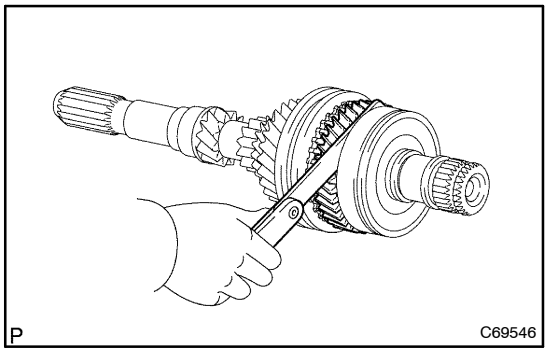
INPUT SHAFT ASSY (E354)

OVERHAUL

4103X–02

HINT:

COMPONENTS: See page 41–1.

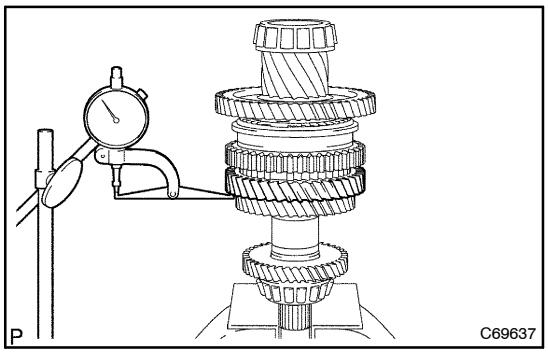


1. INSPECT 4TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the 4th gear thrust clearance.

Standard clearance:

0.10 – 0.57 mm (0.0039– 0.0224 in.)

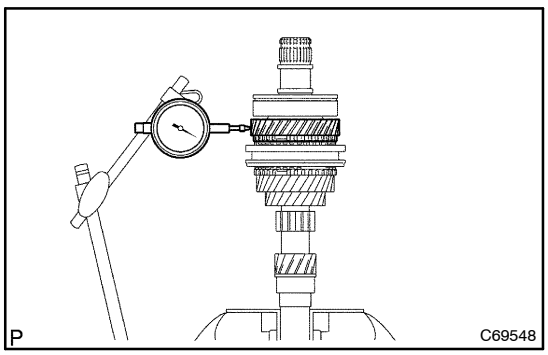


2. INSPECT 3RD GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 3rd gear thrust clearance.

Standard clearance:

0.10 – 0.35 mm (0.0039 – 0.0138 in.)



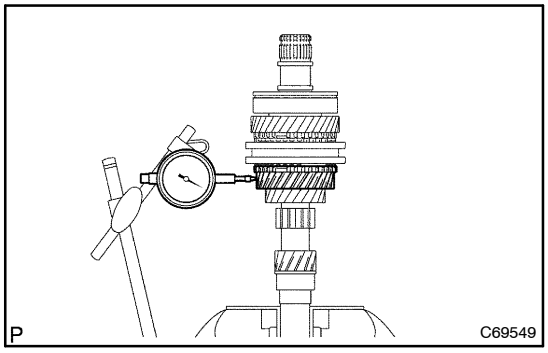
3. INSPECT 4TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 4th gear radial clearance.

Standard clearance: mm (in.)

Bearing	Standard clearance
KOYO made	0.009 – 0.053 (0.0004 – 0.0021)
NSK made	0.009 – 0.051 (0.0004 – 0.0020)

If the clearance exceeds the maximum, replace the 4th gear needle roller bearing.



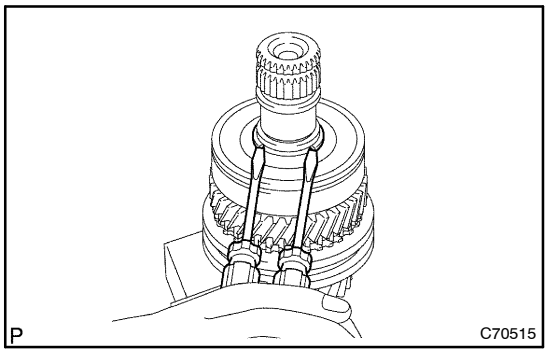
4. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 3rd gear radial clearance.

Standard clearance: mm (in.)

Bearing	Standard clearance
KOYO made	0.009 – 0.053 (0.0004 – 0.0021)
NSK made	0.009 – 0.051 (0.0004 – 0.0020)

If the clearance exceeds the maximum, replace the 3rd gear needle roller bearing.



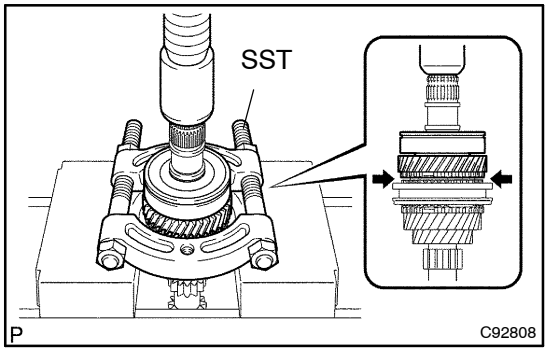
5. REMOVE 4TH GEAR

(a) Hold the input shaft assy and soft jaws with a vise.

(b) Using a 2 screwdrivers and a hammer, remove the input shaft rear bearing shaft snap ring from the input shaft.

NOTICE:

Using a waste to prevent the snap ring from being scattered.

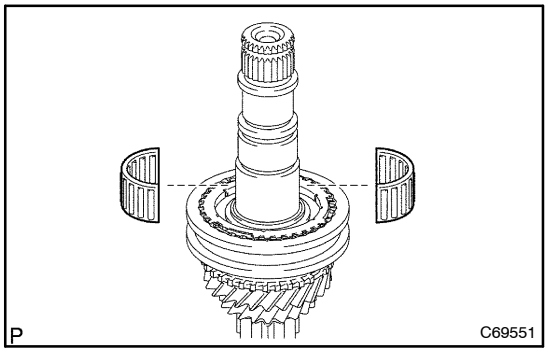


(c) Using SST and a press, remove the input shaft rear bearing and 4th gear.

SST 09950–00020

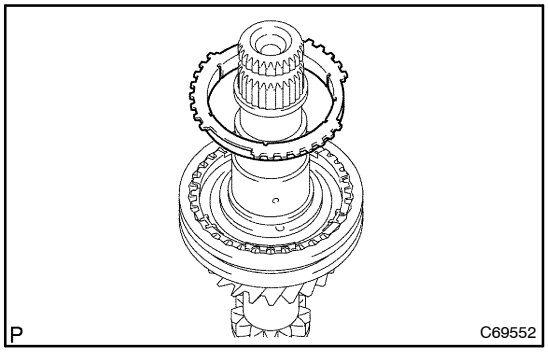
NOTICE:

Do not tighten SST excessively.



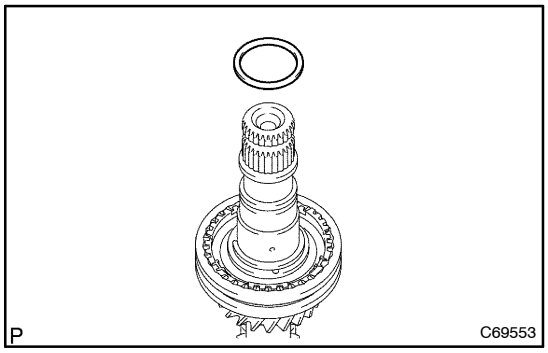
6. REMOVE 4TH GEAR NEEDLE ROLLER BEARING

(a) Remove the 4th gear needle roller bearing from the input shaft.



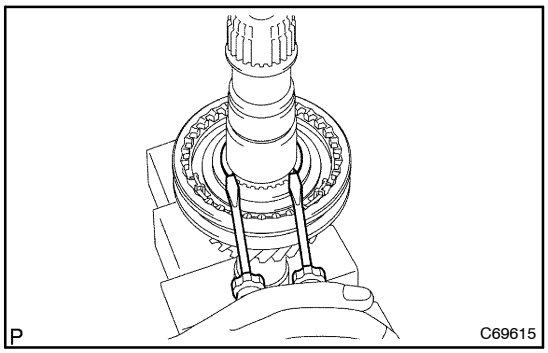
7. REMOVE 2ND SYNCHRONIZER OUTER RING

(a) Remove the 2nd synchronizer outer ring from the transmission clutch hub No.2.



8. REMOVE 4TH GEAR BEARING SPACER

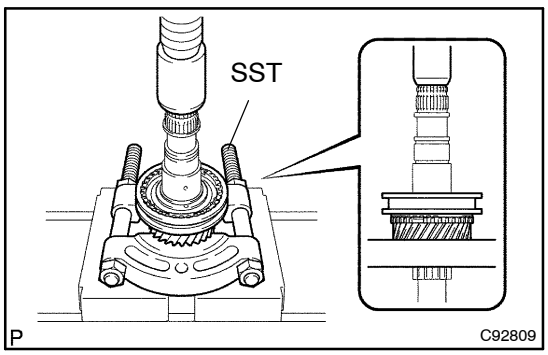
(a) Remove the 4th gear bearing spacer from the transmission clutch hub No.2.



9. REMOVE 3RD GEAR

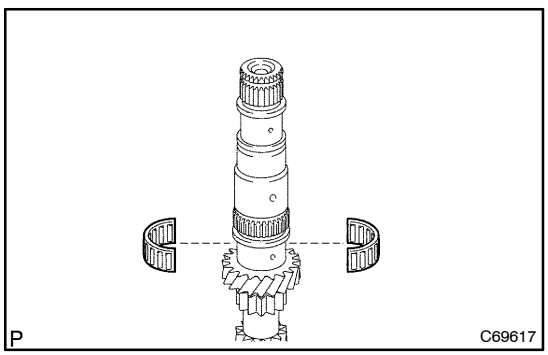
(a) Using 2 screwdrivers and a hammer, remove the clutch hub No.2 setting shaft snap ring from the input shaft.

NOTICE:
Using a waste to prevent the snap ring from being scattered.



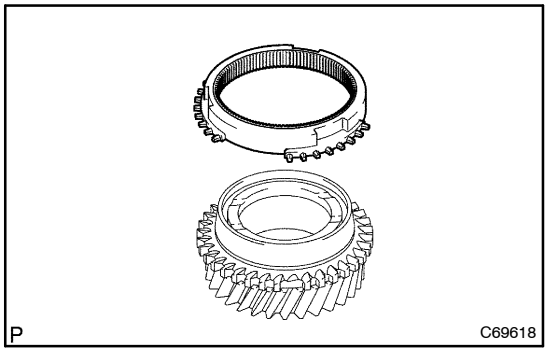
(b) Using SST and a press, remove the transmission clutch hub No.2 and 3rd gear from the input shaft.
SST 09950–00020

NOTICE:
Do not tighten SST excessively.



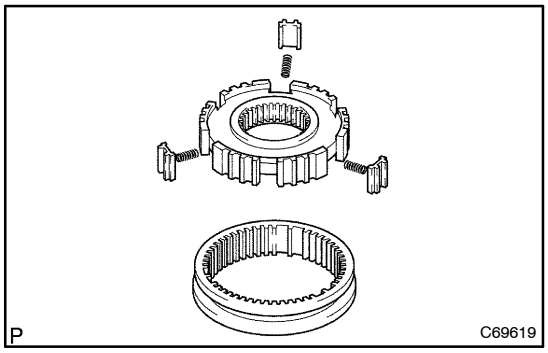
10. REMOVE 3RD GEAR NEEDLE ROLLER BEARING

(a) Remove the 3rd gear needle roller bearing from the input shaft.



11. REMOVE SYNCHRONIZER RING NO.3

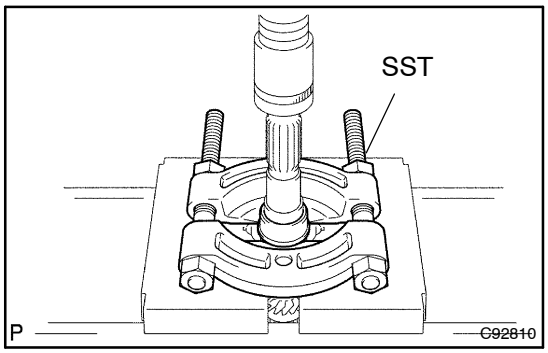
(a) Remove the synchronizer ring No.3 from the 3rd gear.



12. REMOVE TRANSMISSION HUB SLEEVE NO.2

(a) Remove the transmission hub sleeve No.2, 3 synchromesh shifting keys and 3 synchromesh shifting key springs from the transmission clutch hub No.2.

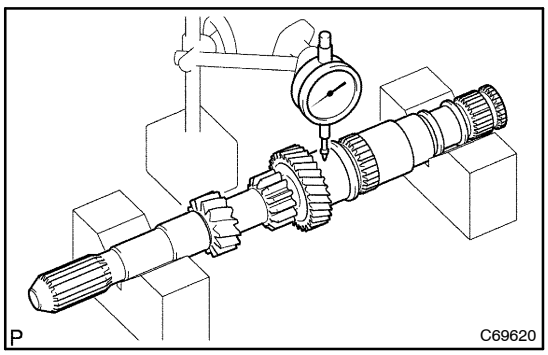
NOTICE:
Using a waste to prevent the shifting key and sifting key spring from being scattered.



13. REMOVE INPUT SHAFT FRONT BEARING

(a) Using SST and a press, remove the input shaft front bearing (inner race) from the input shaft.
SST 09950–00020

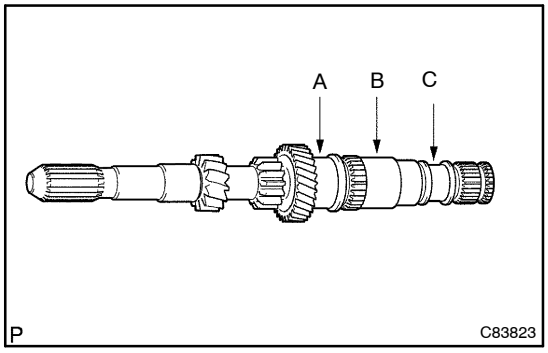
NOTICE:
Do not tighten SST excessively.



14. INSPECT INPUT SHAFT

(a) Using V–block and dial indicator, measure the shaft run out.
Maximum run out: 0.03 mm (0.0012 in.)

If the run out exceeds the maximum, replace the input shaft.

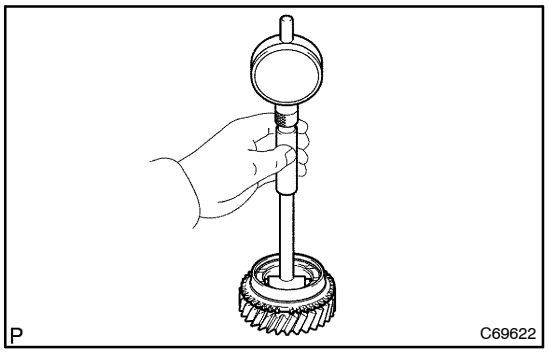


(b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

Outer diameter: mm (in.)

	Standard outer diameter	Minimum outer diameter
A	35.984 – 36.000 (1.4167 – 1.4173)	35.984 (1.4163)
B	35.984 – 36.000 (1.4167 – 1.4173)	35.984 (1.4163)
C	27.957 – 27.972 (1.1007 – 1.1103)	27.957 (1.1007)

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

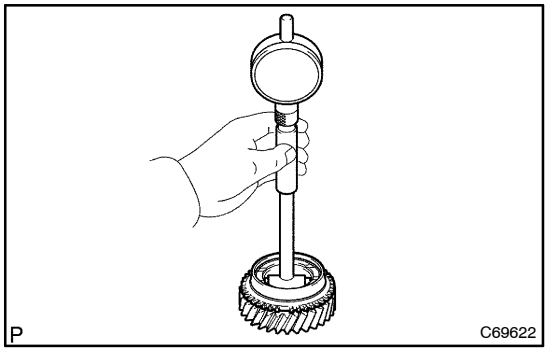


15. INSPECT 4TH GEAR

(a) Using a cylinder gauge, measure the inside diameter of the 4th gear.

Inside diameter: mm (in.)

Standard inside diameter	Maximum inside diameter
42.009 – 42.025 (1.6539 – 1.6545)	42.025 (1.6545)

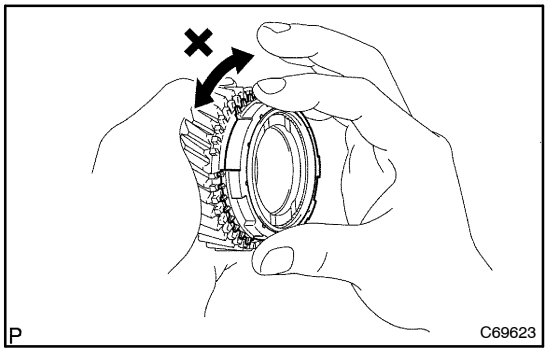


16. INSPECT 3RD GEAR

(a) Using a cylinder gauge, measure the inside diameter of the 3rd gear.

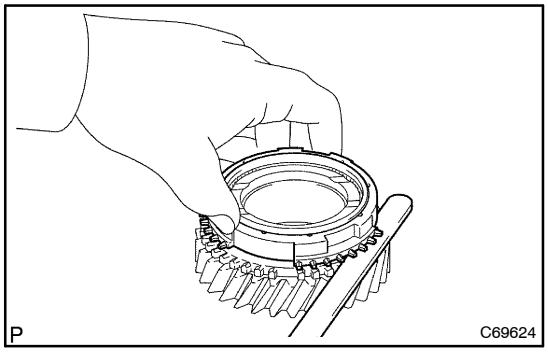
Inside diameter: mm (in.)

Standard inside diameter	Maximum inside diameter
43.009 – 43.025 (1.6933 – 1.6939)	43.025 (1.6939)



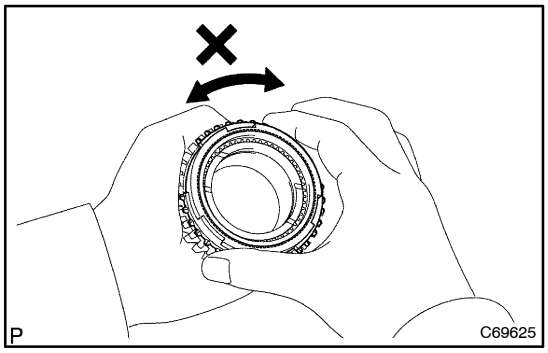
17. INSPECT 2ND SYNCHRONIZER OUTER RING

(a) Coat the 4th gear cone with gear oil. Turn the synchronizer ring No.3 in one direction while pushing it to the 4th gear cone. Check that the ring locks.



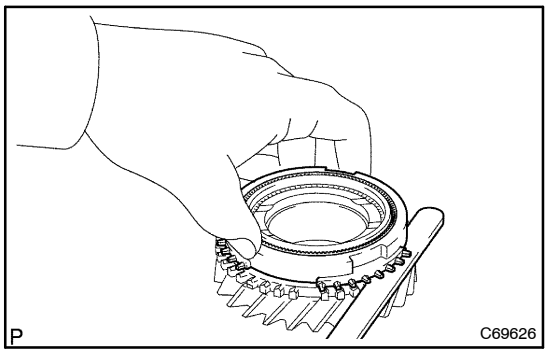
(b) Using a feeler gauge, measure the clearance between the synchronizer outer ring back and 4th gear spline end.
Standard clearance:
0.75 – 1.65 mm (0.0295 – 0.0650 in.)

If the standard clearance is out of specification, replace the synchronizer ring.



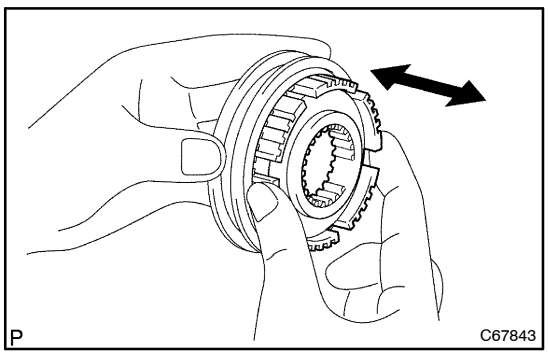
18. INSPECT SYNCHRONIZER RING NO.3

(a) Coat the 3rd gear cone with gear oil. Turn the synchronizer outer ring in one direction while pushing it to the 3rd gear cone. Check that the ring locks.



(b) Using a feeler gauge, measure the clearance between the synchronizer ring No.3 back and 3rd gear spline end.
Standard clearance:
0.65 – 1.75 mm (0.0256 – 0.0689 in.)

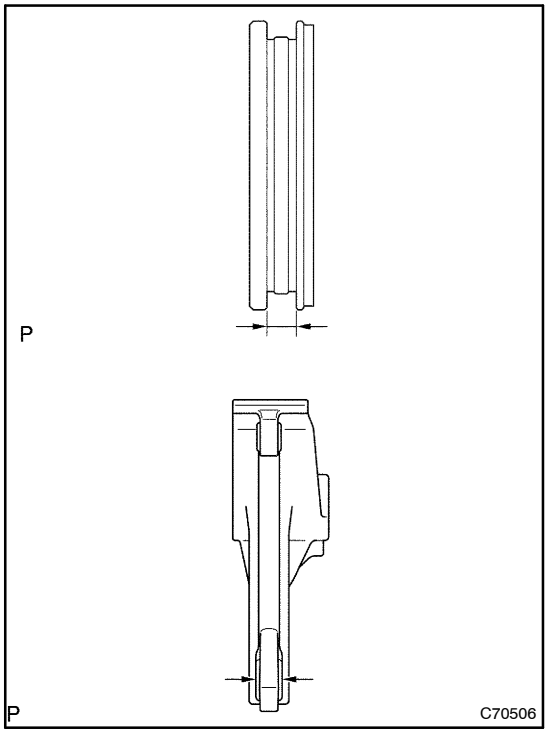
If the standard clearance is out of specification, replace the synchronizer ring No.3.



19. INSPECT TRANSMISSION HUB SLEEVE NO.2

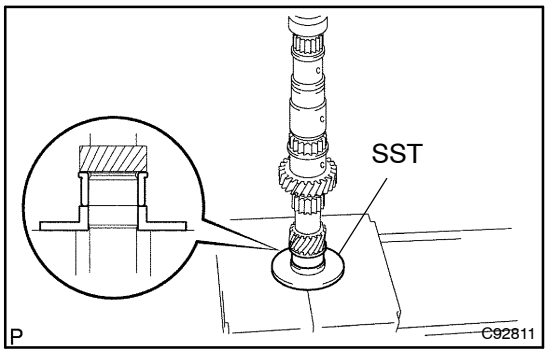
(a) Inspect the sliding condition between transmission hub sleeve No.2 and transmission clutch hub No.2.

(b) Inspect tip of spline gear on the transmission hub sleeve No.2 for wear.



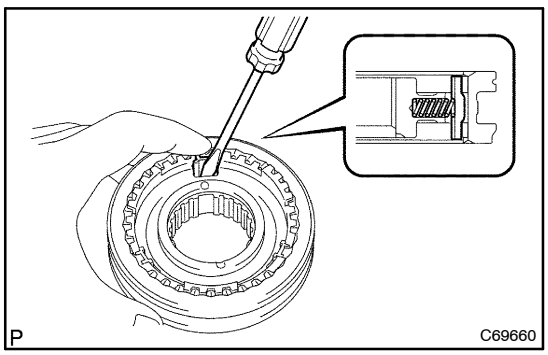
(c) Using a vernier calipers, measure the transmission hub sleeve No.2 groove and the thickness of the claw part on gear shift fork No.2, and calculate the clearance.
Standard clearance:
0.11 – 0.69 mm (0.0043 – 0.0272 in.)

If the clearance is out of the specification, replace the transmission hub sleeve No.2 and gear shift fork No.2 with the new one.



20. INSTALL INPUT SHAFT FRONT BEARING

(a) Using SST and a press, install the input shaft front bearing (inner race).
SST 09608–00071

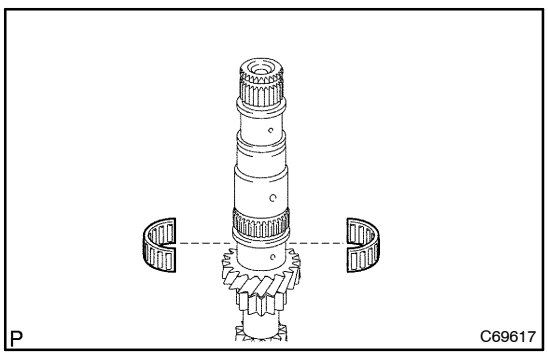


21. INSTALL TRANSMISSION HUB SLEEVE NO.2

(a) Coat the transmission hub sleeve No.2 with gear oil.
(b) Install the 3 synchromesh key springs with transmission hub sleeve No.2.

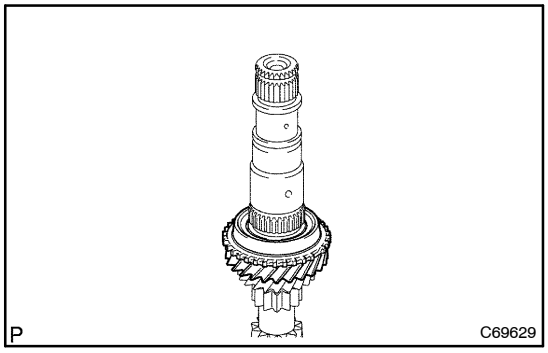
NOTICE:
Do not install the transmission clutch hub sleeve No.2 and the transmission clutch hub No.2 incorrect orientation.

(c) Using a screwdriver, install the synchromesh shifting key to the input shaft.



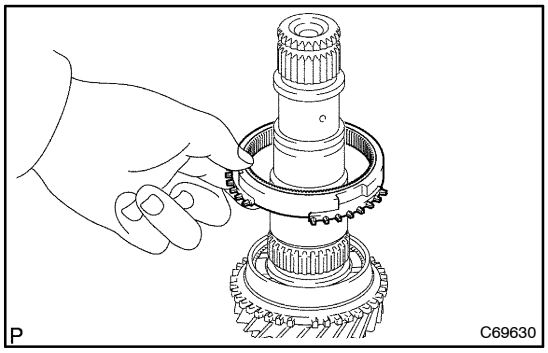
22. INSTALL 3RD GEAR NEEDLE ROLLER BEARING

(a) Coat the 3rd gear bearing with gear oil, install it to the input shaft.



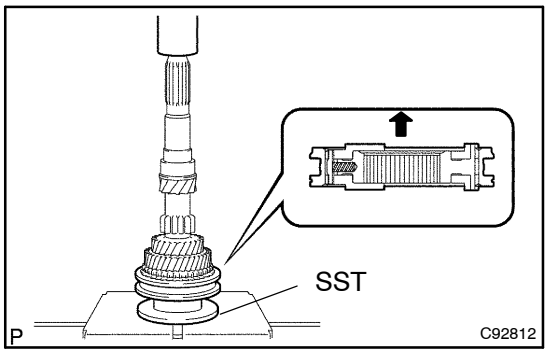
23. INSTALL 3RD GEAR

(a) Coat the 3rd gear with gear oil, install it to the input shaft.



24. INSTALL SYNCHRONIZER RING NO.3

(a) Coat the synchronizer ring No.3 with gear oil, install it to the 3rd gear.

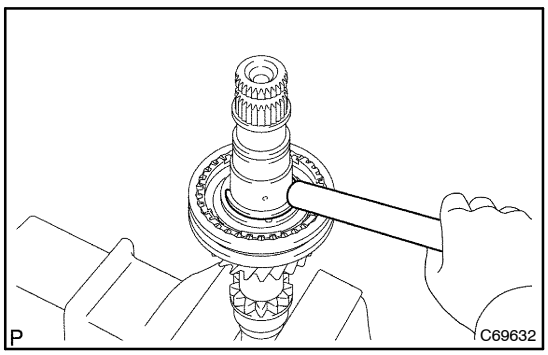


25. INSTALL TRANSMISSION CLUTCH HUB NO.2

(a) Using SST and a press, install the transmission clutch hub No.2 to the input shaft.
SST 09316–60011 (09316–00041)

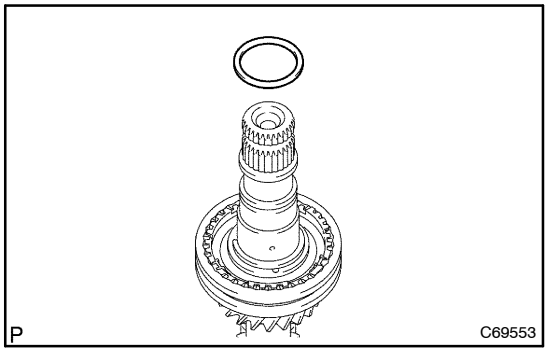
NOTICE:

- **Align the claw of clutch hub No.2 with notch of synchronizer ring No.3 and install them.**
- **Make sure that the 3rd gear should rotate.**



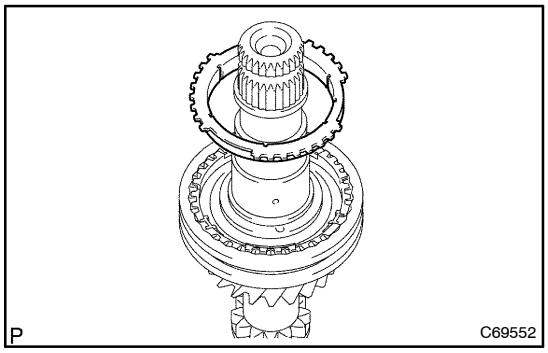
(b) Select a snap ring so that clearance between the transmission clutch hub No.2 and the clutch hub No.2 shaft snap ring will be the standard clearance. Using a brass bar and a hammer, install the snap ring.
Standard clearance: 0.1 mm or less (0.0039 or less)
Snap ring thickness:

Part No.	Thickness: mm (in.)	Mark
90520–34003	2.30 – 2.35 (0.0906 – 0.0925)	H
90520–34004	2.35 – 2.40 (0.0925 – 0.0945)	J
90520–34005	2.40 – 2.45 (0.0945 – 0.0965)	K
90520–34006	2.45 – 2.50 (0.0965 – 0.0984)	L
90520–34007	2.50 – 2.55 (0.0984 – 0.1004)	M
90520–34008	2.55 – 2.60 (0.1004 – 0.1024)	N
90520–34009	2.60 – 2.65 (0.1024 – 0.1043)	P



26. INSTALL 4TH GEAR BEARING SPACER

(a) Coat the 4th gear bearing spacer with gear oil, install it to the input shaft.

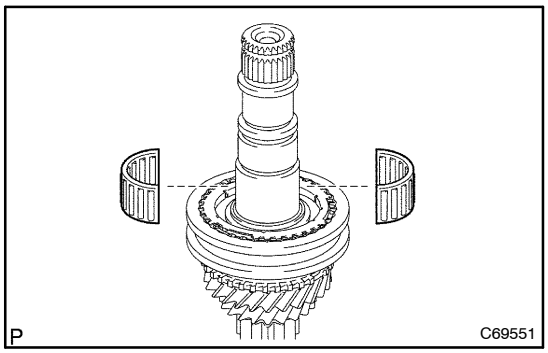


27. INSTALL 2ND SYNCHRONIZER OUTER RING

(a) Coat the 2nd synchronizer outer ring with gear oil, install it to the transmission clutch hub No.2.

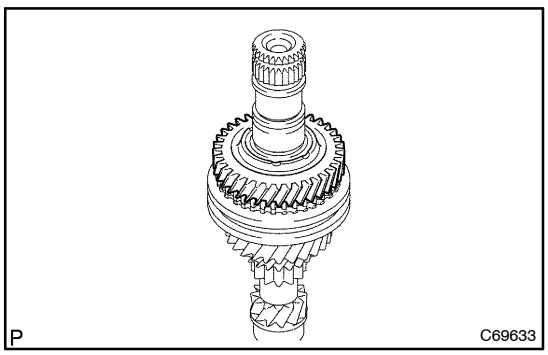
NOTICE:

Align the claw of the clutch hub No.2 with the noch of the 2nd synchronizer outer ring and assemble.



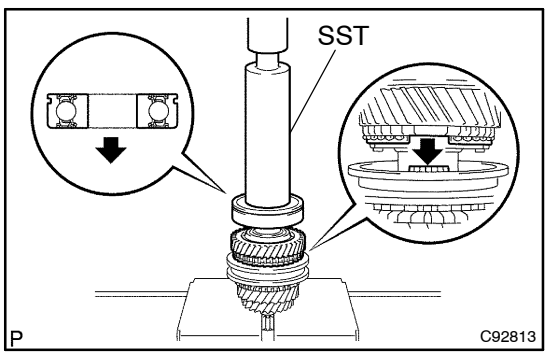
28. INSTALL 4TH GEAR NEEDLE ROLLER BEARING

(a) Coat the 4th gear needle roller bearing with gear oil, install it to the input shaft.



29. INSTALL 4TH GEAR

(a) Coat the 4th gear with gear oil, install it to the input shaft.

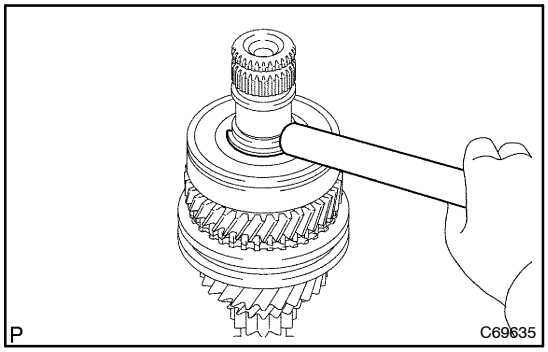


30. INSTALL INPUT SHAFT REAR RADIAL BALL BEARING

(a) Using SST and a press, install the input shaft rear radial ball bearing to the input shaft.
SST 09608–06041

NOTICE:

- **Make the groove on the bearing face to the rear and install.**
- **Make sure that the 3rd gear rotates.**

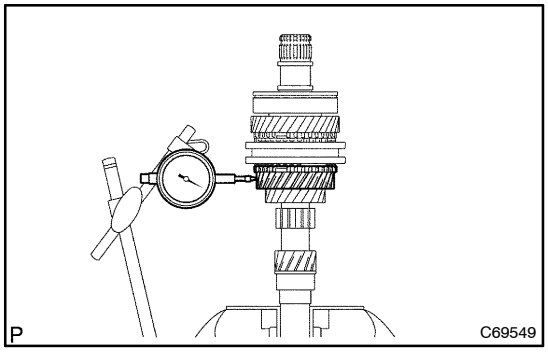


(b) Select a snap ring so that the clearance between the input shaft radial ball rear bearing and the input shaft rear bearing snap ring will be the standard clearance. Using a brass bar and a hammer, install the snap ring.

Standard clearance: 0.1 mm or less

Snap ring

Part No.	thickness: mm (in.)	Mark
90520–30008	2.35 – 2.40 (0.0925 – 0.0945)	1
90520–30009	2.40 – 2.45 (0.0945 – 0.0965)	2
90520–30010	2.45 – 2.50 (0.0965 – 0.0984)	3
90520–30011	2.50 – 2.55 (0.0984 – 0.1004)	4
90520–30012	2.55 – 2.60 (0.1004 – 0.1024)	5
90520–30013	2.60 – 2.65 (0.1024 – 0.1043)	6
90520–30021	2.65 – 2.70 (0.1043 – 0.1063)	7
90520–30022	2.70 – 2.75 (0.1063 – 0.1083)	8



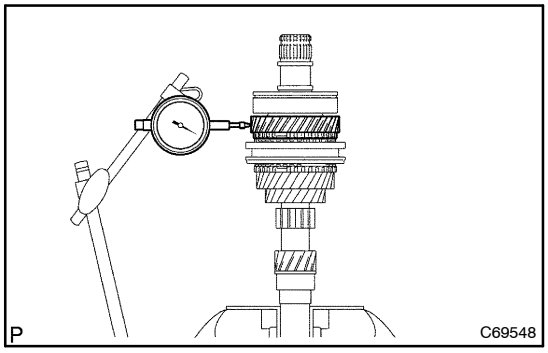
31. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 3rd gear radial clearance.

Standard clearance: mm (in.)

Bearing	Standard clearance
KOYO made	0.009 – 0.053 (0.0004 – 0.0021)
NSK made	0.009 – 0.051 (0.0004 – 0.0020)

If the clearance exceeds the maximum, replace the 3rd gear needle roller bearing.



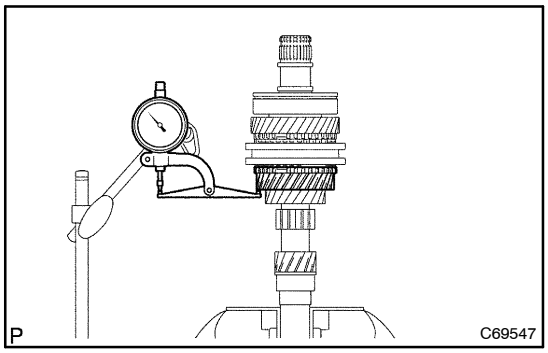
32. INSPECT 4TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 4th gear radial clearance.

Standard clearance: mm (in.)

Bearing	Standard clearance
KOYO made	0.009 – 0.053 (0.0004 – 0.0021)
NSK made	0.009 – 0.051 (0.0004 – 0.0020)

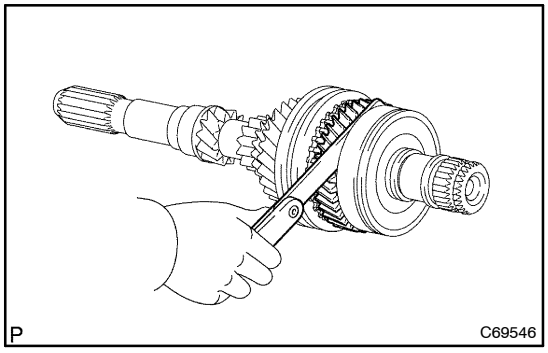
If the clearance exceeds the maximum, replace the 4th gear needle roller bearing.



33. INSPECT 3RD GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 3rd gear thrust clearance.

Standard clearance:
0.10 – 0.35 mm (0.0039 – 0.0138 in.)



34. INSPECT 4TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the 4th gear thrust clearance.

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