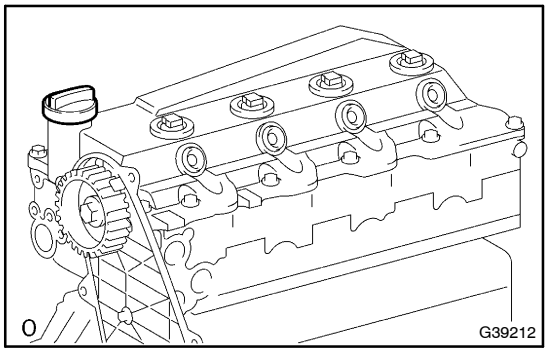
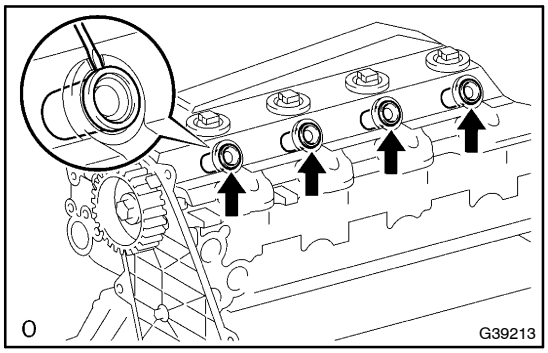
14207–03

OVERHAUL



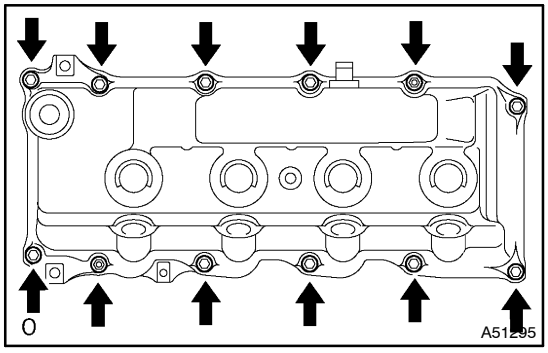
1. REMOVE OIL FILLER CAP SUB–ASSY

(a) Remove the oil filler cap from the cylinder head cover.



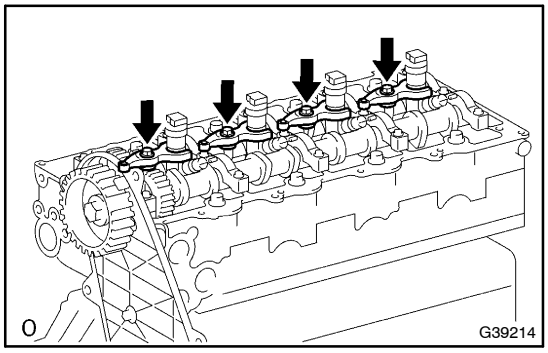
2. REMOVE NOZZLE HOLDER SEAL

(a) Pry out the 4 nozzle holder seals with a screwdriver.



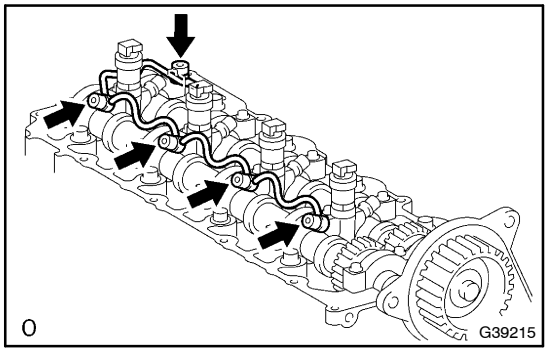
3. REMOVE CYLINDER HEAD COVER SUB–ASSY

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



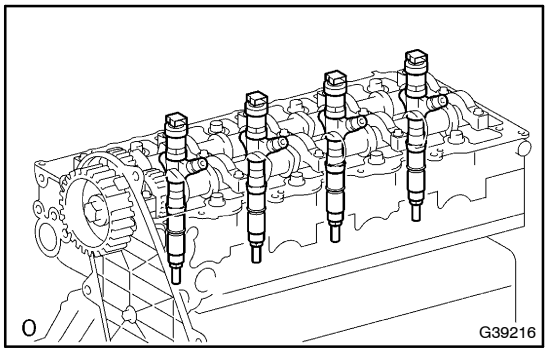
4. REMOVE NOZZLE HOLDER CLAMP

(a) Remove the 4 bolts, 4 washers and 4 nozzle holder clamps.



5. REMOVE NOZZLE LEAKAGE PIPE ASSY

(a) Remove the union bolt, 4 hollow screws, nozzle leakage pipe and 5 gaskets from the cylinder head and injector.

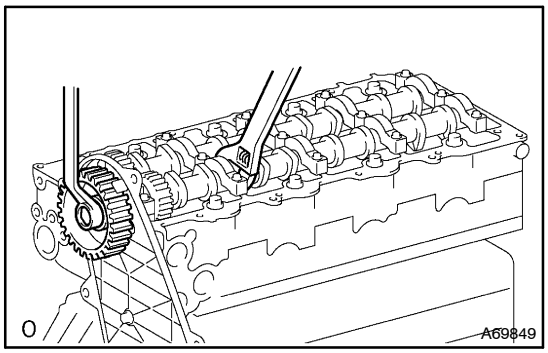


6. REMOVE INJECTOR ASSY

(a) Remove the 4 injectors from the cylinder head.

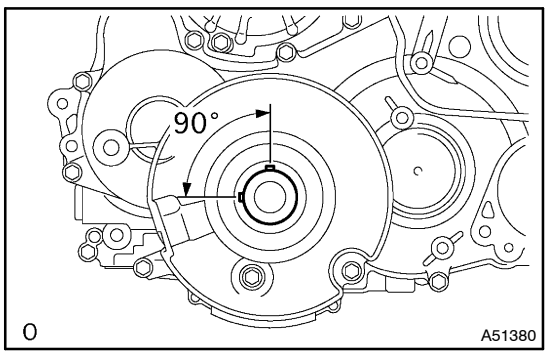
HINT:

Remember the installed locations of each injector before removing them from the cylinder head.

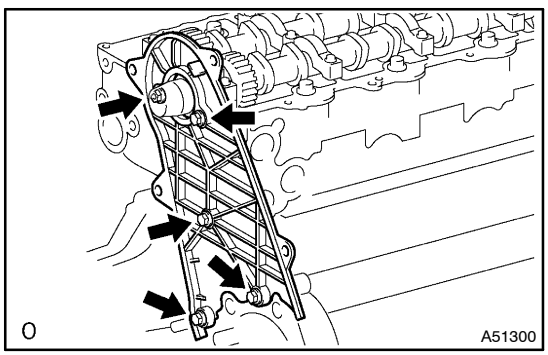


7. REMOVE CAMSHAFT TIMING PULLEY

(a) Remove the bolt, the timing pulley and the set key while holding the hexagon portion of the camshaft with a monkey wrench.

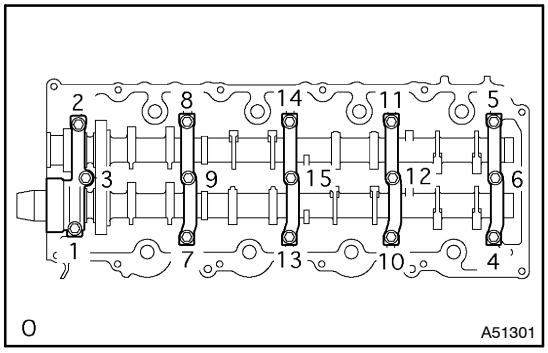


(b) Rotate the crankshaft about 90° counterclockwise from the TDC position to lower the piston.



8. REMOVE TIMING BELT NO.2 COVER

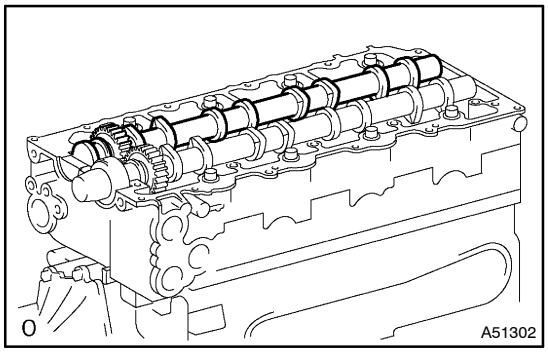
(a) Remove the 4 bolts, nut and timing belt No.2 cover.



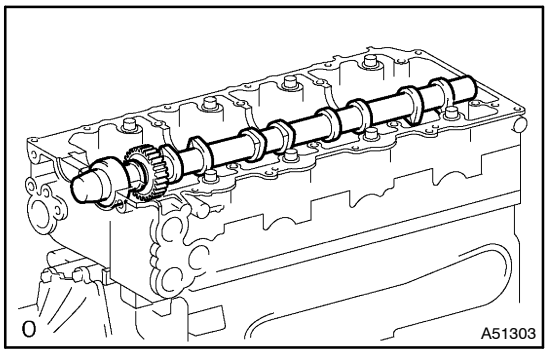
9. REMOVE NO.2 CAMSHAFT

(a) Uniformly loosen the 15 bearing cap bolts in the order indicated in the illustration and then remove them in the same order.

(b) Remove the 5 bearing caps.

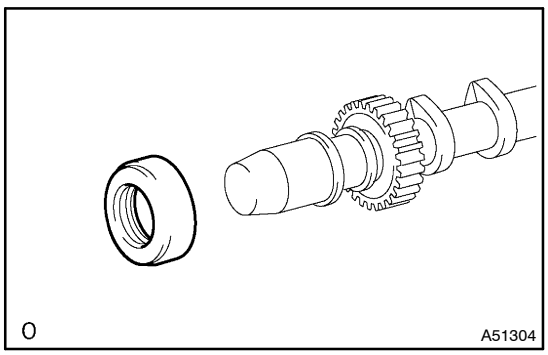


(c) Remove the camshaft No.2.



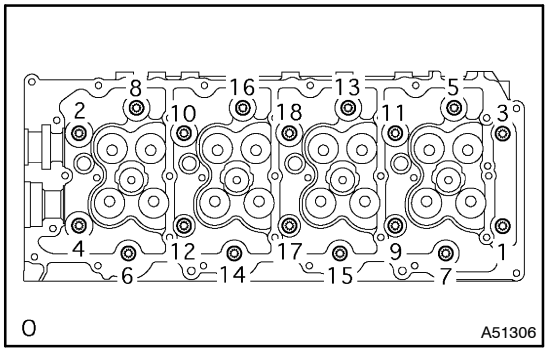
10. REMOVE CAMSHAFT

(a) Remove the camshaft from the cylinder head.



11. REMOVE CAMSHAFT SETTING OIL SEAL

(a) Remove the oil seal from the camshaft.



12. REMOVE CYLINDER HEAD SUB–ASSY

(a) Uniformly loosen the 18 cylinder head bolts in the order indicated in the illustration and then remove them in the same order.

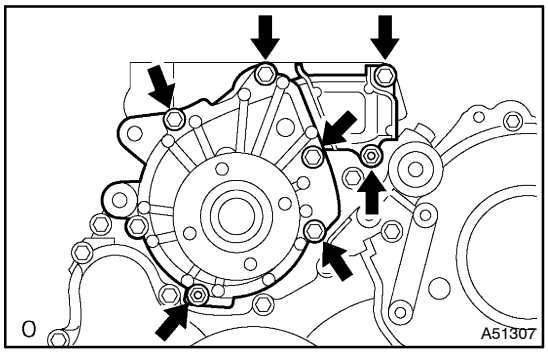
NOTICE:

Removing in incorrect order will cause the cylinder head to be warped.

(b) Remove the cylinder head and cylinder head gasket from the cylinder block.

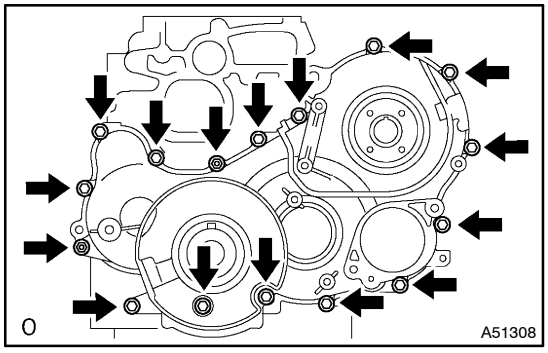
HINT:

Prevent the removed cylinder head from being damaged.



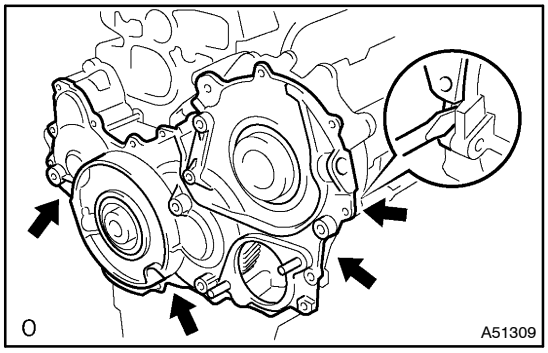
13. REMOVE WATER PUMP ASSY

(a) Remove the 5 bolts, 2 nuts, water pump and gasket.

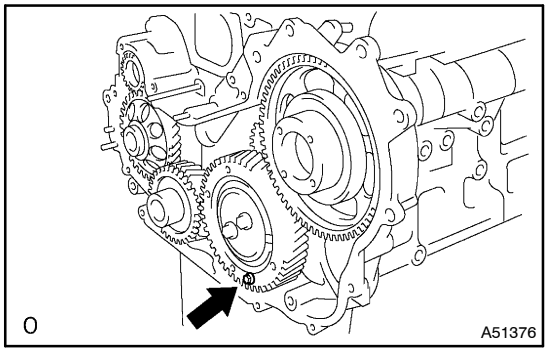


14. REMOVE TIMING GEAR CASE

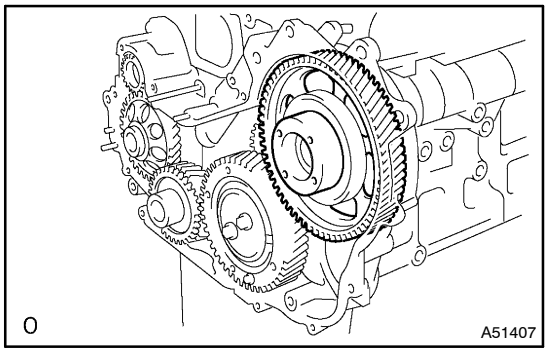
(a) Remove the 14 bolts and 2 nuts.



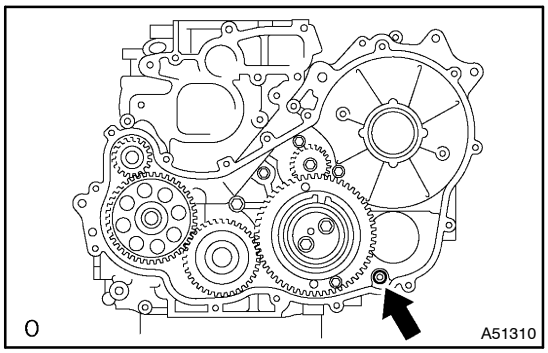
(b) Separate the timing gear case softly with a slotted–screwdriver.



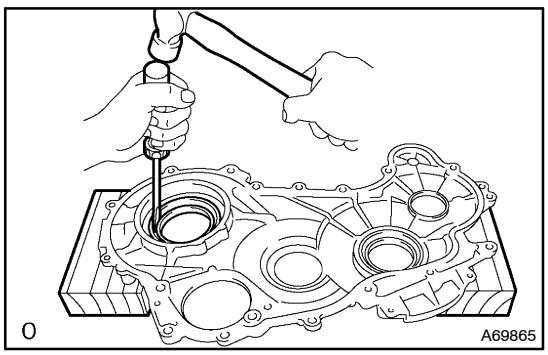
(c) Secure the idler sub–gears to the idler gear with a service bolt.



(d) Remove the injection gear.

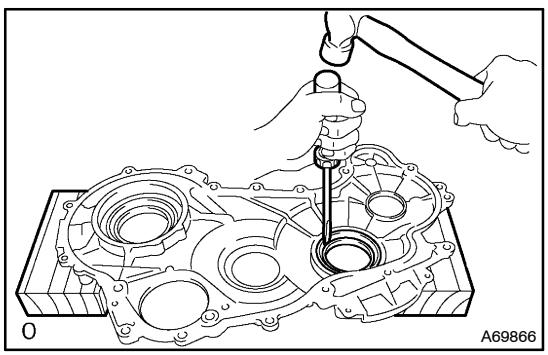


(e) Remove the O–ring.



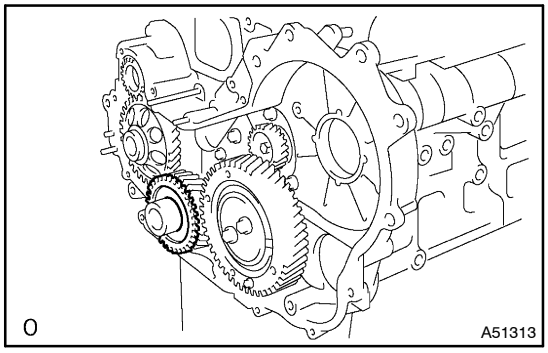
15. REMOVE TIMING GEAR CASE OR TIMING CHAIN CASE OIL SEAL

(a) Remove the oil seal with a slotted–screwdriver and hammer.



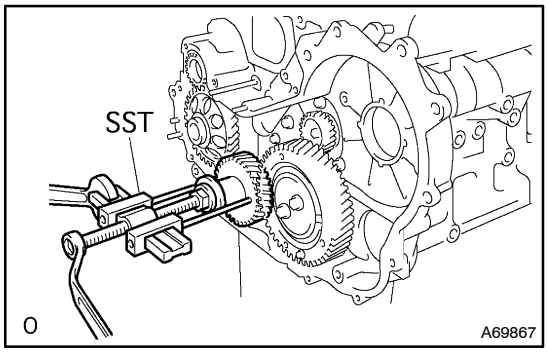
16. REMOVE TIMING CHAIN OR BELT COVER OIL SEAL

(a) Remove the oil seal with a slotted–screwdriver and hammer.



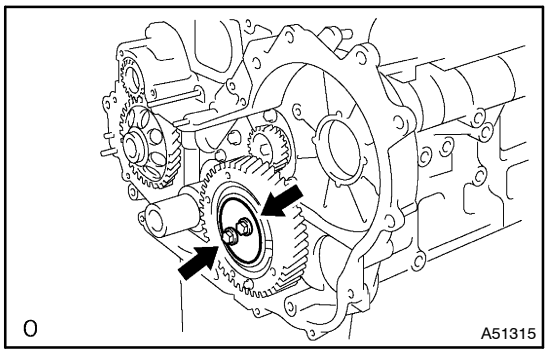
17. REMOVE CRANKSHAFT POSITION SENSOR PLATE NO.1

(a) Remove the crank angle sensor plate No.1.



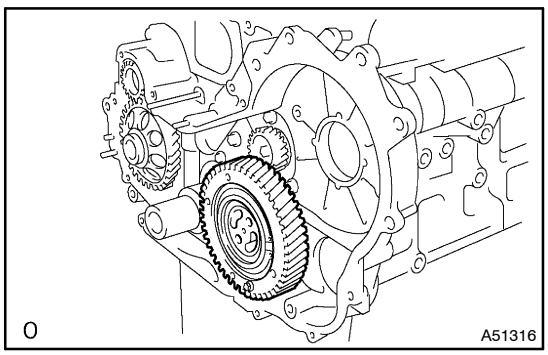
18. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET

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



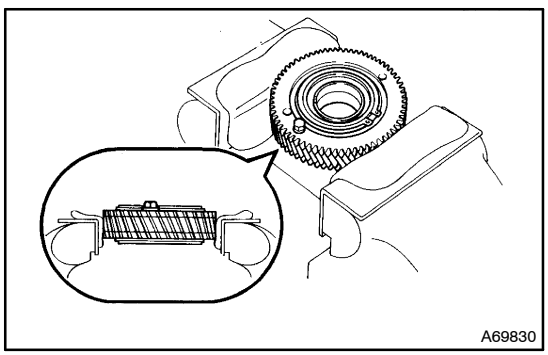
19. REMOVE IDLE GEAR THRUST PLATE

(a) Remove the 2 bolts and idle gear thrust plate.



20. REMOVE IDLE GEAR NO.1

(a) Remove the idle gear No.1.

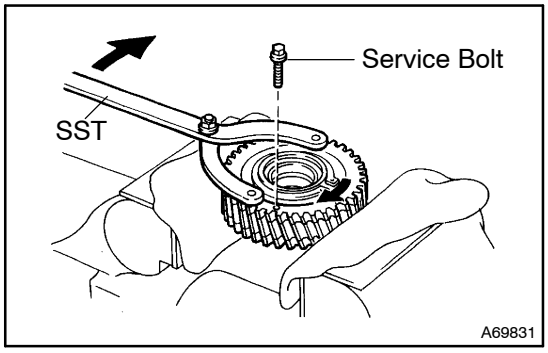


21. REMOVE IDLE SUB GEAR NO.1

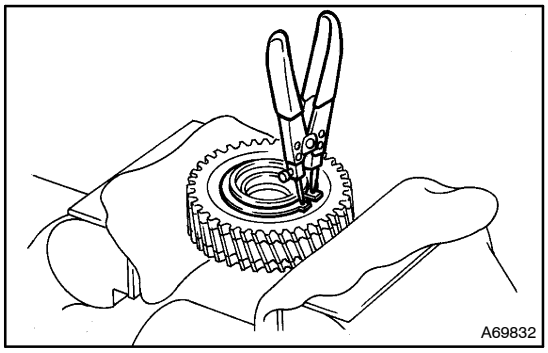
(a) Set the idle gear No.1 and idle sub gear No.2 in a vise.

NOTICE:

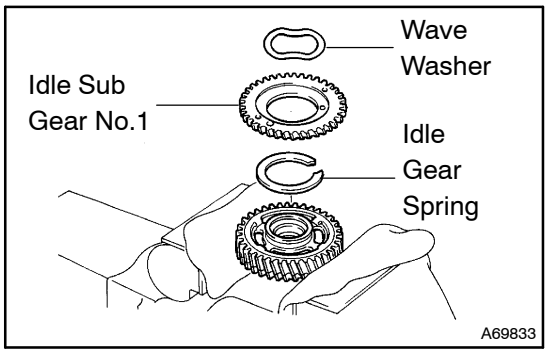
Be careful not to damage the gears.



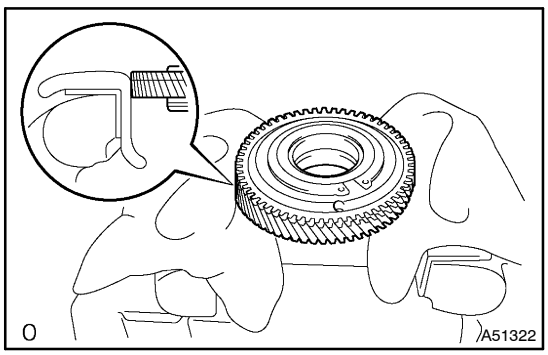
(b) Using SST, turn the idle sub gear No.1 clockwise and remove the service bolt.
SST 09960–10010 (09962–01000, 09963–00600)



(c) Using snap ring pliers, remove the shaft snap ring.



(d) Remove the wave washer.
(e) Remove the idle sub gear No.1.
(f) Remove the idle gear spring.
(g) Remove the idle gear No.1 from the vise.

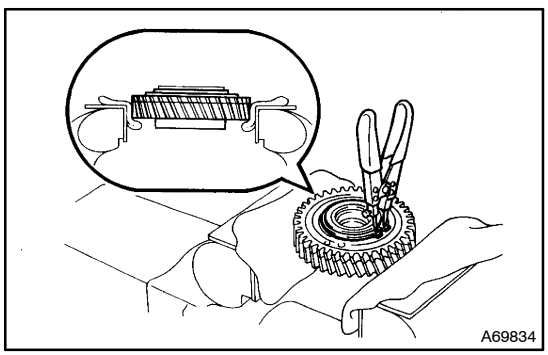


22. REMOVE IDLE SUB GEAR NO.2

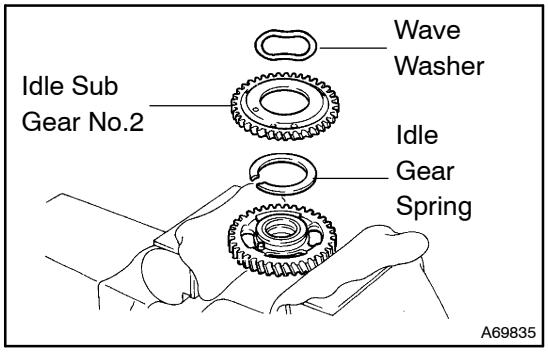
(a) Reverse the idle gear No.1 and reset it in the vise.

NOTICE:

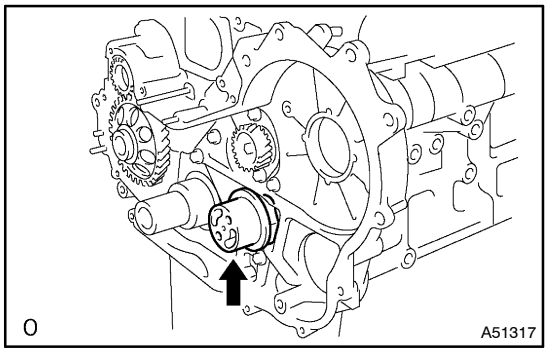
Be careful not to damage the gear.



(b) Using snap ring pliers, remove the shaft snap ring.

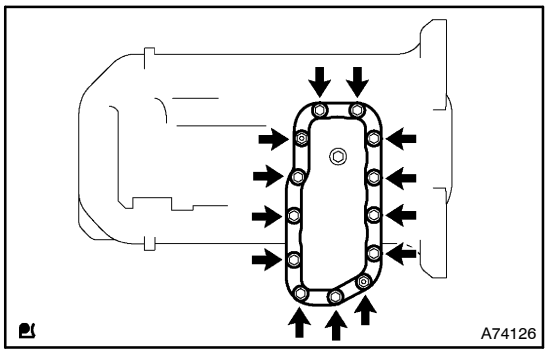


(c) Remove the wave washer.
(d) Remove the idle sub gear No.2.
(e) Remove the idle gear spring.



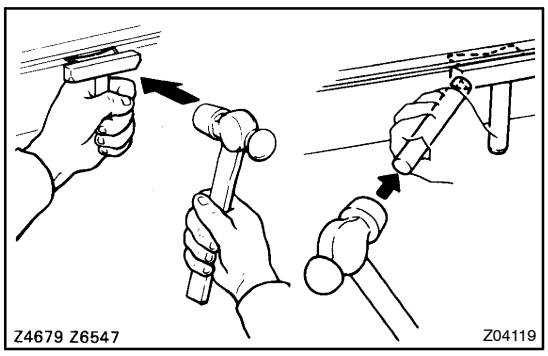
23. REMOVE IDLE GEAR SHAFT NO.1

(a) Remove the idle gear shaft No.1.

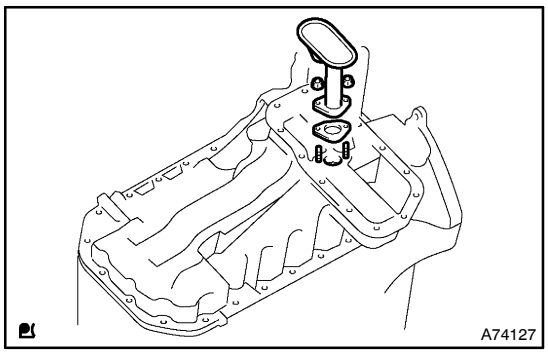


24. REMOVE OIL PAN SUB–ASSY NO.2

(a) Remove the 11 bolts and 2 nuts.

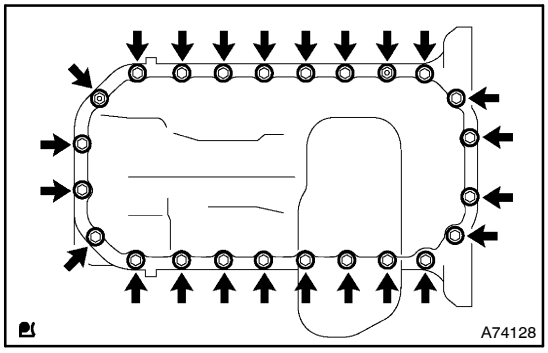


(b) Remove the oil pan No.2 with SST.
SST 09032–00100



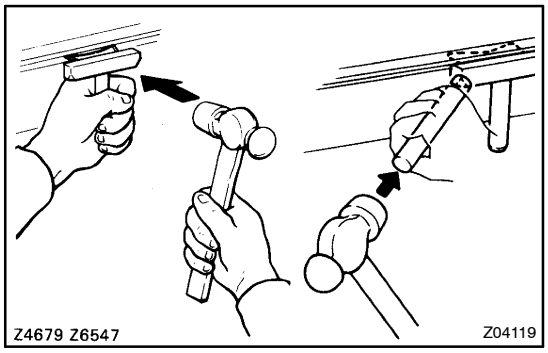
25. REMOVE OIL STRAINER SUB–ASSY

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



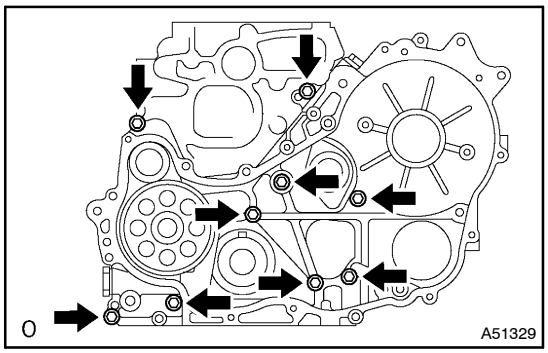
26. REMOVE OIL PAN SUB–ASSY

(a) Remove the 22 bolts and 2 nuts.



(b) Remove the oil pan sub–assy with SST.
SST 09032–00100

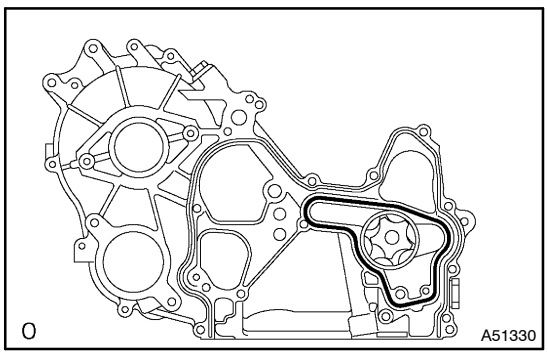
(c) Remove the oil pan gasket.



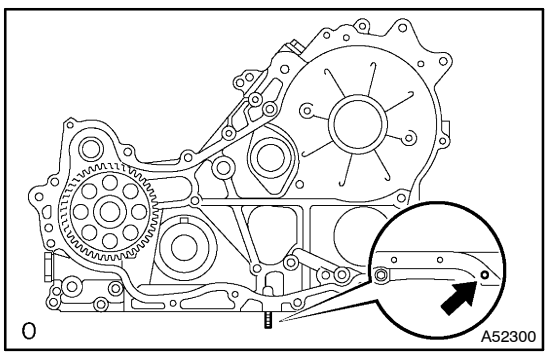
27. REMOVE TIMING GEAR CASE ASSY

(a) Remove the 8 bolts and union bolt.

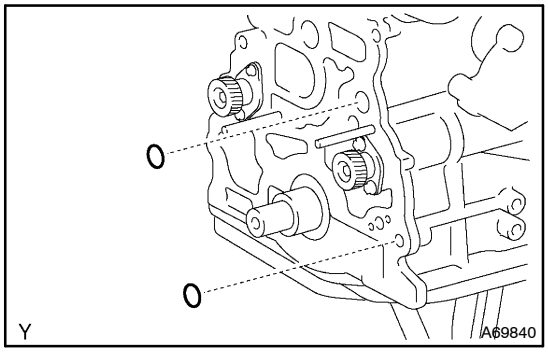
(b) Using a plastic–faced hammer, tap out the timing gear case.



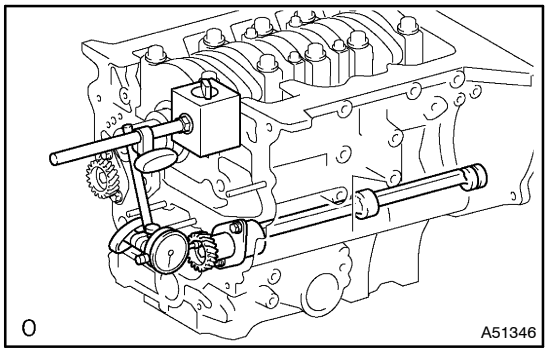
(c) Remove the oil pump gasket.



(d) Remove the stud bolt.



(e) Remove the 2 O–rings.



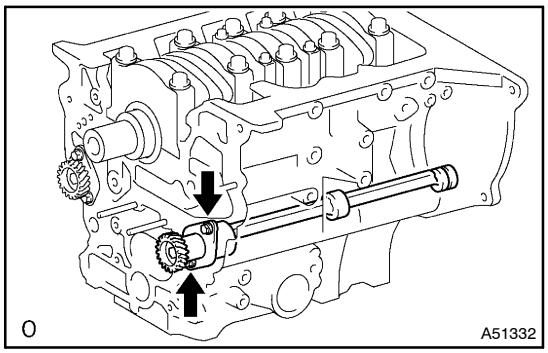
28. INSPECT NO.1 BALANCESHAFT SUB–ASSY

(a) Using a dial indicator, measure the thrust clearance by moving the balanceshaft back and forth.

Standard thrust clearance:
0.065 to 0.140 mm (0.0026 to 0.0055 in.)
Maximum thrust clearance: 0.25 mm (0.0098 in.)

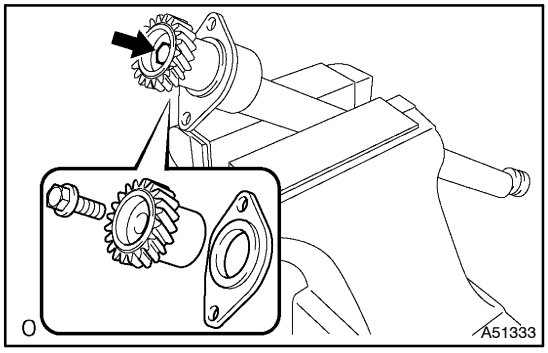
If the thrust clearance is greater than the maximum clearance, replace the balanceshaft thrust washer.

If the thrust clearance would still be greater than the maximum clearance, replace the balanceshaft.



29. REMOVE NO.1 BALANCESHAFT SUB–ASSY

(a) Remove the 2 bolts and balanceshaft No.1.



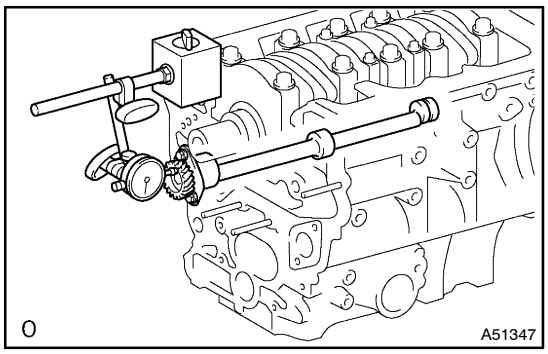
30. REMOVE BALANCESHAFT DRIVEN GEAR NO.1

(a) Mount the balanceshaft in a vise.

NOTICE:

Be careful not to damage the balanceshaft.

(b) Remove the bolt, balanceshaft driven gear No.1 and balanceshaft thrust washer.



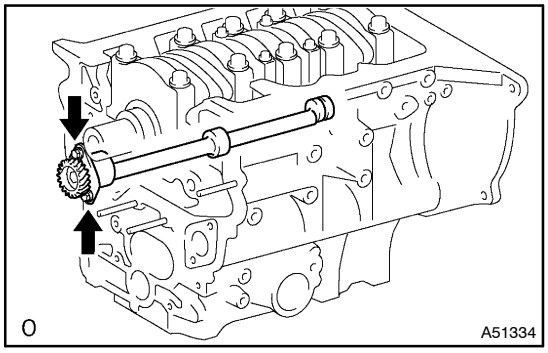
31. INSPECT NO.2 BALANCESHAFT SUB–ASSY

(a) Using a dial indicator, measure the thrust clearance by moving the balanceshaft back and forth.

Standard thrust clearance:
0.065 to 0.140 mm (0.0026 to 0.0055 in.)
Maximum thrust clearance: 0.25 mm (0.0098 in.)

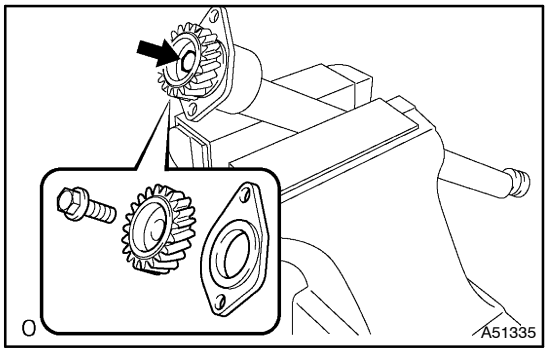
If the thrust clearance is greater than the maximum clearance, replace the balance shaft thrust washer.

If the thrust clearance would still be greater than the maximum clearance, replace the balanceshaft.



32. REMOVE NO.2 BALANCESHAFT SUB–ASSY

(a) Remove the 2 bolts and balanceshaft No.2.



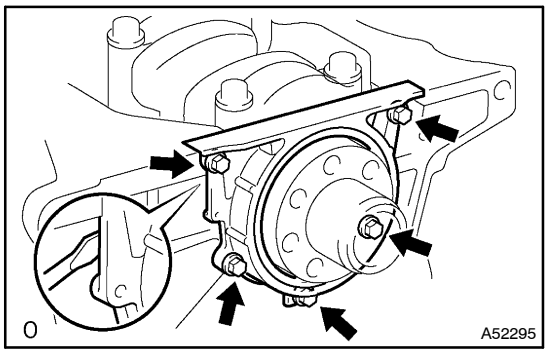
33. REMOVE BALANCESHAFT DRIVEN GEAR NO.2

(a) Mount the balanceshaft in a vise.

NOTICE:

Be careful not to damage the balanceshaft.

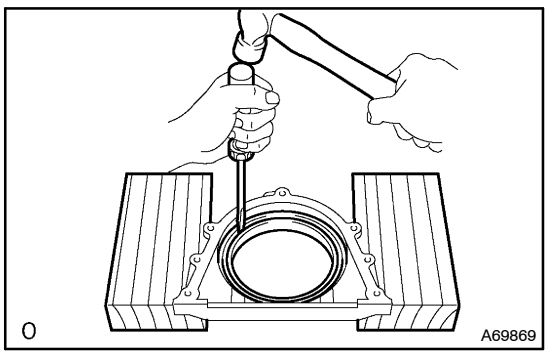
(b) Remove the bolt, balanceshaft driven gear No.2 and balanceshaft thrust washer.



34. REMOVE ENGINE REAR OIL SEAL RETAINER

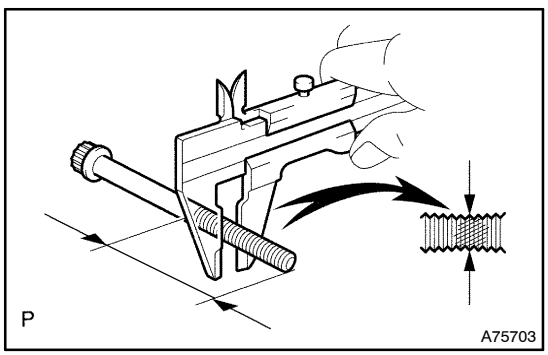
(a) Remove the 5 bolts.

(b) Separate the engine rear oil seal retainer from the cylinder block with a slotted–screwdriver.



35. REMOVE ENGINE REAR OIL SEAL

(a) Using a screwdriver and a hammer, tap out the oil seal.



36. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the outer diameter of the thread.

Standard outer diameter:

11.76 to 11.97 mm (0.4630 to 0.4713 in.)

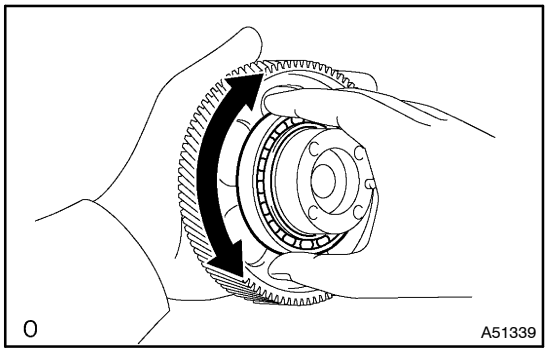
Minimum outer diameter: 11.6 mm (0.457 in.)

If the outer diameter is less than the minimum, replace the bolt.

(b) Check for damage to the threads of the cylinder head bolt.

(c) Check for damage to the threads of the cylinder block.

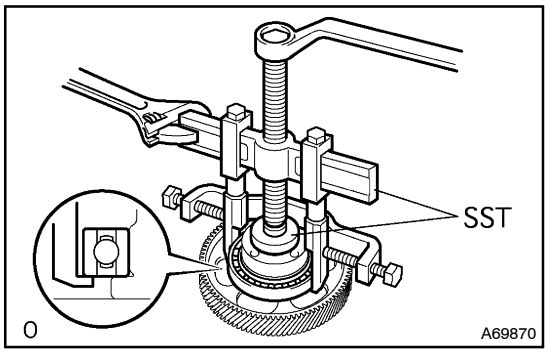
(d) Check that the 18 cylinder head bolts are installed to the cylinder block smoothly.



37. INSPECT INJECTION GEAR

(a) Check the bearing condition.

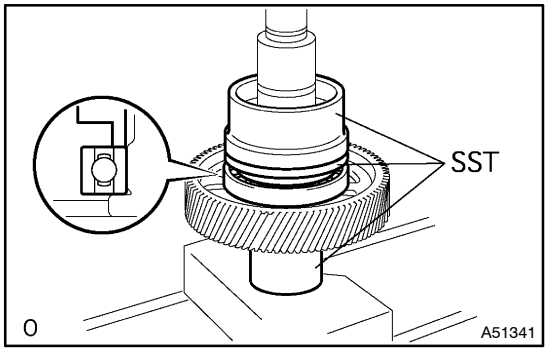
Replace the bearing if it is worn.



38. REPLACE INJECTION GEAR BEARING

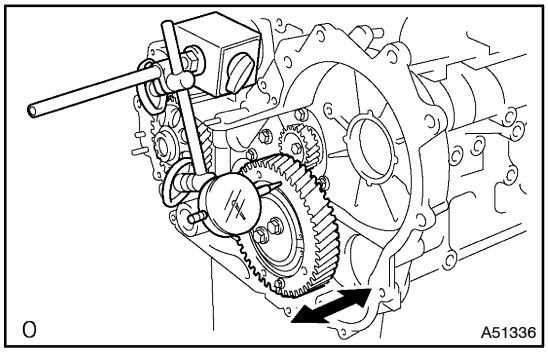
(a) Using SST, remove the bearing.

SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00480)



(b) Using SST and a press, press in a new bearing.

SST 09223–00010, 09223–15020, 09502–12010

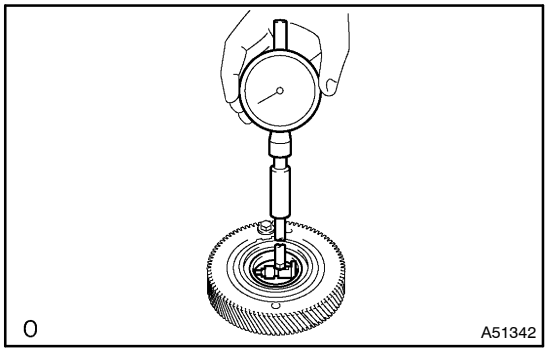


39. INSPECT IDLE GEAR NO.1

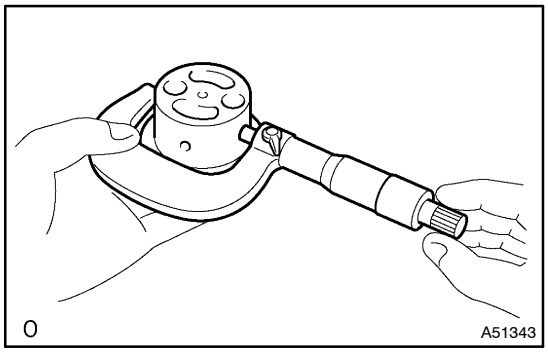
(a) Using a dial indicator, measure the thrust clearance.

Standard thrust clearance:
0.06 to 0.11 mm (0.0024 to 0.0043 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

If the thrust clearance is greater than the maximum clearance, replace the thrust plate. If the thrust clearance would still be greater than the maximum clearance, replace the idle gear and/or idle gear shaft.



(b) Using a cylinder gauge, measure the diameter of the idle gear.
Inside diameter of the idle gear:
44.000 to 44.025 mm (1.7323 to 1.7333 in.)



(c) Using a micrometer, measure the diameter of the idle gear shaft.
Idle gear shaft diameter:
43.955 to 43.990 mm (1.7305 to 1.7319 in.)

(d) Subtract the idle gear shaft diameter from the inside diameter of the idle gear.
Standard oil clearance:
0.010 to 0.070 mm (0.0004 to 0.0028 in.)
Maximum oil clearance: 0.20 mm (0.0079 in.)

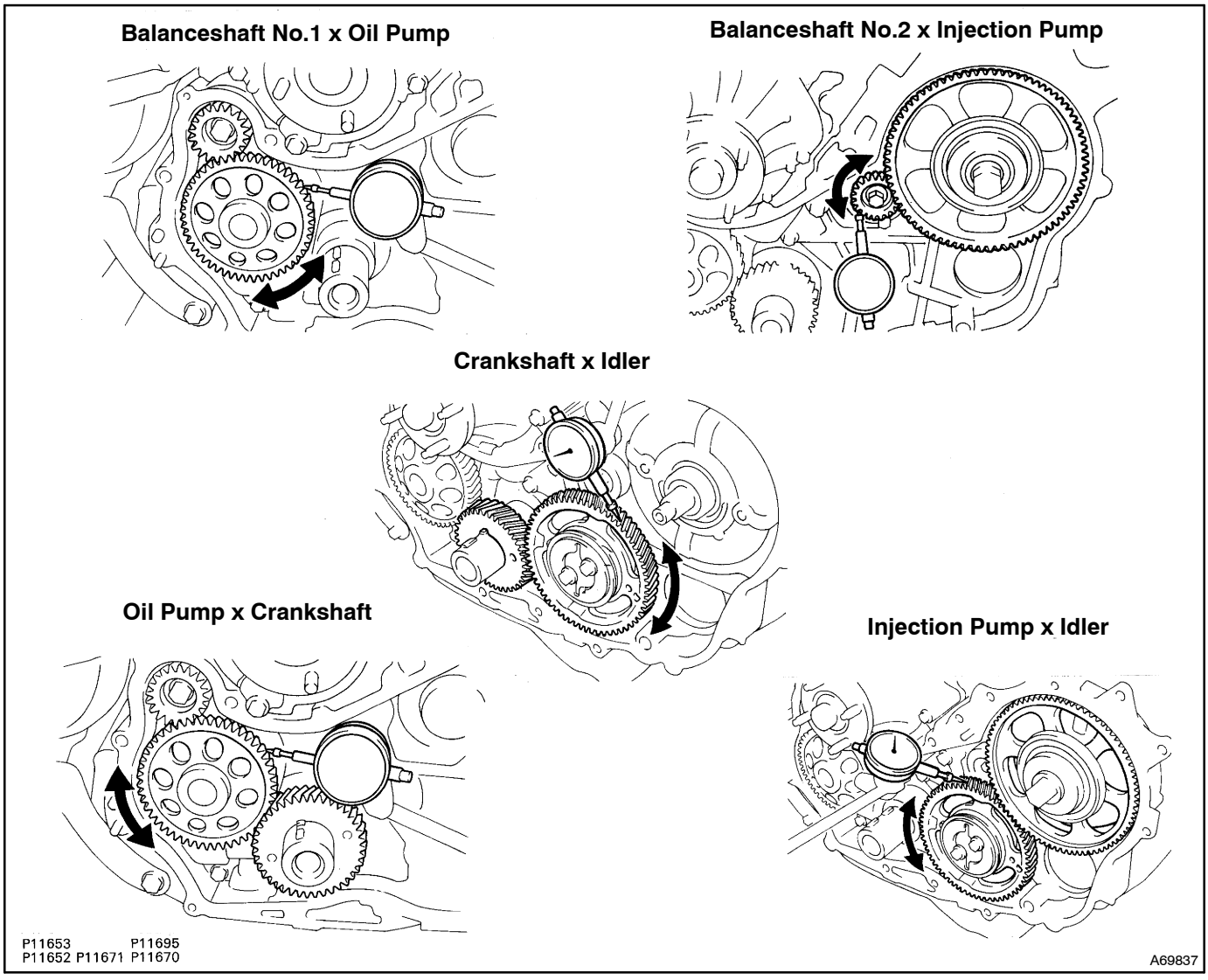
If the clearance is greater than the maximum clearance, replace the gear and shaft.

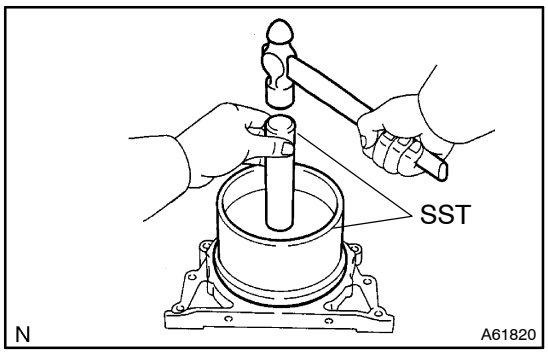
40. INSPECT BACKLASH

(a) Using a dial indicator, measure the backlash.

Standard gear backlash:
0.02 to 0.15 mm (0.0008 to 0.0060 in.)
Maximum gear backlash: 0.20 mm (0.0079 in.)

If the gear backlash is greater than the maximum backlash, replace the gears as a set.

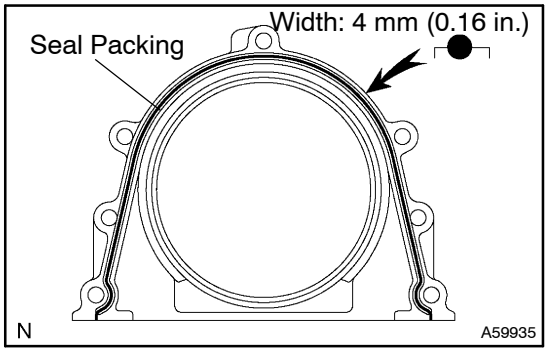




41. INSTALL ENGINE REAR OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal until its surface reaches the rear oil seal retainer.
SST 09223–15030, 09950–70010 (09951–07100)

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



42. INSTALL ENGINE REAR OIL SEAL RETAINER

(a) Remove old seal packing (FIPG) from the rear oil seal retainer and cylinder block.

(b) Apply seal packing to the specific places described in the illustration.

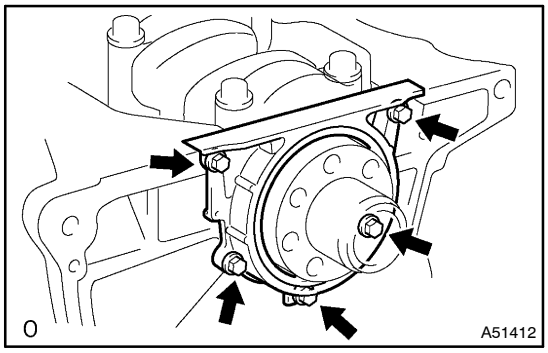
Seal packing: Part No. 08826–00080 or equivalent

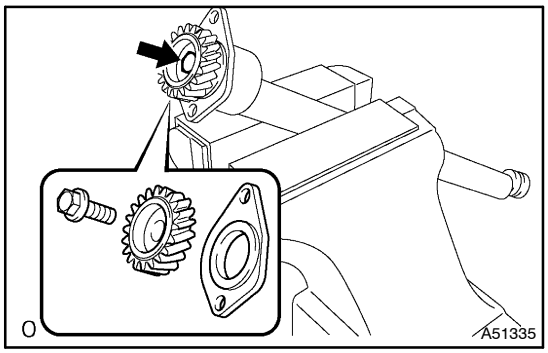
NOTICE:

Install the engine rear oil retainer within 3 minutes and tighten its bolts within 15 minutes after applying FIPG is competed.

(c) Install the retainer with the 5 bolts.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)





43. INSTALL BALANCESHAFT DRIVEN GEAR NO.2

(a) Mount the balanceshaft in a vise.

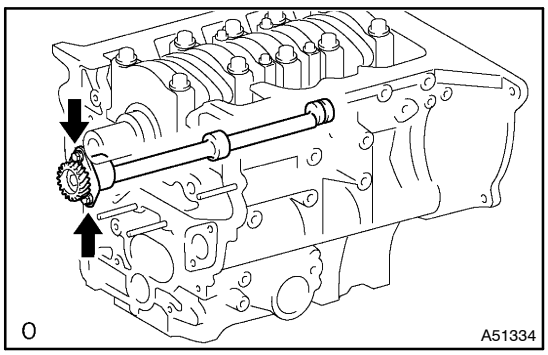
NOTICE:

Be careful not to damage the balanceshafts.

(b) Align the balanceshaft knock pin with the knock pin hole, and install the balanceshaft thrust washer and balanceshaft driven gear No.2.

(c) Install and torque the bolt.

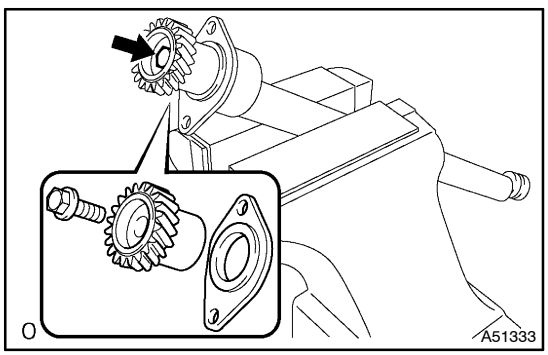
Torque: 36 N·m (367 kgf·cm, 27 ft·lbf)



44. INSTALL NO.2 BALANCESHAFT SUB–ASSY

(a) Install the balanceshaft No.2 with the 2 bolts.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)



45. INSTALL BALANCESHAFT DRIVEN GEAR NO.1

(a) Mount the balanceshaft in a vise.

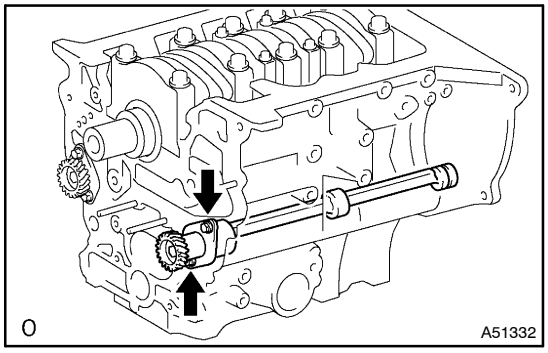
NOTICE:

Be careful not to damage the balanceshafts.

(b) Align the balanceshaft knock pin with the knock pin hole, and install the balanceshaft thrust washer and balanceshaft driven gear No.1.

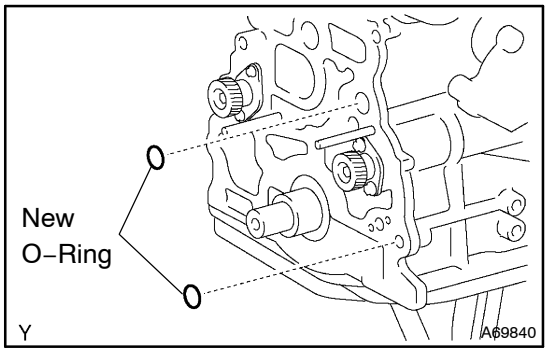
(c) Install and torque the bolt.

Torque: 36 N·m (367 kgf·cm, 27 ft·lbf)



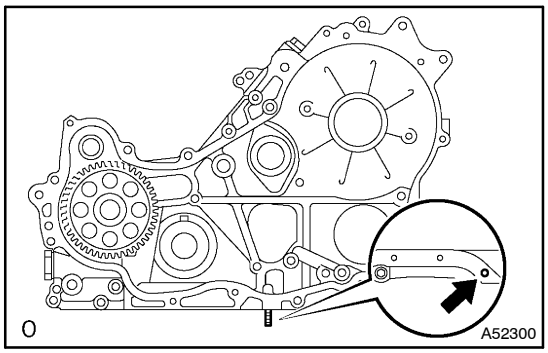
46. INSTALL NO.1 BALANCESHAFT SUB–ASSY

(a) Install the balanceshaft No.1 with the 2 bolts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

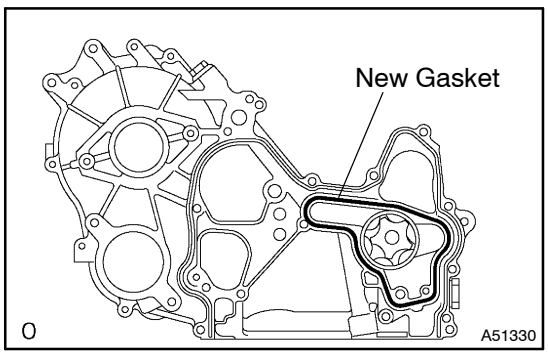


47. INSTALL TIMING GEAR CASE ASSY

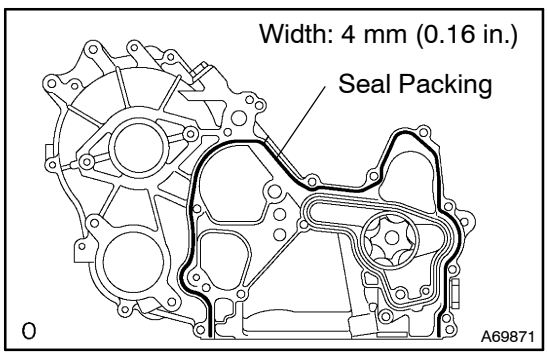
(a) Install 2 new O–rings to the cylinder block.



(b) Install the stud bolt.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



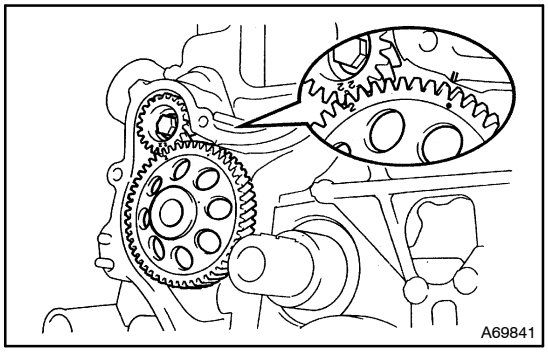
(c) Place a new gasket into the groove of the timing gear case as shown in the illustration.



(d) Remove old seal packing (FIPG) from the timing gear case and cylinder block.

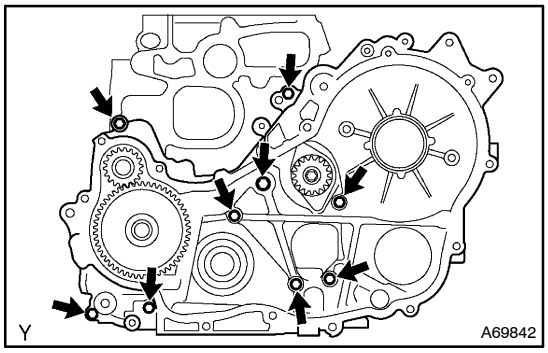
(e) Apply seal packing to the specific places described in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

NOTICE:
Install the timing gear case within 3 minutes and tighten the bolts within 15 minutes after applying FIPG is competed.



(f) Align the matchmark on the balanceshaft driven gear No.1 with the ”2” mark on the pump drive gear.

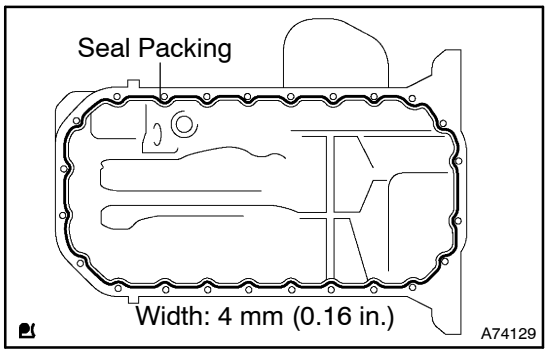
(g) Align the mark on the oil pump drive gear with the mark on the timing gear case.



(h) 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

48. INSTALL OIL PAN SUB–ASSY

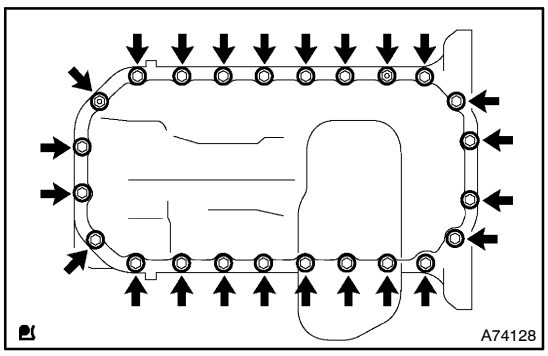
(a) Remove old seal packing (FIPG) from the oil pan sub–assy and cylinder block.



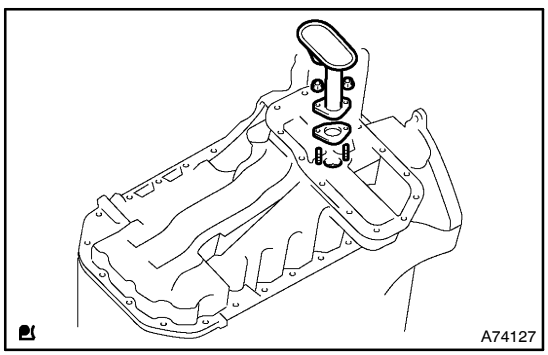
(b) Apply seal packing to the specific places described in the illustration.

(c) Set a new oil pan gasket to the oil pan sub–assy.
Seal packing: Part No. 08826–00080 or equivalent

NOTICE:
Install the oil pan within 3 minutes and tighten its bolts within 15 minutes after applying FIPG is competed.

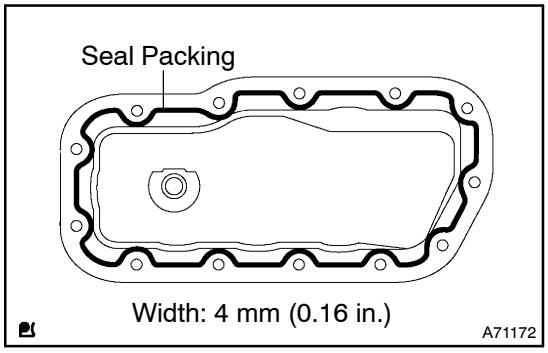


(d) Install the oil pan with the 22 bolts and 2 nuts.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



49. INSTALL OIL STRAINER SUB–ASSY

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



50. INSTALL OIL PAN SUB–ASSY NO.2

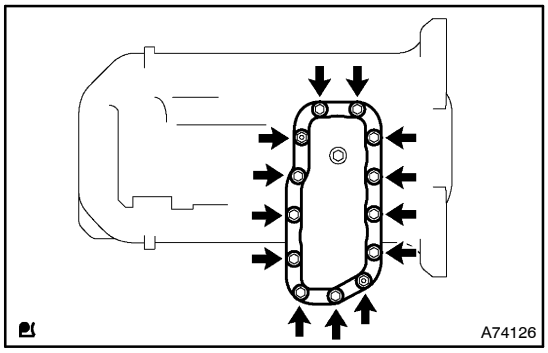
(a) Remove old seal packing (FIPG) from the oil pan sub–assy and cylinder block.

(b) Apply seal packing to the specific places described in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

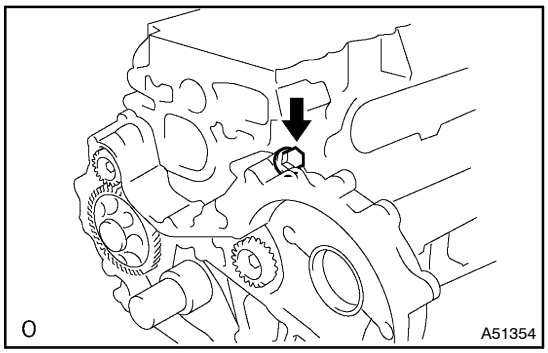
NOTICE:

Install the oil pan No. 2 within 3 minutes and tighten its bolts and nuts within 15 minutes after applying FIPG is competed.

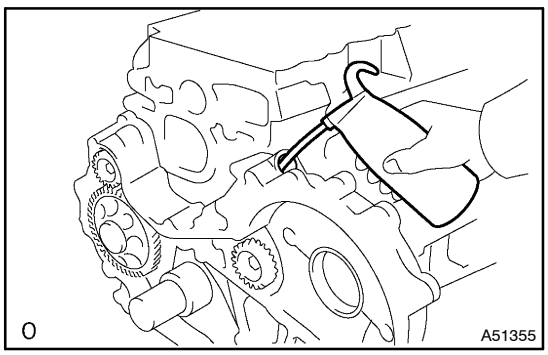


(c) Install the oil pan No. 2 with the 11 bolts and 2 nuts.

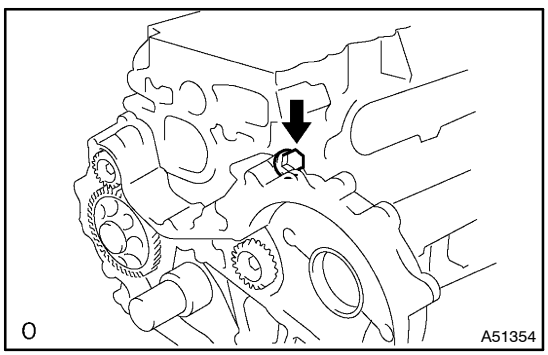
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



(d) Remove the plug and gasket.



(e) Pour approx. 50 cc (1.7 fl. oz) of engine oil into the oil pump.



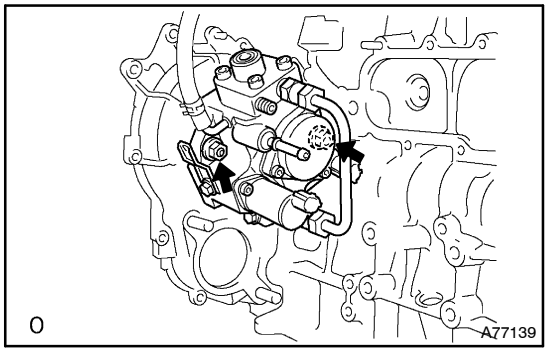
(f) Set a new gasket and install the plug.

Torque: 44 N·m (449 kgf·cm, 33 ft·lbf)

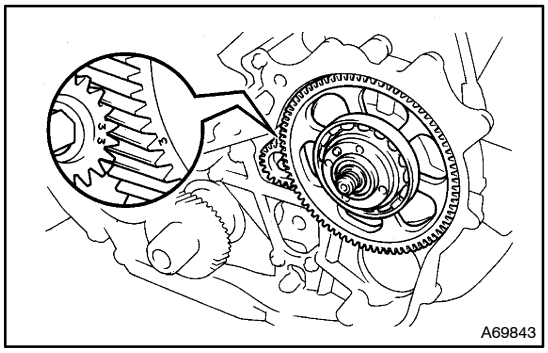
51. INSTALL INJECTION GEAR

(a) Install a new O–ring to the injection pump assy.

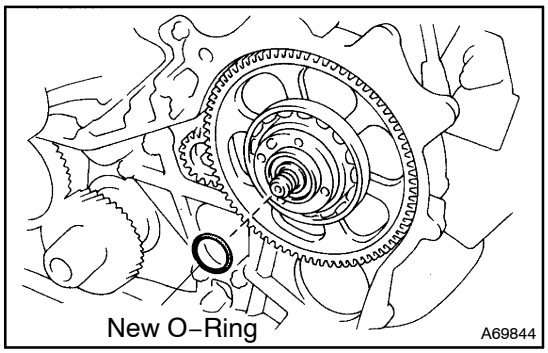
(b) Fit the spline with the matchmark on the pump housing.



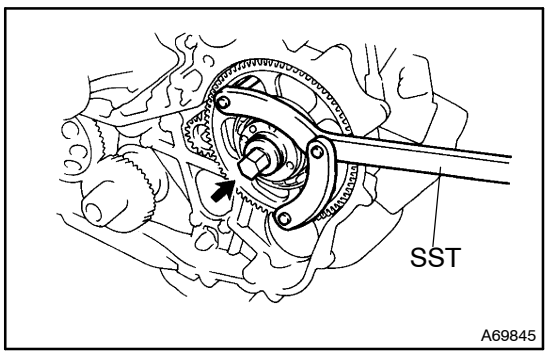
(c) Temporarily install the injection pump assy with the 2 nuts.
(d) Tighten the 2 nuts on the injection pump assy.
Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)



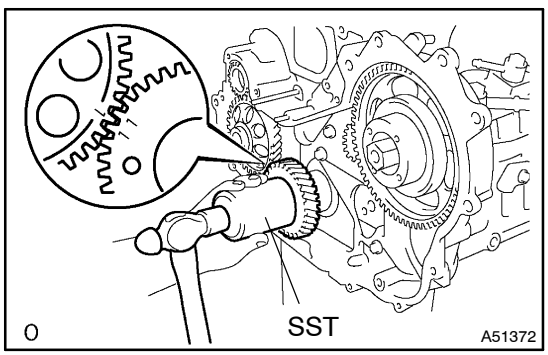
(e) The matchmarks on the balanceshaft driven gear No.2 should be aligned with the ”3” marks.



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

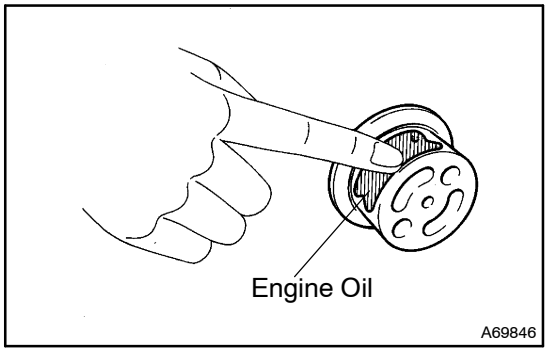


(g) Install the injection gear set nut.
(h) Using SST, tighten the nut.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)



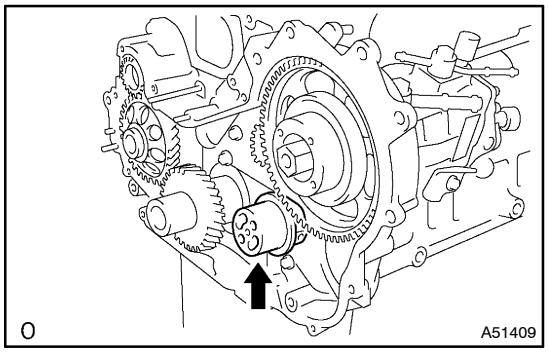
52. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

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

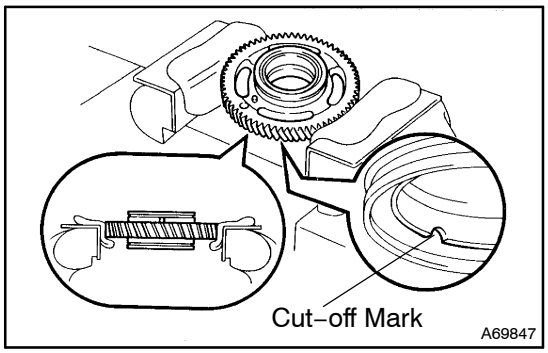


53. INSTALL IDLE GEAR SHAFT NO.1

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



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



54. INSTALL IDLE SUB GEAR NO.2

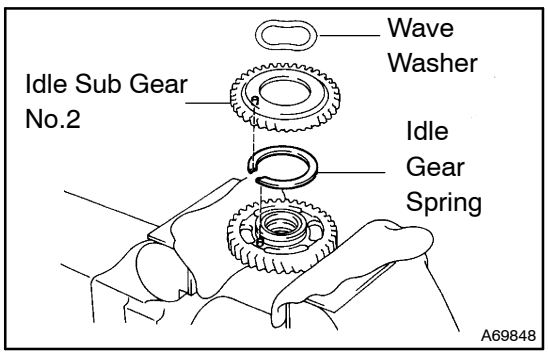
(a) Set the idle gear No.1 in a vise.

HINT:

The cut–off mark of the idle gear faces down.

NOTICE:

Be careful not to damage the gear.



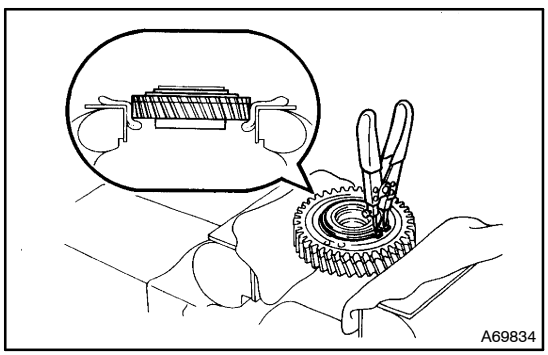
(b) Install the idle gear spring.

(c) Install the idle sub gear No.2.

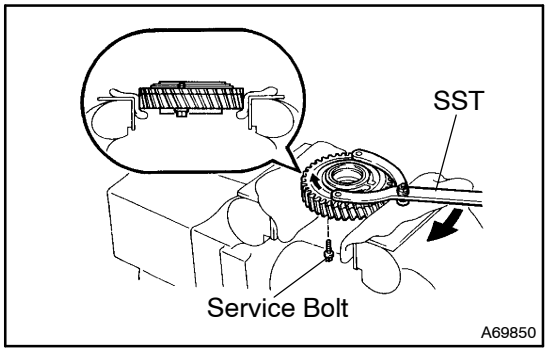
(d) Install the wave washer.

HINT:

Fit the pins on the gears to the spring ends.

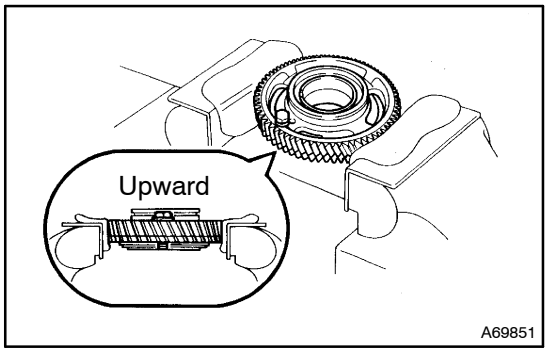


(e) Using snap ring pliers, install the snap ring.



(f) Using SST, align the holes of the idle gear No.1 and idle sub gear No.2 by turning the idle sub gear No.2 clockwise, and install a service bolt.
SST 09960–10010 (09962–01000, 09963–00600)

(g) Remove the idle gear No.1 from the vise and turn it upside down.

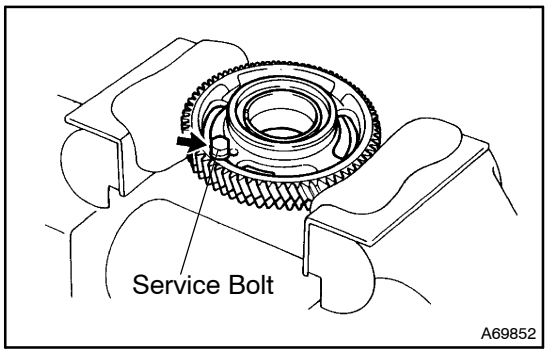


55. INSTALL IDLE SUB GEAR NO.1

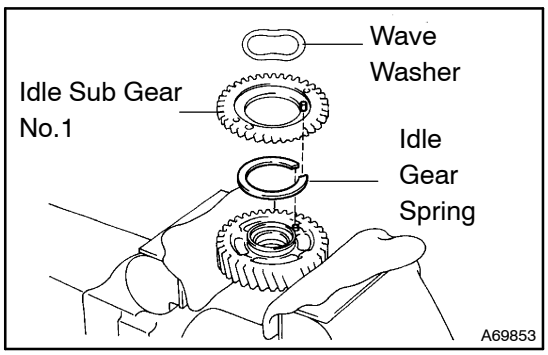
(a) Set the idle gear No.1 and idle sub gear No.2 in a vise.

NOTICE:

Be careful not to damage the gears.



(b) Remove the service bolt.



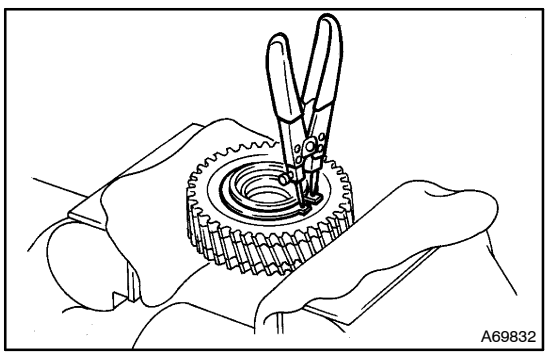
(c) Install the idle gear spring.

(d) Install the idle sub gear No.1.

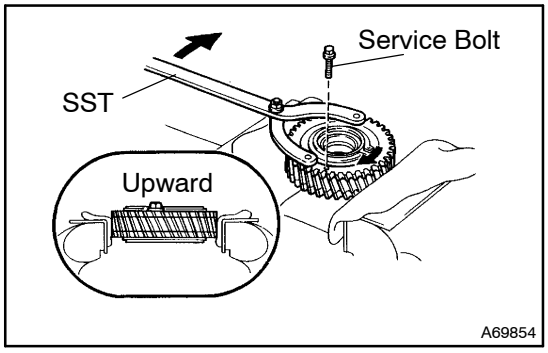
(e) Install the wave washer.

HINT:

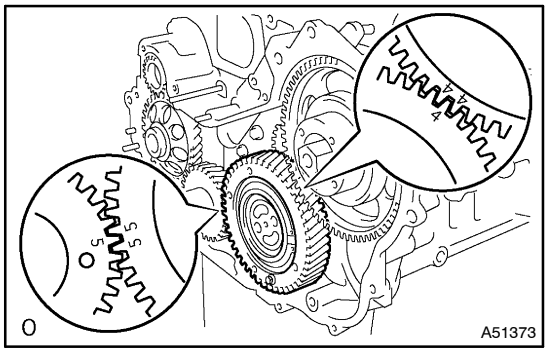
Fit the pins on the gears to the spring ends.



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

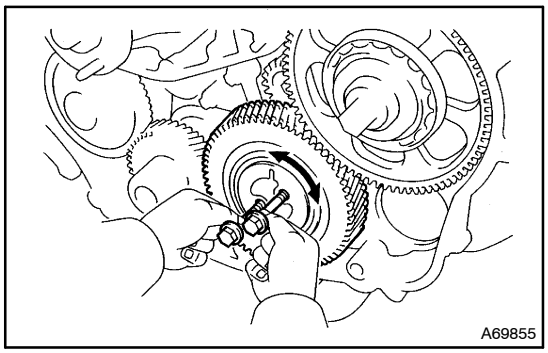


(g) Using SST, align the holes of the idle gear No.1 and idle sub gear No.1 by turning the idle sub gear No.1 clockwise, and install a service bolt.
SST 09960–10010 (09962–01000, 09963–00600)



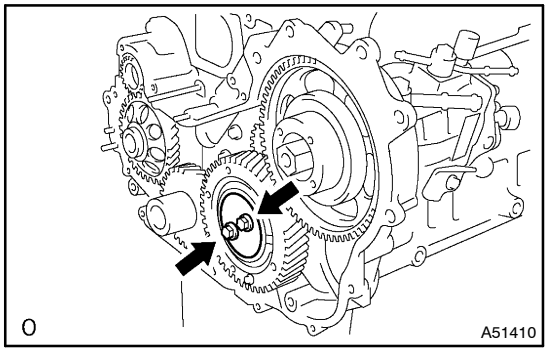
56. INSTALL IDLE GEAR NO.1

(a) Align mark ”4” of the idle gear No.1 with marks ”4” of the injection gear.
Align mark ”5” of the idle gear No.1 with marks ”5” of the crankshaft timing gear.

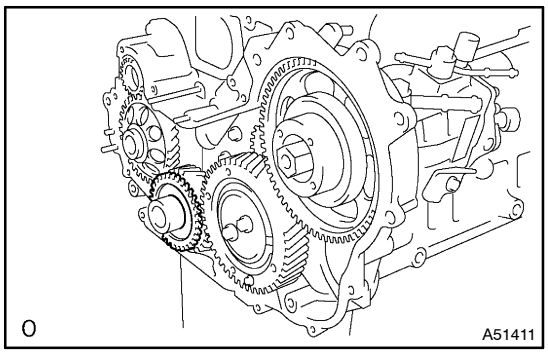


57. INSTALL IDLE GEAR THRUST PLATE

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

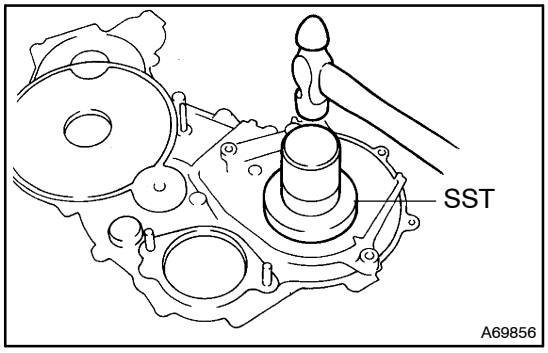


(b) Install the idle gear thrust plate with the 2 bolts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)



58. INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1

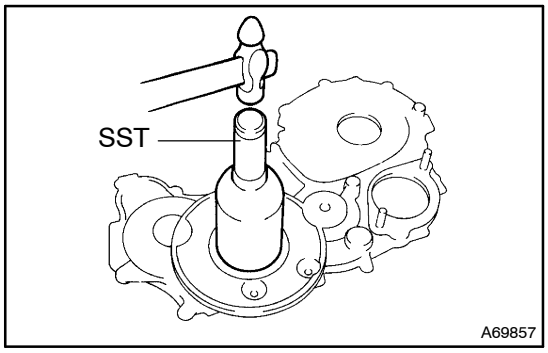
(a) Install the crankshaft position sensor plate No.1.



59. INSTALL TIMING CHAIN OR BELT COVER OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal until its surface reaches the timing gear case.
SST 09223–78010

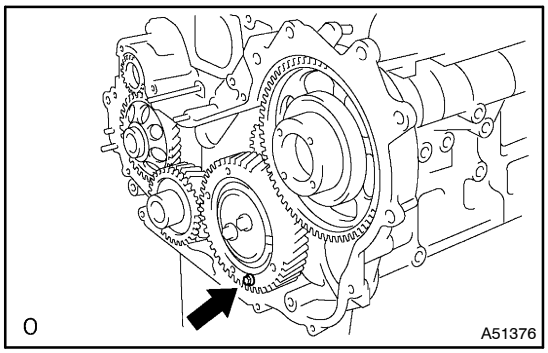
(b) Apply MP grease to the oil seal lip.



60. INSTALL TIMING GEAR CASE OR TIMING CHAIN CASE OIL SEAL

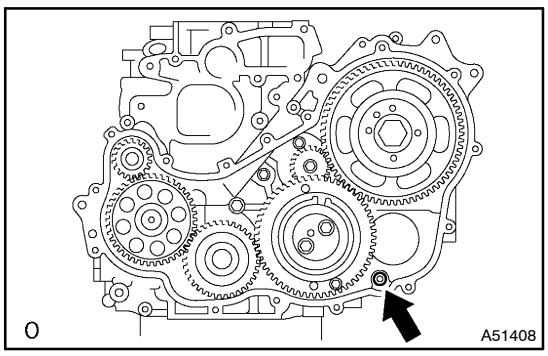
(a) Using SST and a hammer, tap in a new oil seal until its surface reaches the timing gear case.
SST 09214–76011

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

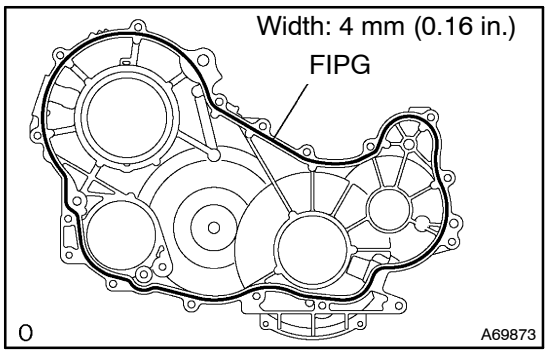


61. INSTALL TIMING GEAR CASE

(a) Remove the service bolt.



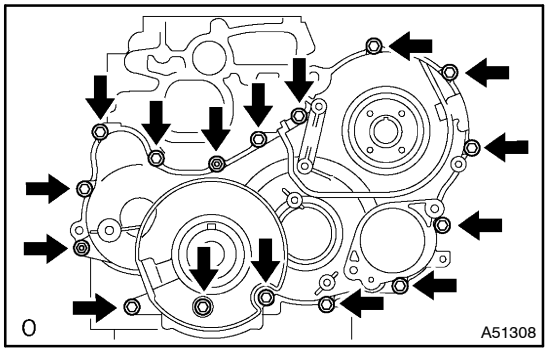
(b) Install a new O–ring to the timing gear case.



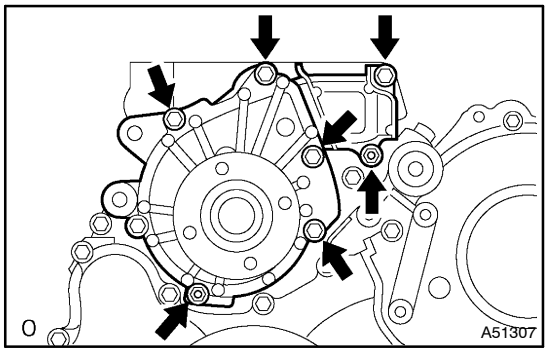
(c) Apply FIPG (seal packing) to the timing gear case as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

Install the timing case cover within 3 minutes and tighten its bolts and nuts within 15 minutes after applying FIPG is competed.

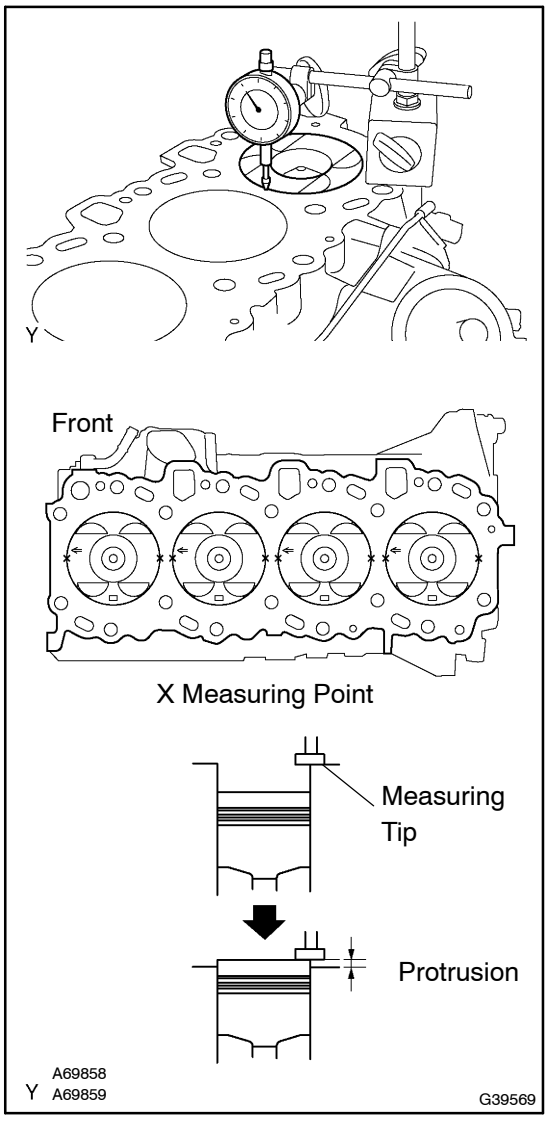


(d) Install the timing gear cover with the 14 bolts and 2 nuts.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)



62. INSTALL WATER PUMP ASSY

(a) Install the 5 bolts, 2 nuts, water pump and gasket.
Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)

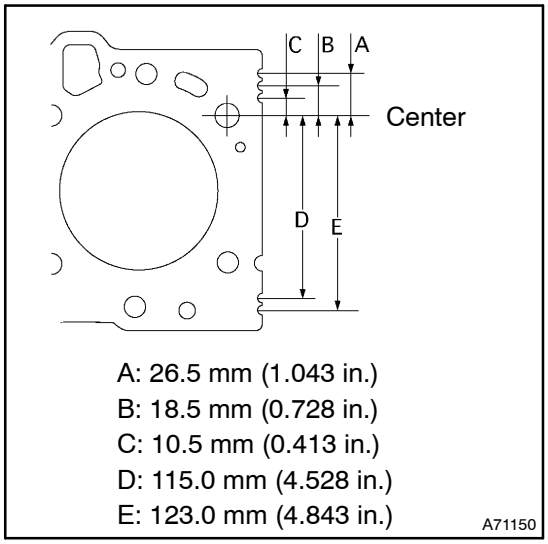


63. INSTALL CYLINDER HEAD SUB–ASSY

(a) Check each piston head protrusion.
(1) Using a dial indicator, measure the amount of each piston head protrusion, between the top surfaces of each cylinder head and piston head.
(2) Perform the measurement at 2 places for each cylinder as shown in the illustration, making a total of 8 measurements.
(3) For the piston protrusion value of each cylinder, use the average of the 2 measurements of each cylinder.

Protrusion: 0.005 to 0.255 mm (0.00020 to 0.01004 in.)

HINT:
Measurement should be done at 2 locations, right and left sides of each piston head.



(b) Select an appropriate cylinder head gasket.

HINT:

Each cylinder head gasket A to E has a unique notch position at its back–end, which helps you to identify an individual gasket.

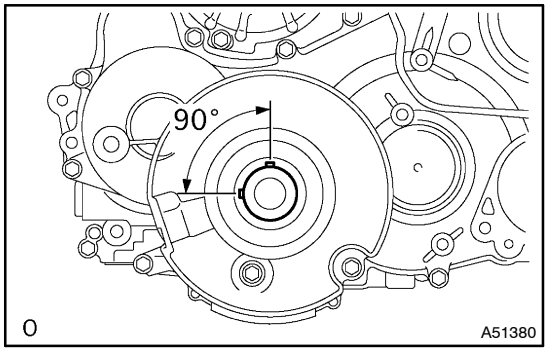
(1) Find the maximum value among all the measured piston head protrusion length to select an appropriate cylinder head gasket from A to E.

Gasket size	Piston protrusion mm (in.)
A	0.005 to 0.054 (0.0002 to 0.00213)
B	0.055 to 0.104 (0.00217 to 0.00409)
C	0.105 to 0.154 (0.00413 to 0.00606)
D	0.155 to 0.204 (0.00610 to 0.00803)
E	0.205 to 0.255 (0.00807 to 0.01004)

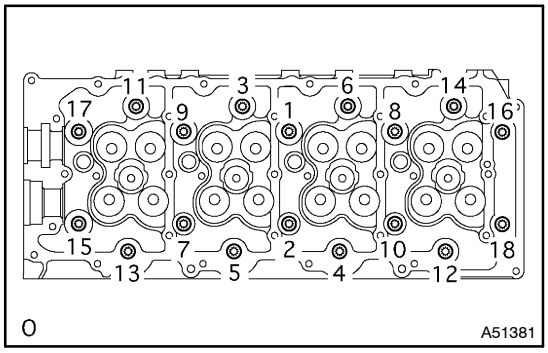
Cylinder heard gasket thickness:

Gasket size	Gasket thickness mm (in.)
A	0.80 to 0.90 (0.0315 to 0.0354)
B	0.85 to 0.95 (0.0335 to 0.0374)
C	0.90 to 1.00 (0.0354 to 0.0394)
D	0.95 to 1.05 (0.0374 to 0.0413)
E	1.00 to 1.10 (0.0394 to 0.0433)

(c) Place a new cylinder head gasket in position on the cylinder block.



(d) Lower the piston by rotating the crankshaft about 90° counterclockwise from the TDC position.



(e) Install the cylinder head bolts.

HINT:

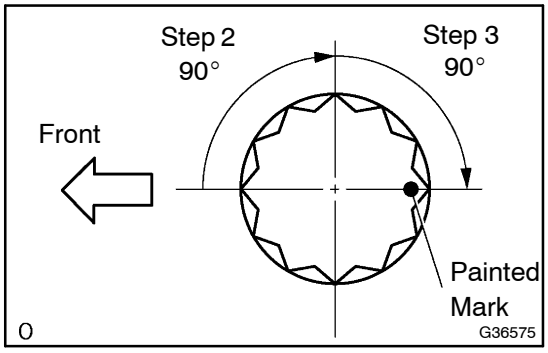
The cylinder head bolts are tightened in 3 progressive steps.

(f) Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.

(g) Step 1

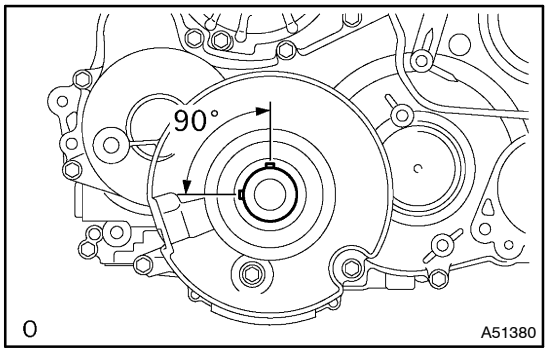
(1) Install and uniformly tighten the 18 cylinder head bolts, in several passes in the sequence shown.

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)



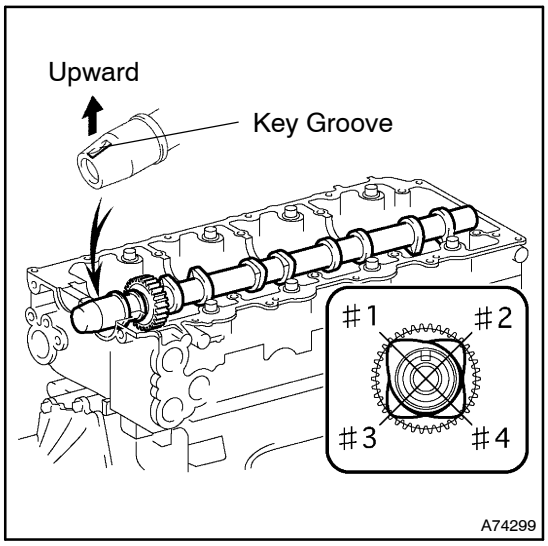
(h) Step 2
(1) Mark the front of the cylinder head bolt with paint.
(2) Retighten the cylinder head bolts 90° in the order shown.

(i) Step 3
(1) Retighten the cylinder head bolts by an additional 90°.
(2) Check that the painted mark is now facing rearward.

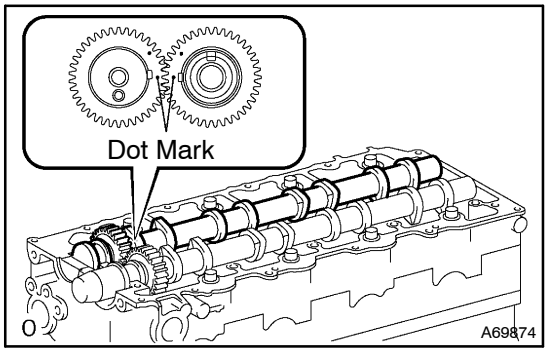


64. INSPECT VALVE CLEARANCE

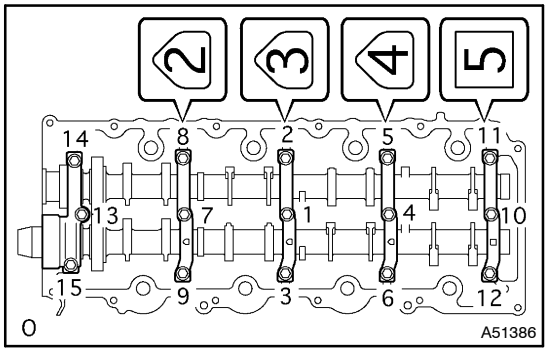
(a) Install the camshaft and camshaft No.2.
(1) Set the crankshaft and turn it 90° counterclockwise from the TDC position.



(2) Place the camshaft to the cylinder head as shown in the illustration.



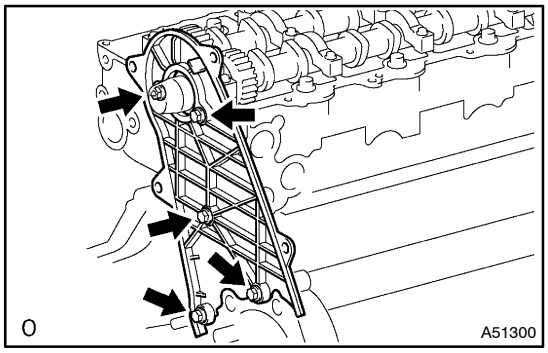
(3) Align the dot marks of the camshaft and camshaft No.2 by meshing the 2 gears before placing the camshaft No.2.



(4) Install the camshaft bearing cap as shown in the illustration.

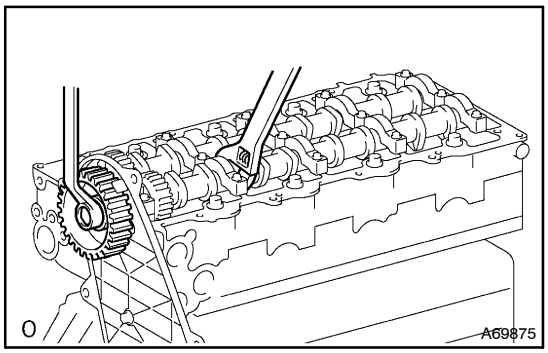
(5) Tighten the 15 bolts for the camshaft bearing cap in the specified order described in the illustration.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



(b) Install the timing belt No.2 cover with the 4 bolts and nut.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



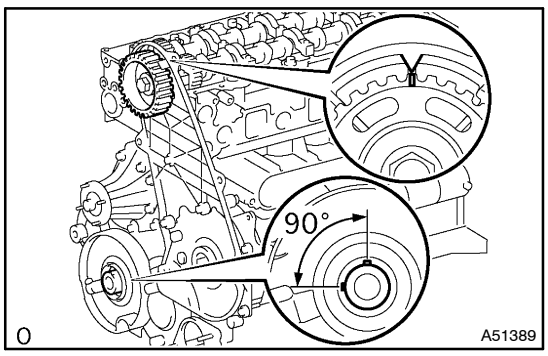
(c) Install the camshaft timing pulley.

(1) Install the set key to the key groove of the camshaft.

(2) Align the set key with the key groove of the timing pulley.

(3) Hold the hexagonal portion of the camshaft, and install the timing pulley with the bolt.

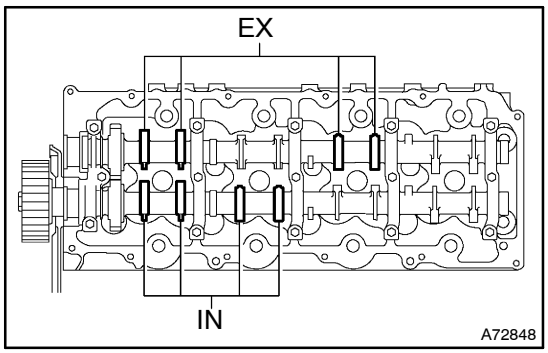
Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)



(d) Inspect the valve clearance.

(1) Lower the piston by rotating the crankshaft about 90° counterclockwise from the TDC position.

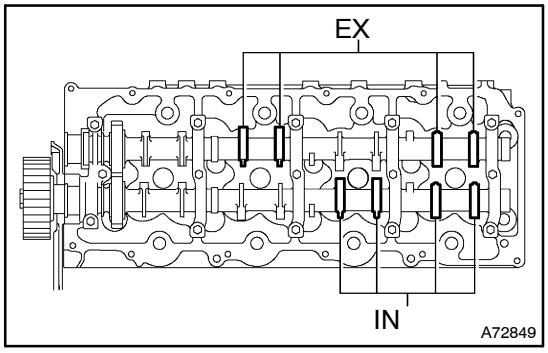
(2) Align the timing mark of the camshaft timing pulley with the arrow mark of the timing belt No.2 cover.



(3) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

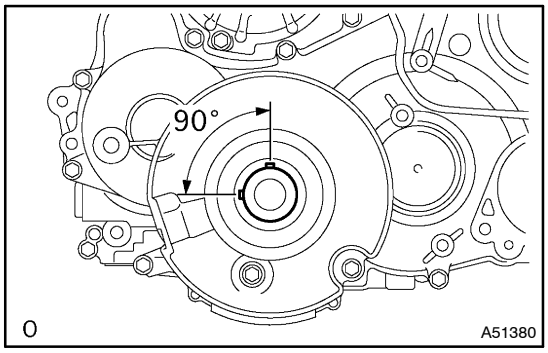
(4) Record the out–of–specification valve clearance measurements. They will be used later to determine the required replacement valve lifter.

Valve clearance (cold):
Intake: 0.20 to 0.30 mm (0.0079 to 0.0118 in.)
Exhaust: 0.35 to 0.45 mm (0.0138 to 0.0177 in.)



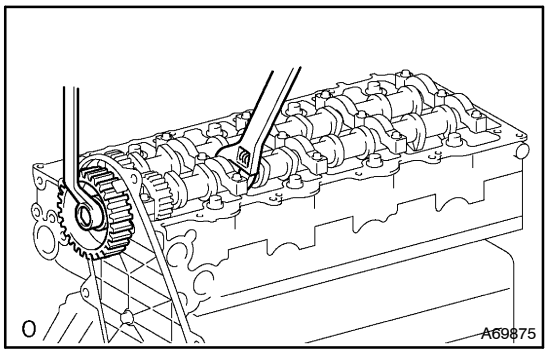
(5) Turn the crankshaft 360° to set the No.4 cylinder to the TDC position.

(6) Check only the valves indicated in the illustration. Measure the valve clearance (See procedure (C) above).



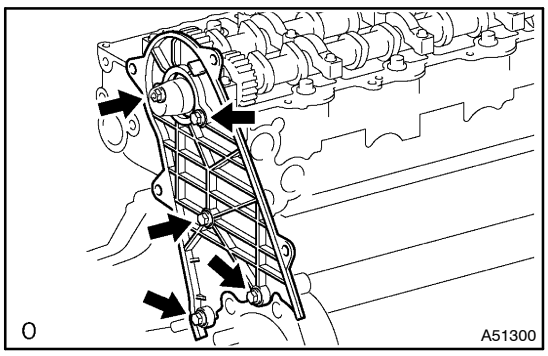
65. ADJUST VALVE CLEARANCE

(a) Set the crankshaft and turn it 90° counterclockwise from the TDC position.

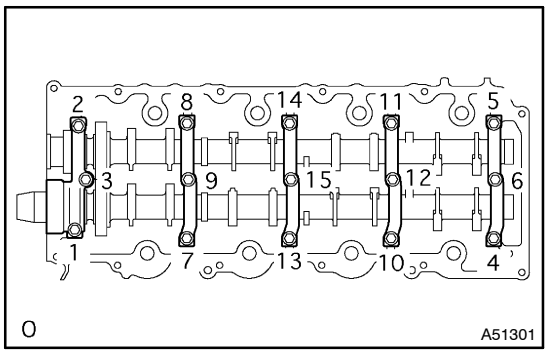


(b) Remove the camshaft timing pulley.

(1) Hold the hexagon portion of the camshaft with a monkey wrench, and remove the bolt, timing pulley and set key.



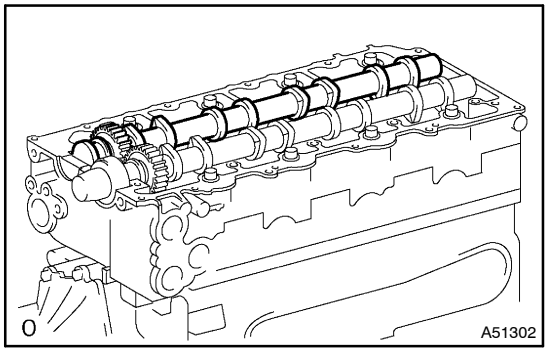
(c) Remove the 4 bolts, nut and timing belt No.2 cover.



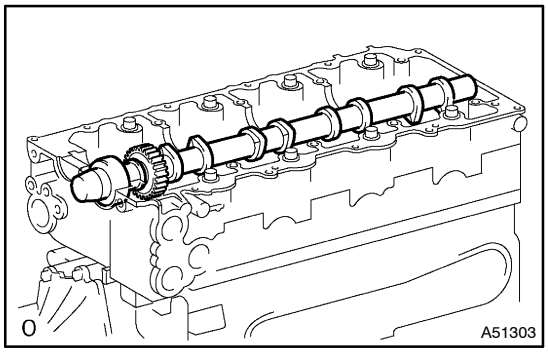
(d) Remove the camshaft and camshaft No.2.

(1) Uniformly loosen the 15 bearing cap bolts in order indicated in the illustration and remove them in the same order.

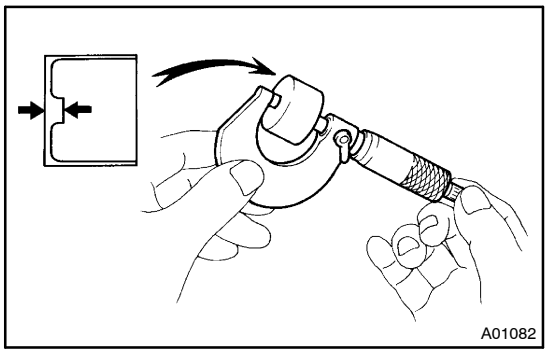
(2) Remove the 5 bearing caps.



(3) Remove the camshaft No.2 from the cylinder head.



(4) Remove the camshaft from the cylinder head.



(e) Adjust the valve clearance.

HINT:

Determine the size of the valve lifter to be installed according to the following formula or charts:

(1) Using a micrometer, measure the thickness of the removed lifter.

(2) Calculate the thickness of a new lifter so the valve clearance comes within the specified value.

A	Thickness of new lifter
B	Thickness of used lifter
C	Measured valve clearance

Valve clearance:

Intake A = B + (C – 0.25 mm (0.0098 in.))

Exhaust A = B + (C – 0.40 mm (0.0158 in.))

(3) Select a new lifter with a thickness as close as possible to the calculated values.

HINT:

Valve lifters are available in 35 sizes in increments of 0.020 mm (0.0008 in.), from 5.060 mm (0.1992 in.) to 5.740 mm (0.2260 in.).

(4) Install the selected valve lifter.

Valve Lifter Selection Chart (Exhaust)

Measured clearance mm (in.) \ Removed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.210 (0.2051)	5.220 (0.2055)	5.230 (0.2059)	5.240 (0.2063)	5.250 (0.2067)	5.260 (0.2071)	5.270 (0.2075)	5.280 (0.2079)	5.290 (0.2083)	5.300 (0.2087)	5.310 (0.2091)	5.320 (0.2094)	5.330 (0.2098)	5.340 (0.2102)	5.350 (0.2106)	5.360 (0.2110)	5.370 (0.2114)	5.380 (0.2118)	5.390 (0.2122)	5.400 (0.2126)	5.410 (0.2130)	5.420 (0.2134)	5.430 (0.2138)	5.440 (0.2142)	5.450 (0.2146)	5.460 (0.2150)	5.470 (0.2154)	5.480 (0.2157)	5.490 (0.2161)	5.500 (0.2165)	5.510 (0.2169)	5.520 (0.2173)	5.530 (0.2177)	5.540 (0.2181)	5.550 (0.2185)	5.560 (0.2189)	5.570 (0.2193)	5.580 (0.2197)	5.590 (0.2201)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 - 0.020 (0.0000 - 0.0008)																																																									
0.021 - 0.040 (0.0008 - 0.0016)																																																									
0.041 - 0.060 (0.0016 - 0.0024)																																																									
0.061 - 0.080 (0.0024 - 0.0031)																																																									
0.081 - 0.100 (0.0032 - 0.0039)																																																									
0.101 - 0.120 (0.0040 - 0.0047)																																																									
0.121 - 0.140 (0.0048 - 0.0055)																																																									
0.141 - 0.160 (0.0056 - 0.0063)																																																									
0.161 - 0.180 (0.0063 - 0.0071)																																																									
0.181 - 0.200 (0.0071 - 0.0079)																																																									
0.201 - 0.220 (0.0079 - 0.0087)																																																									
0.221 - 0.240 (0.0087 - 0.0094)																																																									
0.241 - 0.260 (0.0095 - 0.0102)																																																									
0.261 - 0.280 (0.0103 - 0.0110)																																																									
0.281 - 0.300 (0.0111 - 0.0118)																																																									
0.301 - 0.320 (0.0119 - 0.0126)																																																									
0.321 - 0.340 (0.0126 - 0.0134)																																																									
0.341 - 0.344 (0.0134 - 0.0135)																																																									
0.350 - 0.450 (0.0138 - 0.0177)																																																									
0.451 - 0.470 (0.0178 - 0.0185)	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	
0.471 - 0.490 (0.0185 - 0.0193)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74		
0.491 - 0.510 (0.0193 - 0.0201)	16	18	20	22	24	26	28	30	32	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74					
0.511 - 0.530 (0.0201 - 0.0209)	18	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74							
0.531 - 0.550 (0.0209 - 0.0217)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74								
0.551 - 0.570 (0.0217 - 0.0224)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74									
0.571 - 0.590 (0.0225 - 0.0232)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74											
0.591 - 0.610 (0.0233 - 0.0240)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74													
0.611 - 0.630 (0.0241 - 0.0248)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74															
0.631 - 0.650 (0.0248 - 0.0256)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																	
0.651 - 0.670 (0.0256 - 0.0264)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																			
0.671 - 0.690 (0.0264 - 0.0272)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																					
0.691 - 0.710 (0.0272 - 0.0280)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																							
0.711 - 0.730 (0.0280 - 0.0287)	38	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.731 - 0.750 (0.0288 - 0.0295)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																											
0.751 - 0.770 (0.0296 - 0.0303)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																												
0.771 - 0.790 (0.0304 - 0.0311)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																													
0.791 - 0.810 (0.0311 - 0.0319)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																														
0.811 - 0.830 (0.0319 - 0.0327)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74																														
0.831 - 0.850 (0.0327 - 0.0335)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74																														
0.851 - 0.870 (0.0335 - 0.0343)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74																														
0.871 - 0.890 (0.0343 - 0.0350)	54	56	58	60	62	64	66	68	70	70	72	72	74	74																														
0.891 - 0.910 (0.0351 - 0.0358)	56	58	60	62	64	66	68	70	72	72	74	74																														
0.911 - 0.930 (0.0359 - 0.0366)	58	60	62	64	66	68	70	72	74	74																														
0.931 - 0.950 (0.0367 - 0.0374)	60	62	64	66	68	70	72	74																														
0.951 - 0.970 (0.0374 - 0.0382)	62	64	66	68	70	72	74																															
0.971 - 0.990 (0.0382 - 0.0390)	64	66	68	70	72	74																																
0.991 - 1.010 (0.0390 - 0.0398)	66	68	70	72	74																																	
1.011 - 1.030 (0.0398 - 0.0406)	68	70	72	74																																		
1.031 - 1.050 (0.0406 - 0.0413)	70	72	74																																			
1.051 - 1.070 (0.0414 - 0.0421)	72	74																																				
1.071 - 1.090 (0.0422 - 0.0429)	74																																					

Exhaust valve clearance (Cold):
0.35 to 0.45 mm (0.0138 to 0.0177 in.)

EXAMPLE:
The 5.340 mm (0.2102 in.) lifter is installed, and the measured clearance is 0.480 mm (0.0189 in.).
Replace the 5.340 mm (0.2102 in.) shim with a new No.42 lifter.

New Lifter Thickness mm (in.)

No.	Thickness	No.	Thickness	No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

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Valve Lifter Selection Chart (Intake)

Measured clearance mm (in.) \ Removed lifter thickness mm (in.)	5.060 (0.1992)	5.080 (0.2000)	5.100 (0.2008)	5.120 (0.2016)	5.140 (0.2024)	5.160 (0.2031)	5.180 (0.2039)	5.200 (0.2047)	5.210 (0.2051)	5.220 (0.2055)	5.230 (0.2059)	5.240 (0.2063)	5.250 (0.2067)	5.260 (0.2071)	5.270 (0.2075)	5.280 (0.2079)	5.290 (0.2083)	5.300 (0.2087)	5.310 (0.2091)	5.320 (0.2094)	5.330 (0.2098)	5.340 (0.2102)	5.350 (0.2106)	5.360 (0.2110)	5.370 (0.2114)	5.380 (0.2118)	5.390 (0.2122)	5.400 (0.2126)	5.410 (0.2130)	5.420 (0.2134)	5.430 (0.2138)	5.440 (0.2142)	5.450 (0.2146)	5.460 (0.2150)	5.470 (0.2154)	5.480 (0.2157)	5.490 (0.2161)	5.500 (0.2165)	5.510 (0.2169)	5.520 (0.2173)	5.530 (0.2177)	5.540 (0.2181)	5.550 (0.2185)	5.560 (0.2189)	5.570 (0.2193)	5.580 (0.2197)	5.590 (0.2201)	5.600 (0.2205)	5.620 (0.2213)	5.640 (0.2220)	5.660 (0.2228)	5.680 (0.2236)	5.700 (0.2244)	5.720 (0.2252)	5.740 (0.2260)
0.000 - 0.020 (0.0000 - 0.0008)																	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	40	42	44	46	48	50
0.021 - 0.040 (0.0008 - 0.0016)															06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	42	44	46	48	50	52
0.041 - 0.060 (0.0016 - 0.0024)													06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	44	46	48	50	52	54
0.061 - 0.080 (0.0024 - 0.0031)											06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	46	48	50	52	54	56
0.081 - 0.100 (0.0032 - 0.0039)									06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	48	50	52	54	56	58
0.101 - 0.120 (0.0040 - 0.0047)								06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	50	52	54	56	58	60
0.121 - 0.140 (0.0048 - 0.0055)							06	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	52	54	56	58	60	62
0.141 - 0.160 (0.0056 - 0.0063)						06	08	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	54	56	58	60	62	64
0.161 - 0.180 (0.0063 - 0.0071)					06	08	10	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	54	56	58	60	62	64	66
0.181 - 0.200 (0.0071 - 0.0079)				06	08	10	12	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	58	60	62	64	66	68
0.200 - 0.300 (0.0079 - 0.0118)																																																								
0.301 - 0.320 (0.0119 - 0.0126)	12	14	16	18	20	22	24	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	70	72	74							
0.321 - 0.340 (0.0126 - 0.0134)	14	16	18	20	22	24	26	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	72	74							
0.341 - 0.360 (0.0134 - 0.0142)	16	18	20	22	24	26	28	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	74							
0.361 - 0.380 (0.0142 - 0.0150)	18	20	22	24	26	28	30	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74								
0.381 - 0.400 (0.0150 - 0.0157)	20	22	24	26	28	30	32	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74									
0.401 - 0.420 (0.0158 - 0.0165)	22	24	26	28	30	32	34	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74											
0.421 - 0.440 (0.0166 - 0.0173)	24	26	28	30	32	34	36	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74													
0.441 - 0.460 (0.0174 - 0.0181)	26	28	30	32	34	36	38	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74															
0.461 - 0.480 (0.0181 - 0.0189)	28	30	32	34	36	38	40	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																	
0.481 - 0.500 (0.0189 - 0.0197)	30	32	34	36	38	40	42	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																			
0.501 - 0.520 (0.0197 - 0.0205)	32	34	36	38	40	42	44	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																					
0.521 - 0.540 (0.0205 - 0.0213)	34	36	38	40	42	44	46	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																							
0.541 - 0.560 (0.0213 - 0.0220)	36	38	40	42	44	46	48	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																								
0.561 - 0.580 (0.0221 - 0.0228)	38	40	42	44	46	48	50	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																									
0.581 - 0.600 (0.0229 - 0.0236)	40	42	44	46	48	50	52	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.601 - 0.620 (0.0237 - 0.0244)	42	44	46	48	50	52	54	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.621 - 0.640 (0.0244 - 0.0252)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.641 - 0.660 (0.0252 - 0.0260)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.661 - 0.680 (0.0260 - 0.0268)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74																										
0.681 - 0.700 (0.0268 - 0.0276)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74																										
0.701 - 0.720 (0.0276 - 0.0283)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74																										
0.721 - 0.740 (0.0284 - 0.0291)	54	56	58	60	62	64	66	68	70	70	72	72	74	74																										
0.741 - 0.760 (0.0292 - 0.0299)	56	58	60	62	64	66	68	70	72	72	74	74																												
0.761 - 0.780 (0.0300 - 0.0307)	58	60	62	64	66	68	70	72	74	74																												
0.781 - 0.800 (0.0307 - 0.0315)	60	62	64	66	68	70	72	74																														
0.801 - 0.820 (0.0315 - 0.0323)	62	64	66	68	70	72	74																															
0.821 - 0.840 (0.0323 - 0.0331)	64	66	68	70	72	74																																
0.841 - 0.860 (0.0331 - 0.0339)	66	68	70	72	74																																	
0.861 - 0.880 (0.0339 - 0.0346)	68	70	72	74																																		
0.881 - 0.900 (0.0347 - 0.0354)	70	72	74																																			
0.901 - 0.920 (0.0355 - 0.0362)	72	74																																				
0.921 - 0.940 (0.0363 - 0.0370)	74																																					

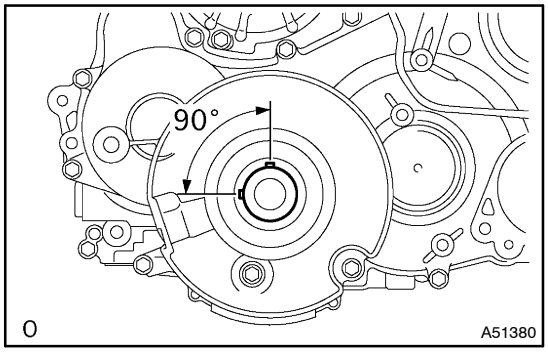
Intake valve clearance (Cold):
0.20 to 0.30 mm (0.0079 to 0.00118 in.)

EXAMPLE:
The 5.250 mm (0.2067 in.) lifter is installed, and the measured clearance is 0.400 mm (0.0158 in.). Replace the 5.250 mm (0.2067 in.) shim with a new No.40 lifter.

New Lifter Thickness mm (in.)

No.	Thickness	No.	Thickness	No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)		

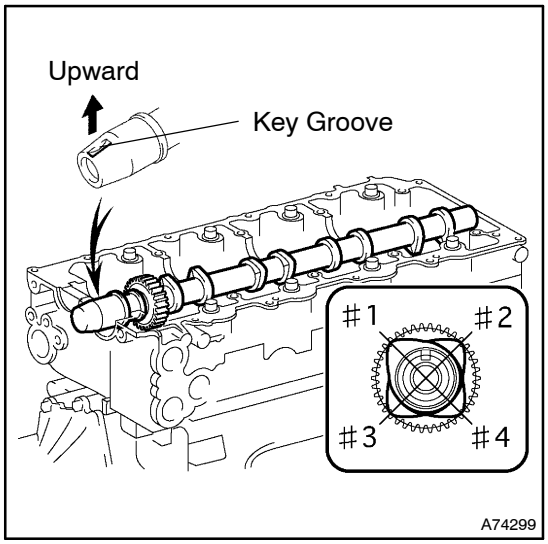
A72846



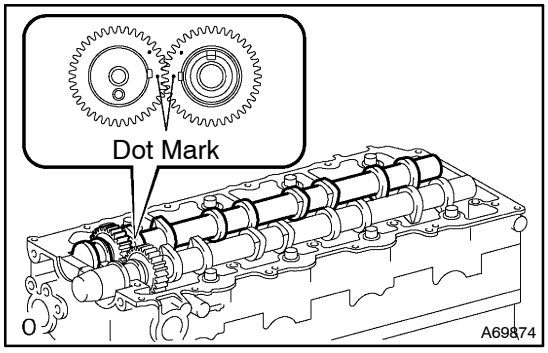
66. INSTALL CAMSHAFT

(a) Install the camshaft and camshaft No.2.

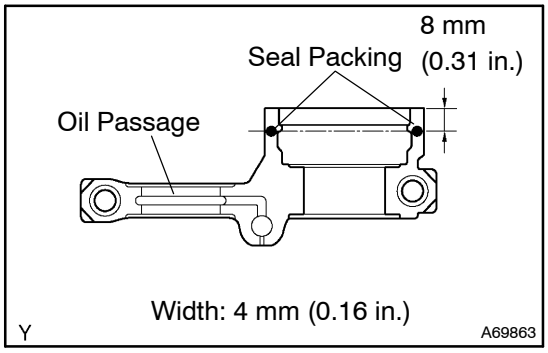
(1) Set the crankshaft and turn it 90° counterclockwise from the TDC position.



(2) Place the camshaft to the cylinder head as shown in the illustration.



(3) Align the dot marks of the camshaft and camshaft No.2 by meshing both of the two gears before placing the camshaft No.2.



(4) Remove old seal packing (FIPG) from the camshaft bearing cap and cylinder head.

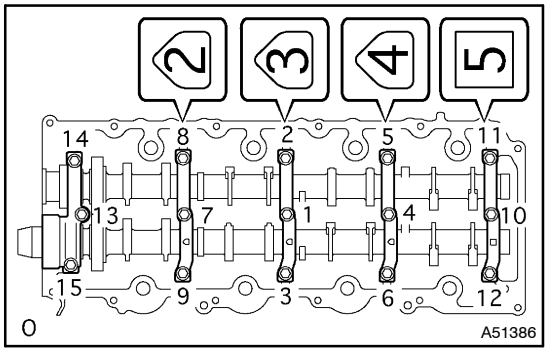
(5) Apply seal packing to the specific places described in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

Thickness: 1.0 mm (0.04 in.)

NOTICE:

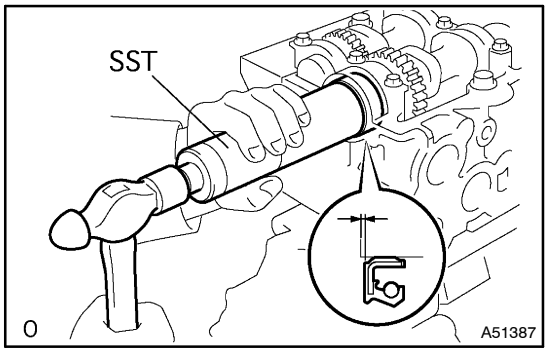
- **Be careful not to adhere FIPG to the oil passage of the bearing cap.**
- **After applying FIPG is completed, install the camshaft bearing cap within 3 minutes and tighten its bolts within 15 minutes.**
- **Do not start the engine within 2 hours after the installation.**



(6) Install the camshaft bearing cap as shown in the illustration.

(7) Tighten the 15 bolts for the camshaft bearing cap in the specified order described in the illustration.

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)



67. INSTALL CAMSHAFT SETTING OIL SEAL

(a) Install the oil seal.

(1) Apply a small amount of MP grease to a new oil seal lip.

NOTICE:

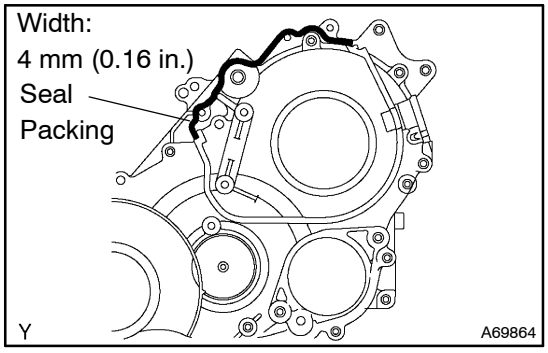
Keep the lip clean. Prevent dirt and dust from adhering to that area.

(2) Fit the oil seal using SST and a hammer.

SST 09608–06041

Oil seal depth from the flat–end surface :

0.5 to – 1.5 mm (0.020 to – 0.060 in.)



68. INSTALL TIMING BELT NO.2 COVER

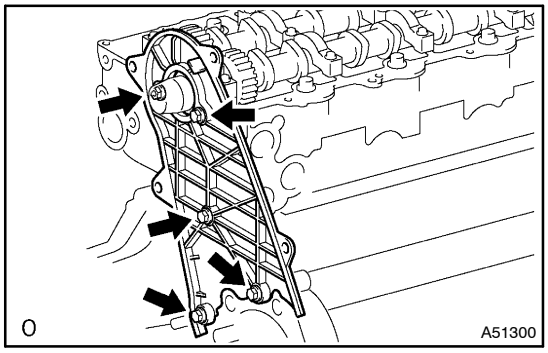
(a) Remove old packing (FIPG) from the timing gear case.

(b) Apply seal packing to the specific places described in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

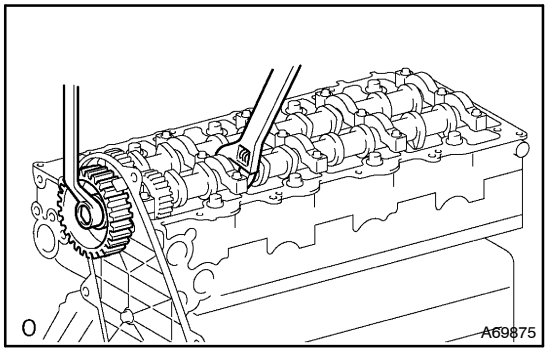
NOTICE:

Install the timing belt No.2 cover within 3 minutes and tighten its bolts and nut within 15 minutes after applying FIPG is competed.



(c) Install the timing belt No.2 cover with the 4 bolts and nut.

Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)



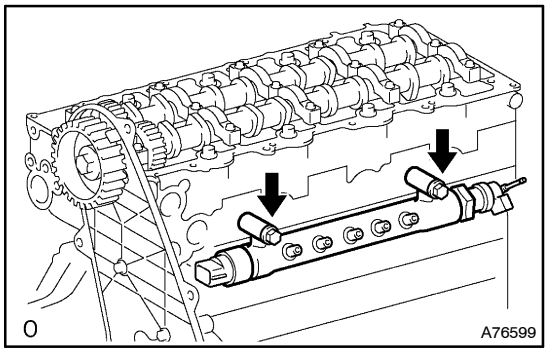
69. INSTALL CAMSHAFT TIMING PULLEY

(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 portion of the camshaft, and install the timing pulley with the bolt.

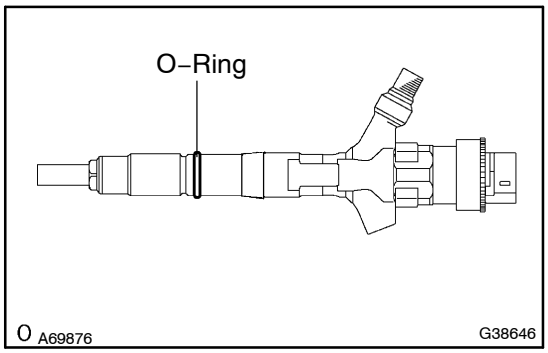
Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf)



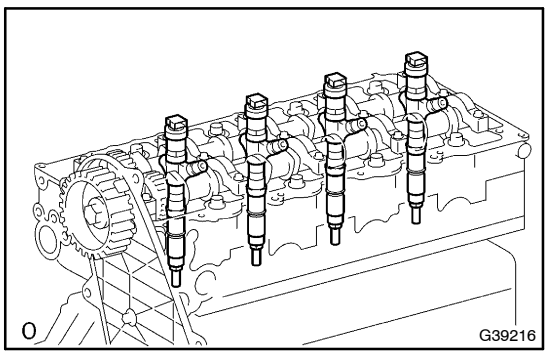
70. INSTALL INJECTOR ASSY

(a) Install the common rail with the 2 bolts.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)



(b) Apply a light coat of engine oil to a new O–ring for each injector.

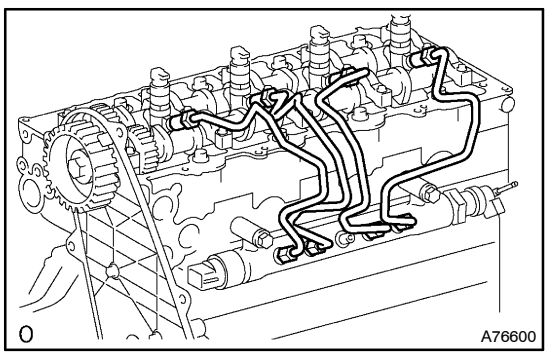


(c) Install 4 new nozzle seats to the cylinder head.

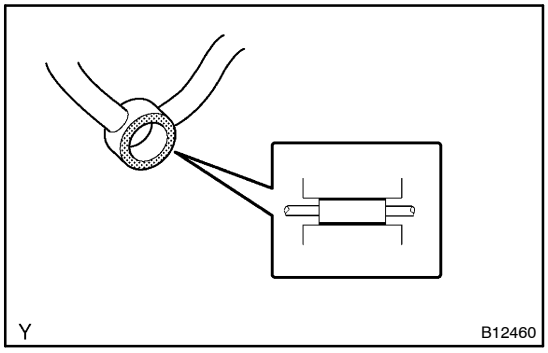
(d) Install the injector to the cylinder head.

NOTICE:

- **At this time, insert the injector until it touches the nozzle sheet surface.**
- **When installing the injector to the cylinder head, if the injector comes to float up with the reaction of O–ring, pull out the injector and install it again.**
- **Do not exchange the injector.**



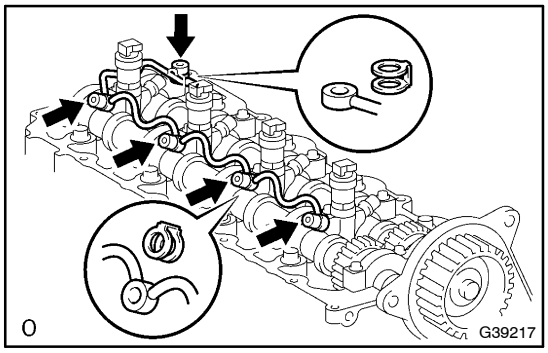
(e) Temporarily install the 4 injection pipes.



(f) Before installing the nozzle leakage pipe, check that there is no scratch and deformation (dent) on the seal surface of the unions (at five positions) using a straight edge.

HINT:

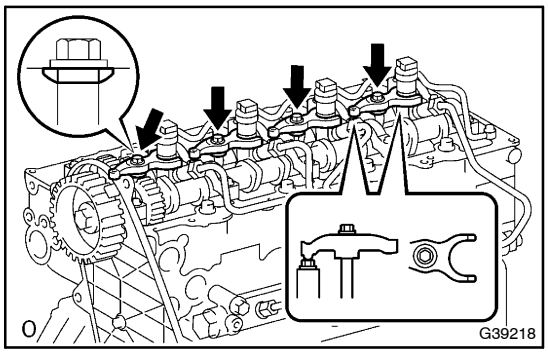
If there is any scratch or deformation, replace it to a new one.



(g) Place the nozzle leakage pipe and 5 new gaskets.

(h) Apply a light coat of engine oil to the 4 hollow screws and union bolt.

(i) Temporarily install the leakage pipe with the 4 hollow screws and union bolt.



(j) Set the spring to each injector as shown in the illustration.

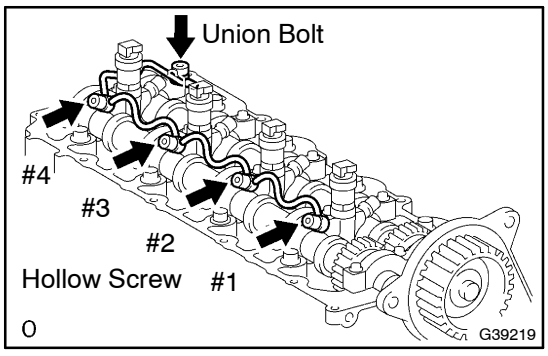
(k) Set a new washer on the nozzle holder clamp as shown in the illustration.

(l) Tighten the bolt.

Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)

NOTICE:

- **Clip the injector at the fork portion with a clamp which is set on the head of the cam cap bolt. At this time, check that the clamp does not hold the injector at the part where the spring is attached.**
- **To tighten the clamp bolt, temporarily tighten it by hand until the bearing surface of the bolt touches the washer, then tighten to the specified torque.**
- **When tightening to the specified torque, pay attention not to tilt the bolt and the clamp.**
- **The washer can not be reused.**
- **If overtightening the washer, replace it with a new one.**



(m) Tighten the 4 hollow screws from #1 to #4 in order.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

NOTICE:

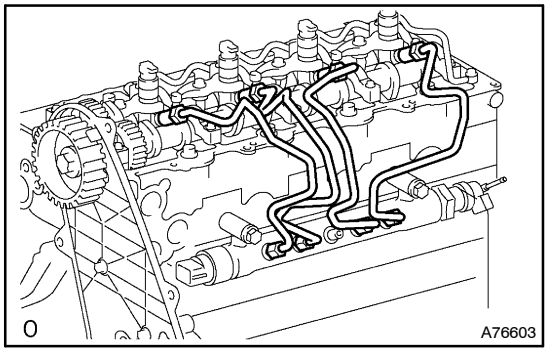
If any of the screws are overtightened, replace the nozzle leakage pipe assy with a new one.

(n) Tighten the union bolt.

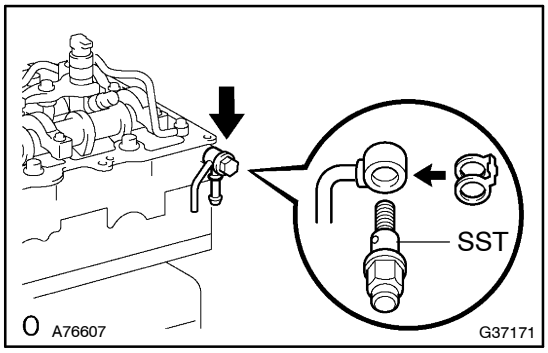
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

NOTICE:

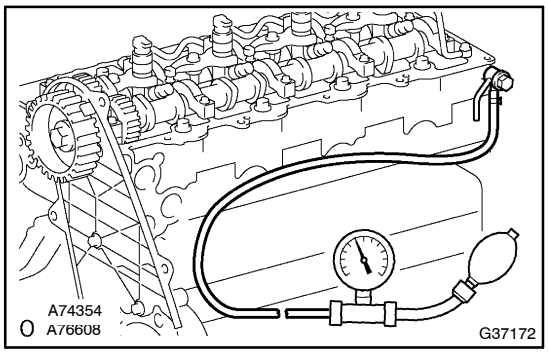
If the bolt is overtightened, replace the nozzle leakage pipe assy with a new one.



(o) Remove the 4 injection pipes.
(p) Remove the 2 bolts and common rail.



(q) Check that there are no leaks from the nozzle leakage pipe connection.
(1) Using SST, install the nozzle leakage pipe No.2 and new gasket to the cylinder head.
SST 09280–00010
Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)
(2) Apply a light coat of engine oil (any fluid to detect fuel leakage) to the nozzle leakage pipe connection.

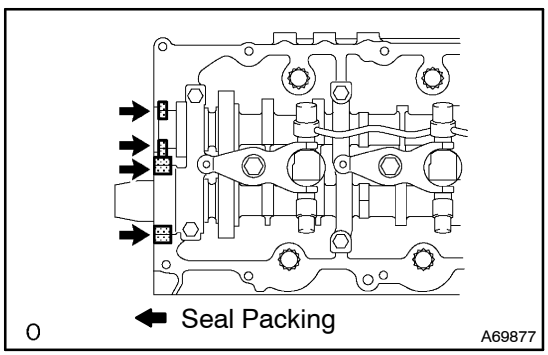


(3) Using SST (turbo charger pressure gauge), set the SST to the leakage pipe No.2 and maintain 250 kPa (2.5 kgf/cm^2, 37 psi) of pressure for 60 seconds to check that there are no leaks from the leakage pipe No.1.
SST 09992–00242

NOTICE:
Be sure to keep specified pressure, preventing from leakage.

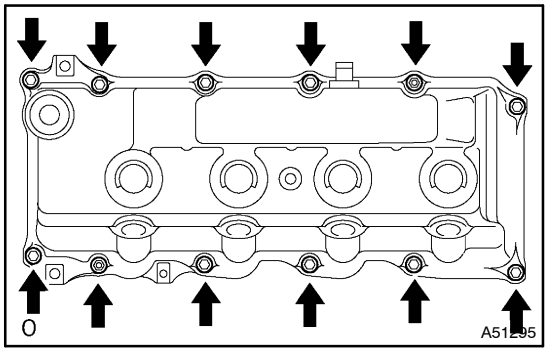
HINT:
- (Apply a coat of engine oil to the leakage pipe connection,) and check that no bubbles come from the leakage pipe connection or each nozzle leakage pipe connection.
- Check that the indication on the SST (turbo charger pressure gauge) does not go down while pressure is applied.

(4) After checking fuel leaks, wipe off engine oil from the leakage pipe connection.
(r) Remove the SST, union bolt, bolt and nozzle leakage pipe No.2.

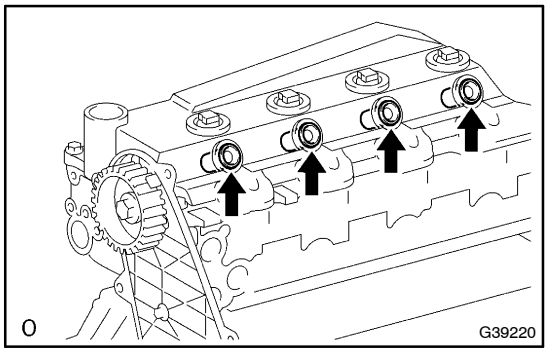


71. INSTALL CYLINDER HEAD COVER SUB–ASSY
(a) Remove old seal packing (FIPG) from the cylinder head.
(b) Apply seal packing to the specific places described in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

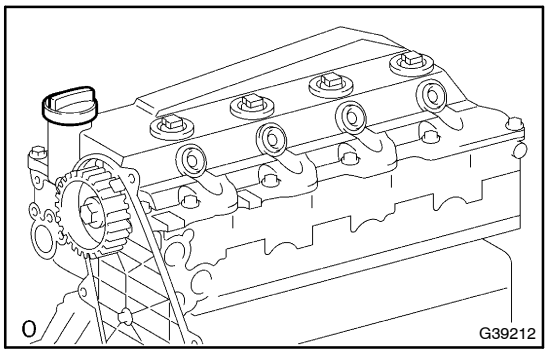
NOTICE:
After applying the seal packing, parts must be assembled within 3 minutes, and then tighten them within 15 minutes.



(c) Install the gasket to the cylinder head cover.
(d) Install the cylinder head cover with the 10 bolts and the 2 nuts. Uniformly tighten the bolts and nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



72. INSTALL NOZZLE HOLDER SEAL
(a) Install 4 new nozzle holder seals.



73. INSTALL OIL FILLER CAP SUB–ASSY
(a) Install the oil filler cap to the cylinder head cover.