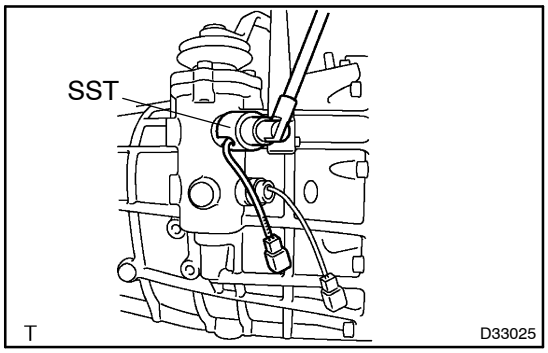
410HE–01

OVERHAUL

NOTICE:

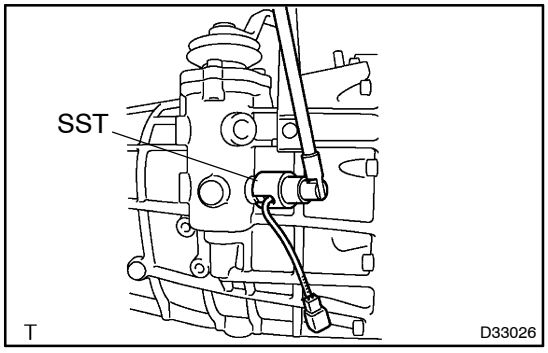
When working with FIPG (seal packing) material, you must observe the following items.

- **Using a razor blade and gasket scraper, remove all old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components.**
- **Clean both sealing surfaces with non–residue solvent.**
- **Apply FIPG to an approximately 1.2 mm (0.047 in.) wide bead of FIPG material along the sealing surface.**
- **Parts must be assembled within 10 minutes after application of FIPG material. Otherwise, the FIPG material must be removed and reapplied.**



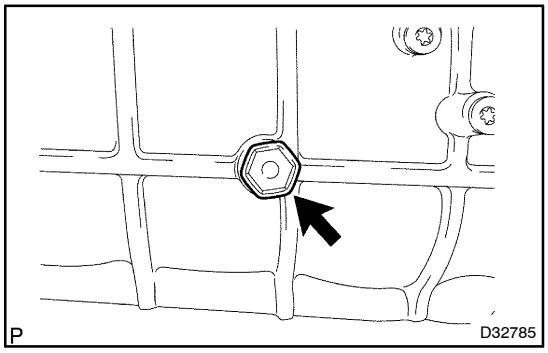
1. REMOVE BACK UP LAMP SWITCH ASSY

(a) Using SST, remove the switch and gasket.
SST 09817–16011



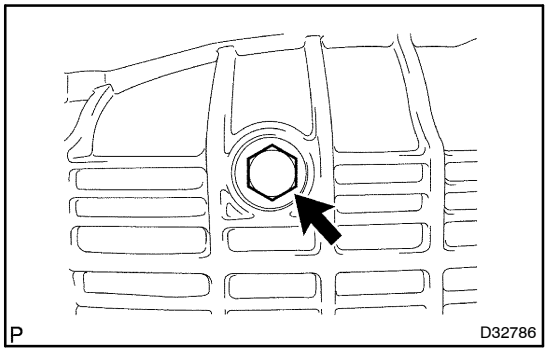
2. REMOVE EXHAUST BRAKE NEUTRAL SWITCH ASSY

(a) Using SST, remove the switch and gasket.
SST 09817–16011



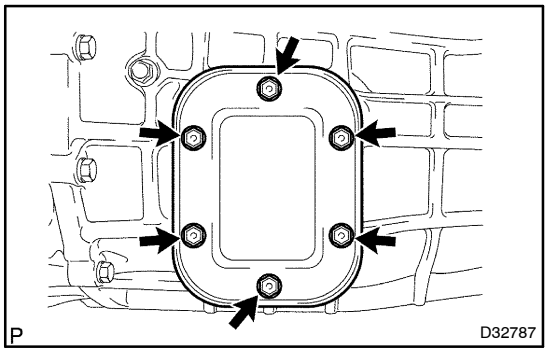
3. REMOVE TRANSMISSION FILLER PLUG

(a) Remove the filler plug and gasket.



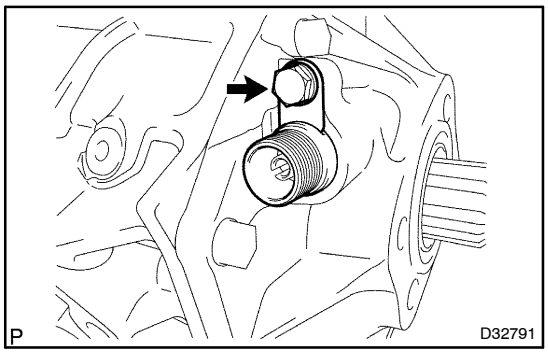
4. REMOVE TRANSMISSION DRAIN PLUG

(a) Remove the drain plug and gasket.



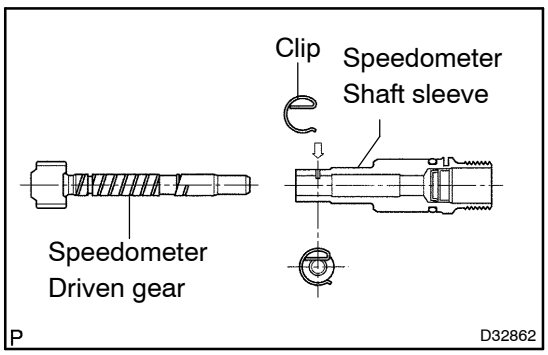
5. REMOVE MANUAL TRANSMISSION POWER TAKE–OFF COVER

(a) Remove the 6 bolts, cover and gasket.



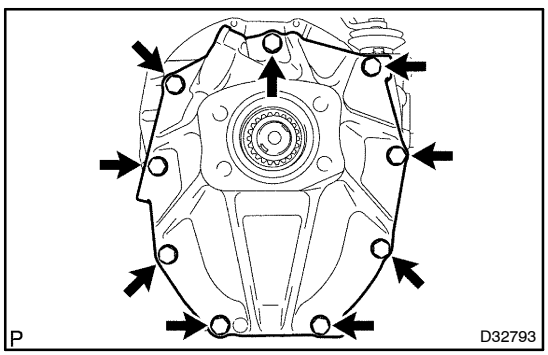
6. REMOVE SPEEDOMETER DRIVEN GEAR SUB–ASSY

(a) Remove the bolt, lock plate and driven gear.



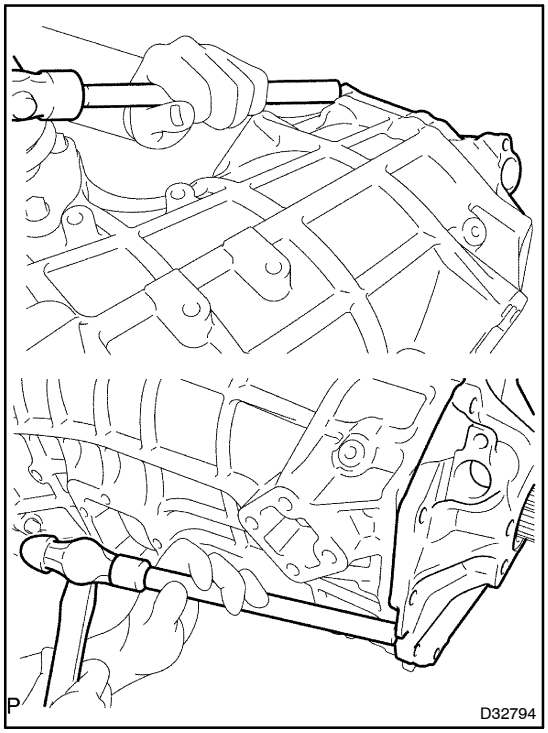
(b) Remove the clip from the speedometer sleeve.
(c) Remove the driven gear from the sleeve.
(d) Remove the O–ring from the sleeve.
(e) Check the teeth of the speedometer driven gear.

If the driver gear is damaged, replace it.



7. REMOVE TRANSMISSION REAR BEARING RETAINER

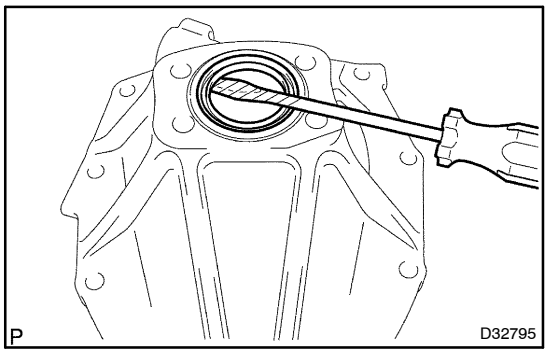
(a) Remove the 9 bolts.



(b) Using a brass bar and hammer, carefully tap out the bearing retainer.

HINT:

Make the brass bar touched the rib portion of the case.

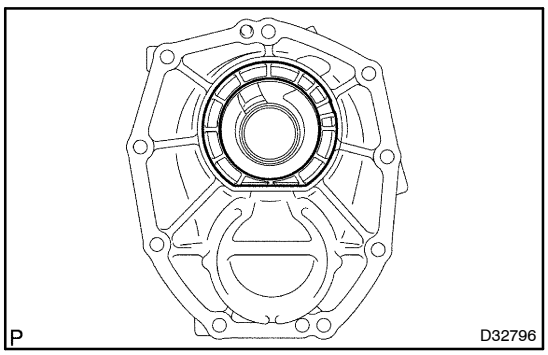


8. REMOVE TRANSMISSION REAR BEARING RETAINER OIL SEAL

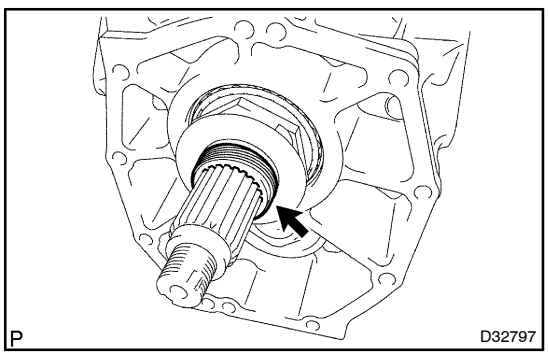
(a) Using a screwdriver, pry out the oil seal.

HINT:

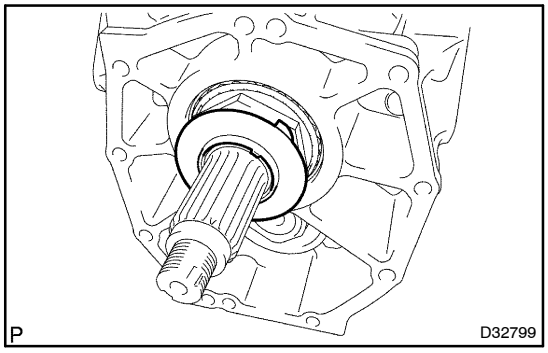
Tape the screwdriver tip before use.



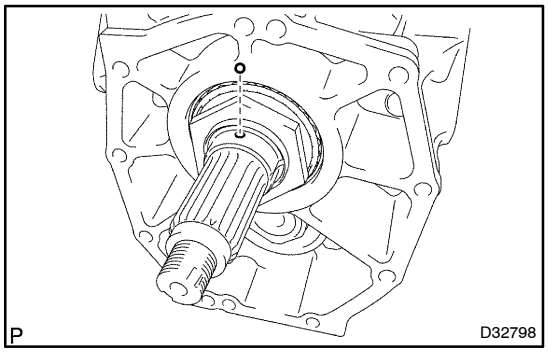
9. REMOVE TRANSMISSION REAR BEARING RETAINER SPACER



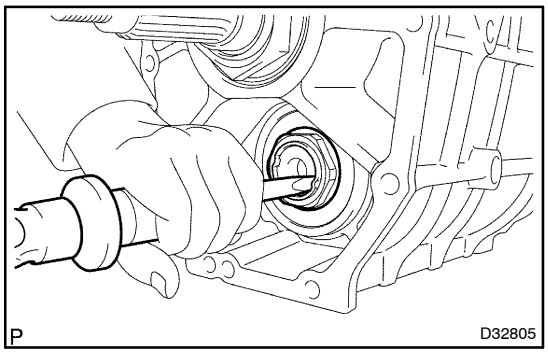
10. REMOVE SPEEDOMETER DRIVE GEAR



11. REMOVE TRANSMISSION OIL RECEIVER NO. 3

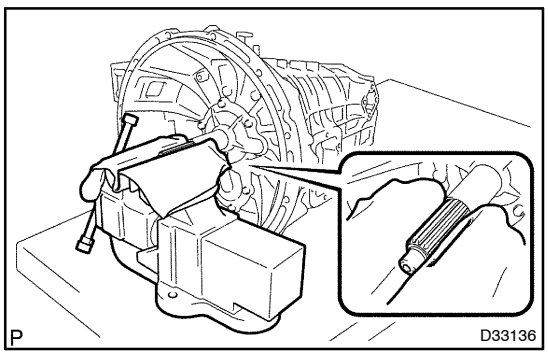


12. REMOVE SPEEDOMETER DRIVE GEAR PIN (BALL)

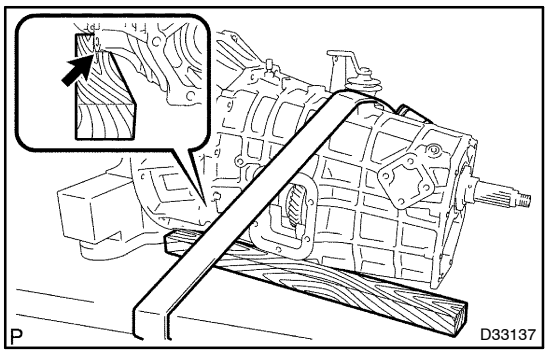


13. REMOVE COUNTER GEAR LOCK NUT

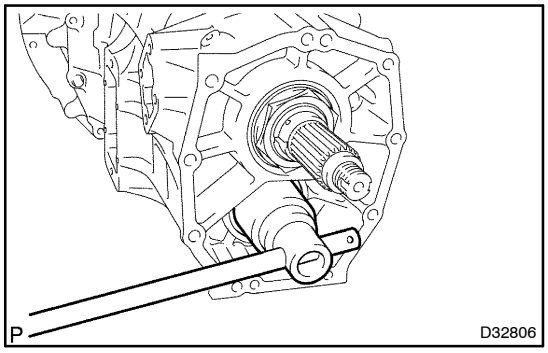
(a) Using a chisel and hammer, unstake the lock nut.



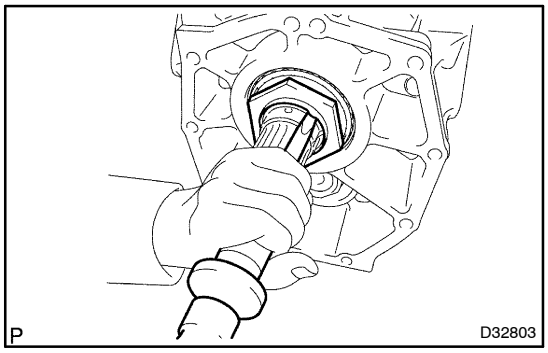
(b) Fix the input shaft's spline part through 2 protective aluminum plates and a shop rag in a vise, and move the gear to the 4th place.



(c) Using 2 belts and a wooden block, fasten the transmission to the work bench.

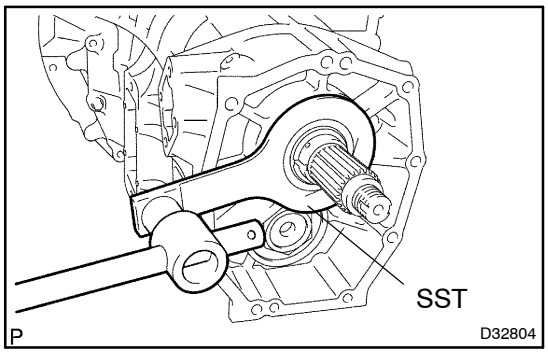


(d) Using a 50 mm socket wrench, remove the lock nut from the counter gear.



14. REMOVE OUTPUT SHAFT ADJUSTING NUT

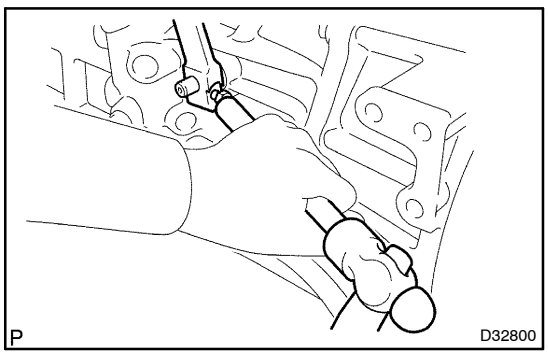
(a) Using a chisel and hammer, unstake the nut.



(b) Using SST, remove the nut from the output shaft.
SST 09617–28010

(c) Remove the 2 belts and wooden block from the transmission.

(d) Move the gear back to neutral and remove the input shaft spline part from the vise.



15. REMOVE OUTER SELECT LEVER

(a) Remove the nut and spring washer from the select lever shaft knock pin.

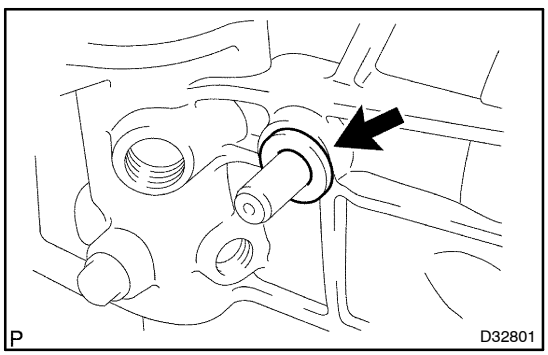
(b) Install the nut to the select lever shaft knock pin.

(c) Using a brass bar and hammer, tap the nut and disengage the knock pin from the outer select lever.

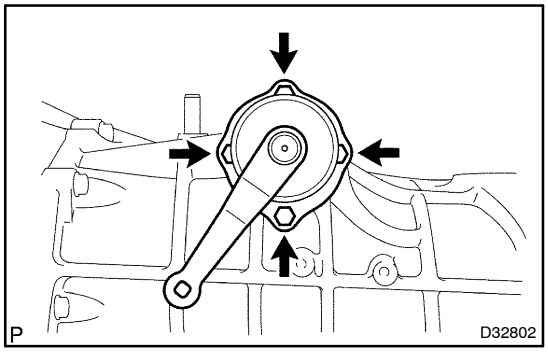
NOTICE:

Do not directly tap the knock pin.

(d) Remove the select lever from the select lever shaft.

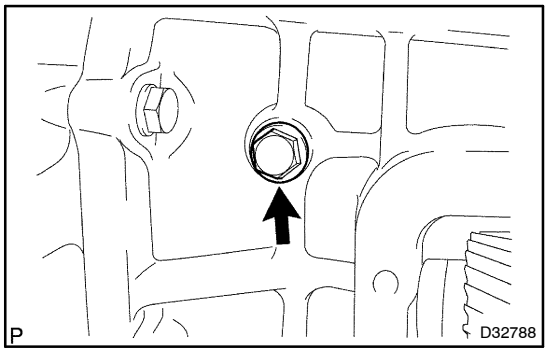


(e) Remove the washer from the select lever shaft.

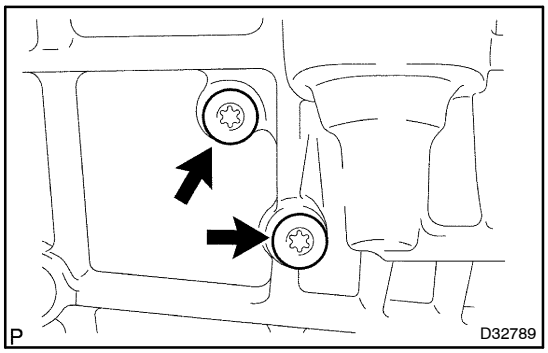


16. REMOVE SHIFT LEVER SHAFT HOUSING ASSY

(a) Remove the 4 bolts, shift housing and select return spring from the transmission case.

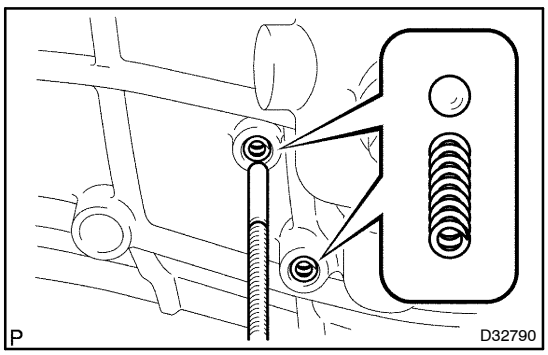


17. REMOVE REVERSE IDLER GEAR SHAFT BOLT



18. REMOVE SHIFT DETENT BALL

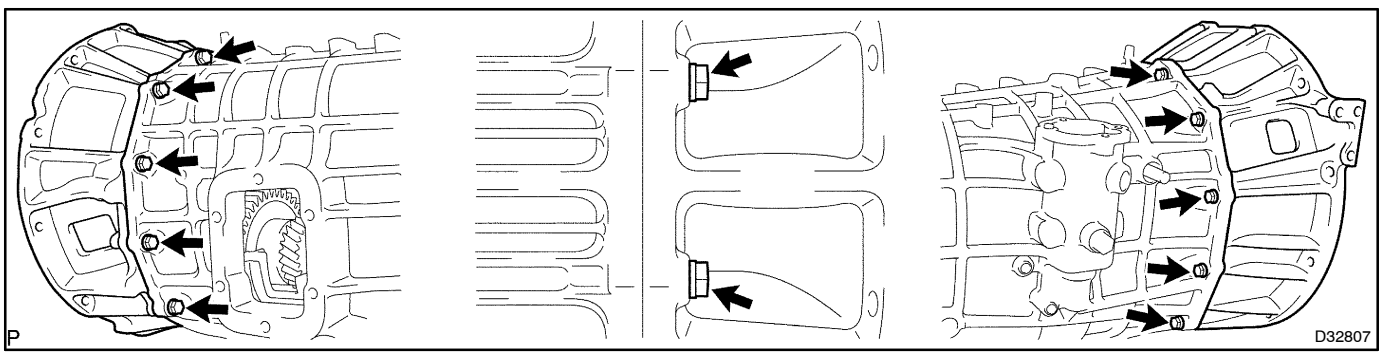
(a) Using a torx wrench (T40), remove the 2 plugs.

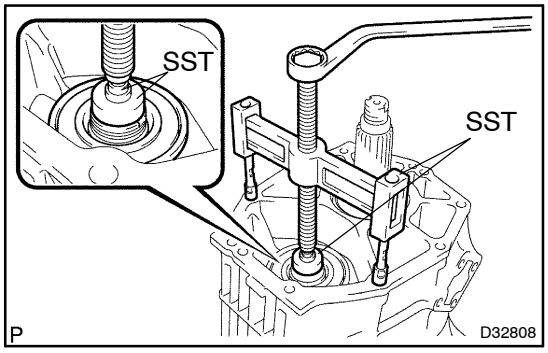


(b) Using a magnet finger, remove the 2 springs and 2 shift detent balls.

19. REMOVE TRANSMISSION CASE

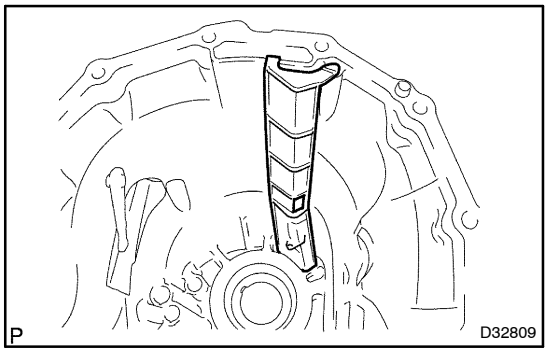
(a) Remove the 12 bolts.



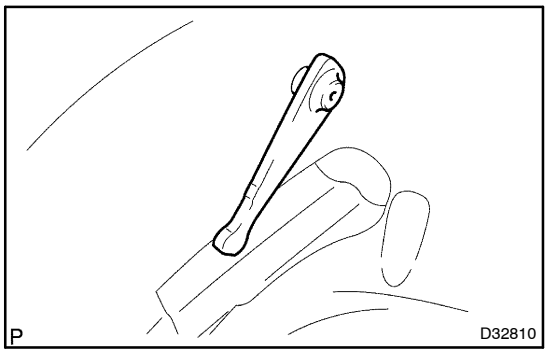


(b) Using SST, remove the counter gear rear bearing, output shaft spacer and transmission case from the clutch housing.

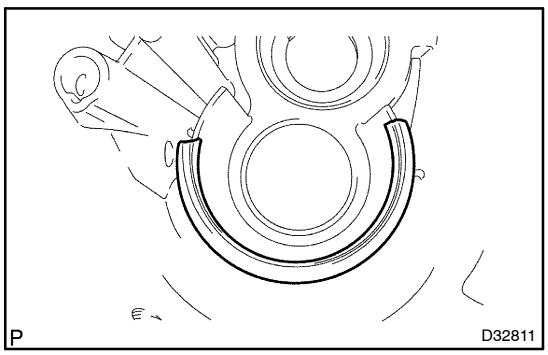
SST 09950–40011 (09951–04020, 09953–04030, 09957–04010), 09950–50013 (09952–05010, 09954–05021, 09955–05010), 09950–60010 (09951–00330)



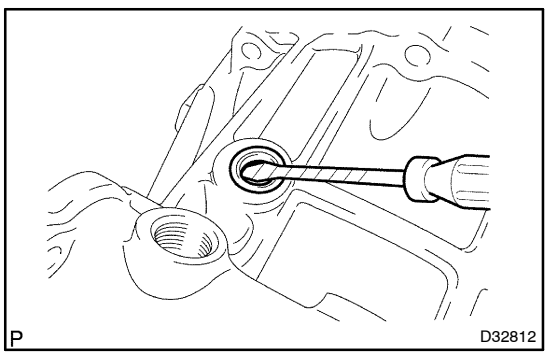
20. REMOVE TRANSMISSION OIL RECEIVER NO. 2



21. REMOVE SELECT LEVER SHAFT



22. REMOVE TRANSMISSION OIL SEPARATOR SEAL

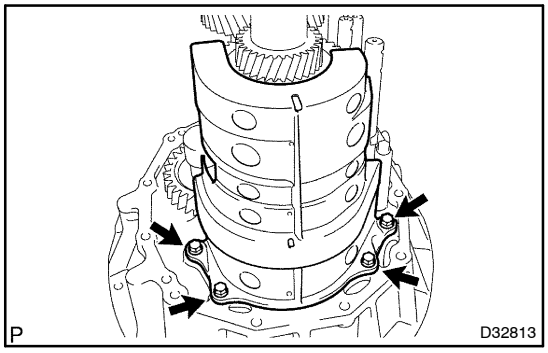


23. REMOVE SELECT LEVER OIL SEAL

(a) Using a screwdriver, pry out the oil seal from the transmission case.

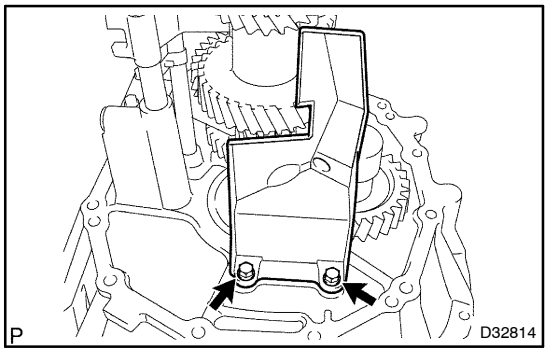
HINT:

Tape the screwdriver tip before use.



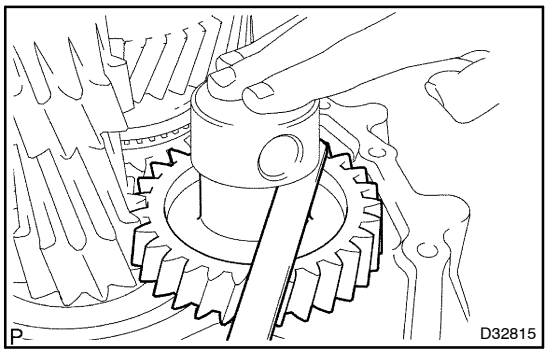
24. REMOVE TRANSMISSION OIL SEPARATOR

(a) Remove the 4 bolts and oil separate.



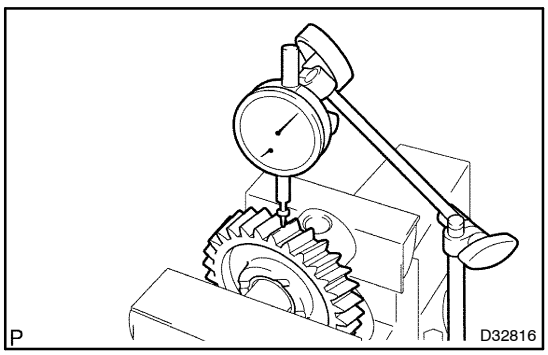
25. REMOVE TRANSMISSION OIL RECEIVER NO. 1

(a) Remove the 2 bolts and oil receiver.



26. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE

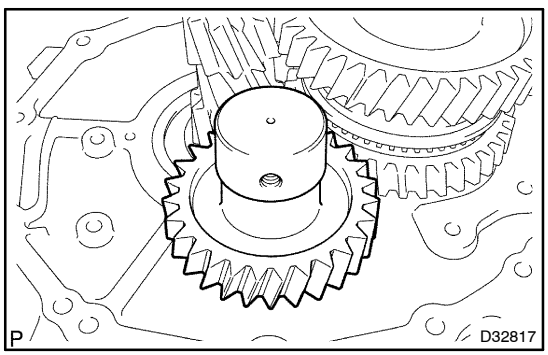
(a) Using a feeler gauge, measure the thrust clearance.
Standard clearance:
0.10 to 0.62 mm (0.0039 to 0.0242 in.)
Maximum clearance:
0.62 mm (0.0242 in.)



27. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

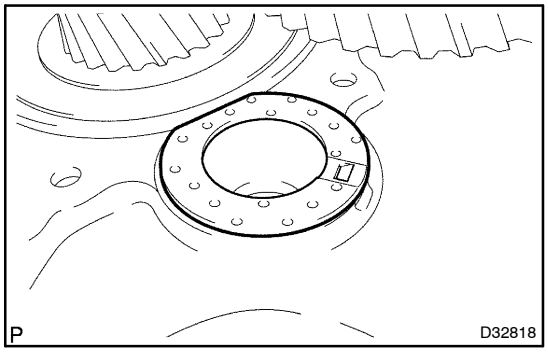
(a) Using a dial indicator, measure the radial clearance.
Standard clearance:
0.015 to 0.059 mm (0.0006 to 0.0023 in.)
Maximum clearance:
0.059 mm (0.0023 in.)

If the clearance is not as specified, replace the reverse idler gear needle roller bearing.

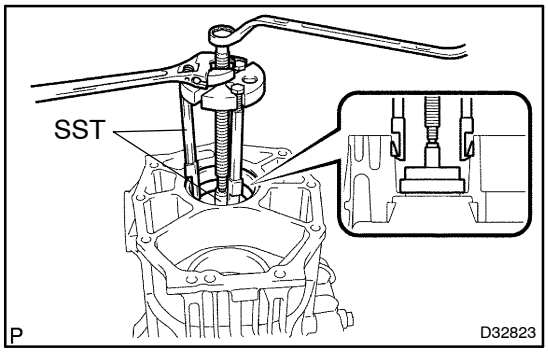


28. REMOVE REVERSE IDLER GEAR

(a) Remove the gear shaft, needle roller bearing and gear.



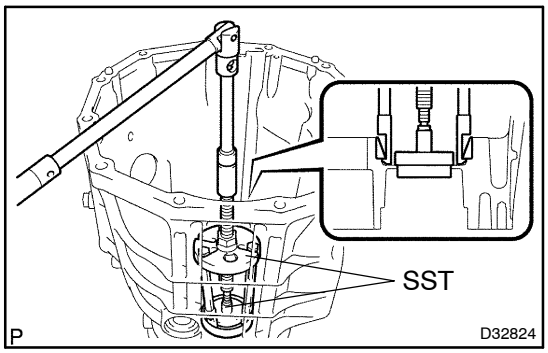
(b) Remove the idler gear thrust washer.



29. REMOVE OUTPUT SHAFT REAR TAPERED ROLLER BEARING

(a) Using SST, remove the roller bearing from the transmission case.

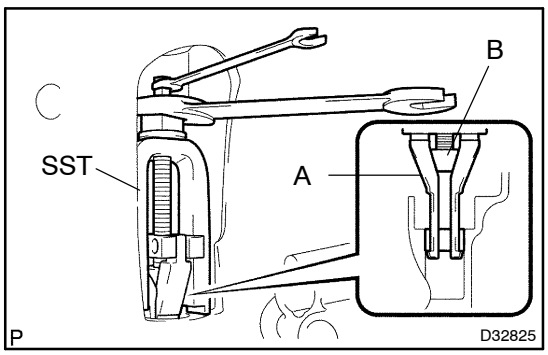
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03021), 09950–40011 (09957–04010), 09950–60020 (09951–00750, 09952–06010), 09951–00700



30. REMOVE OUTPUT SHAFT FRONT TAPERED ROLLER BEARING

(a) Using SST, remove the roller bearing from the transmission case.

SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03021), 09950–40011 (09957–04010), 09950–60010 (09951–00590, 09951–00610, 09952–06010)



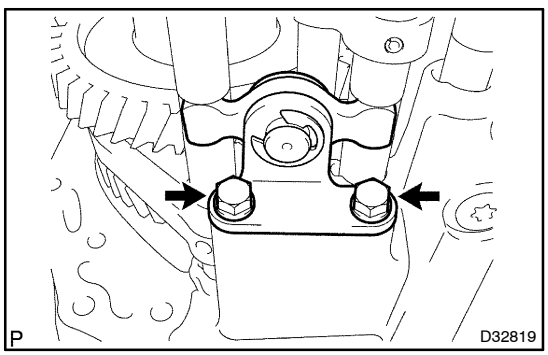
31. REMOVE SHIFT AND SELECT LEVER SHAFT BIMETAL FORMED BUSH

(a) Using SST, remove the bush from the transmission case.

SST 09319–60020

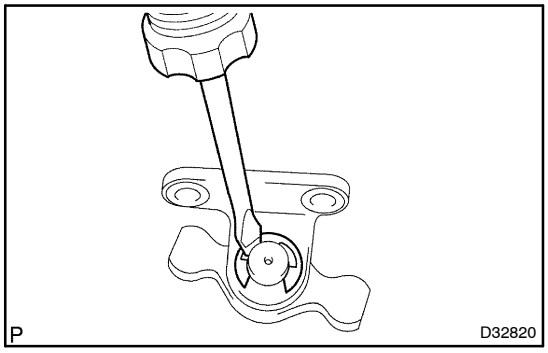
NOTICE:

- **Do not damage it.**
- **When setting SST A into the bush, do not tighten SST B using a tool. Tighten it lightly with your hand.**

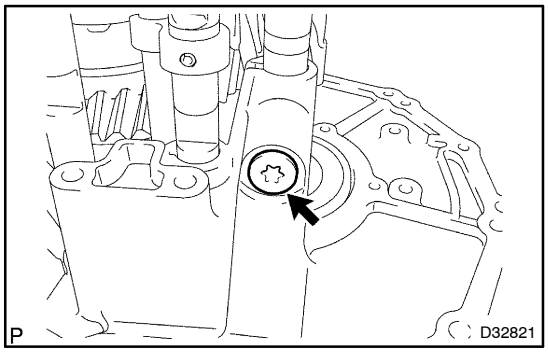


32. REMOVE SHIFT LEVER INNER

(a) Remove the 2 bolts and shift lever from the clutch housing.

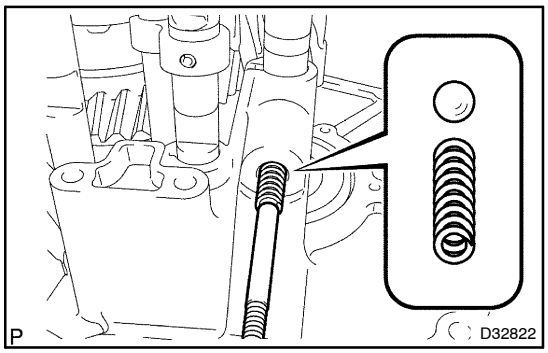


(b) Using a screwdriver, remove the E–ring, shift lever and pin from the shift lever inner mount.

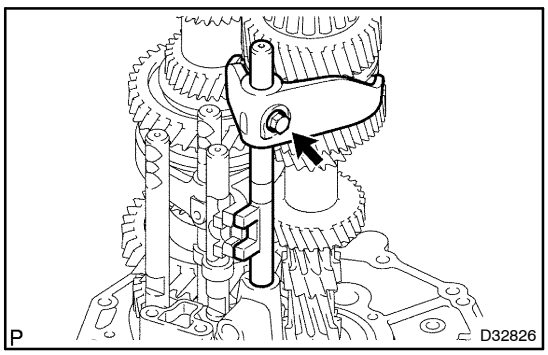


33. REMOVE SHAFT DETENT BALL

(a) Using a torx socket wrench (T40), remove the shift detent ball plug from the clutch housing.

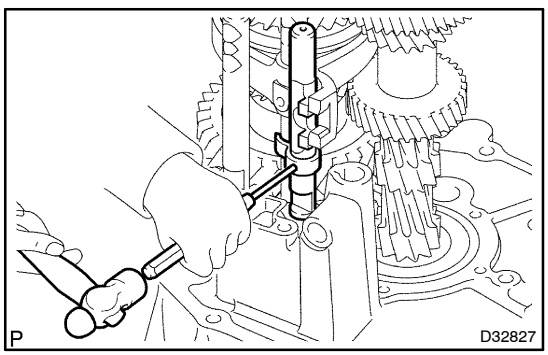


(b) Using a magnetic finger, remove the spring and ball from the clutch housing.



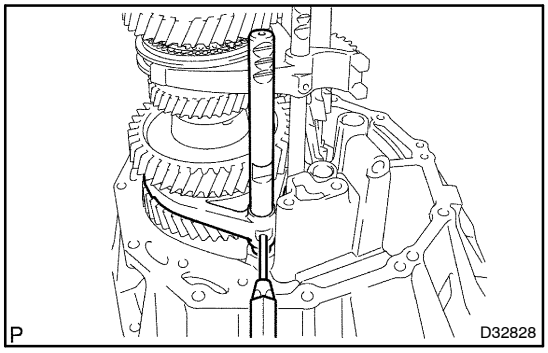
34. REMOVE SHIFT FORK SHAFT NO. 3

(a) Remove the bolt, shift fork shaft and gear shift fork.



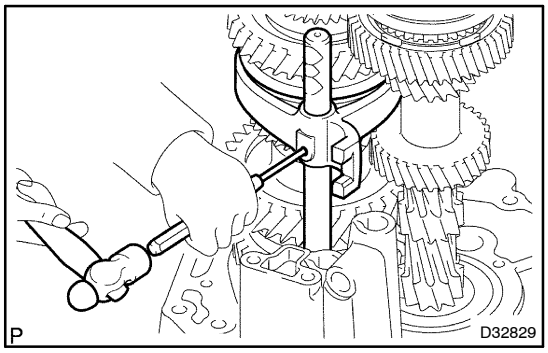
35. REMOVE SHIFT FORK SHAFT NO. 4

(a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the shift fork slotted pin, shift fork shaft and gear shift fork guide.



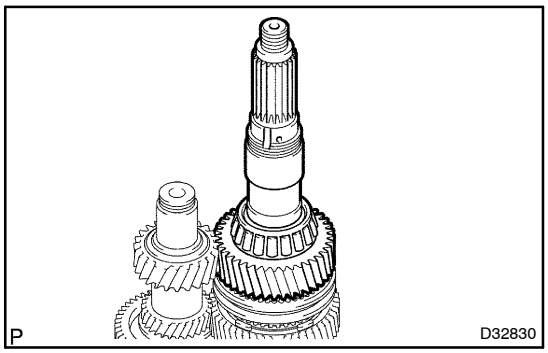
36. REMOVE SHIFT FORK SHAFT NO. 1

(a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the slotted pin, shift fork shaft and gear shift fork.



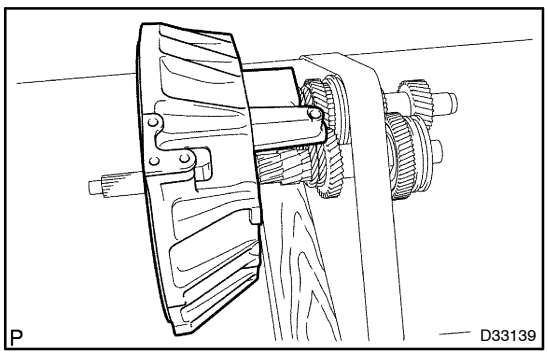
37. REMOVE SHIFT FORK SHAFT NO. 2

(a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the slotted pin, shift fork shaft and gear shift fork.



38. REMOVE OUTPUT SHAFT

(a) Remove the output shaft and synchronizer ring No.4.



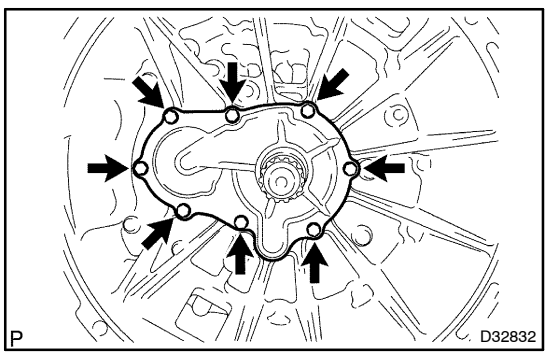
39. FIX CLUTCH HOUSING ASSY

(a) Bind the input shaft and counter gear together with a rope or wire.

(b) Place them on a wooden block and fix them to the work bench with a belt.

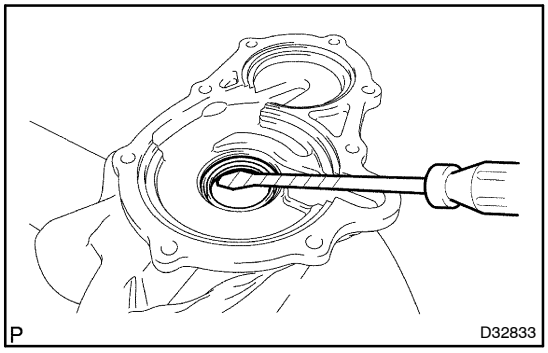
NOTICE:

Be careful not to drop the clutch housing assy.



40. REMOVE TRANSMISSION FRONT BEARING RETAINER

(a) Remove the 8 bolts and retainer.

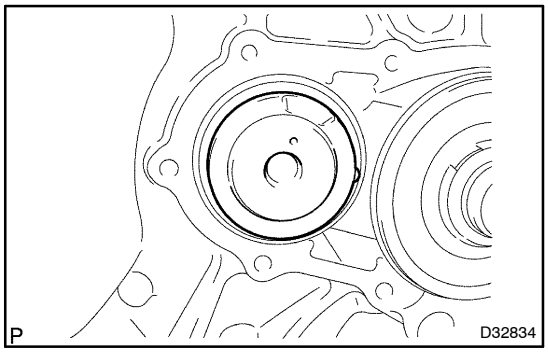


41. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using a screwdriver, pry out the oil seal from the retainer.

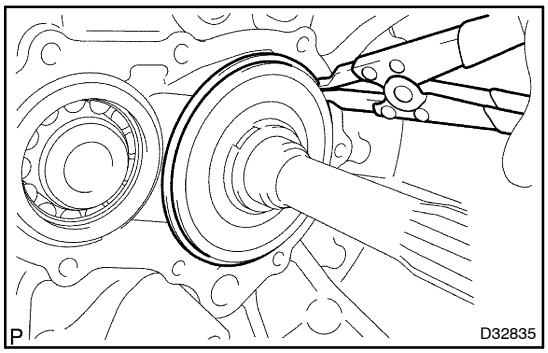
HINT:

Tape the screwdriver tip before use.



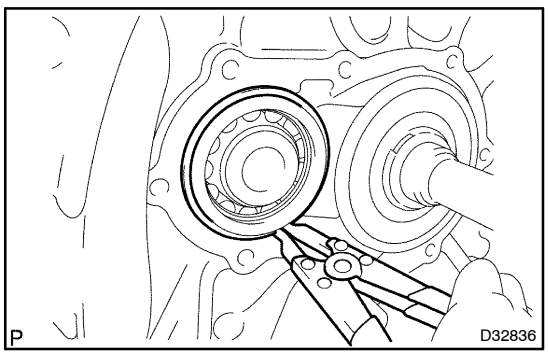
42. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL RECEIVER

(a) Remove the oil receiver from the clutch housing.



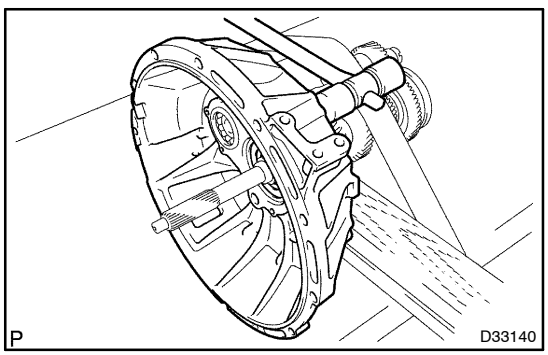
43. REMOVE INPUT SHAFT FRONT BEARING SNAP RING

(a) Using a snap ring expander, remove the snap ring from the input shaft front bearing.



44. REMOVE COUNTER GEAR FRONT BEARING SNAP RING

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



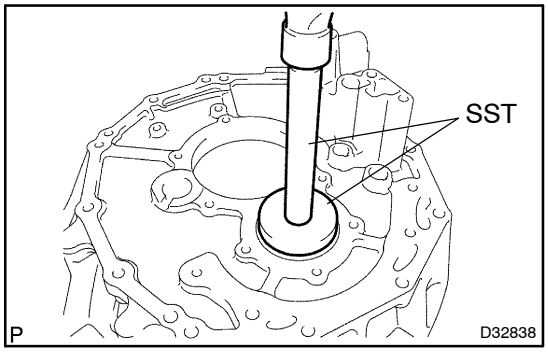
45. REMOVE CLUTCH HOUSING ASSY

(a) Using a plastic hammer, tap out the clutch housing.

NOTICE:

Do not allow the clutch housing assy to fall.

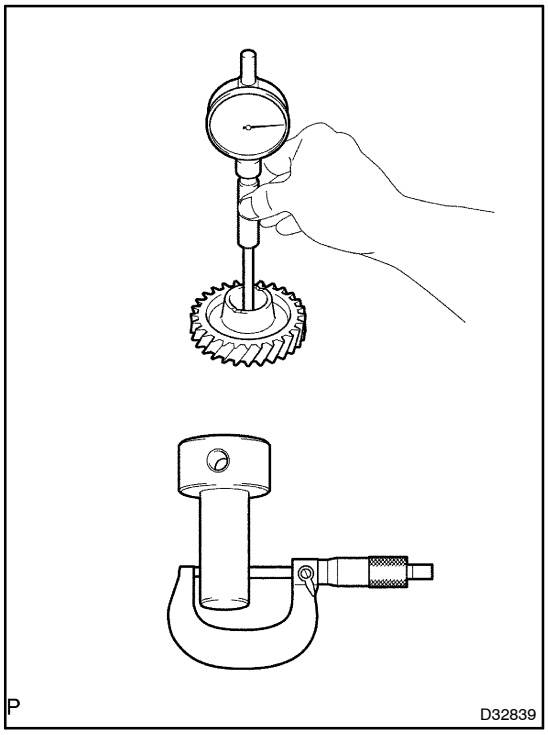
(b) Remove the rope or wire from the input shaft and counter gear.



46. REMOVE COUNTER GEAR FRONT BEARING

(a) Using SST and a hammer, remove the bearing from the clutch housing.

SST 09950–60020 (09951–00680), 09950–70010 (09951–07100)



47. REMOVE REVERSE IDLER GEAR

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

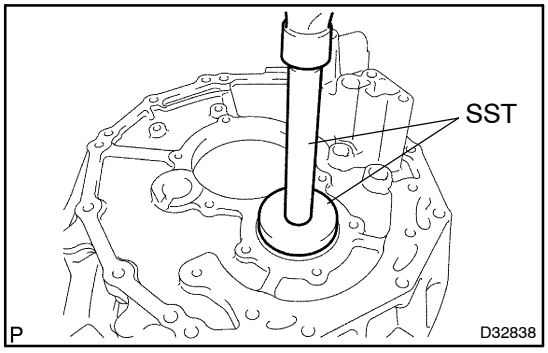
Standard inside diameter:
35.015 to 35.036 mm (1.3785 to 1.3793 in.)
Maximum inside diameter: 35.036 mm (1.3793 in.)

If the inside diameter exceeds the maximum, replace the reverse idler gear.

(b) Using a micrometer, measure the outer diameter of the idler gear shaft.

Standard outer diameter:
27.987 to 28.000 mm (1.1018 to 1.1024 in.)
Minimum outer diameter: 27.987 mm (1.1018 in.)

If the diameter is less than the minimum, replace the reverse idler gear shaft.

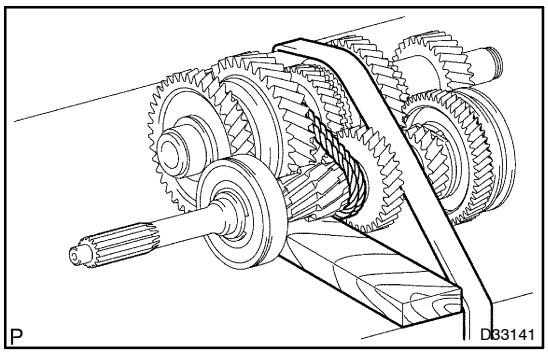


48. INSTALL COUNTER GEAR FRONT BEARING

(a) Using SST and a hammer, tap in a new bearing to the clutch housing.

SST 09950–60020 (09951–00680), 09950–70010 (09951–07100)

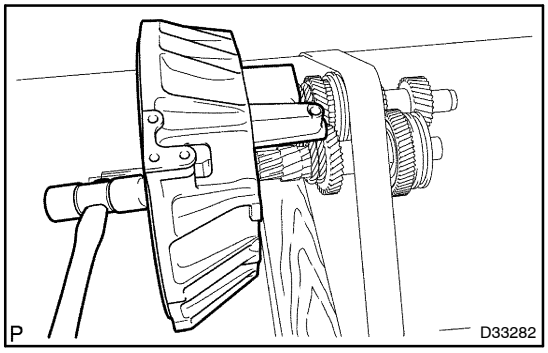
NOTICE:
When installing, face the snap ring grooves to the engine side.



49. INSTALL CLUTCH HOUSING ASSY

(a) Bind the input shaft and counter gear together with a rope or wire.

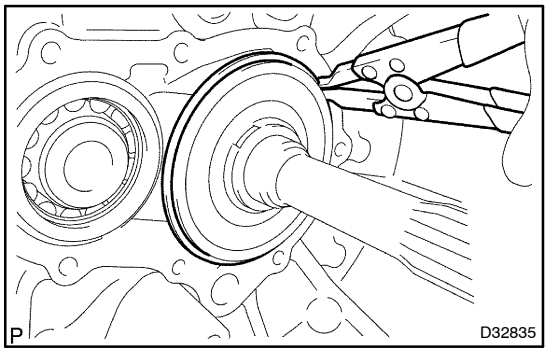
(b) Place them on a wooden block and fix them to the work bench with a belt.



(c) Using a plastic hammer, tap in the input shaft and counter gear.

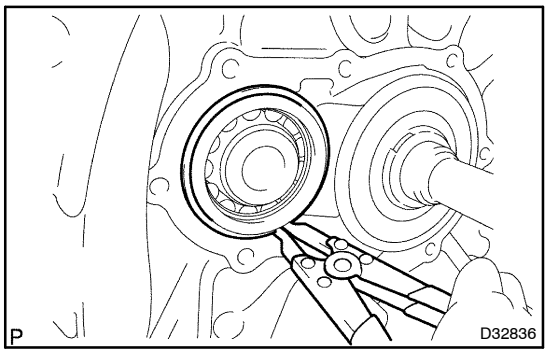
NOTICE:

- **Do not allow the clutch housing to fall.**
- **Be careful not to damage or drop the counter gear front bearing.**



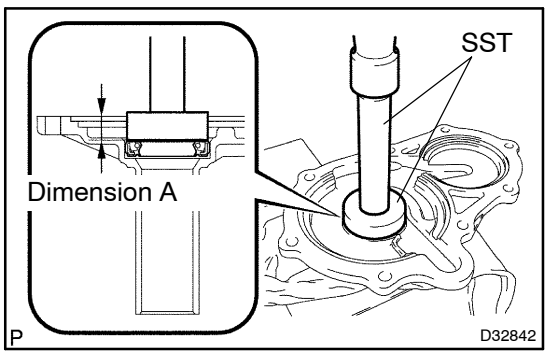
50. INSTALL INPUT SHAFT FRONT BEARING SNAP RING

(a) Using a snap ring expander, install a new snap ring to the input shaft front bearing.



51. INSTALL COUNTER GEAR FRONT BEARING SNAP RING

(a) Using a snap ring expander, install a new snap ring to the counter gear front bearing.



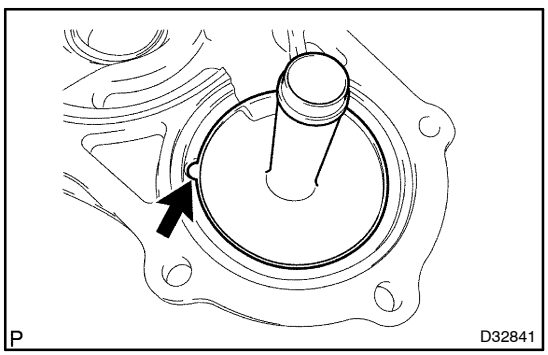
52. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal to the retainer according to dimension A.

SST 09950–60010 (09951–00480), 09950–70010 (09951–07100)

Dimension A: 13.8 to 14.6 mm (0.543 to 0.575 in.)

(b) Coat the rip of the oil seal with MP grease.

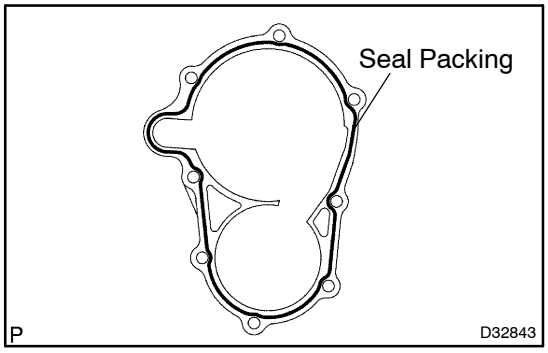


53. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL RECEIVER

(a) Install the oil receiver to the transmission front bearing retainer.

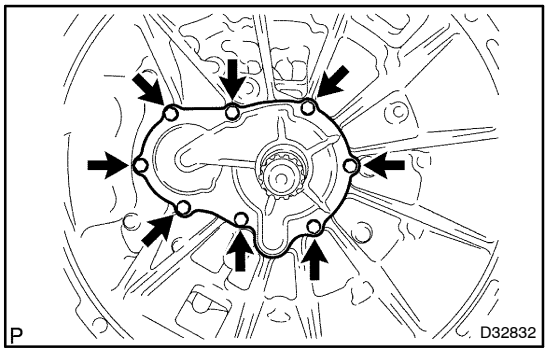
HINT:

When installing, align the turn stopper on the oil receiver with the grooves on the bearing retainer.



54. INSTALL TRANSMISSION FRONT BEARING RETAINER

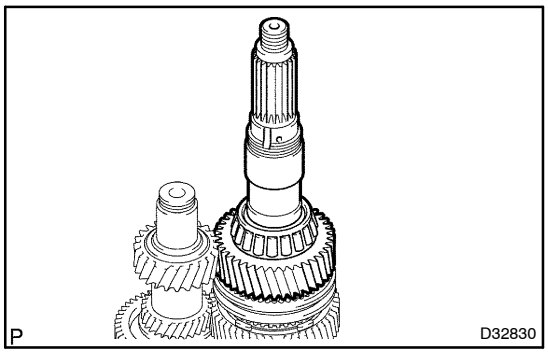
(a) Apply FIPG (seal packing) to the retainer as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



(b) Coat 8 new bolts with sealant.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent
Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)

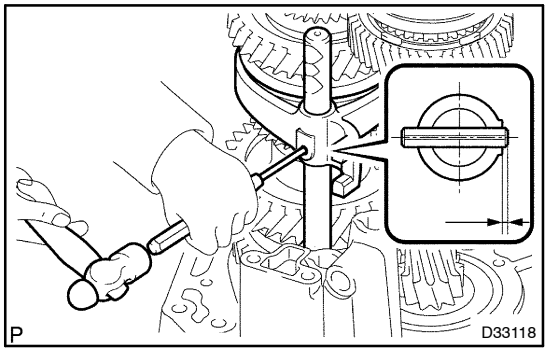
(c) Install the transmission front bearing retainer with the 8 sealant–coated bolts.

(d) Remove the rope from the input shaft and counter gear.



55. INSTALL OUTPUT SHAFT

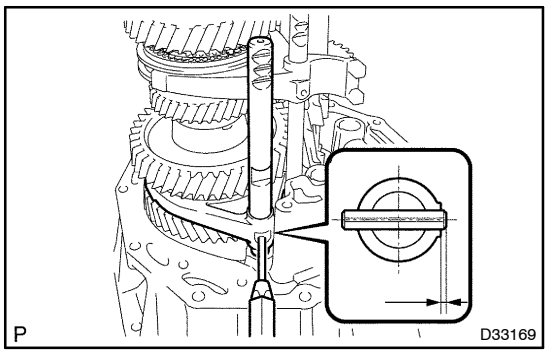
(a) Coat the output shaft and synchronizer ring with gear oil, and install them.



56. INSTALL SHIFT FORK SHAFT NO. 2

(a) Coat the sliding and rotating surface of the gear shift fork and shIft fork shaft with gear oil, and install them.

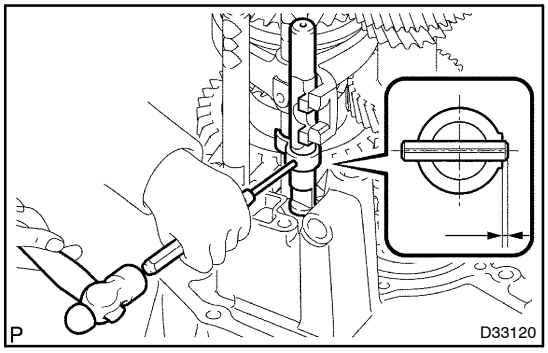
(b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shaft fork slotted pin to the gear shift fork and shift fork shaft.
Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)



57. INSTALL SHIFT FORK SHAFT NO. 1

(a) Coat the sliding and rotating gear shift fork and shift fork shaft with gear oil, and install them.

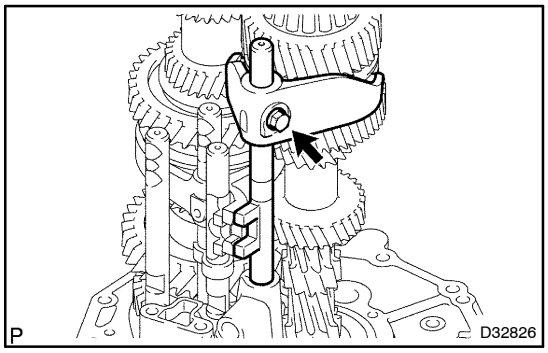
(b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shift fork slotted pin to the gear shift fork and shift fork shaft.
Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)



58. INSTALL SHIFT FORK SHAFT NO. 4

(a) Coat the sliding and rotating surface of the gear shift fork and shift fork shaft with gear oil, and install them.

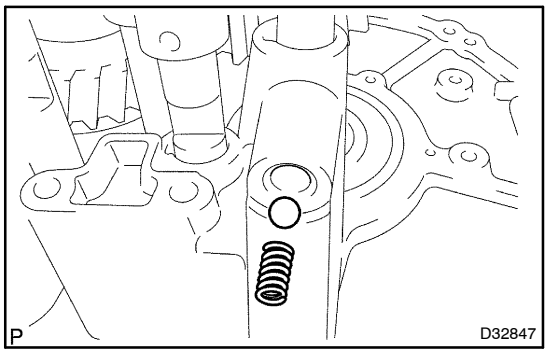
(b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shift fork slotted pin to the gear shift fork guide and shift fork shaft.
Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)



59. INSTALL SHIFT FORK SHAFT NO. 3

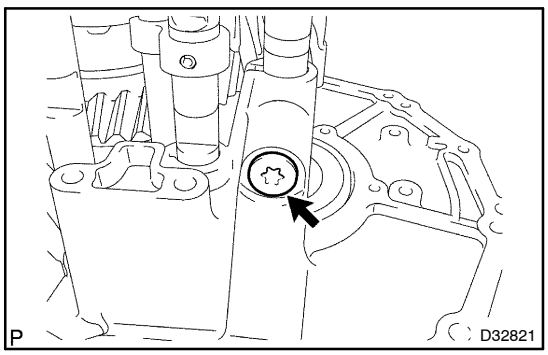
(a) Coat the sliding and rotating surface of the gear shift fork and shift fork shaft with gear oil, and install them.

(b) Install a new shift fork lock bolt to the gear shift fork and gear shift fork shaft.
Torque: 46 N·m (469 kgf·cm, 34 ft·lbf)

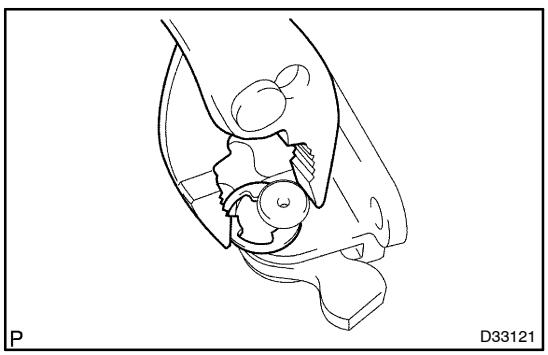


60. INSTALL SHAFT DETENT BALL

(a) Install the ball and spring to the hole of the clutch housing.



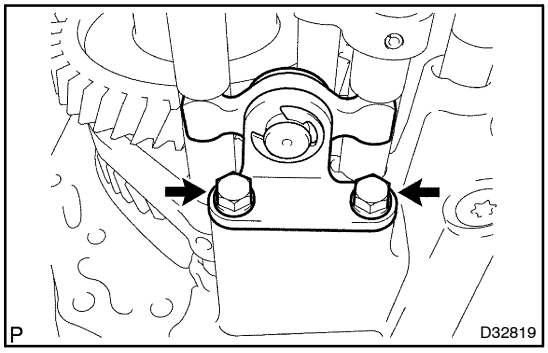
(b) Using a torx wrench (T40), install a new plug to the clutch housing.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



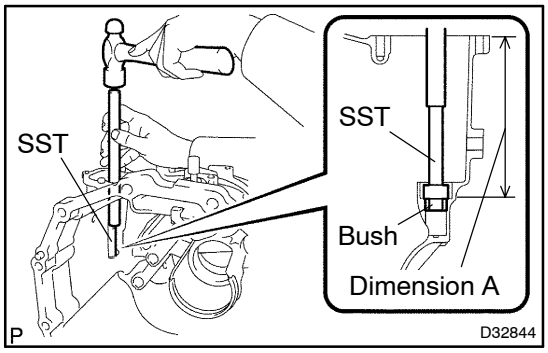
61. INSTALL SHIFT LEVER INNER

(a) Install the shift lever and pin to the mount.

(b) Using pliers, install a new E–ring to the shift lever.

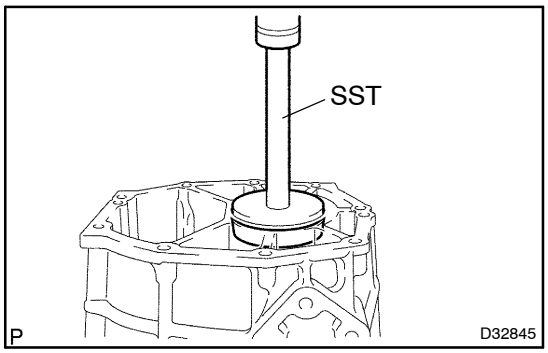


(c) Install the shift lever to the clutch housing with the 2 bolts.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)



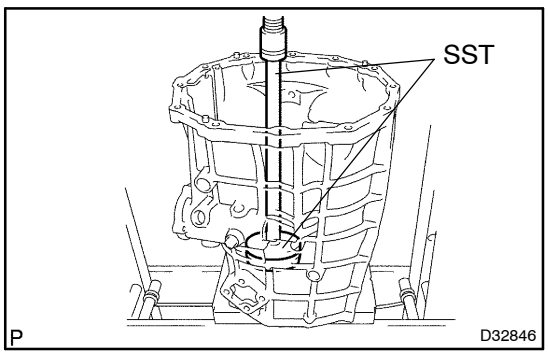
62. INSTALL SHIFT AND SELECT LEVER SHAFT BIMETAL FORMED BUSH

(a) Using SST, a brass bar and hammer, tap in a new bush to the transmission case according to dimension A.
SST 09820–36010
Dimension A: 149.0 to 150.0 mm (5.866 to 5.906 in.)



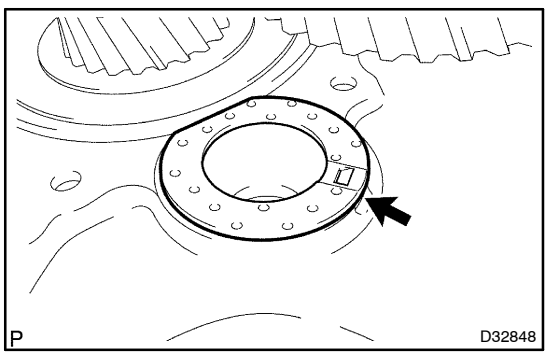
63. INSTALL OUTPUT SHAFT REAR TAPERED ROLLER BEARING

(a) Using SST and a press, press in a new bearing to the transmission case.
SST 09950–70010 (09951–07100), 09951–01000



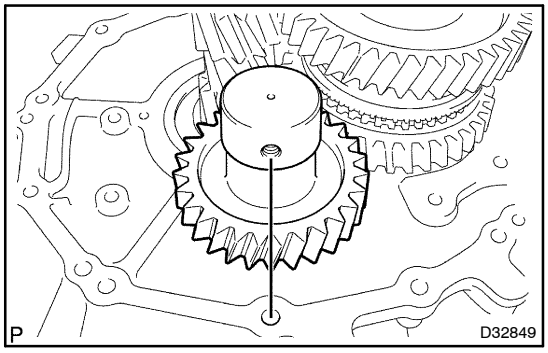
64. INSTALL OUTPUT SHAFT FRONT TAPERED ROLLER BEARING (OUTER RACE)

(a) Using SST and a press, press in a new bearing to the transmission case.
SST 09950–60020 (09951–00890), 09950–70010 (09951–07360)



65. INSTALL REVERSE IDLER GEAR

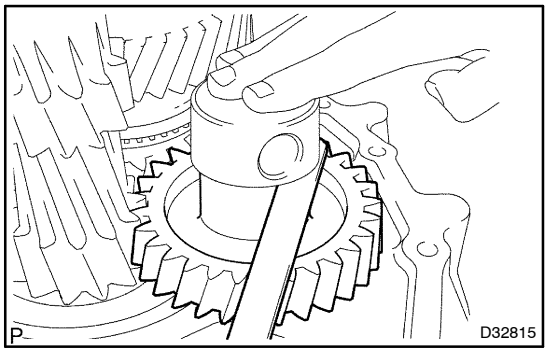
(a) Aligning the turn stopper (protruding part) on the reverse idler gear thrust washer with the hole on the clutch housing.



(b) Coat the sliding and rotating surface of the reverse idler gear shaft, reverse idler gear needle roller bearing and reverse idler gear with gear oil, and install them.

NOTICE:

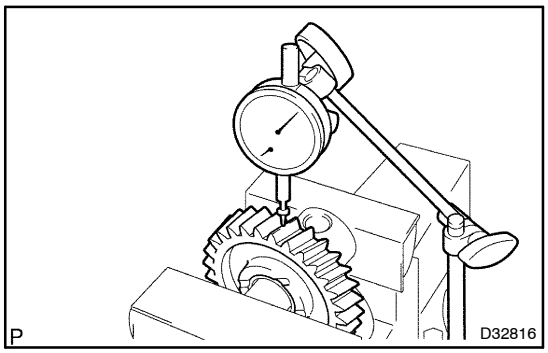
Align the mark on the reverse idler gear shaft and bolt hole as shown in the illustration.



66. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE

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

Standard clearance:
0.10 to 0.62 mm (0.0039 to 0.0244 in.)
Maximum clearance: 0.62 mm (0.0244 in.)

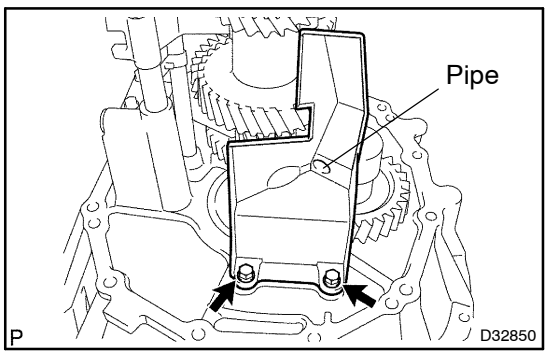


67. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE

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

Standard clearance:
0.015 to 0.059 mm (0.0006 to 0.0023 in.)
Maximum clearance: 0.059 mm (0.0023 in.)

If the clearance exceeds the maximum, replace the reverse idler gear needle roller bearing.



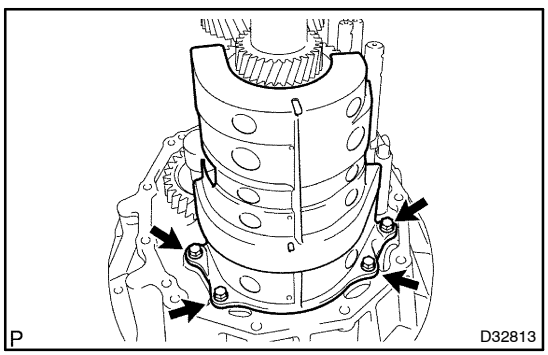
68. INSTALL TRANSMISSION OIL RECEIVER NO. 1

(a) Install the oil receiver with the 2 bolts.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

HINT:

Install the pipe of the oil receiver to the hole of the reverse idler gear shaft.



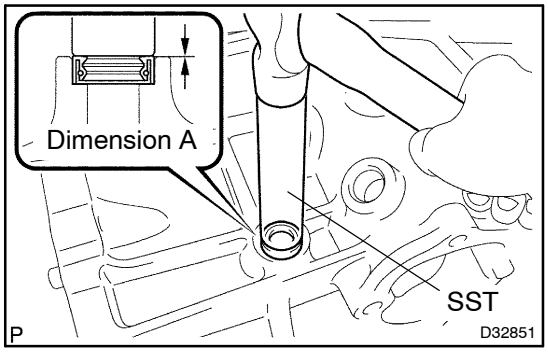
69. INSTALL TRANSMISSION OIL SEPARATOR

(a) Install the oil separator with the 4 bolts.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

HINT:

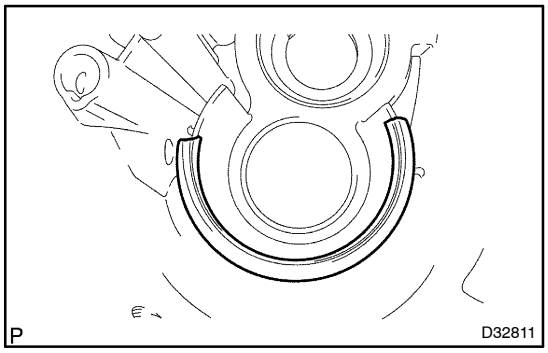
While installing the oil separator, slightly lift up the counter gear.



70. INSTALL SELECT LEVER OIL SEAL

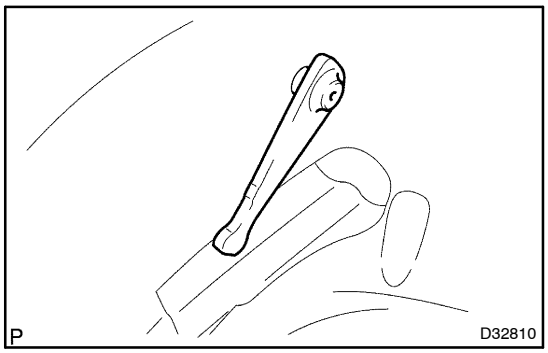
(a) Using SST and a hammer, tap in a new select lever shaft oil seal to the transmission according to dimension A.
SST 09950–60010 (09951–00200), 09950–70010 (09951–07100)
Dimension A: 0 to 1.0 mm (0 to 0.039 in.)

(b) Apply MP grease to the lip of the oil seal.



71. INSTALL TRANSMISSION OIL SEPARATOR SEAL

(a) Install a new seal to the transmission case.

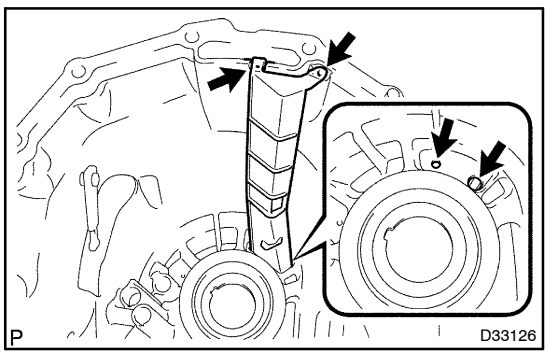


72. INSTALL SELECT LEVER SHAFT

(a) Install the shaft to the transmission case.

NOTICE:

Make sure to set the select lever at the position shown in the illustration, otherwise you may have trouble at a later work.

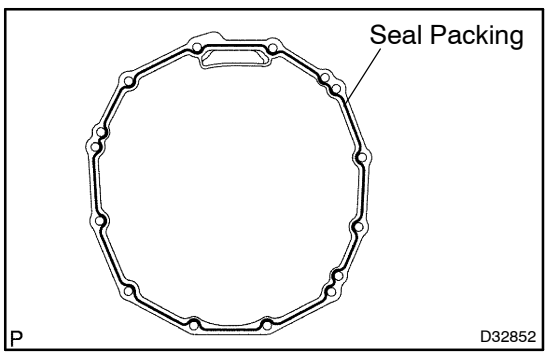


73. INSTALL TRANSMISSION OIL RECEIVER NO. 2

(a) Install the oil receiver to the transmission case.

HINT:

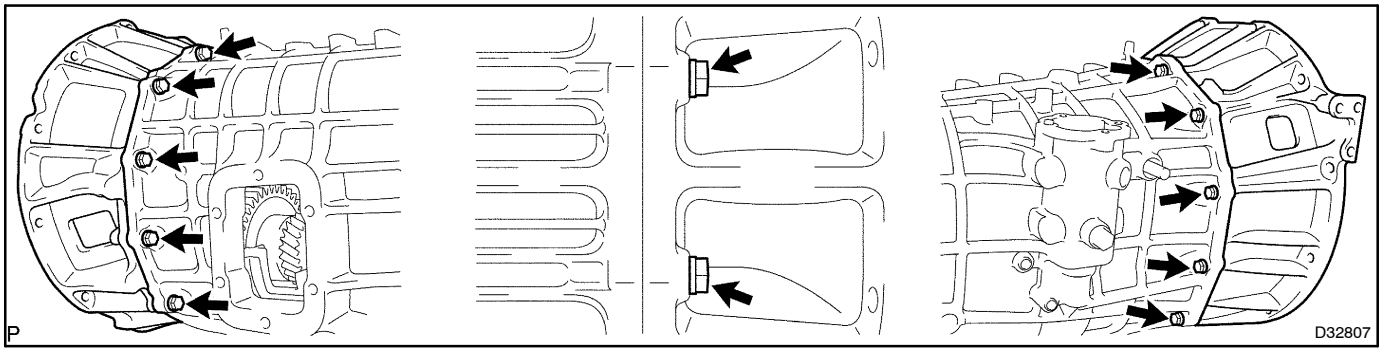
Insert the protruding part on the oil receiver No. 2 into the groove on the transmission case.

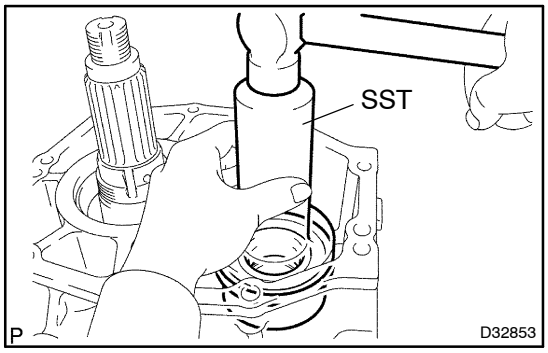


74. INSTALL TRANSMISSION CASE

(a) Apply FIPG (seal packing) to the transmission case as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent

(b) Install the transmission case to the clutch housing with 12 new bolts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



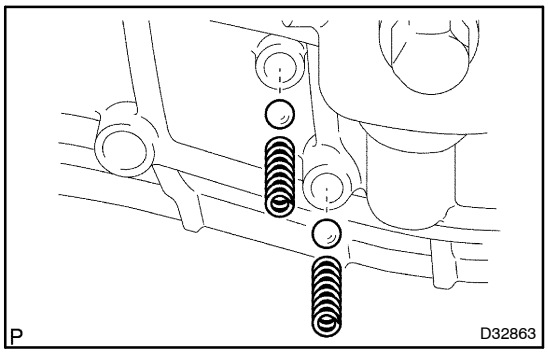


(c) Using SST and a hammer, tap in a new counter gear rear bearing to the counter gear.
SST 09309–36010

(d) Install a new spacer and new output shaft rear tapered roller bearing to the output shaft.

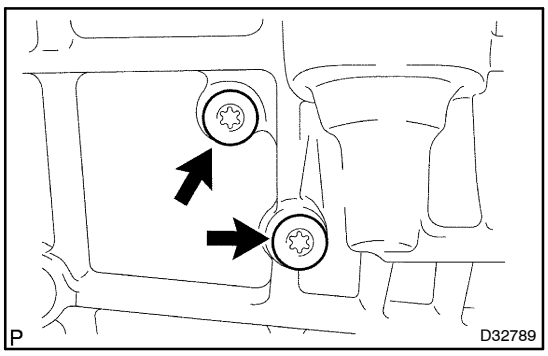
(e) Temporarily install a new output shaft adjusting nut to the output shaft.

(f) Temporarily install a new counter gear lock nut to the counter gear.

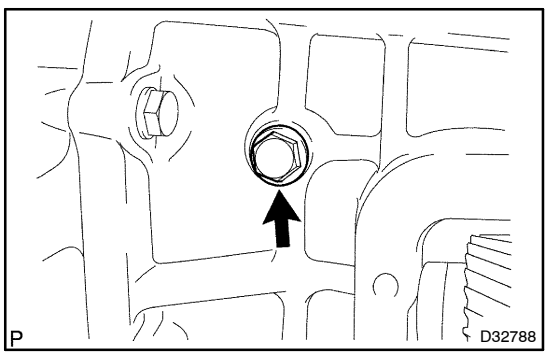


75. INSTALL SHIFT DETENT BALL

(a) Install the 2 balls and 2 springs into the transmission case.

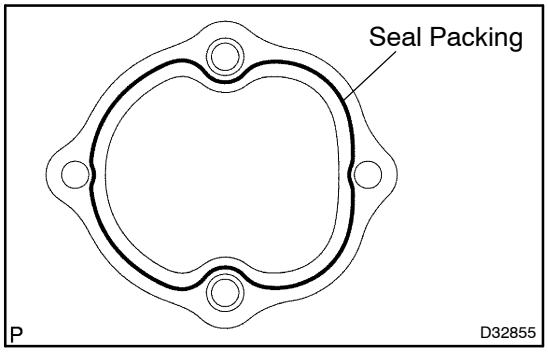


(b) Using a torx wrench (T40), install 2 new plugs to the transmission case.
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



76. INSTALL REVERSE IDLER GEAR SHAFT BOLT

(a) Install a new bolt to the transmission case.
Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

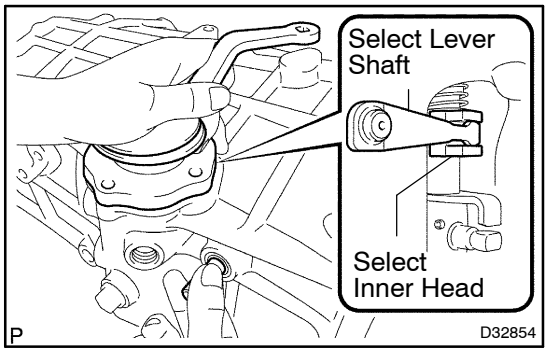


77. INSTALL SHIFT LEVER SHAFT HOUSING ASSY

(a) Apply FIPG (seal packing) to the housing as shown in the illustration.

FIPG:

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

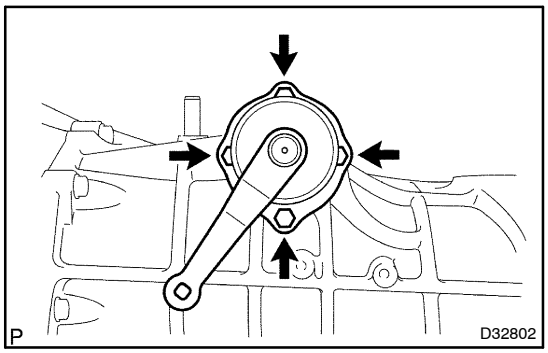


(b) Install the select return spring to the transmission case.

(c) Insert the tip of the select lever shaft into the hole on the select inner head.

NOTICE:

Be careful not to let the select lever fall into the transmission case.

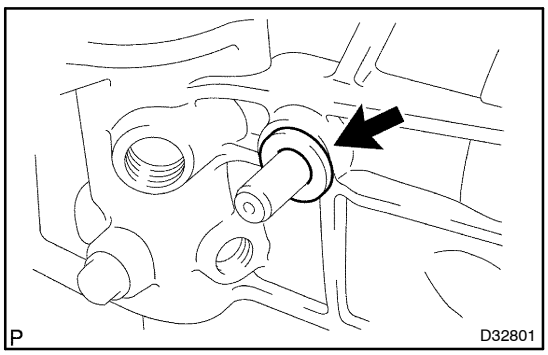


(d) Install the housing to the transmission case with the 4 bolts.

Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)

NOTICE:

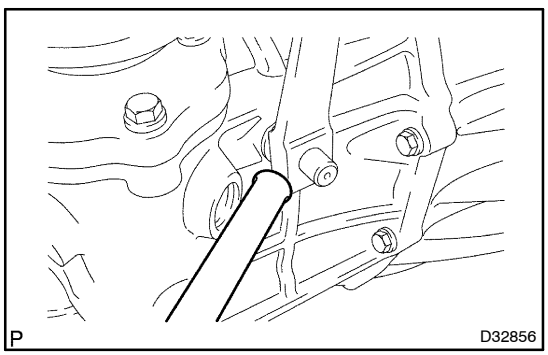
Be sure that the shift inner lever is inserted into the grooves on the shift fork shaft No. 4 and shift fork No. 2.



78. INSTALL OUTER SELECT LEVER

(a) Install the washer to the select lever shaft.

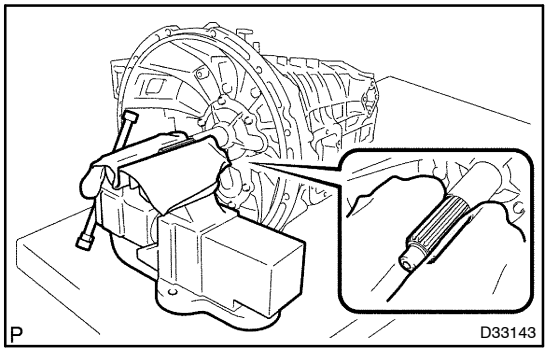
(b) Install the lever to the select lever shaft.



(c) Using a brass bar and hammer, tap in a new select lever shaft knock pin to the outer select lever.

(d) Secure the knock pin with a new spring washer and the nut.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

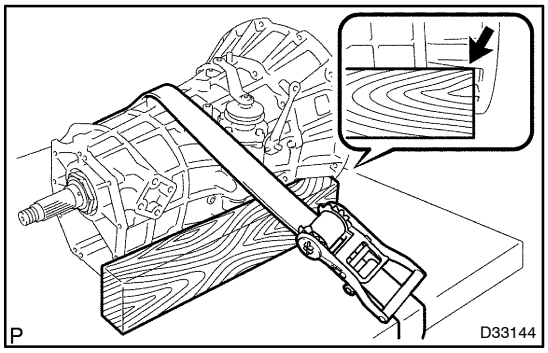


79. ADJUST OUTPUT SHAFT TAPERD ROLLER BEARING PRELOAD

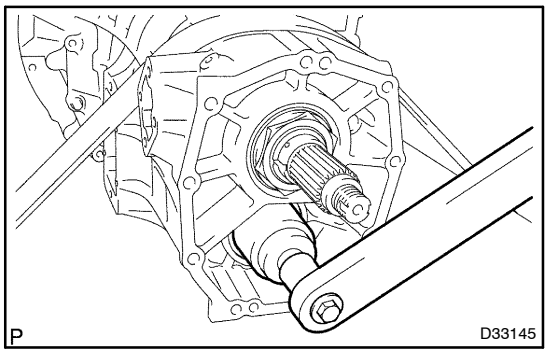
(a) Fix the input shaft's spline part through 2 protective aluminum plates and a shop rag in a vise, and move the gear to the 4th place.

NOTICE:

Be careful not to damage the spline area.

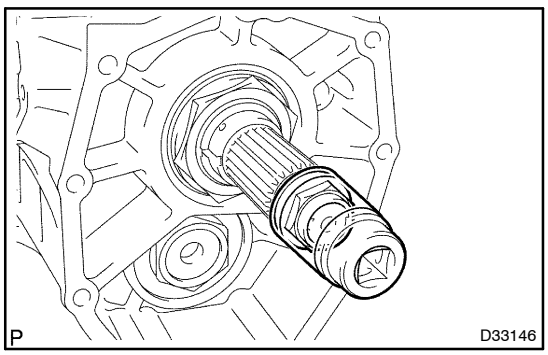


(b) Using 2 belts and a wooden block, fasten the transmission to the work bench.



(c) Using a 50 mm socket wrench, install the counter gear lock nut.

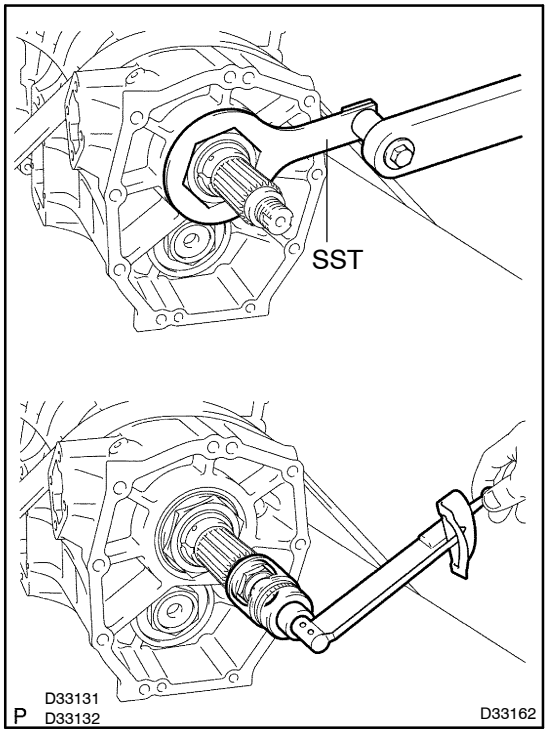
Torque: 132 N·m (1,346 kgf·cm, 97 ft·lbf)



(d) Install the output shaft rear set nut.

HINT:

- The output shaft rear set nut is used for measuring preload.
- The output shaft rear set nut's code is 90179–24008.

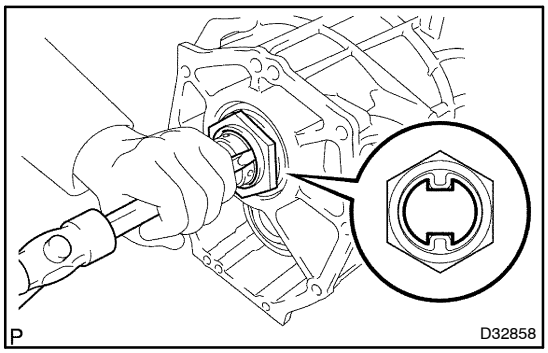


(e) Using SST, tighten the output shaft adjusting nut so that the preload is within the standard.
SST 09617–28010
Preload (at starting):
0.3 to 0.8 N·m (3.06 to 8.16 kgf·cm 2.66 to 7.10 in.·lbf)

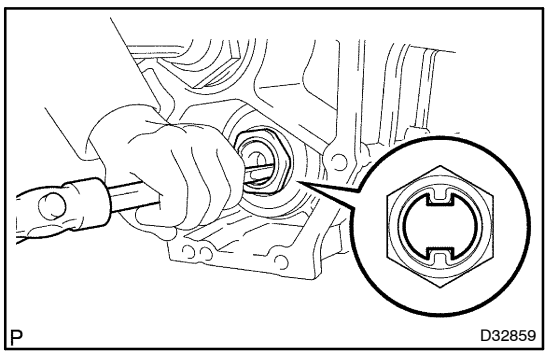
HINT:
Before preload measurement, return the gear to neutral.
If the result is not as specified, tighten and adjust the output shaft adjusting nut.

NOTICE:
If the output shaft adjusting nut is loosened or removed due to large preload, always replace the output shaft tapered roller bearing spacer with a new spacer.

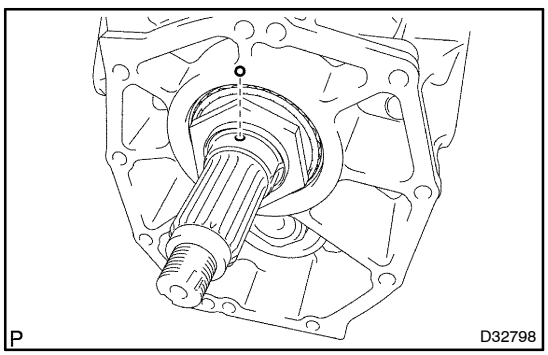
(f) Remove the output shaft rear set nut.
(g) Remove the 2 belts and wooden block from the transmission assy.
(h) Remove the gear to neutral and remove the input shaft from the vise.



(i) Using a chisel and hammer, caulk the output shift adjusting nut.

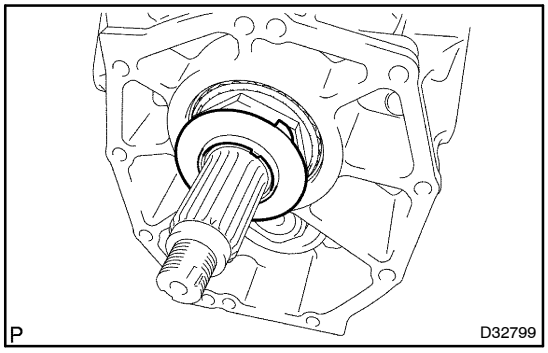


(j) Using a chisel and hammer, caulk the counter gear lock nut.

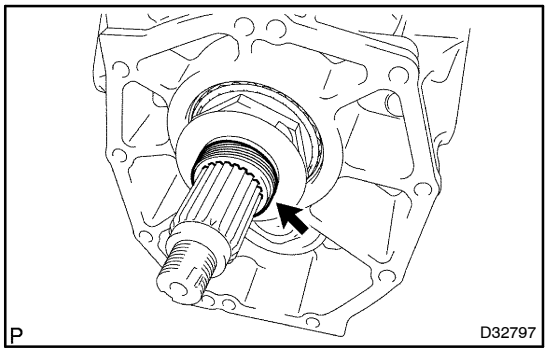


80. INSTALL SPEEDOMETER DRIVE GEAR PIN (BALL)

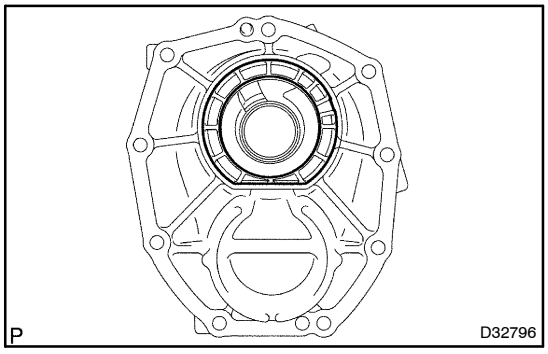
(a) Apply MP grease to the pin (ball).
(b) Install the pin (ball) to the output shaft.



81. INSTALL TRANSMISSION OIL RECEIVER NO. 3



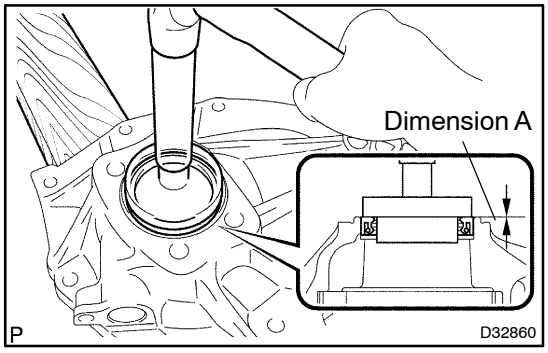
82. INSTALL SPEEDOMETER DRIVE GEAR



83. INSTALL TRANSMISSION REAR BEARING RETAINER SPEACER

NOTICE:

Be careful with the installation direction.



84. INSTALL TRANSMISSION REAR BEARING RETAINER OIL SEAL

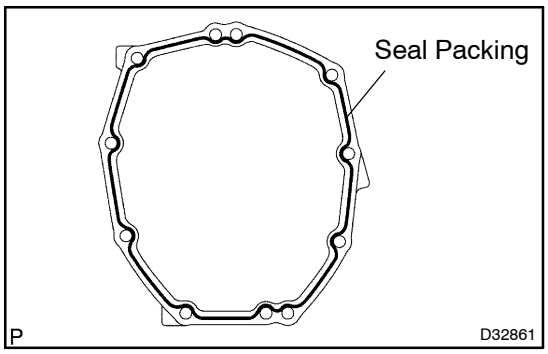
(a) Place the transmission rear retainer on a wooden block.

(b) Using SST and a hammer, tap in a new oil seal to the transmission case according to the dimension A.

SST 09950–60010 (09951–00470, 09951–00610, 09952–06010), 09950–70010 (09951–07100)

Dimension A: 0 to 0.5 mm (0 to 0.0120 in.)

(c) Apply a light coat of grease to the lip of the transmission rear retainer oil seal.

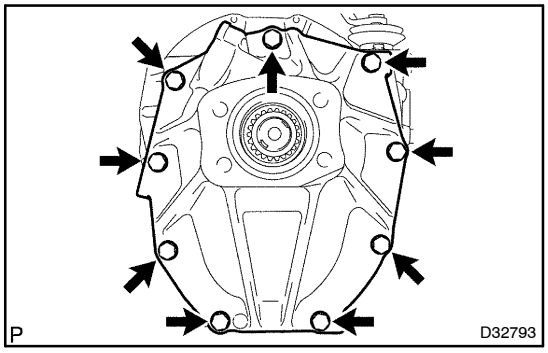


85. INSTALL TRANSMISSION REAR BEARING RETAINER

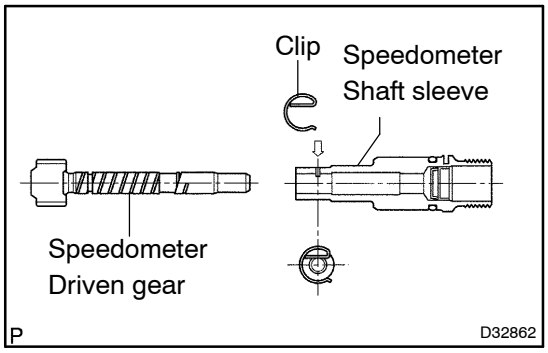
(a) Apply FIPG (seal packing) to the retainer as shown in the illustration.

FIPG:

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



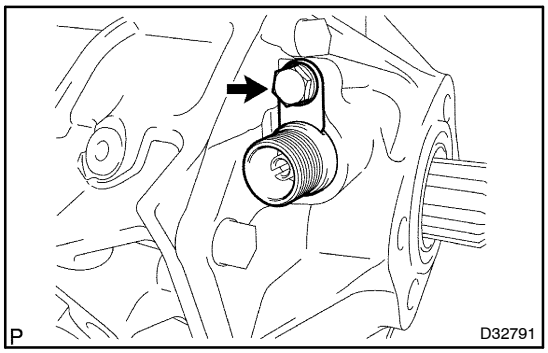
(b) Install the retainer with the 9 bolts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



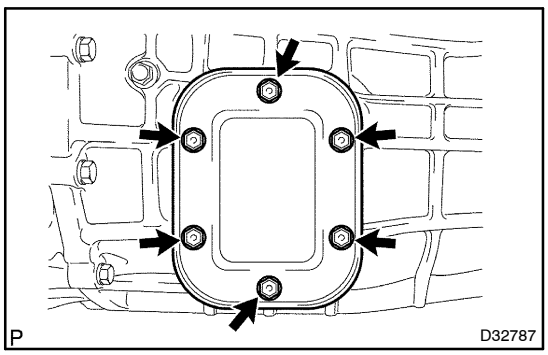
86. INSTALL SPEEDOMETER DRIVEN GEAR SUB–ASSY
(a) Install a new O–ring to the speedometer sleeve.
(b) Install the driven gear to the speedometer sleeve with the clip.

NOTICE:
Make sure to install the clip in the direction shown in the illustration.

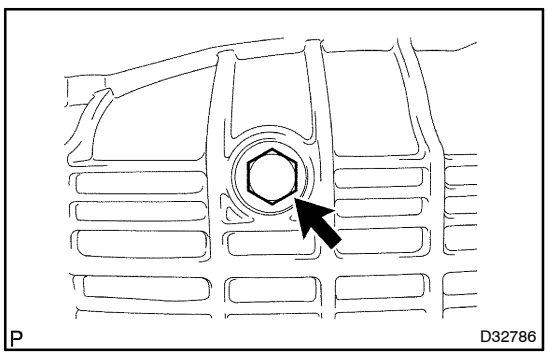
(c) Install the driven gear to the transmission rear bearing retainer.



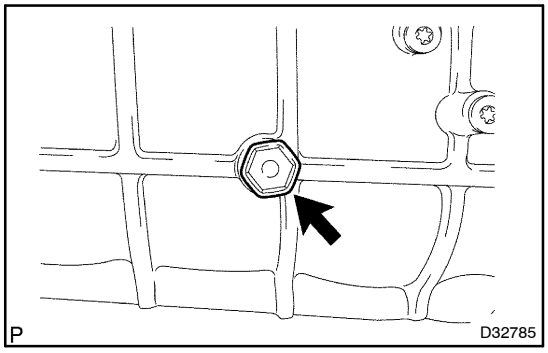
(d) Install the speedometer sleeve lock plate to the transmission rear retainer with the bolt.
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)



87. INSTALL MANUAL TRANSMISSION POWER TAKE–OFF COVER
(a) Install a new gasket and the power take–off cover with the 6 bolts.
Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)



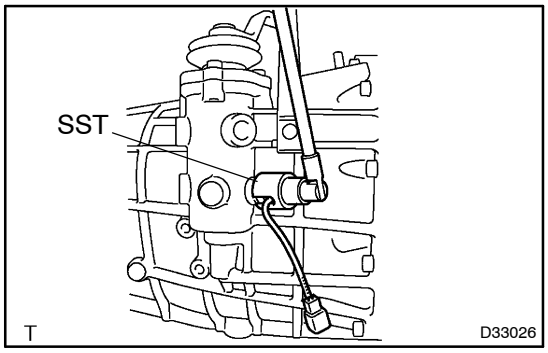
88. INSTALL TRANSMISSION FILLER PLUG
(a) Install a new gasket and the filler plug to the transmission case.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



89. INSTALL TRANSMISSION DRAIN PLUG

(a) Install a new gasket and the drain plug to the transmission case.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

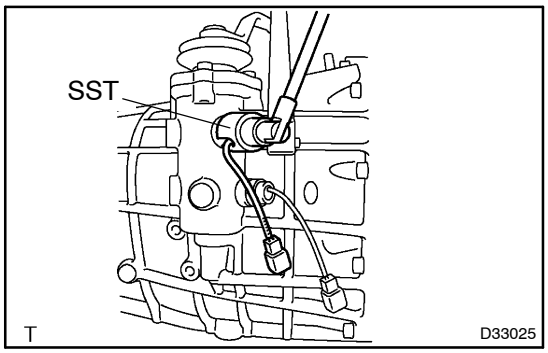


90. INSTALL EXHAUST BRAKE NEUTRAL SWITCH ASSY

(a) Using SST, install the neutral switch.

SST 09817–16011

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)



91. INSTALL BACK UP LAMP SWITCH ASSY

(a) Using SST, install a new gasket and the back up switch.

SST 09817–16011

Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)