MANUAL TRANSAXLE

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

MX06R–03

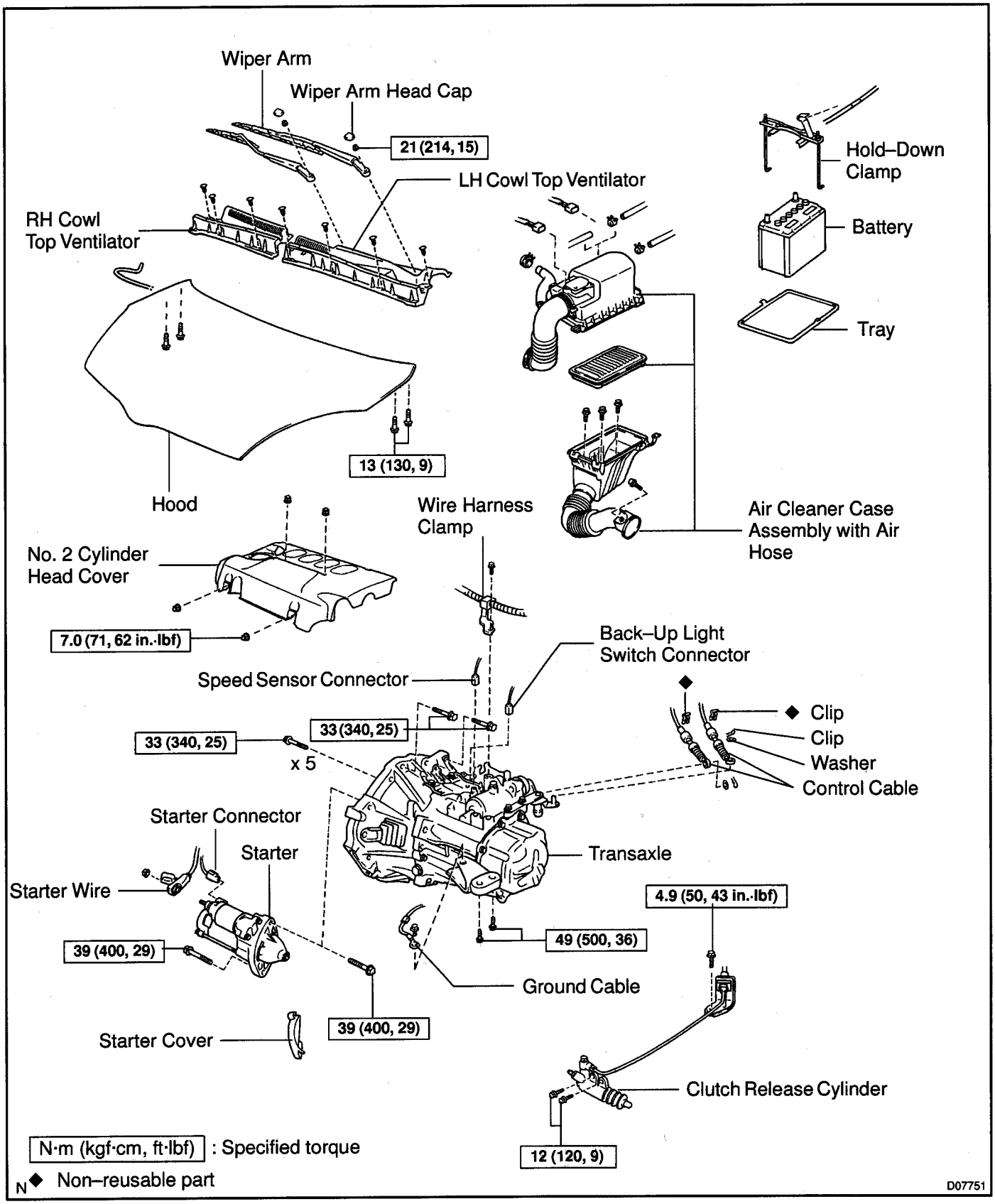
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

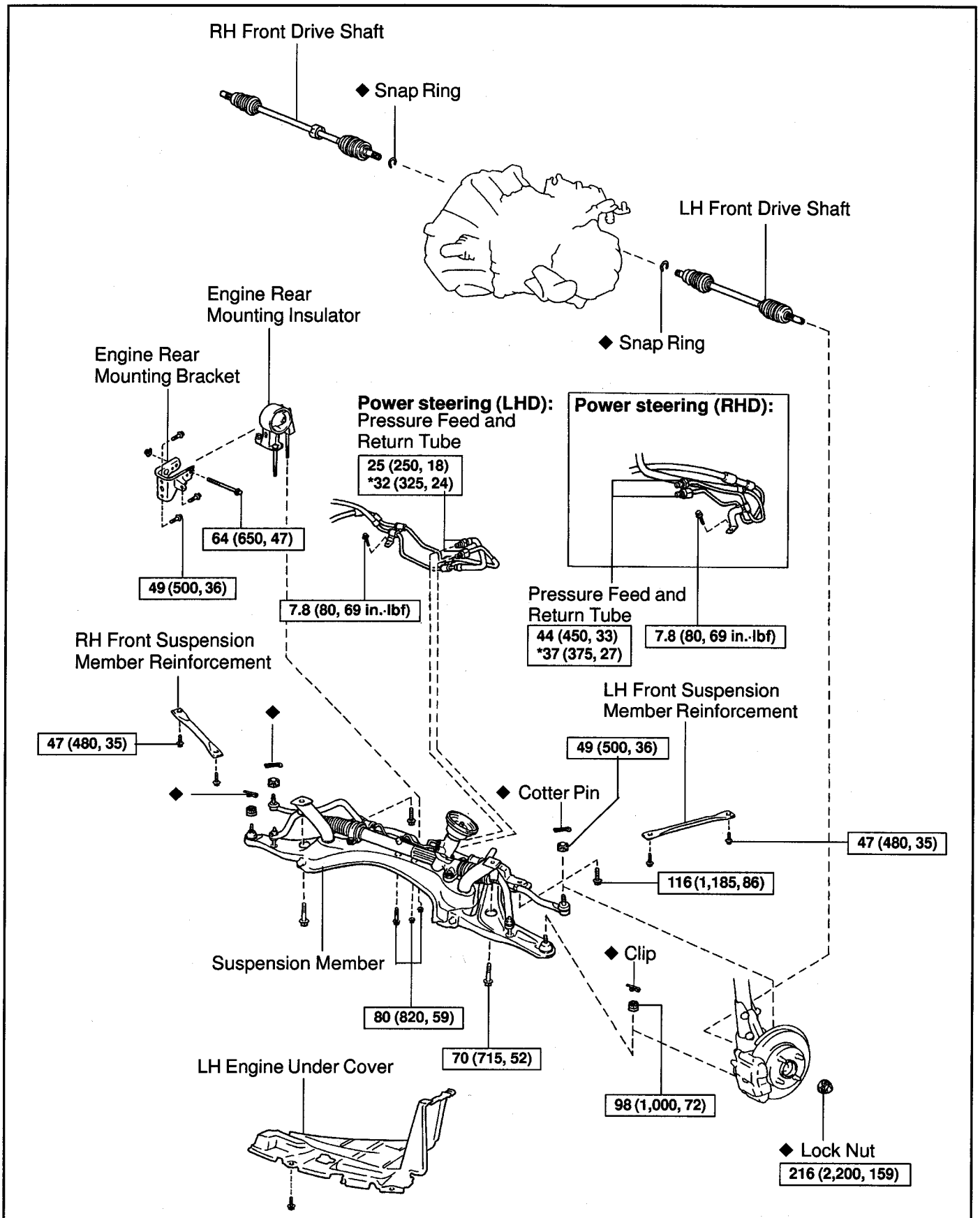
Symptom	Suspect Area	See page
Noise	1. Oil (Level low)	MX–4
	2. Oil (Wrong)	MX–4
	3. Gear (Worn or damaged)	MX–9
	4. Bearing (Worn or damaged)	MX–9
Oil leakage	1. Oil (Level too high)	MX–4
	2. Gasket (Damaged)	MX–9
	3. Oil seal (Worn or damaged)	MX–9
	4. O–Ring (Worn or damaged)	MX–9
Hard to shift or will not shift	1. Control cable (Faulty)	MX–44
	2. Synchronizer ring (Worn or damaged)	MX–23 MX–30
	3. Shift key spring (Damaged)	MX–23 MX–30
Jumps out of gear	1. Locking ball spring (Damaged)	MX–9
	2. Shift fork (Worn)	MX–9
	3. Gear (Worn or damaged)	MX–9
	4. Bearing (Worn or damaged)	MX–9

MANUAL TRANSAXLE UNIT

COMPONENTS

MX0A8–01





N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
* For use with SST

N

D07752

MX

MX0A9–01

REMOVAL

1. REMOVE HOOD

HINT:

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

Adjust the hood (See page BO–10).

2. REMOVE WIPER ARM (See page BO–33)

HINT:

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

Adjust the installation position of the wiper arms (See page BO–35).

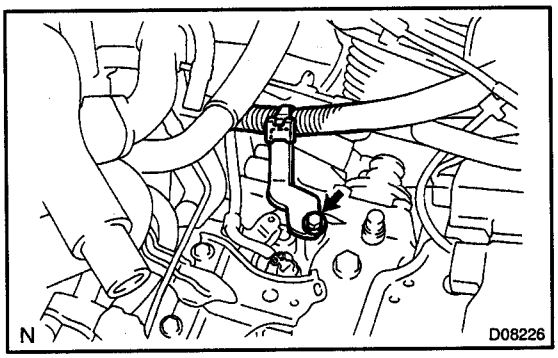
3. REMOVE RH AND LH COWL TOP VENTILATOR LOUVERS (See page BO–33)

4. REMOVE NO. 2 CYLINDER HEAD COVER

Remove the 4 nuts and No. 2 cylinder head cover.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

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



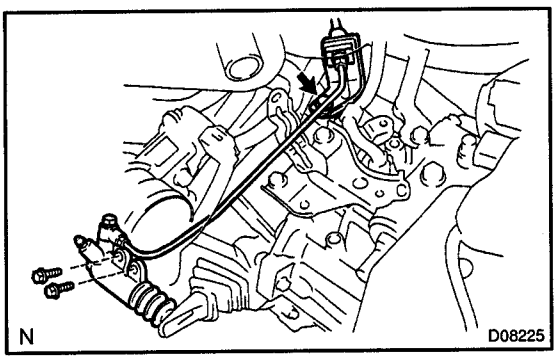
6. DISCONNECT WIRE HARNESS FROM TRANSAXLE

Remove the set bolt of the wire harness clamp.

7. DISCONNECT CONTROL CABLE

(a) Remove the 2 clips and washers.

(b) Remove the 2 clips and disconnect the control cables from the transaxle.



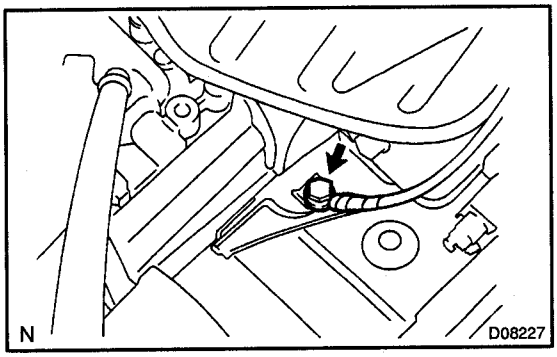
8. DISCONNECT CLUTCH RELEASE CYLINDER

(a) Remove the set bolt of the clutch line.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(b) Remove the 2 set bolts of the clutch release cylinder.

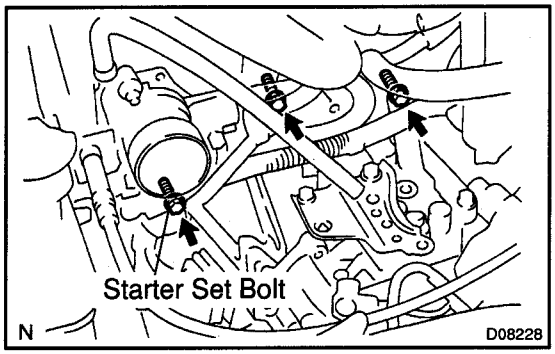
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



9. DISCONNECT GROUND CABLE

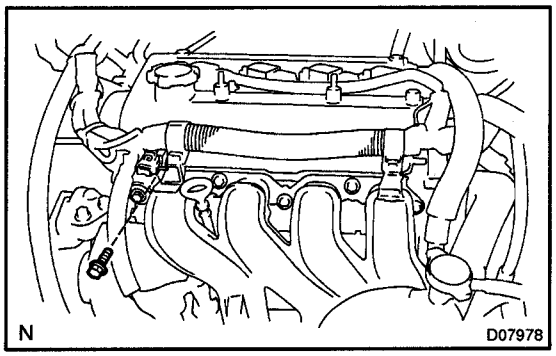
Remove the set bolt of the ground cable from the engine left mounting bracket.

10. DISCONNECT BACK–UP LIGHT SWITCH AND SPEED SENSOR CONNECTORS



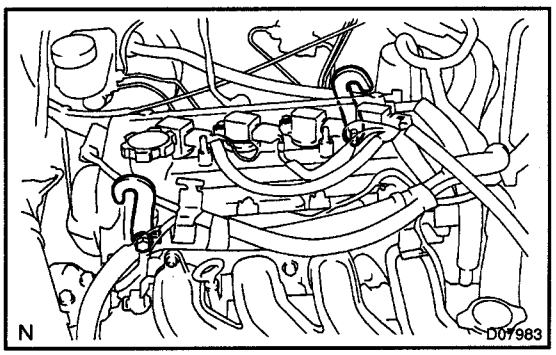
11. REMOVE 2 TRANSAXLE UPPER SIDE MOUNTING BOLTS
Torque: 33 N·m (340 kgf·cm, 25 ft·lbf)

12. REMOVE STARTER SET BOLT
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



13. ATTACH ENGINE SLING DEVICE TO ENGINE HANGER

(a) Remove the bolt.



(b) Install the 2 No. 1 engine hangers with the bolts in the correct direction.
Parts No.:
No. 1 engine hanger: 12281–21010
Bolt: 91642–81025
Torque: 40 N·m (400 kgf·cm, 29 ft·lbf)

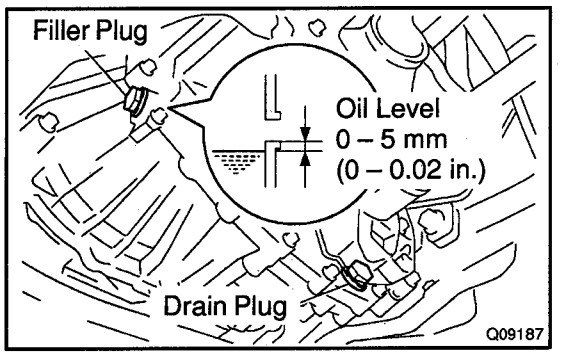
(c) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

14. RAISE VEHICLE

CAUTION:
Make sure that the vehicle is securely supported.

15. REMOVE LH ENGINE UNDER COVER



16. DRAIN TRANSAXLE OIL
Oil grade: API GL–4 or GL–5
Viscosity: SAE 75 W–90
Capacity: 1.9 liters (2.0 US qts, 1.7 Imp. qts)
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

17. REMOVE RH AND LH FRONT DRIVE SHAFTS
(See page SA–17)

18. REMOVE SUSPENSION MEMBER

(a) Remove the 4 bolts, RH and LH front suspension member reinforcements.
Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

(b) Remove the 2 set nuts and bolt of the engine rear mounting insulator from the suspension member (See page SA–36).

(c) Disconnect the sliding yoke (See page SR–12).

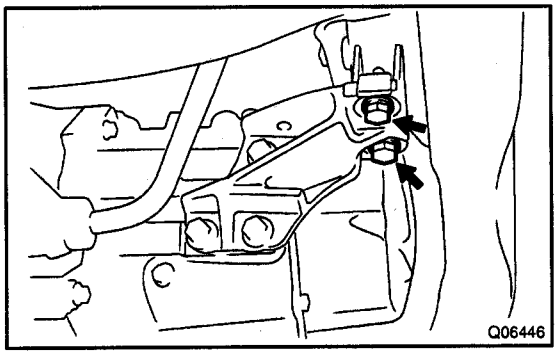
(d) Power steering:
Disconnect the pressure feed and return tubes (See page SR–52).

(e) Power steering:
Disconnect the tube clamp (See page SR–52).

(f) Remove the suspension member (See page SA–36).

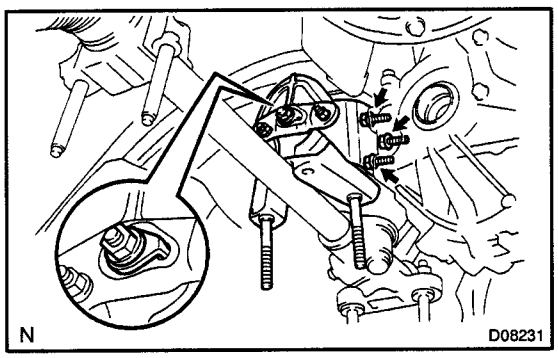
19. JACK UP TRANSAXLE SLIGHTLY

Using a transmission jack, support the transaxle.



20. DISCONNECT ENGINE LEFT MOUNTING BRACKET FROM ENGINE LEFT MOUNTING INSULATOR

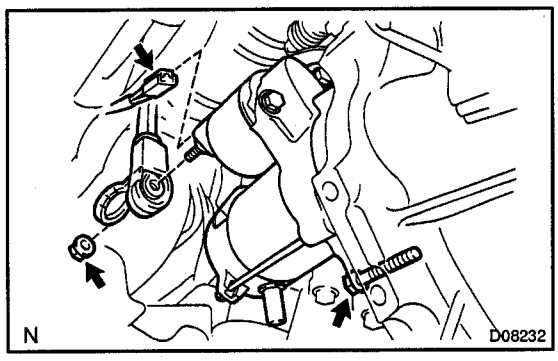
Remove the 2 bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



21. REMOVE ENGINE REAR MOUNTING INSULATOR AND BRACKET

(a) Remove the bolt, nut and engine rear mounting insulator.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

(b) Remove the 3 bolts and engine rear mounting bracket.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

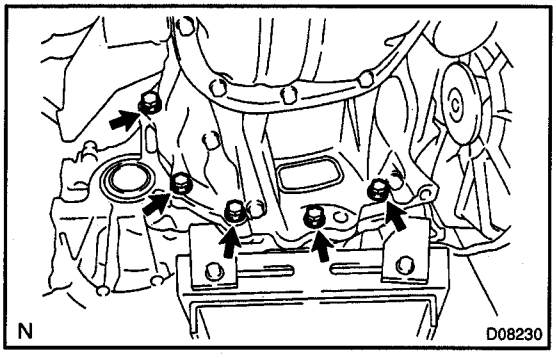


22. REMOVE STARTER

(a) Remove the bolt, starter cover and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Disconnect the starter connector.

(c) Remove the nut and starter wire.



23. REMOVE 5 TRANSAXLE LOWER SIDE MOUNTING BOLTS

Torque: 33 N·m (340 kgf·cm, 25 ft·lbf)

24. REMOVE TRANSAXLE

Lower the 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.

MX06U–03

INSTALLATION

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

HINT:

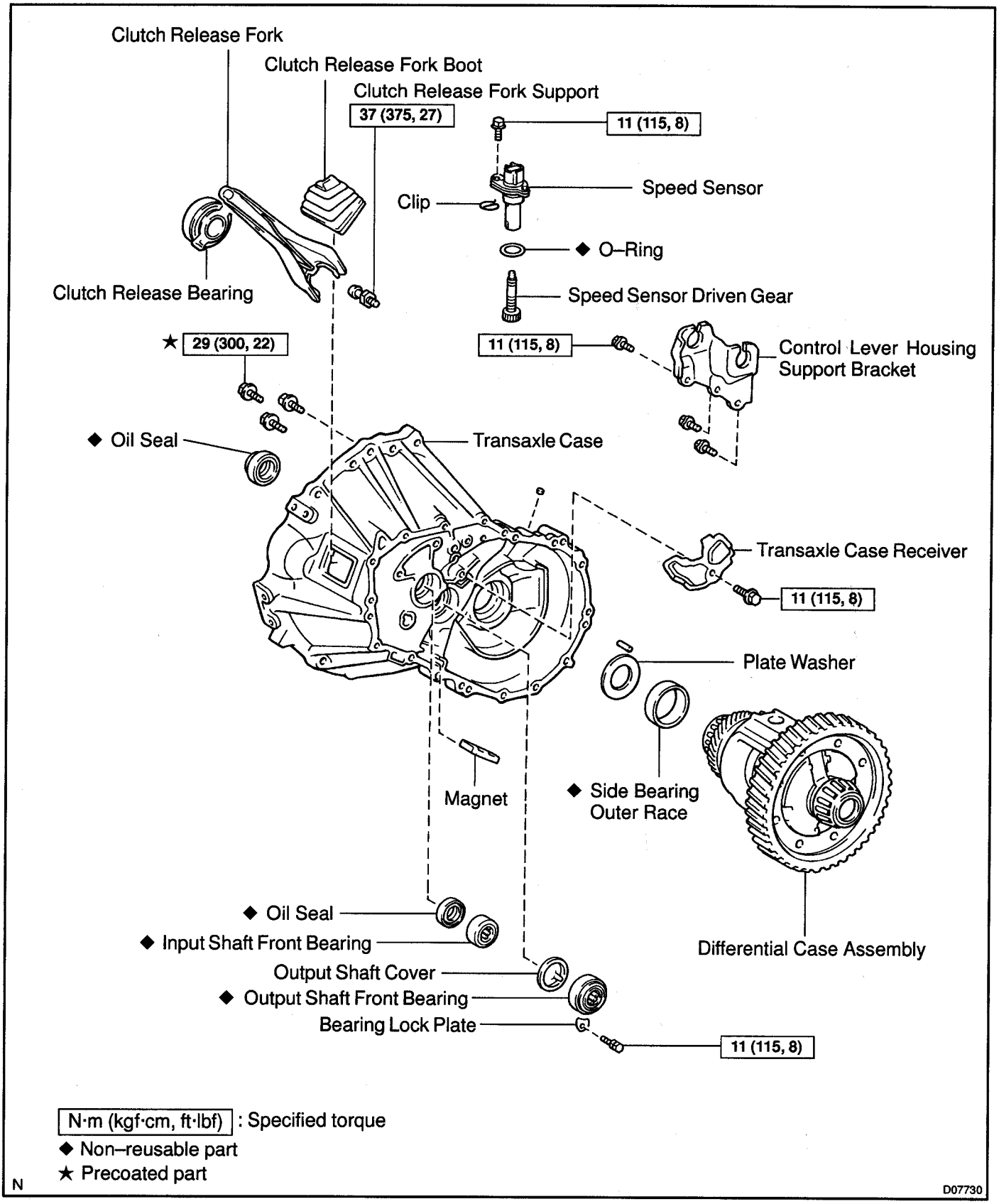
After installation, check and inspect items as follows.

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

MANUAL TRANSAXLE ASSEMBLY

COMPONENTS

MX06V–03

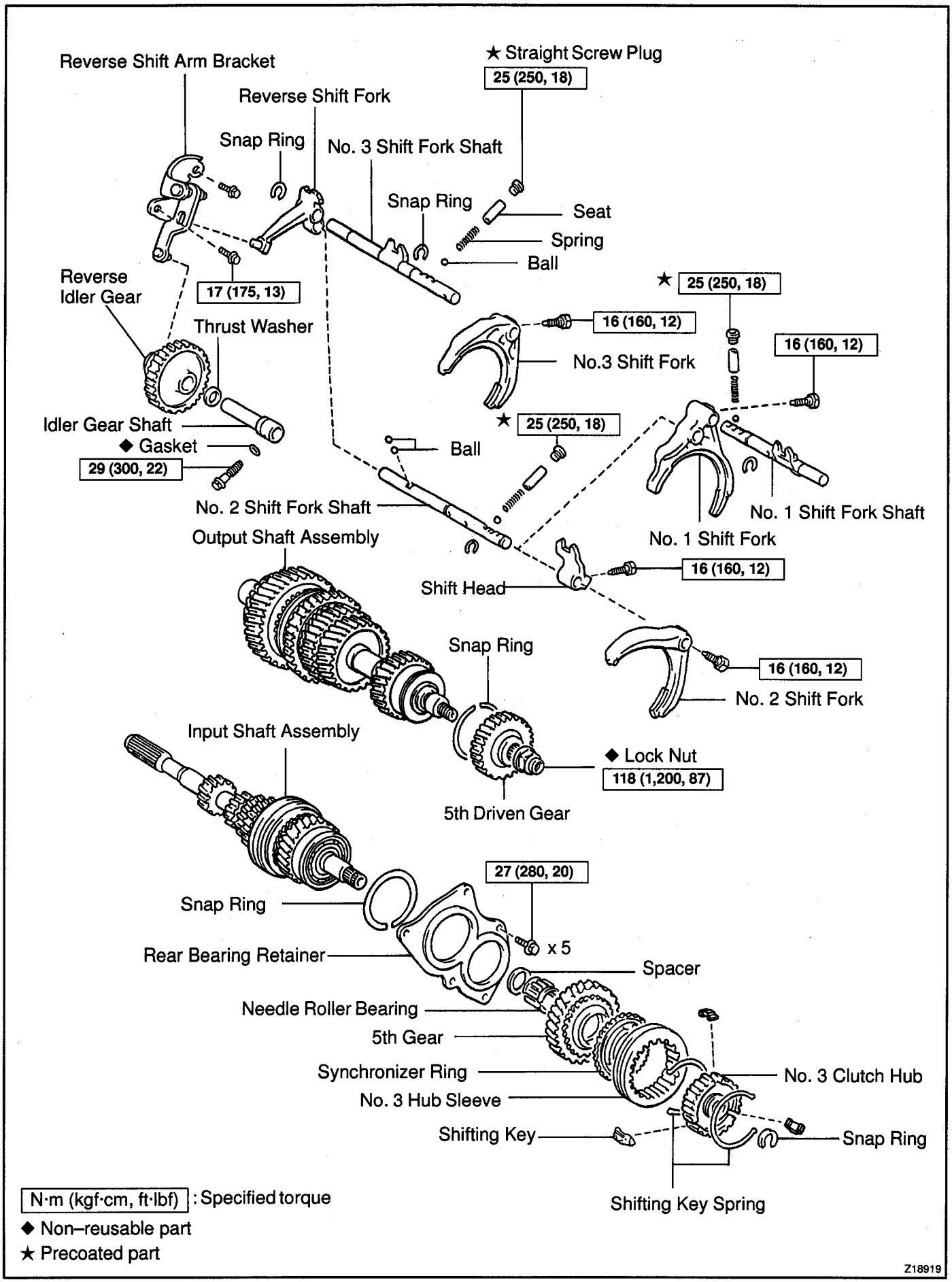


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part

N

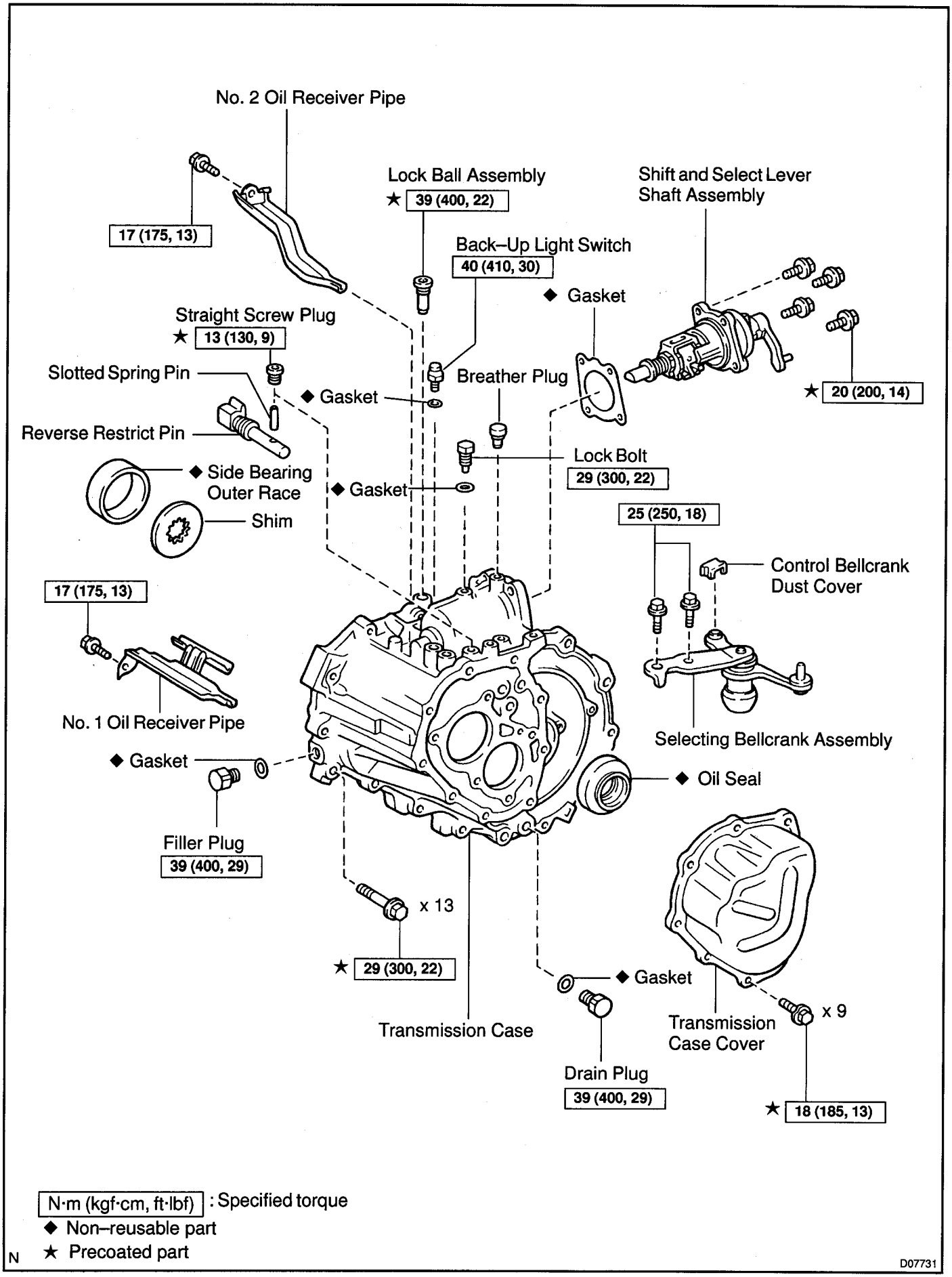
D07730

MX



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part

Z18919


No. 2 Oil Receiver Pipe
17 (175, 13)
Lock Ball Assembly
★ 39 (400, 22)
Back–Up Light Switch
40 (410, 30)
◆ Gasket
Shift and Select Lever Shaft Assembly
★ 20 (200, 14)
Straight Screw Plug
★ 13 (130, 9)
Slotted Spring Pin
◆ Gasket
Breather Plug
Reverse Restrict Pin
◆ Side Bearing Outer Race
Shim
◆ Gasket
Lock Bolt
29 (300, 22)
25 (250, 18)
Control Bellcrank Dust Cover
17 (175, 13)
No. 1 Oil Receiver Pipe
Selecting Bellcrank Assembly
◆ Gasket
Filler Plug
39 (400, 29)
◆ Oil Seal
x 13
★ 29 (300, 22)
Transmission Case
◆ Gasket
Drain Plug
39 (400, 29)
Transmission Case Cover
x 9
★ 18 (185, 13)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
N
D07731

MX0AA–01

DISASSEMBLY

1. REMOVE CLUTCH RELEASE FORK AND BEARING

HINT:

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

Apply molybdenum disulphide lithium base grease (See page CL–17).

2. REMOVE FILLER PLUG AND DRAIN PLUG WITH 2 GASKETS

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

3. REMOVE SPEED SENSOR

(a) Remove the bolt and speed sensor.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

(b) Using a small screwdriver, remove the clip from the speed sensor.

(c) Remove the speed sensor driven gear from the speed sensor.

(d) Using a small screwdriver, remove the O–ring from the speed sensor.

4. REMOVE BACK–UP LIGHT SWITCH WITH GASKET

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

5. REMOVE CONTROL LEVER HOUSING SUPPORT BRACKET

Remove the 3 bolts and control lever housing support bracket.

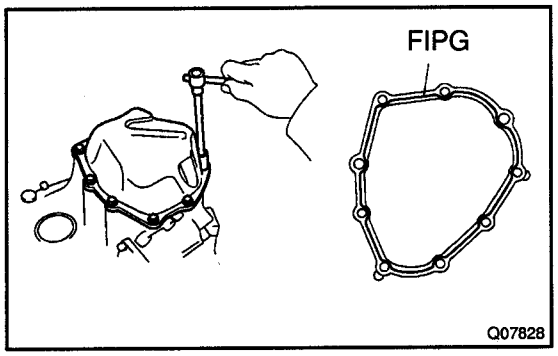
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

6. REMOVE SELECTING BELLCRANK ASSEMBLY

(a) Remove the 2 bolts and selecting bellcrank assembly.

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

(b) Remove the control bellcrank dust cover from the selecting bellcrank assembly.



7. REMOVE TRANSMISSION CASE COVER

(a) Remove the 9 bolts.

Sealant:

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

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

(b) Carefully tap the projection of the transmission case cover with a brass bar and hammer and remove it.

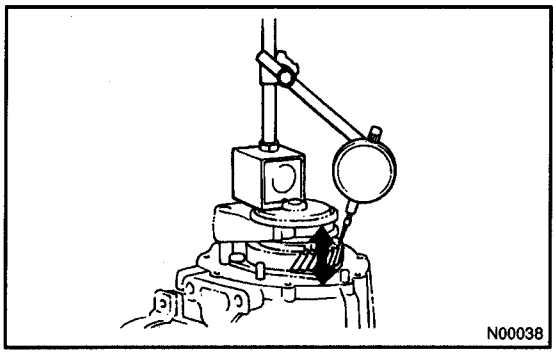
HINT:

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

Apply FIPG to the transmission case cover, as shown in the illustration.

FIPG:

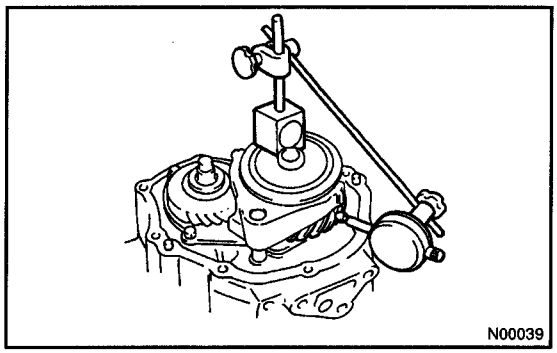
Part No. 08826–00090, THREE BOND 1281 or equivalent



8. INSPECT 5TH GEAR THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance.

Standard clearance:
0.10 – 0.57 mm (0.0039 – 0.0224 in.)
Maximum clearance:
0.57 mm (0.0224 in.)

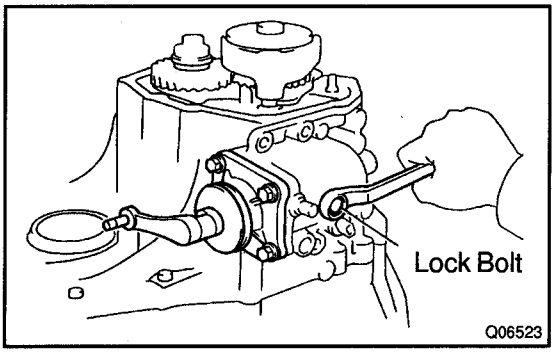


9. INSPECT 5TH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

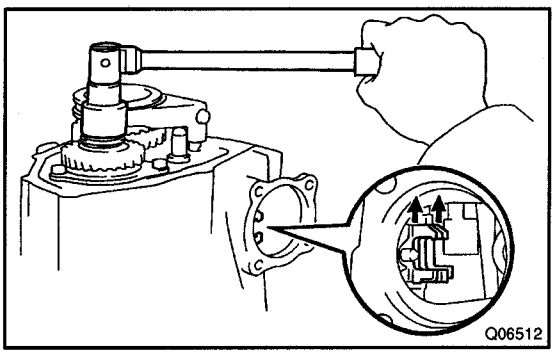
If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



10. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

(a) Remove the lock bolt and gasket.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Remove the 4 bolts and pull out the shift and select lever shaft assembly with the gasket.
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



11. REMOVE LOCK NUT

(a) Engage the gear to the double meshing.

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

(c) Remove the lock nut.
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(d) Disengage the double meshing of the gear.

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

(a) Remove the bolt from the No. 3 shift fork.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

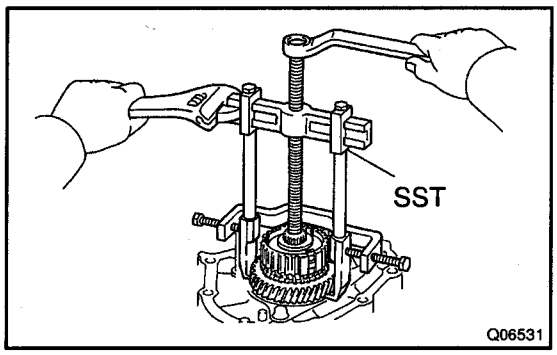
(b) Remove the No. 3 hub sleeve and No. 3 shift fork.

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 reassembly, please refer to the following item.
Select a snap ring that allows the minimum axial play.

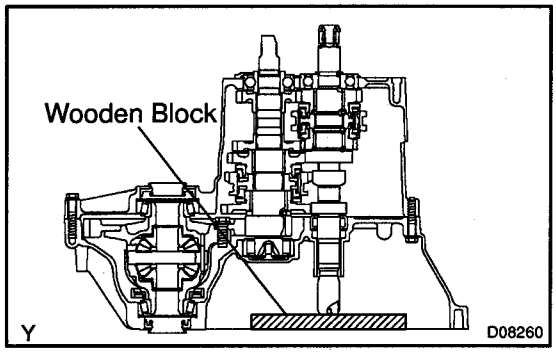
Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
A	2.25 (0.0886)	E	2.49 (0.0980)
B	2.31 (0.0909)	F	2.55 (0.1004)
C	2.37 (0.0933)	G	2.61 (0.1028)
D	2.43 (0.0957)	–	–



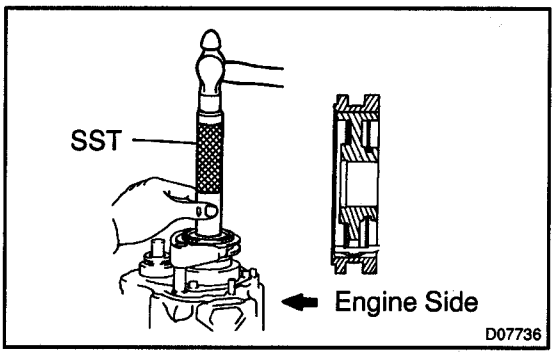
(b) Using SST, remove the No. 3 clutch hub assembly, 5th gear and synchronizer ring.
SST 09950–40011

HINT:
At the time of reassembly, please refer to the following items.

- Install the No. 3 clutch hub assembly to the No. 3 hub sleeve.



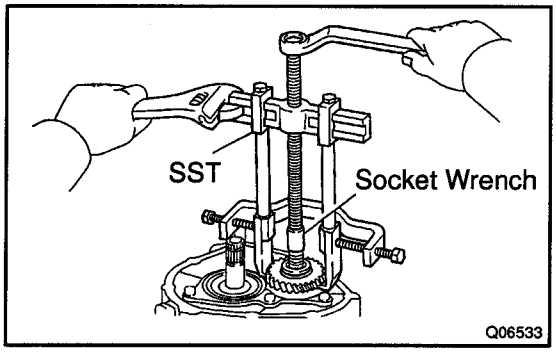
- Before driving in the No. 3 clutch hub assembly, place the suitable sized wooden block on the rear side of the input shaft, as shown in the illustration. When driving it in, fix the input shaft firmly so that it is not pushed downward. Otherwise the input shaft rear bearing is overloaded, it might be damaged.



- Using SST and a hammer, drive in the No. 3 hub sleeve assembly with the No. 3 shift fork.
  SST 09612–22011

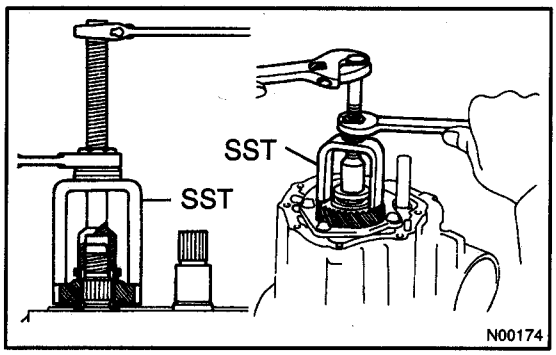
NOTICE:
Align the synchronizer ring slots with the shifting keys.

(c) Remove the needle roller bearings and spacer.

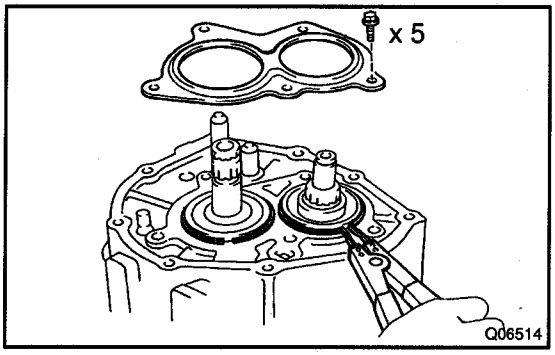


14. REMOVE 5TH DRIVEN GEAR

Using SST and a socket wrench, remove the 5th driven gear.
SST 09950–40011



HINT:
At the time of reassembly, please refer to the following item.
Using SST, install the 5th driven gear.
SST 09309–12020

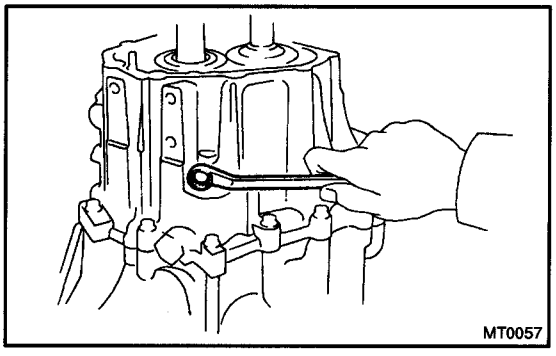


15. REMOVE REAR BEARING RETAINER

Remove the 5 bolts and rear bearing retainer.
Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

16. REMOVE BEARING SNAP RING

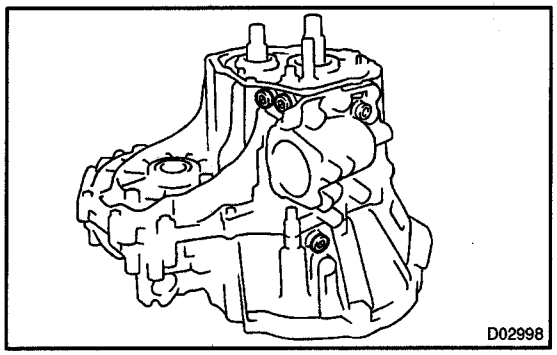
Using a snap ring expander, remove the 2 snap rings.
HINT:
If it is difficult to remove and install the snap rings, pull up the shafts.



17. REMOVE REVERSE IDLER GEAR SHAFT LOCK BOLT AND GASKET
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

18. REMOVE SNAP RING FROM NO. 2 SHIFT FORK SHAFT

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

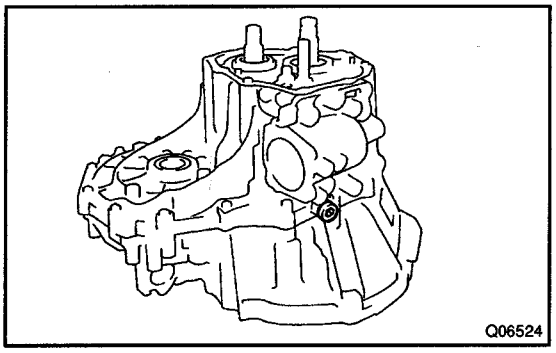


19. REMOVE STRAIGHT SCREW PLUG, SEAT, SPRING AND BALL

(a) Using a hexagon wrench, remove the 3 straight screw plugs.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

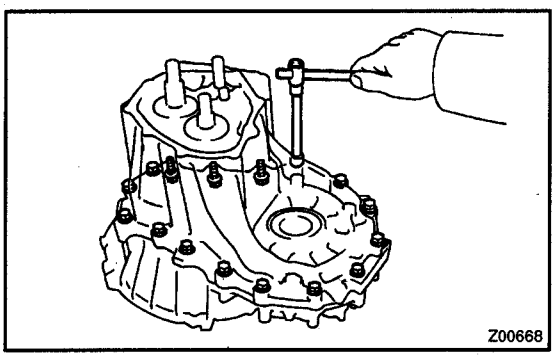
(b) Using a magnetic finger, remove the 3 seats, springs and balls.



20. REMOVE LOCK BALL ASSEMBLY

Using a hexagon wrench, remove the lock ball assembly.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

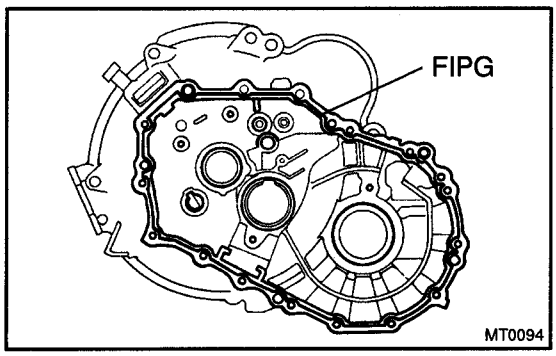


21. REMOVE TRANSMISSION CASE

(a) Remove the 16 bolts.

Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Carefully tap the transmission case with a plastic hammer and remove it.

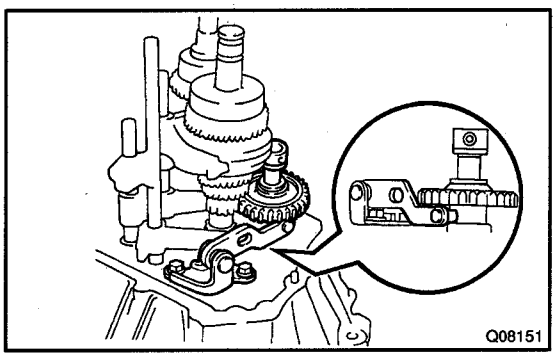


HINT:
At the time of reassembly, please refer to the following item.
Apply FIPG to the transaxle case, as shown in the illustration.

FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

(c) Remove the 2 bolts, No. 1 and No. 2 oil receiver pipes from the transmission case.

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



22. REMOVE REVERSE IDLER GEAR, THRUST WASHER AND SHAFT

23. REMOVE REVERSE SHIFT ARM BRACKET

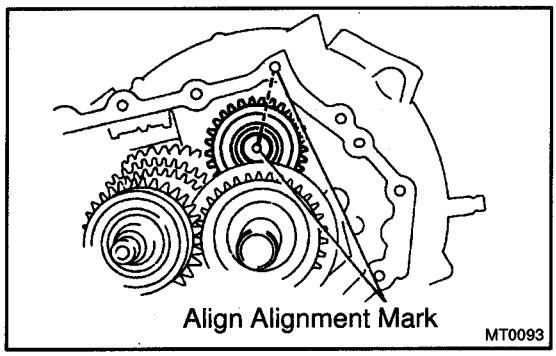
Remove the 2 bolts and reverse shift arm bracket.

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

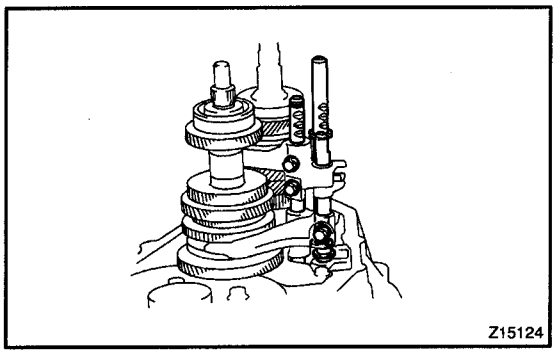
NOTICE:
At the time of reassembly, please refer to the following items.

- **Set the pin on the top of the reverse shift arm into a groove on the reverse idler gear.**

- **Fit the claw of the reverse shift arm bracket with the notch of the input shaft front bearing.**



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

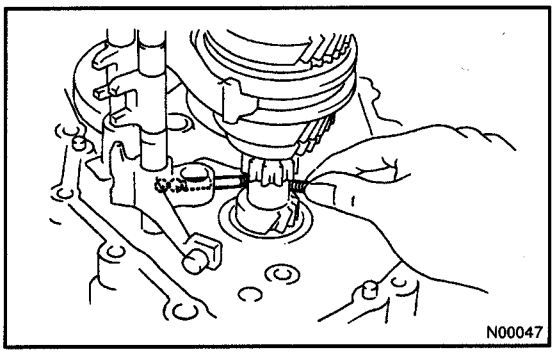


24. REMOVE SHIFT FORK AND SHIFT FORK SHAFT

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

(b) Remove the 3 set bolts.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

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



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

(e) Remove the No. 3 shift fork shaft and reverse shift fork.

(f) Pull out the No. 1 shift fork shaft.

(g) Remove the No. 1 and No. 2 shift forks.

25. REMOVE INPUT AND OUTPUT SHAFTS TOGETHER FROM TRANSAXLE CASE

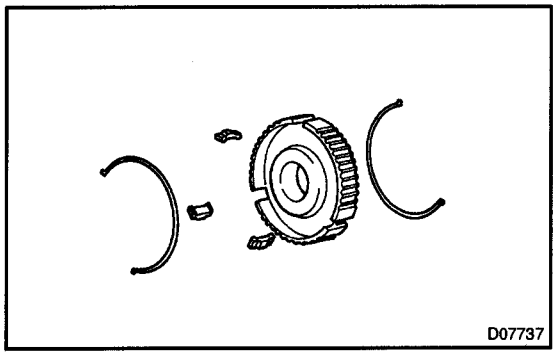
26. REMOVE DIFFERENTIAL CASE ASSEMBLY

NOTICE:

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

Before reassembly, inspect the differential side bearing preload (See page MX–41).

27. REMOVE MAGNET FROM TRANSAXLE CASE



28. DISASSEMBLE NO. 3 CLUTCH HUB ASSEMBLY

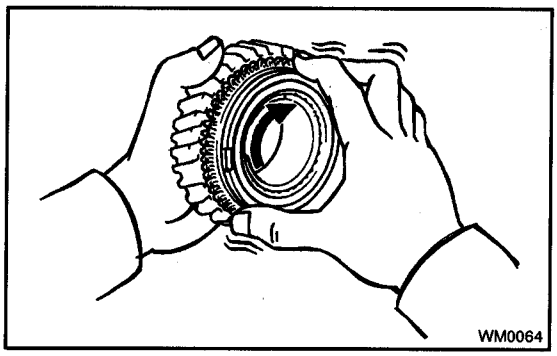
(a) Using a screwdriver, remove the 2 shifting key springs from the No. 3 clutch hub.

NOTICE:

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

Position the shifting key springs so that their end gaps are not aligned.

(b) Remove the 3 shifting keys from the No. 3 clutch hub.


WM0064

INSPECTION

MX0AB-01

1. INSPECT 5TH GEAR SYNCHRONIZER RING

(a) Check for wear or damage.

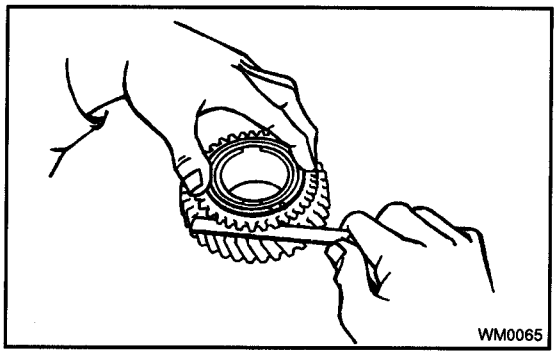
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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.


WM0065

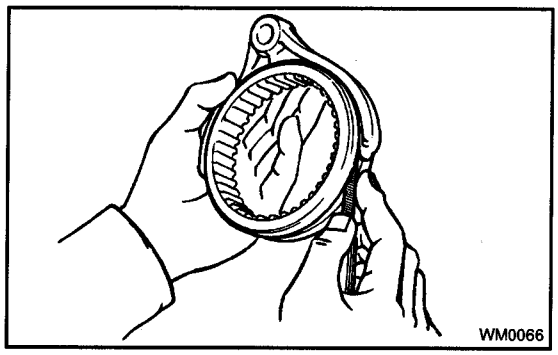
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 in.)

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

NOTICE:

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


WM0066

2. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

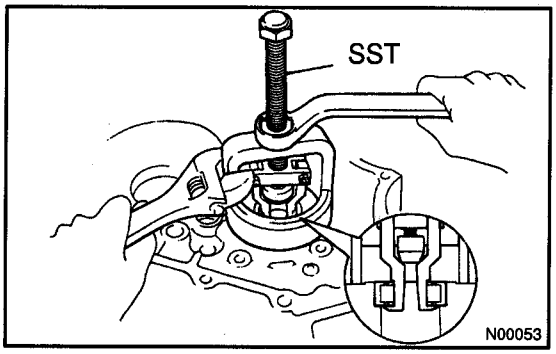
Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

Maximum clearance: 0.5 mm (0.020 in.)

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

3. REMOVE TRANSAXLE CASE RECEIVER

Remove the bolt and transaxle case receiver.

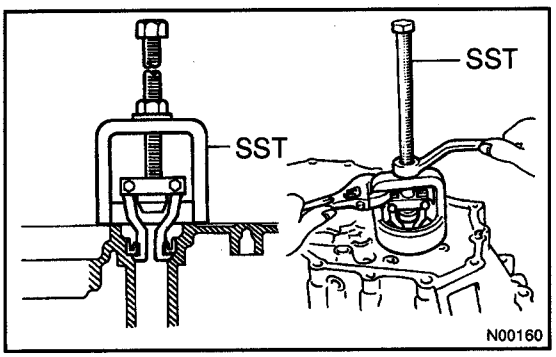


N00053

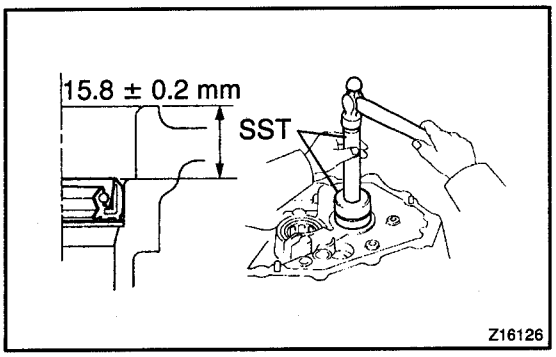
4. IF NECESSARY, REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL

(a) Using SST, remove the input shaft front bearing.

SST 09612–65014

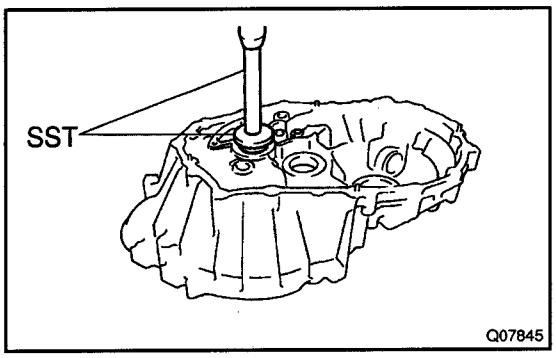


(b) Using SST, remove the oil seal.
SST 09612–65014

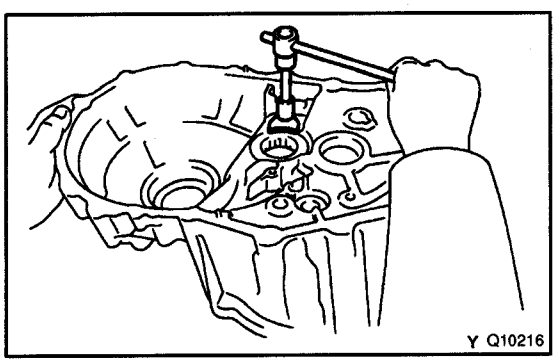


(c) Using SST and a hammer, install a new oil seal.
SST 09950–60010 (09951–00360), 09950–70010 (09951–07150)
Drive in depth: 15.8 ± 0.2 mm (0.622 ± 0.008 in.)

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

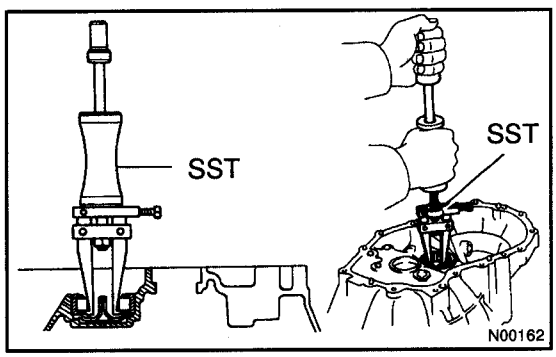


(e) Using SST and a press, install a new input shaft front bearing.
SST 09950–60010 (09951–00460), 09950–70010 (09951–07150)

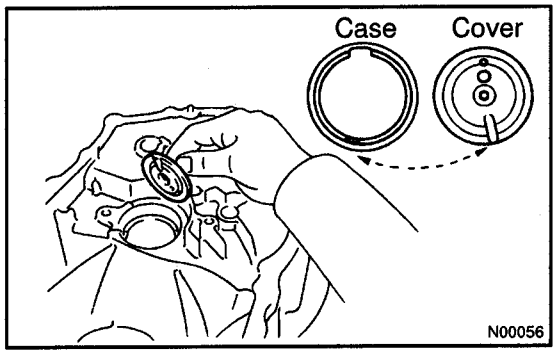


5. IF NECESSARY, REPLACE OUTPUT SHAFT FRONT BEARING AND OUTPUT SHAFT COVER

(a) Remove the bolt and bearing lock plate.

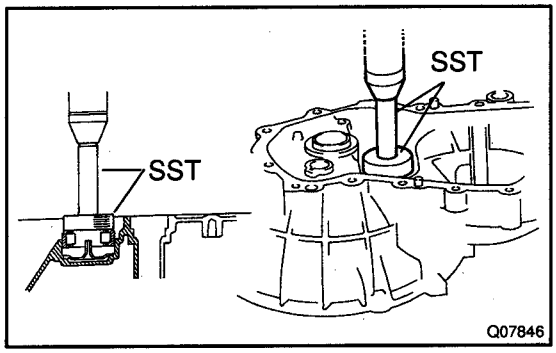


(b) Using SST, pull out the output shaft front bearing.
SST 09308–00010



(c) Remove the output shaft cover.
(d) Install the output shaft cover.

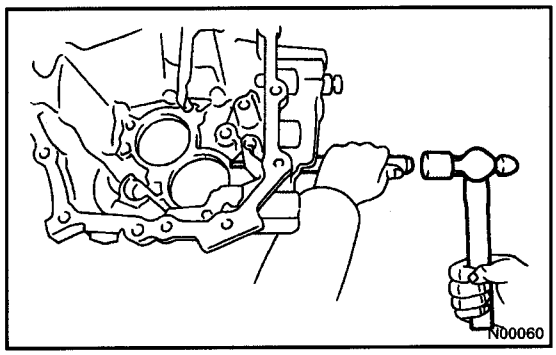
NOTICE:
Install the output shaft cover projection into the case side hollow.



(e) Using SST and a press, install a new output shaft front bearing.
SST 09950–60010 (09951–00620), 09950–70010 (09951–07150)
(f) Install the bearing lock plate with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

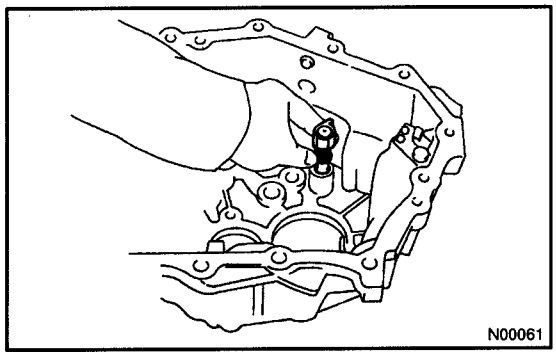
6. INSTALL TRANSAXLE CASE RECEIVER

Install the transaxle case receiver with the bolt.
Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



7. 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.
(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 the straight screw plug.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

MX06Y–02

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.**
- **Part must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

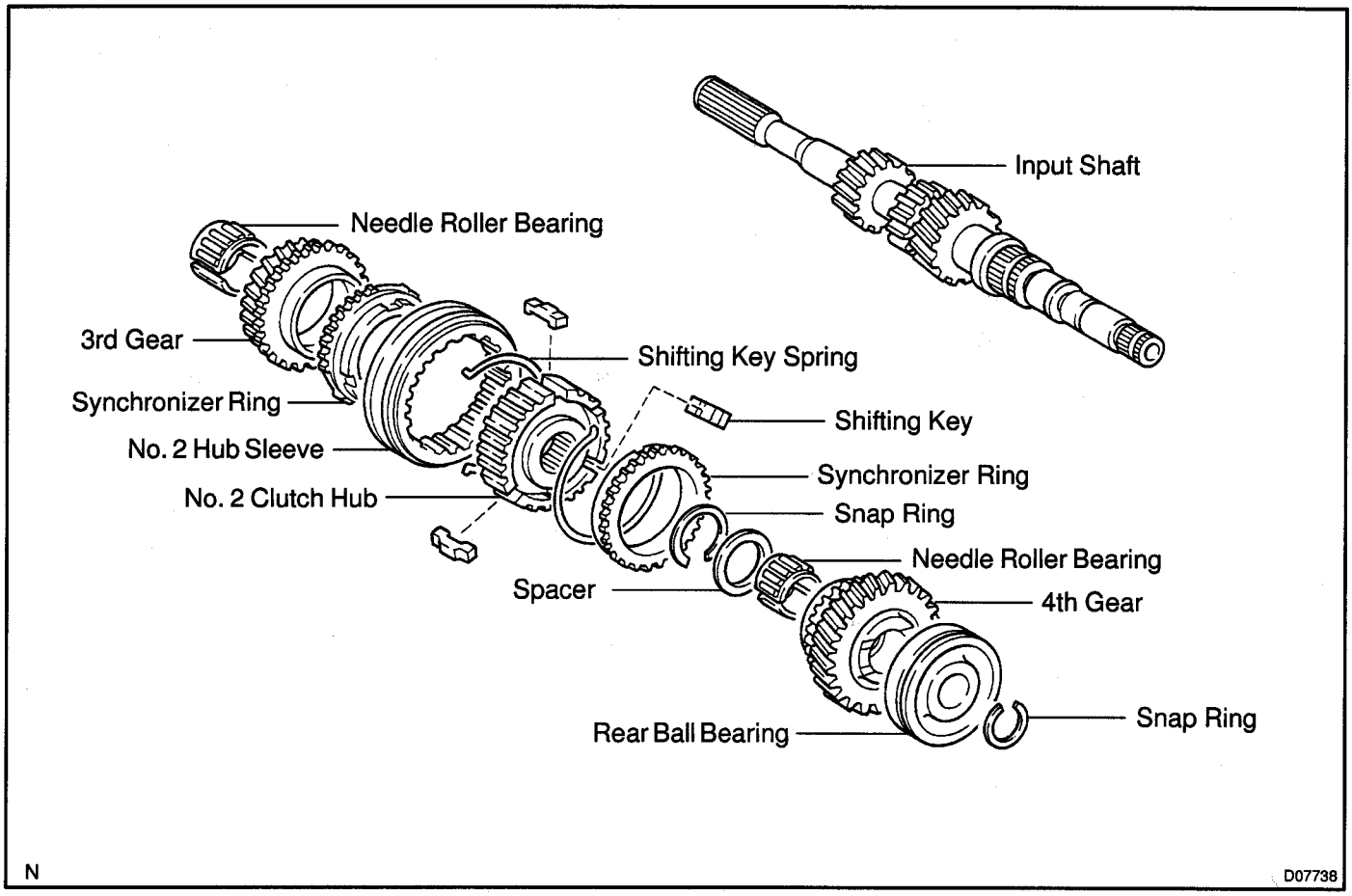
HINT:

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

INPUT SHAFT

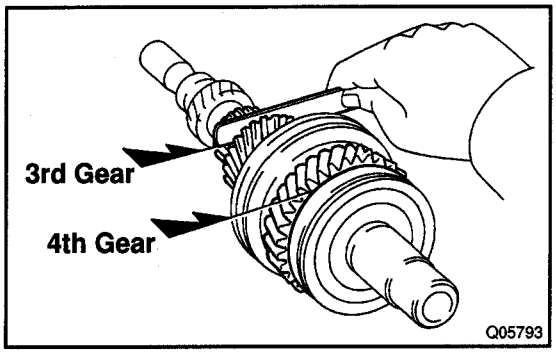
COMPONENTS

MX06Z-03



MX070-03

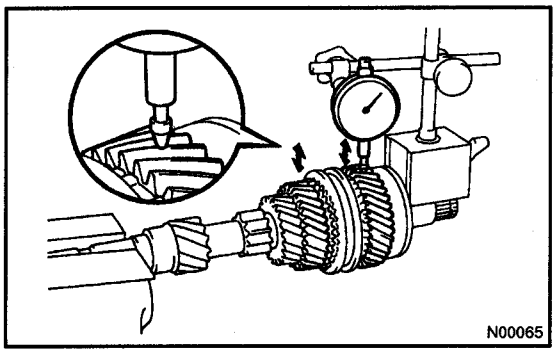
DISASSEMBLY



1. INSPECT 3RD AND 4TH GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
3rd gear: 0.10 – 0.35 mm (0.0039 – 0.0138 in.)
4th gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
3rd gear: 0.35 mm (0.0138 in.)
4th gear: 0.55 mm (0.0217 in.)



2. INSPECT 3RD AND 4TH GEARS RADIAL CLEARANCE

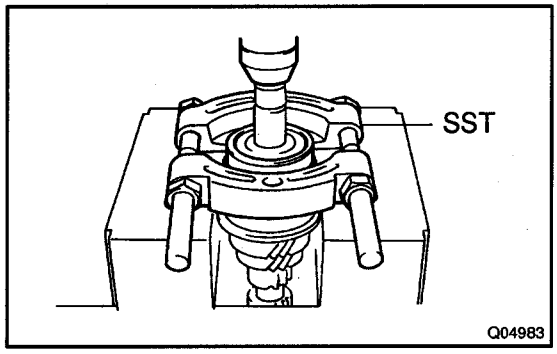
Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:
KOYO made:
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
Maximum clearance:
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 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.



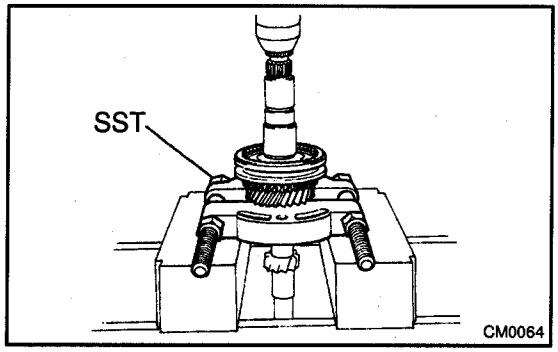
4. REMOVE REAR BALL BEARING, 4TH GEAR, NEEDLE ROLLER BEARING, SPACER AND SYNCHRONIZER RING FROM INPUT SHAFT

(a) Using SST and a press, remove the rear ball bearing and 4th gear.
SST 09950–00020

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

5. REMOVE SNAP RING

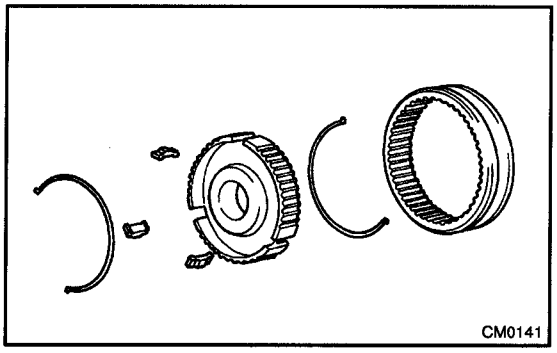
Using 2 screwdrivers and a hammer, tap out the snap ring.



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

(a) Using SST and a press, remove the No. 2 hub sleeve assembly, 3rd gear and synchronizer ring.
SST 09950–00020

(b) Remove the needle roller bearings.



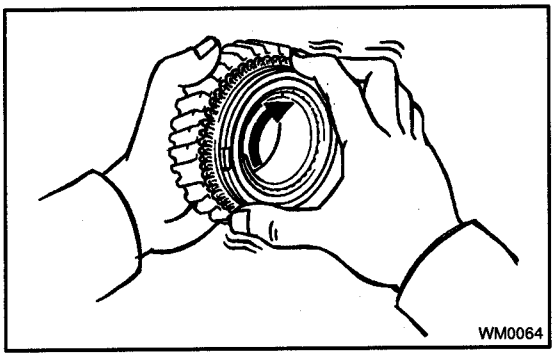
7. DISASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

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

(b) Remove the No. 2 hub sleeve from the No. 2 clutch hub.

MX071–03

INSPECTION



1. INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

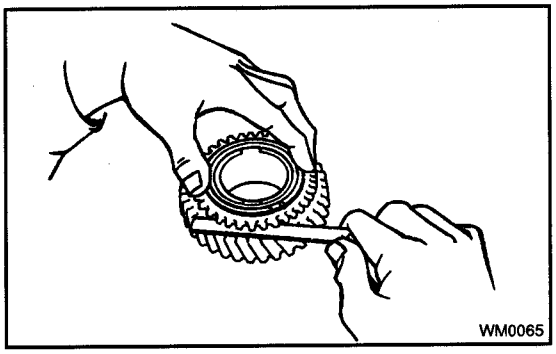
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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.



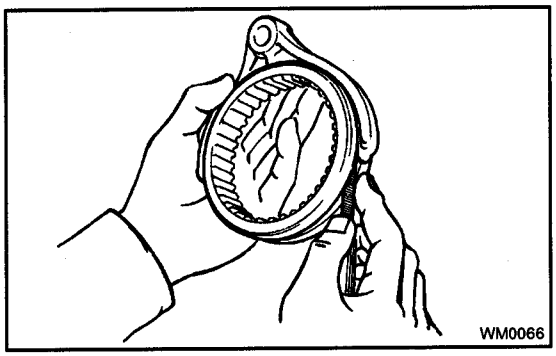
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 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.

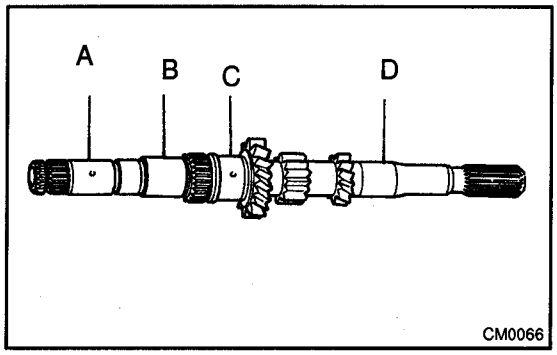


2. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

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.



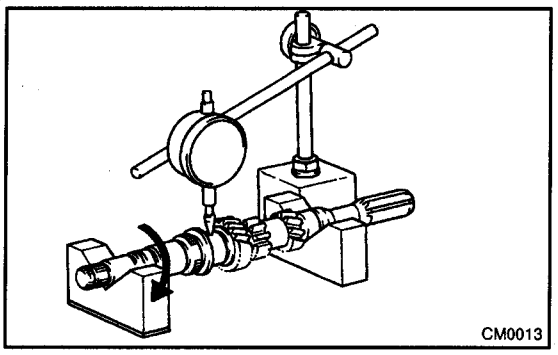
3. INSPECT INPUT SHAFT

(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: 24.885 mm (0.9797 in.)
Part B: 28.985 mm (1.1411 in.)
Part C: 30.985 mm (1.2199 in.)
Part D: 24.967 mm (0.9830 in.)

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

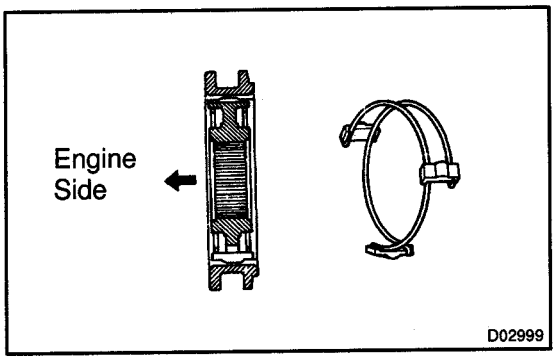


(c) Using a dial indicator, check the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

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

MX072-03



REASSEMBLY

HINT:

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

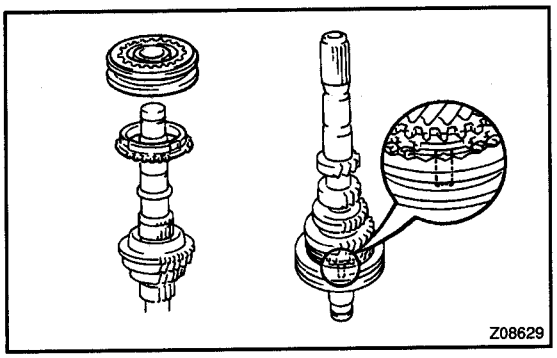
1. ASSEMBLE NO. 2 HUB SLEEVE ASSEMBLY

(a) Install the 3 shifting keys and No. 2 hub sleeve to the No. 2 clutch hub.

(b) Install the 2 shifting key springs under the shifting keys.

NOTICE:

Position the shifting key springs so that their end gaps are not in line.

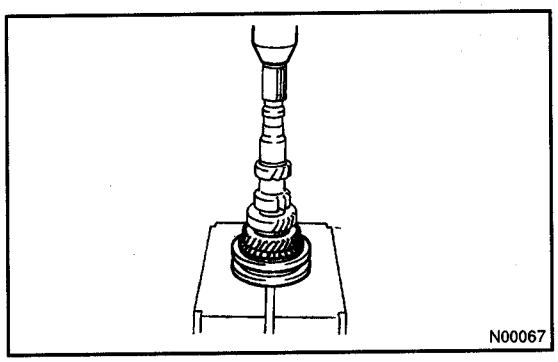


2. INSTALL NEEDLE ROLLER BEARING, 3RD GEAR, SYNCHRONIZER RING AND NO. 2 HUB SLEEVE ASSEMBLY TO INPUT SHAFT

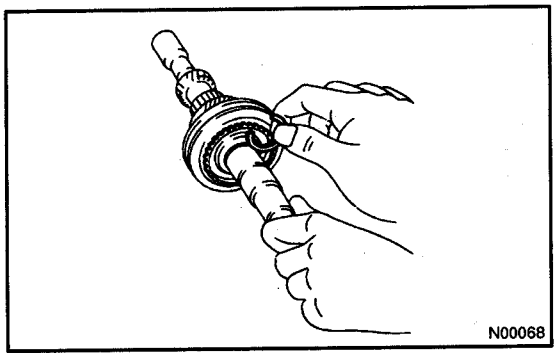
(a) Apply gear oil to the needle roller bearings and install it.

(b) Install the 3rd gear and synchronizer ring.

(c) Install the No. 2 hub sleeve assembly so that the synchronizer ring slots and shifting keys are aligned.



(d) Using a press, install the No. 2 hub sleeve assembly.



3. INSTALL SNAP RING

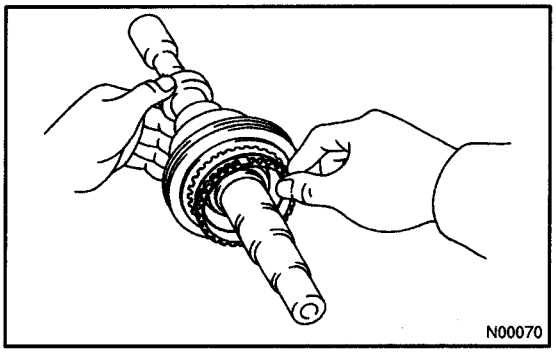
(a) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
0	2.30 (0.0906)	3	2.48 (0.0976)
1	2.36 (0.0929)	4	2.54 (0.1000)
2	2.42 (0.0953)	5	2.60 (0.1024)

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

4. INSPECT 3RD GEAR THRUST CLEARANCE

(See page MX–24)



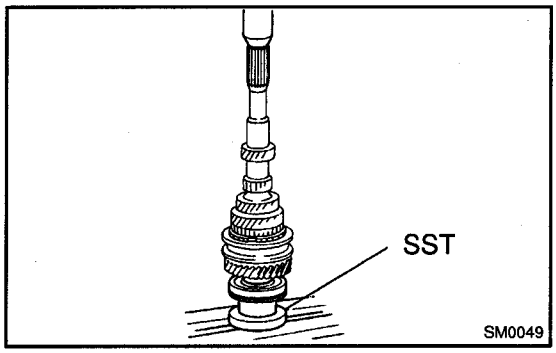
5. INSTALL SPACER, NEEDLE ROLLER BEARING, SYNCHRONIZER RING, 4TH GEAR AND REAR BALL BEARING

(a) Install the spacer.

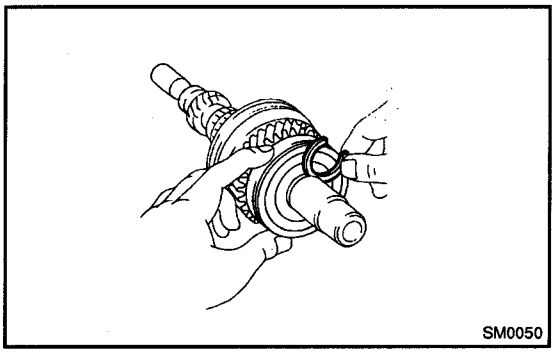
(b) Apply gear oil to the needle roller bearings and install it.

(c) Place the synchronizer ring on the No. 2 hub sleeve assembly and align the synchronizer ring slots with the shifting keys.

(d) Install the 4th gear.



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

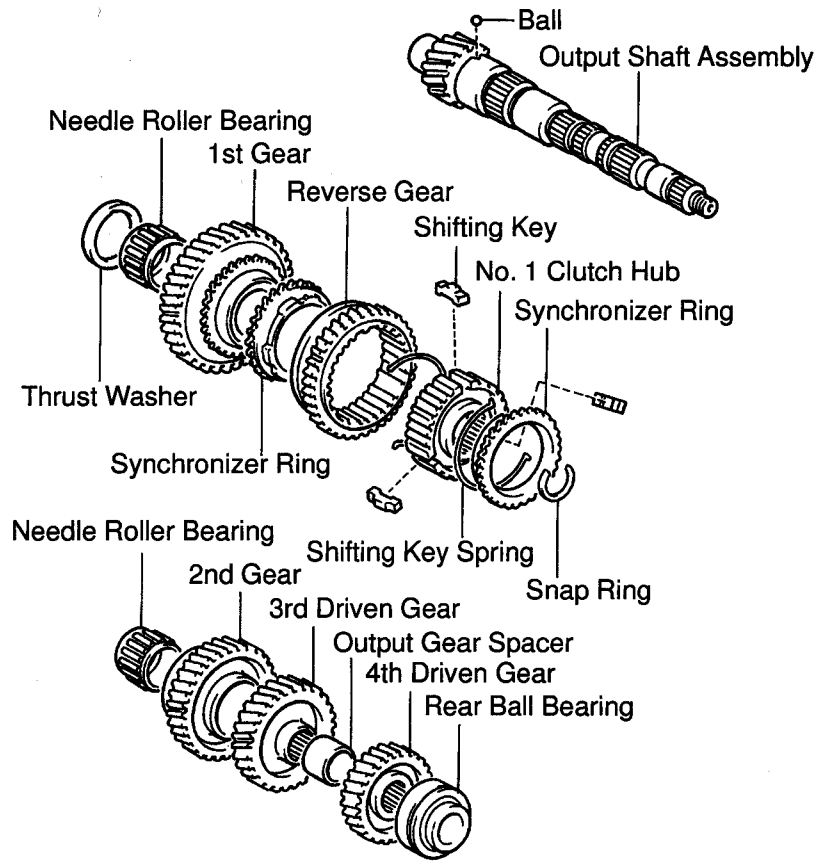
(b) Using a screwdriver and hammer, tap in the snap ring.

7. INSPECT 4TH GEAR THRUST CLEARANCE
(See page MX–24)

OUTPUT SHAFT

COMPONENTS

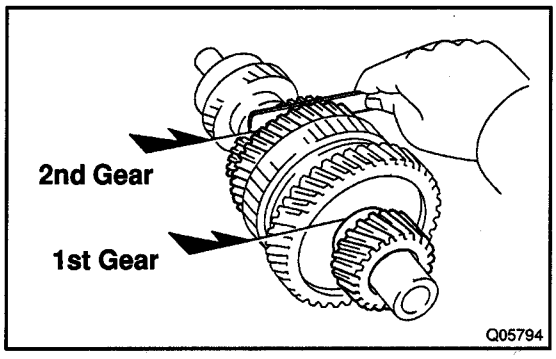
MX073-03



Q06509

MX074–03

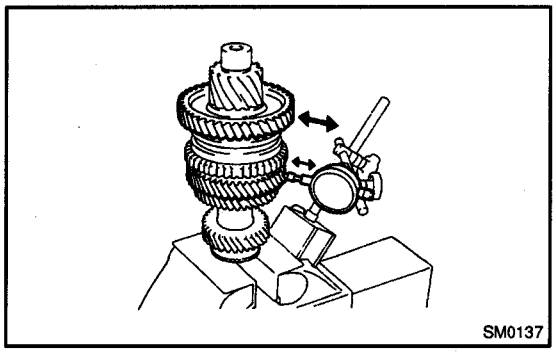
DISASSEMBLY



1. INSPECT 1ST AND 2ND GEARS THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance.

Standard clearance:
1st gear: 0.10 – 0.40 mm (0.0039 – 0.0157 in.)
2nd gear: 0.10 – 0.55 mm (0.0039 – 0.0217 in.)
Maximum clearance:
1st gear: 0.40 mm (0.0157 in.)
2nd gear: 0.55 mm (0.0217 in.)

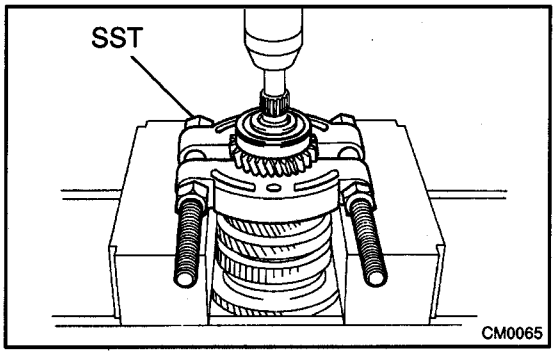


2. INSPECT 1ST AND 2ND GEARS RADIAL CLEARANCE

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

Standard clearance:
KOYO made
0.015 – 0.058 mm (0.0006 – 0.0023 in.)
NSK made:
0.015 – 0.056 mm (0.0006 – 0.0022 in.)
KOYO made: 0.058 mm (0.0023 in.)
NSK made: 0.056 mm (0.0022 in.)

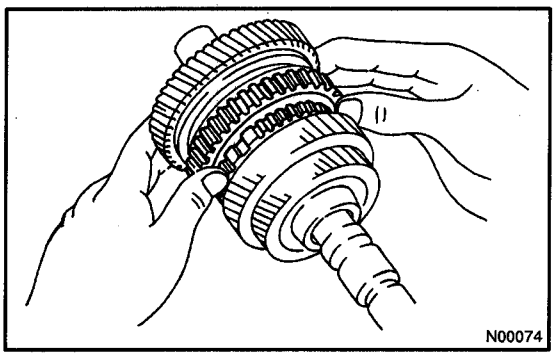
If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.



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

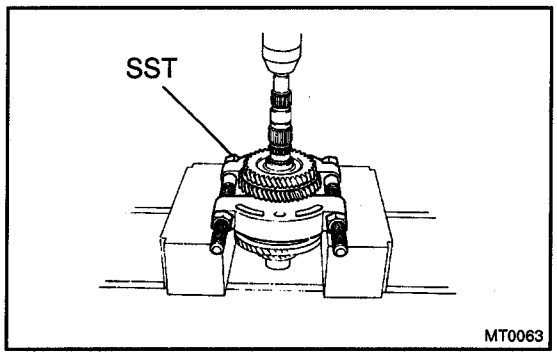
(a) Using SST and a press, remove the rear ball bearing and 4th driven gear.
SST 09950–00020

(b) Remove the output gear spacer.



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

(a) Shift the reverse gear into the 1st gear.

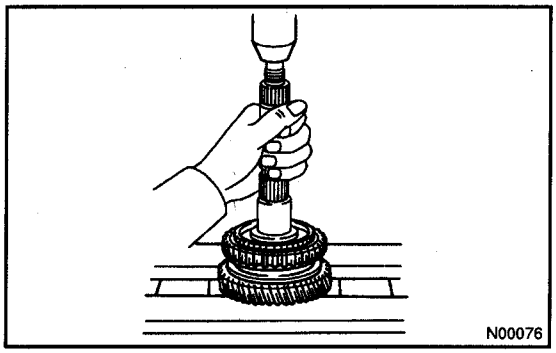


(b) Using SST and a press, remove the 3rd driven gear and 2nd gear.
SST 09950–00020

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

5. REMOVE SNAP RING

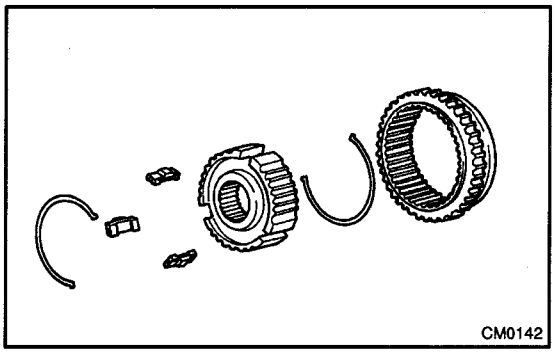
Using 2 screwdrivers and a hammer, tap out the snap ring.



6. REMOVE REVERSE GEAR ASSEMBLY, 1ST GEAR, SYNCHRONIZER RING, NEEDLE ROLLER BEARING, THRUST WASHER AND BALL

(a) Using a press, remove the reverse gear assembly, 1st gear and synchronizer ring.

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



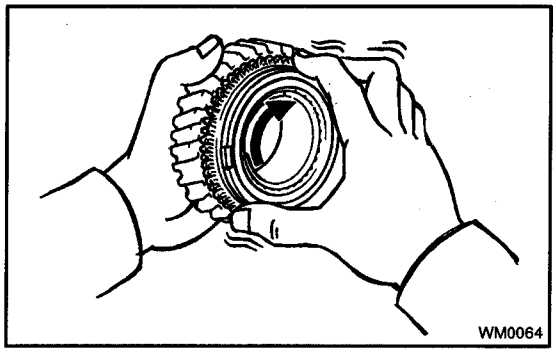
7. DISASSEMBLE REVERSE GEAR ASSEMBLY

(a) Using a screwdriver, remove the 2 shifting key springs and 3 shifting keys from the No. 1 clutch hub.

(b) Remove the reverse gear from the No. 1 clutch hub.

MX075-04

INSPECTION


WM0064

1. INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

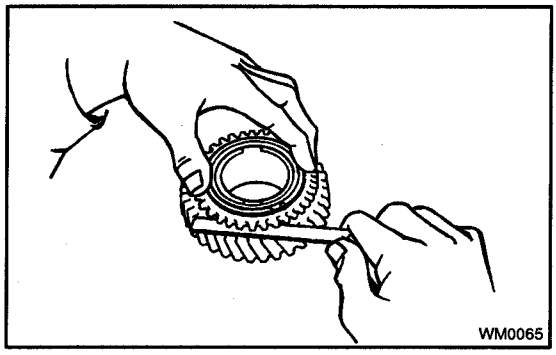
(b) Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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.


WM0065

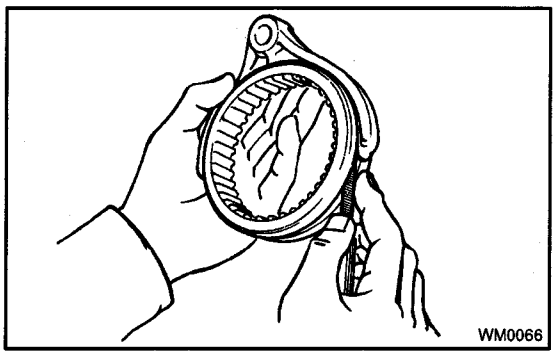
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.75 mm (0.0295 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.

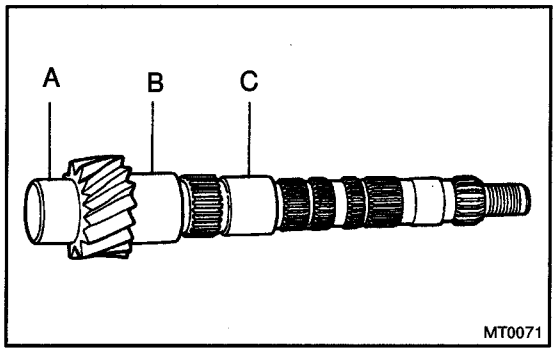

WM0066

2. INSPECT SHIFT FORK AND REVERSE GEAR CLEARANCE

Using a feeler gauge, measure the clearance between the reverse gear and shift fork.

Maximum clearance: 0.35 mm (0.014 in.)

If the clearance exceeds the maximum, replace the shift fork or reverse gear.



MT0071

3. 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.

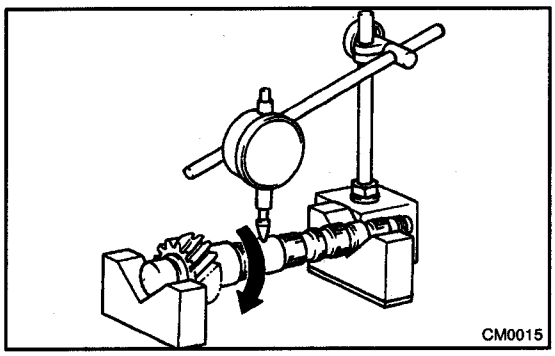
Minimum outer diameter:

Part A: 32.985 mm (1.2986 in.)

Part B: 37.985 mm (1.4955 in.)

Part C: 31.985 mm (1.2592 in.)

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

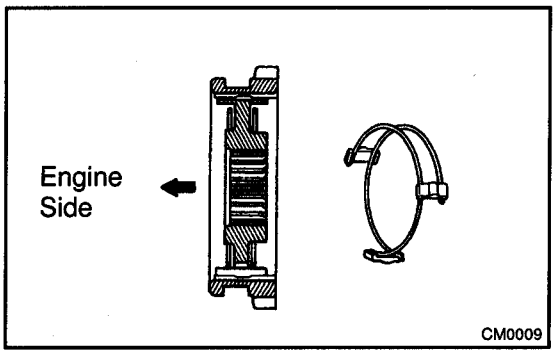


(c) Using a dial indicator, check the shaft runout.
Maximum runout: 0.03 mm (0.0012 in.)

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

MX076-03

REASSEMBLY



HINT:

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

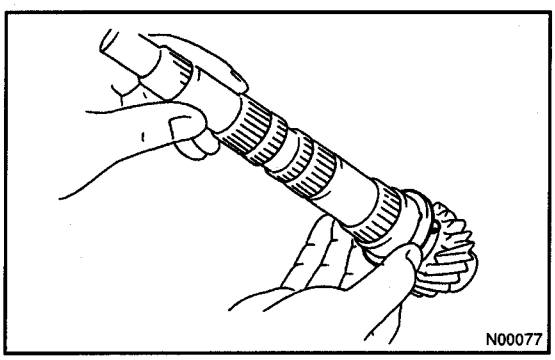
1. ASSEMBLE REVERSE GEAR ASSEMBLY

(a) Install the 3 shifting keys and reverse gear to the No. 1 clutch hub.

(b) Install the 2 shifting key springs under the shifting keys.

NOTICE:

Position the shifting key springs so that their end gaps are not in line.



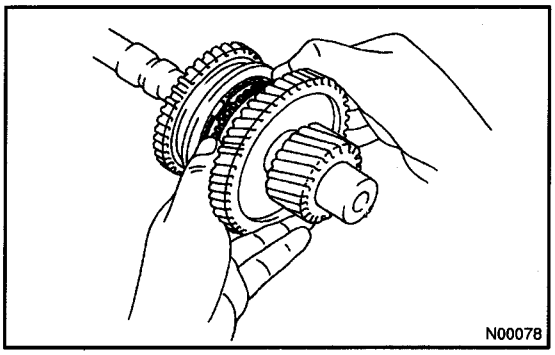
2. INSTALL BALL, THRUST WASHER, NEEDLE ROLLER BEARING, 1ST GEAR, SYNCHRONIZER RING AND REVERSE GEAR ASSEMBLY TO OUTPUT SHAFT

(a) Install the ball to the output shaft.

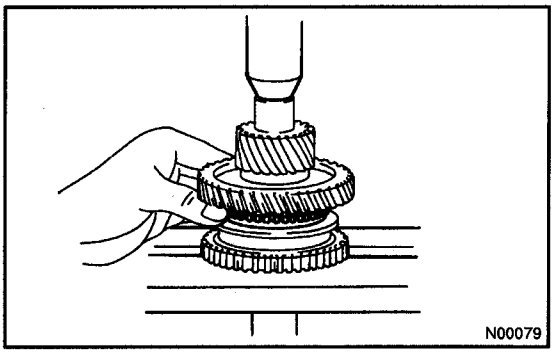
(b) Fit the thrust washer groove securely over the locking ball when installing the thrust on the output shaft.

(c) Apply gear oil to the needle roller bearing and install it.

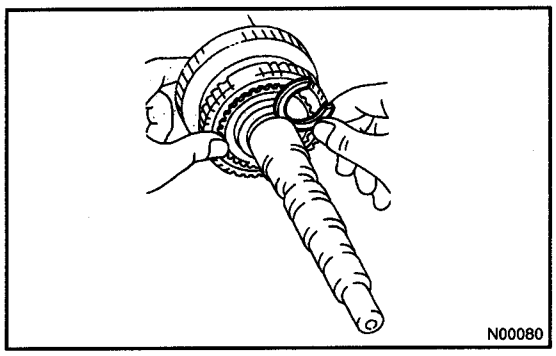
(d) Install the 1st gear and synchronizer ring.



(e) Place the reverse gear assembly and align the synchronizer ring slots with the shifting keys.



(f) Using a press, install the reverse gear assembly.



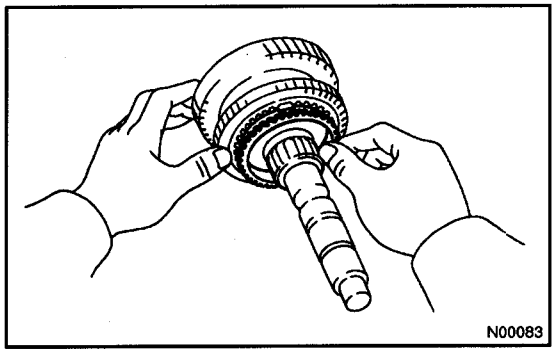
3. INSTALL SNAP RING

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

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

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

4. INSPECT 1ST GEAR THRUST CLEARANCE
(See page MX–31)

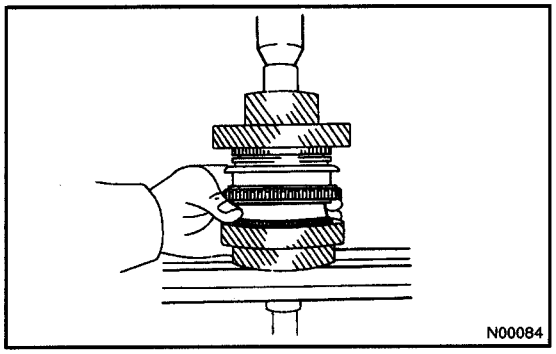


5. INSTALL NEEDLE ROLLER BEARING, SYNCHRONIZER RING, 2ND GEAR AND 3RD DRIVEN GEAR

(a) Apply gear oil to the needle roller bearing and install it.

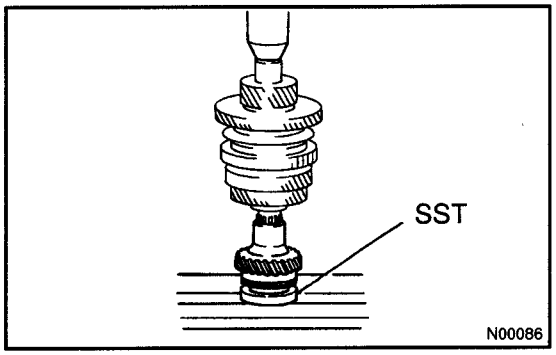
(b) Place the synchronizer ring on the reverse gear assembly and align the ring slots with the shifting keys.

(c) Install the 2nd gear.



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

6. INSPECT 2ND GEAR THRUST CLEARANCE
(See page MX–31)



7. INSTALL OUTPUT GEAR SPACER, 4TH DRIVEN GEAR AND REAR BALL BEARING

(a) Install the output gear spacer.

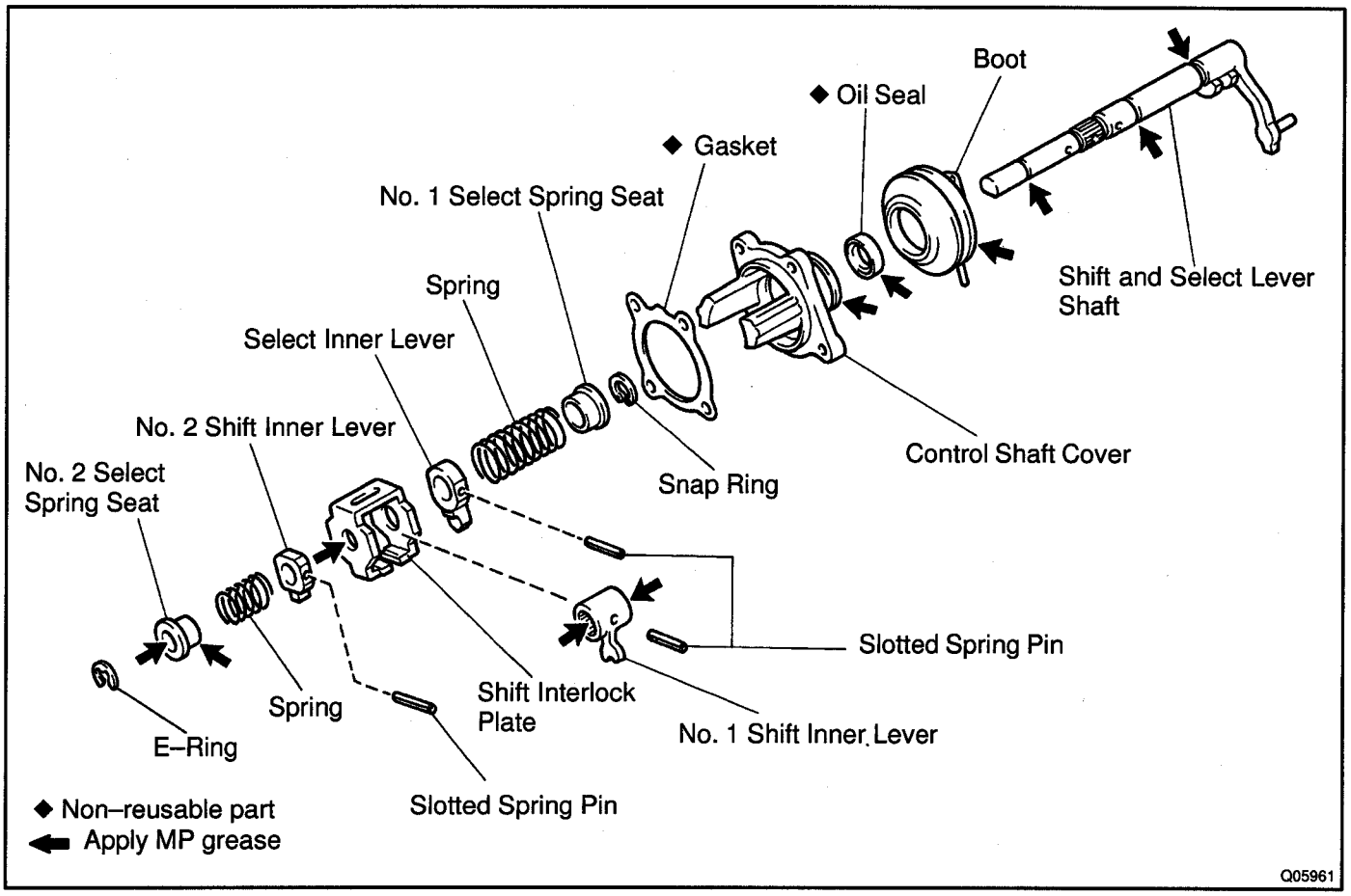
(b) Using SST and a press, install the 4th driven gear and rear ball bearing.

SST 09608–00071

SHIFT AND SELECT LEVER SHAFT

COMPONENTS

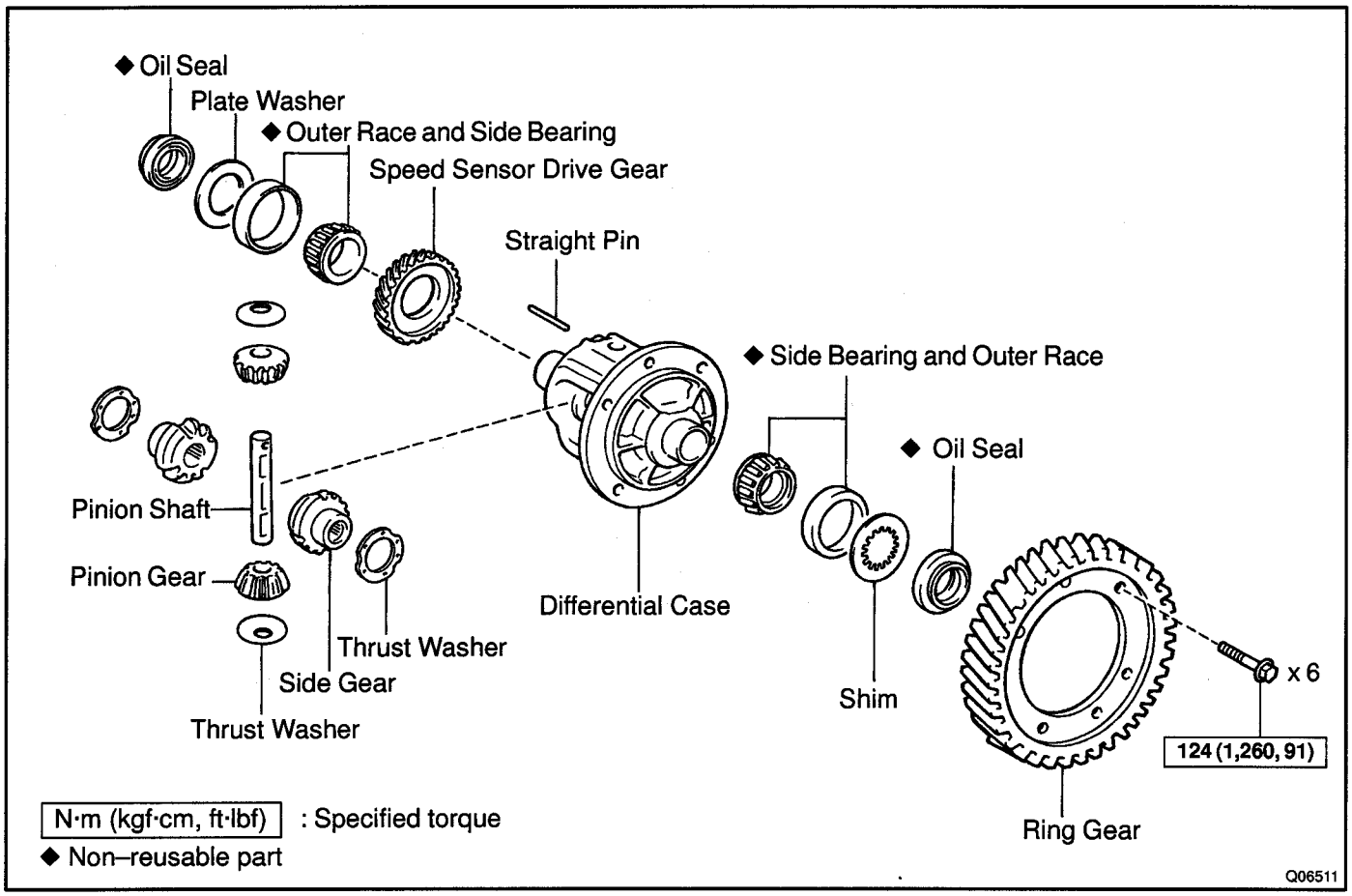
MX077–03



DIFFERENTIAL CASE

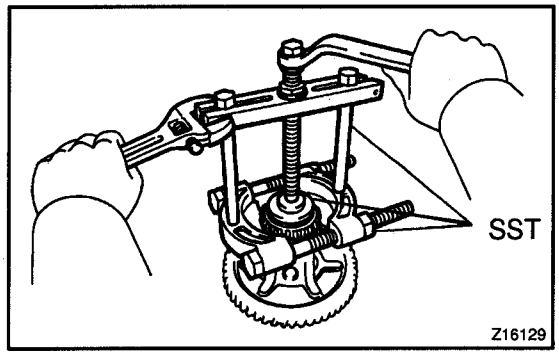
COMPONENTS

MX078-03



MX079-03

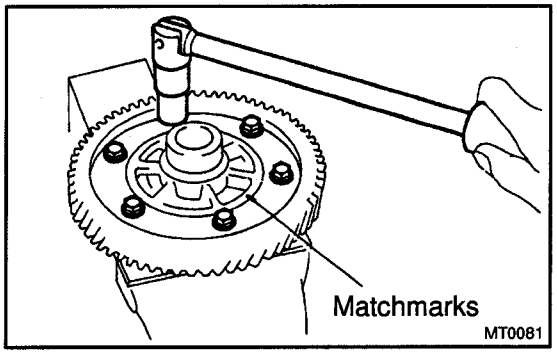
DISASSEMBLY



1. REMOVE SIDE BEARING FROM DIFFERENTIAL CASE

(a) Using SST, remove the bearings from both sides of the differential case.
SST 09950–00020, 09950–00030, 09950–60010 (09951–00360)

(b) Remove the speed sensor drive gear from the RH side.

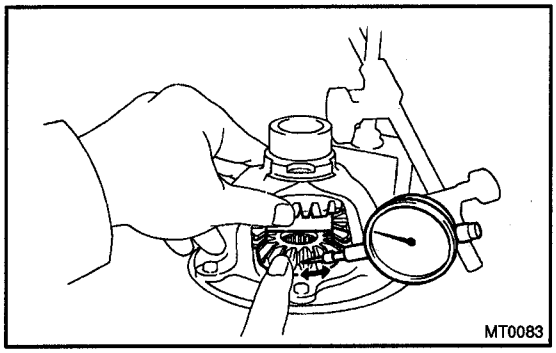


2. REMOVE RING GEAR

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

(b) Remove the 6 bolts.

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

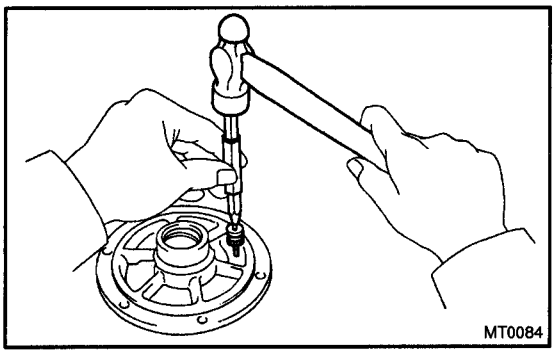


3. INSPECT SIDE GEAR BACKLASH

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.

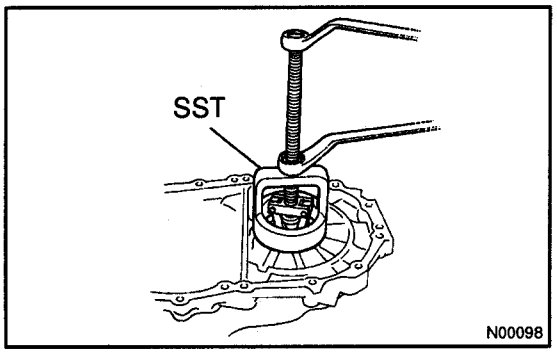


4. DISASSEMBLE DIFFERENTIAL CASE

(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 pinion gears and side gears with the 4 thrust washers from each gear.

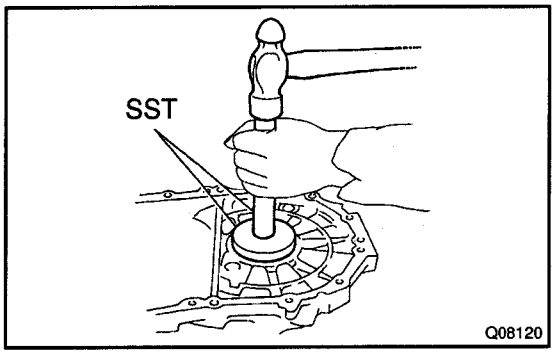


5. Transmission case side: IF NECESSARY, REPLACE OIL SEAL AND SIDE BEARING OUTER RACE

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

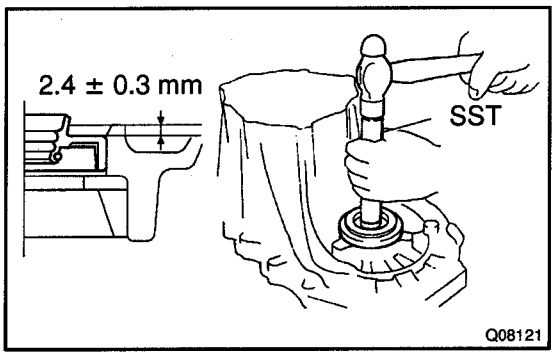
(b) Using SST, pull out the outer race and shim.
SST 09612–65014

(c) Place the shim into the differential case.



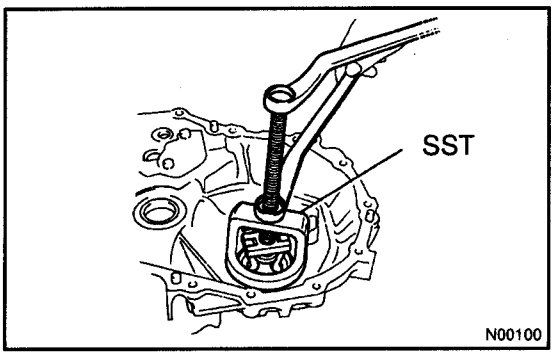
(d) Using SST and a hammer, drive in a new outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)

NOTICE:
When replacing the side bearing outer race, replace the side bearing along with it.



(e) Using SST and a hammer, drive in a new oil seal.
SST 09350–32014 (09351–32111), 09950–70010 (09951–07150)
Drive in depth: 2.4 ± 0.3 mm (0.094 ± 0.012 in.)

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

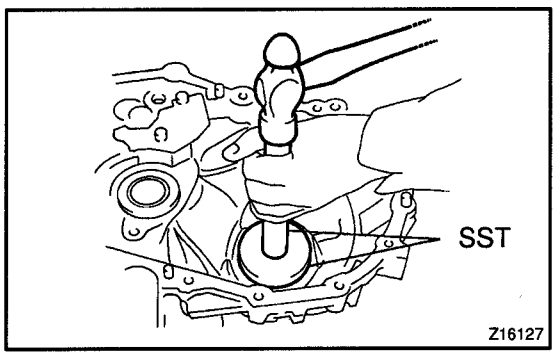


6. Transaxle case side:
IF NECESSARY, REPLACE OIL SEAL AND SIDE BEARING OUTER RACE

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

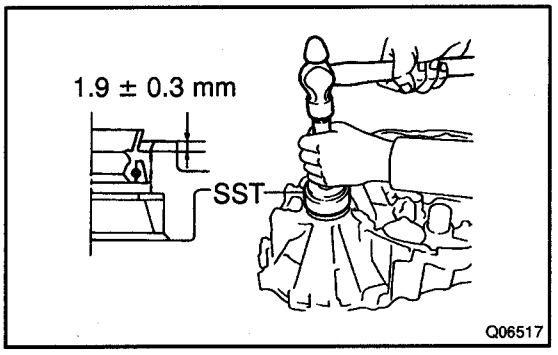
(b) Using SST, pull out the outer race and plate washer.
SST 09612–65014

(c) Place the plate washer into the differential case.



(d) Using SST and a hammer, drive in a new outer race.
SST 09950–60020 (09951–00680), 09950–70010 (09951–07150)

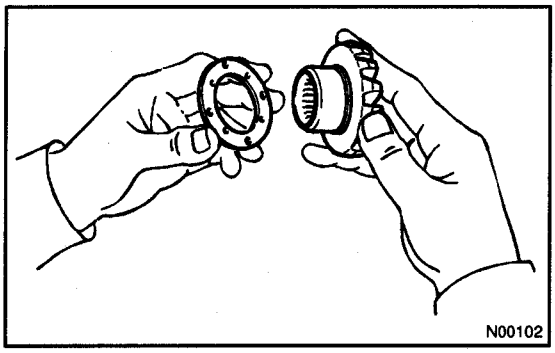
NOTICE:
When replacing the side bearing outer race, replace the side bearing along with it.



(e) Using SST and a hammer, drive in a new oil seal.
SST 09350–32014 (09351–32130, 09351–32150)
Drive in depth: 1.9 ± 0.3 mm (0.075 ± 0.012 in.)

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

MX07A-04


N00102

REASSEMBLY

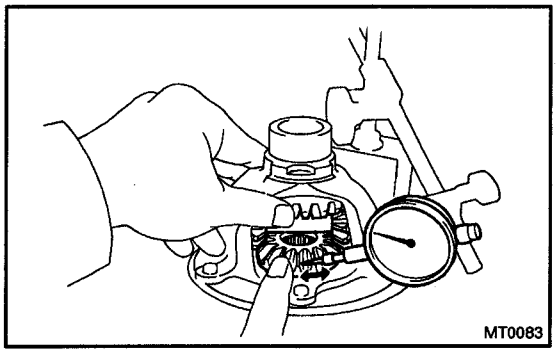
1. ASSEMBLE DIFFERENTIAL CASE

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

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

(c) Install the pinion shaft.


MT0083

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

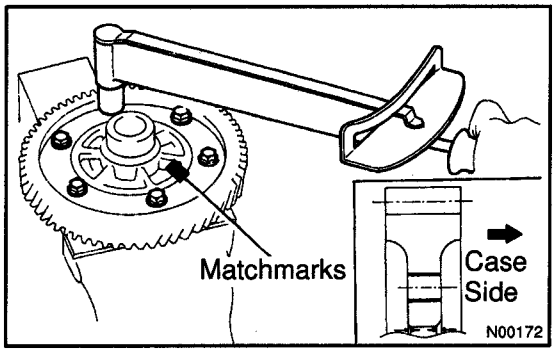
2. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surface of the differential case.

(b) Heat the ring gear in boiling water.

(c) Carefully remove the ring gear from the water.

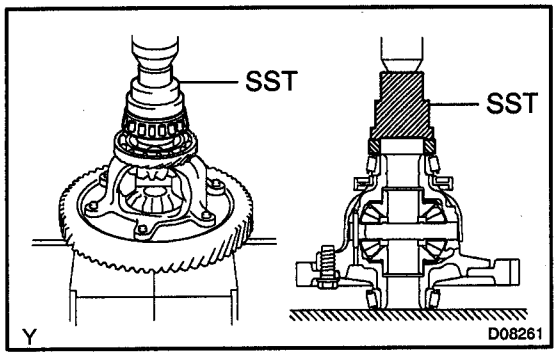
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.



N00172

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

(e) Install the 6 set bolts. Tighten each set bolt uniformly, a little at a time in succession. Torque the bolts.
Torque: 124 N·m (1,260 kgf·cm, 91 ft·lbf)



3. INSTALL SIDE BEARING

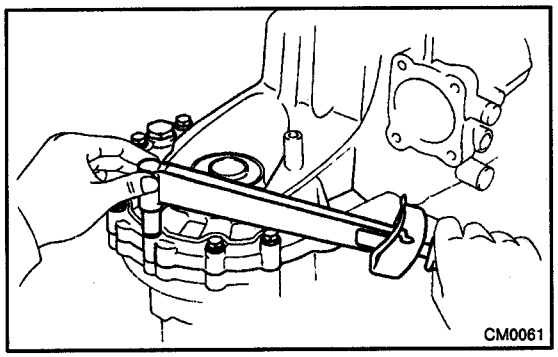
(a) Install the speed sensor drive gear to the RH side.

(b) Using SST and a press, install new side bearings to the both sides of the differential case.

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

NOTICE:

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



4. INSPECT DIFFERENTIAL SIDE BEARING PRELOAD

NOTICE:

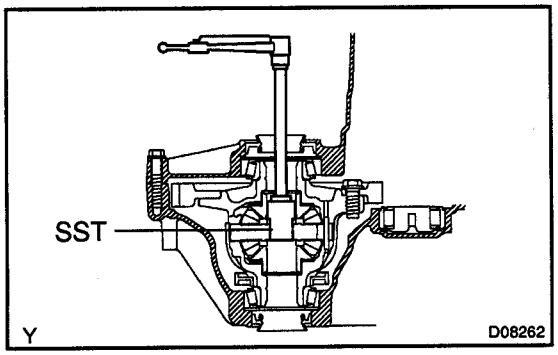
Perform this only when replacing the side bearing and outer race of the differential case.

(a) Install the differential case assembly 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) 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

(e) 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 side bearing with SST (See page MX–39).

(f) Select an appropriate shim.

HINT:
The preload will change by about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 in.·lbf) corresponding to a change of 0.05 mm (0.0020 in.) in shim thickness.

Mark	Thickness mm (in.)	Mark	Thickness mm (in.)
AA	2.10 (0.0827)	LL	2.60 (0.1024)
BB	2.15 (0.0846)	MM	2.65 (0.1043)
CC	2.20 (0.0866)	NN	2.70 (0.1063)
DD	2.25 (0.0886)	PP	2.75 (0.1083)
EE	2.30 (0.0906)	QQ	2.80 (0.1102)
FF	2.35 (0.0925)	RR	2.85 (0.1122)
GG	2.40 (0.0945)	SS	2.90 (0.1142)
HH	2.45 (0.0965)	TT	2.95 (0.1161)
JJ	2.50 (0.0984)	UU	3.00 (0.1181)
KK	2.55 (0.1004)	–	–

SHIFT LEVER AND CONTROL CABLE

MX07B–03

COMPONENTS