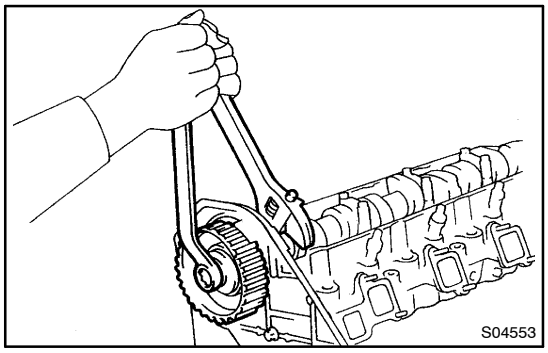
170BS–01

REPLACEMENT

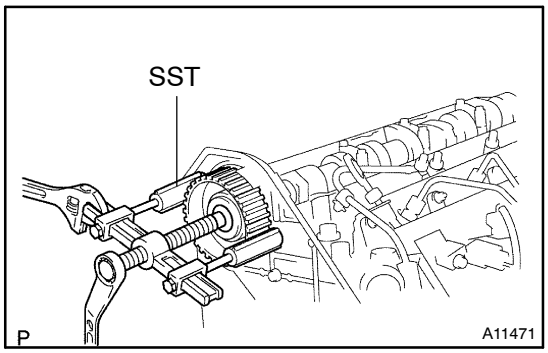
1. **DRAIN ENGINE OIL (See page 17–52)**
2. **REMOVE INTERCOOLER ASSY (See page 13–11)**
3. **REMOVE RADIATOR ASSY (See page 16–36)**
4. **REMOVE TIMING BELT (See page 14–152)**
5. **REMOVE CYLINDER HEAD COVER SUB–ASSY**

(a) Remove the 10 bolts, 2 nuts, cylinder head cover and gasket.



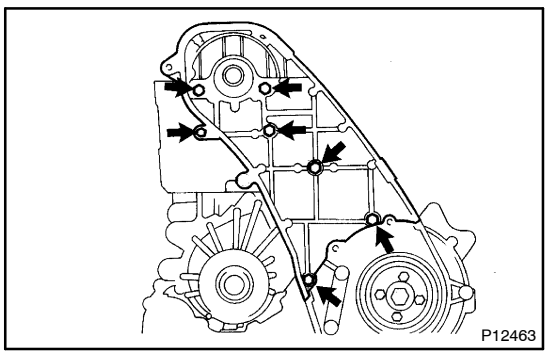
6. **REMOVE CAMSHAFT TIMING PULLEY**

(a) Hold the hexagon wrench head portion of the camshaft with a wrench, and remove the No. 1 camshaft timing pulley bolt.



(b) Using SST, remove the No. 1 camshaft timing pulley.
SST 09950–40011 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04061)

(c) Remove the set key.



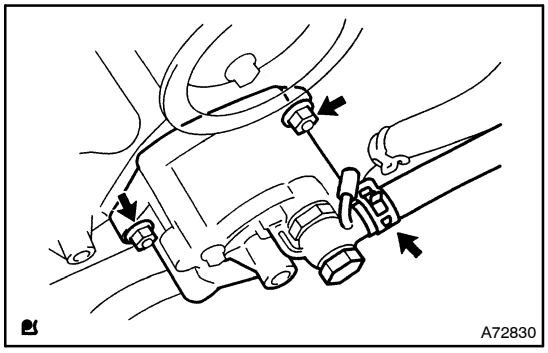
7. **REMOVE CAMSHAFT OIL SEAL RETAINER**

(a) Remove the 7 bolts and camshaft oil seal retainer.

8. **REMOVE WATER PUMP ASSY (See page 16–30)**
9. **REMOVE INJECTION OR SUPPLY PUMP ASSY (See page 11–81)**
10. **SEPARATE VANE PUMP OIL RESERVOIR ASSY**

(a) Remove the 3 bolts and vane pump oil reservoir assy.

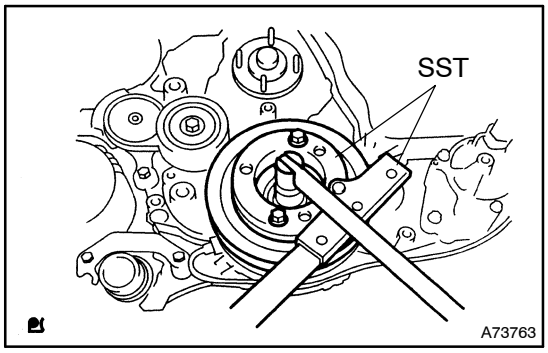
HINT:
Disconnect the vane pump oil reservoir assy with the hose connected, and then it should be hung with rope.



11. REMOVE VACUUM PUMP ASSY

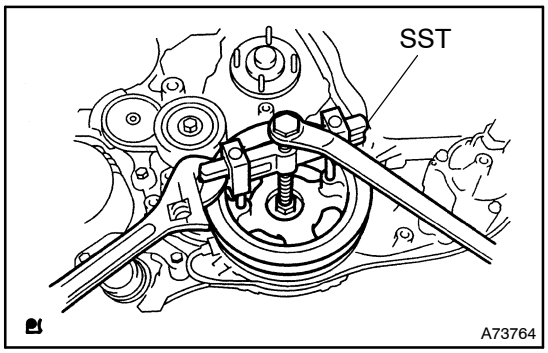
(a) Disconnect the vacuum hose.

(b) Remove the 2 nuts, 2 O–rings and vacuum pump.

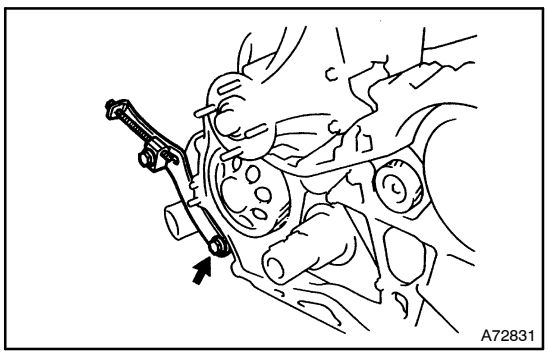


12. REMOVE CRANKSHAFT PULLEY

(a) Using SST, loosen the pulley bolt.
SST 09213–58013, 09330–00021

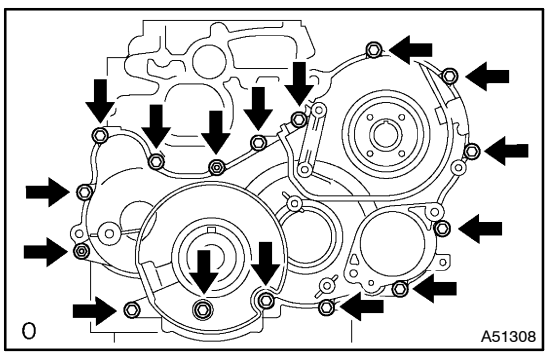


(b) Using SST, remove the crankshaft pulley.
SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)



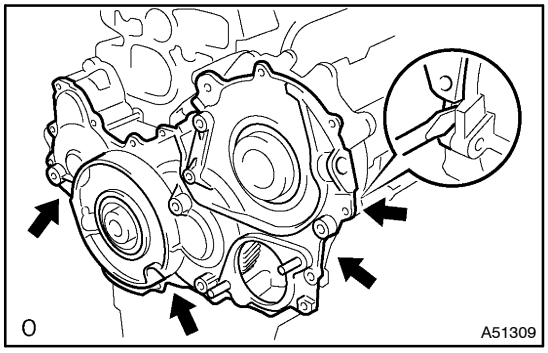
13. REMOVE FAN BELT ADJUSTING BAR

(a) Remove the bolt and adjusting bar.

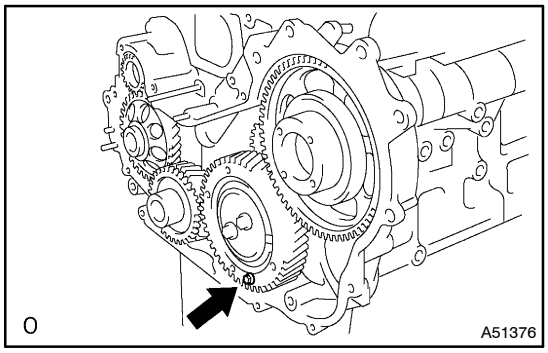


14. REMOVE TIMING GEAR CASE

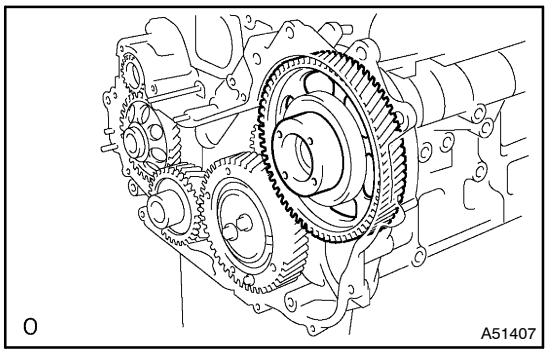
(a) Remove the 14 bolts and 2 nuts.



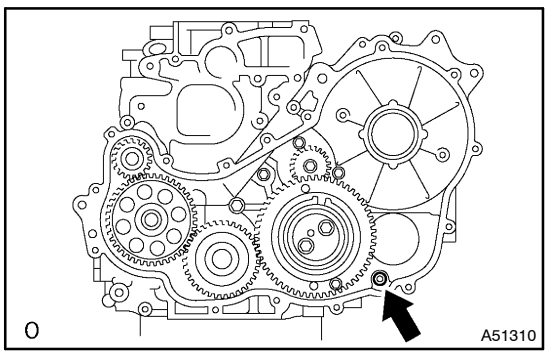
(b) Using a screwdriver, pry out the timing chain or belt cover.



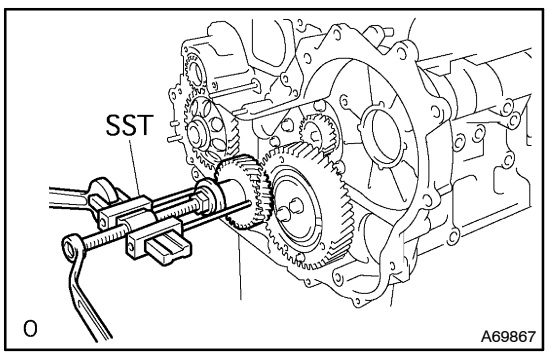
(c) Secure the idler sub–gears to the idler gear with a service bolt.



(d) Remove the injection gear.

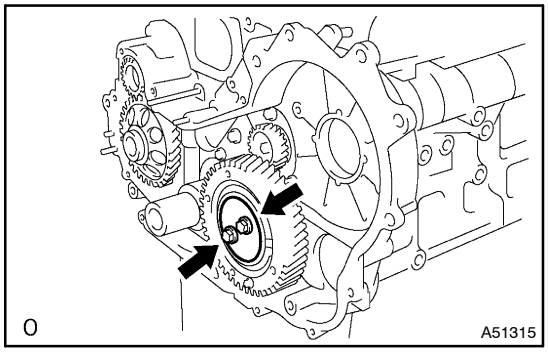


(e) Remove the O–ring.



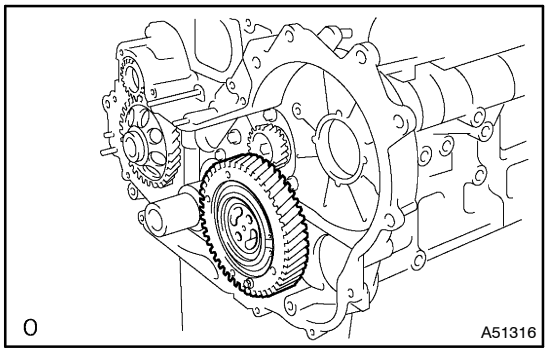
15. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Using SST, remove the crankshaft timing gear.
SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05010)

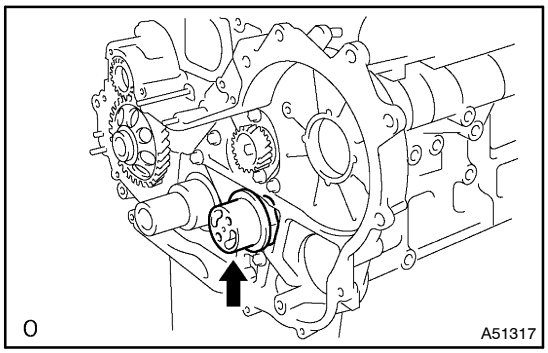


16. REMOVE IDLE GEAR THRUST PLATE

(a) Remove the 2 bolts, idler gear thrust plate.



17. REMOVE IDLE GEAR NO.1



18. REMOVE IDLE GEAR SHAFT NO.1

19. REMOVE MANUAL TRANSMISSION UNIT ASSY (M/T TRANSMISSION) (See page 41–13)

20. REMOVE CLUTCH COVER ASSY (M/T TRANSMISSION) (See page 42–15)

21. REMOVE CLUTCH DISC ASSY (M/T TRANSMISSION) (See page 42–15)

22. REMOVE FLYWHEEL SUB–ASSY (M/T TRANSMISSION) (See page 14–183)

23. REMOVE AUTOMATIC TRANSMISSION ASSY (A/T TRANSMISSION) (See page 40–20)

24. REMOVE DRIVE PLATE & RING GEAR SUB–ASSY (A/T TRANSMISSION) (See page 14–183)

25. REMOVE OIL PAN INSULATOR

(a) Remove the 2 bolts and oil pan insulator.

26. REMOVE REAR END PLATE

(a) Remove the bolt and rear plate.

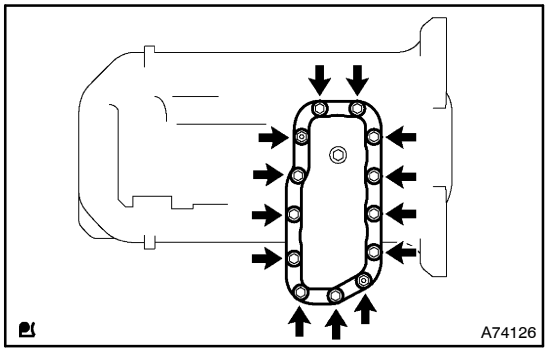
27. REMOVE DIFFERENTIAL CARRIER ASSY FRONT (See page 29–13)

28. REMOVE OIL COOLER INLET TUBE NO.1 (See page 40–20)

29. REMOVE OIL COOLER OUTLET TUBE NO.1 (See page 40–20)

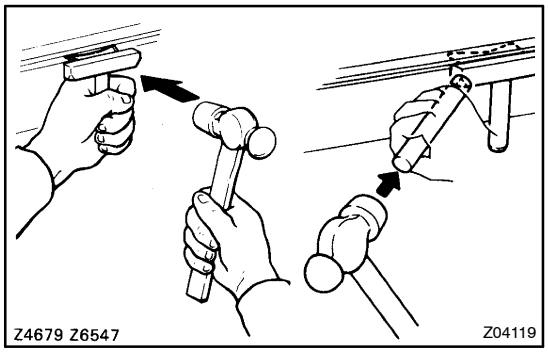
30. REMOVE OIL PAN COVER SUB–ASSY NO.1

(a) Remove the 4 bolts and oil pan cover.



31. REMOVE OIL PAN SUB–ASSY NO.2

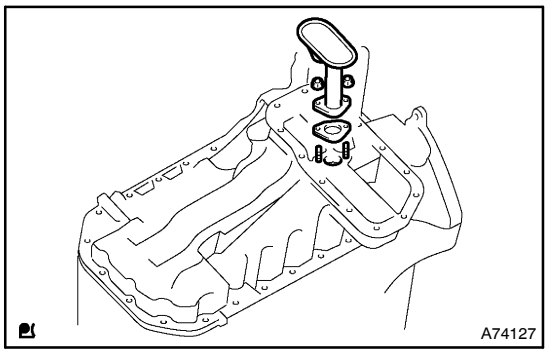
(a) Remove the 11 bolts and 2 nuts.



(b) Insert the blade of SST between the cylinder block and oil pan, and cut off applied sealer and remove the oil pan.
SST 09032–00100

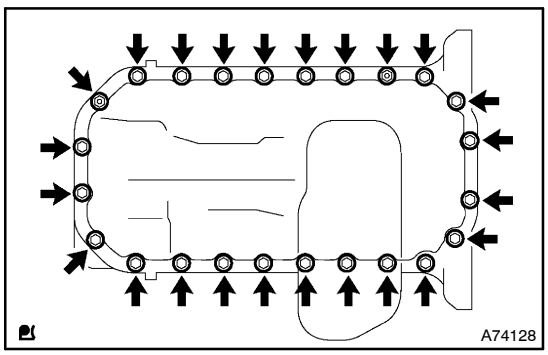
NOTICE:

- **Do not use SST for the timing gear case side and rear oil seal retainer.**
- **Be careful not to damage the oil pan flange.**



32. REMOVE OIL STRAINER SUB–ASSY

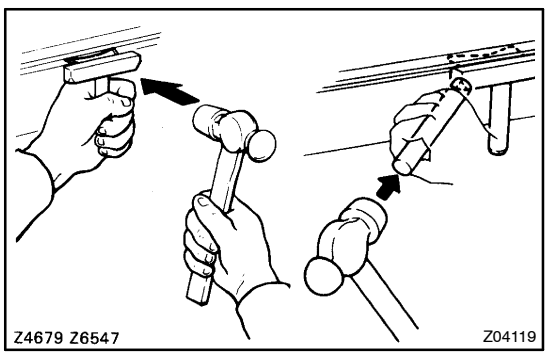
(a) Remove the 2 nuts, oil strainer and gasket.



33. REMOVE OIL PAN SUB–ASSY

(a) Disconnect the engine oil level sensor connector.

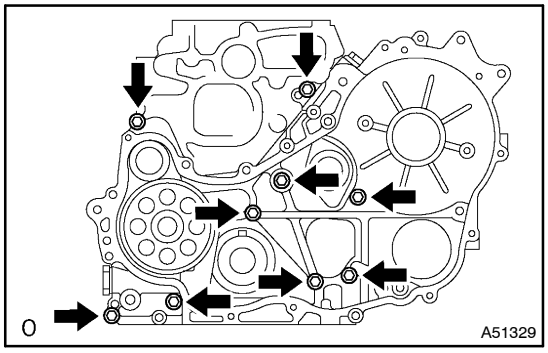
(b) Remove the 22 bolts, 2 nuts and gasket.



(c) Insert the blade of SST between the cylinder block and oil pan, and cut off applied sealer and remove the oil pan.
SST 09032–00100

NOTICE:

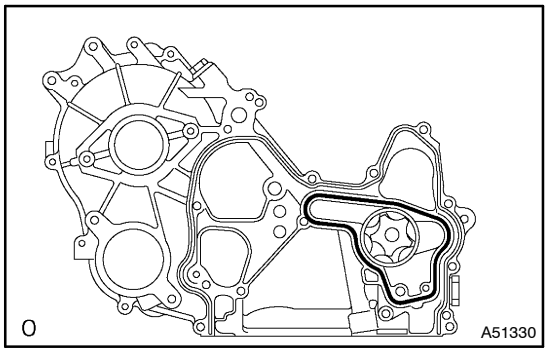
- **Do not use SST for the timing gear case side and rear oil seal retainer.**
- **Be careful not to damage the oil pan flange.**



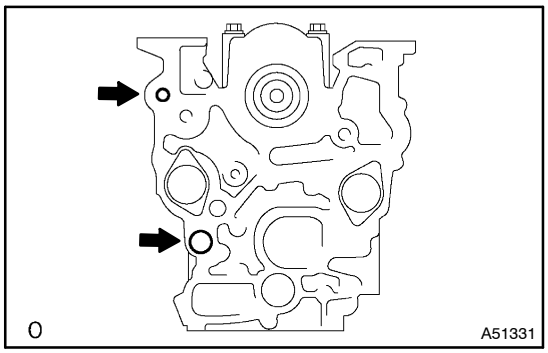
34. REMOVE TIMING GEAR CASE ASSY

(a) Remove the 8 bolts and union bolt.

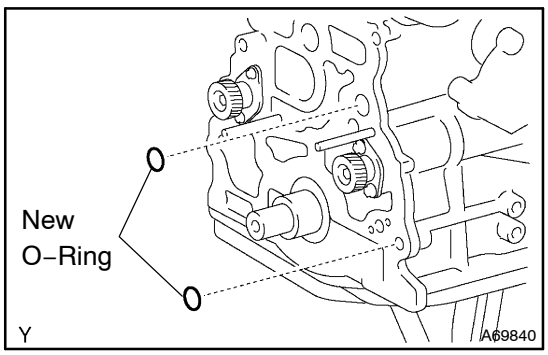
(b) Using a plastic–faced hammer, lightly tap out the timing gear case.



(c) Remove the oil pump gasket.

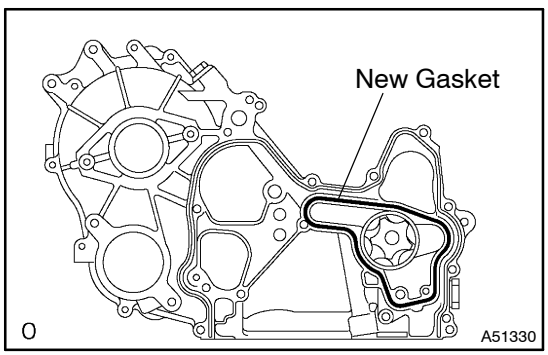


(d) Remove the 2 O–rings.

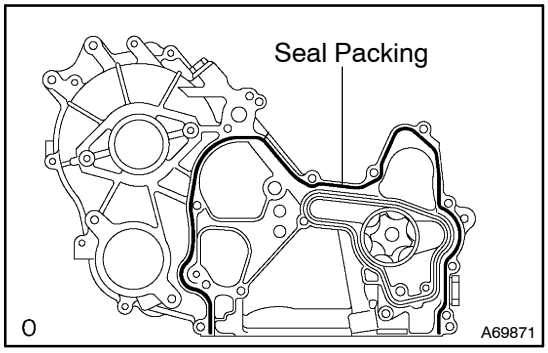


35. INSTALL TIMING GEAR CASE ASSY

(a) Install 2 new O–rings to the cylinder block.



(b) Place a new gasket into the groove of the timing gear case as shown in the illustration.

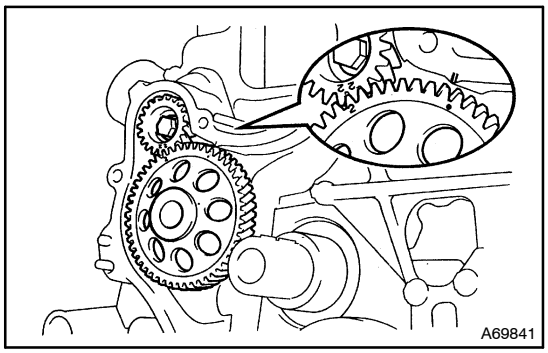


(c) Apply seal packing to the timing gear case as shown in the illustration.
   (1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
   (2) Immediately remove nozzle from the tube and reinstall cap.

Seal packing: part No. 08826 – 00080 or equivalent

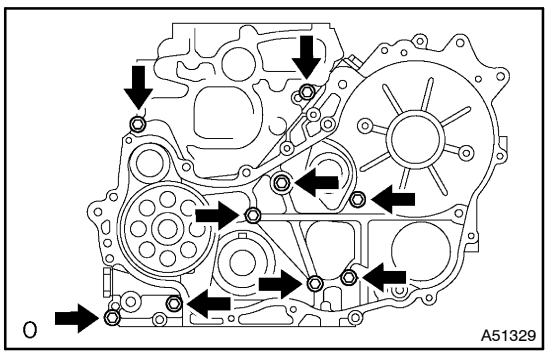
NOTICE:

- **Avoid applying an excessive amount to the surface.**
- **Install a nozzle that has been cut to a 5 mm (0.20 in.) opening.**
- **Parts must be assembled within 15 minutes of application. Otherwise the material must be removed and reapplied.**
- **Immediately remove nozzle from the tube and reinstall the cap.**



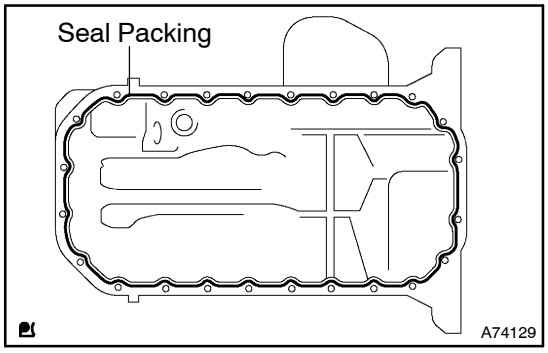
(d) The matchmark on the balanceshaft driven gear No.1 should be aligned with the ”2” mark.

(e) Align the mark on the oil pump drive gear with the mark on the timing gear case.



(f) Install the 8 bolts and union bolt.

Torque:
13 N·m (130 kgf·cm, 9 ft·lbf) for Bolt
16 N·m (160 kgf·cm, 12 ft·lbf) for Union bolt



36. INSTALL OIL PAN SUB–ASSY

(a) Apply seal packing to the oil pan as shown in the illustration.

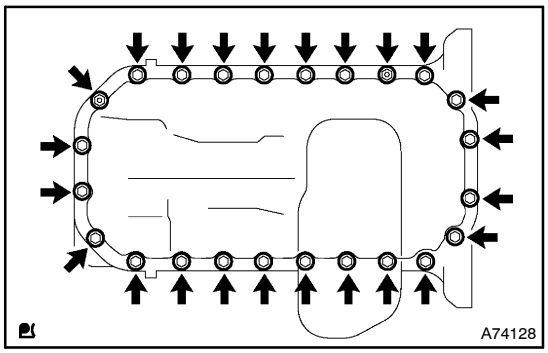
Seal packing: Part No. 08826–00080 or equivalent

(1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

(2) Immediately remove nozzle from the tube and reinstall cap.

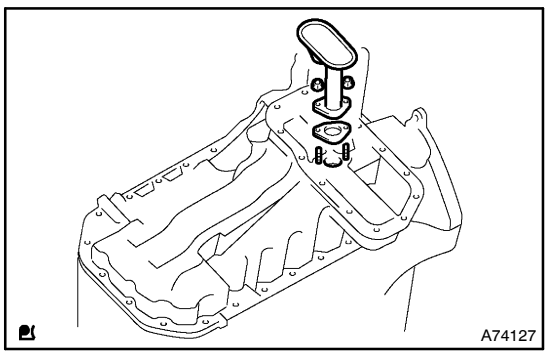
NOTICE:

- **Avoid applying an excessive amount to the surface.**
- **Install a nozzle that has been cut to a 5 mm (0.20 in.) opening.**
- **Parts must be assembled within 15 minutes of application. Otherwise the material must be removed and reapplied.**
- **Immediately remove nozzle from the tube and reinstall the cap.**



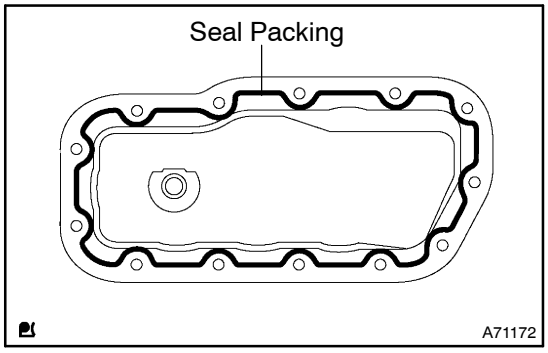
(b) Install the oil pan and gasket with the 22 bolts and 2 nut.
Torque: 14.5 N·m (148 kgf·cm, 11 ft·lbf)

(c) Connect the engine oil level sensor connector.



37. INSTALL OIL STRAINER SUB–ASSY

(a) Install a new gasket and the oil strainer with the 2 nuts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



38. INSTALL OIL PAN SUB–ASSY NO.2

(a) Apply seal packing to the oil pan as shown in the illustration.

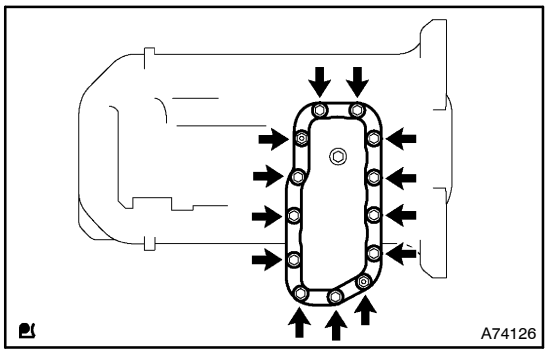
Seal packing: Part No. 08826–00080 or equivalent

(1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

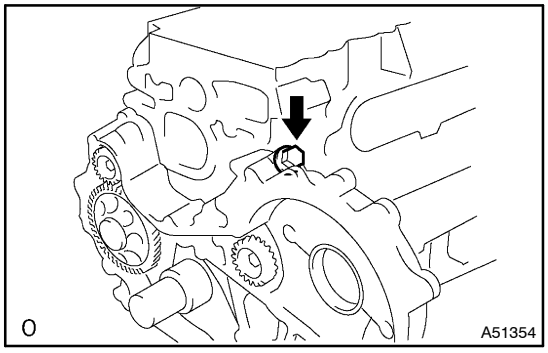
(2) Immediately remove nozzle from the tube and reinstall cap.

NOTICE:

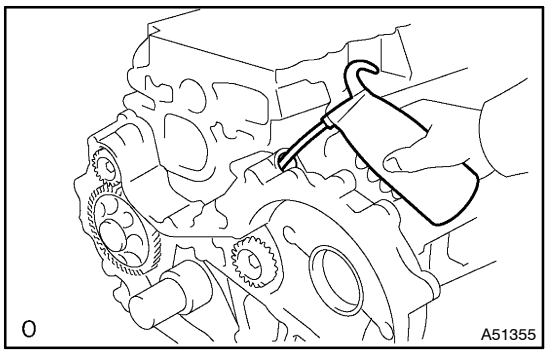
- **Avoid applying an excessive amount to the surface.**
- **Install a nozzle that has been cut to a 5 mm (0.20 in.) opening.**
- **Parts must be assembled within 15 minutes of application. Otherwise the material must be removed and reapplied.**
- **Immediately remove nozzle from the tube and reinstall the cap.**



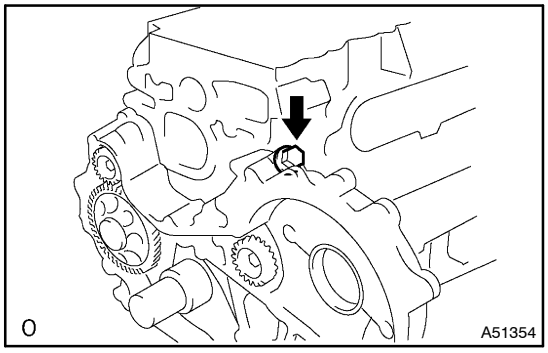
(b) Install the oil pan with the 11 bolts and 2 nut.
Torque: 9 N·m (92 kgf·cm, 80 in.·lbf)



(c) Remove the plug and gasket.

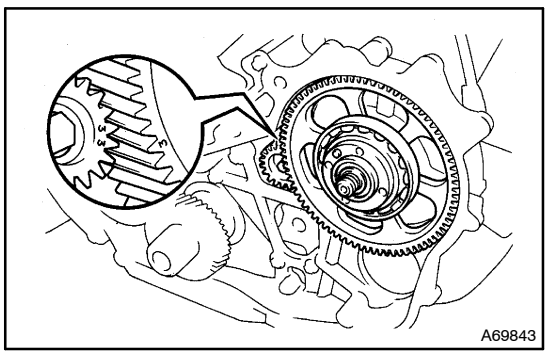


(d) Pour in approx. 1.3 litters (1.4 US qts, 1.1 Imp. qts) of engine oil into the oil pump.

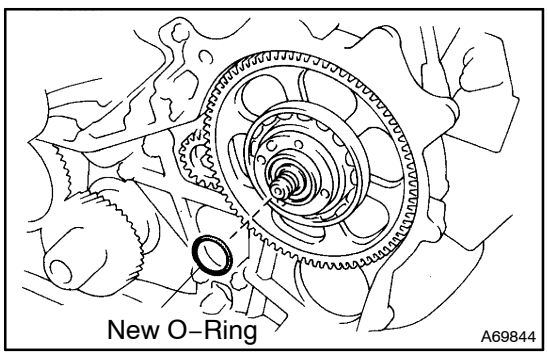


(e) Install the plug with a new gasket.
Torque: 44 N·m (449 kgf·cm, 33 ft·lbf)

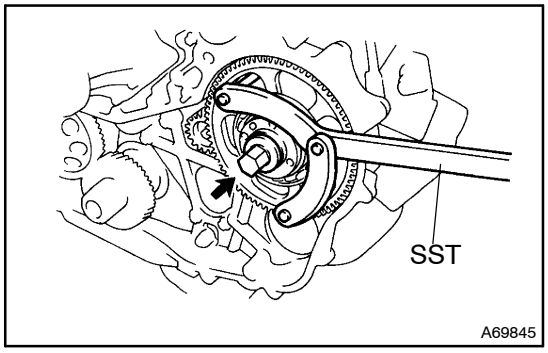
39. INSTALL OIL PAN COVER SUB–ASSY NO.1
(a) Install the oil pan cover with the 4 bolts.
Torque: 9 N·m (92 kgf·cm, 80 in.·lbf)
40. INSTALL OIL COOLER OUTLET TUBE NO.1 (See page 40–20)
41. INSTALL OIL COOLER INLET TUBE NO.1 (See page 40–20)
42. INSTALL DIFFERENTIAL CARRIER ASSY FRONT (See page 29–13)
43. INSTALL REAR END PLATE
(a) Install the end plate with bolt.
Torque: (8 N·m (82 kgf·cm, 71 in·lbf)
44. INSTALL OIL PAN INSULATOR
(a) Install the oil pan insulator with 2 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)
45. INSTALL DRIVE PLATE & RING GEAR SUB–ASSY (A/T TRANSMISSION) (See page 14–183)
46. INSTALL AUTOMATIC TRANSMISSION ASSY (A/T TRANSMISSION) (See page 40–20)
47. INSTALL FLYWHEEL SUB–ASSY (M/T TRANSMISSION) (See page 14–183)
48. INSTALL CLUTCH DISC ASSY (M/T TRANSMISSION) (See page 42–15)
49. INSTALL CLUTCH COVER ASSY (M/T TRANSMISSION) (See page 42–15)
50. INSTALL MANUAL TRANSMISSION UNIT ASSY (M/T TRANSMISSION) (See page 41–13)



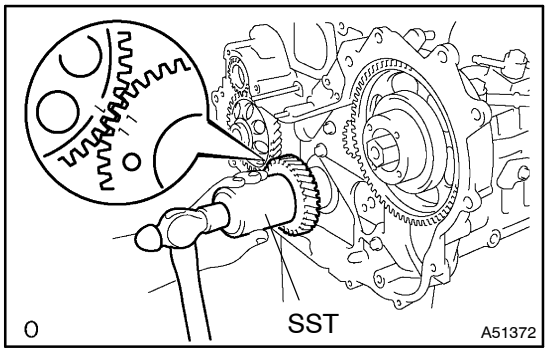
51. INSTALL INJECTION GEAR
(a) The match marks on the balanceshaft driven gear No.2 should be aligned with ”3” marks.



(b) Install a new O–ring to the injection gear.

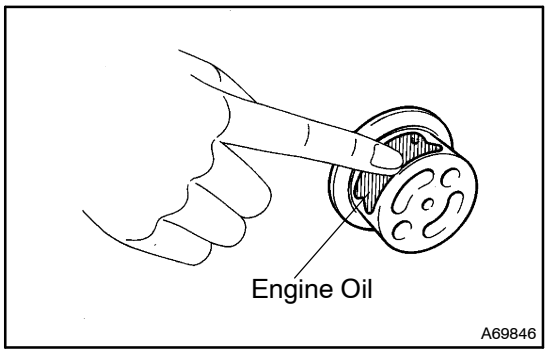


(c) Install the injection gear set nut.
(d) Using SST, torque the nut.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



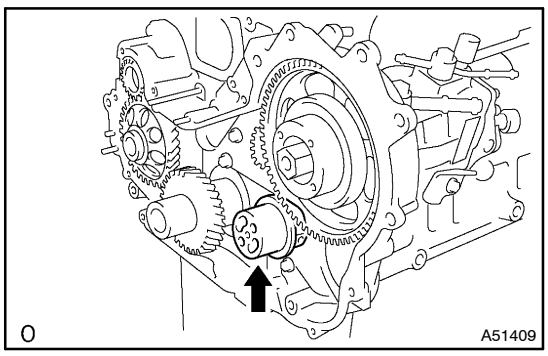
52. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

(a) The matchmarks on the oil pump drive gear should be aligned with ”1” marks.
(b) Using SST and a hammer, tap in the timing gear.
SST 09223–00010

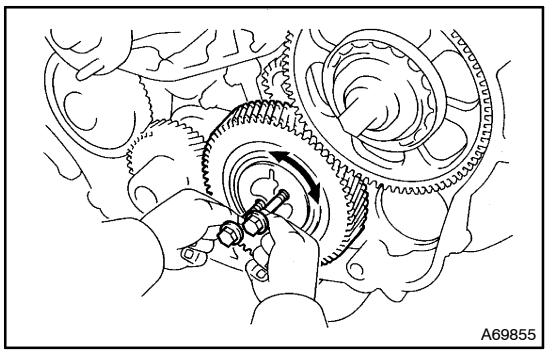


53. INSTALL IDLE GEAR SHAFT NO.1

(a) Coat the idler gear shaft No.1 with engine oil as shown in the illustration.

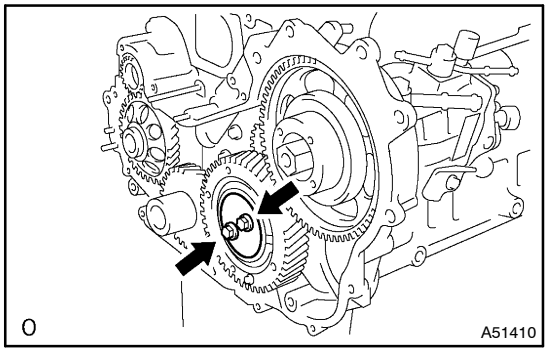


(b) Install the idler gear shaft No.1 to the cylinder block.



54. INSTALL IDLE GEAR NO.1

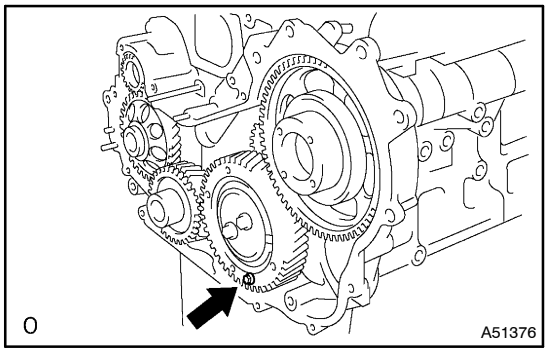
(a) Align the idle gear thrust plate set bolt holes.



(b) Install the idle gear thrust plate with the 2 bolts. Torque the bolts.

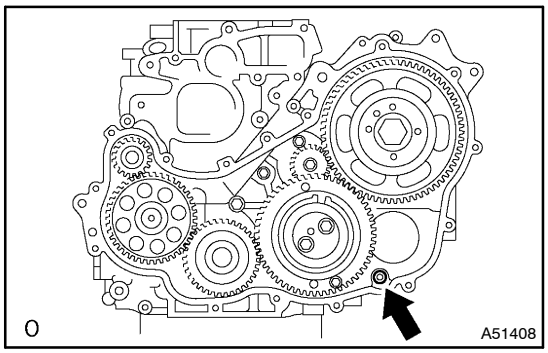
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

55. INSTALL IDLE GEAR THRUST PLATE

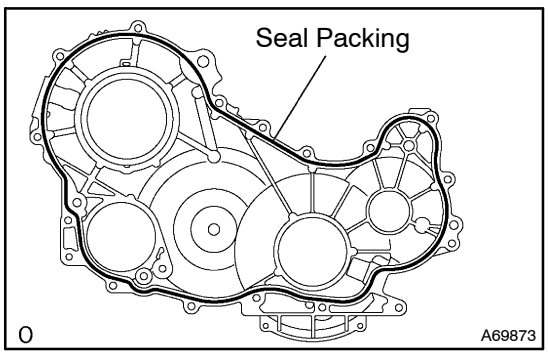


56. INSTALL TIMING GEAR CASE

(a) Remove the service bolt.



(b) Install a new O–ring to the timing gear case.



(c) Apply seal packing to the timing gear case as shown in the illustration.

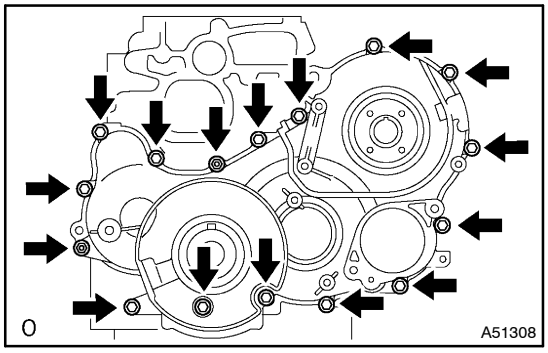
Seal packing: Part No. 08826–00080 or equivalent

(1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

(2) Immediately remove nozzle from the tube and reinstall cap.

NOTICE:

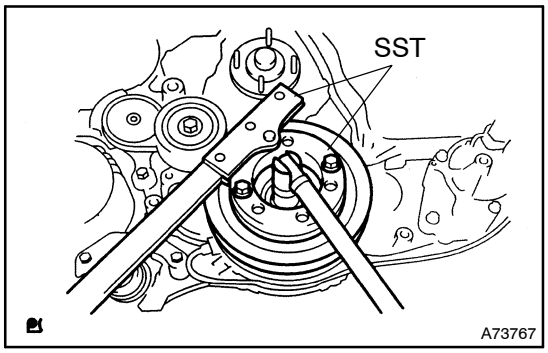
- **Avoid applying an excessive amount to the surface.**
- **Install a nozzle that has been cut to a 5 mm (0.20 in.) opening.**
- **Parts must be assembled within 15 minutes of application. Otherwise the material must be removed and reapplied.**
- **Immediately remove nozzle from the tube and reinstall cap.**



(d) Install the timing gear case with the 14 bolts and 2 nuts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

57. INSTALL FAN BELT ADJUSTING BAR

(a) Install the adjusting bar with the bolt.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



58. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley.
(b) Using SST, install the pulley bolt.
SST 09213–58013, 09330–00021
Torque: 365 N·m (3,725 kgf·cm, 125 ft·lbf)

59. INSTALL VACUUM PUMP ASSY

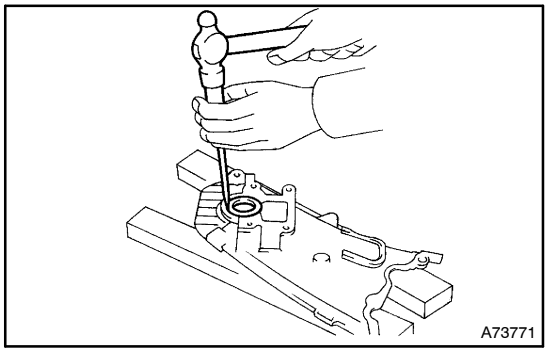
(a) Install the 2 O–rings and vacuum pump with the 2 nuts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

60. INSTALL VANE PUMP OIL RESERVOIR ASSY

(a) Install the vane pump oil reservoir assy with the 3 bolts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

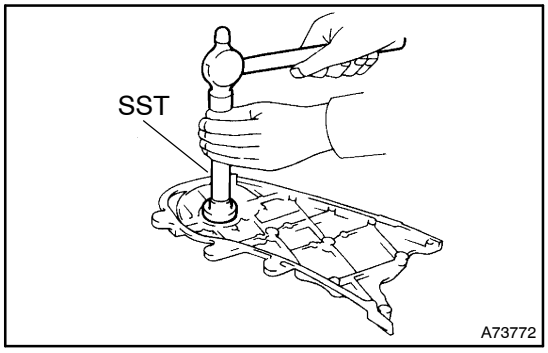
61. INSTALL INJECTION OR SUPPLY PUMP ASSY (See page 11–81)

62. INSTALL WATER PUMP ASSY (See page 16–30)



63. INSTALL CAMSHAFT OIL SEAL RETAINER

(a) Using a screw driver, remove the camshaft oil seal.



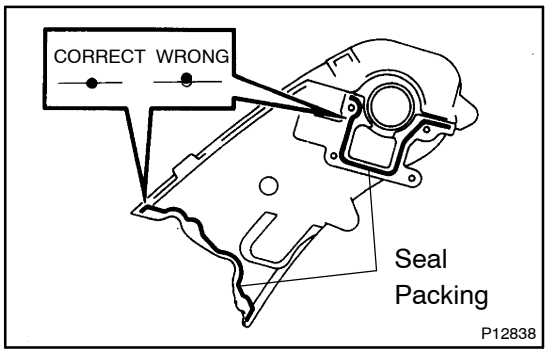
(b) Apply MP grease to a new oil seal lip.

NOTICE:

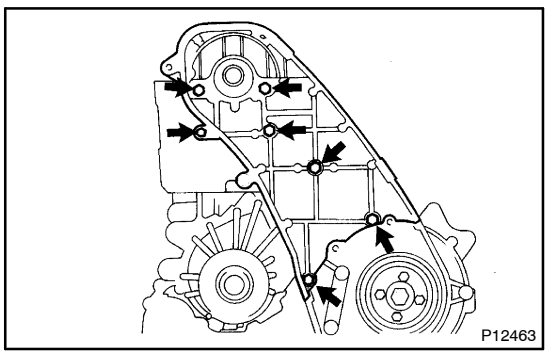
Keep the lip off of foreign materials.

(c) Using SST, tap in the oil seal until its surface is flush with the camshaft oil seal retainer edge.
SST 09223–46011

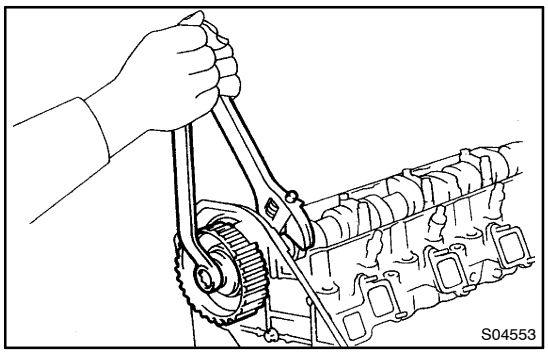
(d) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of timing gear cover and camshaft oil seal retainer.
(1) Using a razor blade and basket scraper, remove all the old packing (FIPG) material form the gasket surfaces and sealing groove.
(2) Thoroughly clean all components to remove all the loose material.
(3) Using a non–residue solvent, clean both sealing surfaces.



(e) Apply seal packing to the camshaft oil seal retainer as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent
(1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
(2) Immediately remove nozzle from the tube and reinstall cap.



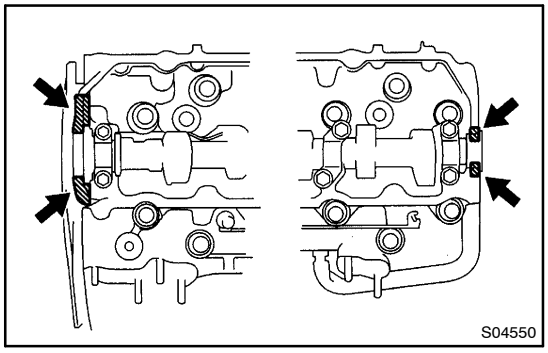
(f) Install the camshaft oil seal retainer with the 7 bolts.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



64. INSTALL CAMSHAFT TIMING PULLEY

(a) Install the set key to the key groove of the camshaft.
(b) Align the set key with the key groove of the timing pulley.
(c) Hold the hexagon wrench head portion of the camshaft, and install the timing pulley with the bolt.
Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)

65. INSTALL CYLINDER HEAD COVER SUB–ASSY



(a) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

(1) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.

(2) Immediately remove nozzle from the tube and reinstall cap.

(b) Install the gasket to the cylinder head cover.

(c) Install the cylinder head cover with 10 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

66. INSTALL TIMING BELT (See page 14–152)

67. INSTALL RADIATOR ASSY (See page 16–36)

68. INSTALL INTERCOOLER ASSY (See page 13–11)

69. ADD ENGINE OIL (See page 17–52)

70. CHECK FOR ENGINE OIL LEAKS