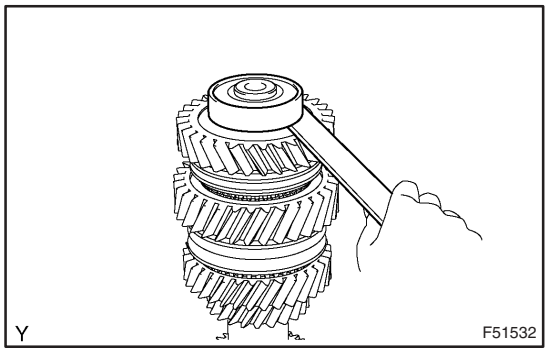
OVERHAUL



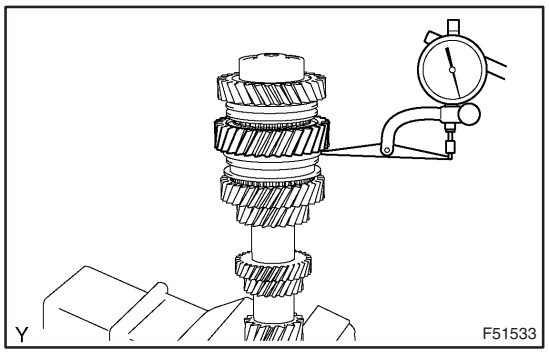
1. INSPECT REVERSE GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the reverse gear thrust clearance.

Standard clearance:

0.125 to 0.375 mm (0.0049 to 0.0148 in.)

If the clearance is out of specification, replace the synchronizer ring No.4.



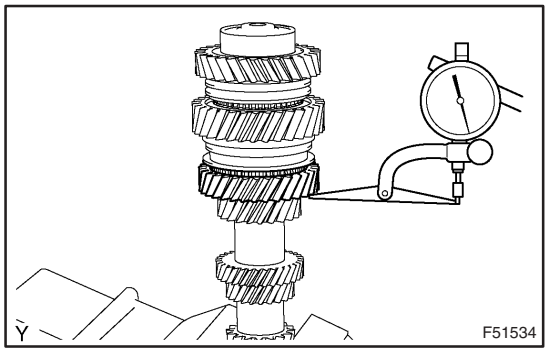
2. INSPECT 1ST GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 1st gear thrust clearance.

Standard clearance:

0.10 to 0.43 mm (0.0039 to 0.0169 in.)

If the clearance is out of specification, replace the synchronizer ring set No.1.



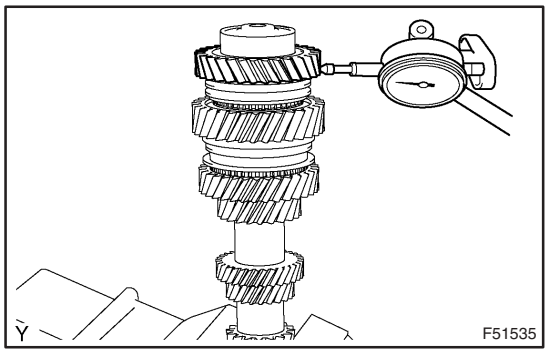
3. INSPECT 2ND GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 2nd gear thrust clearance.

Standard clearance:

0.10 to 0.43 mm (0.0039 to 0.0169 in.)

If the clearance is out of specification, replace the synchronizer ring set No.1.



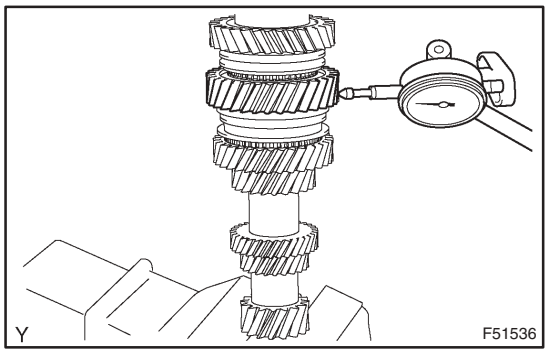
4. INSPECT REVERSE GEAR RADIAL CLEARANCE

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

Standard clearance:

0.015 to 0.065 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the reverse gear needle roller bearing or shaft.

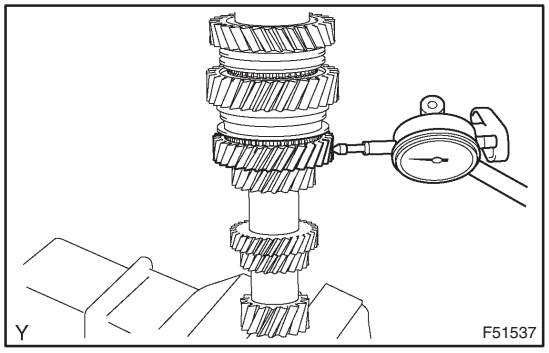


5. INSPECT 1ST GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 1st gear radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the 1st gear needle roller bearing or shaft.

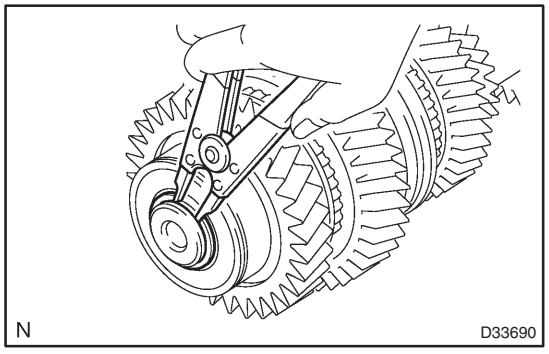


6. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 2nd gear radial clearance.

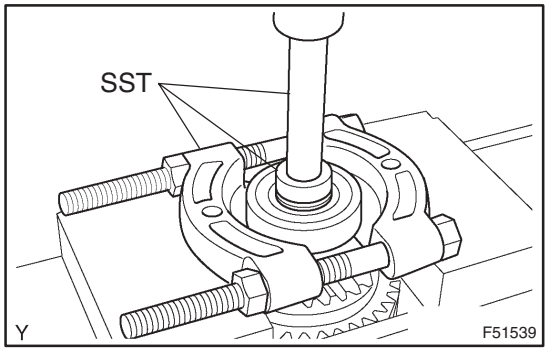
Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the 2nd gear needle roller bearing or shaft.



7. REMOVE COUNTER GEAR FRONT BEARING SNAP RING NO.1

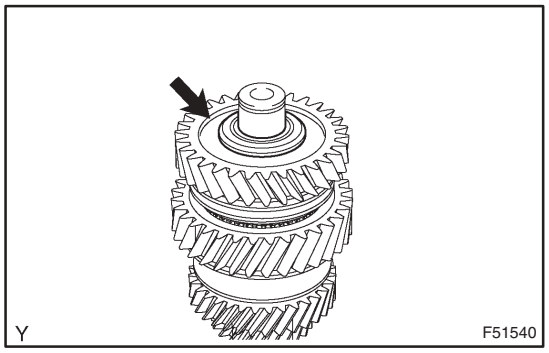
(a) Using a snap ring expander, remove the counter gear front bearing snap ring No.1 from the counter gear.



8. REMOVE COUNTER GEAR FRONT BEARING

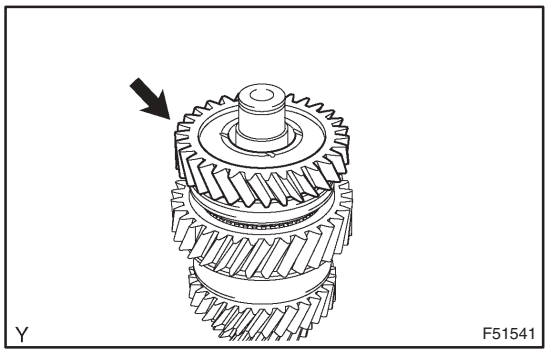
(a) Using SST and a press, remove the counter gear front bearing from the counter gear.

SST 09950–00020, 09950–70010 (09951–07100), 09950–60010 (09951–00320)



9. REMOVE REVERSE GEAR BEARING RACE INNER

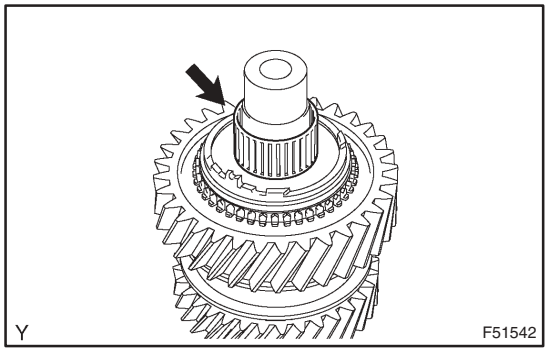
(a) Remove the reverse gear bearing race inner from the counter gear.



10. REMOVE COUNTER SHAFT REVERSE GEAR

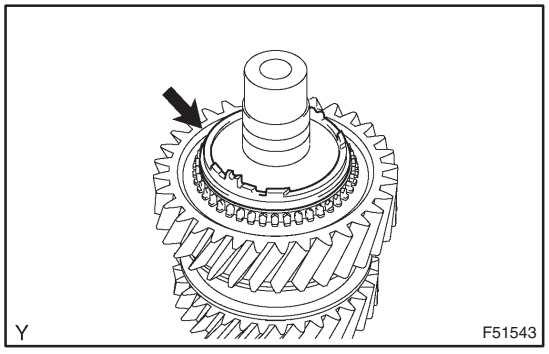
(a) Remove the counter shaft reverse gear from the counter gear.

(b) Remove the transmission hub sleeve No.3, synchromesh shifting key spring No.3 and synchromesh shifting key No.3.



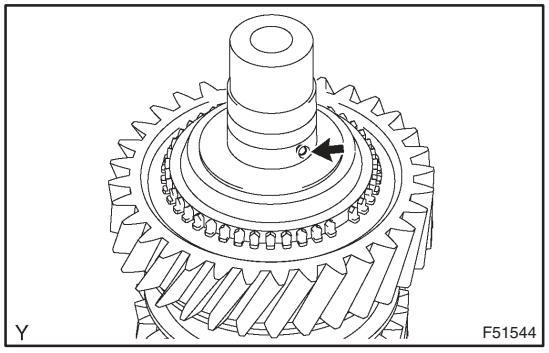
11. REMOVE REVERSE GEAR NEEDLE ROLLER BEARING

(a) Remove the reverse gear needle roller bearing from the counter gear.



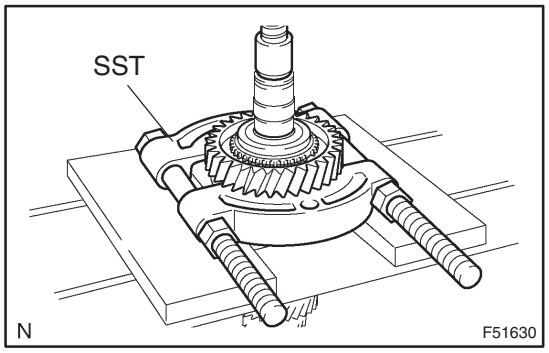
12. REMOVE SYNCHRONIZER RING NO.4

(a) Remove the synchronizer ring No.4 from the counter gear.



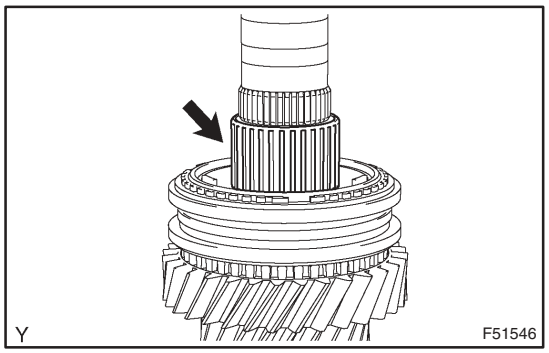
13. REMOVE BALL

(a) Remove the ball from the counter gear.



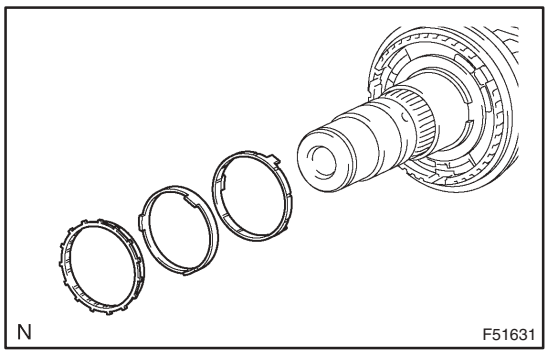
14. REMOVE COUNTER SHAFT 1ST SPEED GEAR

(a) Using a press, remove the counter shaft 1st speed gear with the reverse gear spline piece from the counter gear.
SST 09950–00020



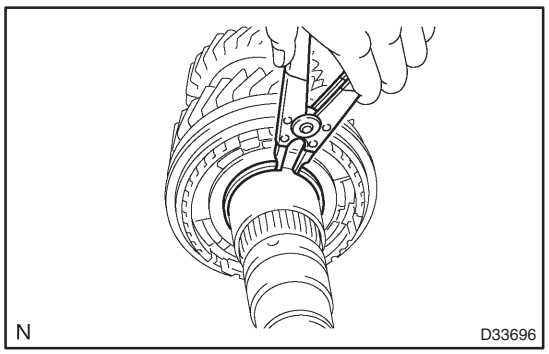
15. REMOVE 1ST GEAR NEEDLE ROLLER BEARING

(a) Remove the 1st gear needle roller bearing from the counter gear.



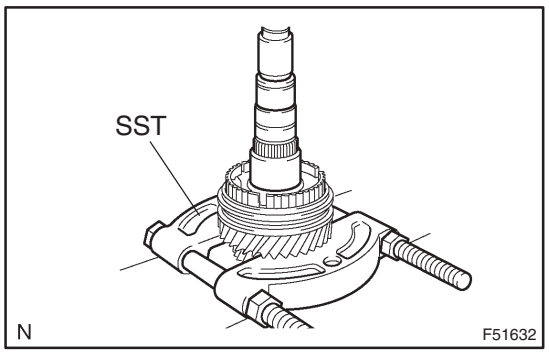
16. REMOVE SYNCHRONIZER RING SET NO.1 (FOR 1ST GEAR)

(a) Remove the synchronizer ring set No.1 from the counter gear.



17. REMOVE CLUTCH HUB NO.1 SHAFT SNAP RING

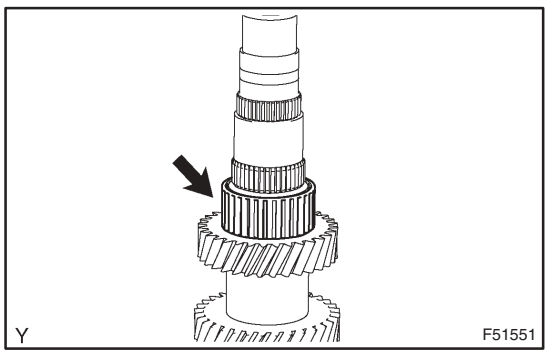
(a) Using a snap ring expander, remove the clutch hub No.1 shaft snap ring from the counter gear.



18. REMOVE COUNTER SHAFT 2ND SPEED GEAR

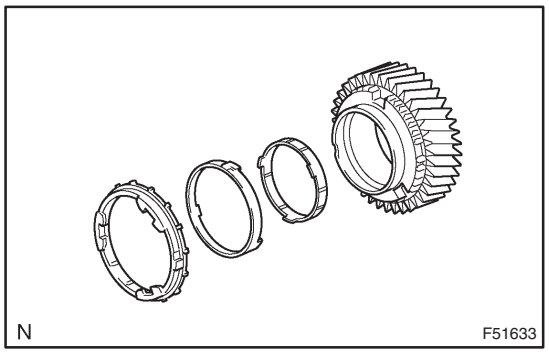
(a) Using a press, remove the counter shaft 2nd speed gear with the transmission clutch hub No.1 from the counter gear.

SST 09950–00020



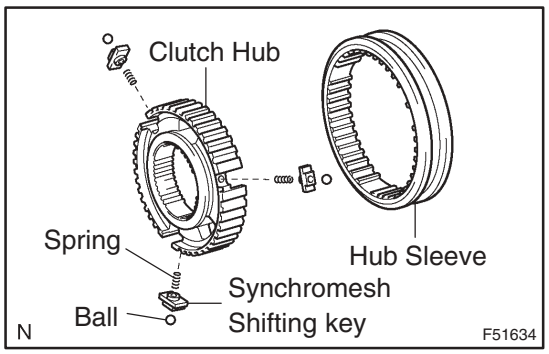
19. REMOVE 2ND GEAR NEEDLE ROLLER BEARING

(a) Remove the 2nd gear needle roller bearing from the counter gear.



20. REMOVE SYNCHRONIZER RING SET NO.1 (FOR 2ND GEAR)

(a) Remove the synchronizer ring set No.1 from the 2nd gear.

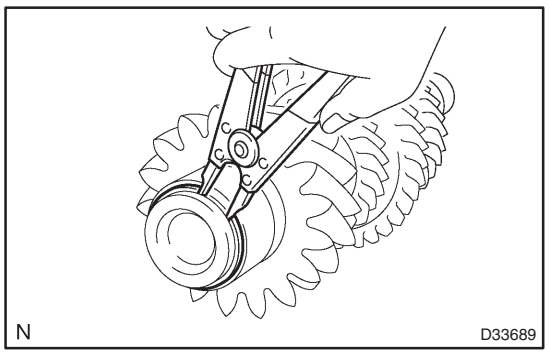


21. REMOVE TRANSMISSION CLUTCH HUB NO.1

(a) Remove the hub sleeve, 3 synchromesh shifting keys, 3 balls and 3 springs from the clutch hub.

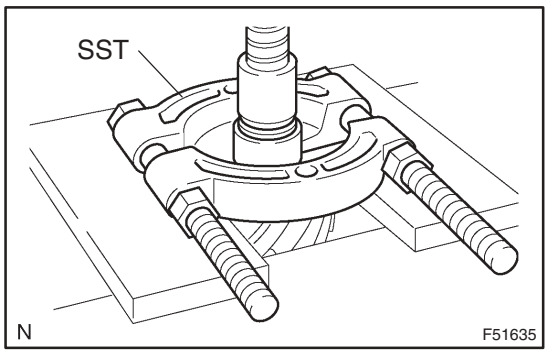
NOTICE:

Use a shop rag to prevent the balls and springs from scattering.



22. REMOVE SNAP RING COUNTER GEAR REAR BEARING

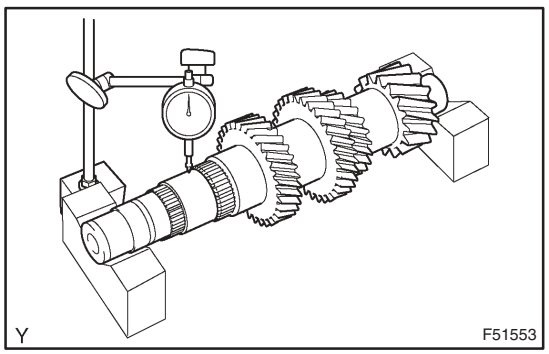
(a) Using a snap ring expander, remove the snap ring from the counter gear.



23. REMOVE CYLINDRICAL ROLLER BEARING INNER RACE

(a) Using SST and a press, remove the cylindrical roller bearing inner race.

SST 09950–00020

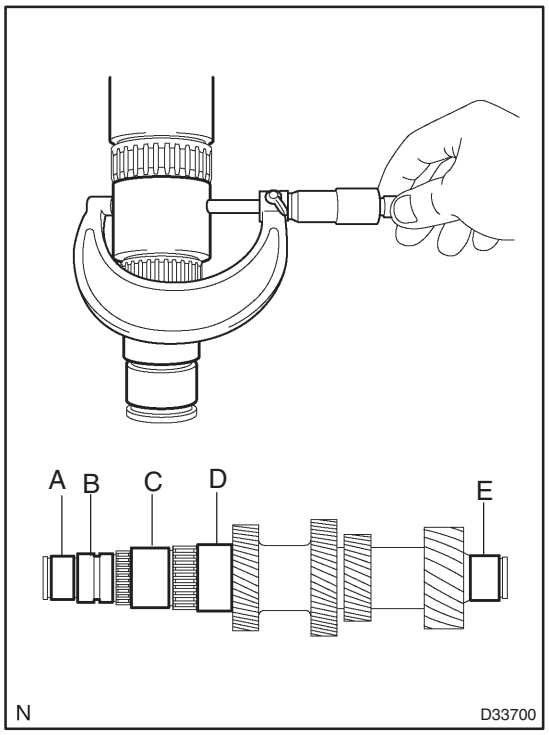


24. INSPECT COUNTER GEAR

(a) Using a dial indicator and 2 V–blocks, measure the shaft runout.

Maximum runout: 0.03 mm (0.0012 in.)

If the runout exceeds the maximum, replace the counter gear.



(b) Using a micrometer, measure the outer diameter of the counter gear journal surface.

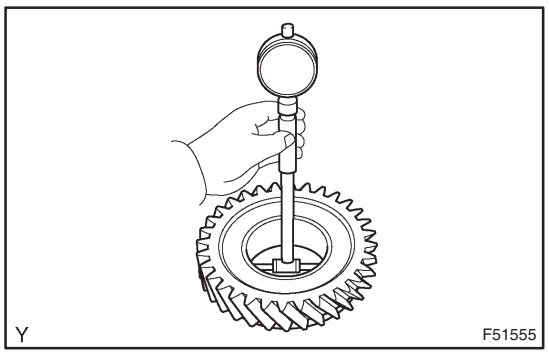
Standard:

Part	Outer diameter mm (in.)
A	34.002 to 34.015 (1.3387 to 1.3392)
B	36.985 to 37.000 (1.4561 to 1.4567)
C	47.985 to 48.000 (1.8892 to 1.8898)
D	53.985 to 54.000 (2.1254 to 2.1260)
E	34.002 to 34.015 (1.3387 to 1.3392)

Minimum:

Part	Outer diameter mm (in.)
A	34.002 (1.3387)
B	36.985 (1.4561)
C	47.985 (1.8892)
D	53.985 (2.1254)
E	34.002 (1.3387)

If the diameter is less than the minimum, replace the counter gear.

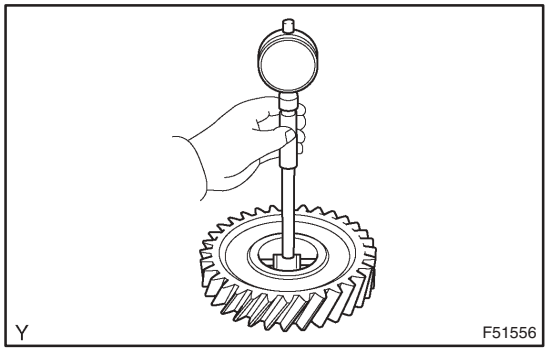


25. INSPECT COUNTER SHAFT REVERSE GEAR

(a) Using a cylinder gauge, measure the inside diameter of the counter shaft reverse gear.

Standard inside diameter:
51.015 to 51.040 mm (2.0085 to 2.0095 in.)
Maximum inside diameter: 51.040 mm (2.0095 in.)

If the inside diameter exceeds the maximum, replace the counter shaft reverse gear.

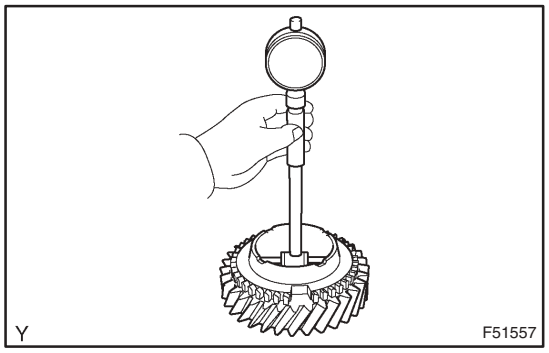


26. INSPECT COUNTER SHAFT 1ST SPEED GEAR

(a) Using a cylinder gauge, measure the inside diameter of the counter shaft 1st speed gear.

Standard inside diameter:
54.015 to 54.040 mm (2.1266 to 2.1276 in.)
Maximum inside diameter: 54.040 mm (2.1276 in.)

If the inside diameter exceeds the maximum, replace the counter shaft 1st speed gear.

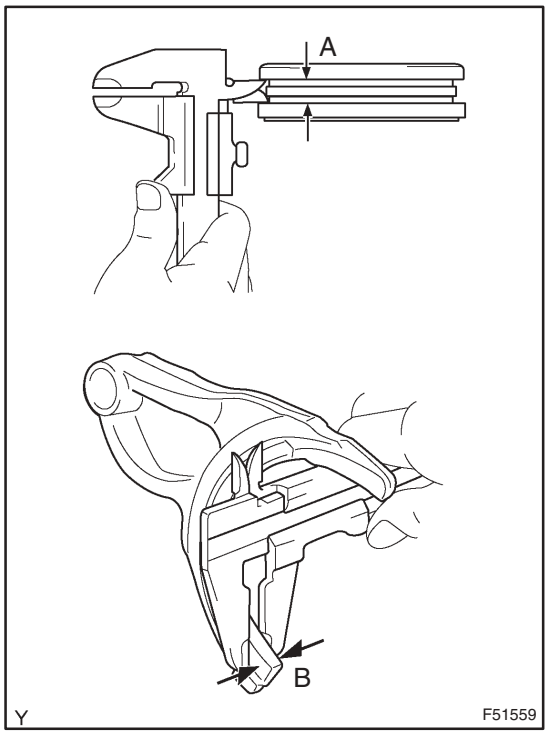


27. INSPECT COUNTER SHAFT 2ND SPEED GEAR

(a) Using a cylinder gauge, measure the inside diameter of the counter shaft 2nd speed gear.

Standard inside diameter:
60.015 to 60.040 mm (2.3628 to 2.3638 in.)
Maximum inside diameter: 60.040 mm (2.3638 in.)

If the inside diameter exceeds the maximum, replace the counter shaft 2nd speed gear.

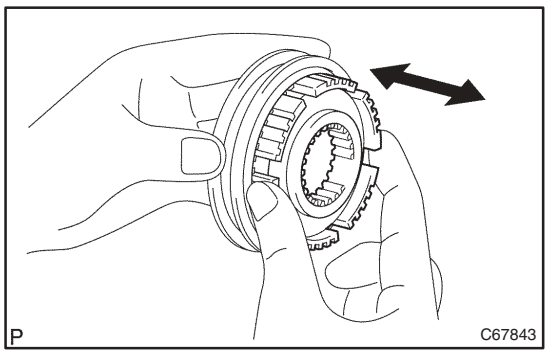


28. INSPECT TRANSMISSION HUB SLEEVE NO.3

(a) Using vernier calipers, measure the width of the transmission hub sleeve No.3 groove (A) and the thickness of the claw part on the gear shift fork No.4 (B), and calculate the clearance.

Standard clearance (A – B):
0.26 to 0.84 mm (0.0102 to 0.0331 in.)

If the clearance is out of specification, replace the transmission hub sleeve No.3 and gear shift fork No.4.

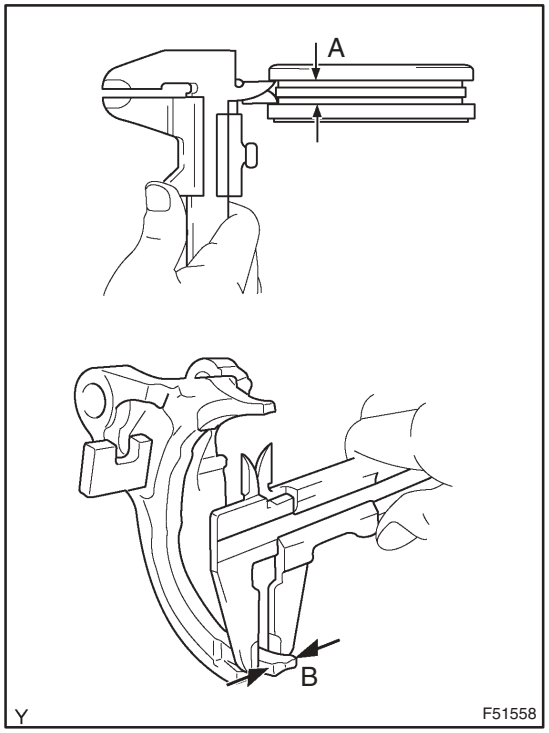


29. INSPECT TRANSMISSION HUB SLEEVE NO.1

(a) Check the sliding condition between the transmission hub No.1 and transmission hub sleeve No.1.

(b) Check that the spline gear edges of the transmission hub sleeve No.1 are not worn down.

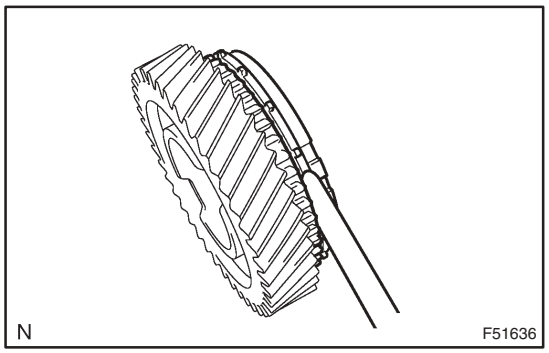
If there are any defects, replace the transmission hub sleeve No.1.



(c) Using vernier calipers, measure the width of the transmission hub sleeve No.1 groove (A) and the thickness of the claw part on the gear shift fork No.1 (B), and calculate the clearance.

Standard clearance (A – B):
0.15 to 0.35 mm (0.0059 to 0.0138 in.)

If the clearance is out of specification, replace the transmission hub sleeve No.1 and gear shift fork No.1.

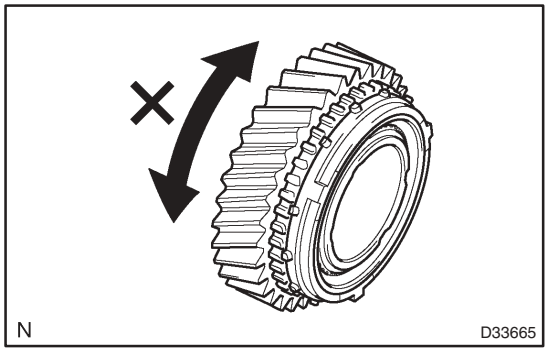


30. INSPECT SYNCHRONIZER RING NO.4

(a) Using a feeler gauge, measure the clearance between the synchronizer ring and reverse gear.

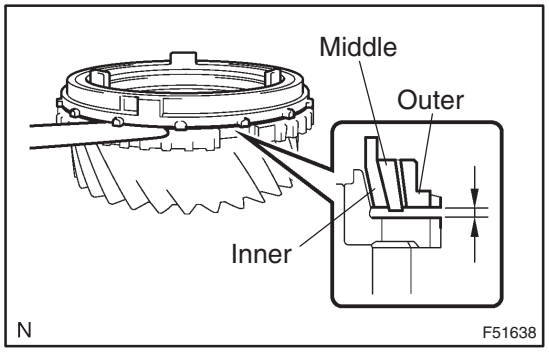
Standard clearance:
0.70 to 1.30 mm (0.0276 to 0.0512 in.)
Minimum clearance:
0.70 mm (0.0276 in.)

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



(b) Apply gear oil to the reverse gear cone. Press the synchronizer ring against the reverse gear cone and check that the synchronizer ring does not turn in the directions shown in the illustration.

If it turns, replace the synchronizer ring.

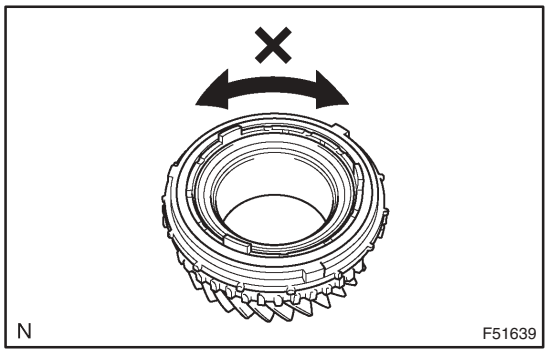


31. INSPECT SYNCHRONIZER RING SET NO.1 (FOR 1ST GEAR)

(a) Using a feeler gauge, measure the clearance between the synchronizer ring and 1st gear.

Standard clearance:
Inner: 1.48 to 2.12 mm (0.0583 to 0.0835 in.)
Middle: 0.68 to 1.92 mm (0.0268 to 0.0756 in.)
Outer: 0.88 to 1.72 mm (0.0346 to 0.0677 in.)
Minimum clearance:
Inner: 1.48 mm (0.0583 in.)
Middle: 0.68 mm (0.0268 in.)
Outer: 0.88 mm (0.0346 in.)

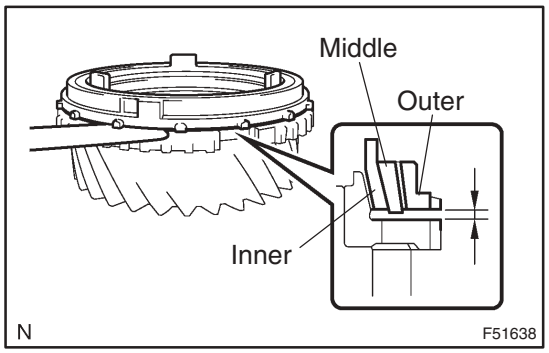
If the clearance is less than the minimum, replace the synchronizer ring.



(b) Apply gear oil to the 1st gear cone. Press the synchronizer ring against the 1st gear cone and check that the synchronizer ring does not turn in the directions shown in the illustration.

If it turns, replace the synchronizer ring.

(c) Recheck the braking effect of the synchronizer ring.

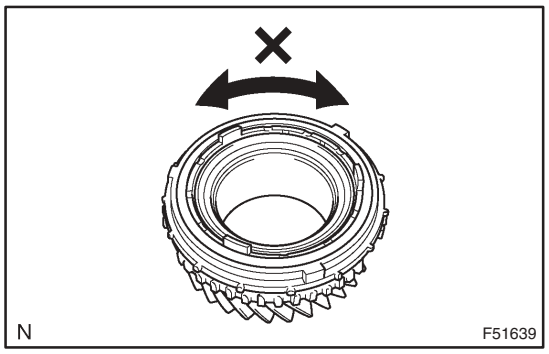


32. INSPECT SYNCHRONIZER RING SET NO.1 (FOR 2ND GEAR)

(a) Using a feeler gauge, measure the clearance between the synchronizer ring and 2nd gear.

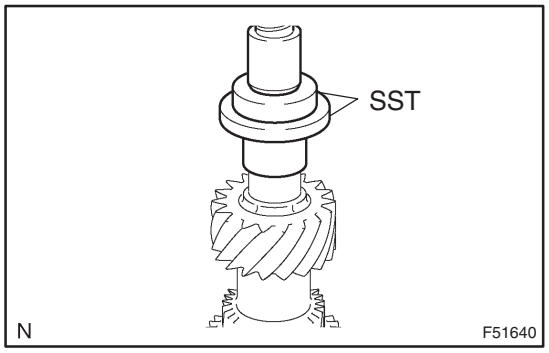
Standard clearance:
Inner: 1.48 to 2.12 mm (0.0583 to 0.0835 in.)
Middle: 0.68 to 1.92 mm (0.0268 to 0.0756 in.)
Outer: 0.88 to 1.72 mm (0.0346 to 0.0677 in.)
Minimum clearance:
Inner: 1.48 mm (0.0583 in.)
Middle: 0.68 mm (0.0268 in.)
Outer: 0.88 mm (0.0346 in.)

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



(b) Apply gear oil to the 2nd gear cone. Press the synchronizer ring against the 2nd gear cone and check that the synchronizer ring does not turn in the directions shown in the illustration.

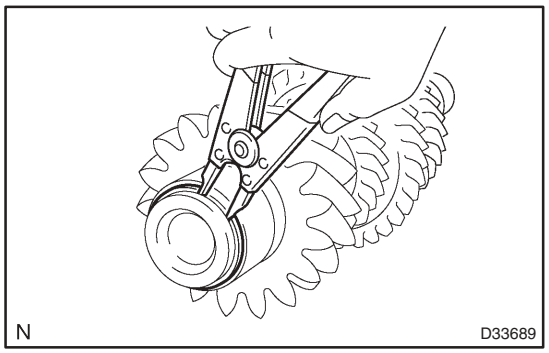
If it turns, replace the synchronizer ring.



33. INSTALL CYLINDRICAL ROLLER BEARING INNER RACE

(a) Using SST and a press, install a new cylindrical roller bearing inner race.

SST 09950–60010 (09951–00540)



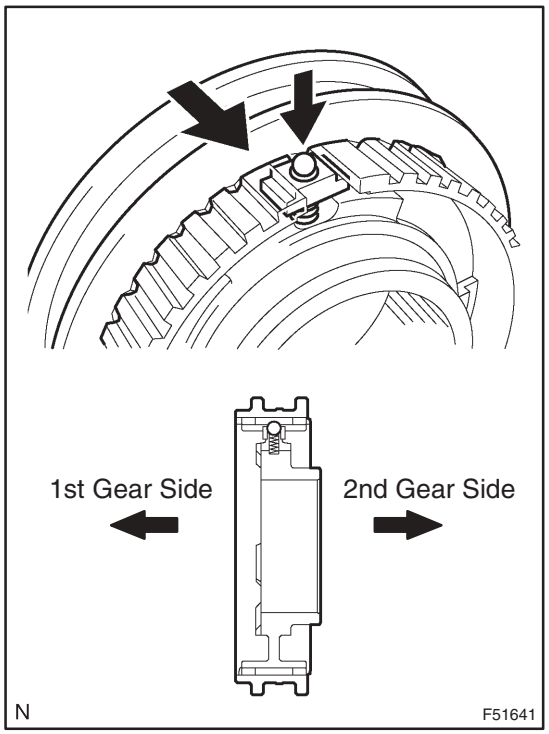
34. INSTALL SNAP RING COUNTER GEAR REAR BEARING

(a) Select a snap ring counter gear rear bearing that will allow for the minimum amount of axial play.

Standard clearance:
0.1 mm (0.004 in.) or less
Snap ring thickness:

Part No.	Thickness: mm (in.)	Mark
90520–31015	2.35 to 2.40 (0.0925 to 0.0945)	A
90520–31016	2.40 to 2.45 (0.0945 to 0.0965)	B
90520–31017	2.45 to 2.50 (0.0965 to 0.0984)	C
90520–31018	2.50 to 2.55 (0.0984 to 0.1004)	D
90520–31019	2.55 to 2.60 (0.1004 to 0.1024)	E
90520–31020	2.60 to 2.65 (0.1024 to 0.1043)	F
90520–31021	2.65 to 2.70 (0.1043 to 0.1063)	G
90520–31022	2.70 to 2.75 (0.1063 to 0.1083)	H
90520–31023	2.75 to 2.80 (0.1083 to 0.1102)	J
90520–31024	2.80 to 2.85 (0.1102 to 0.1122)	K
90520–31025	2.85 to 2.90 (0.1122 to 0.1142)	L
90520–31033	2.90 to 2.95 (0.1142 to 0.1161)	M

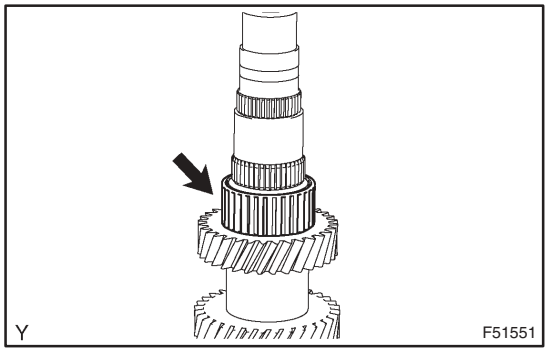
(b) Using a snap ring expander, install the snap ring to the counter gear.



35. INSTALL TRANSMISSION CLUTCH HUB NO.1

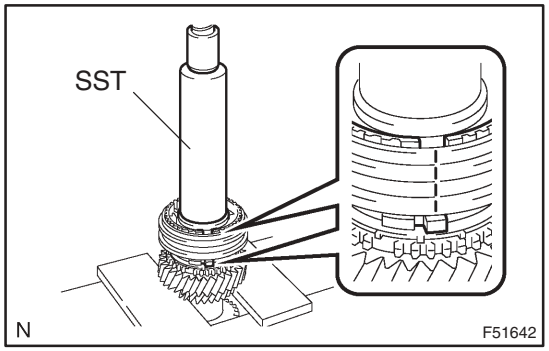
(a) Apply a thin layer of gear oil to the sleeve and hub.
(b) Install the clutch hub sleeve to the clutch hub.
(c) Install the 3 shifting keys to the clutch hub.
(d) Install the 3 shifting key springs to the clutch hub.
(e) Place the balls in the holes of the shifting keys, and install the hub sleeve while pushing in the balls.

NOTICE:
Take care to prevent the balls from scattering.



36. INSTALL 2ND GEAR NEEDLE ROLLER BEARING

(a) Coat the 2nd gear needle roller bearing with gear oil, and install it to the counter gear.

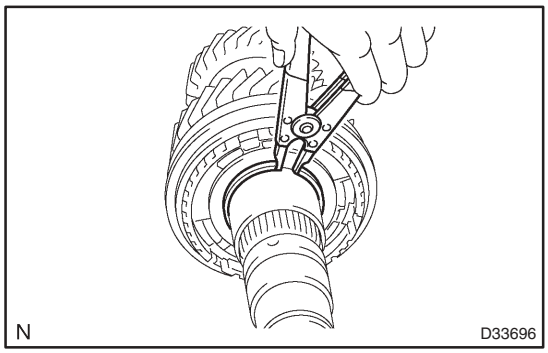


37. INSTALL COUNTER SHAFT 2ND SPEED GEAR

(a) Coat the counter shaft 2nd speed gear with gear oil, and install it to the counter gear.
(b) Coat the synchronizer ring set No.1 (for 2nd gear) with gear oil, and install them to the counter gear.
(c) Using SST and a press, install the transmission clutch hub No.1 to the counter gear.
SST 09308–14010

HINT:
Make sure that the protruding part on the synchronizer ring is fitted into the groove of the clutch hub.

NOTICE:
After installation, make sure that the gear and synchronizer ring move smoothly.



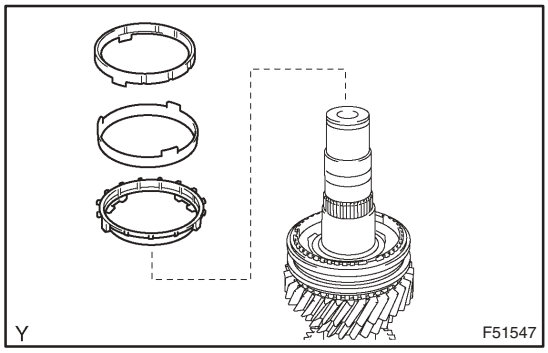
38. INSTALL CLUTCH HUB NO.1 SHAFT SNAP RING

(a) Select a clutch hub No.1 shaft snap ring that will allow for the minimum amount of axial play.

Standard clearance:
0.1 mm (0.004 in.) or less
Snap ring thickness:

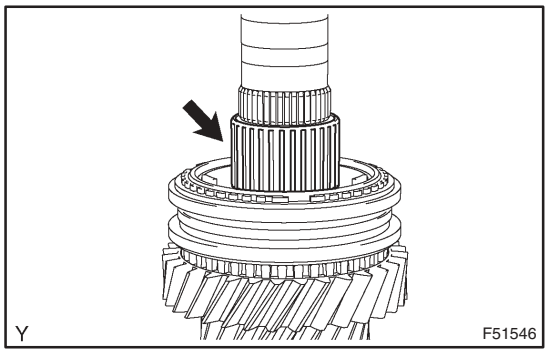
Part No.	Thickness: mm (in.)	Mark
90520–45013	2.28 to 2.33 (0.0898 to 0.0917)	A
90520–45014	2.33 to 2.38 (0.0917 to 0.0937)	B
90520–45015	2.38 to 2.43 (0.0937 to 0.0957)	C
90520–45016	2.43 to 2.48 (0.0957 to 0.0976)	D
90520–45017	2.48 to 2.53 (0.0976 to 0.0996)	E
90520–45018	2.53 to 2.58 (0.0996 to 0.1016)	F
90520–45019	2.58 to 2.63 (0.1016 to 0.1035)	G

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



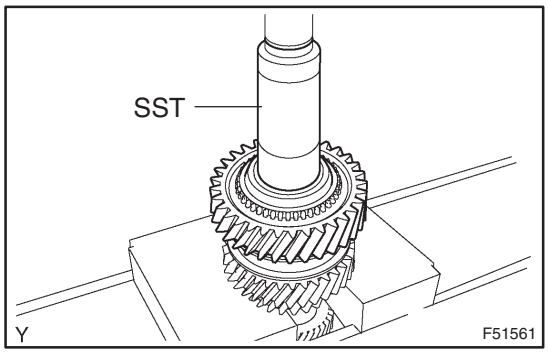
39. INSTALL SYNCHRONIZER RING SET NO.1 (FOR 1ST GEAR)

(a) Coat the synchronizer ring set No.1 with gear oil, and install them to the counter gear.



40. INSTALL 1ST GEAR NEEDLE ROLLER BEARING

(a) Coat the 1st gear needle roller bearing with gear oil, and install it to the counter gear.

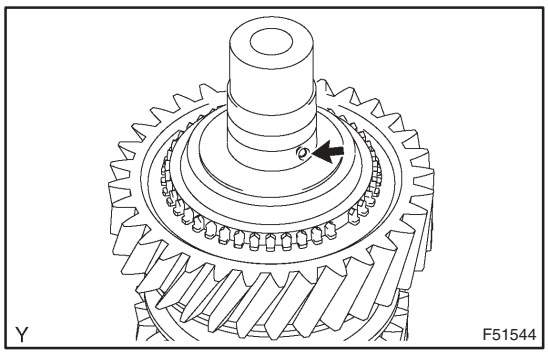


41. INSTALL COUNTER SHAFT 1ST SPEED GEAR

(a) Coat the counter shaft 1st speed gear with gear oil, and install it to the counter gear.

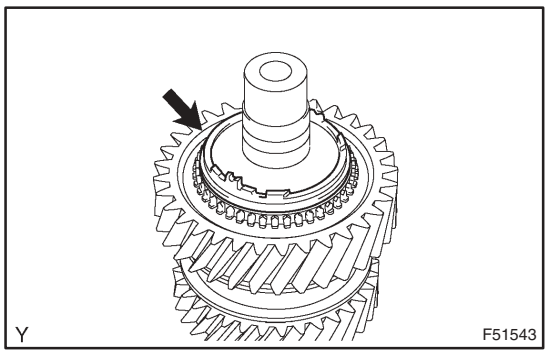
(b) Using SST and a press, install the reverse gear spline piece.

SST 09309–37010



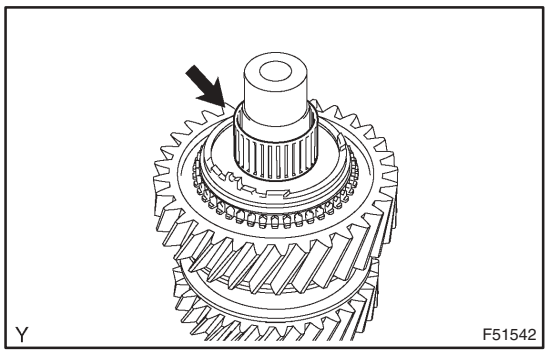
42. INSTALL BALL

(a) Install the ball to the counter gear.



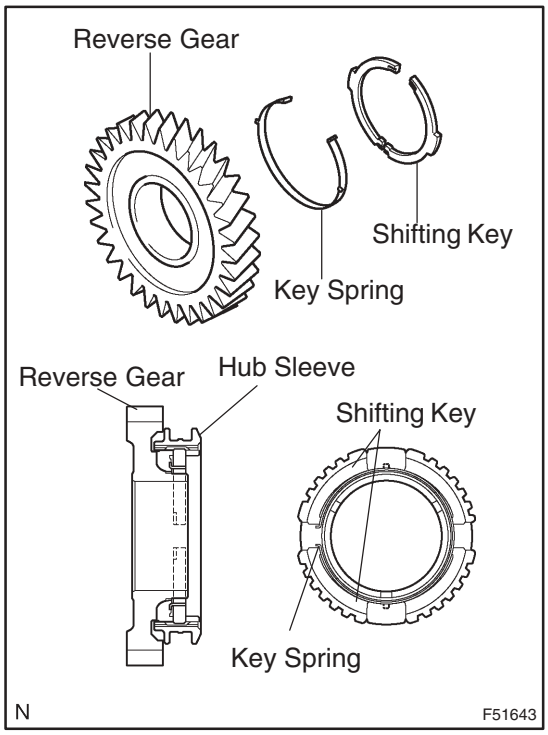
43. INSTALL SYNCHRONIZER RING NO.4

(a) Coat the synchronizer ring No.4 with gear oil, and install it to the counter gear.



44. INSTALL REVERSE GEAR NEEDLE ROLLER BEARING

(a) Coat the reverse gear needle roller bearing with gear oil, and install it to the counter gear.



45. INSTALL COUNTER SHAFT REVERSE GEAR

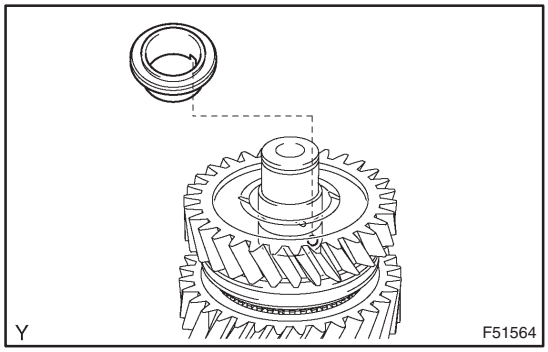
(a) Install the key spring and 2 shifting keys to the reverse gear.

HINT:

- Install the shifting keys with the grooves on the reverse gear side.
- Install the key spring with its claw on the reverse gear side.
- Refer to the illustration when installing the key spring and shifting keys.

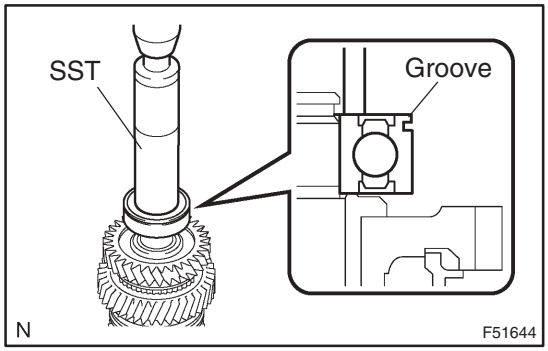
(b) Install the hub sleeve to the reverse gear as shown in the illustration.

(c) Coat the counter shaft reverse gear with gear oil, and install it to the counter gear.



46. INSTALL REVERSE GEAR BEARING RACE INNER

(a) Align the groove of the reverse gear bearing race inner with the ball, and install it.



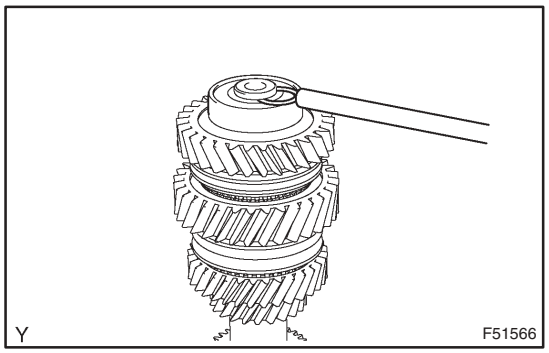
47. INSTALL COUNTER GEAR FRONT BEARING

(a) Using SST and a press, install the counter gear front bearing to the counter gear.

SST 09608–06041

HINT:

Make sure that the groove of the bearing faces in the direction shown in the illustration.



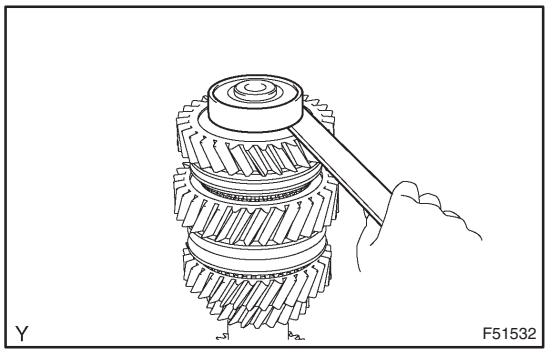
48. INSTALL COUNTER GEAR FRONT BEARING SNAP RING NO.1

(a) Select a counter gear front bearing snap ring that will allow for the minimum amount of axial play.

Standard clearance:
0.1 mm (0.004 in.) or less
Snap ring thickness:

Part No.	Thickness: mm (in.)	Mark
90520–31015	2.35 to 2.40 (0.0925 to 0.0945)	A
90520–31016	2.40 to 2.45 (0.0945 to 0.0965)	B
90520–31017	2.45 to 2.50 (0.0965 to 0.0984)	C
90520–31018	2.50 to 2.55 (0.0984 to 0.1004)	D
90520–31019	2.55 to 2.60 (0.1004 to 0.1024)	E
90520–31020	2.60 to 2.65 (0.1024 to 0.1043)	F
90520–31021	2.65 to 2.70 (0.1043 to 0.1063)	G
90520–31022	2.70 to 2.75 (0.1063 to 0.1083)	H
90520–31023	2.75 to 2.80 (0.1083 to 0.1102)	J
90520–31024	2.80 to 2.85 (0.1102 to 0.1122)	K
90520–31025	2.85 to 2.90 (0.1122 to 0.1142)	L
90520–31033	2.90 to 2.95 (0.1142 to 0.1161)	M

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

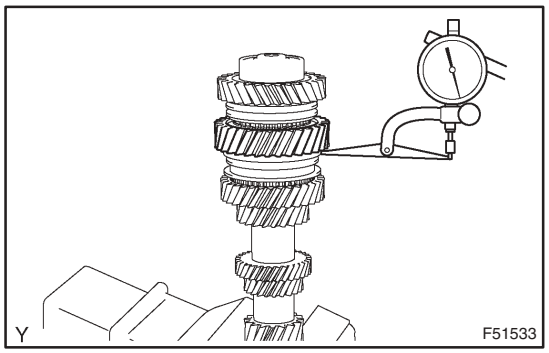


49. INSPECT REVERSE GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the reverse gear thrust clearance.

Standard clearance:
0.125 to 0.375 mm (0.0049 to 0.0148 in.)

If the clearance is out of specification, replace the synchronizer ring No.4.

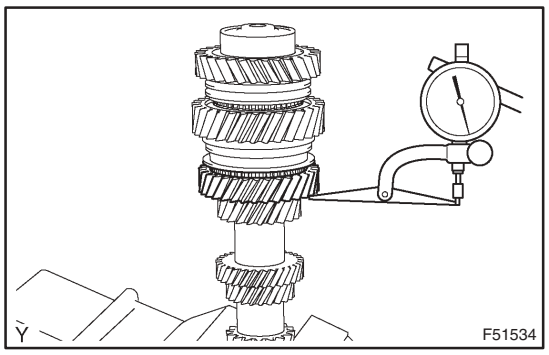


50. INSPECT 1ST GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 1st gear thrust clearance.

Standard clearance:
0.10 to 0.43 mm (0.0039 to 0.0169 in.)

If the clearance is out of specification, replace the synchronizer ring set No.1.

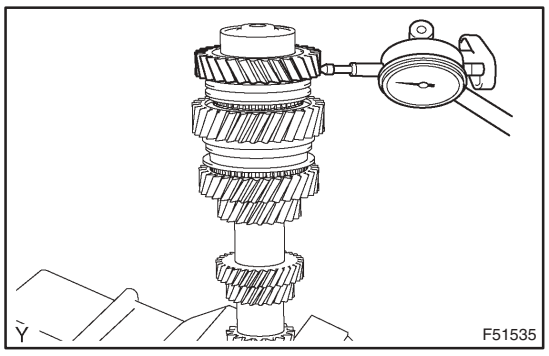


51. INSPECT 2ND GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 2nd gear thrust clearance.

Standard clearance:
0.10 to 0.43 mm (0.0039 to 0.0169 in.)

If the clearance is out of specification, replace the synchronizer ring set No.1.

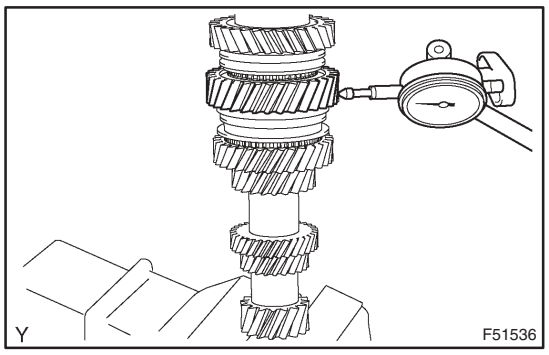


52. INSPECT REVERSE GEAR RADIAL CLEARANCE

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

Standard clearance:
0.015 to 0.065 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the reverse gear needle roller bearing or shaft.

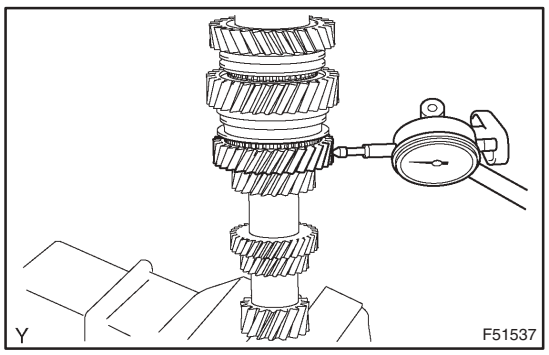


53. INSPECT 1ST GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 1st gear radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the 1st gear needle roller bearing or shaft.



54. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 2nd gear radial clearance.

Standard clearance:
0.015 to 0.067 mm (0.0006 to 0.0026 in.)

If the clearance is out of specification, replace the 2nd gear needle roller bearing or shaft.