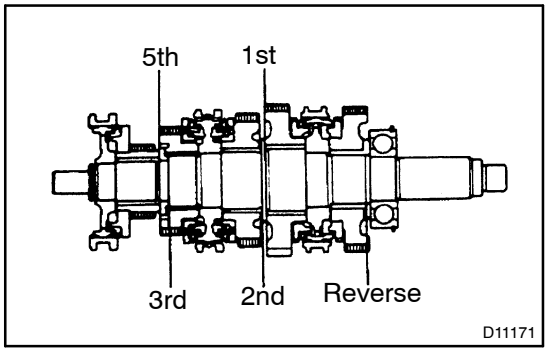
410CY–01

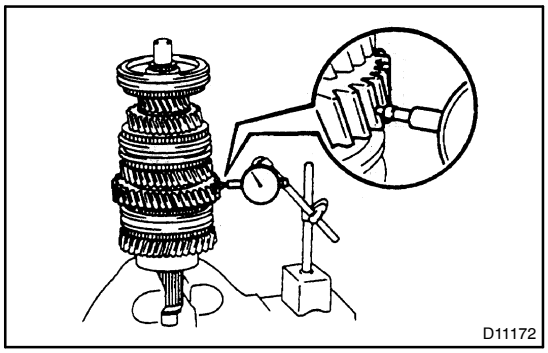
OVERHAUL



1. INSPECT EACH GEAR THRUST CLEARANCE

Standard gear thrust clearance:

Gear	Thrust Clearance mm (in.)
1st	0.1 – 0.35 (0.0039 – 0.0138)
2nd	0.1 – 0.35 (0.0039 – 0.0138)
3rd	0.1 – 0.60 (0.0039 – 0.0236)
5th	0.1 – 0.50 (0.0039 – 0.0197)
Reverse Gear	0.15 – 0.30 (0.0059 – 0.0118)



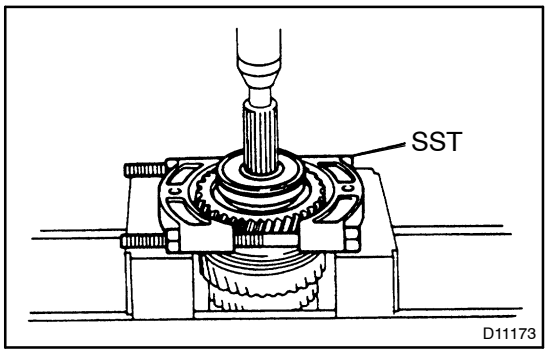
2. INSPECT EACH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the oil clearance between the gear and shaft with the needle roller bearing installed.

Standard radial clearance:

Gear	Radial Clearance mm (in.)
1st	0.030 – 0.075 (0.0012 – 0.0030)
2nd and Reverse	0.030 – 0.081 (0.0012 – 0.0032)
3rd and 5th	0.015 – 0.066 (0.0006 – 0.0026)

If necessary, replace the gear, needle roller bearing or shaft.



3. REMOVE REVERSE GEAR

(a) Using SST and a press, press out the reverse gear.
SST 09555–55010

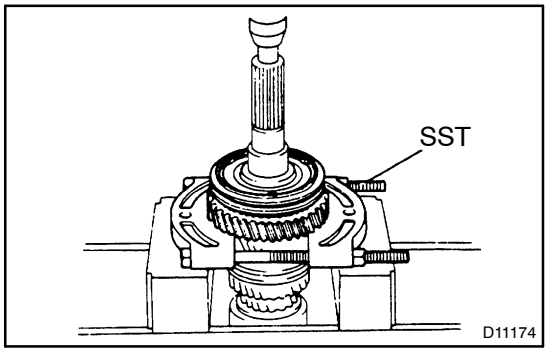
4. REMOVE OUTPUT SHAFT REAR BEARING

5. REMOVE REVERSE GEAR BEARING RACE INNER

(a) Using SST and press, press out the rear bearing, reverse gear and inner race.
SST 09555–55010

(b) Remove the needle roller bearing.

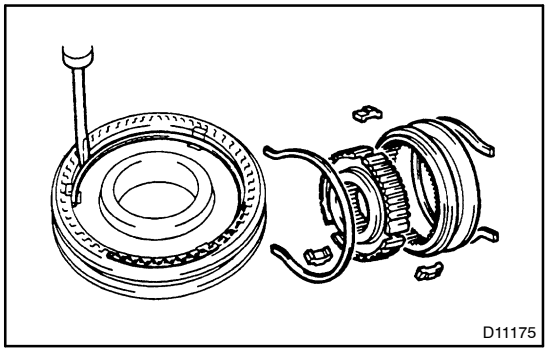
(c) Using a magnetic finger, remove the steel ball from the output shaft.



6. REMOVE 1ST GEAR

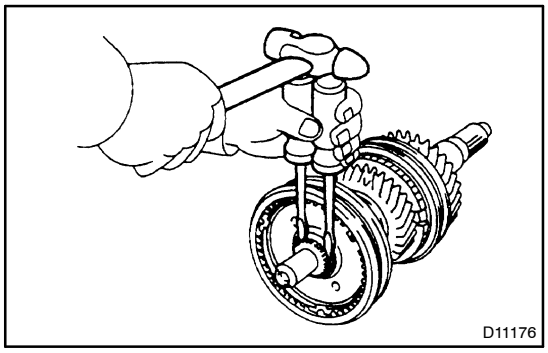
(a) Using SST and press, press out the 1st gear, synchronizer ring and clutch hub No. 1 assy.
SST 09555–55010

(b) Remove the needle roller bearing.



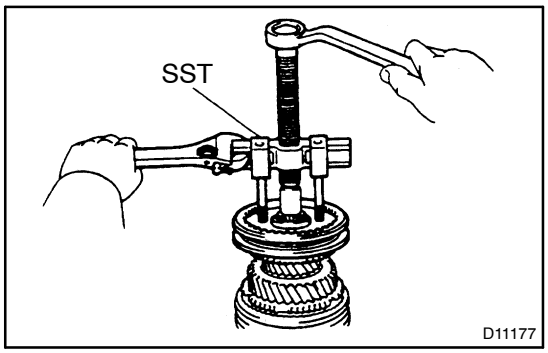
7. REMOVE TRANSMISSION CLUTCH HUB NO.1

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



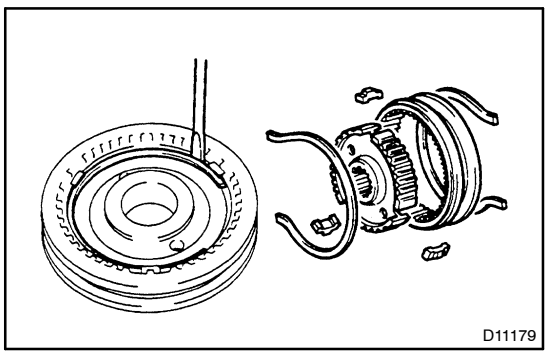
8. REMOVE TRANSMISSION CLUTCH HUB NO.3

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

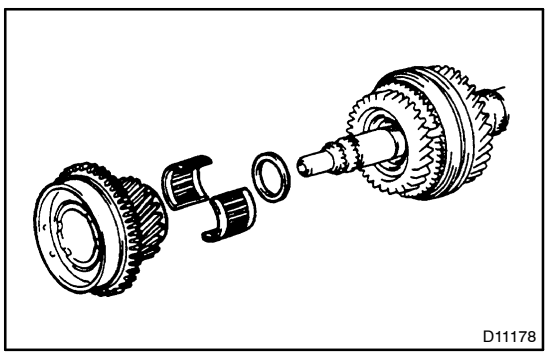


(b) Using SST, remove the clutch hub No. 3 assy.
SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05030, 09957–04010)

(c) Remove the synchronizer ring.

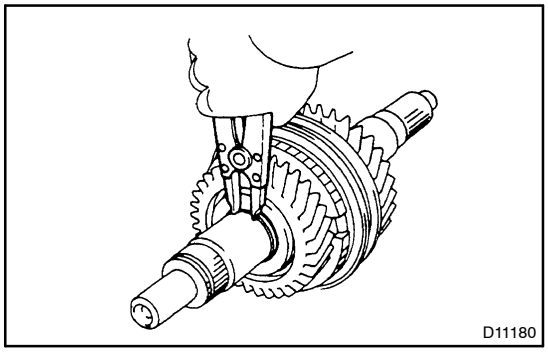


(d) Using a screwdriver, remove the 3 shifting keys and 2 springs and clutch hub No. 3 from the hub sleeve No. 3.



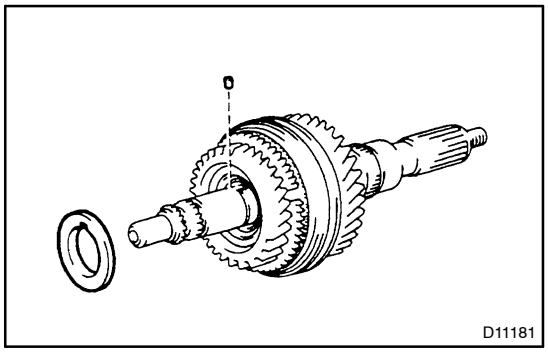
9. REMOVE 5TH GEAR

(a) Remove the 5th gear, needle roller bearing and spacer.

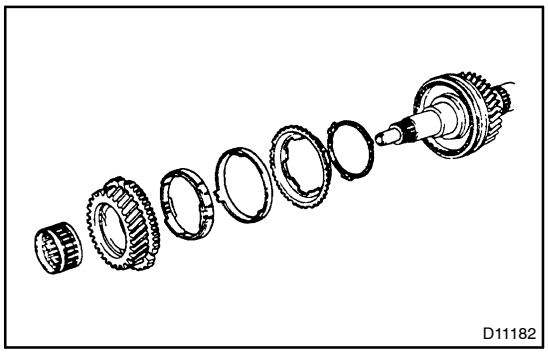


10. REMOVE 3RD GEAR

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



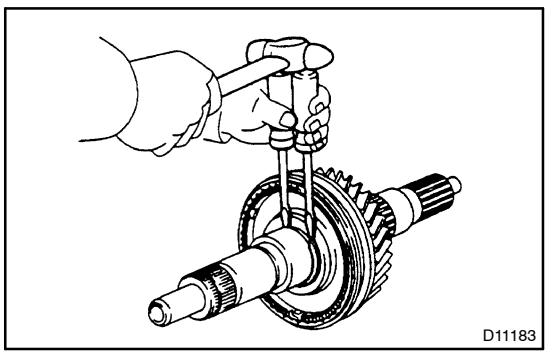
(b) Remove the thrust washer and straight pin.



(c) Remove the 3rd gear, needle roller bearing and synchronizer rings.

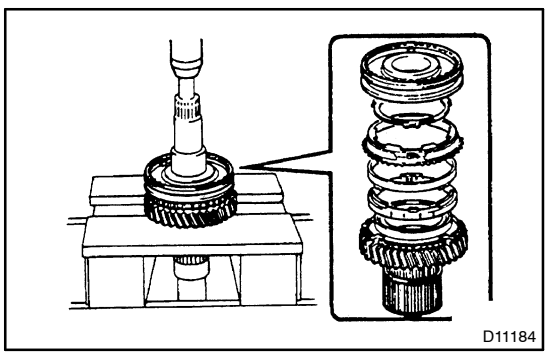
HINT:

When dismantling the manual transmission, make sure the 3rd gear's inner, middle and outer synchronizer rings are tagged together with the spacer ring.



11. REMOVE 2ND GEAR

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



(b) Using a press, remove the 2nd gear, synchronizer rings and hub sleeve No. 2 assembly.

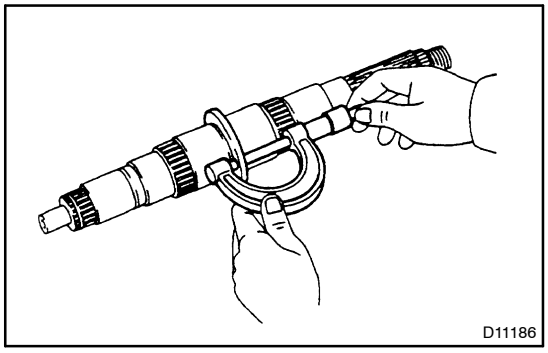
HINT:

When dismantling the manual transmission, make sure the 2nd gear's inner, middle and outer synchronizer rings are tagged together with the spacer ring.

(c) Remove the needle roller bearing.

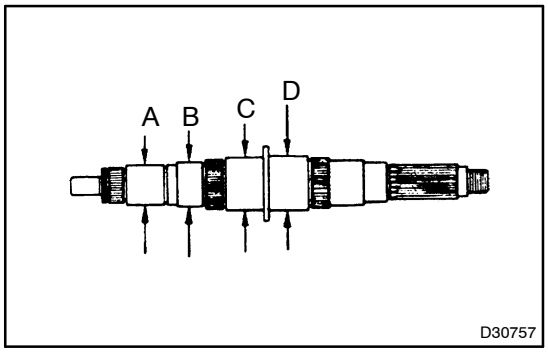
12. REMOVE TRANSMISSION CLUTCH HUB NO.2

(a) Remove the clutch hub, shifting keys and springs from the hub sleeve.


D11186

13. INSPECT OUTPUT SHAFT

(a) Using a micrometer, measure the flange thickness.
Minimum thickness: 4.85 mm (0.1909 in.)

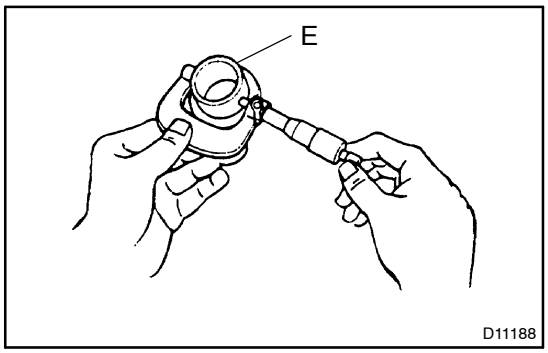


D30757

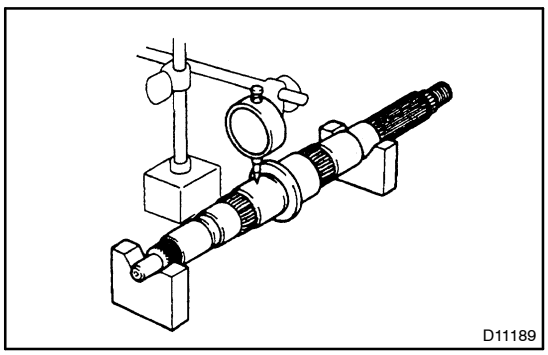
(b) Using a micrometer, measure the journal diameter.
Minimum diameter:

Gear	Diameter mm (in.)
A 5th	36.975 (1.4557)
B 3rd	46.975 (1.8494)
C 2nd	53.975 (2.1250)
D 1st	57.975 (2.2825)
E Reverse	53.975 (2.1250)

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

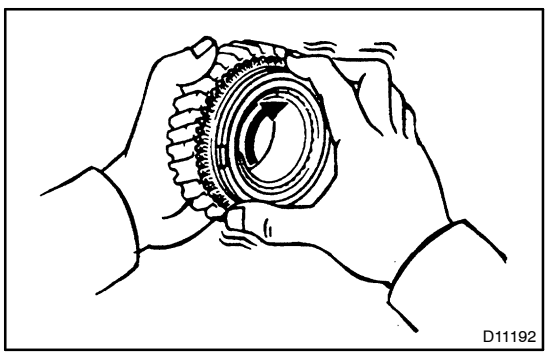


D11188


D11189

(c) Using a dial indicator, check the shaft runout.
Maximum runout: 0.05 mm (0.0020 in.)

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


D11192

14. INSPECT SYNCHRONIZER RINGS FOR 1ST, 4TH AND 5TH

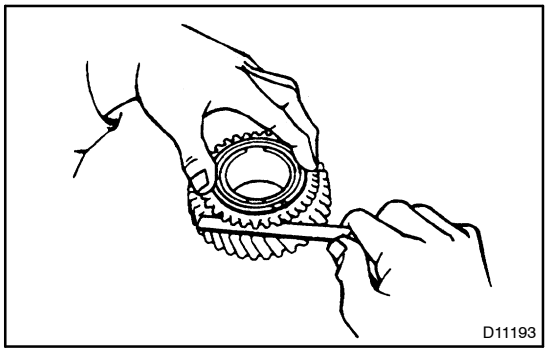
(a) Check for wear or damage.

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

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.

HINT:
Wash off completely the fine lapping compound after robbing.

(c) Check again the braking effect of the syncronizer ring.If it does not lock, replace the synchronizer ring.

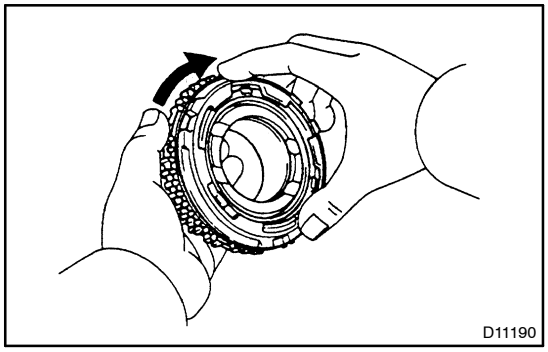

D11193

(d) Using filler gauge, measure the clearance between the synchronizer ring back and gear spine end.
Standard clearance:

Gear	Clearance mm (in.)
1st	1.1 – 1.9 (0.043 – 0.075)
4th and 5th	0.8 – 1.6 (0.031 – 0.063)

HINT:

- When replacing either a synchronizer ring or gear, apply a small amount of fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.
- Wash off completely the fine lapping compound after rubbing.
- When replacing both the synchronizer ring and gear, there is no need to apply any compound or to rub them together.


D11190

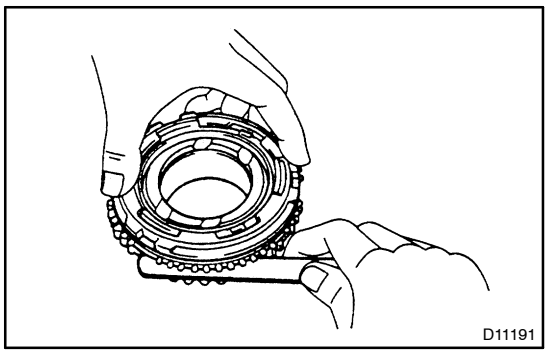
15. INSPECT SYNCHRONIZER RINGS FOR 2ND AND 3RD

(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 and 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.
HINT:
Wash off completely the fine lapping compound after robbing.

(c) Check the braking effect of the syncronizer ring again. If it does not lock, replace the synchronizer ring.

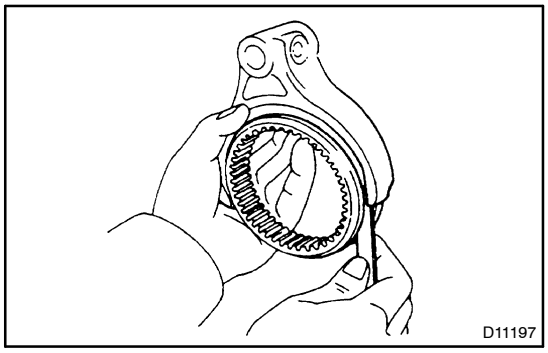

D11191

(d) Using filler gauge, measure the clearance between the synchronizer ring back and the gear spline end.
Standard clearance:
0.82 – 1.78 mm (0.0323 – 0.0701 in.)

HINT:

- When replacing either a synchronizer ring or gear, apply a small amount of fine lapping compound between the synchronizer ring and gear cone. Lightly rub the synchronizer ring and gear cone together.

- Wash off completely the fine lapping compound after rubbing.
- When replacing both the synchronizer ring and gear, there is no need to apply any compound or to rub them together.

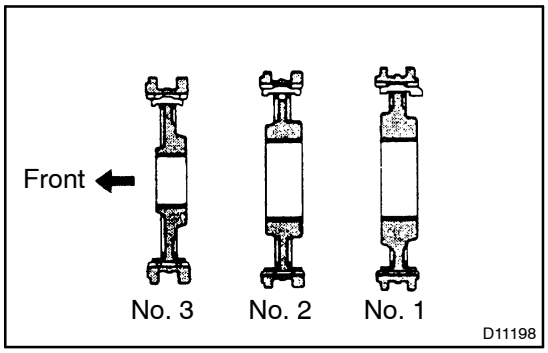


16. INSPECT SHIFT FORK AND HUB SLEEVE CLEARANCE

(a) 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 limit, replace the shift fork or hub sleeve.



17. INSTALL TRANSMISSION CLUTCH HUB NO.1

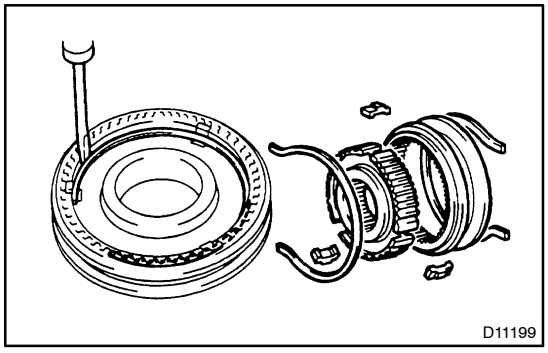
(a) Install the clutch hub and shifting keys to the hub sleeve.
(b) Install the shifting key springs under the shifting keys.

18. INSTALL TRANSMISSION CLUTCH HUB NO.2

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

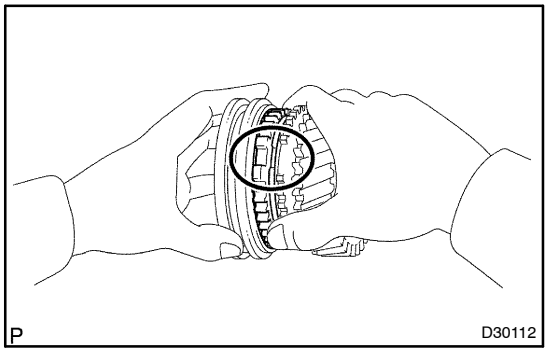
19. INSTALL TRANSMISSION CLUTCH HUB NO.3

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



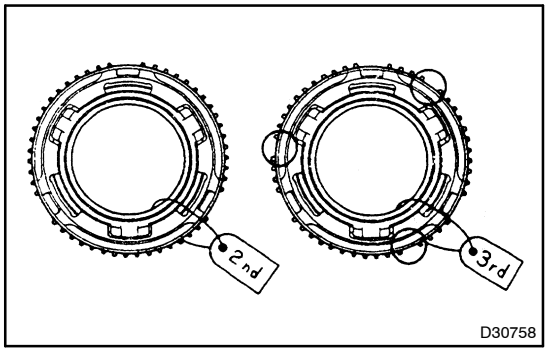
NOTICE:

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



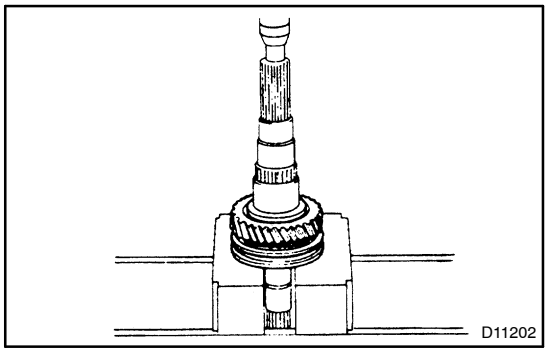
20. INSTALL 2ND GEAR AND TRANSMISSION HUB SLEEVE NO.2

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

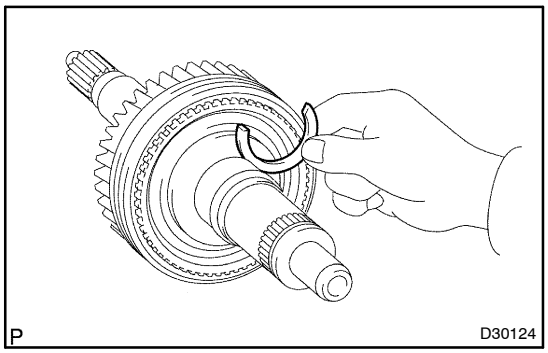


NOTICE:
The outer synchronizer ring for the 3rd gear has 1 tooth less in each group of the driven teeth than the 2nd gear. Make sure that the correct synchronizer ring is installed for the gear.

(c) Install the needle roller bearing in the 2nd gear.



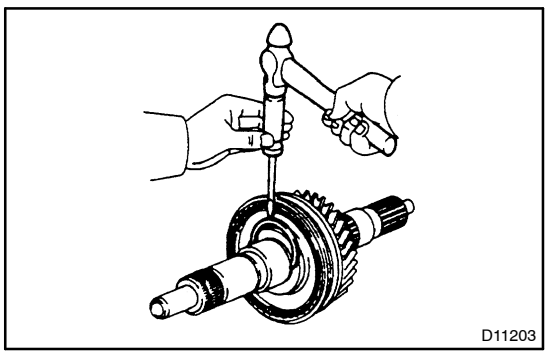
(d) Using a press, install the 2nd gear and No. 2 hub sleeve.



21. INSTALL CLUTCH HUB NO.2 SETTING SHAFT SNAP RING

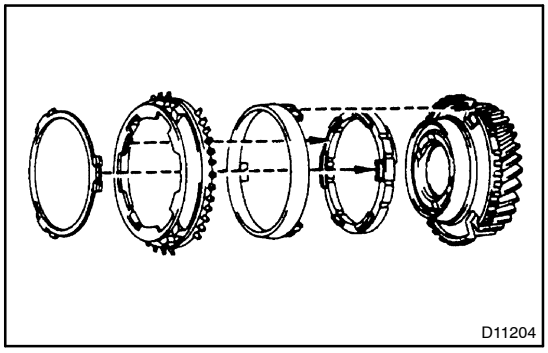
(a) Select a snap ring that allows minimum axial play.

Mark	Thickness mm (in.)
2	1.90 – 1.95 (0.0748 – 0.0768)
3	1.95 – 2.00 (0.0768 – 0.0787)
4	2.00 – 2.05 (0.0787 – 0.0807)
5	2.05 – 2.10 (0.0807 – 0.0827)
6	2.10 – 2.15 (0.0827 – 0.0846)
7	2.15 – 2.20 (0.0846 – 0.0866)



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

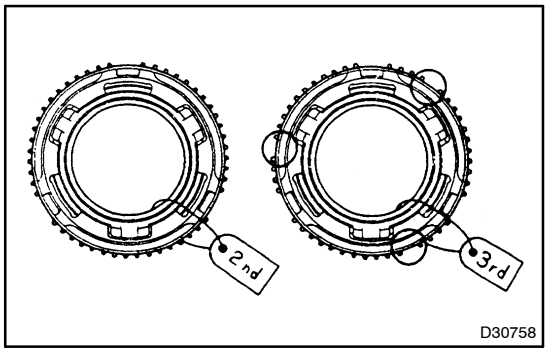
22. INSPECT 2ND GEAR THRUST CLEARANCE (See step 1)


D11204

23. INSTALL 3RD GEAR AND THRUST WASHER

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

(b) Assemble the 3rd gear, synchronizer ring and needle roller bearing.

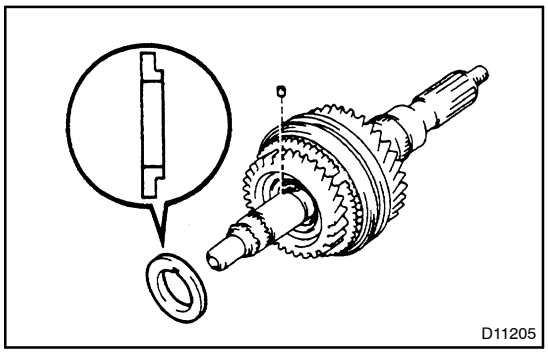


D30758

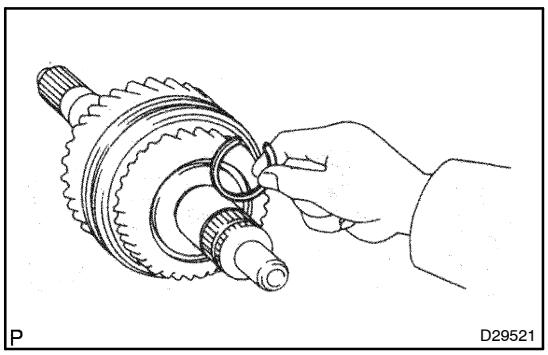
NOTICE:

The outer synchronizer ring for the 3rd gear has 1 tooth less in each group of the driven teeth than the 2nd gear. Make sure that the correct synchronizer ring is installed for the gear.

(c) Install the assembly on the shaft with the synchronizer ring slots aligned with the shifting keys.


D11205

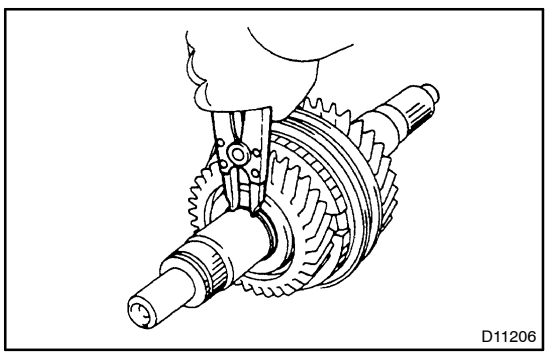
(d) Install the thrust washer onto the output shaft with the straight pin aligned with the thrust washer.


P D29521

24. INSTALL GEAR THRUST WASHER SHAFT SNAP RING

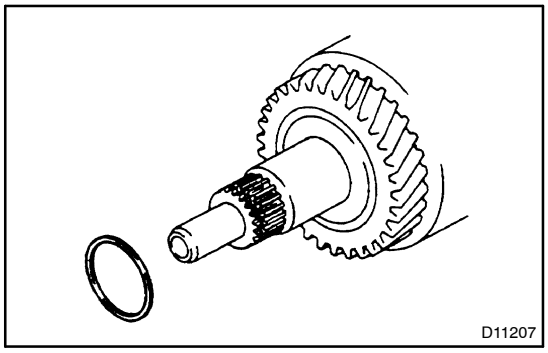
(a) Select a snap ring that allows minimum axial play.

Mark	Thickness mm (in.)
A	2.90 – 2.90 (0.1142 – 0.1161)
B	2.95 – 3.00 (0.1161 – 0.1181)
C	3.00 – 3.05 (0.1181 – 0.1201)
D	3.05 – 3.10 (0.1201 – 0.1220)
F	3.10 – 3.15 (0.1220 – 0.1240)


D11206

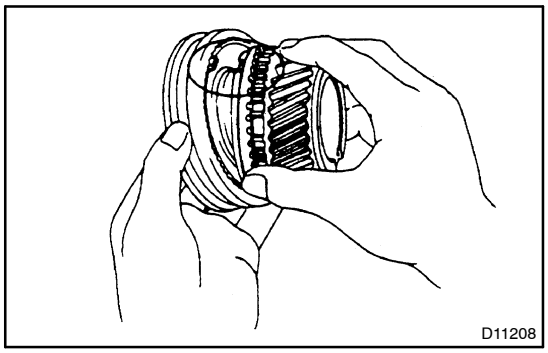
(b) Using snap ring pliers, install the snap ring.

25. INSPECT 3RD GEAR THRUST CLEARANCE (See step 1)

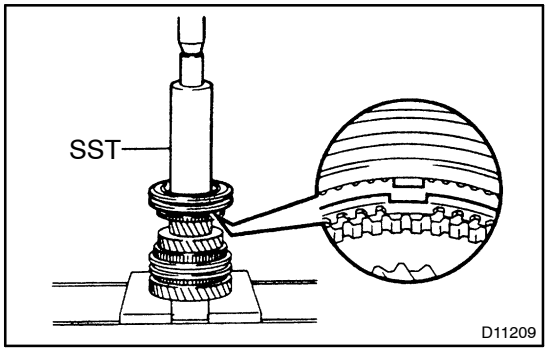


26. INSTALL 5TH GEAR AND TRANSMISSION HUB SLEEVE NO.3

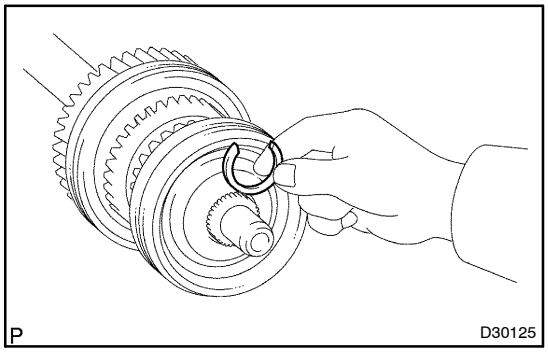
(a) Install the spacer on the output shaft.



(b) Apply gear oil to the needle roller bearing.
(c) Place the synchronizer ring on the gear and align the ring slots with the shifting keys.
(d) Install the needle roller bearing in the 5th gear.



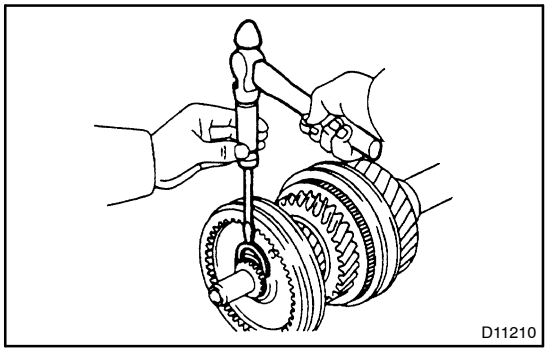
(e) Using SST and a press, press in the 5th gear and hub sleeve No. 3.
SST 09316–60011 (09316–00011)



27. INSTALL TRANSMISSION CLUTCH HUB NO.3 SHAFT SNAP RING

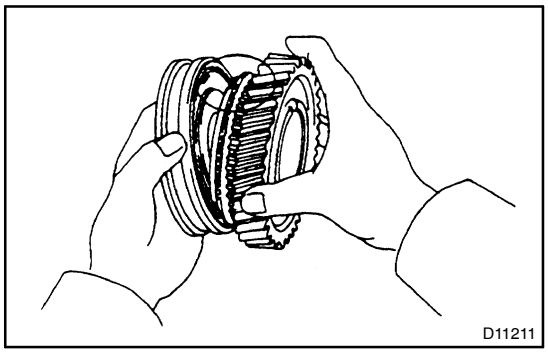
(a) Select a snap ring that allows minimum axial play.

Mark	Thickness mm (in.)
4	1.90 – 1.95 (0.0748 – 0.0768)
5	1.95 – 2.00 (0.0768 – 0.0787)
6	2.00 – 2.05 (0.0787 – 0.0807)
7	2.05 – 2.10 (0.0807 – 0.0827)
8	2.10 – 2.15 (0.0827 – 0.0846)
9	2.15 – 2.20 (0.0846 – 0.0866)



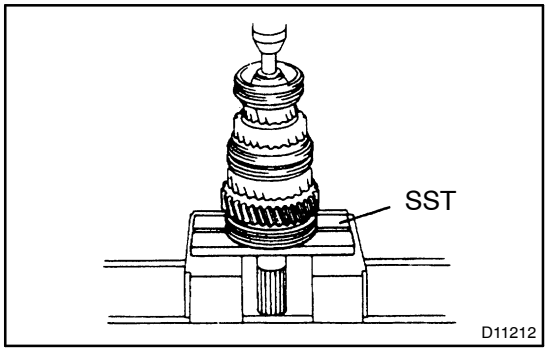
(b) Using a screwdriver and hammer, tap in the snap ring.

28. INSPECT 5TH GEAR THRUST CLEARANCE (See step 1)



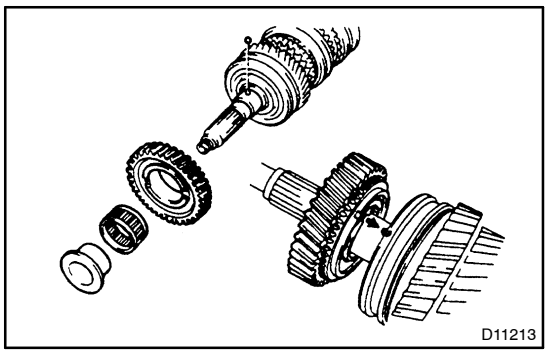
29. INSTALL 1ST GEAR AND TRANSMISSION HUB SLEEVE NO.1

(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 1st gear.



(d) Using SST and a press, install the 1st gear and hub sleeve No.1.
SST 09527–30010

30. INSPECT 1ST GEAR THRUST CLEARANCE (See step 1)

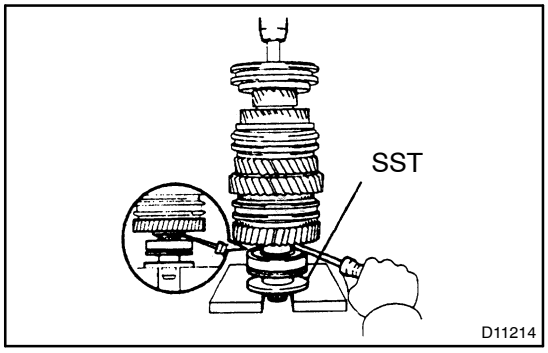


31. INSTALL REVERSE GEAR BEARING

(a) Install the steel ball into the output shaft.
(b) Apply gear oil to the needle roller bearing.
(c) Install the needle roller bearing and the inner race in the reverse gear.

32. INSTALL REVERSE GEAR

(a) Install the reverse gear on the shaft.



33. INSTALL OUTPUT SHAFT REAR BEARING

(a) Using SST and a press, press in the bearing on the shaft with the outer race snap ring groove toward the rear.
SST 09316–60011 (09316–00041)

HINT:
Using a screwdriver, hold the reverse gear and inner race to prevent it from falling.

34. INSPECT REVERSE GEAR THRUST CLEARANCE (See step 1)