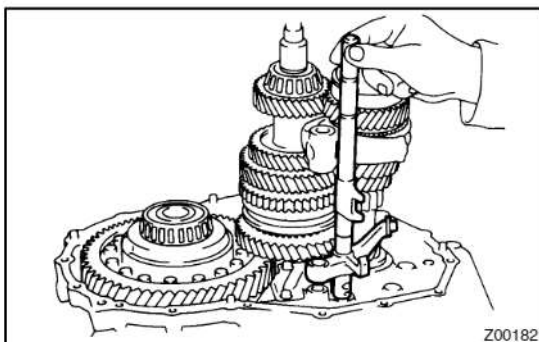
When it is difficult to push the fork shaft through the reverse shift fork, pull up the No.3 shift fork shaft.

**27. REMOVE INTERLOCK ROLLER**

Using a magnetic finger, remove the interlock roller from the reverse shift fork.

**28. REMOVE NO.2 SHIFT FORK SHAFT, SHIFT HEAD AND NO.1 SHIFT FORK**

- (a) Pull out the No.2 shift fork shaft.
- (b) Remove the shift head and No.1 shift fork.

**29. REMOVE NO.3 SHIFT FORK SHAFT WITH REVERSE SHIFT FORK AND NO.2 SHIFT FORK**

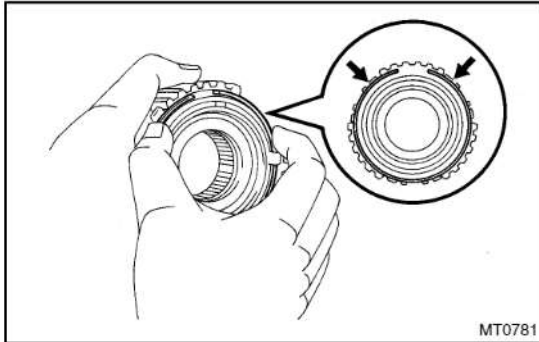
- (a) Pull out the No.3 shift fork shaft with the reverse shift fork.
- (b) Remove the No.2 shift fork.

30. REMOVE SNAP RING

- (a) Using 2 screwdrivers and a hammer, remove the snap ring and reverse shift fork from the No.3 shift fork shaft.
- (b) Using 2 screwdrivers and a hammer, remove the 3 snap rings from the No.1, No.2 and No.3 shift fork shafts.

31. REMOVE INPUT AND OUTPUT SHAFTS ASSEMBLY

- (a) Leaning the output shaft to the differential side, remove the input shaft assembly.
- (b) Lift up the differential case assembly, remove the output shaft assembly.

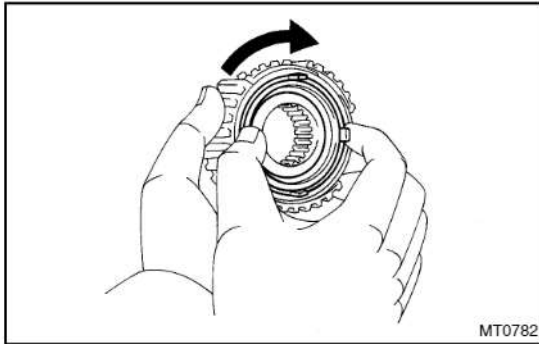
32. REMOVE MAGNET FROM TRANSAXLE CASE**33. REMOVE NO.5 SYNCHRONIZER RING WITH KEY SPRING FROM NO.3 CLUTCH HUB**

- (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.

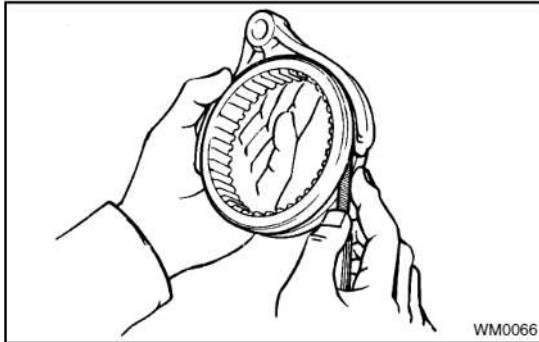


INSPECTION

1. INSPECT NO.5 SYNCHRONIZER RING

- Check for wear or damage.
- 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 it does not lock, replace the synchronizer ring.

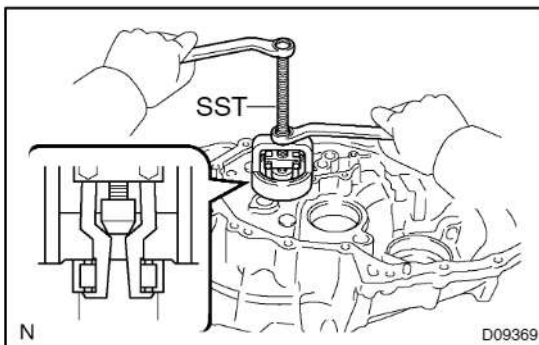


2. MEASURE No.3 SHIFT FORK AND HUB SLEEVE CLEARANCE

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

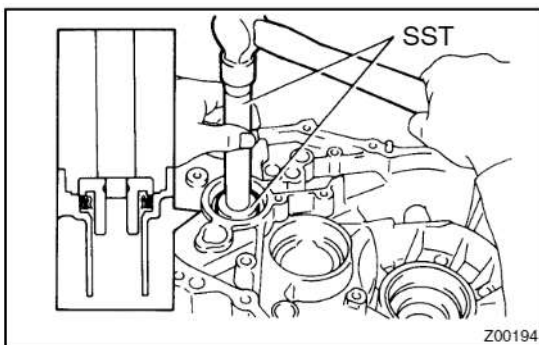
Maximum clearance: 0.35 mm (0.014 in.)

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

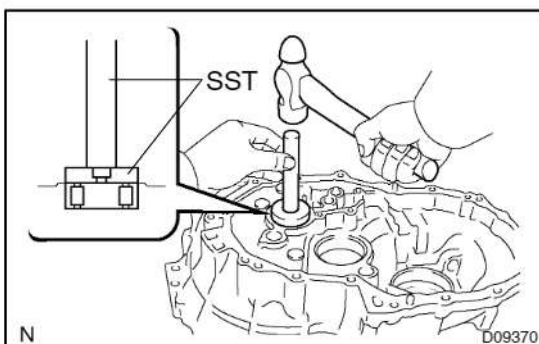


3. IF NECESSARY, REPLACE INPUT SHAFT BEARING AND OIL SEAL

- Remove the 3 bolts and transaxle case receiver.
- Using SST, pull out the bearing.
SST 09612-65014
- Using a screwdriver, remove the oil seal.

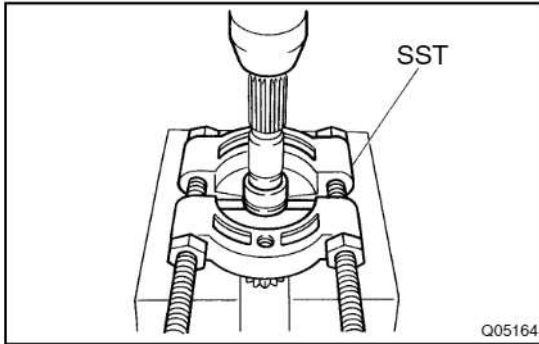


- Using SST, drive in a new oil seal.
SST 09608-00081, 09950-70010 (09951-07150)
- Coat the lip of seal with MP grease.

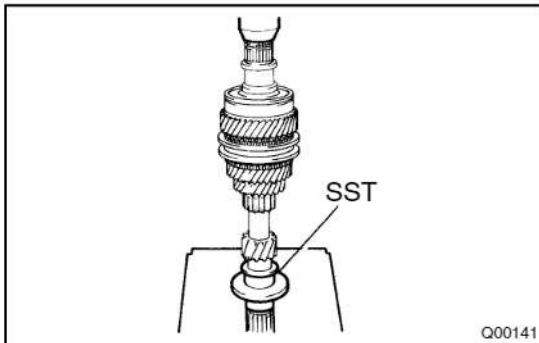


- Using SST, drive in a new bearing.
SST 09950-60010 (09951-00580), 09950-70010 (09951-07150)
- Install the transaxle case receiver.
- Install and torque the 3 bolts.

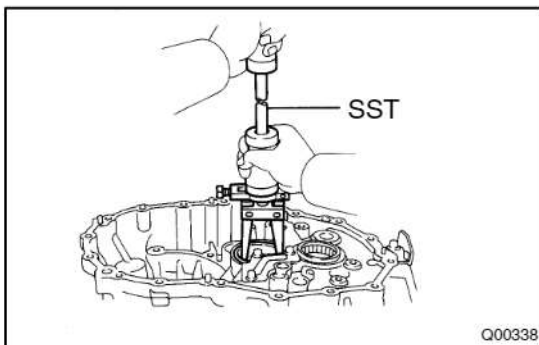
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



- (i) Using SST and a press, remove the inner race.
SST 09950-00020

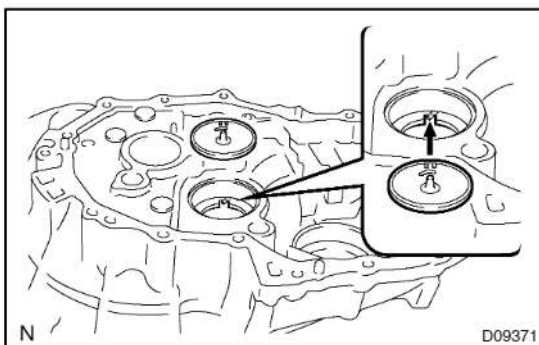


- (j) Using SST and a press, install a new input shaft front bearing inner race.
SST 09316-60011 (09316-00021)

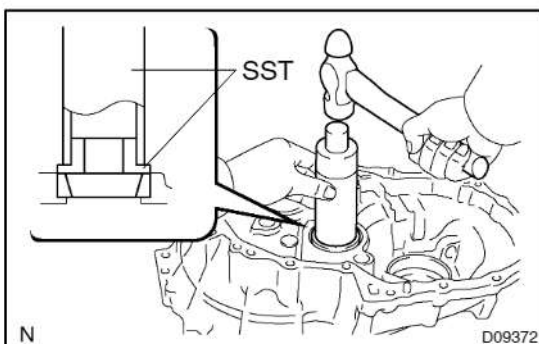


4. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING OUTER RACE AND OUTPUT SHAFT FRONT COVER

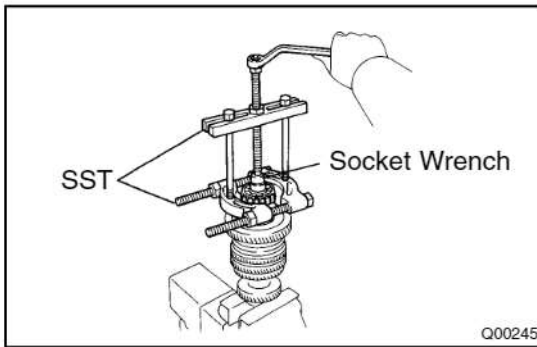
- (a) Using SST, pull out the output shaft front bearing outer race.
SST 09308-00010
(b) Remove the output shaft cover.



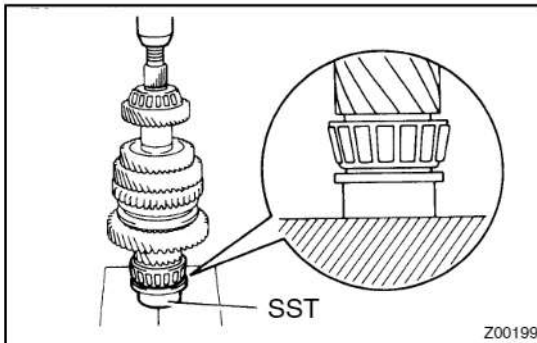
- (c) Install a new output shaft cover.
HINT:
Install the output shaft cover projection into the case side groove.



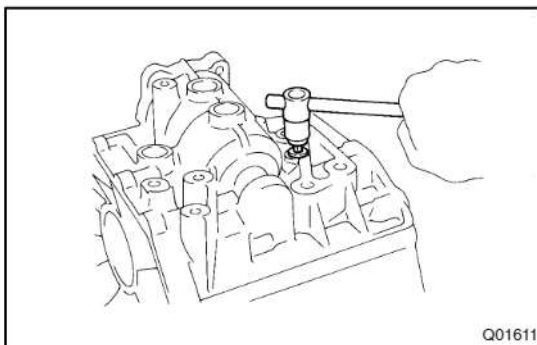
- (d) Using SST and a hammer, drive in a new output shaft front bearing outer race.
SST 09316-60011 (09316-00011, 09316-00021)



- (e) Using SST and a socket wrench, remove the output shaft front bearing.
SST 09950-00020, 09950-00030

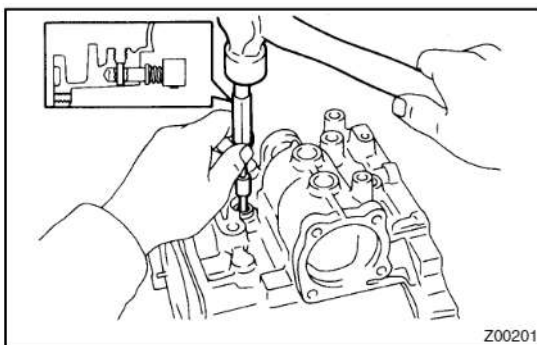


- (f) Using SST and a press, install a new output shaft front bearing.
SST 09316-60011 (09316-00071)



5. IF NECESSARY, REPLACE REVERSE RESTRICT PIN

- (a) Using a hexagon wrench (6 mm), remove the 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.
(e) Apply sealant to the screw plug threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
(f) Using a hexagon wrench (6 mm), install and torque the screw plug.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly.

(See page MX-12)

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.

HINT:

- Before reassembly, select a shim by adjusting output shaft preload.
- Coat all of the sliding and rotating surfaces with gear oil before reassembly.

ADJUST OUTPUT SHAFT PRELOAD

(a) Install the output shaft assembly to the transaxle case.

(b) Install the transmission case to the transaxle case.

HINT:

If necessary, tap on the case with a plastic hammer.

(c) Install and torque the 17 bolts.

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

(d) Install the output shaft rear taper roller bearing outer race.

(e) Install the adjusting shim.

HINT:

When reusing the output shaft bearing, first install a shim of the same thickness as before. If installing a new taper roller bearing, first select and install a shim of lesser thickness than before.

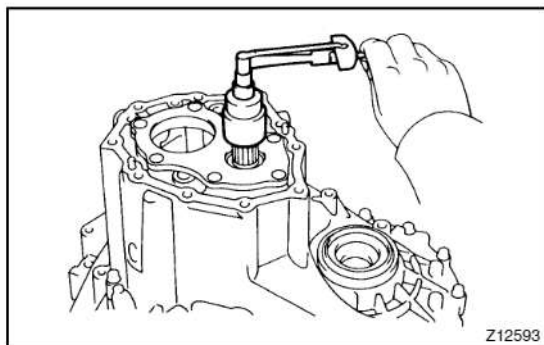
(f) Install the rear bearing retainer.

(g) Using a torx wrench (T45), install and torque the 7 torx screws.

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

(h) Install a new lock nut to the output shaft.

(i) Turn the output shaft right and left 2 or 3 times to allow the bearing to settle.



- (j) Using a torque wrench, measure the preload.

Preload (at starting):

New 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 the specification, select an appropriate adjusting shim.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	1.30 (0.0512)	D	1.95 (0.0768)
1	1.35 (0.0531)	E	2.00 (0.0787)
2	1.40 (0.0551)	F	2.05 (0.0807)
3	1.45 (0.0571)	G	2.10 (0.0827)
4	1.50 (0.0591)	H	2.15 (0.0846)
5	1.55 (0.0610)	J	2.20 (0.0866)
6	1.60 (0.0630)	K	2.25 (0.0886)
7	1.65 (0.0650)	L	2.30 (0.0906)
8	1.70 (0.0669)	M	2.35 (0.0925)
9	1.75 (0.0689)	N	2.40 (0.0945)
A	1.80 (0.0709)	P	2.45 (0.0965)
B	1.85 (0.0728)	Q	2.50 (0.0984)
C	1.90 (0.0748)	–	–

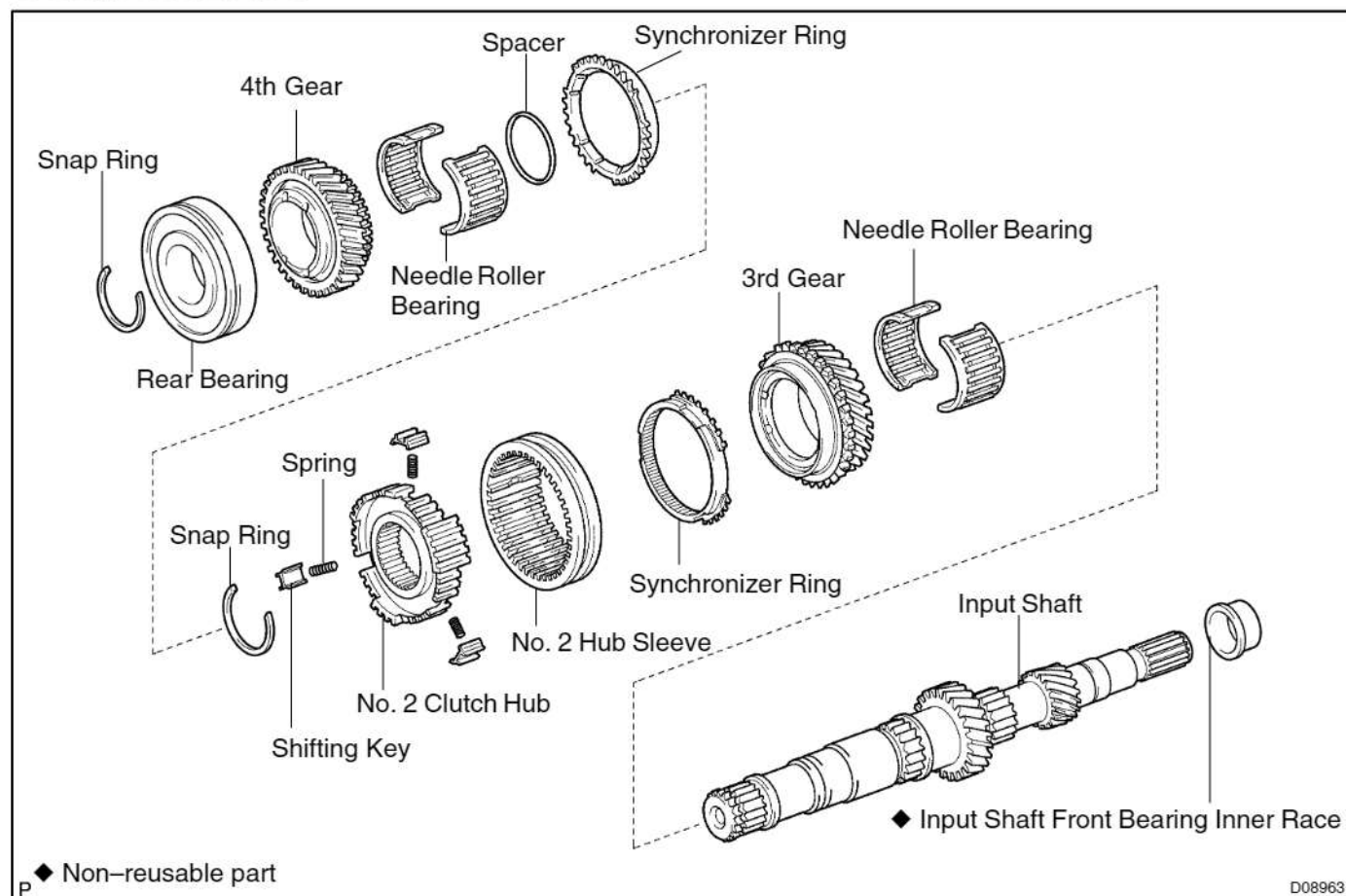
- (k) Remove the lock nut.

- (l) Remove these parts. Removal is in the reverse order of installation.

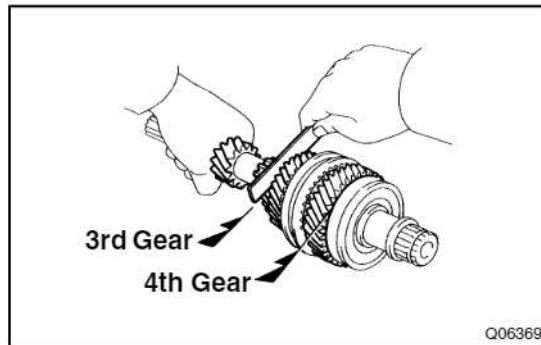
- Rear bearing retainer
- Shim
- Transmission case
- Output shaft assembly
- Output shaft rear bearing outer race

INPUT SHAFT COMPONENTS

MX028-06



D08963



DISASSEMBLY

1. MEASURE 3RD AND 4TH GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

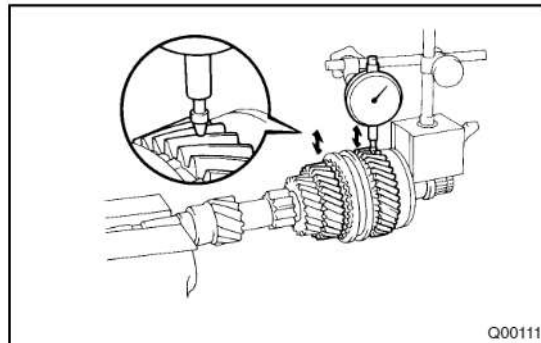
Minimum clearance:

3rd gear and 4th gear: 0.10 mm (0.0039 in.)

Maximum clearance:

3rd gear: 0.40 mm (0.0157 in.)

4th gear: 0.60 mm (0.0236 in.)



2. CHECK 3RD AND 4TH GEARS RADIAL CLEARANCE

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

Maximum clearance:

3rd gear: 0.053 mm (0.0021 in.)

4th gear: 0.051 mm (0.0020 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 AND 4TH GEAR

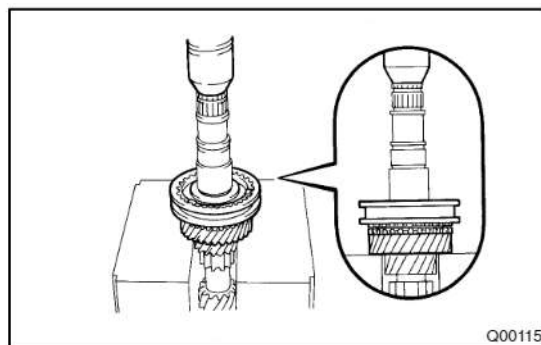
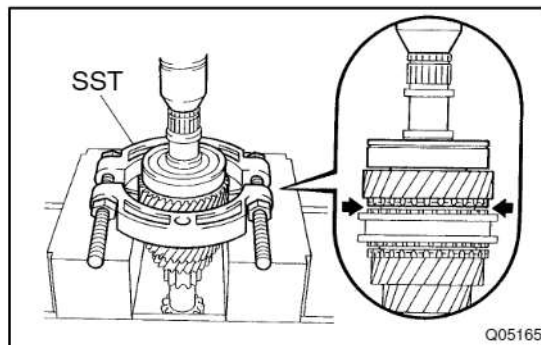
Using SST and a press, remove the rear bearing.

SST 09950-00020

5. REMOVE NEEDLE ROLLER BEARING, SPACER AND SYNCHRONIZER RING

6. REMOVE SNAP RING

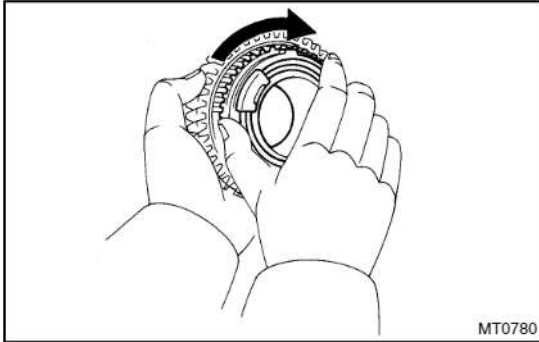
Using 2 screwdrivers and a hammer, tap out the snap ring.



7. REMOVE NO.2 CLUTCH HUB ASSEMBLY, SYNCHRONIZER RING AND 3RD GEAR

Using a press, remove the No.2 hub sleeve, 3rd gear and synchronizer rings.

8. REMOVE NEEDLE ROLLER BEARING

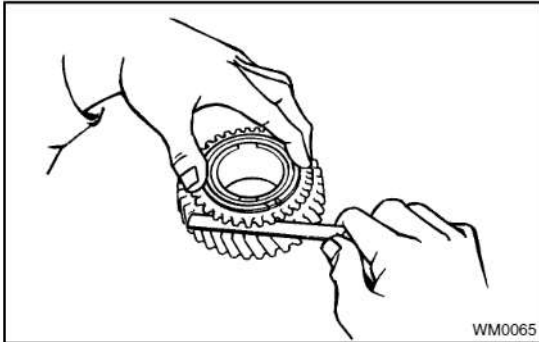


INSPECTION

1. INSPECT 3RD GEAR SYNCHRONIZER RING

- (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.

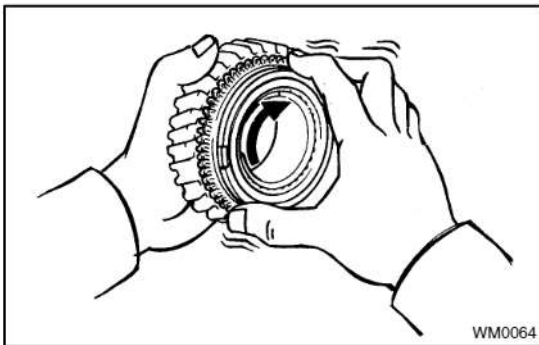
If it does not lock, replace the synchronizer ring.



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

Minimum clearance: 0.65 mm (0.026 in.)

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



2. INSPECT 4TH GEAR SYNCHRONIZER RING

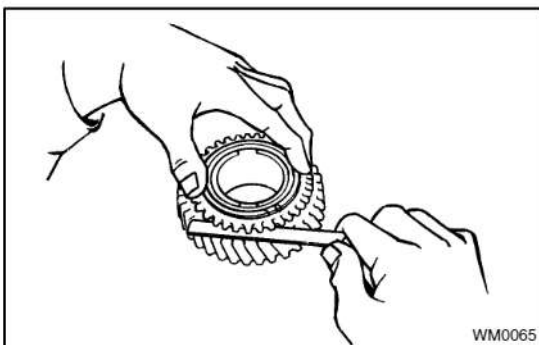
- (a) Check for wear or damage.
- (b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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



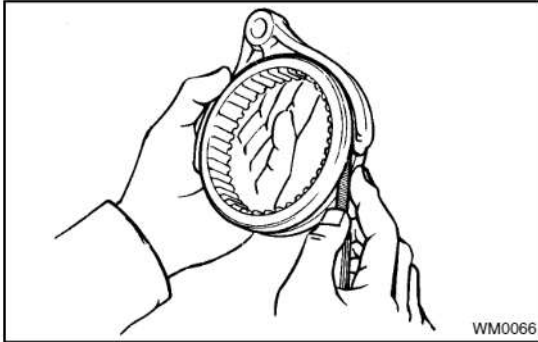
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and spline end.

Minimum clearance: 0.75 mm (0.030 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.

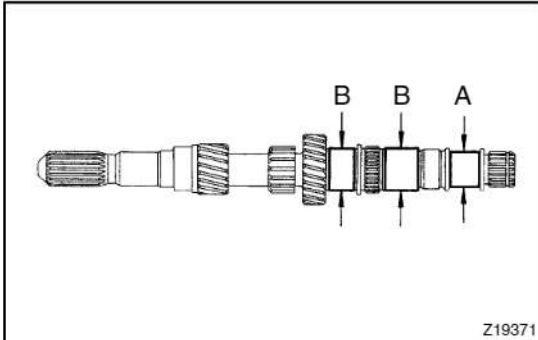


3. MEASURE NO.2 SHIFT FORK AND HUB SLEEVE CLEARANCE

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

Maximum clearance: 0.69 mm (0.027 in.)

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



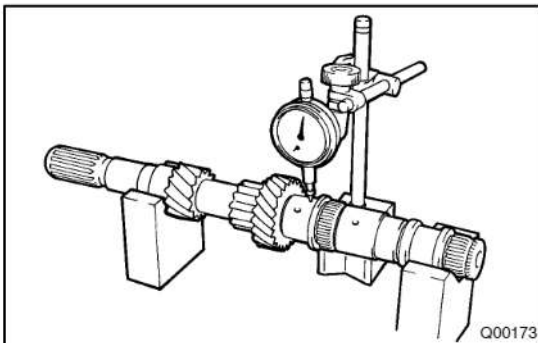
4. INSPECT INPUT SHAFT

- (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:

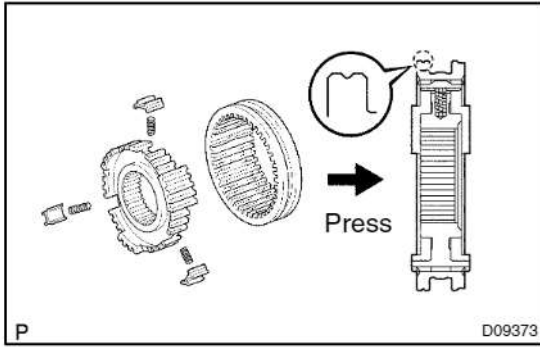
Part A: 27.957 mm (1.1007 in.)

Part B: 35.984 mm (1.4167 in.)



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

Maximum runout: 0.03 mm (0.0012 in.)



REASSEMBLY

HINT:

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

1. INSTALL NO.2 CLUTCH HUB INTO HUB SLEEVE

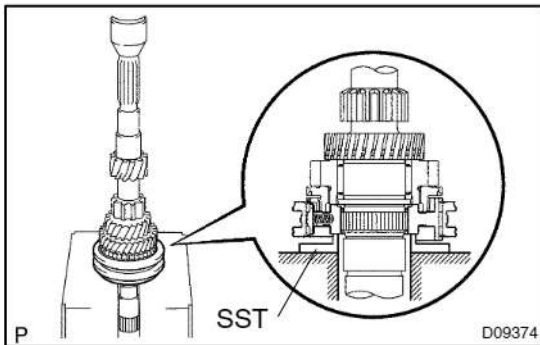
- Install the 3 springs and shifting keys to the clutch hub.
- Install the hub sleeve to the clutch hub.

HINT:

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

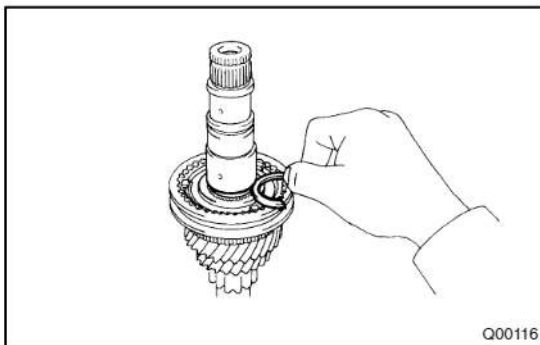
2. INSTALL NEEDLE ROLLER BEARING, 3RD GEAR, SYNCHRONIZER RING AND NO.2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

- Apply MP grease to the needle roller bearing.
- Assemble the needle roller bearings into the 3rd gear.
- Place the synchronizer rings on the gear and align the ring slots with the shifting keys.



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

SST 09506-35010



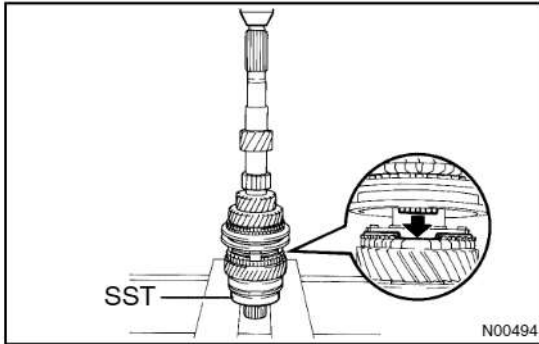
3. INSTALL SNAP RING

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

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
H	2.30 (0.0906)	M	2.50 (0.0984)
J	2.35 (0.0925)	N	2.55 (0.1004)
K	2.40 (0.0945)	P	2.60 (0.1024)
L	2.45 (0.0965)	—	—

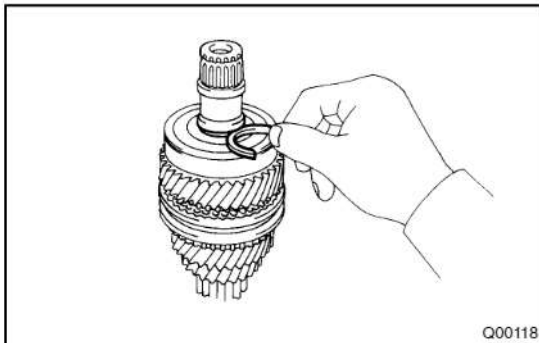
- Using a screwdriver and hammer, tap in the snap ring.

4. MEASURE 3RD GEAR THRUST CLEARANCE (See page MX-24)



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

- Install the spacer.
- Apply MP grease to the needle roller bearings.
- Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
- Install the 4th gear.
- Using SST and a press, install the rear ball bearing.
SST 09506-35010



6. INSTALL SNAP RING

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

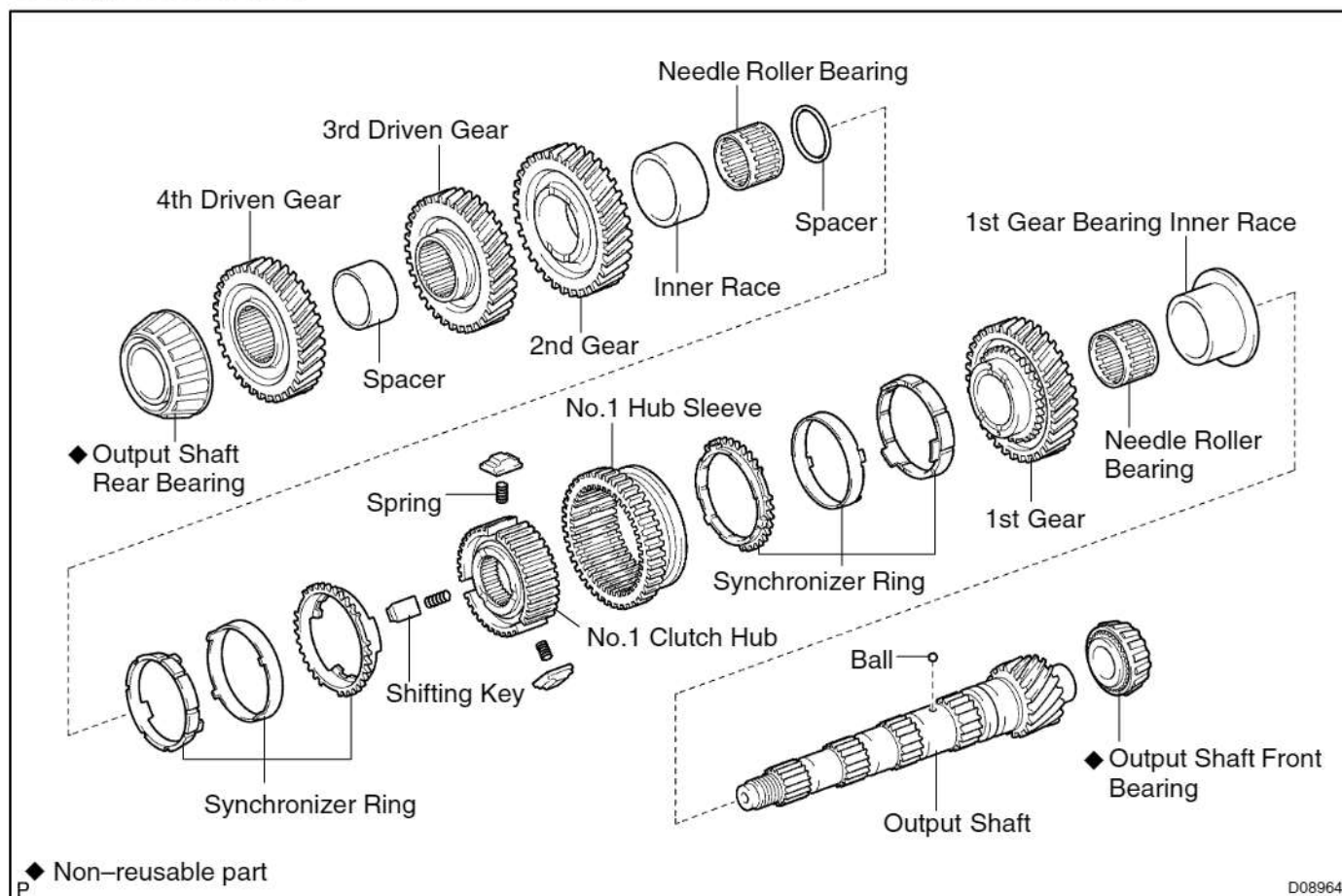
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
1	2.35 (0.0925)	5	2.55 (0.1004)
2	2.40 (0.0945)	6	2.60 (0.1024)
3	2.45 (0.0965)	7	2.65 (0.1043)
4	2.50 (0.0984)	8	2.70 (0.1063)

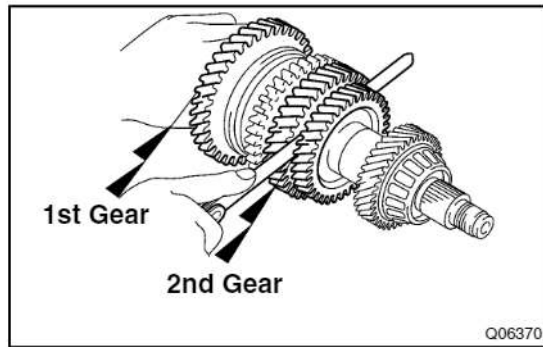
- Using a screwdriver and hammer, tap in the snap ring.

7. MEASURE 4TH GEAR THRUST CLEARANCE (See page MX-24)

OUTPUT SHAFT COMPONENTS

MX02C-06





DISASSEMBLY

1. MEASURE 1ST AND 2ND GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Minimum clearance:

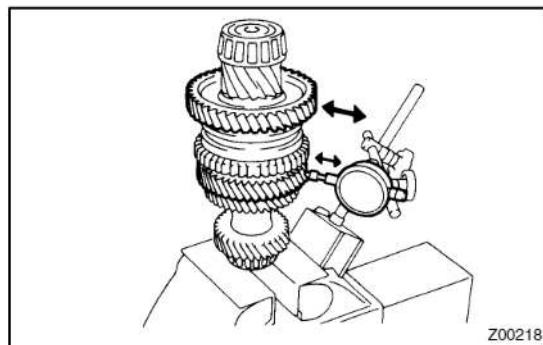
1st gear: 0.25 mm (0.0098 – 0.0138 in.)

2nd gear: 0.10 – 0.45 mm (0.0039 – 0.0177 in.)

Maximum clearance:

1st gear: 0.40 mm (0.0157 in.)

2nd gear: 0.35 mm (0.0137 in.)



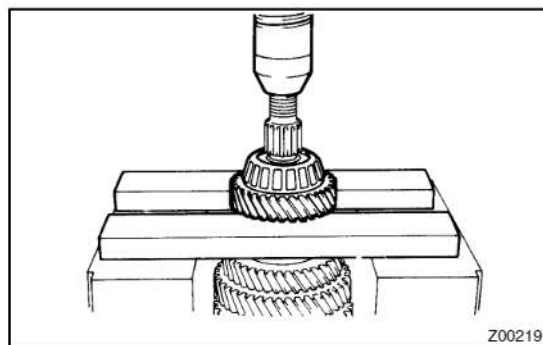
2. CHECK 1ST AND 2ND GEARS RADIAL CLEARANCE

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

Maximum clearance:

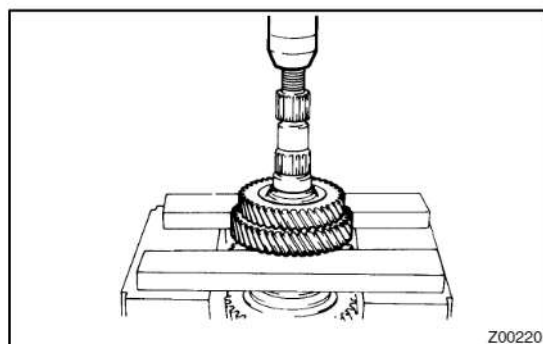
1st and 2nd gears: 0.053 mm (0.0020 in.)

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



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

- Using a press, remove the bearing and 4th driven gear.
- Remove the spacer.

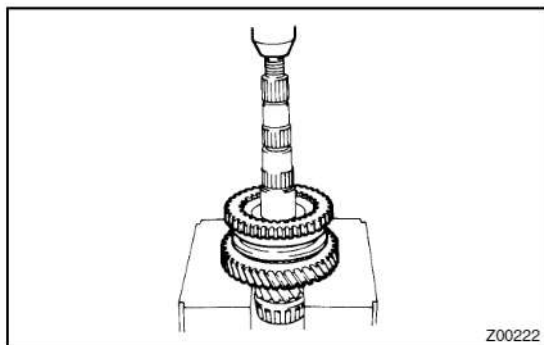


4. REMOVE 3RD DRIVEN GEAR AND 2ND GEAR

Using a press, remove the 3rd driven gear and 2nd gear.

5. REMOVE NEEDLE ROLLER BEARING, SPACER AND SYNCHRONIZER RING

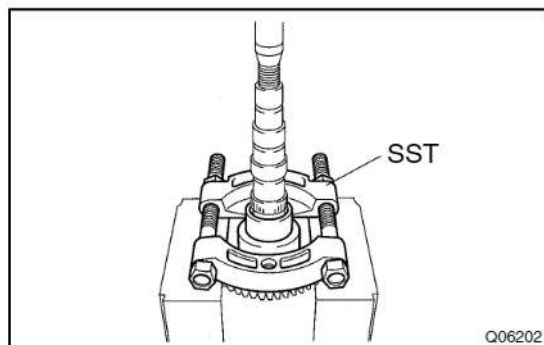
6. REMOVE INNER RACE AND BALL FROM OUTPUT SHAFT



7. REMOVE NO.1 HUB SLEEVE ASSEMBLY AND 1ST GEAR

Using a press, remove the No.1 hub sleeve and 1st gear.

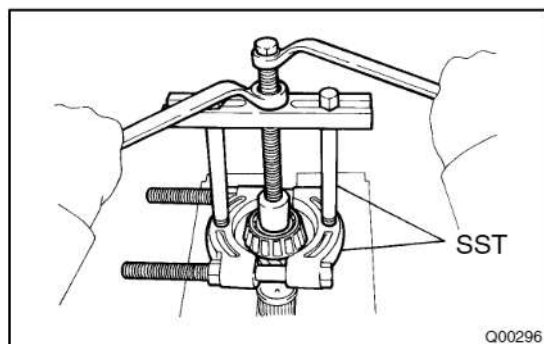
8. REMOVE SYNCHRONIZER RING AND NEEDLE ROLLER BEARING



9. REMOVE 1ST GEAR BEARING INNER RACE

Using SST and a press, remove the 1st gear bearing inner race.

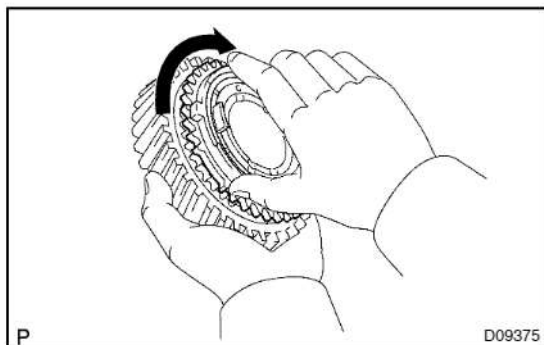
SST 09950-00020



10. REMOVE OUTPUT SHAFT FRONT BEARING

Using SST, remove the output shaft front bearing.

SST 09950-00020, 09950-00030



INSPECTION

1. INSPECT 1ST GEAR SYNCHRONIZER RING

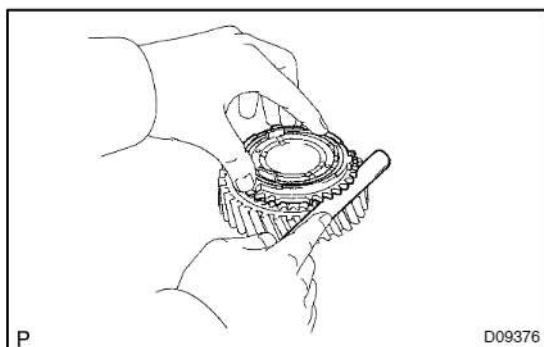
- (a) Check for wear or damage.
- (b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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



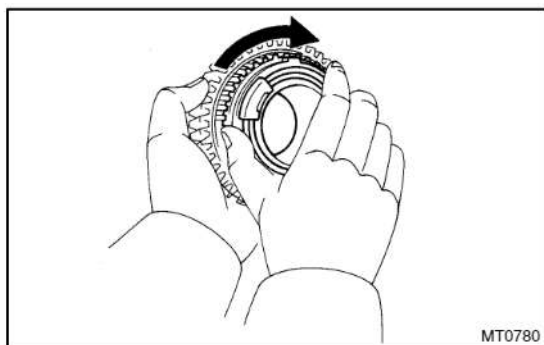
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.7 mm (0.028 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:

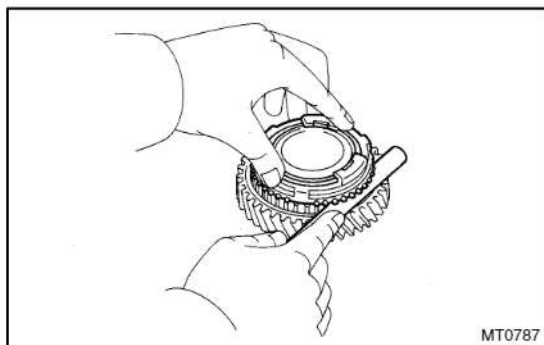
Ensure the fine lapping compound is completely washed off after rubbing.



2. INSPECT 2ND GEAR SYNCHRONIZER RING

- (a) Check 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.

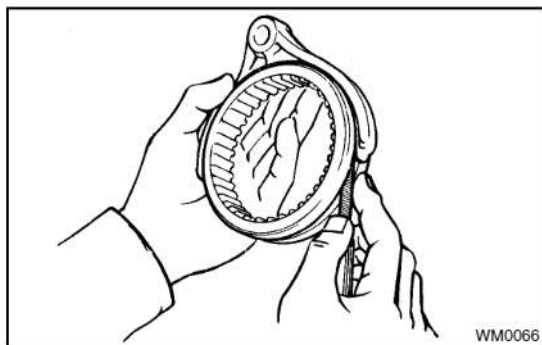
If it does not lock, replace the synchronizer ring.



- (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.

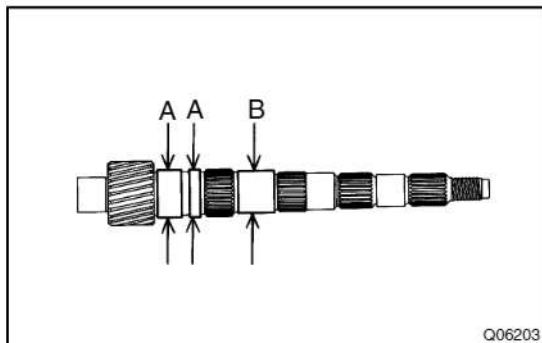


3. MEASURE NO.1 SHIFT FORK AND HUB SLEEVE CLEARANCE

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

Maximum clearance: 0.35 mm (0.014 in.)

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



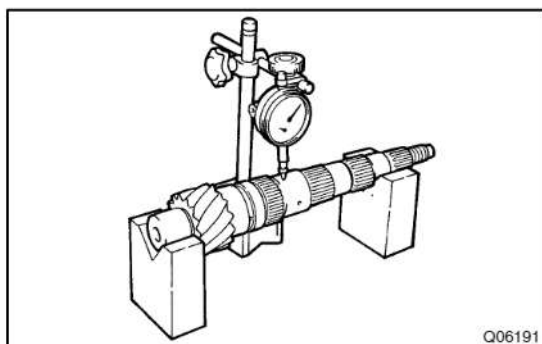
4. INSPECT OUTPUT SHAFT

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

Minimum outer diameter:

Part A: 37.610 mm (1.4807 in.)

Part B: 34.502 mm (1.3584 in.)



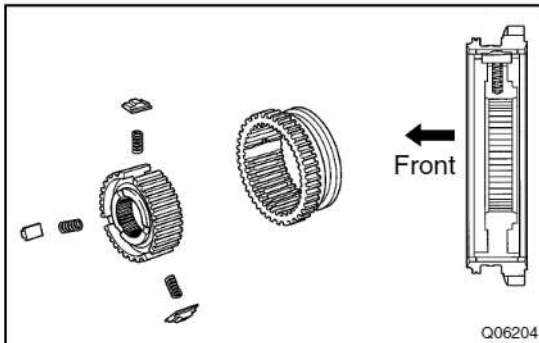
- (c) Using a dial indicator, check the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

REASSEMBLY

HINT:

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

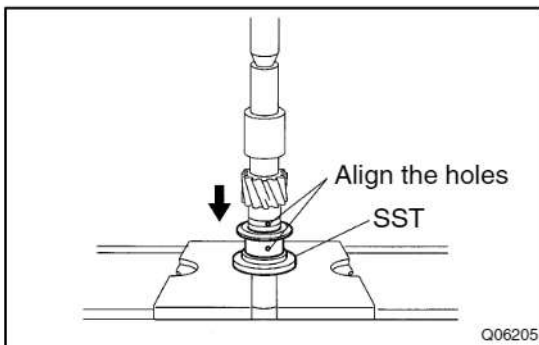


1. INSTALL NO.1 CLUTCH HUB INTO HUB SLEEVE

- Install the 3 springs and shifting keys to the clutch hub.
- Install the hub sleeve to the clutch hub.

HINT:

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

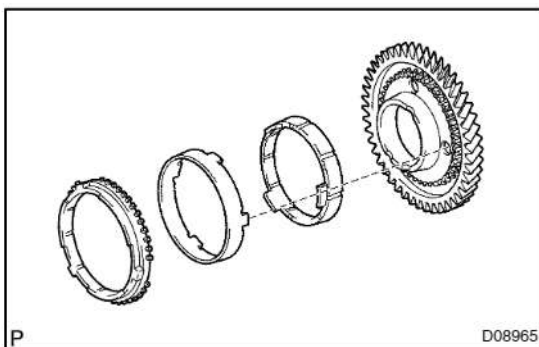


2. INSTALL 1ST GEAR BEARING INNER RACE

Using SST and a press, install the 1st gear bearing inner race.
SST 09506-35010

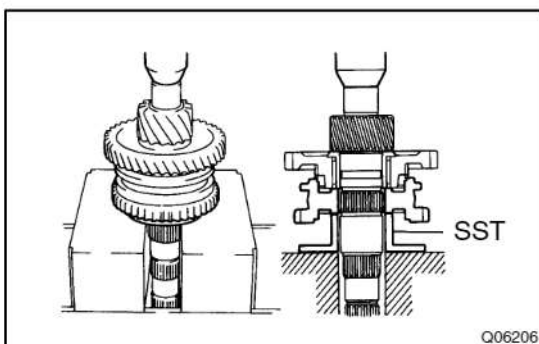
HINT:

Align the hole of the output shaft and inner race.



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

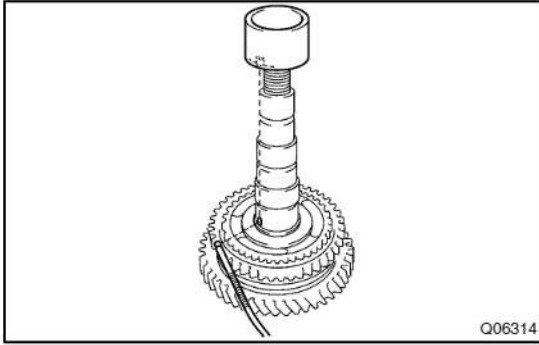
- Apply MP grease to the needle roller bearing.
- Install the 1st gear.
- Place the synchronizer ring (for the 1st gear) on the gear and align the ring slots with the shifting keys.



- Using SST and a press, install the 1st gear and No.1 hub sleeve.

SST 09316-60011 (09316-00041)

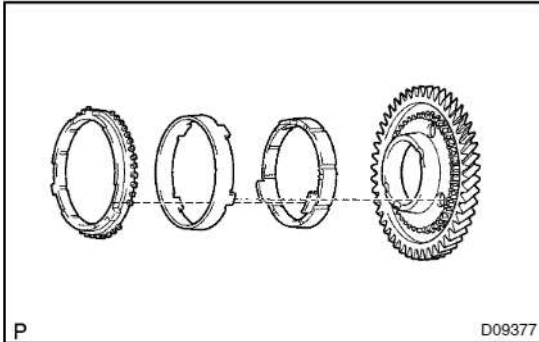
4. MEASURE 1ST GEAR THRUST CLEARANCE (See page MX-30)



5. INSTALL BALL AND INNER RACE TO OUTPUT SHAFT

HINT:

Align the groove of the inner race and ball.



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

- Install the spacer.
- Apply MP grease to the needle roller bearing.
- Place the synchronizer rings (for the 2nd gear) on the gear.

NOTICE:

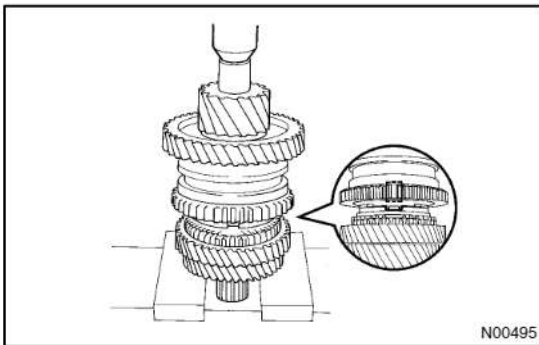
Do not install the synchronizer ring for the 1st gear.

- Install the 2nd gear.
- Using a press, install the 3rd driven gear.

NOTICE:

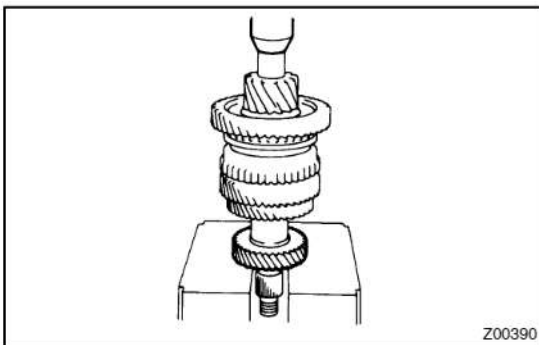
Align the clutch hub grooves with the projections on the synchronizer ring.

7. MEASURE 2ND GEAR THRUST CLEARANCE (See page MX-30)



8. INSTALL SPACER AND 4TH DRIVEN GEAR

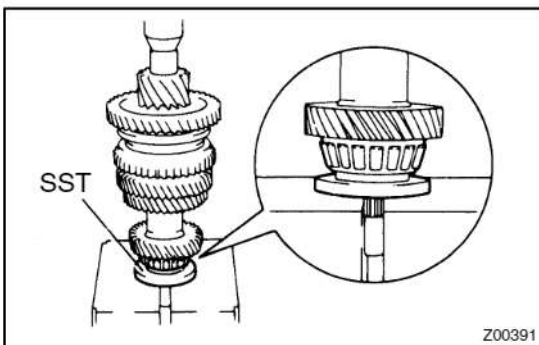
- Install the spacer.
- Using a press, install the 4th driven gear.

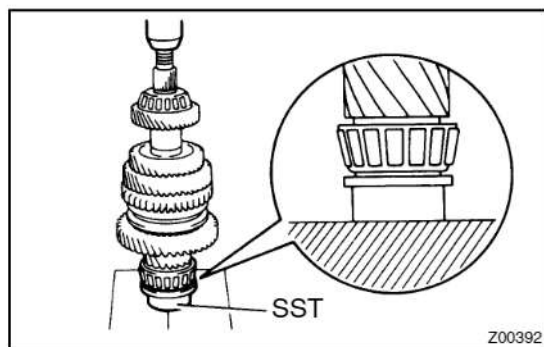


9. INSTALL OUTPUT SHAFT REAR BEARING

Using SST and a press, install the bearing.

SST 09506-30012



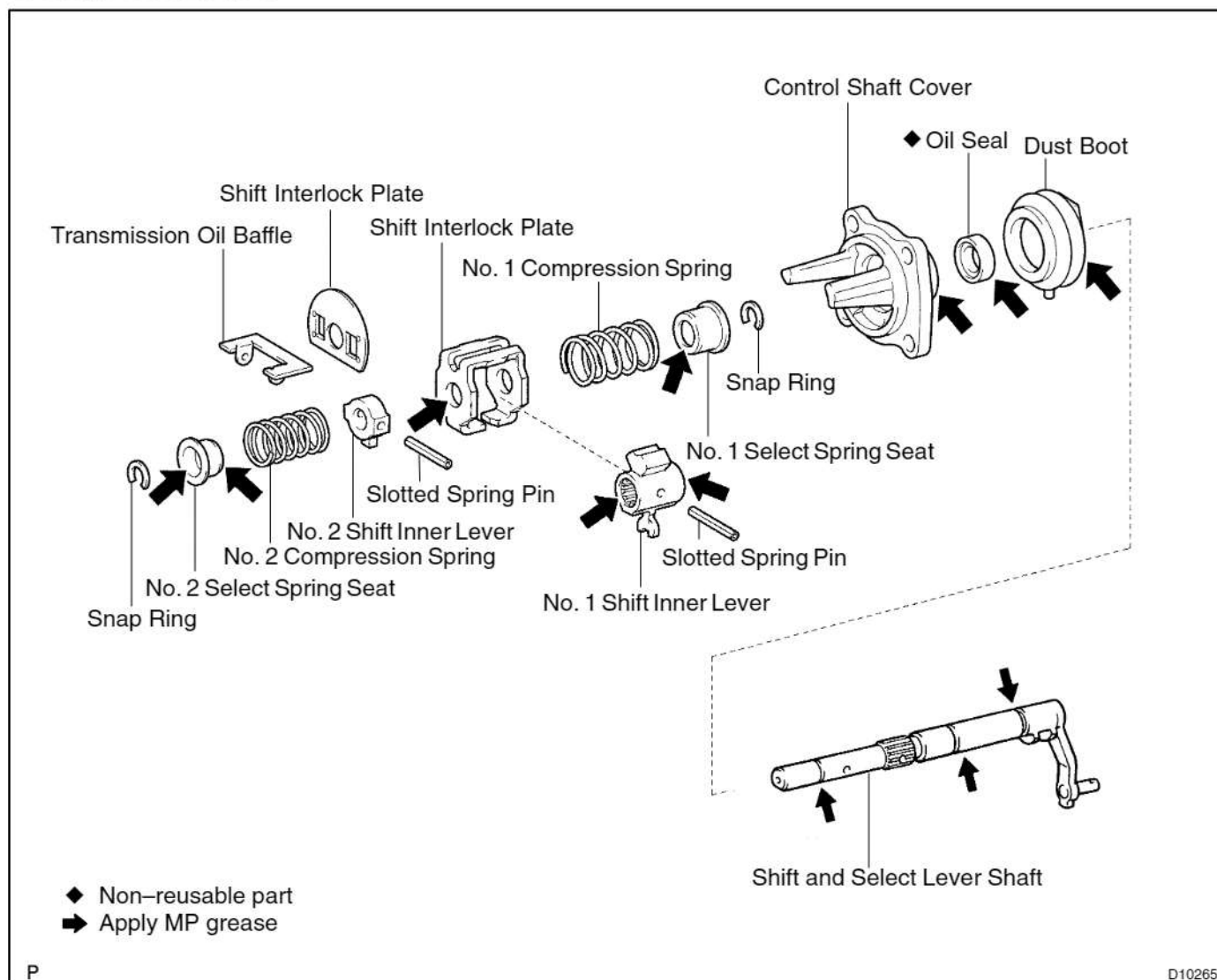
**10. INSTALL OUTPUT SHAFT FRONT BEARING**

Using SST and a press, install a new output shaft front bearing.

SST 09316-60011 (09316-00071)

SHIFT AND SELECT LEVER SHAFT COMPONENTS

MX021-06

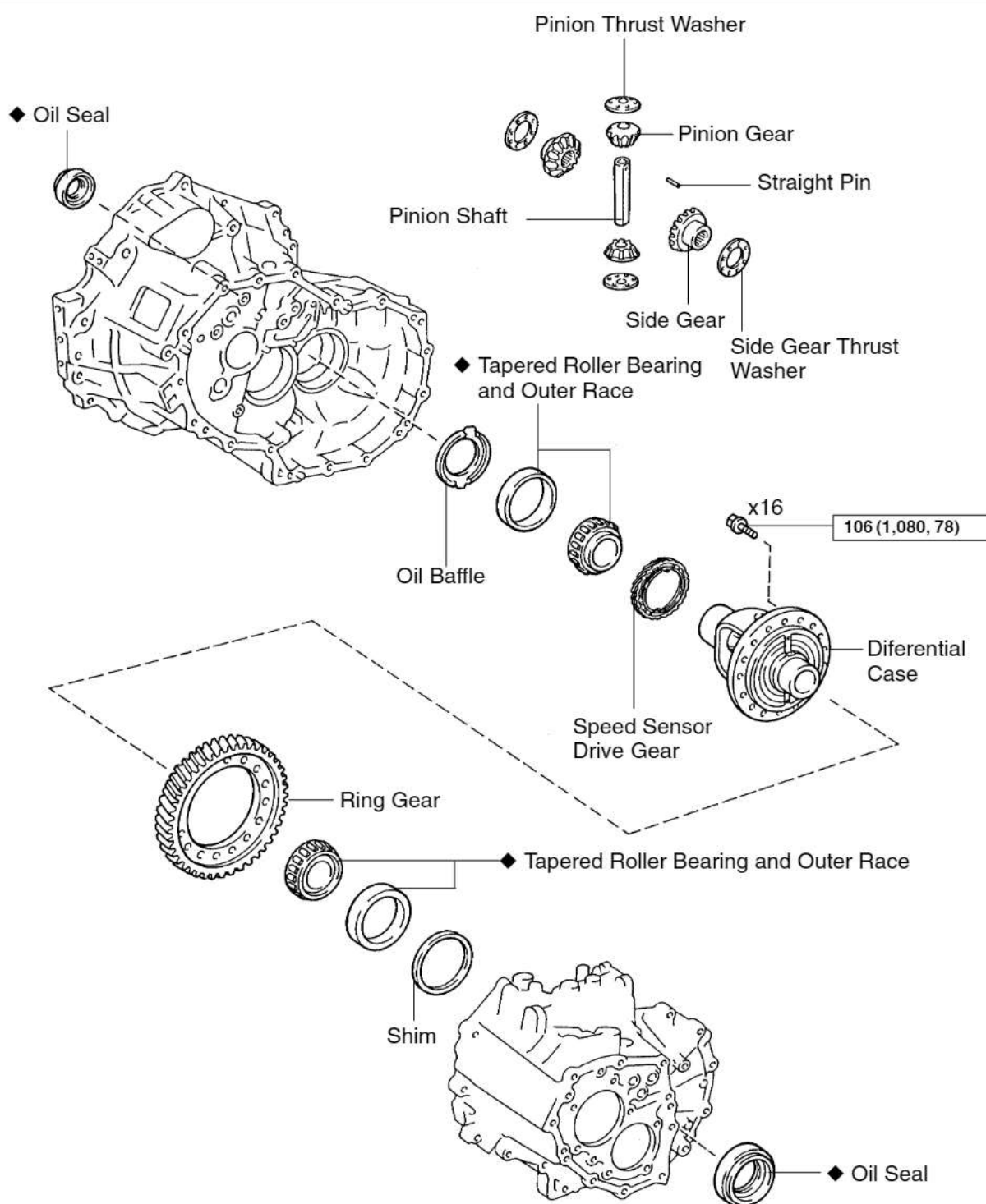


P

D10265

DIFFERENTIAL CASE COMPONENTS

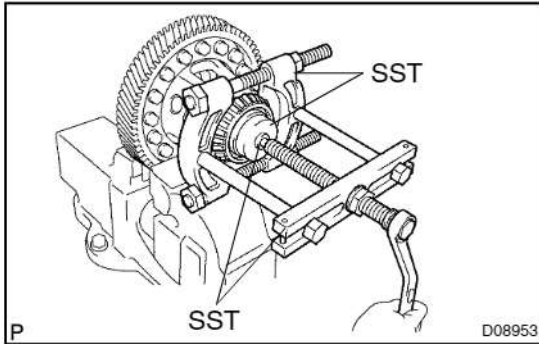
MX060-04



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

N ◆ Non-reusable part

D10266



DISASSEMBLY

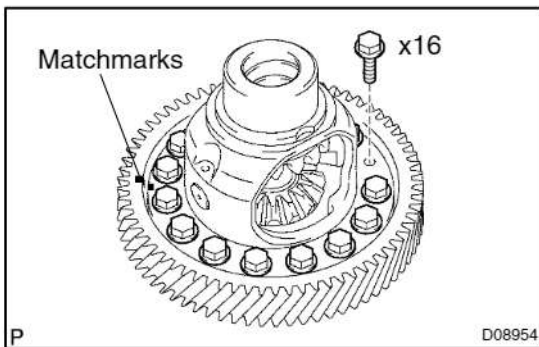
1. Speed sensor drive gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

- (a) Using SST, remove the tapered roller bearing.
SST 09950-00020, 09950-00030, 09950-40011
(09957-04010), 09950-60010 (09951-00530)

HINT:

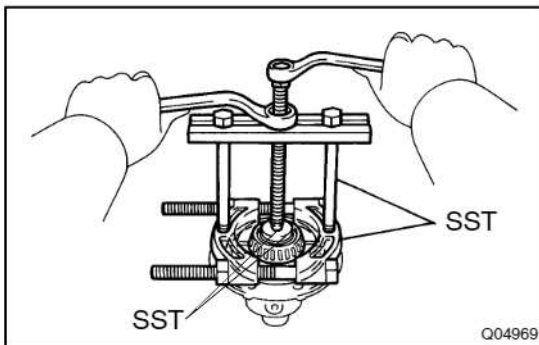
Set the claw of SST to the bearing inner race securely.

- (b) Remove the speed sensor drive gear.



2. REMOVE RING GEAR

- (a) Place matchmarks on the ring gear and differential case.
(b) Remove the 16 bolts.
(c) Using a copper hammer, tap on the ring gear to remove it from the differential case.



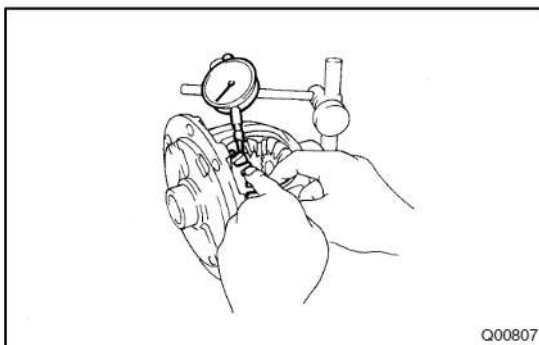
3. Ring gear side: REMOVE TAPERED ROLLER BEARING FROM DIFFERENTIAL CASE

Using SST, remove the tapered roller bearing.

SST 09950-00020, 09950-00030, 09950-40011
(09957-04010), 09950-60010 (09951-00450)

HINT:

Set the claw of SST to the bearing inner race at the position where the differential case is indented.



4. INSPECT SIDE GEAR BACKLASH

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

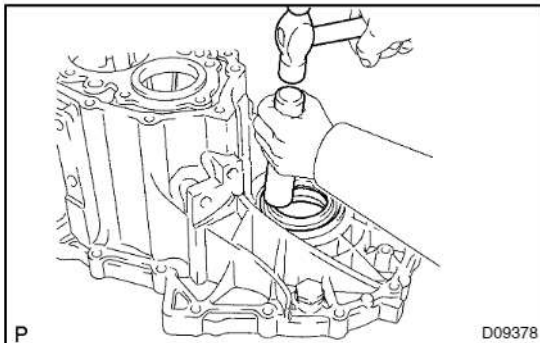
Standard backlash:

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

**6. Transmission Case Side:****IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE**

- (a) Using a screwdriver and a hammer, remove the oil seal.
- (b) Using a brass bar and hammer, drive out the tapered roller bearing outer race lightly and evenly.
- (c) Remove the shim.
- (d) Install the shim.

HINT:

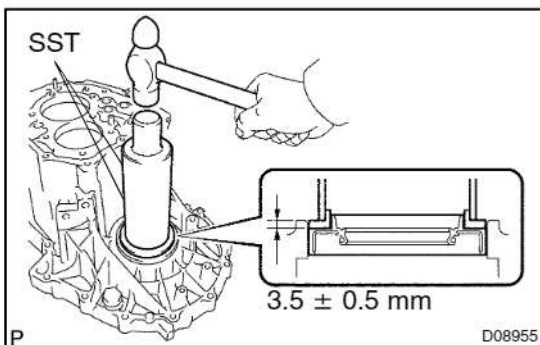
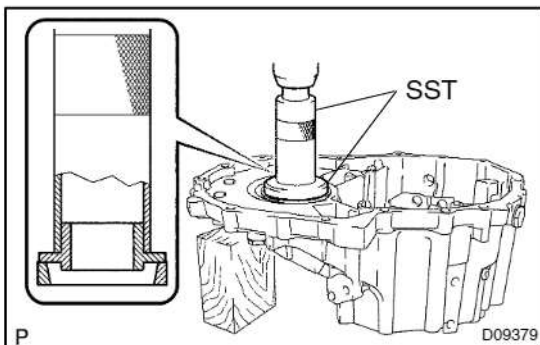
First select and install a shim of lesser thickness than before.

- (e) Using SST and a press, install a new tapered roller bearing outer race.

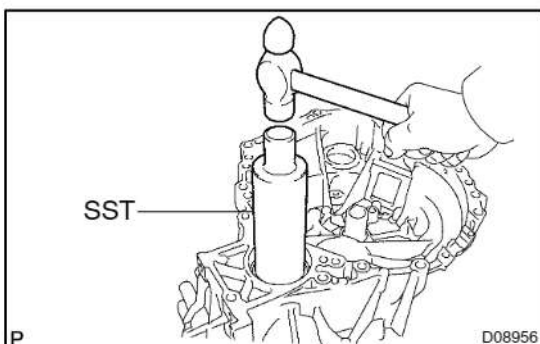
SST 09316-60011 (09316-00011, 09316-00041)

NOTICE:

When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.



- (f) Using SST and a hammer, drive in a new oil seal.
SST 09316-60010 (09316-00011, 09316-00031)
Drive in depth: 3.5 ± 0.5 mm (0.138 ± 0.020 in.)
- (g) Coat the lip of oil seal with MP grease.

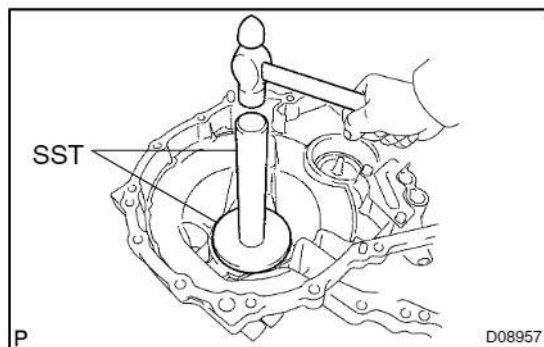
**7. Transaxle Case Side:****IF NECESSARY, REPLACE OIL SEAL AND TAPERED ROLLER BEARING OUTER RACE**

- (a) Using a screwdriver and hammer, drive out the oil seal from the transaxle case.
- (b) Using SST, remove the tapered roller bearing outer race.
SST 09316-60011 (09316-00011, 09316-00021)
- (c) Remove the oil baffle.

(d) Install the oil baffle.

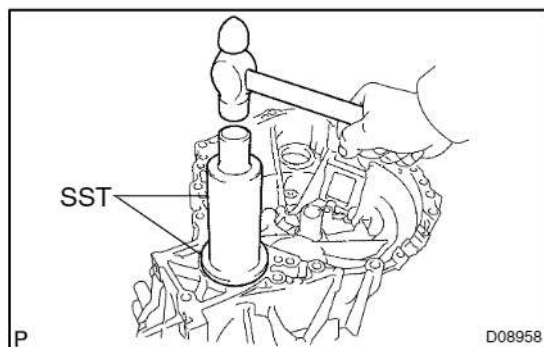
HINT:

Install the oil baffle projection into the case side cutout.



(e) Using SST and a press, install a new tapered roller bearing outer race.

SST 09950-60020 (09951-00890), 09950-70010 (09951-00150)



(f) Using SST and a hammer, drive in a new oil seal.

SST 09316-60011 (09316-00011, 09316-00041)

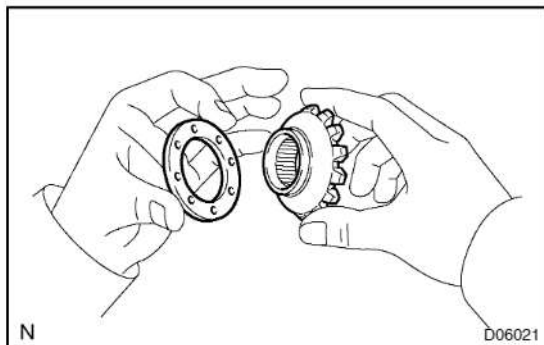
Drive in depth: 0 ± 0.5 mm (0 ± 0.020 in.)

(g) Coat the oil seal lip with MP grease.

REASSEMBLY

HINT:

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



1. ASSEMBLE DIFFERENTIAL CASE

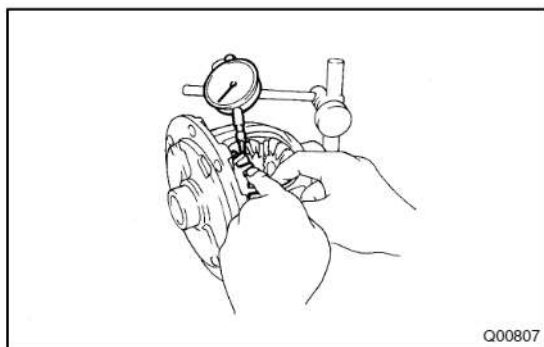
- (a) Install the correct thrust washers and side gears. Refer to the table below, select thrust washers which will ensure that the backlash is within the specification. Try to select washers of the same size for both sides.

Standard backlash:

0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thickness mm (in.)	Thickness mm (in.)
1.00 (0.0394)	1.20 (0.0472)
1.10 (0.0433)	1.30 (0.0512)

- (b) Install the thrust washers and side gears in the differential case.
- (c) Install the pinion shaft.



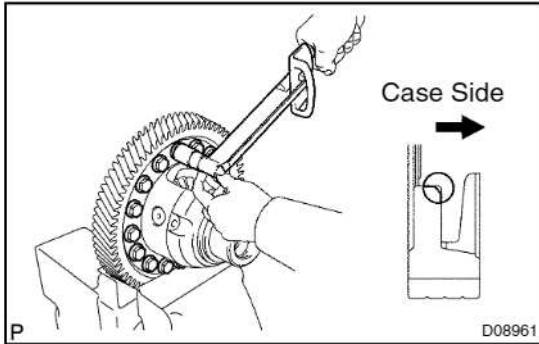
- (d) Using a dial indicator, check the side gear backlash. Measure the side gear backlash while holding one pinion toward the differential case.

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.

- (e) Using a pin punch and hammer, drive in the straight pin through the differential case and hole in the pinion shaft.
- (f) Using a chisel and hammer, caulk the pin holes around the circumference of the differential case.



2. INSTALL RING GEAR ON DIFFERENTIAL CASE

- Clean the contact surface of the differential case.
- Heat the ring gear in boiling water.
- Carefully take the ring gear out of the water.
- After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

HINT:

Align the matchmarks on the differential case and contact the ring gear.

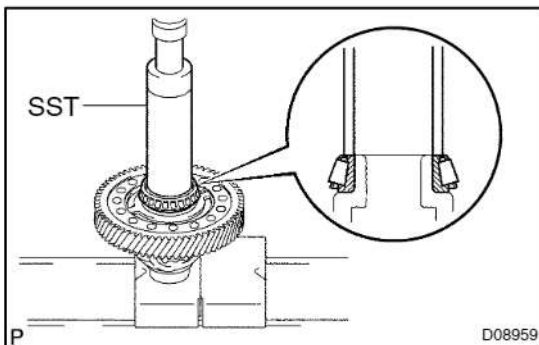
- Temporarily install the 16 set bolts.

CAUTION:

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

- After the ring gear has cooled sufficiently, torque the ring gear set bolts uniformly at a time.

Torque: 106 N·m (1,080 kgf·cm, 78 ft·lbf)



3. Ring gear side:

INSTALL TAPERED ROLLER BEARING

Using SST and a press, install a new tapered roller bearing.

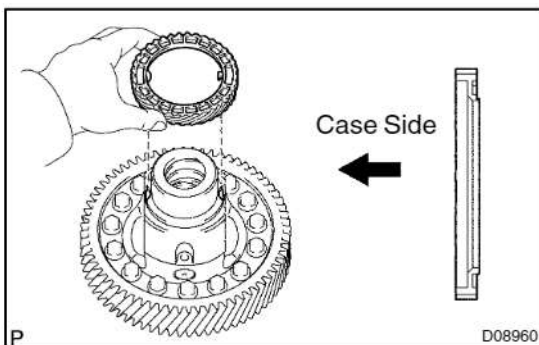
SST 09316-60011 (09316-00011)

NOTICE:

When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:

Set SST to the bearing inner race securely.



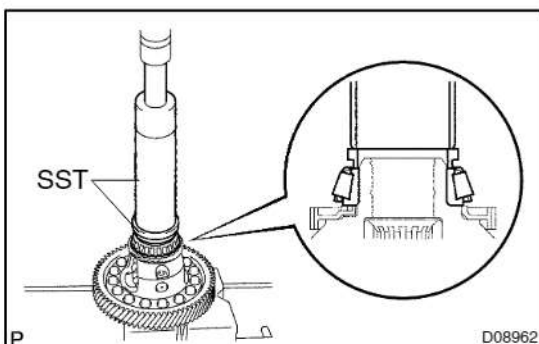
4. Speed sensor drive gear side:

INSTALL TAPERED ROLLER BEARING

- Place the speed sensor drive gear in position to stop it turning, and install the speed sensor drive gear.

NOTICE:

Be sure to install the speed sensor drive gear in the correct direction, as shown in the illustration.



- Using SST, a steel plate and press, install a new tapered roller bearing.

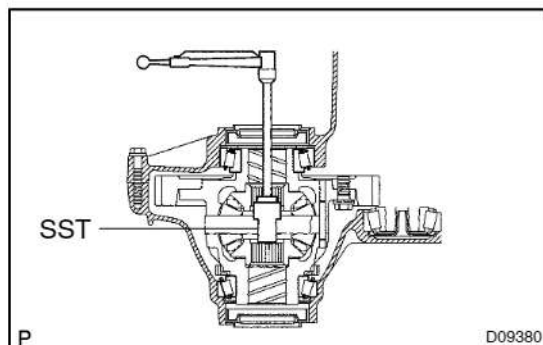
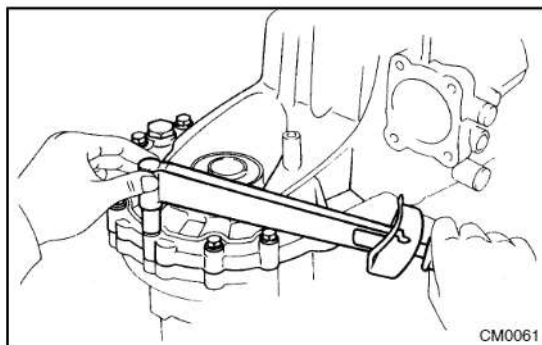
SST 09316-20011, 09316-60011 (09316-00011)

NOTICE:

When replacing the tapered roller bearing outer race, replace the tapered roller bearing along with it.

HINT:

Set SST to the bearing inner race securely.



5. INSPECT DIFFERENTIAL TAPERED ROLLER BEARING PRELOAD

NOTICE:

Perform this only when replacing the tapered roller bearing and outer race of the differential case.

- Install the differential case assembly to the transaxle case.
- Install the transmission case to the transaxle case with the 17 bolts.

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

- Using SST and a torque wrench, turn the differential case assembly right and left 2 or 3 times to allow the bearings to settle.

SST 09564-32011

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

SST 09564-32011

Preload (at starting):

New 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 the specification, remove the transmission case side outer race of the tapered roller bearing with SST (See page MX-39). Select an appropriate shim.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)

- Remove the 17 bolts and transmission case.
- Remove the differential case assembly.

SHIFT LEVER AND CONTROL CABLE COMPONENTS

MX09C-02

