

MANUAL TRANSMISSION SYSTEM

MTOBW-02

PRECAUTION

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. 1.2 mm (0.047 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.

TROUBLESHOOTING

MTOBX-02

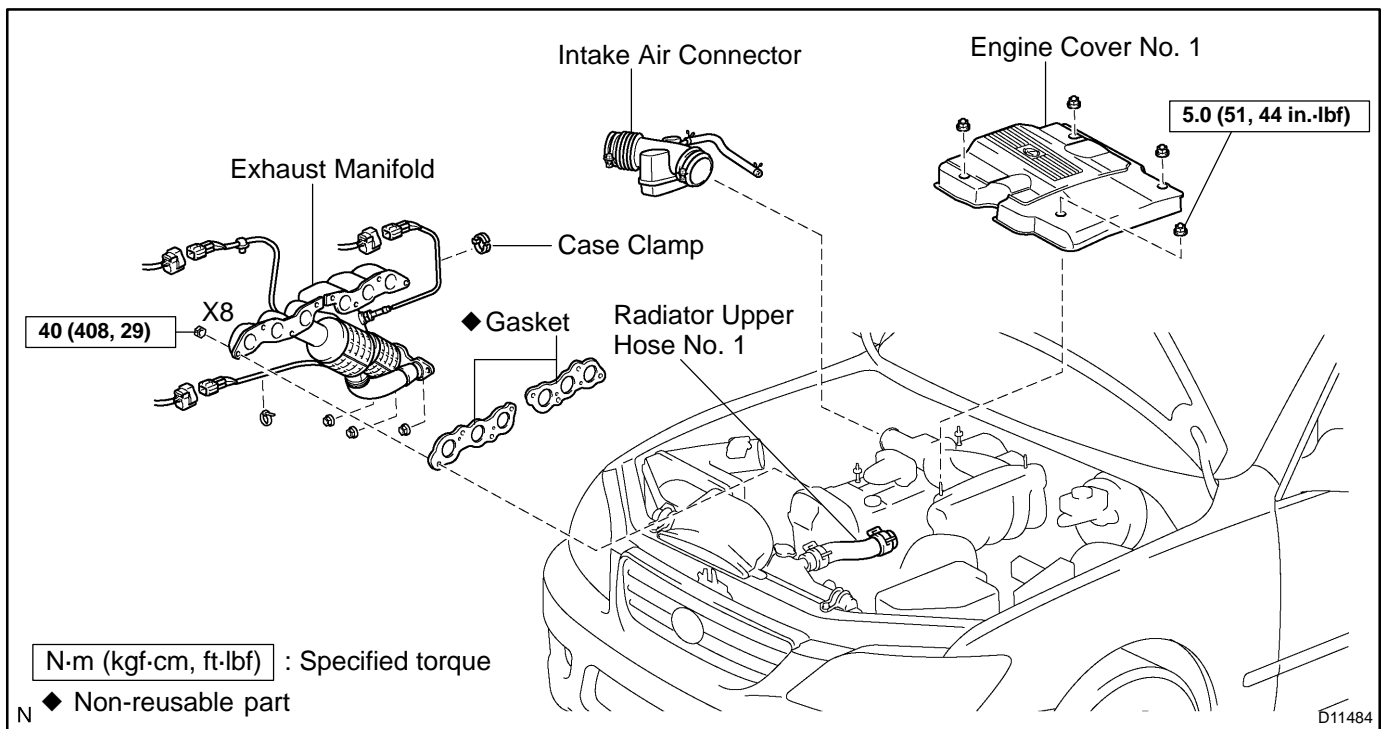
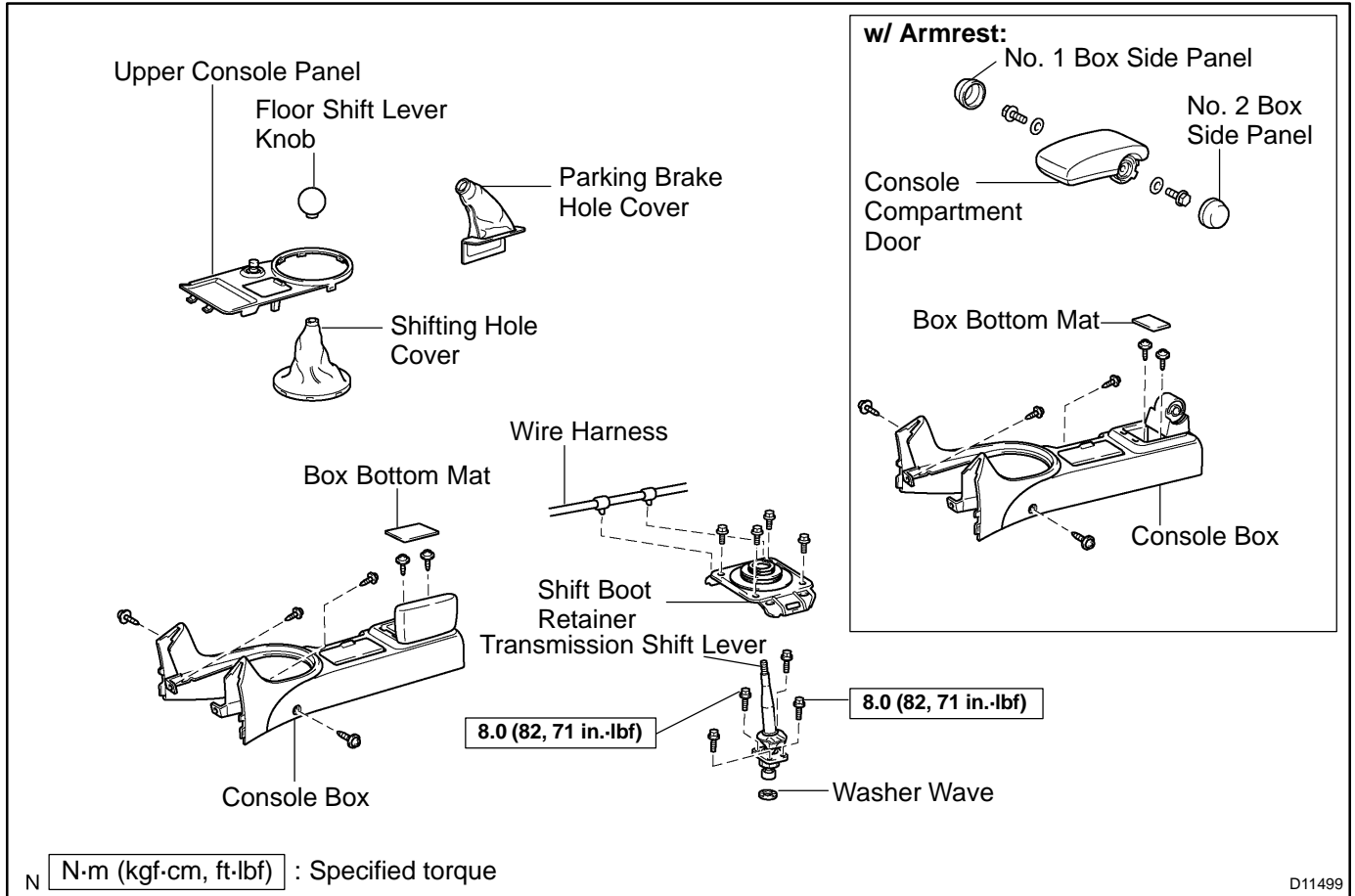
PROBLEM SYMPTOMS TABLE

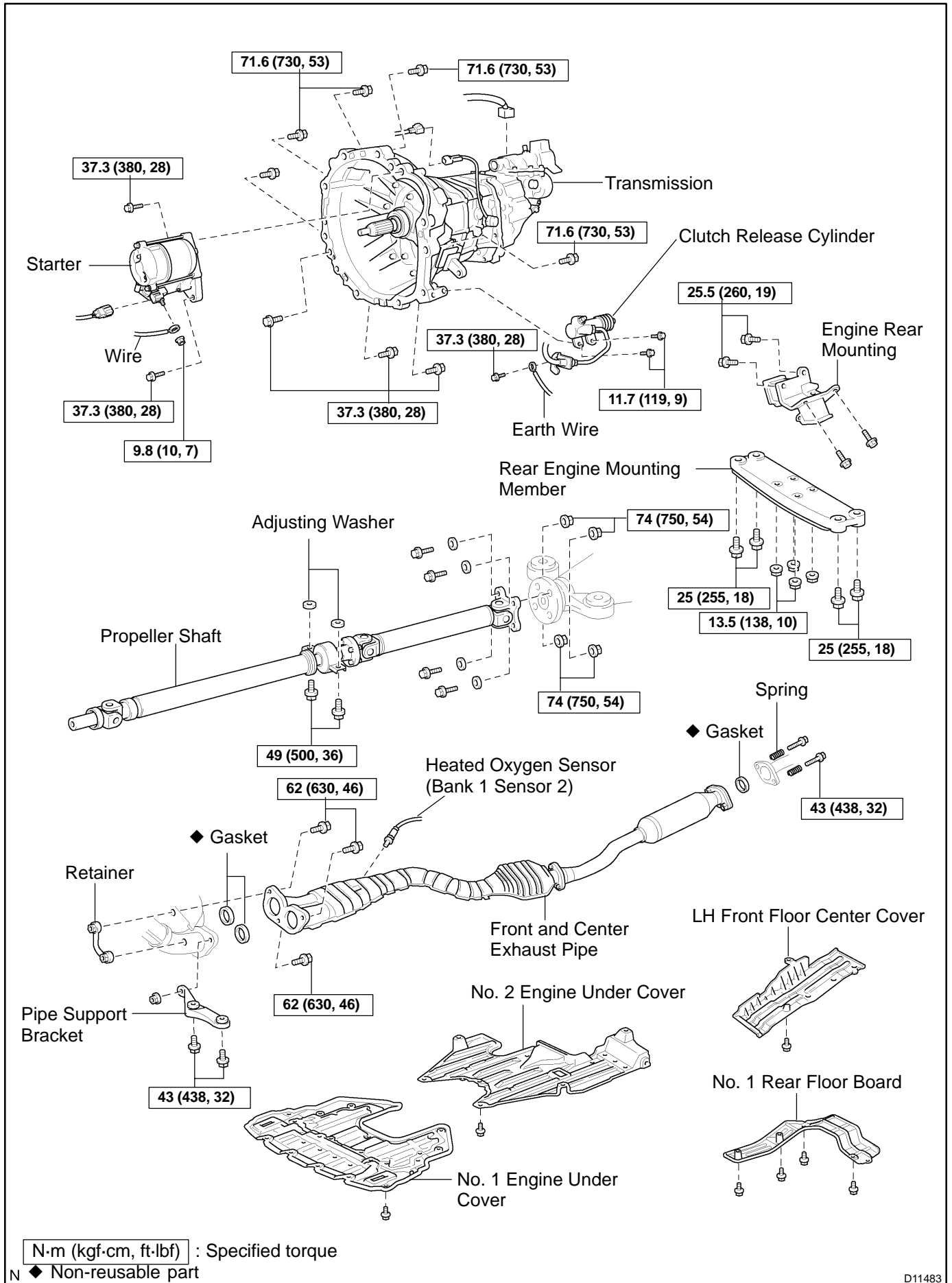
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	<ol style="list-style-type: none"> 1. Oil (Level low) 2. Oil (Wrong) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged) 	MT-8 MT-8 MT-11 MT-11
Oil leakage	<ol style="list-style-type: none"> 1. Oil (Level too high) 2. Gasket (Damaged) 3. Oil seal (Worn or damaged) 4. O-Ring (Worn or damaged) 	MT-8 MT-11 MT-11 MT-11
Hard to shift or will not shift	<ol style="list-style-type: none"> 1. Synchronizer ring (Worn or damaged) 2. Shift key spring (Damaged) 	MT-25 MT-30 MT-38 MT-30 MT-38
Jumps out of gear	<ol style="list-style-type: none"> 1. Locking ball spring (Damaged) 2. Shift fork (Worn) 3. Gear (Worn or damaged) 4. Bearing (Worn or damaged) 	MT-11 MT-11 MT-11 MT-11

MANUAL TRANSMISSION UNIT COMPONENTS

MT0FS-02

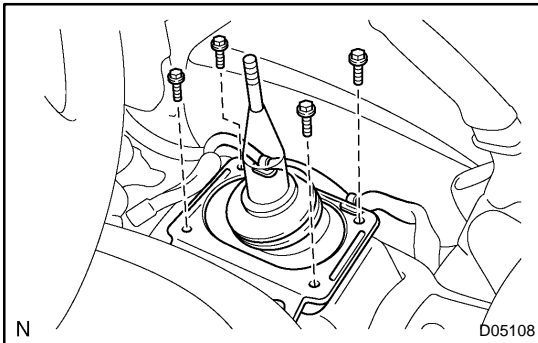




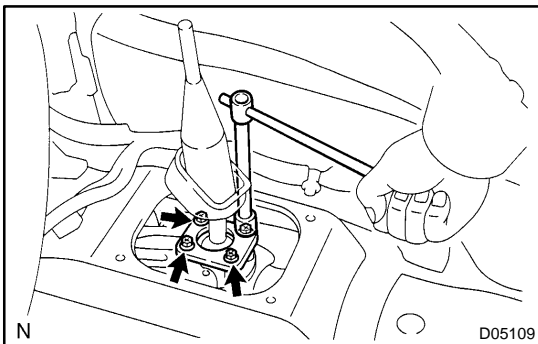
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REMOVAL

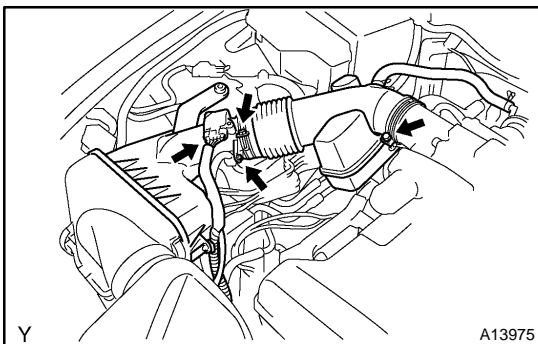
1. REMOVE UPPER CONSOLE PANEL AND CONSOLE BOX (See page [BO-139](#))



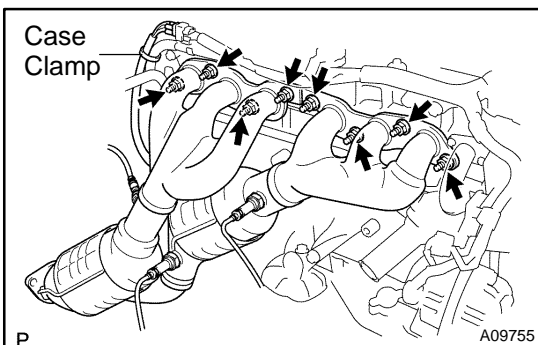
2. REMOVE SHIFT BOOT RETAINER
 - (a) Disconnect the 2 wire harness clamps.
 - (b) Remove the 4 bolts and shift boot retainer.
3. REMOVE SHIFT BOOT



4. REMOVE TRANSMISSION SHIFT LEVER
Remove the 4 bolts, transmission shift lever and washer washer.
5. REMOVE ENGINE COVER NO. 1
6. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS
7. DRAIN ENGINE COOLANT
8. DISCONNECT RADIATOR UPPER HOSE NO. 1 FROM ENGINE



9. REMOVE INTAKE AIR CONNECTOR
 - (a) Disconnect the MAF meter connector.
 - (b) Disconnect the engine wire harness clamp from the air cleaner case.
 - (c) Loosen the 2 hose clamp bolts, remove the intake air connector from the throttle body.



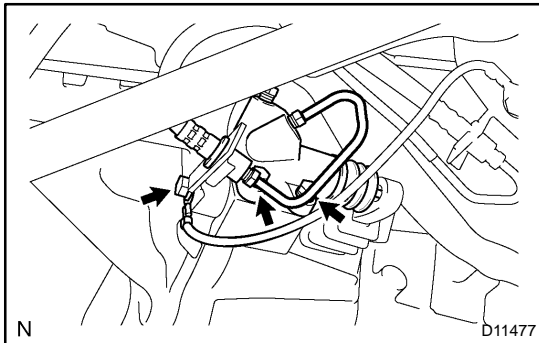
10. REMOVE EXHAUST MANIFOLD
 - (a) Remove the case clamp.
 - (b) Disconnect the heated oxygen sensor (bank 2 sensor 1) connector.
 - (c) Remove the 8 nuts, exhaust manifold and 2 gaskets.
11. RAISE VEHICLE

NOTICE:

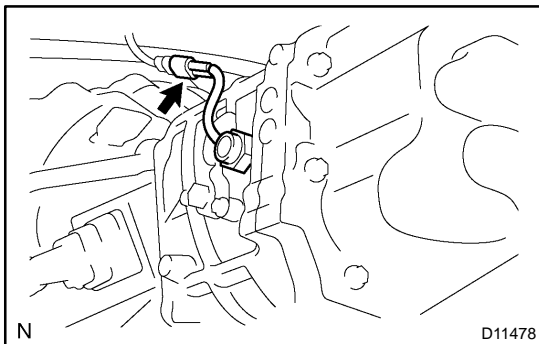
Make sure that the vehicle is securely supported.

12. DRAIN TRANSMISSION OIL

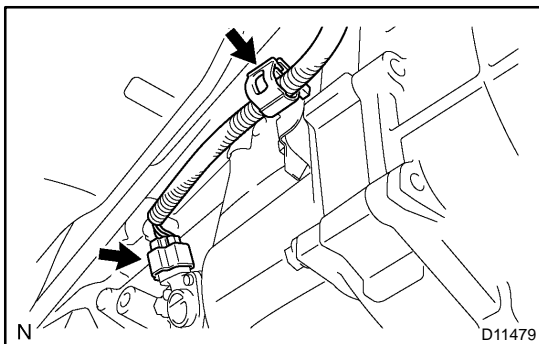
13. REMOVE LH FRONT FLOOR CENTER COVER
14. REMOVE NO. 1 REAR FLOOR BOARD
15. REMOVE FRONT AND CENTER EXHAUST PIPES
(See page [EM-100](#))
16. REMOVE PROPELLER SHAFT (See page [PR-4](#))



17. **DISCONNECT CLUTCH RELEASE CYLINDER, CLUTCH LINE BRACKET AND EARTH WIRE**
 - (a) Remove the 2 bolts and disconnect the clutch release cylinder.
 - (b) Remove the bolt and disconnect the clutch line bracket and earth wire.



18. **DISCONNECT BACK-UP LIGHT SWITCH CONNECTOR**



19. **DISCONNECT SPEED SENSOR CONNECTOR AND WIRE HARNESS**

- (a) Disconnect the connector.
- (b) Disconnect the wire harness from the clamp.

20. **REMOVE STARTER**

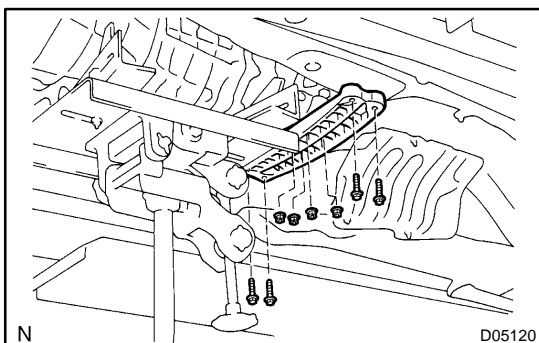
- (a) Disconnect the connector.
- (b) Remove the nut and wire.
- (c) Remove the 2 bolts and starter.

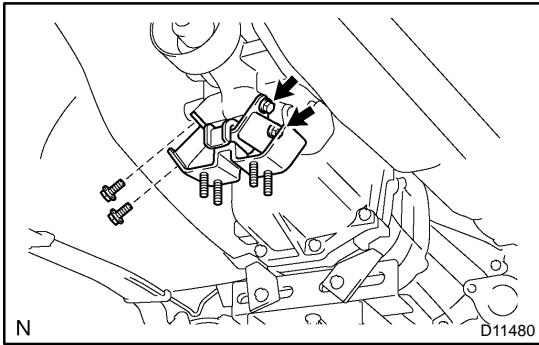
21. **JACK UP TRANSMISSION SLIGHTLY**

Using a transmission jack, support the transmission.

22. **REMOVE REAR ENGINE MOUNTING MEMBER**

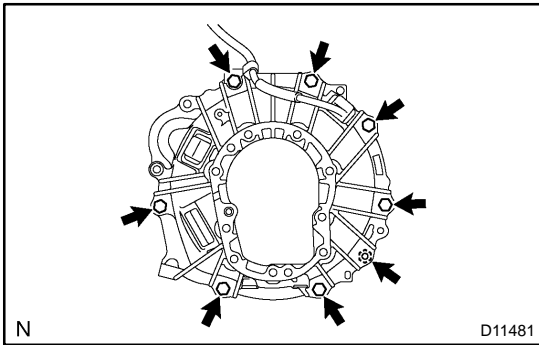
Remove the 4 bolts, 4 nuts and rear engine mounting member.





23. REMOVE ENGINE REAR MOUNTING

Remove the 4 bolts and engine rear mounting.

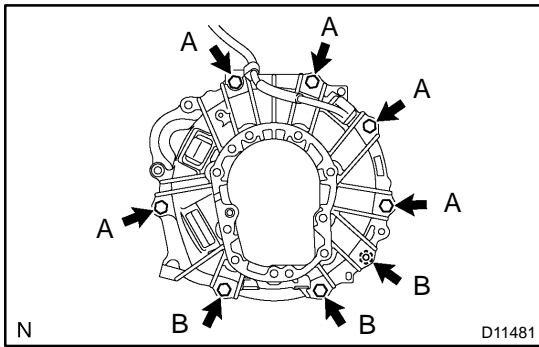


24. REMOVE TRANSMISSION

Remove the 8 bolts, wire harness clamp and transmission.

HINT:

After separating the transmission from the engine, turn the transmission a little in the clockwise. At the condition that the transmission housing does not contact the body, lower the jack.



INSTALLATION

1. INSTALL TRANSMISSION

- (a) Raise the engine front side.
- (b) Align the input spline with a clutch disc and install the transmission to the engine.

HINT:

Turn the transmission a little in the clockwise and jack up until just before the transmission housing touches the body.

- (c) Install the transmission and wire harness clamp with the 8 bolts.

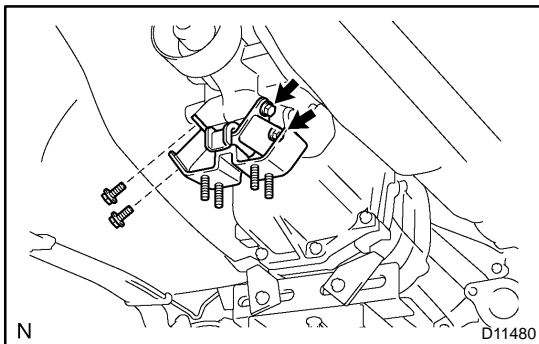
Torque:

Bolt A (12 mm head bolt):

71.6 N·m (730 kgf·cm, 53 ft·lbf)

Bolt B (10 mm head bolt):

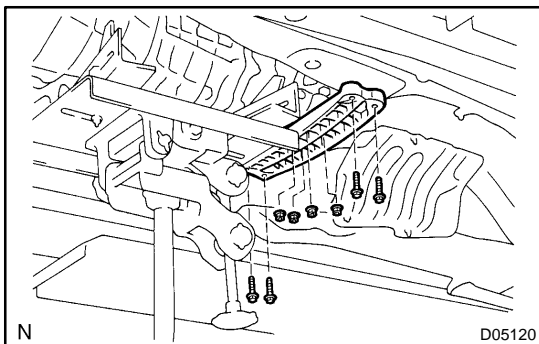
37.3 N·m (380 kgf·cm, 28 ft·lbf)



2. INSTALL ENGINE REAR MOUNTING

Install the engine rear mounting with 4 the bolts.

Torque: 25.5 N·m (260 kgf·cm, 19 ft·lbf)



3. INSTALL REAR ENGINE MOUNTING MEMBER

Install the rear engine mounting member with the 4 bolts and 4 nuts.

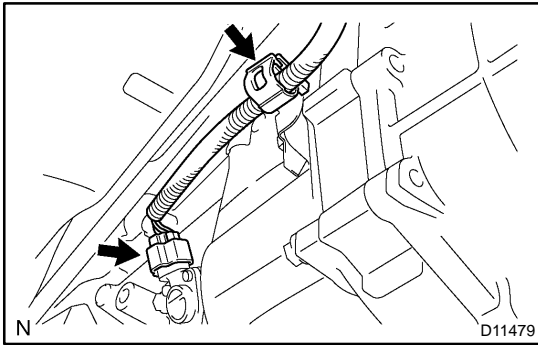
Torque:

Bolt: 25 N·m (255 kgf·cm, 18 ft·lbf)

Nut: 13.5 N·m (138 kgf·cm, 10 ft·lbf)

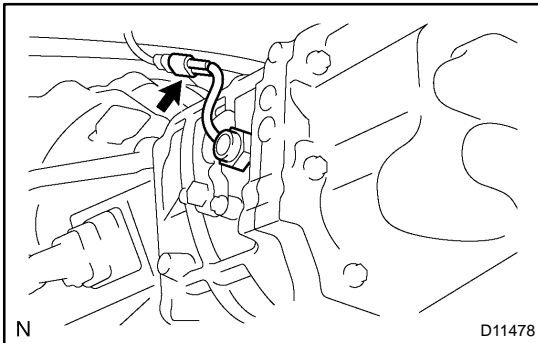
4. INSTALL STARTER

- (a) Install the starter with the 2 bolts.
Torque: 37.3 N·m (380 kgf·cm, 28 ft·lbf)
- (b) Install the wire with the nut.
Torque: 9.8 N·m (10 kgf·cm, 7 ft·lbf)
- (c) Connect the connector.

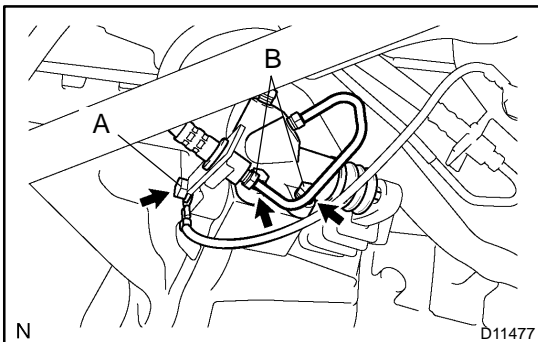


5. CONNECT SPEED SENSOR CONNECTOR AND WIRE HARNESS

- (a) Connect the wire harness to the clamp.
- (b) Connect the connector.



6. CONNECT BACK-UP LIGHT SWITCH CONNECTOR



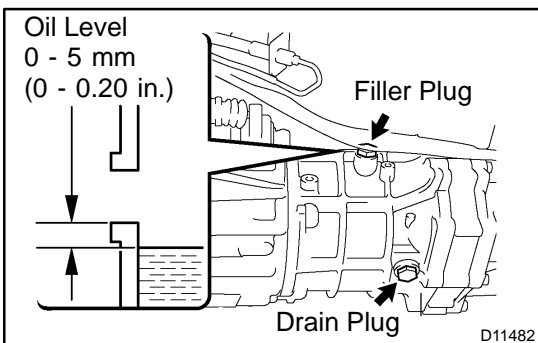
7. CONNECT CLUTCH RELEASE CYLINDER, CLUTCH LINE BRACKET AND EARTH WIRE

- (a) Connect the clutch line and earth wire with the bolt.
Torque:
- (b) Connect the clutch release cylinder with the 2 bolts.

Bolt A: 37.3 N-m (380 kgf-cm, 28 ft-lbf)

Torque:
Bolt B: 11.7 N-m (119 kgf-cm, 9 ft-lbf)

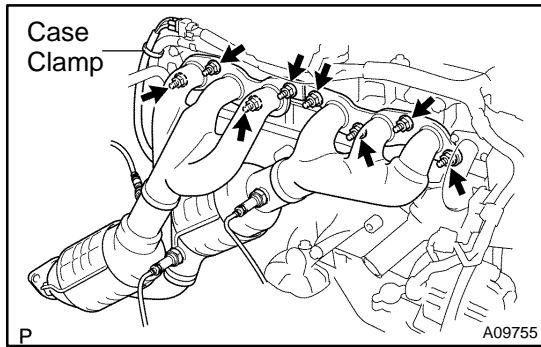
- 8. INSTALL PROPELLER SHAFT (See page PR-10)**
- 9. INSTALL FRONT AND CENTER EXHAUST PIPES (See page EM-100)**



10. FILL WITH TRANSMISSION OIL

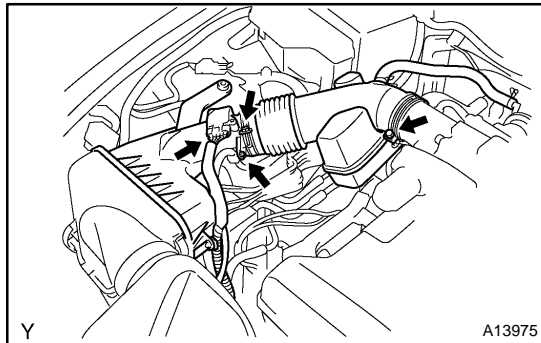
Torque:
Filler and Drain plug:
38 N-m (387 kgf-cm, 28 ft-lbf)
Oil grade: API GL-4 or GL-5
Viscosity: SAE 75W-90
Capacity: 2.6 liter (2.7 US qts, 2.3 Imp. qts)

- 11. INSTALL NO. 1 REAR FLOOR BOARD**
- 12. INSTALL LH FRONT FLOOR CENTER COVER**
- 13. LOWER VEHICLE**



14. INSTALL EXHAUST MANIFOLD

- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.
Torque: 40 N·m (408 kgf·cm, 29 ft·lbf)
- (c) Connect the heated oxygen sensor (bank 2 sensor 1) connector.
- (d) Install the case clamp.



15. INSTALL INTAKE AIR CONNECTOR

- (a) Install the intake air resonator to the throttle body, tighten the 2 hose clamp bolts.
- (b) Connect the PCV hose to the No. 2 cylinder head cover.
- (c) Connect the engine wire harness clamp to the air cleaner case.
- (d) Connect the MAF meter connector.

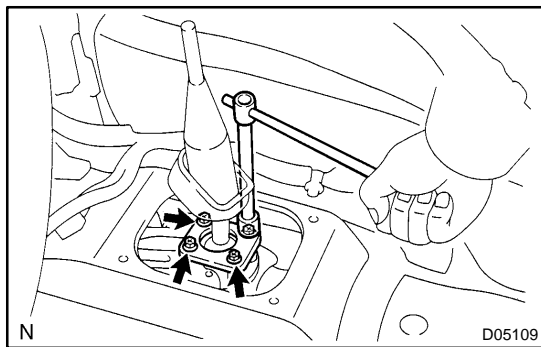
16. CONNECT RADIATOR UPPER HOSE NO. 1 FROM ENGINE

17. FILL WITH ENGINE COOLANT

18. INSTALL ENGINE COVER NO. 1

Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)

19. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

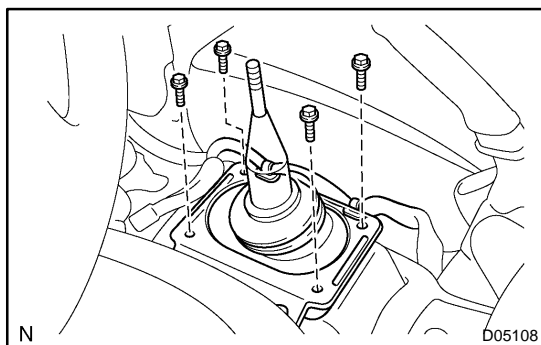


20. INSTALL TRANSMISSION SHIFT LEVER

- (a) Install the washer.
- (b) Apply MP grease to the tip of shift lever.
- (c) Install the shift lever with the 4 bolts.

Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

21. INSTALL SHIFT BOOT



22. INSTALL SHIFT BOOT RETAINER

- (a) Install the shift boot retainer with the 4 bolts.
- (b) Connect the 2 wire harness clamps.

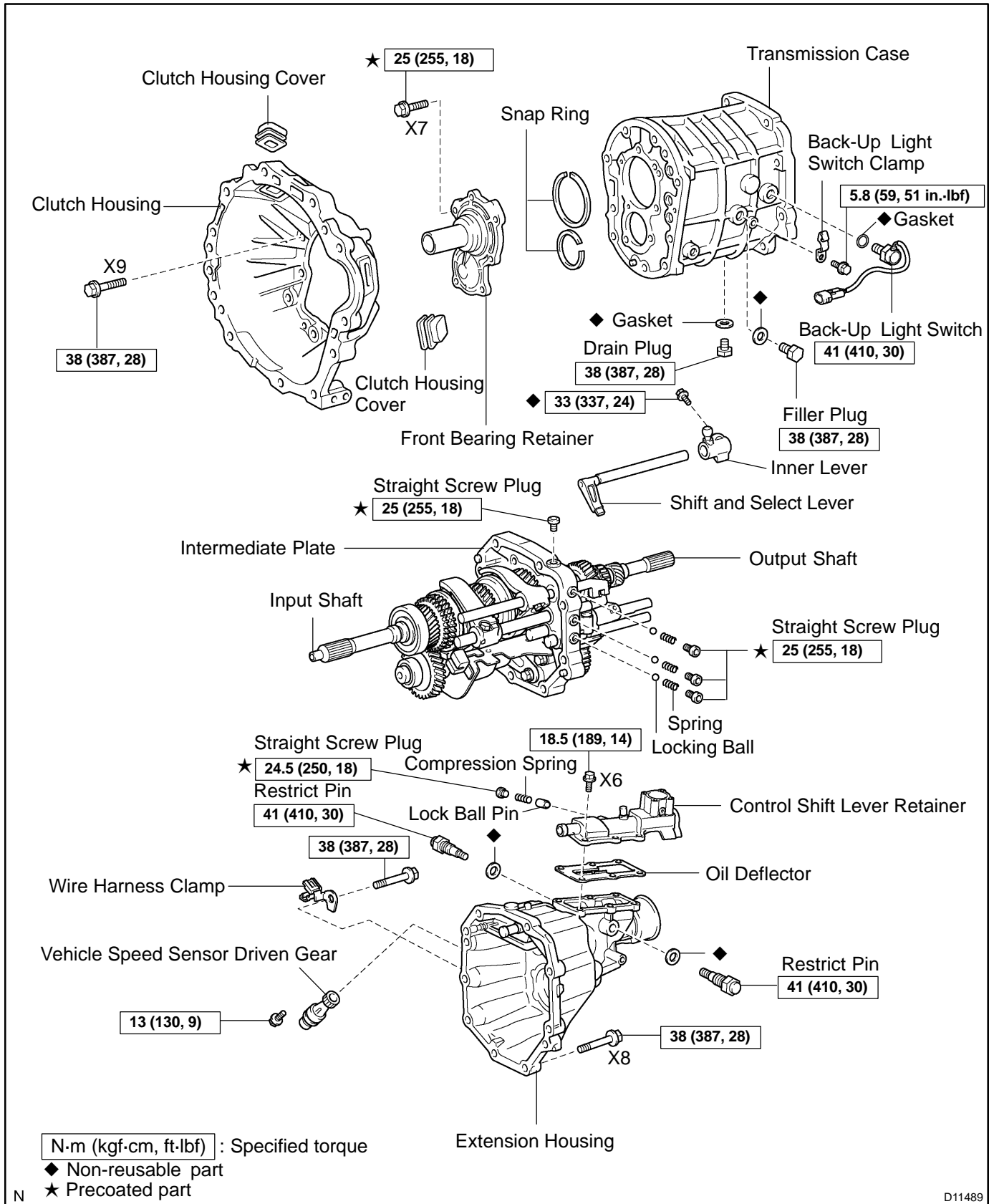
23. INSTALL UPPER CONSOLE PANEL AND CONSOLE BOX (See page BO-149)

24. DO ROAD TEST

Check for abnormal noises and smooth shifting.

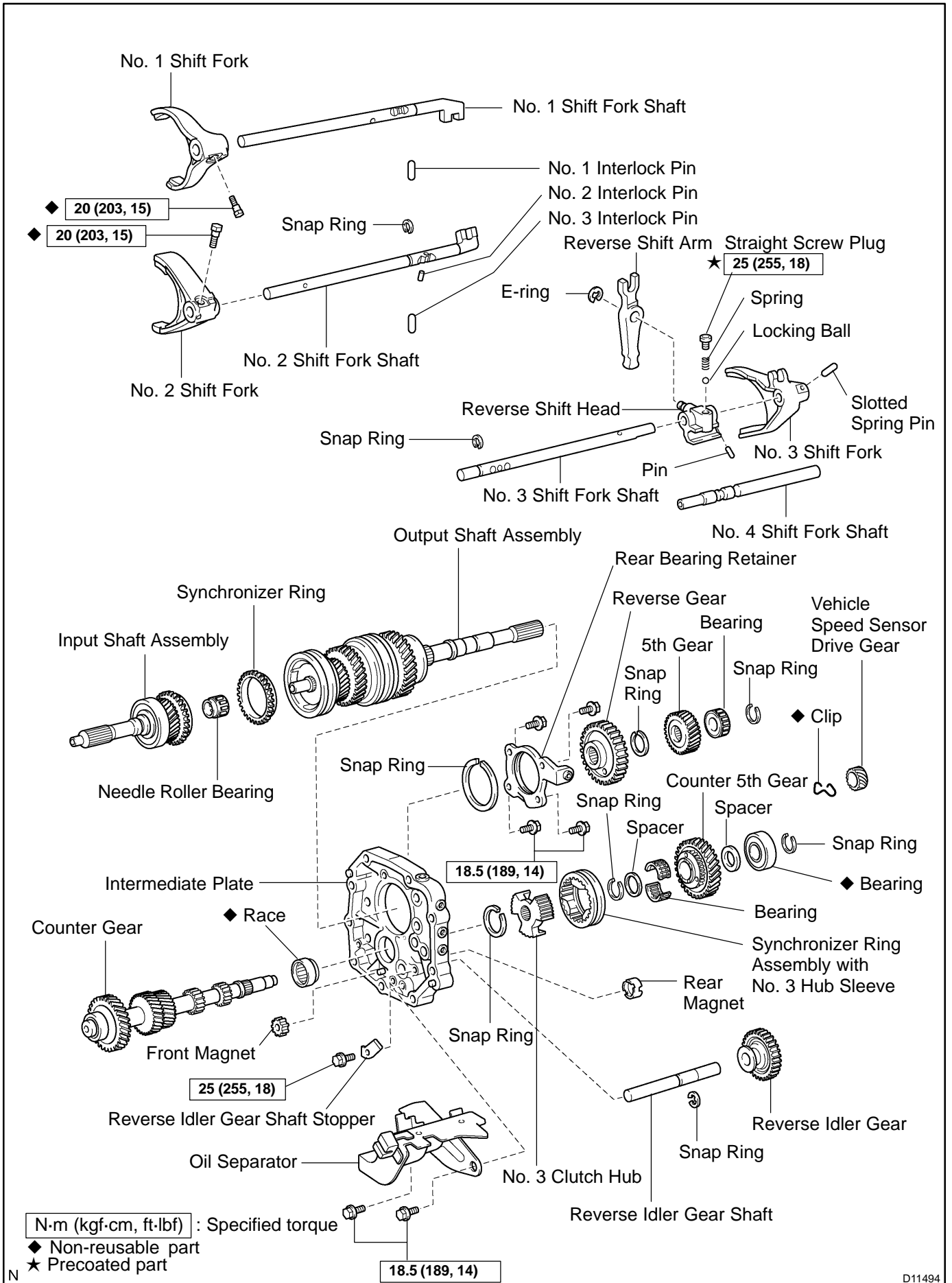
MANUAL TRANSMISSION ASSEMBLY COMPONENTS

MTOC1-03



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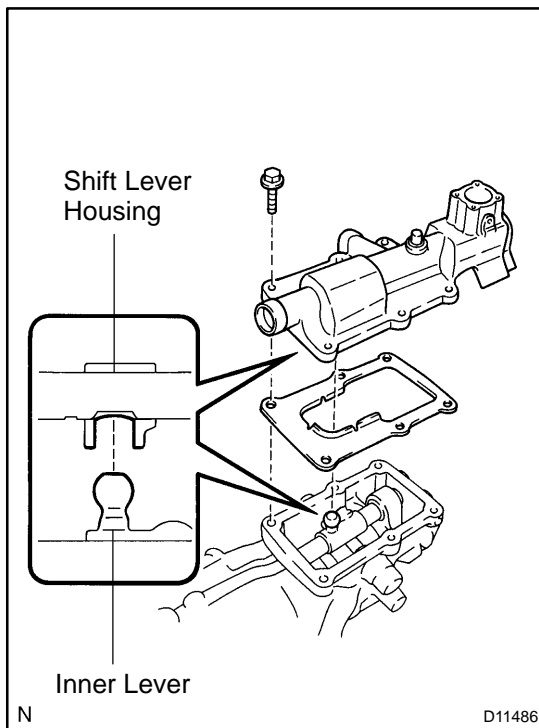


DISASSEMBLY

1. **REMOVE BACK-UP LIGHT SWITCH WITH GASKET**
 - (a) Remove the bolt and disconnect the back-up light switch clamp.
Torque: 5.8 N·m (59 kgf·cm, 51 in.-lbf)
 - (b) Remove the back-up light switch with the gasket.
Torque: 41 N·m (410 kgf·cm, 30 ft-lbf)
2. **REMOVE BOLT AND VEHICLE SPEED SENSOR DRIVEN GEAR**
Torque: 13 N·m (130 kgf·cm, 9 ft-lbf)
3. **REMOVE CLUTCH HOUSING FROM TRANSMISSION CASE**

Remove the 9 bolts and clutch housing.

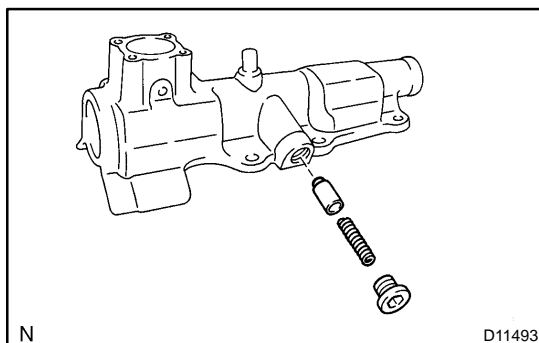
Torque: 38 N·m (387 kgf·cm, 28 ft-lbf)



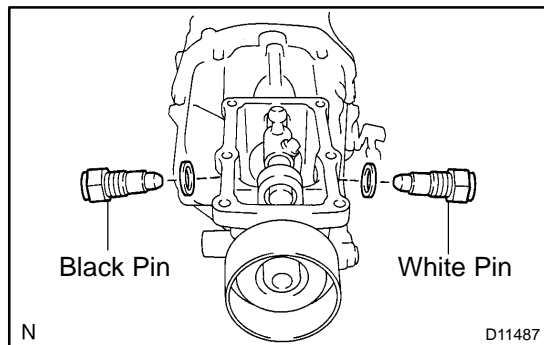
4. **REMOVE CONTROL SHIFT LEVER RETAINER ASSEMBLY**
 - (a) Remove the 6 bolts.
Torque: 18.5 N·m (189 kgf·cm, 14 ft-lbf)
 - (b) Remove the control shift lever retainer assembly and oil deflector.

HINT:

At the time of installation, please refer to the following item. Be sure to spline the small ball portion of inner lever into the shift lever housing.
(At this time, pay attention so that the retainer assy will not move to forth and back.)



- (c) Using a hexagon wrench (10 mm), remove the straight screw plug.
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 24.5 N·m (250 kgf·cm, 18 ft-lbf)
- (d) Using a magnetic finger, remove the compression spring and lock ball pin.



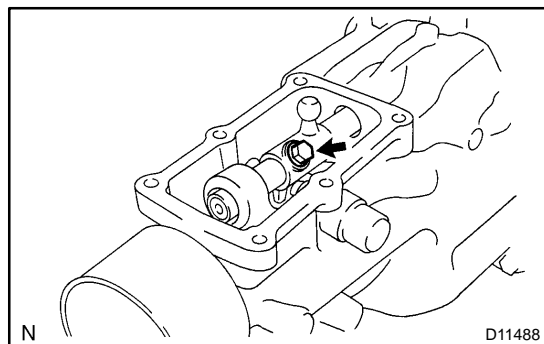
5. REMOVE 2 RESTRICT PINS AND GASKETS

- (a) Remove the restrict pin (color: black) with the gasket.
Torque: 41 N·m (418 kgf-cm, 30 ft-lbf)

HINT:

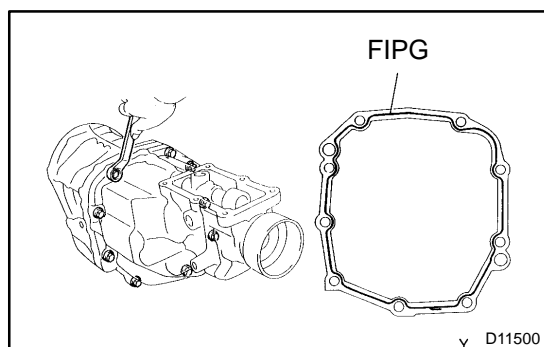
Install the black pin on the reverse gear/5th gear side.

- (b) Remove the restrict pin (color: white) with the gasket.
Torque: 41 N·m (418 kgf-cm, 30 ft-lbf)



6. REMOVE EXTENSION HOUSING

- (a) Remove the shift lever housing set bolt.
Torque: 33 N·m (337 kgf-cm, 24 ft-lbf)



- (b) Remove the 9 bolts and wire harness clamp from the extension housing.

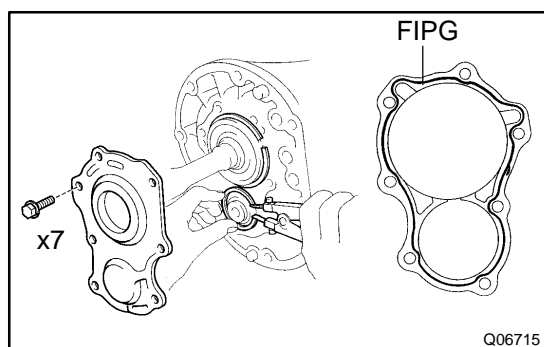
Torque: 38 N·m (387 kgf-cm, 28 ft-lbf)

- (c) Using a plastic hammer, carefully tap the extension housing.

- (d) Pull out the extension housing and inner lever.

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

7. REMOVE SHIFT AND SELECT LEVER



8. REMOVE FRONT BEARING RETAINER AND BEARING SNAP RING

- (a) Remove the 7 bolts.

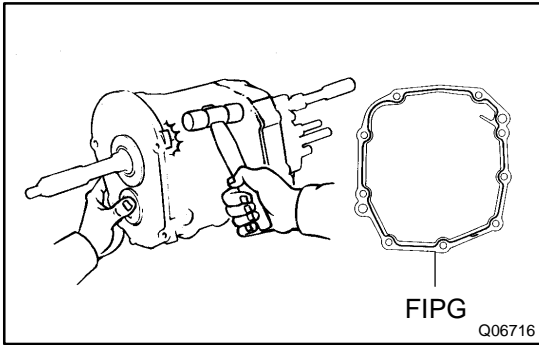
Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

Torque: 25 N·m (255 kgf-cm, 18 ft-lbf)

- (b) Remove the front bearing retainer.

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

- (c) Using a snap ring expander, remove the 2 bearing snap rings.



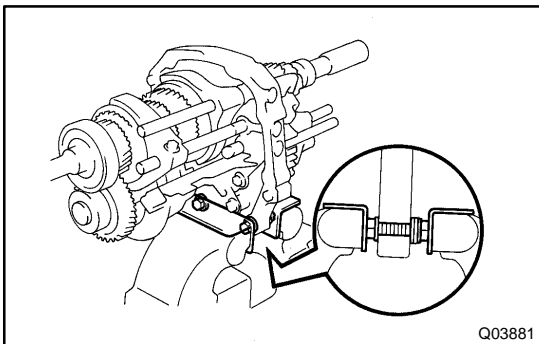
9. SEPARATE INTERMEDIATE PLATE FROM TRANSMISSION CASE

- (a) Using a plastic hammer, carefully tap the transmission case.
- (b) Pull the transmission case from the intermediate plate.

HINT:

At the time of installation, please refer to the following item. Align each bearing outer race and each shift fork shaft end with the case holes.

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



10. MOUNT INTERMEDIATE PLATE IN VISE

- (a) Use the 2 long clutch housing bolts, plate washers and suitable nuts, as shown.

NOTICE:

Increase or decrease plate washers so that the bolt tip does not protrude from the nut.

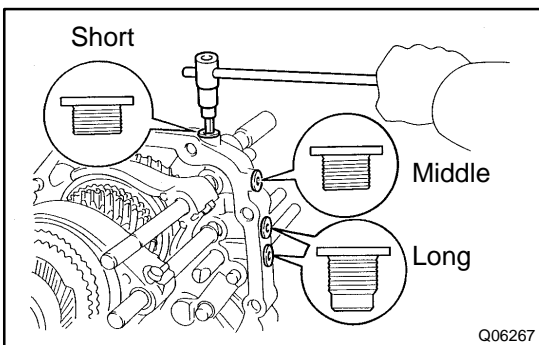
- (b) Mount the intermediate plate in a vise.

11. REMOVE OIL SEPARATOR

Remove the 2 bolts and oil separator.

Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)

12. REMOVE FRONT MAGNET



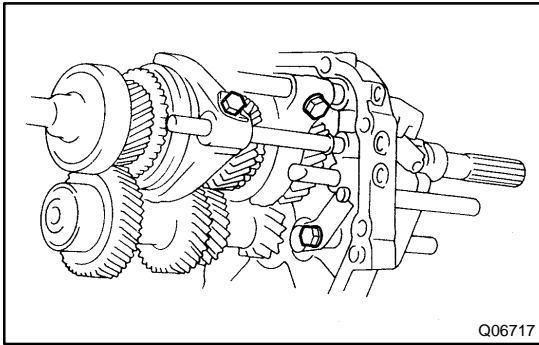
13. REMOVE LOCKING BALL AND SPRING

- (a) Using a hexagon wrench (6 mm), remove the 4 straight screw plugs.

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

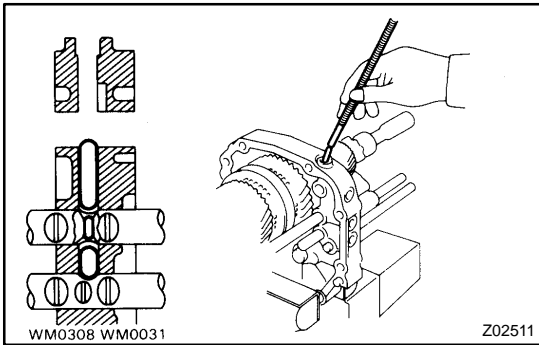
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

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



14. REMOVE SHIFT FORK, SHIFT FORK SHAFT AND REVERSE IDLER GEAR

- (a) Remove the No. 1 and No. 2 shift forks set bolts.
Torque: 20 N·m (203 kgf·cm, 15 ft·lbf)
- (b) Remove the bolt and reverse idler gear shaft stopper.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
- (c) Remove the reverse idler gear and shaft with the snap ring.
- (d) Remove the No. 1 shift fork and shaft.

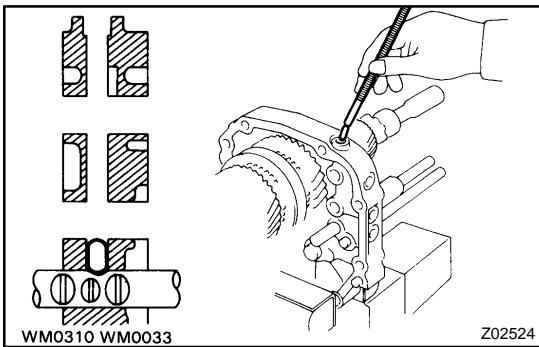


- (e) Using a magnetic finger, remove the No. 1 and No. 2 interlock pins.

HINT:

At the time of installation, please refer to the following item.
Apply MP grease to the No. 1 and No. 2 interlock pins.

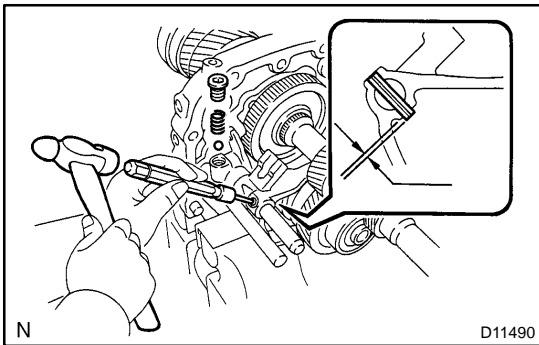
- (f) Using 2 screwdrivers and a hammer, tap out the No. 2 shift fork shaft snap ring.
- (g) Remove the No. 2 shift fork and shaft.



- (h) Using a magnetic finger, remove the No. 3 interlock pin.

HINT:

At the time of installation, please refer to the following item.
Apply MP grease to the No. 3 interlock pin.



- (i) Using a pin punch (5 mm) and hammer, drive out the No. 3 shift fork pin.

HINT:

At the time of installation, please refer to the following item.
Using a pin punch (5 mm) and a hammer, install the No. 3 shift fork pin.

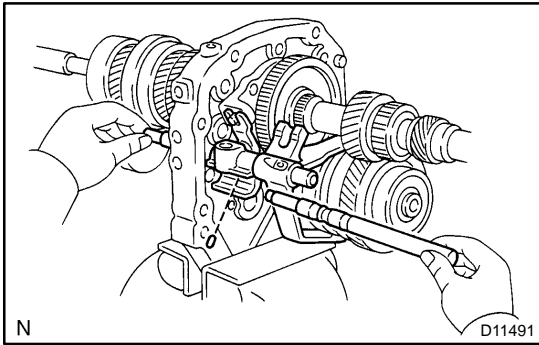
Drive in depth: 0 - 0.5 mm (0 - 0.020 in.)

- (j) Using a hexagon wrench (6 mm), remove the straight screw plug.

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

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

- (k) Using a magnetic finger, remove the spring and ball.



- (l) Pull out the No. 4 shift fork shaft.
- (m) Remove the pin from the reverse shift head.

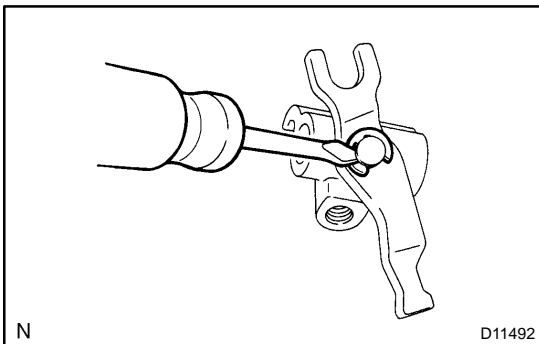
HINT:

At the time of installation, please refer to the following item.
Apply MP grease to the pin.

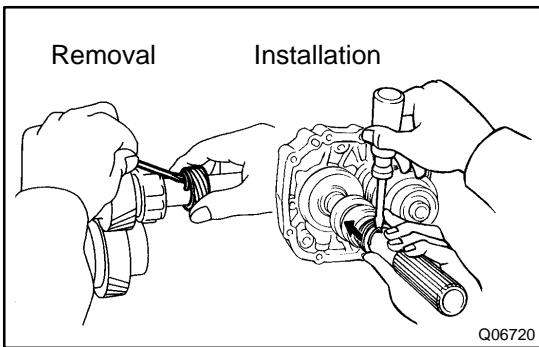
- (n) Remove the No. 3 shift fork, fork shaft and reverse shift arm with the snap ring.

HINT:

At the time of installation, please refer to the following item.
Align the No. 3 shift fork with the No. 3 hub sleeve groove, put the reverse shift arm into the pivot of bearing retainer and align the reverse shift arm shoe with the reverse idler gear groove.

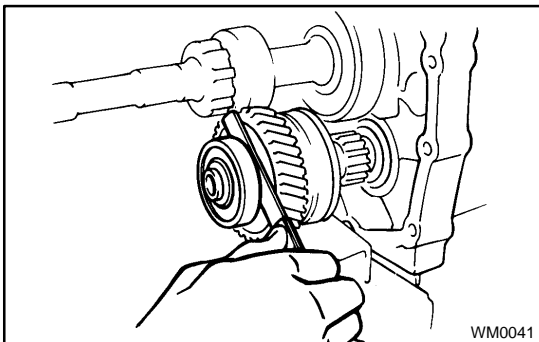


- (o) Using a screwdriver, remove the E-ring, separate the reverse shift head and reverse shift arm.



15. REMOVE VEHICLE SPEED SENSOR DRIVE GEAR

Pry out both ends of the clip and remove the drive gear.



16. INSPECT COUNTER 5TH GEAR THRUST CLEARANCE

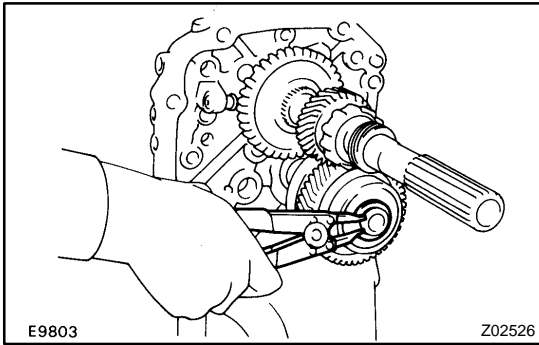
Using a feeler gauge, measure the counter 5th gear thrust clearance.

Standard clearance:

0.10 - 0.41 mm (0.0039 - 0.0161 in.)

Maximum clearance:

0.41 mm (0.0161 in.)



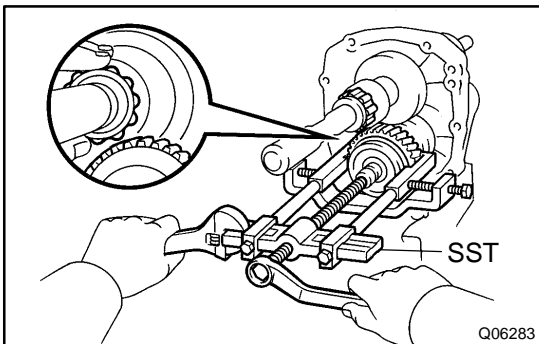
17. REMOVE COUNTER REAR BEARING, SPACER, COUNTER 5TH GEAR AND NEEDLE ROLLER BEARING

(a) Using a snap ring expander, remove the snap ring.

HINT:

At the time of installation, please refer to the following item. Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
1	1.90 - 1.95 (0.0748 - 0.0768)
2	1.96 - 2.01 (0.0772 - 0.0791)
3	2.02 - 2.07 (0.0795 - 0.0815)
4	2.08 - 2.13 (0.0819 - 0.0839)
5	2.14 - 2.19 (0.0843 - 0.0862)
6	2.20 - 2.25 (0.0866 - 0.0886)
7	2.26 - 2.31 (0.0890 - 0.0909)

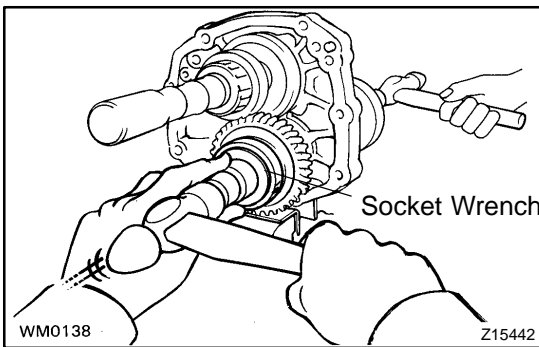


(b) Using SST, remove the rear bearing, spacer, counter 5th gear and bearing.

SST 09950- 40011 (09951- 04020,09953- 04030, 09954- 04010, 09955- 04051, 09957- 04010, 09958-0401 1)

NOTICE:

Be careful not to catch the output shaft rear bearing roller on the counter 5th gear.

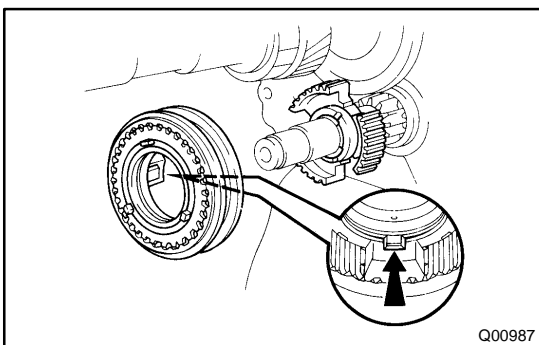


(c) Remove the spacer.

HINT:

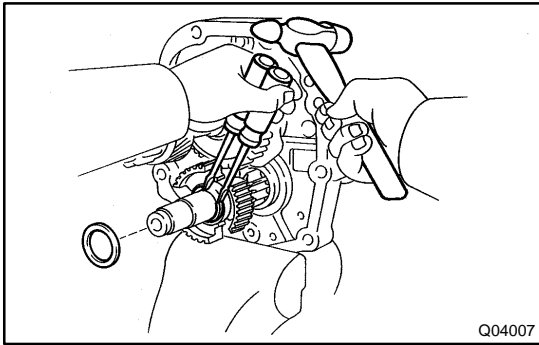
At the time of installation, please refer to the following items.

- Install the counter 5th gear with the 5th gear gaps aligned with the synchronizer cone ring pin.
- Using a socket wrench and hammer, drive in the bearing.
- When driving in the bearing support the counter shaft in front with a 1.4 - 2.3 kg (3 - 5 lb) hammer or equivalent.



18. REMOVE SYNCHRONIZER RING ASSEMBLY WITH NO. 3 HUB SLEEVE AND NO. 3 CLUTCH HUB

(a) Remove the synchronizer ring assembly with the No. 3 hub sleeve from the No. 3 clutch hub.

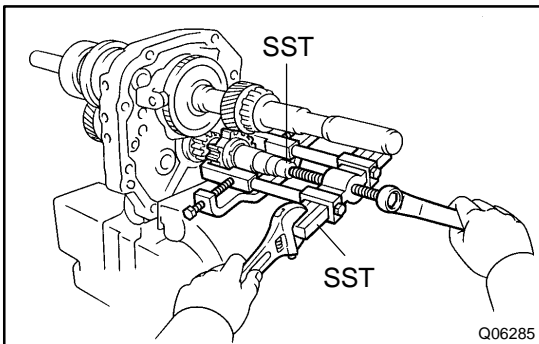


- (b) Remove the spacer.
- (c) Using 2 screwdrivers and a hammer, tap out the snap ring.

HINT:

At the time of installation, please refer to the following item.
Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
2	2.06 - 2.11 (0.0811 - 0.0831)
3	2.12 - 2.17 (0.0835 - 0.0854)
4	2.18 - 2.23 (0.0858 - 0.0878)
5	2.24 - 2.29 (0.0882 - 0.0902)

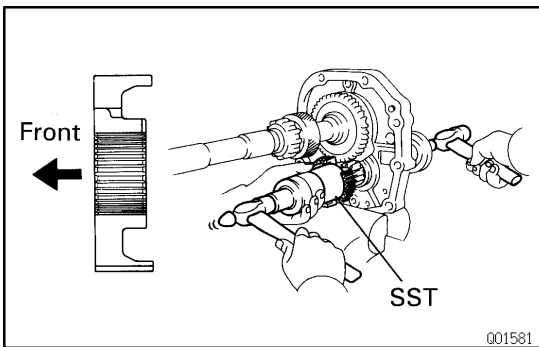


- (d) Using SST, remove the No. 3 clutch hub.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04051, 09957-04010, 09958-04011)
09950-60010 (09951-00200)

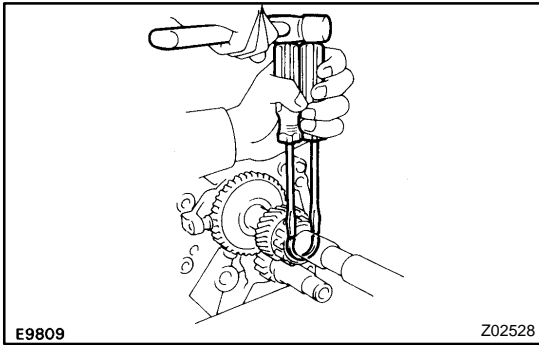
HINT:

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

- Using SST and a hammer, drive in the No. 3 clutch hub.
SST 09316-6001 1 (09316-00011, 09316-00071)
- When installing the No. 3 clutch hub, support the counter shaft in front with a 1.4 - 2.3 kg (3 - 5 lb) hammer or equivalent.



19. REMOVE REAR MAGNET



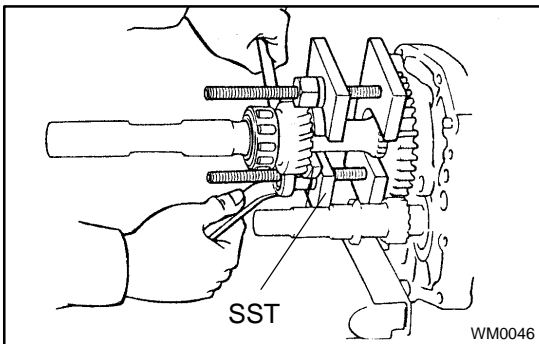
20. REMOVE OUTPUT SHAFT REAR BEARING AND 5TH GEAR

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

HINT:

At the time of installation, please refer to the following item. Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
8	2.31 - 2.36 (0.0909 - 0.0929)
9	2.37 - 2.42 (0.0933 - 0.0953)
10	2.43 - 2.48 (0.0957 - 0.0976)
11	2.49 - 2.54 (0.0980 - 0.1000)
12	2.55 - 2.60 (0.1004 - 0.1024)
13	2.61 - 2.66 (0.1028 - 0.1047)
14	2.68 - 2.73 (0.1055 - 0.1075)
15	2.74 - 2.79 (0.1079 - 0.1098)

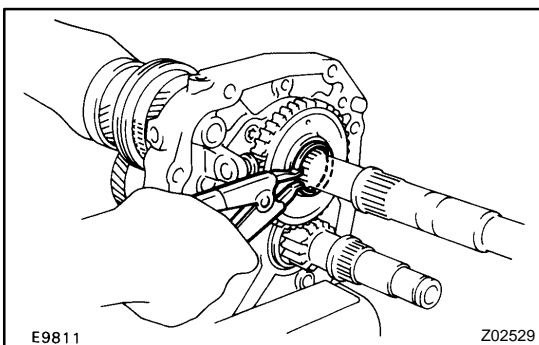
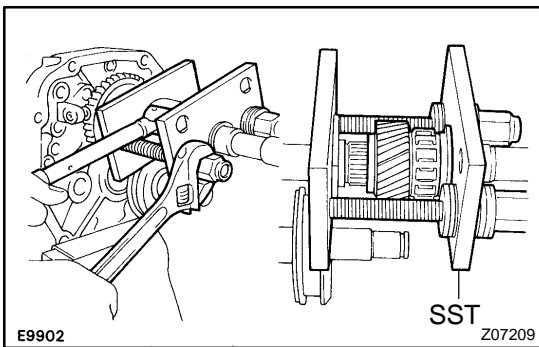


- (b) Using SST, remove the rear bearing and 5th gear.
SST 09312-20012 (09313-00030, 09313-00040, 09313-00050)

HINT:

At the time of installation, please refer to the following item. Using SST, install the 5th gear and rear bearing.

- SST 09312-20012 (09313-00010, 09313-00030, 09313-00040, 09313-00050)



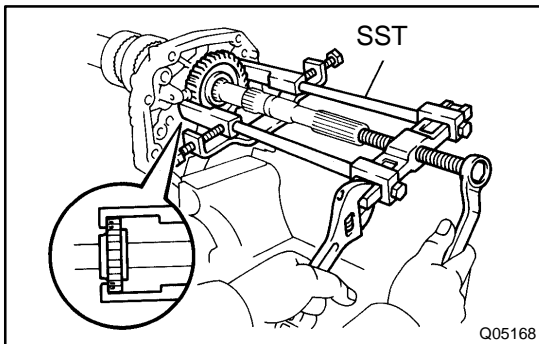
21. REMOVE REVERSE GEAR

- (a) Using a snap ring expander, remove the snap ring.

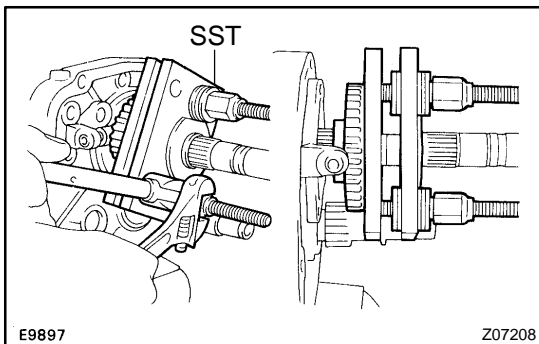
HINT:

At the time of installation, please refer to the following item.
Select a snap ring that will allow minimum axial play.

Mark	Thickness mm (in.)
5	2.25 - 2.30 (0.0886 - 0.0906)
11	2.30 - 2.35 (0.0906 - 0.0925)
12	2.35 - 2.40 (0.0925 - 0.0945)
13	2.40 - 2.45 (0.0945 - 0.0965)
14	2.45 - 2.50 (0.0965 - 0.0984)
15	2.50 - 2.55 (0.0984 - 0.1004)
16	2.55 - 2.60 (0.1004 - 0.1024)
17	2.61 - 2.66 (0.1028 - 0.1047)
18	2.67 - 2.72 (0.1051 - 0.1071)
19	2.73 - 2.78 (0.1075 - 0.1094)
20	2.79 - 2.84 (0.1098 - 0.1118)
21	2.85 - 2.90 (0.1122 - 0.1142)
22	2.91 - 2.96 (0.1146 - 0.1165)
23	2.97 - 3.02 (0.1169 - 0.1189)



- (b) Using SST, remove the reverse gear.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04040, 09955-04051, 09958-04011)



HINT:

At the time of installation, please refer to the following item.
Using SST, install the reverse gear.

- SST 09312-20012 (09313-00030, 09313-00040, 09313-00050)

22. REMOVE REAR BEARING RETAINER

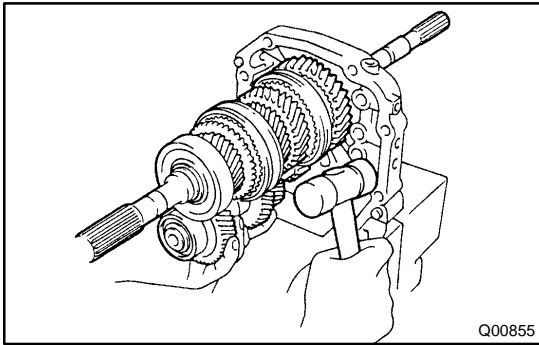
- (a) Using a torx socket wrench (T40), unscrew the 4 torx screws and remove the rear bearing retainer.

Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)

- (b) Using a snap ring expander, remove the 2 snap rings.

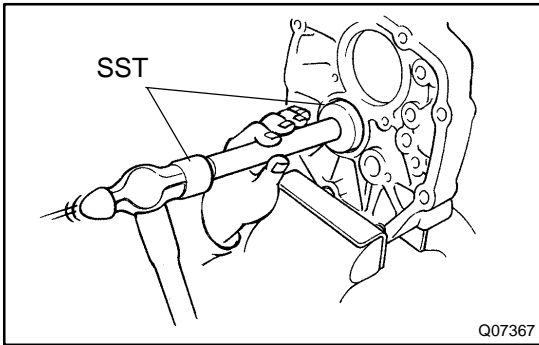
HINT:

At the time of installation, please refer to the following item.
Be sure the snap ring is flush with the intermediate plate surface.



23. REMOVE OUTPUT SHAFT AND COUNTER GEAR FROM INTERMEDIATE PLATE

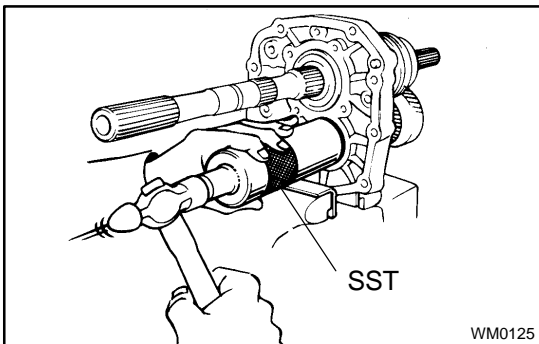
- (a) Remove the output shaft, input shaft and counter gear as a unit from the intermediate plate by pulling on the counter gear and tapping on the intermediate plate with a plastic hammer.
- (b) Remove the input shaft from the output shaft.



HINT:

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

- Before installing the output shaft, use SST to remove the counter gear center bearing outer race.
SST 09950-60010 (09951-00510), 09950-70010 (09951-07150)
- Install the outer race after installing the counter gear.
- Install the output shaft into the intermediate plate by pulling on the output shaft and tapping on the intermediate plate.



HINT:

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

- Apply gear oil to the needle roller bearing.
- Install the needle roller bearing to the input shaft.
- Install the input shaft and counter gear together.
- Using SST and a hammer, install the counter gear center bearing outer race.
SST 09316-6001 1 (09316-00011)
- Be careful not to damage the bearing rollers.

REASSEMBLY

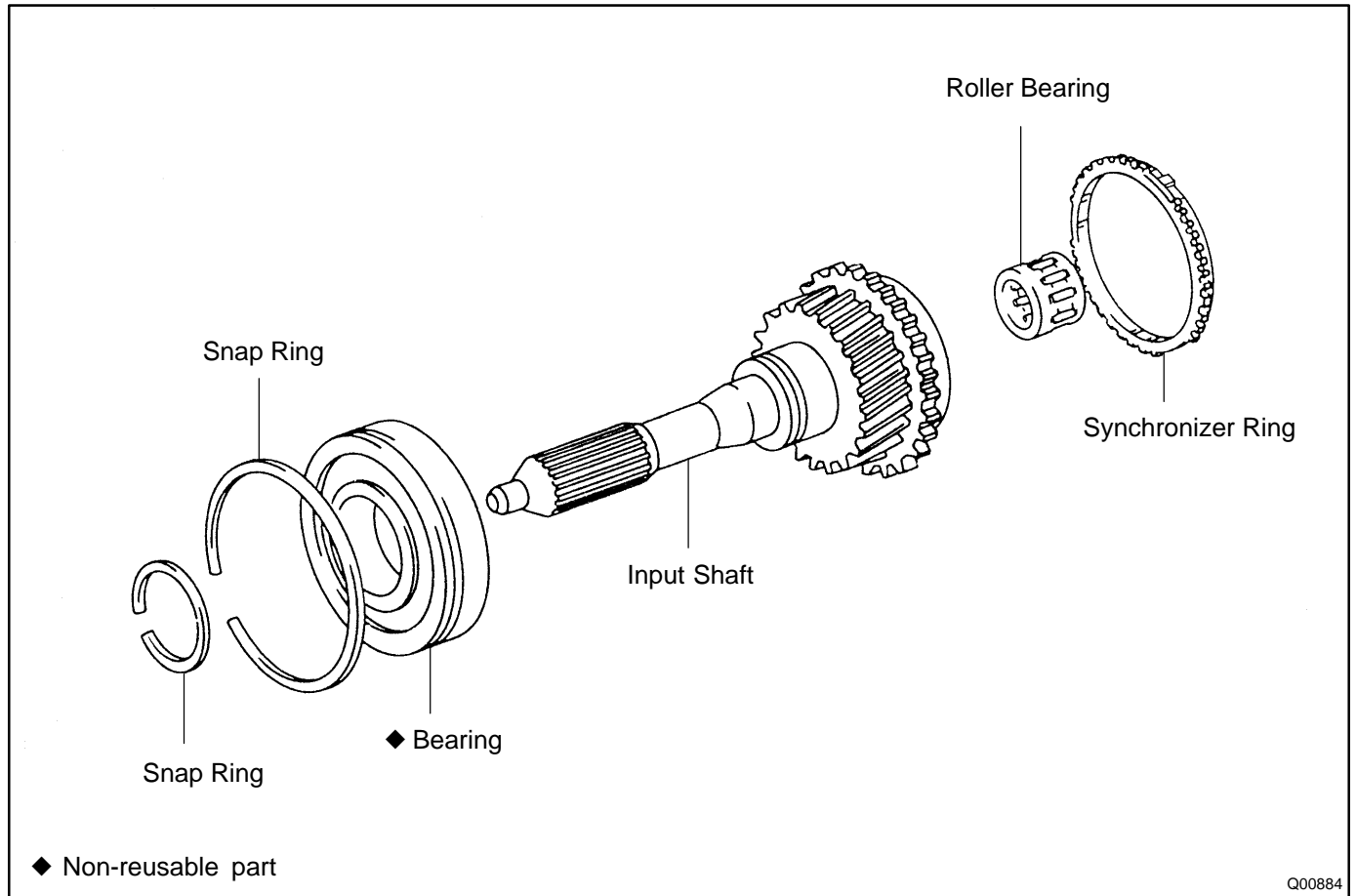
Reassembly is in the reverse order of disassembly (See page [MT-23](#)).

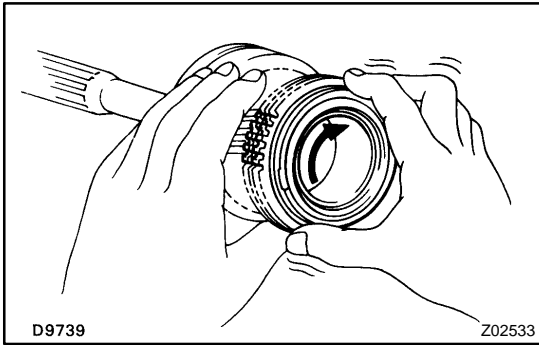
HINT:

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

INPUT SHAFT COMPONENTS

MTOC4-02





INSPECTION

INSPECT SYNCHRONIZER RING

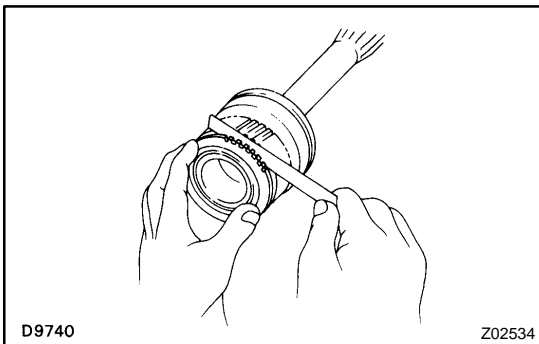
- (a) Check for wear or damage.
- (b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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



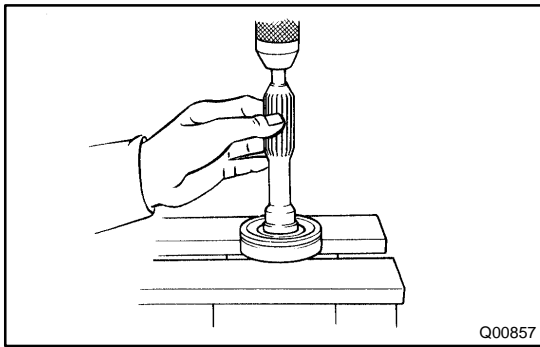
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.7 mm (0.028 in.)

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

NOTICE:

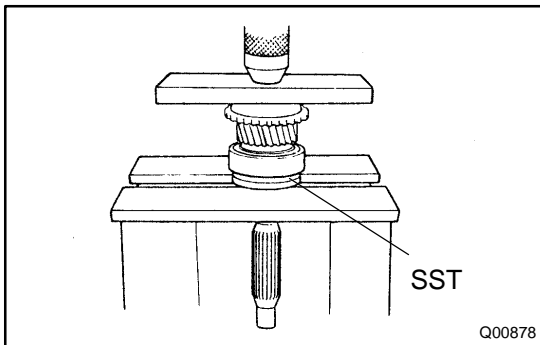
Ensure the fine lapping compound is completely washed off after rubbing.



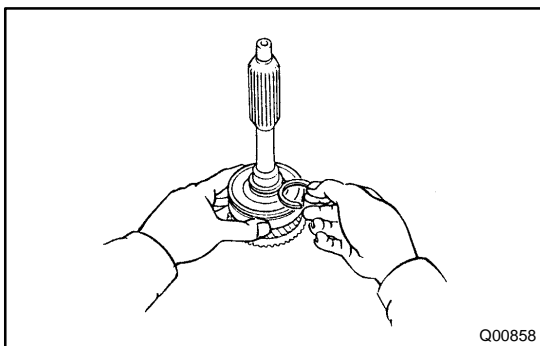
REPLACEMENT

IF NECESSARY, REPLACE INPUT SHAFT BEARING

- (a) Using a snap ring expander, remove the snap ring.
- (b) Using a press, remove the bearing.



- (c) Using SST and a press, install a new bearing.
SST 09506-35010



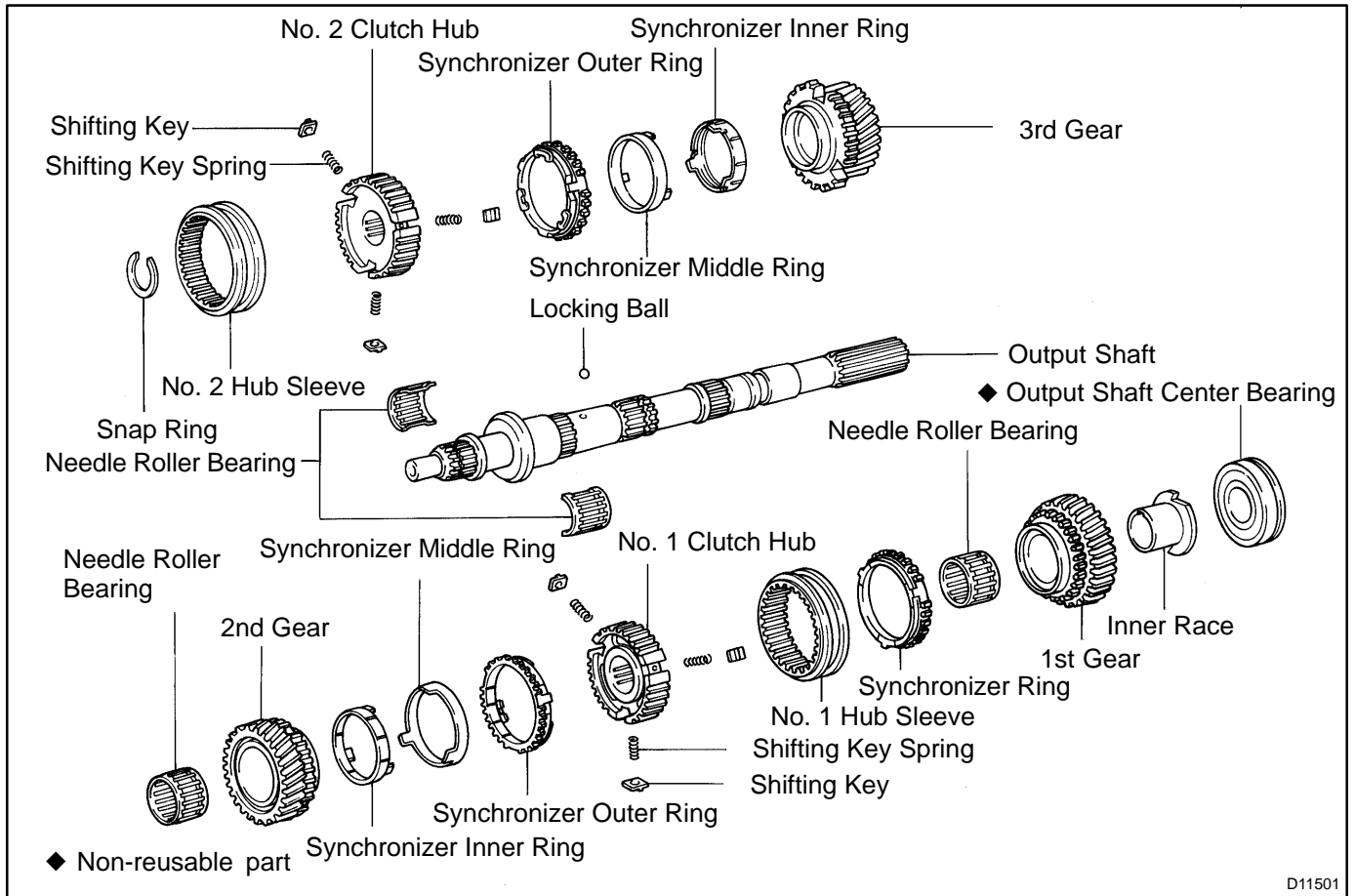
- (d) Select a snap ring that will allow minimum axial play.

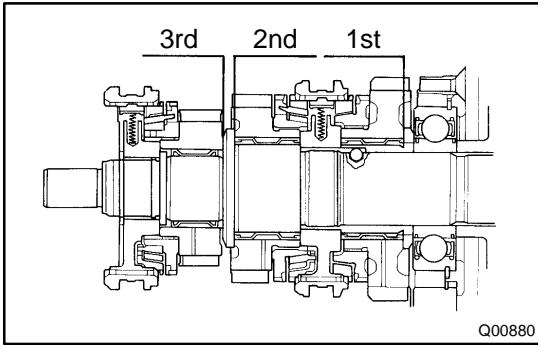
Mark	Thickness mm (in.)
1	2.05 - 2.10 (0.0807 - 0.0827)
2	2.10 - 2.15 (0.0827 - 0.0846)
3	2.15 - 2.20 (0.0846 - 0.0866)
4	2.20 - 2.25 (0.0866 - 0.0886)
5	2.25 - 2.30 (0.0886 - 0.0906)
11	2.30 - 2.35 (0.0906 - 0.0925)
12	2.35 - 2.40 (0.0925 - 0.0945)

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

OUTPUT SHAFT COMPONENTS

MTOCT-02





DISASSEMBLY

1. INSPECT EACH GEAR THRUST CLEARANCE

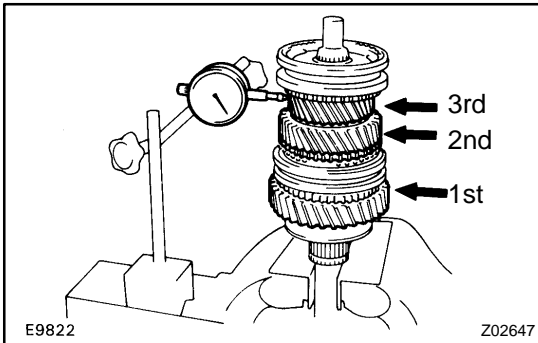
Using a feeler gauge, measure the thrust clearance of each gear.

Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in.)

Maximum clearance:

0.25 mm (0.0098 in.)



2. INSPECT EACH GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of each gear.

Standard clearance:

1st and 2nd gears:

0.009 - 0.060 mm (0.0004 - 0.0024 in.)

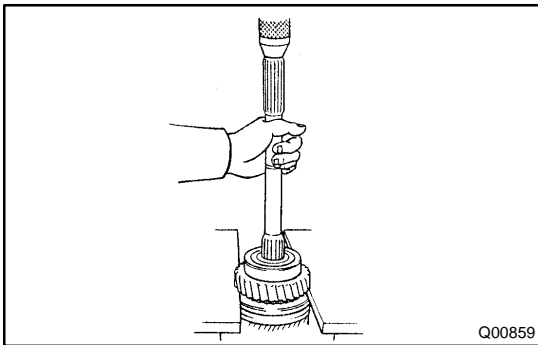
3rd gear: 0.015 - 0.066 mm (0.0006 - 0.0026 in.)

Maximum clearance:

1st and 2nd gears: 0.060 mm (0.0024 in.)

3rd gear: 0.066 mm (0.0026 in.)

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



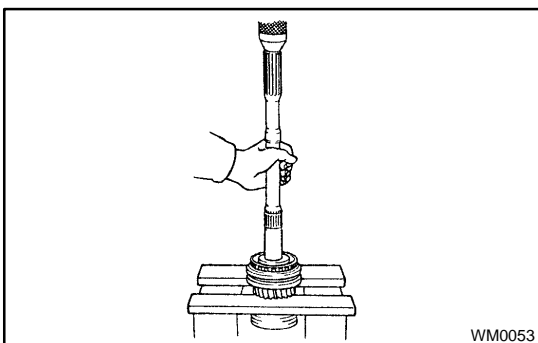
3. REMOVE OUTPUT SHAFT CENTER BEARING AND 1ST GEAR ASSEMBLY

(a) Shift the No. 1 hub sleeve onto the 2nd gear.

(b) Using a press, remove the center bearing, 1st gear, needle roller bearing, inner race and synchronizer ring.

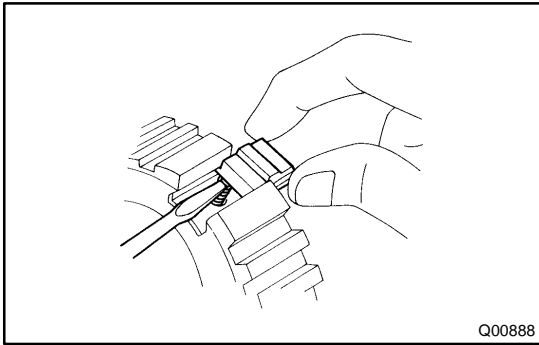
4. REMOVE LOCKING BALL ON OUTPUT SHAFT

Using a magnetic finger, remove the locking ball.



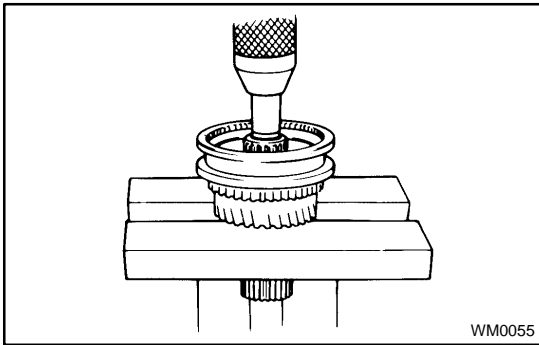
5. REMOVE NO. 1 HUB SLEEVE ASSEMBLY, 2ND GEAR AND NEEDLE ROLLER BEARING

Using a press, remove the parts from the shaft as an assembly.



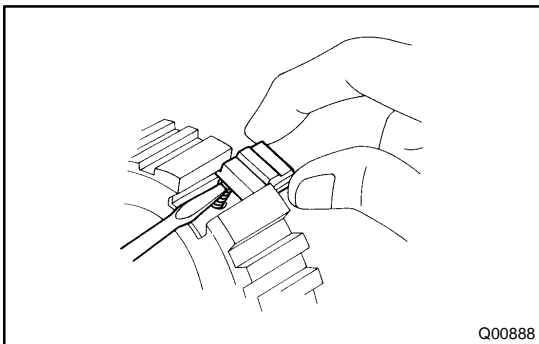
6. REMOVE NO. 1 HUB SLEEVE, SHIFTING KEY AND SPRING FROM NO. 1 CLUTCH HUB

- (a) Remove the No. 1 hub sleeve from the No. 1 clutch hub.
- (b) Push the shifting key spring with a screwdriver, remove the 3 shifting keys and key springs.



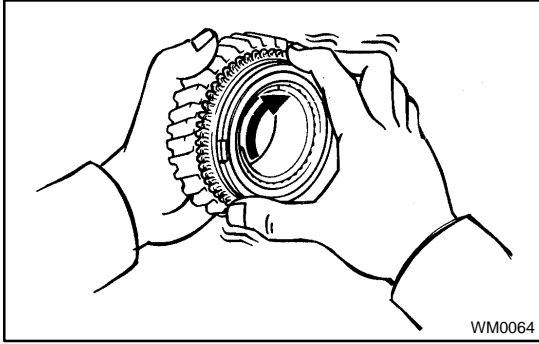
7. REMOVE NO. 2 HUB SLEEVE ASSEMBLY AND 3RD GEAR

- (a) Using a snap ring expander, remove the snap ring.
- (b) Using a press, remove the No. 2 hub sleeve, synchronizer ring and 3rd gear.



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

- (a) Remove the No. 2 hub sleeve from the No. 2 clutch hub.
- (b) Push the shifting key spring with a screwdriver, remove the 3 shifting keys and key springs.



INSPECTION

1. INSPECT 1ST GEAR SYNCHRONIZER RING

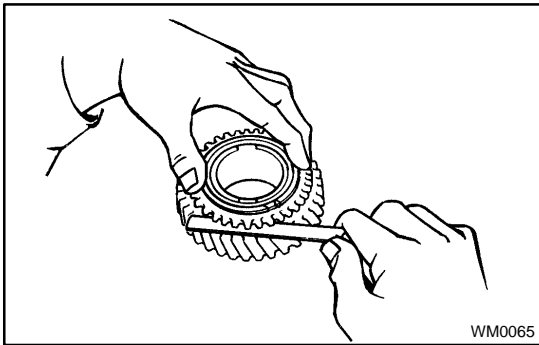
- (a) Check for wear or damage.
- (b) Check the braking effect of the synchronizer ring.
Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

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



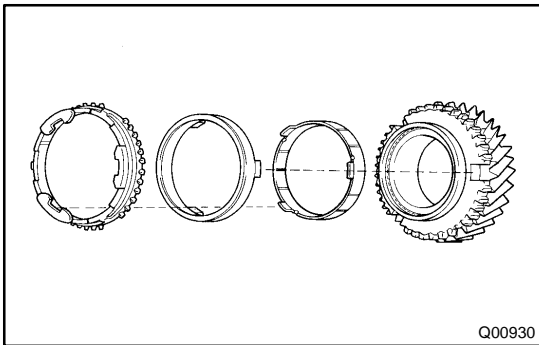
- (d) Using a feeler gauge, measure the clearance between the synchronizer ring back and gear spline end.

Minimum clearance: 0.7 mm (0.028 in.)

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

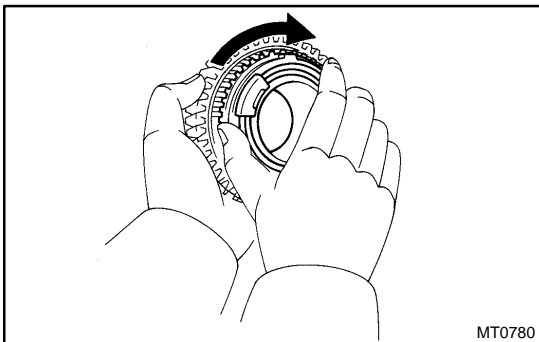
NOTICE:

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



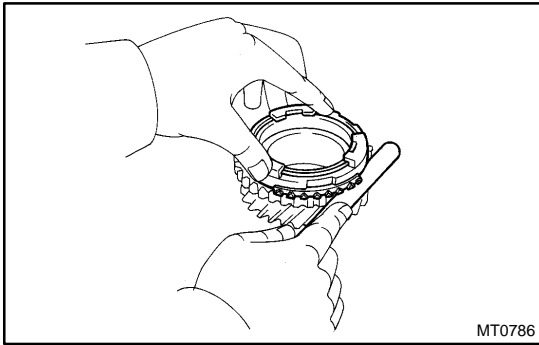
2. INSPECT 2ND AND 3RD GEARS SYNCHRONIZER RING

- (a) Check for wear or damage.
- (b) Install the synchronizer inner ring, middle ring and outer ring to each gear.



- (c) 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.



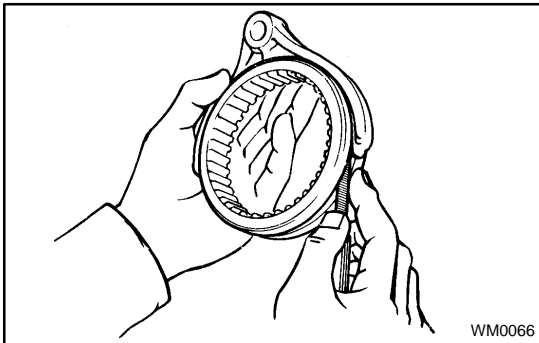
(d) Using a feeler gauge, measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance:

2nd gear: 0.74 mm (0.0291 in.)

3rd gear : 0.70 mm (0.0276 in.)

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

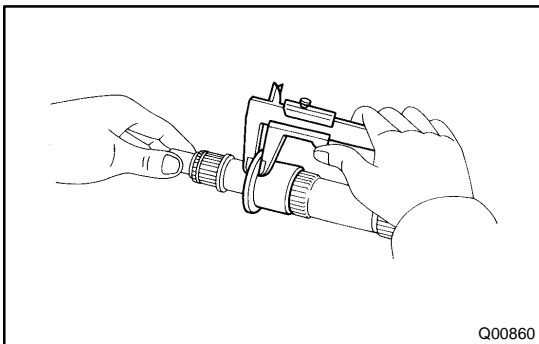


3. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeves and shift forks.

Maximum clearance: 0.5 mm (0.020 in.)

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

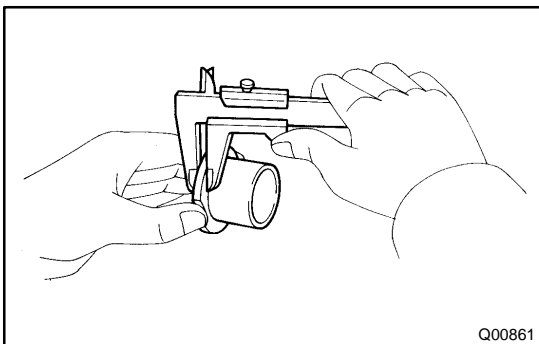


4. INSPECT OUTPUT SHAFT AND INNER RACE

(a) Using vernier calipers, measure the output shaft flange thickness.

Minimum thickness: 5.70 mm (0.2244 in.)

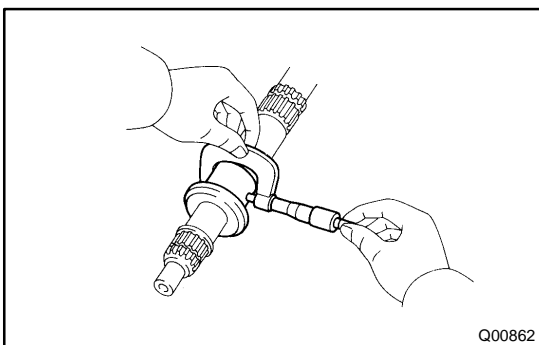
If the thickness is less than the minimum, replace the output shaft.



(b) Using vernier calipers, measure the inner race flange thickness.

Minimum thickness: 4.78 mm (0.1881 in.)

If the thickness is less than the minimum, replace the inner race.



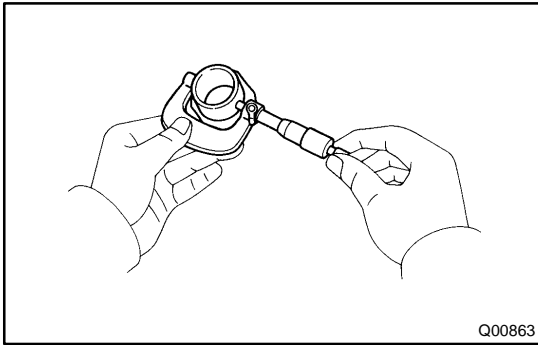
(c) Using a micrometer, measure the outer diameter of the output shaft journal.

Minimum diameter:

2nd gear: 42.975 mm (1.6919 in.)

3rd gear: 31.969 mm (1.2586 in.)

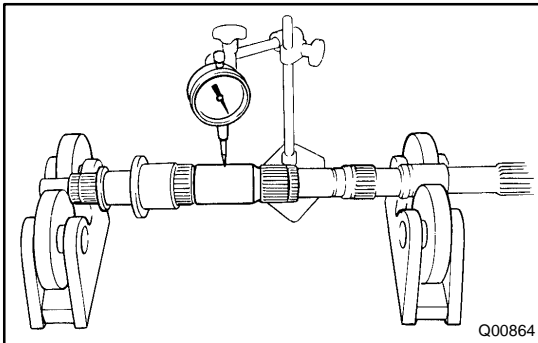
If the outer diameter is less than the minimum, replace the output shaft.



- (d) Using a micrometer, measure the outer diameter of the inner race.

Minimum diameter: 42.975 mm (1.6919 in.)

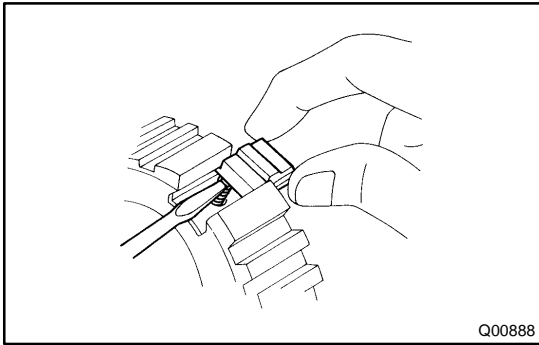
If the outer diameter is less than the minimum, replace the inner race.



- (e) 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.



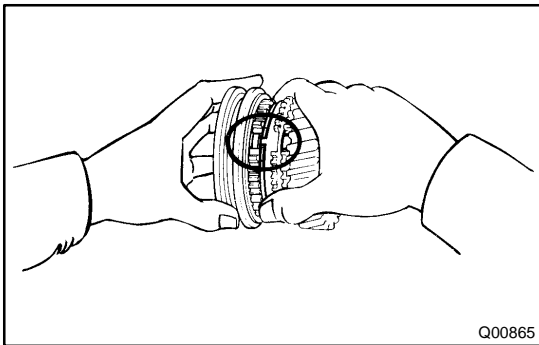
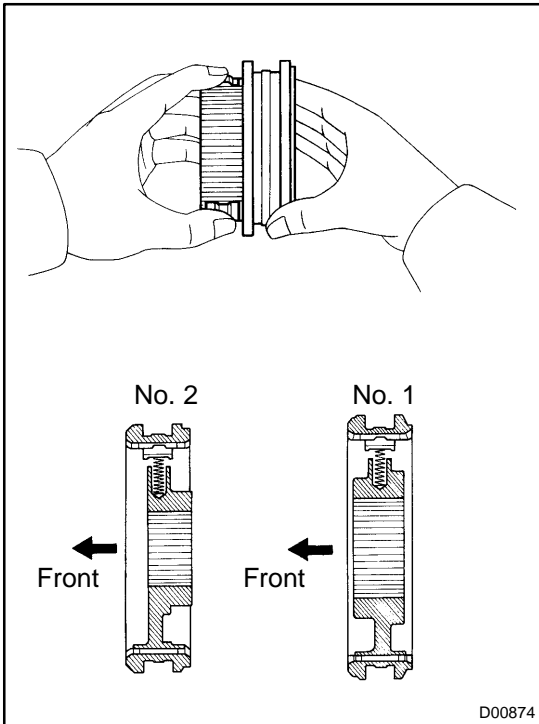
REASSEMBLY

HINT:

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

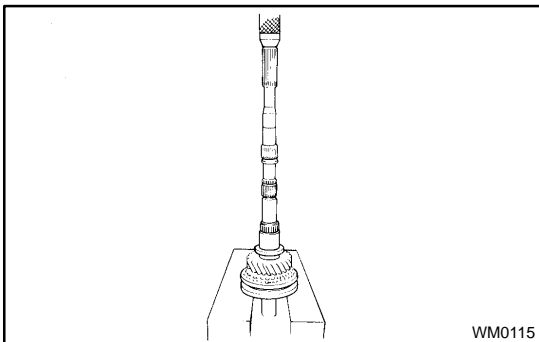
1. INSTALL NO. 1 AND NO. 2 CLUTCH HUBS INTO HUB SLEEVE

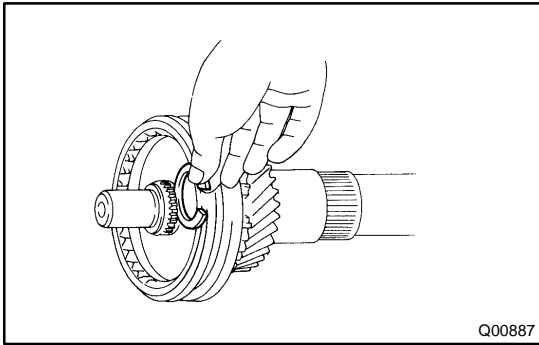
- (a) Install the 3 shifting key springs to the clutch hub.
- (b) While pushing the shifting key spring with a screwdriver, install the 3 shifting keys.
- (c) While pushing the 3 shifting keys, install the clutch hub to the hub sleeve, as shown.



2. INSTALL 3RD GEAR AND NO. 2 CLUTCH HUB ON OUTPUT SHAFT

- (a) Apply gear oil to the shaft.
- (b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
- (c) Using a press, install the 3rd gear and No. 2 clutch hub.





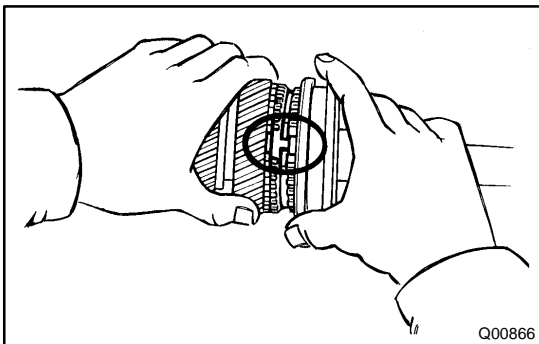
3. INSTALL SNAP RING

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

Mark	Thickness mm (in.)
C-1	1.75 - 1.80 (0.0689 - 0.0709)
D	1.80 - 1.85 (0.0709 - 0.0728)
11	1.86 - 1.91 (0.0732 - 0.0752)
12	1.92 - 1.97 (0.0756 - 0.0776)
13	1.98 - 2.03 (0.0780 - 0.0799)
14	2.04 - 2.09 (0.0803 - 0.0823)
15	2.10 - 2.15 (0.0827 - 0.0846)

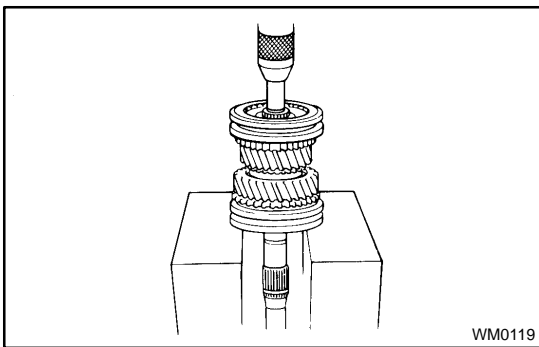
(b) Using a snap ring expander, install the snap ring.

4. INSPECT 3RD GEAR THRUST CLEARANCE
(See page [MT-28](#))



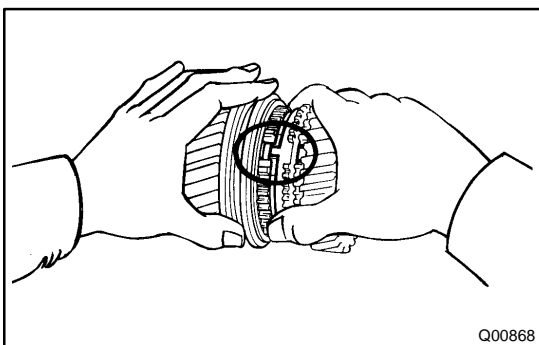
5. INSTALL 2ND GEAR AND NO. 1 CLUTCH HUB

- (a) Apply gear oil to the shaft and needle roller bearing.
- (b) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
- (c) Install the needle roller bearing in the 2nd gear.



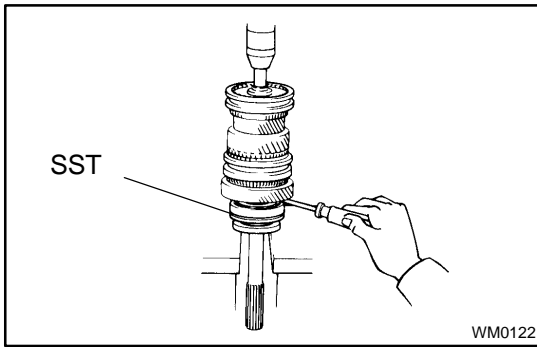
(d) Using a press, install the 2nd gear and No. 1 clutch hub.

6. INSPECT 2ND GEAR THRUST CLEARANCE
(See page [MT-28](#))



7. INSTALL LOCKING BALL AND 1ST GEAR ASSEMBLY

- (a) Install the locking ball in the shaft.
- (b) Apply gear oil to the bearing.
- (c) Assemble the 1st gear, synchronizer ring, needle roller bearing and bearing inner race.
- (d) Install the assembly on the output shaft with the synchronizer ring slots aligned with the shifting keys and turn the inner race to align it with the locking ball.

**8. INSTALL OUTPUT SHAFT CENTER BEARING**

Using SST and a press, install the center bearing on the output shaft with the outer race snap ring groove toward the rear.

HINT:

Hold the 1st gear inner race to prevent it from falling.

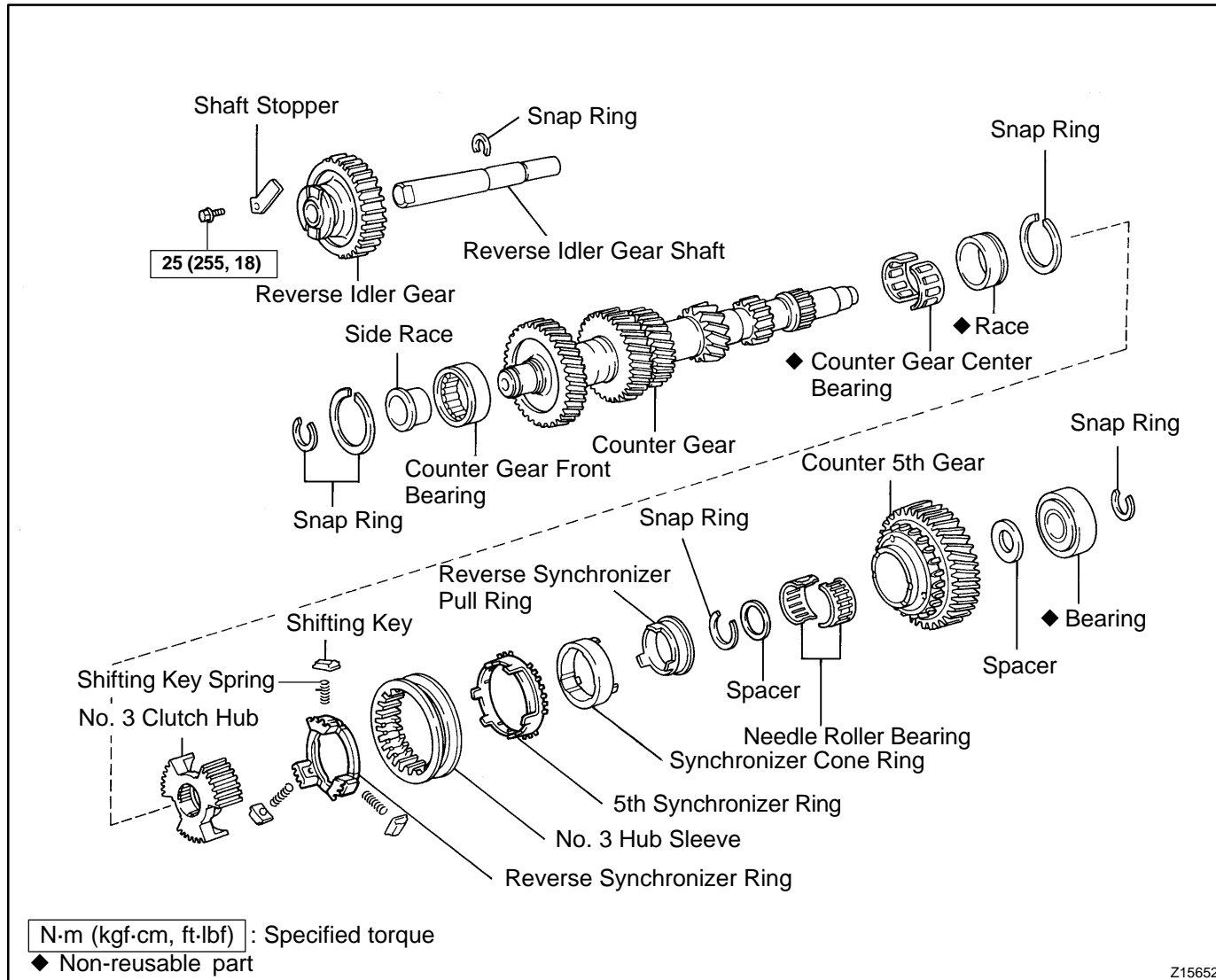
SST 09506-35010

9. INSPECT 1ST GEAR THRUST CLEARANCE

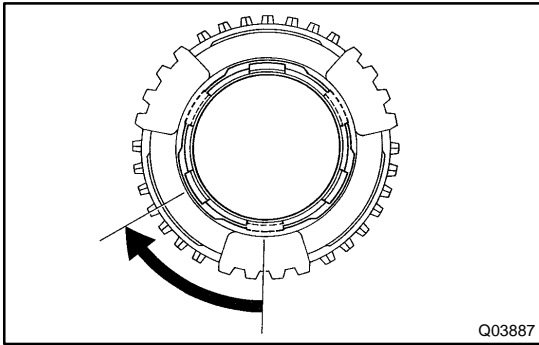
(See page [MT-28](#))

COUNTER GEAR AND REVERSE IDLER GEAR COMPONENTS

MTOCB-02



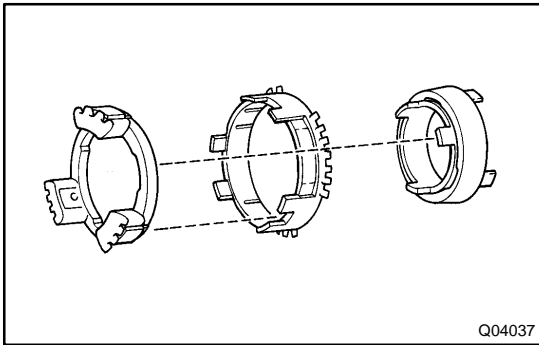
Z15652



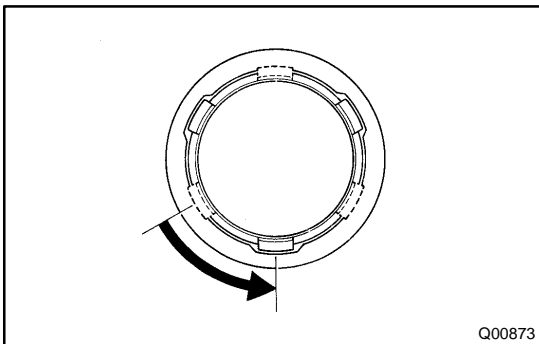
DISASSEMBLY

REMOVE NO. 3 HUB SLEEVE, SHIFTING KEY AND SPRING FROM SYNCHRONIZER RING

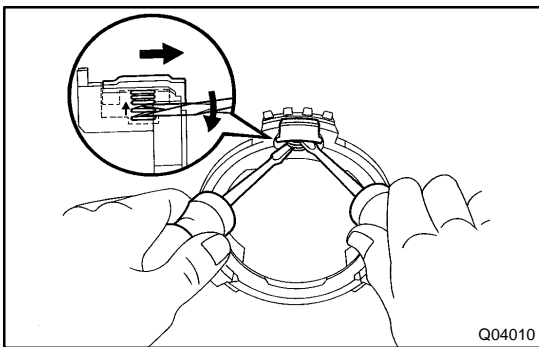
- (a) Remove the synchronizer ring assembly from the No. 3 hub sleeve.
- (b) Turn the reverse synchronizer pull ring.



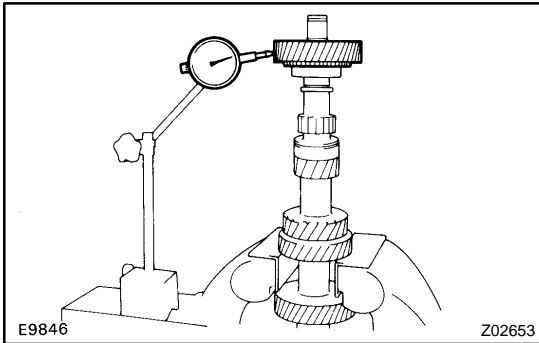
- (c) Remove the reverse synchronizer ring and 5th synchronizer ring from the synchronizer pull ring and cone ring.



- (d) Turn the reverse synchronizer pull ring and separate the pull ring and cone ring.



- (e) Remove the 3 shifting keys and key springs by carefully levering up the shifting key spring with one screwdriver and levering the shifting key away from the reverse synchronizer ring with another screwdriver.



INSPECTION

1. INSPECT COUNTER 5TH GEAR RADIAL CLEARANCE

- (a) Install the spacer, counter 5th gear and needle roller bearing to the counter gear.
- (b) Using a dial indicator, measure the counter 5th gear radial clearance.

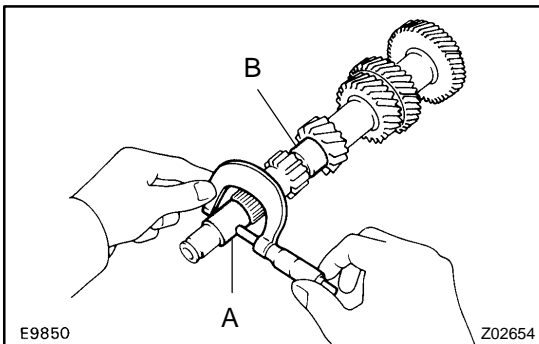
Standard clearance:

0.009 - 0.060 mm (0.0004 - 0.0024 in.)

Maximum clearance:

0.060 mm (0.0024 in.)

If the clearance exceeds the maximum, replace the counter gear, needle roller bearing or counter 5th gear.



2. INSPECT COUNTER GEAR

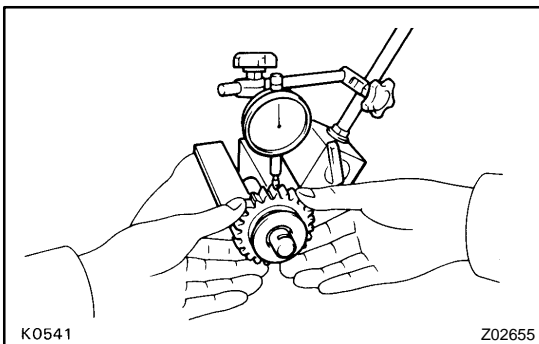
Using a micrometer, measure the outer diameter of the counter shaft journal.

Minimum diameter:

Part A: 26.975 mm (1.0620 in.)

Part B: 29.950 mm (1.1791 in.)

If the outer race is less than the minimum, replace the counter gear.



3. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

Using a dial indicator, measure the reverse idler gear radial clearance.

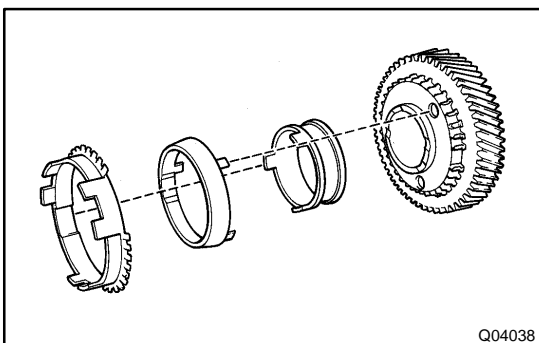
Standard clearance:

0.041 - 0.074 mm (0.0016 - 0.0029 in.)

Maximum clearance:

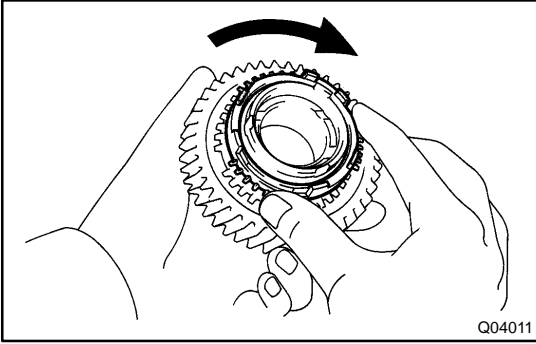
0.074 mm (0.0029 in.)

If the clearance exceeds the maximum, replace the gear or shaft.

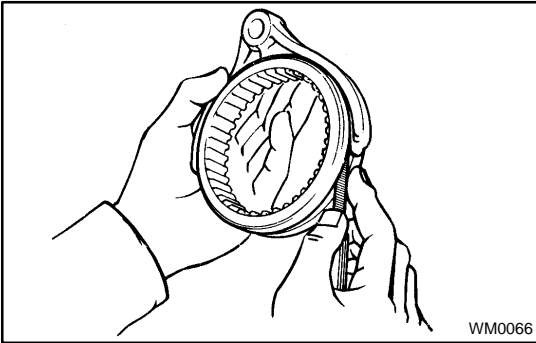


4. INSPECT 5TH GEAR SYNCHRONIZER RING

- (a) Check for wear or damage.
- (b) Install the synchronizer pull ring, cone ring and outer ring to the 5th gear.



- (c) 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.

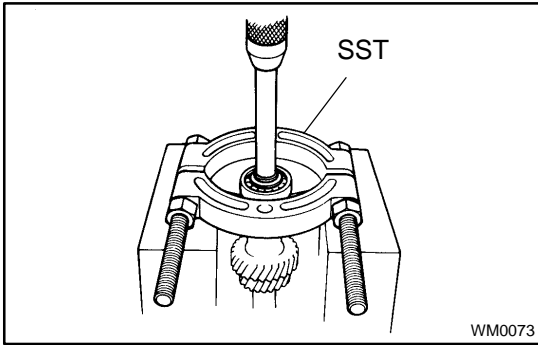


5. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

Using a feeler gauge, measure the clearance between the hub sleeves and shift forks.

Maximum clearance: 0.84 mm (0.0331 in.)

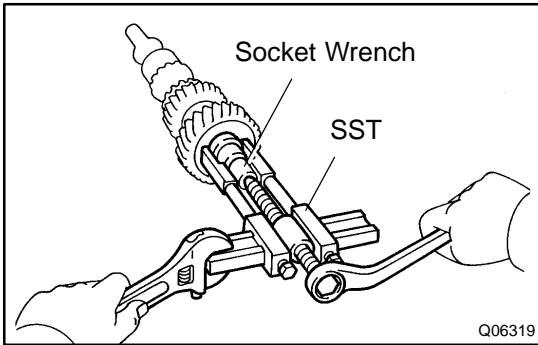
If the clearance exceeds the maximum, replace the shift fork or hub sleeve.



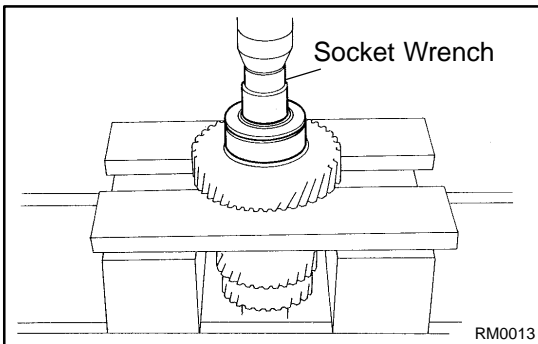
REPLACEMENT

1. IF NECESSARY, REPLACE COUNTER GEAR FRONT BEARING AND SIDE RACE

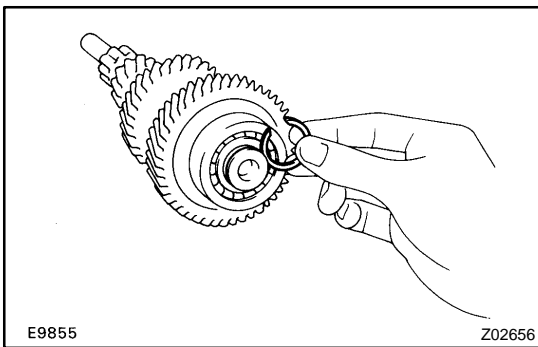
- (a) Using a snap ring expander, remove the snap ring.
- (b) Using SST and a press, press out the bearing.
SST 09950-00020
- (c) Check the side race for wear or damage.



- (d) If necessary, remove the side race.
Using SST and a socket wrench, remove the side race.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04071)



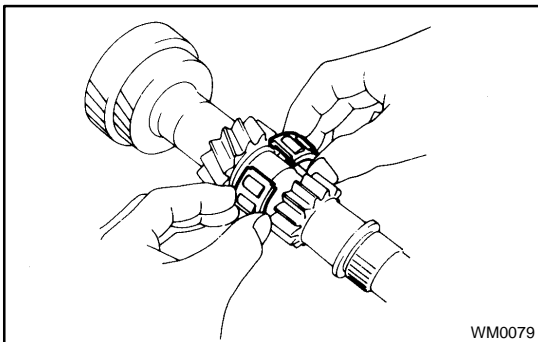
- (e) Using a socket wrench and press, install a new bearing, side race and inner race.



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

Mark	Thickness mm (in.)
A	2.05 - 2.10 (0.0807 - 0.0827)
B	2.10 - 2.15 (0.0827 - 0.0846)
C	2.15 - 2.20 (0.0846 - 0.0866)
D	2.20 - 2.25 (0.0866 - 0.0886)
E	2.25 - 2.30 (0.0886 - 0.0906)
F	2.30 - 2.35 (0.0906 - 0.0925)

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

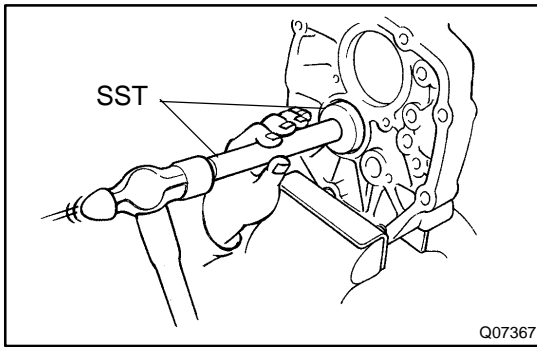


2. IF NECESSARY, REPLACE COUNTER GEAR CENTER BEARING

- (a) Remove the bearing from the counter gear.
- (b) Install a new bearing on the counter gear.

HINT:

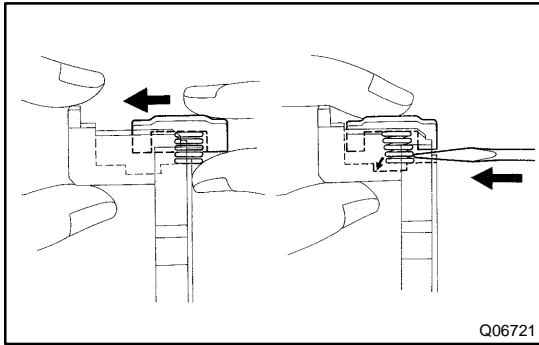
Engage the roller cages.



- (c) Using SST and a hammer, tap out the bearing outer race.
SST 09950-60010 (09951-00510), 09950-70010
(09951-07150)

HINT:

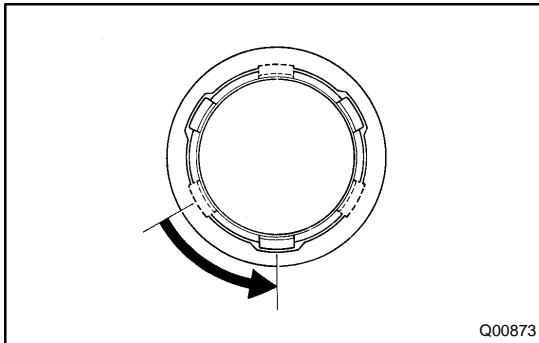
The outer race will be installed later, as the transmission is assembled.



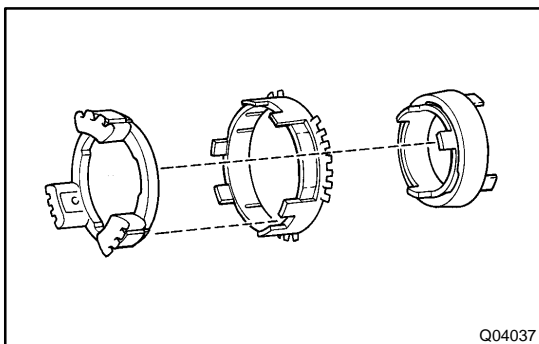
REASSEMBLY

INSTALL SYNCHRONIZER RING ASSEMBLY TO NO. 3 HUB SLEEVE

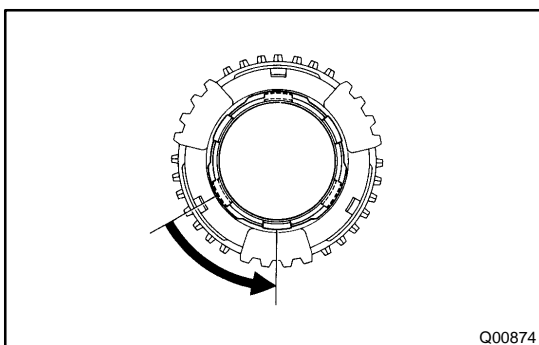
- (a) Push the synchronizer key spring, install the shifting key and key spring to the reverse synchronizer ring.
- (b) Using a screwdriver, push the 3 key springs into the synchronizer ring spring gaps.



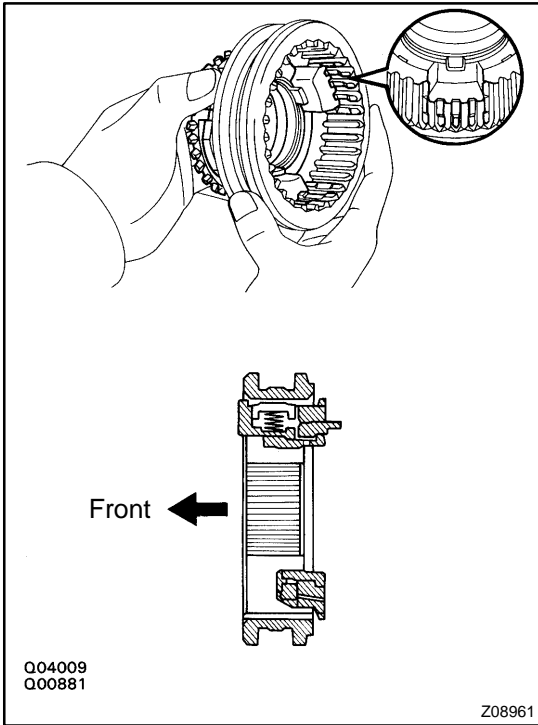
- (c) Install the synchronizer cone ring to the reverse synchronizer pull ring and turn the pull ring.



- (d) Install the 5th synchronizer ring.
- (e) Install the reverse synchronizer ring.



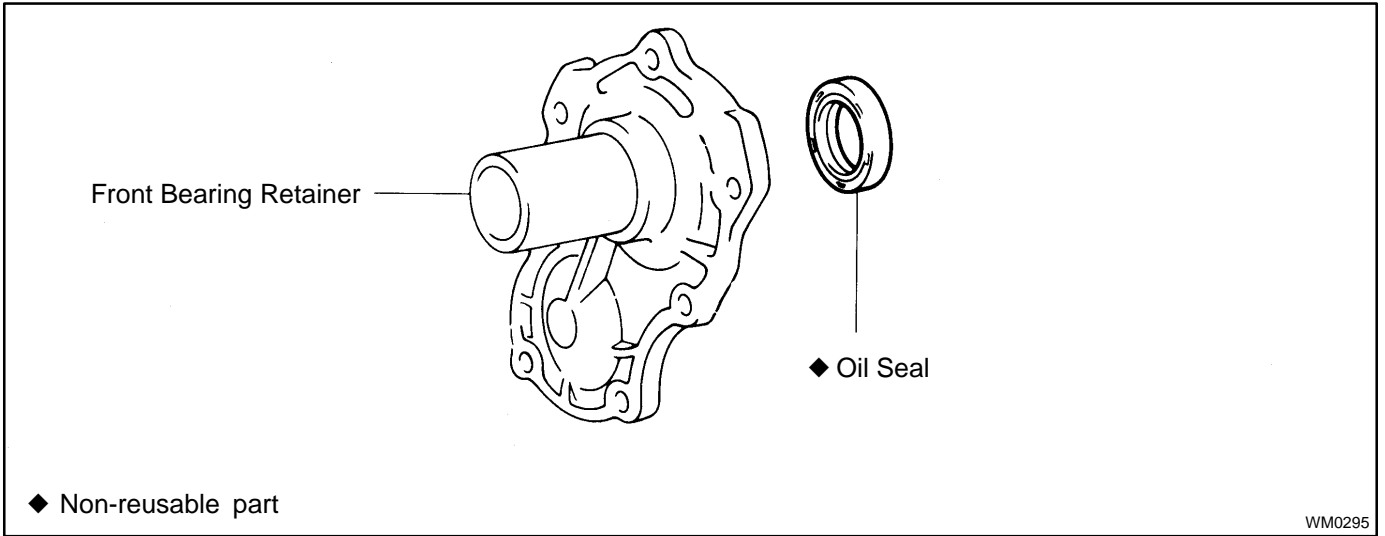
- (f) Turn the reverse synchronizer pull ring.

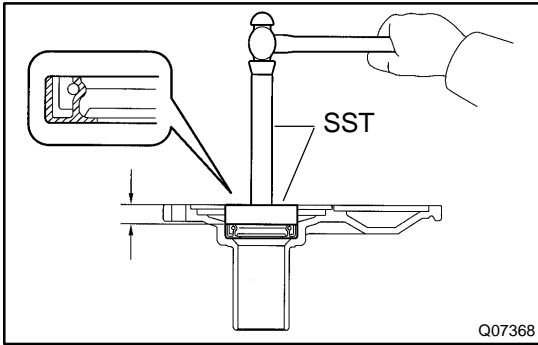


- (g) While pushing 3 shifting keys, install the synchronizer ring assembly to the No. 3 hub sleeve.

FRONT BEARING RETAINER OIL SEAL COMPONENTS

MT0CG-02





REPLACEMENT

IF NECESSARY, REPLACE FRONT BEARING RETAINER OIL SEAL

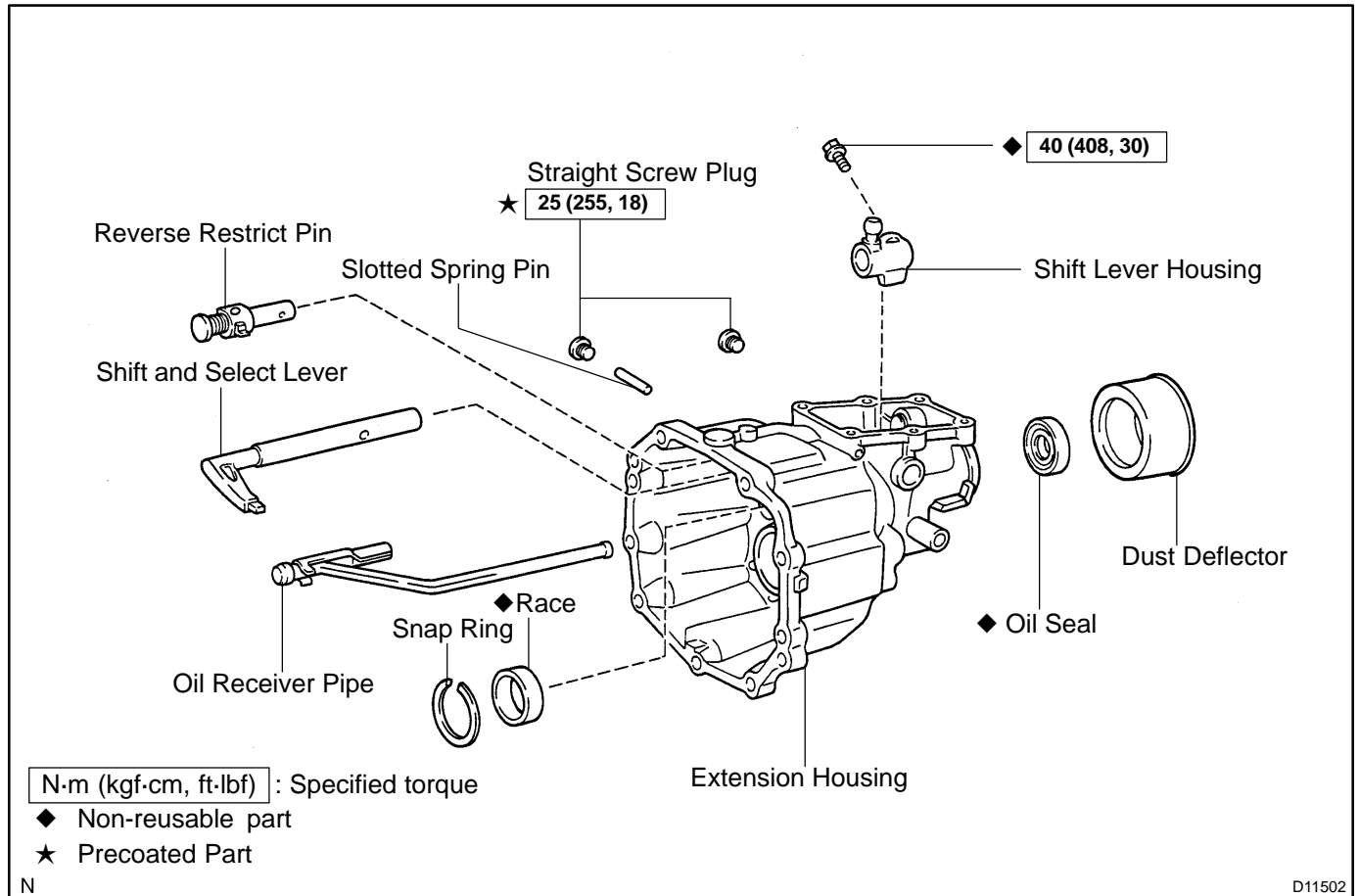
- (a) Using a screwdriver, pry out the oil seal.
- (b) Using SST and a press, install a new oil seal.

SST 09950-60010 (09951-00440), 09950-70010
(09951-07150)

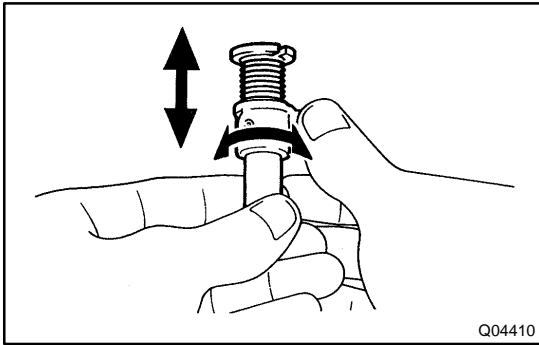
Drive in depth: 12.2 ± 0.5 mm (0.480 ± 0.020 in.)

EXTENSION HOUSING COMPONENTS

MTOCI-02

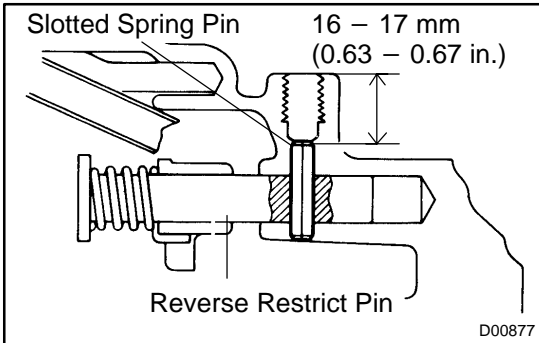


D11502

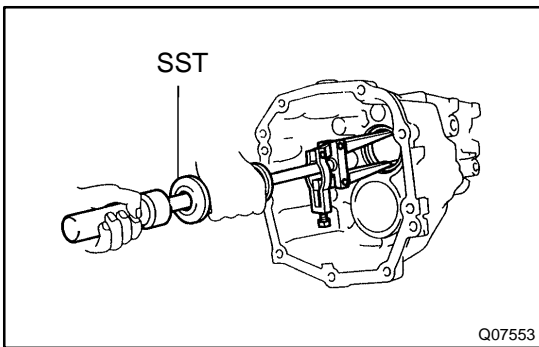
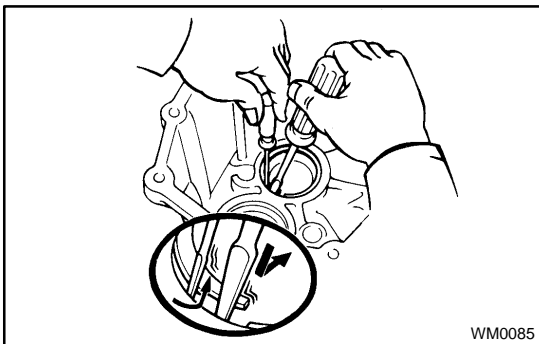


REPLACEMENT

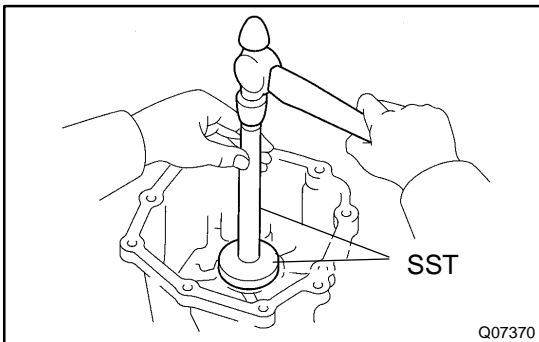
1. **REMOVE REVERSE RESTRICT PIN**
 - (a) Using a hexagon wrench, remove the screw plug.
 - (b) Using a pin punch and hammer, drive out the slotted spring pin.
 - (c) Pull off the lever housing and slide out the shaft.
2. **INSPECT REVERSE RESTRICT PIN**
 - (a) Turn and push the reverse restrict pin by hand.
 - (b) Check for smooth operation.



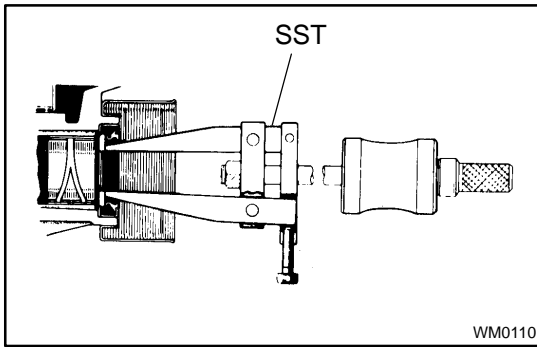
3. **INSTALL REVERSE RESTRICT PIN**
 - (a) Install the lever housing.
 - (b) Using a pin punch and hammer, drive in the slotted spring pin, as shown.
Drive in depth: 16 – 17 mm (0.63 – 0.67 in.)
 - (c) Apply sealant to the plug.
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
 - (d) Install and torque the screw plug.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
4. **IF NECESSARY, REPLACE REAR BEARING OUTER RACE**
 - (a) Using 2 screwdrivers, remove the snap ring.



- (b) Using SST, remove the outer race.
SST 09308-00010

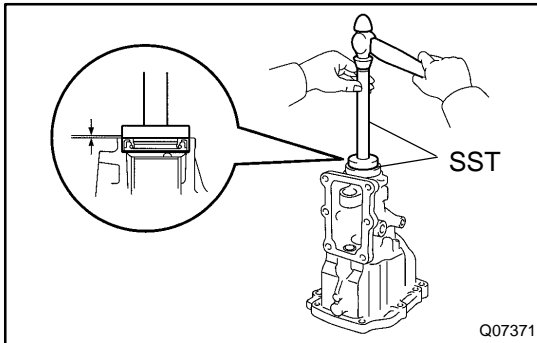


- (c) Using SST, install a new outer race.
SST 09950-60010 (09951-00560), 09950-70010 (09951-07150)
- (d) Using a screwdriver, install the snap ring.

**5. IF NECESSARY, REPLACE OIL SEAL**

(a) Using SST, remove the oil seal.

SST 09308-00010 or
09308-10010 w/ output shaft installed



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

SST 09950-60010 (09951-00560), 09950-70010
(09951-07150)

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