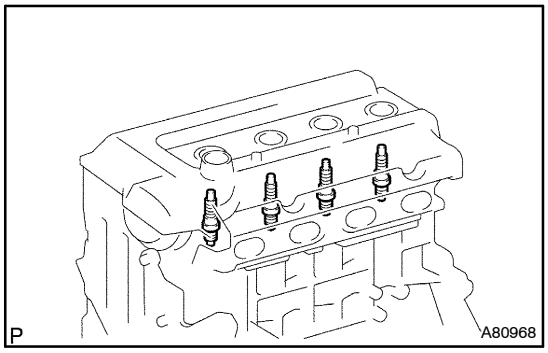
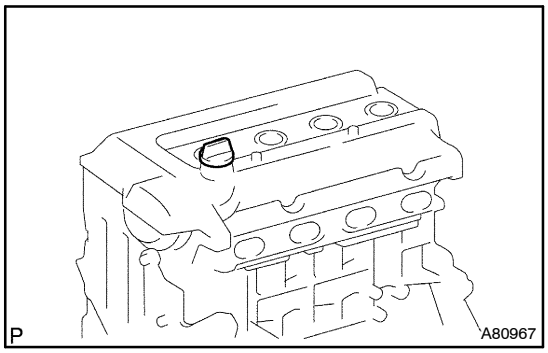
141OH–01

OVERHAUL



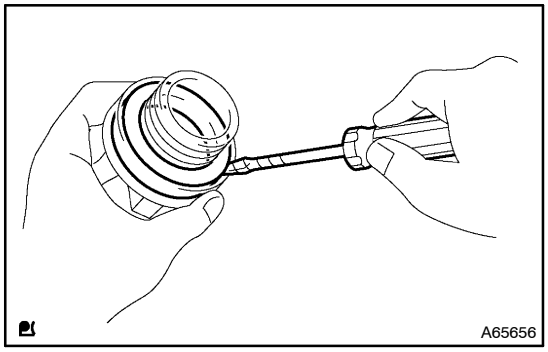
1. REMOVE SPARK PLUG

(a) Using a spark plug wrench, remove the 4 spark plugs.



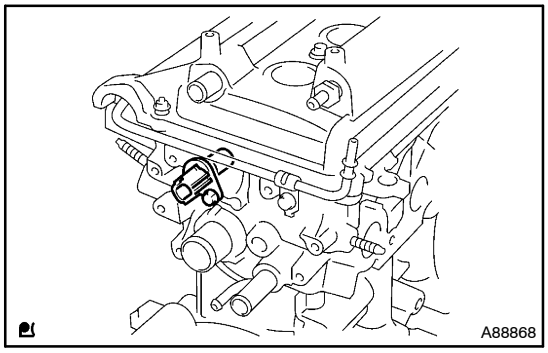
2. REMOVE OIL FILLER CAP SUB–ASSY

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



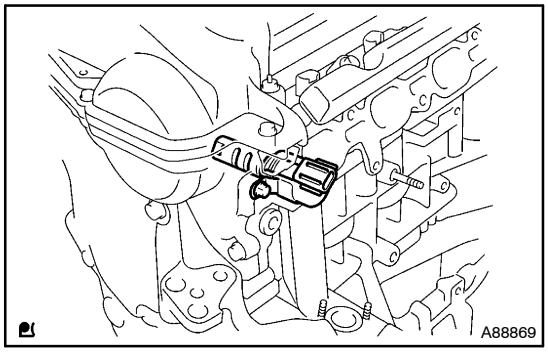
3. REMOVE OIL FILLER CAP GASKET

(a) Using a screwdriver with its tip wrapped in tape, remove the oil filler cap gasket.



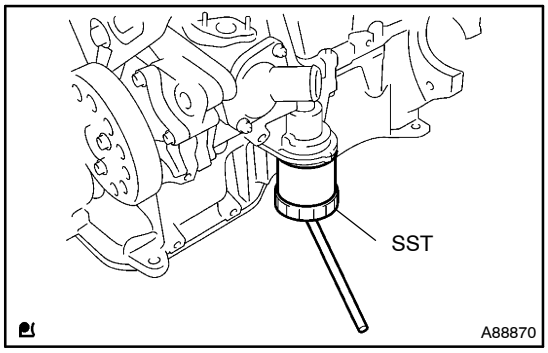
4. REMOVE CAM POSITION SENSOR

(a) Remove the bolt and camshaft position sensor.



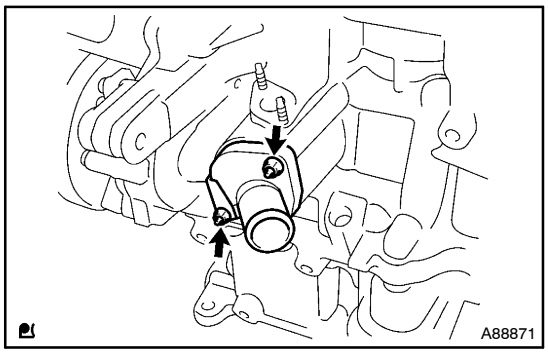
5. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Remove the bolt and camshaft timing oil control valve assembly.



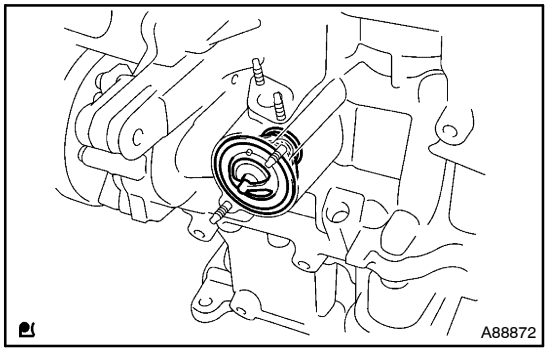
6. REMOVE OIL FILTER SUB–ASSY

(a) Using SST, remove the oil filter.
SST 09228–06501

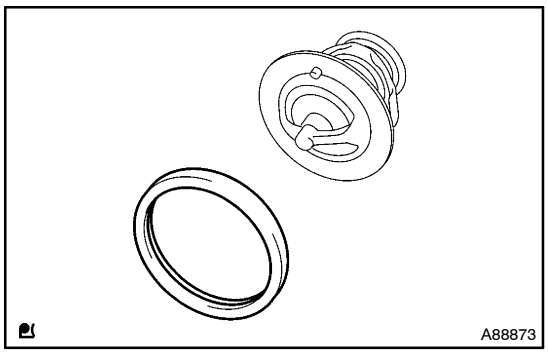


7. REMOVE THERMOSTAT

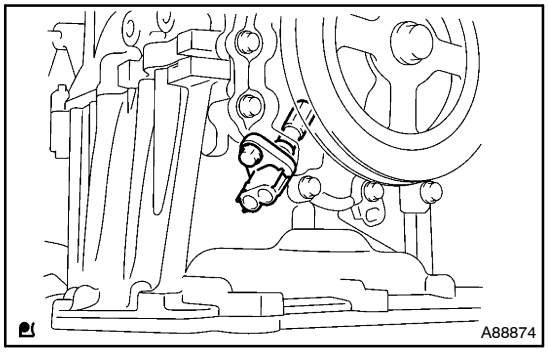
(a) Remove the 2 nuts and water inlet.



(b) Remove the thermostat.

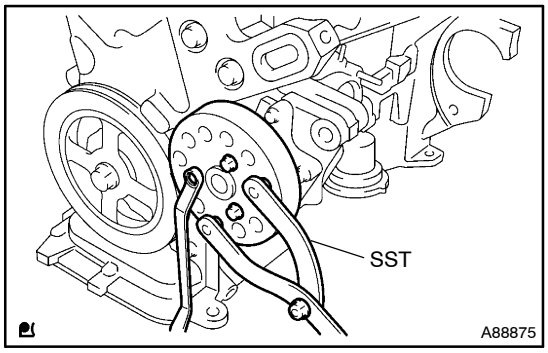


(c) Remove the water inlet housing gasket No. 1 from the thermostat.



8. REMOVE CRANK POSITION SENSOR

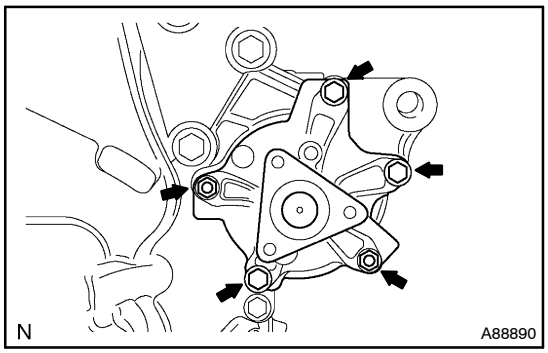
(a) Remove the bolt and crank position sensor.



9. REMOVE WATER PUMP PULLEY

(a) Using SST, hold the water pump pulley.
SST 09960–10010 (09962–01000, 09963–01000)

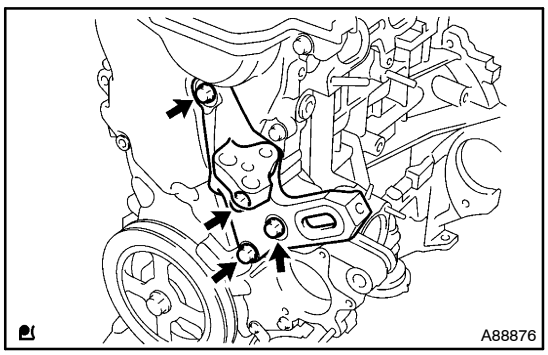
(b) Remove the 3 bolts and water pump pulley.



10. REMOVE WATER PUMP ASSY

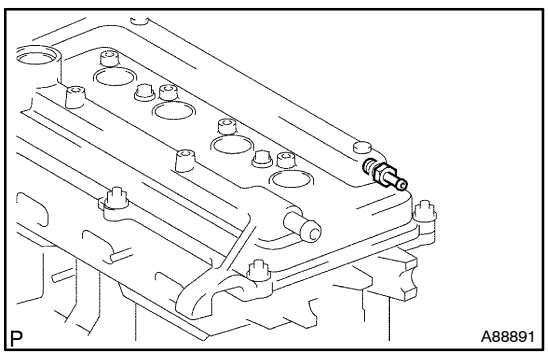
(a) Remove the 3 bolts and 2 nuts, then remove the water pump assembly.

(b) Remove the water pump gasket.



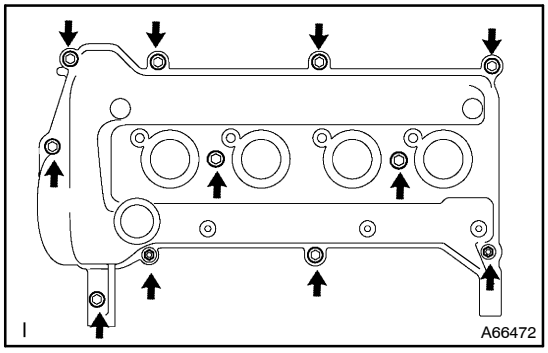
11. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET

(a) Remove the 4 bolts and transverse engine engine mounting bracket.



12. REMOVE VENTILATION VALVE SUB–ASSY

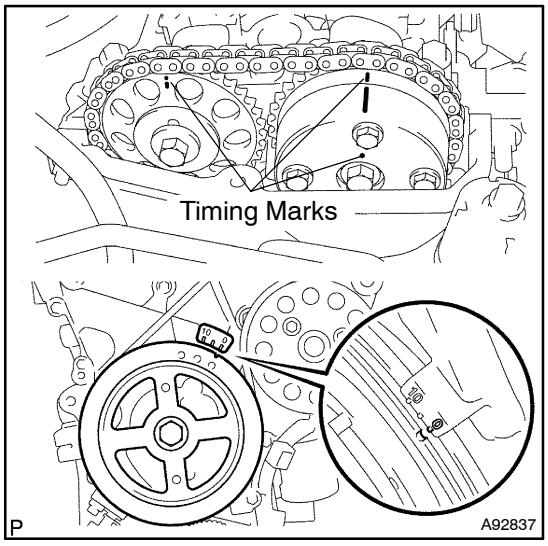
(a) Remove the ventilation valve from the cylinder head cover.



13. REMOVE CYLINDER HEAD COVER SUB–ASSY

(a) Remove the 9 bolts and 2 nuts, then remove the cylinder head cover.

(b) Remove the cylinder head cover gasket from the cylinder head cover.



14. REMOVE CRANKSHAFT DAMPER SUB–ASSY

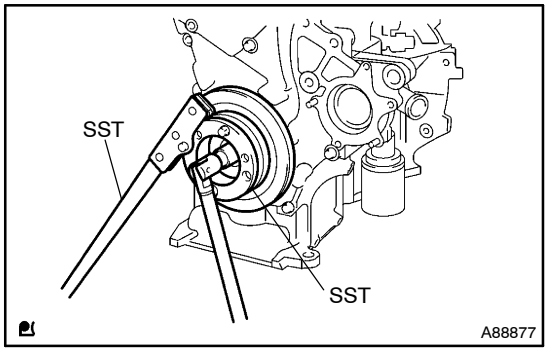
(a) Set the No. 1 cylinder to the TDC/compression.

(1) Turn the crankshaft damper clockwise, then align its timing mark notch with the timing mark ”0”.

(2) Check that the timing marks of the camshaft timing gear are located as illustrated.

HINT:

If not, turn the crankshaft to align the marks.

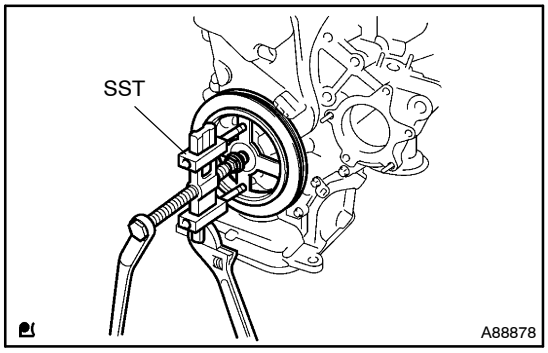


(b) Using SST, hold the crankshaft damper and loosen the crankshaft bolt.

SST 09213–58013 (91111–50845), 09330–00021

NOTICE:

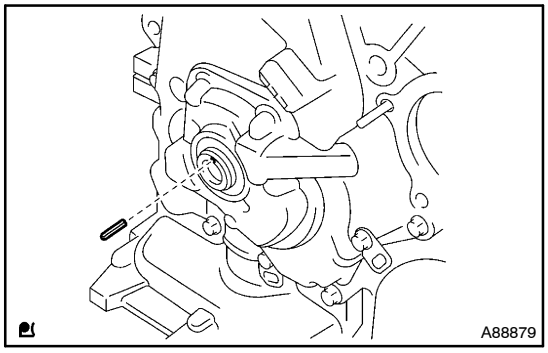
When installing SST, be careful that the bolt which holds SST does not interfere with the chain cover.



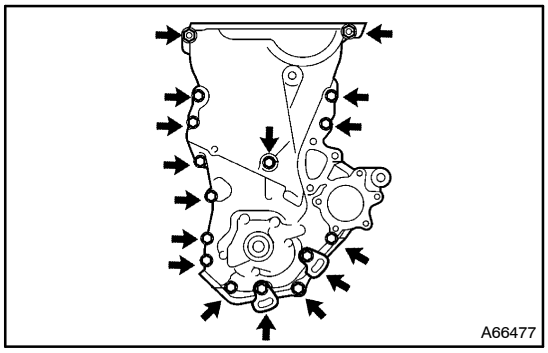
(c) Loosen the crankshaft bolt until the 2 to 3 threads of the bolt is tightened to the crankshaft.

(d) Using SST, remove the crankshaft damper and crankshaft bolt.

SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)

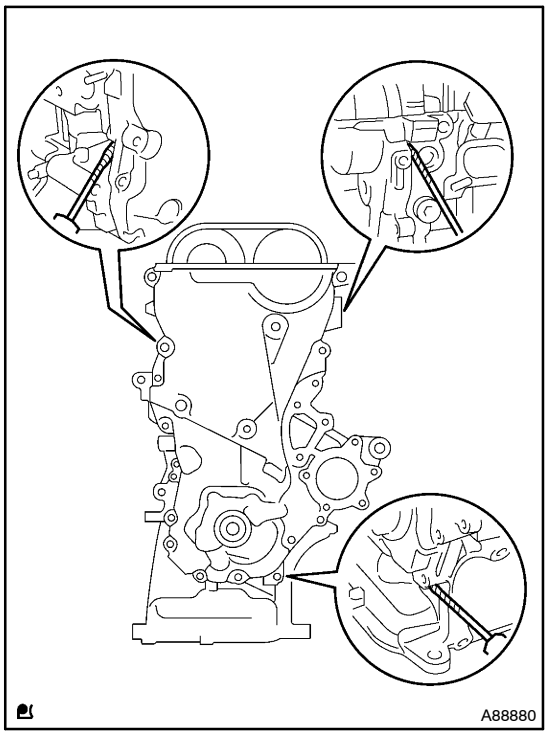


(e) Remove the crankshaft straight pin.



15. REMOVE OIL PUMP ASSY

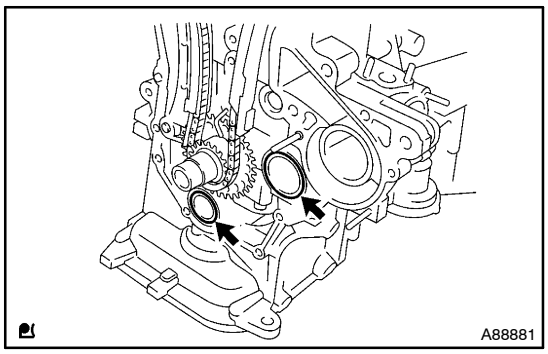
(a) Remove the 15 bolts and nut.



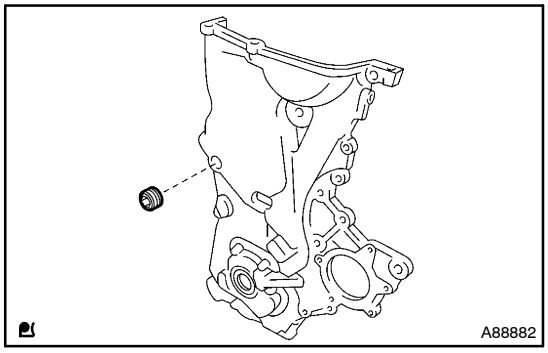
(b) Using a screwdriver with its tip wrapped in tape, remove the oil pump assembly by prying out between the cylinder head and cylinder block.

NOTICE:

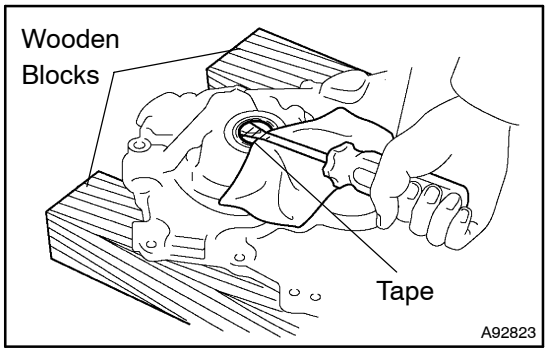
Be careful not to damage the contact surfaces of the oil pump assembly, cylinder head and cylinder block.



(c) Remove the 2 O–rings from the cylinder block and oil pan.

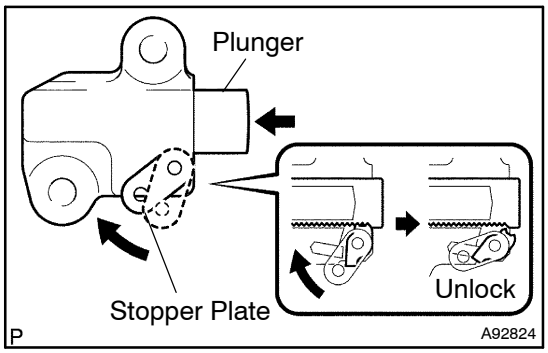


(d) Using an 8 mm socket hexagon wrench, remove the service hole screw plug.



16. REMOVE OIL PUMP SEAL

(a) Using a screwdriver with its tip wrapped in tape, remove the oil seal.



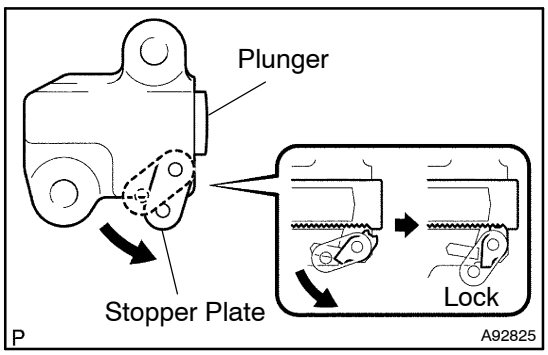
17. REMOVE CHAIN TENSIONER ASSY NO.1

NOTICE:

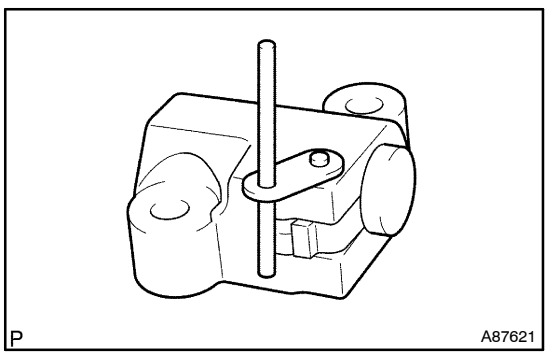
Do not rotate the crankshaft with the chain tensioner removed.

(a) Lift up the stopper plate, then unlock the plunger.

(b) Push in the plunger to the end with the plunger unlocked.



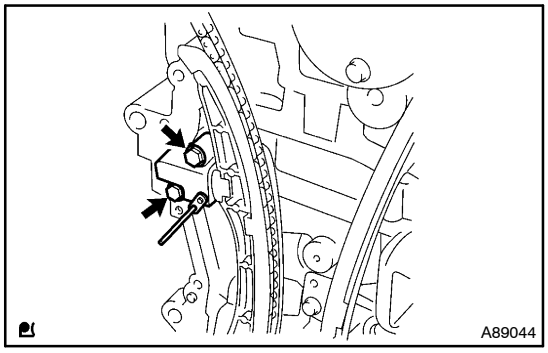
(c) Lift down the stopper plate with the plunger pushed to the end, then lock the plunger.



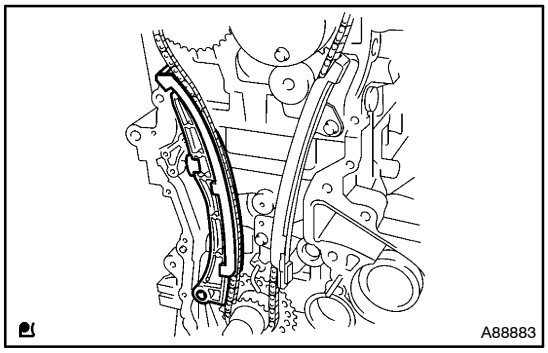
(d) Insert a 3.0 mm diameter bar into the hole of the stopper plate with the plunger locked.

HINT:

If the stopper plate is not completely lifted down and a 3.0 mm diameter bar cannot be inserted, unlock and pull out the plunger slightly. The stopper plate will be completely lifted down and a 3.0 mm diameter bar can be inserted easily.

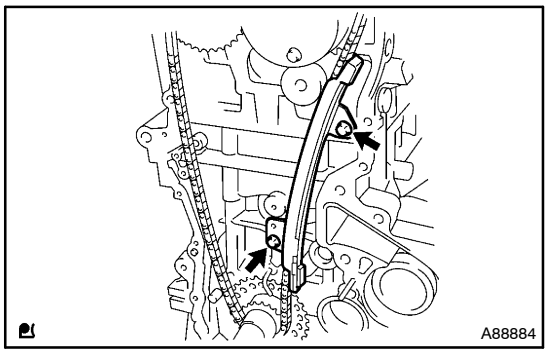


(e) Remove the 2 bolts and chain tensioner No. 1.



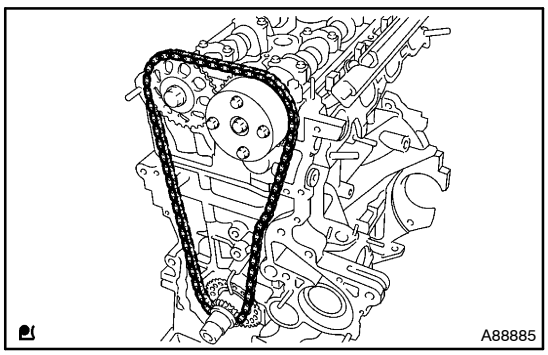
18. REMOVE CHAIN TENSIONER SLIPPER

(a) Remove the chain tensioner slipper from cylinder block.



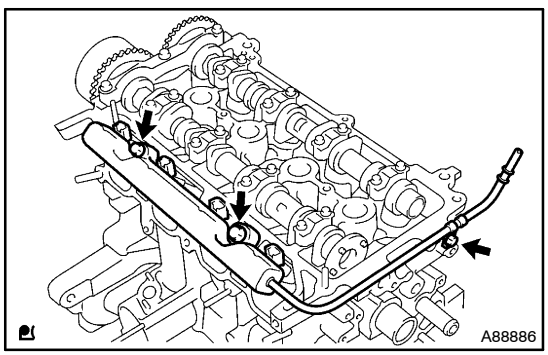
19. REMOVE CHAIN VIBRATION DAMPER NO.1

(a) Remove the 2 bolts and chain vibration damper No. 1.



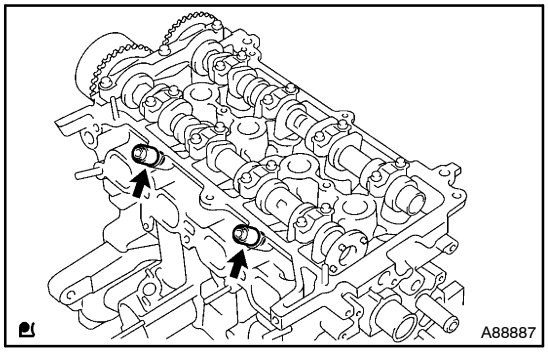
20. REMOVE CHAIN SUB–ASSY

(a) Remove the chain.

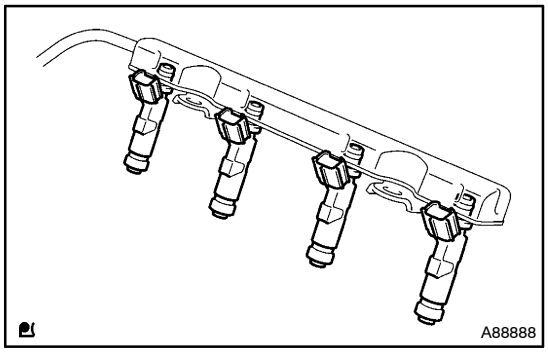


21. REMOVE FUEL DELIVERY PIPE SUB–ASSY

(a) Remove the 3 bolts and fuel delivery pipe with fuel injector assembly.

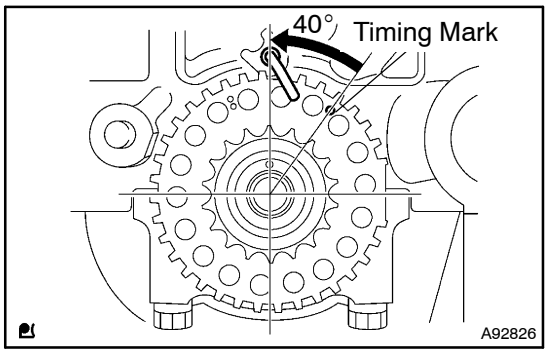


(b) Remove the delivery pipe spacer No. 1 from the cylinder head.



22. REMOVE FUEL INJECTOR ASSY

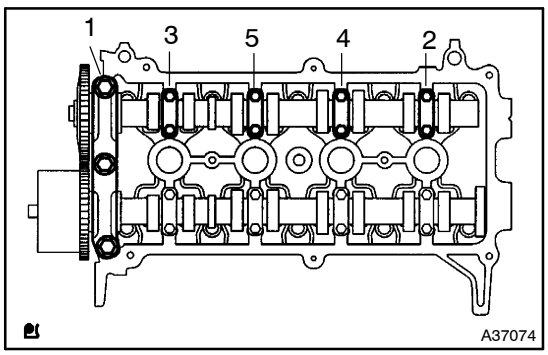
(a) Remove the fuel injector assembly from the fuel delivery pipe.



23. REMOVE NO.2 CAMSHAFT

NOTICE:

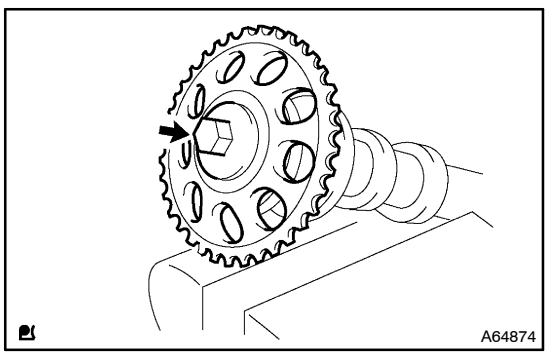
When rotating the camshaft with the chain removed, rotate the crankshaft counterclockwise by 40° from the TDC/ compression.



(a) Remove the camshaft bearing caps No. 1 and No. 2 in the sequence shown in the illustration, then remove the camshaft No. 2.

NOTICE:

Uniformly loosen the bolts keeping the camshaft level.



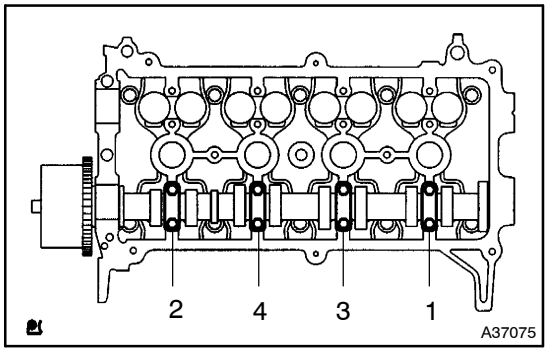
24. REMOVE CAMSHAFT TIMING GEAR OR SPROCKET

(a) Clamp the camshaft in a vise (using an aluminum protector).

(b) Remove the bolt and camshaft timing gear.

NOTICE:

Be careful not to damage the camshaft.



25. REMOVE CAMSHAFT

(a) Remove the camshaft bearing caps No. 2 in the sequence shown in the illustration, then remove the camshaft.

NOTICE:

Uniformly loosen the blots keeping the camshaft level.

26. INSPECT CAMSHAFT TIMING GEAR ASSY

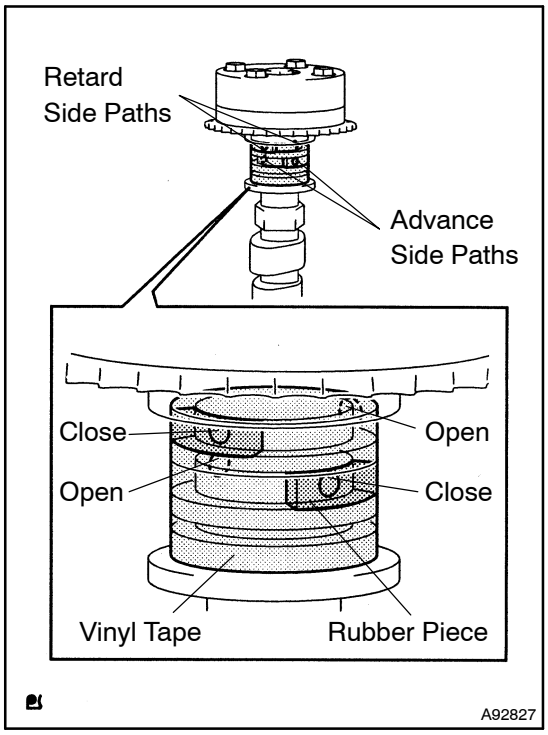
(a) Check the lock of the camshaft timing gear.

(1) Clamp the hexagonal lobe of the camshaft in a vise (using an aluminum protector).

(2) Check that the camshaft timing gear is locked.

NOTICE:

Be careful not to damage the camshaft.



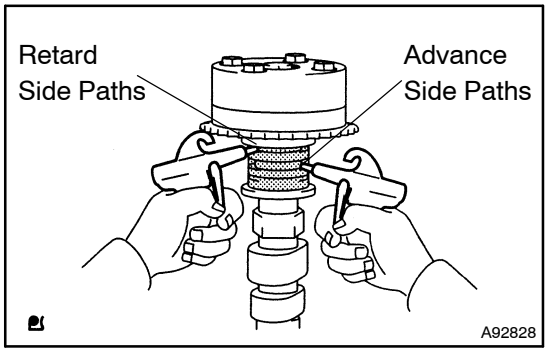
(b) Release the lock pin.

(1) Cover the 4 oil paths of the cam journal with vinyl tape as shown in the illustration.

HINT:

One of the 2 grooves located on the cam journal is for retarding cam timing (upper) and the other is for advancing cam timing (lower). Each groove has 2 oil paths. Plug one of the 2 oil paths for each groove with rubber pieces before wrapping the cam journal with the tape.

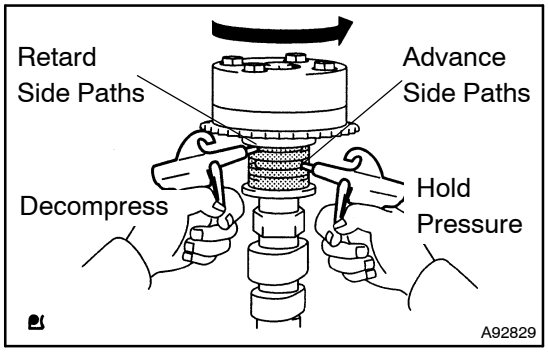
(2) Punctuate the tape which covers the advance side path and retard side path on the opposite side.



(3) Apply approximately 150 kPa (1.5 kgf/cm^2) of air pressure into the 2 punctuated paths (the advance side path and retard side path).

NOTICE:

When applying air pressure, cover the paths with a shop rag to prevent oil splash.



(4) Confirm that the camshaft timing gear assembly revolves in the advance direction when reducing the air pressure of the retard side path.

HINT:
The lock pin is released and the camshaft timing gear revolves in the advance direction.

(5) When the camshaft timing gear assembly reaches the most advanced position, release the air pressure of the retard side path, then release the air pressure of the advance side path.

NOTICE:
If the air pressure of the advance side path is released first, the camshaft timing gear assembly occasionally shifts in the retard direction abruptly, which may damage the lock pin. Be sure to release the air pressure of the retard side path first.

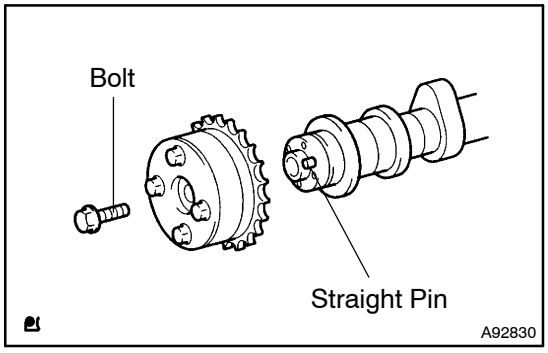
(c) Check the smooth revolution.

(1) Let the camshaft timing gear assembly rotate by 2 or 3 revolutions in the movable range (22.5°) except the most retarded position. Check that it rotates smoothly.

NOTICE:
Do the check by hand, and do not use air pressure.

(d) Check the lock at the most retarded position.

(1) Confirm that the camshaft timing gear assembly is locked at the most retarded position (at the end of the movable range).

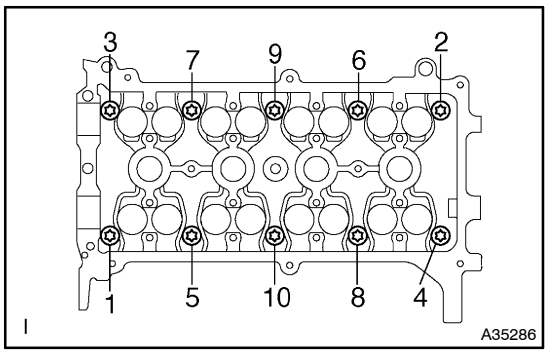


27. REMOVE CAMSHAFT TIMING GEAR ASSY

(a) Turn the camshaft timing gear assembly at the most advanced position.

(b) Remove the bolt and camshaft timing gear assembly.

NOTICE:
- **Do not remove the 4 other bolts.**
- **If reusing the camshaft timing gear assembly, unlock the lock pin inside the camshaft timing gear first.**

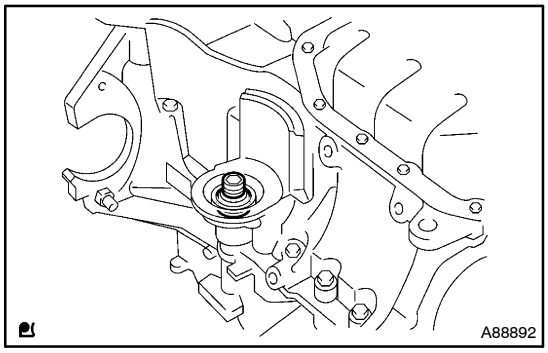


28. REMOVE CYLINDER HEAD SUB–ASSY

(a) Using several steps, loosen the 10 cylinder head bolts with an 8 mm bi–hexagon wrench in the sequence shown in the illustration. Then remove the 10 bolts and 10 washers.

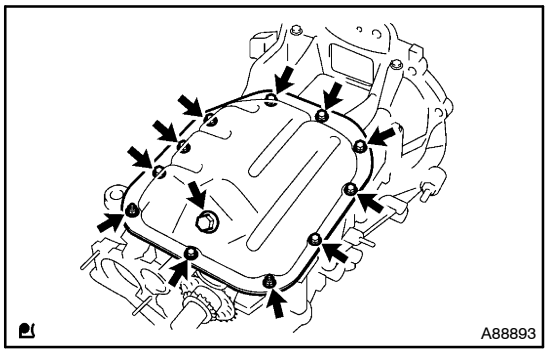
NOTICE:
- **When removing the bolt, do not drop the washer into the engine.**
- **Removing the cylinder head bolts in a wrong order may cause damage to the cylinder head.**

29. REMOVE CYLINDER HEAD GASKET



30. REMOVE OIL FILTER UNION

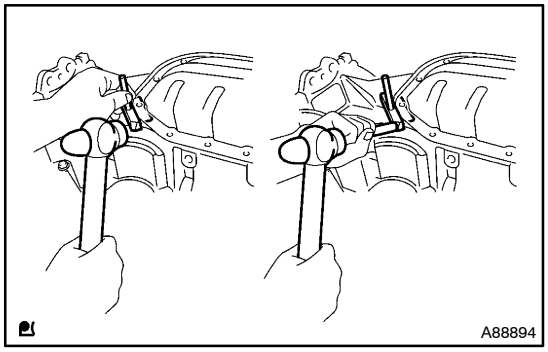
(a) Using a 12 mm socket hexagon wrench, remove the oil filter union.



31. REMOVE OIL PAN SUB–ASSY NO.2

(a) Remove the oil pan drain plug and gasket.

(b) Remove the 9 bolts and 2 nuts.

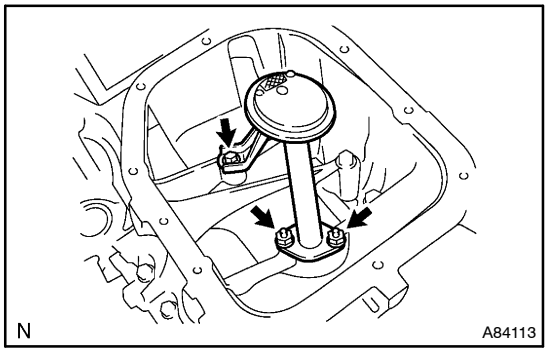


(c) Insert the blade of SST between the oil pan and oil pan No.2, and cut off the applied sealer and remove the oil pan No.2.

SST 09032–00100

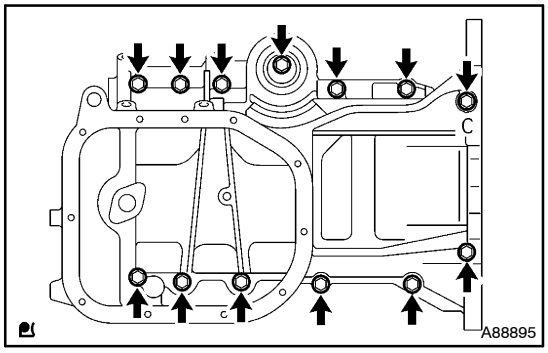
NOTICE:

Be careful not to damage the oil pna and oil pan No.2.



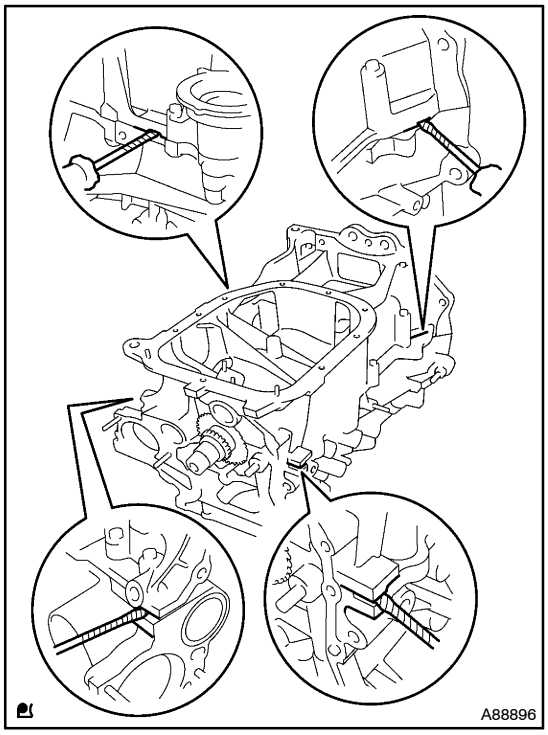
32. REMOVE OIL STRAINER SUB–ASSY

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



33. REMOVE OIL PAN SUB–ASSY

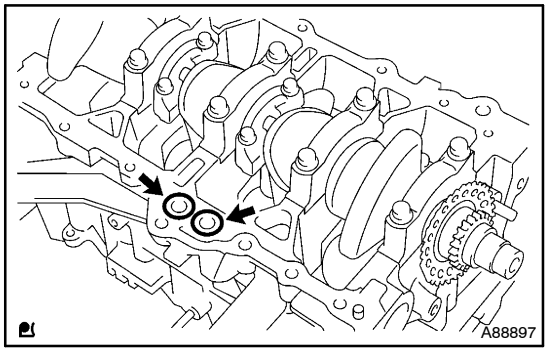
(a) Remove the 13 bolts.



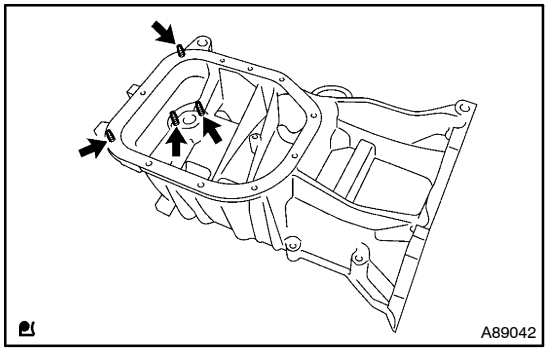
(b) Using a screwdriver with its tip wrapped in tape, remove the oil pan by prying out between the cylinder block and oil pan as illustrated.

NOTICE:

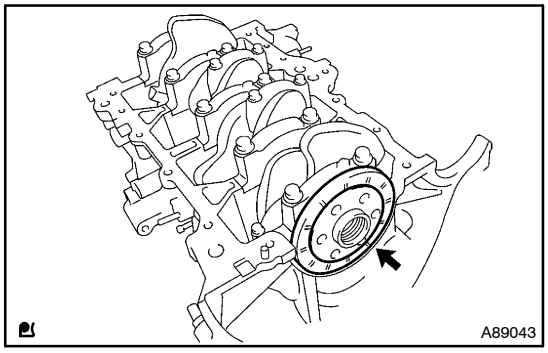
Do not forcibly pry out between the cylinder block and oil pan.



(c) Remove the 2 O–rings from the cylinder block.

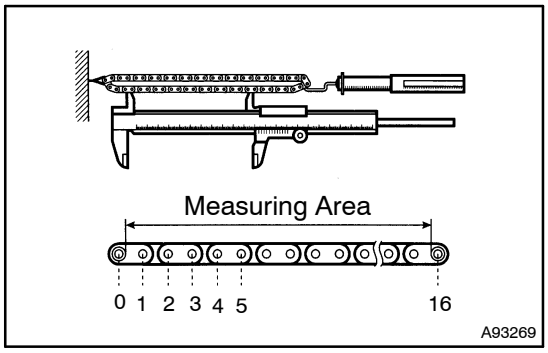


(d) Using a Torx socket wrench E5, remove the 4 stud bolts.



34. REMOVE ENGINE REAR OIL SEAL

(a) Remove the engine rear oil seal.



35. INSPECT CHAIN SUB–ASSY

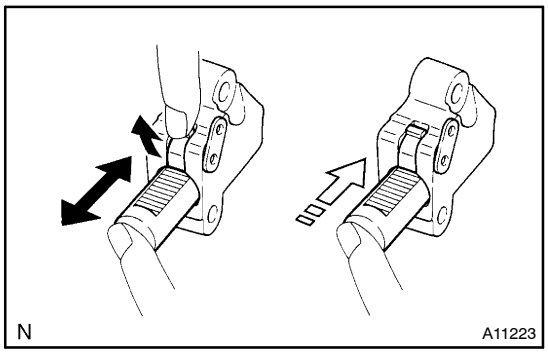
(a) Using a spring scale, measure the length of the timing chain when it was pulled with 140 N (14.3 kgf, 31 lb).

Maximum chain length: 124.2 mm (4.890 in.)

If the chain length is greater than maximum, replace the chain.

HINT:

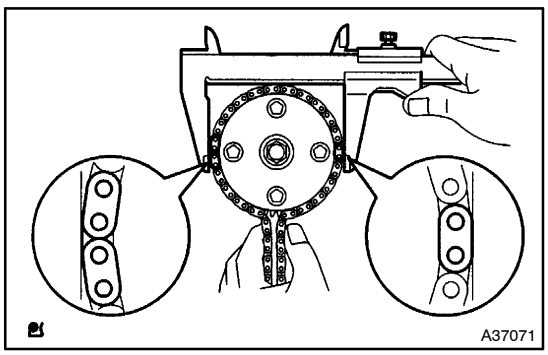
Measure the length at least at 3 places to obtain the average length.



36. INSPECT CHAIN TENSIONER ASSY NO.1

(a) Check that the plunger moves smoothly when the cam is raised with your finger.

(b) Release the cam. Check that the plunger is locked by the cam and does not move when it is pushed by your finger.



37. INSPECT CAMSHAFT TIMING GEAR ASSY

(a) Wrap the chain around the timing gear.

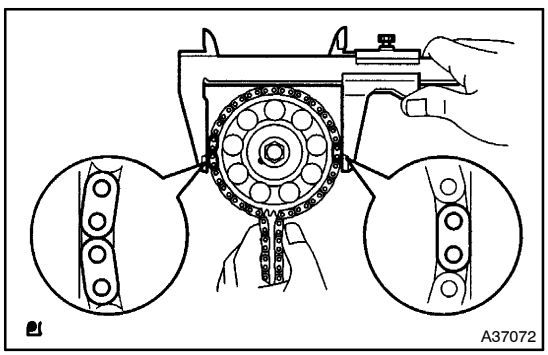
(b) Using vernier calipers, measure the diameter of the timing gear with the chain wrapped.

Minimum gear diameter (w/ chain): 96.2 mm (3.787 in.)

If the diameter is less than minimum, replace the camshaft timing gear assembly.

NOTICE:

When measuring the diameter, vernier calipers must contact the chain link.



38. INSPECT CAMSHAFT TIMING GEAR OR SPROCKET

(a) Wrap the chain around the timing gear.

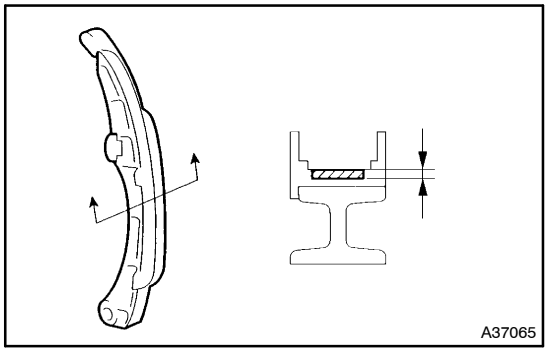
(b) Using vernier calipers, measure the diameter of the timing gear with the chain wrapped.

Minimum gear diameter (w/ chain): 96.2 mm (3.787 in.)

If the diameter is less than minimum, replace the camshaft timing gear.

NOTICE:

When measuring the diameter, vernier calipers must contact the chain link.

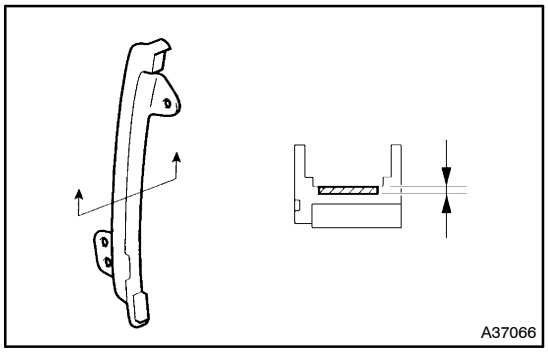


39. INSPECT CHAIN TENSIONER SLIPPER

(a) Using vernier calipers, measure the thickness of the chain tensioner slipper.

Maximum wear: 1.0 mm (0.039 in.)

If the thickness is greater than maximum, replace the chain tensioner slipper.

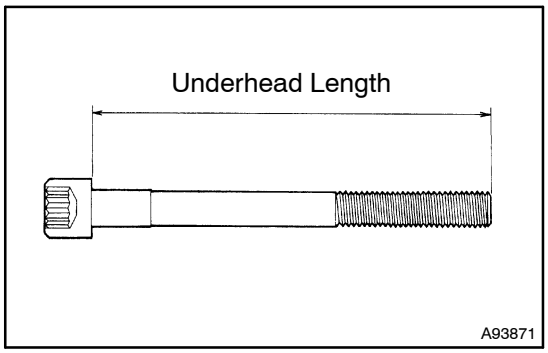


40. INSPECT CHAIN VIBRATION DAMPER NO.1

(a) Using vernier calipers, measure the thickness of the chain vibration damper.

Maximum wear: 1.0 mm (0.039 in.)

If the thickness is greater than maximum, replace the chain vibration damper.



41. INSPECT CYLINDER HEAD SET BOLT

(a) Using vernier calipers, measure the length of the head bolts from the seating to the end.

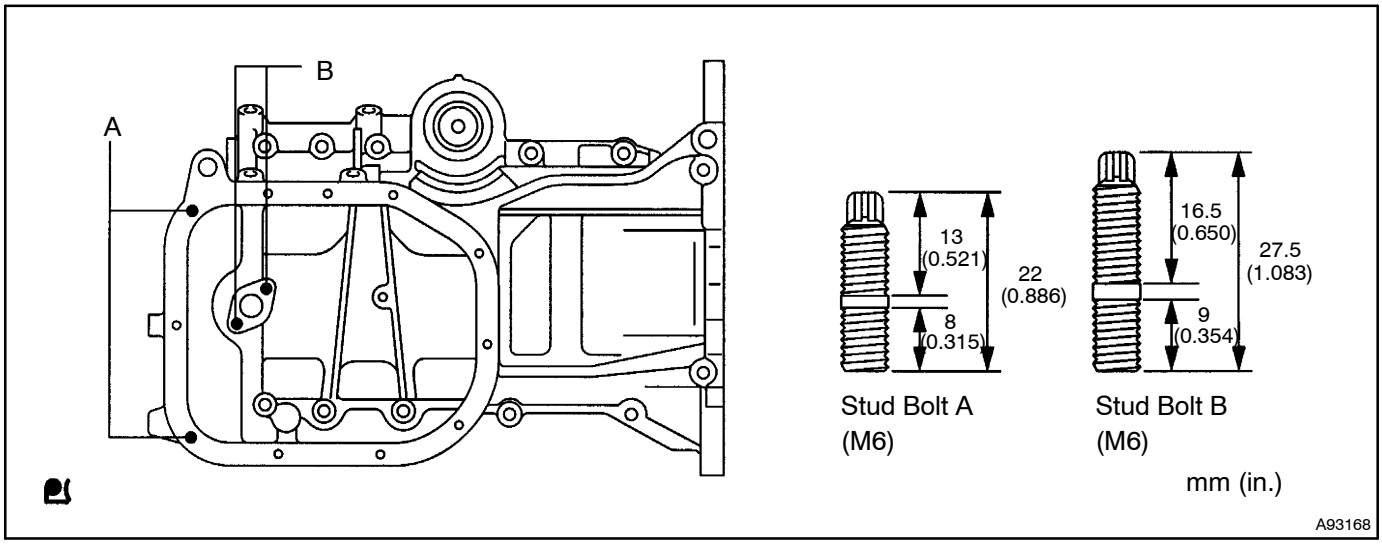
Standard bolt length:
142.8 to 144.2 mm (5.622 to 5.677 in.)
Maximum bolt length: 147.1 mm (5.791 in.)

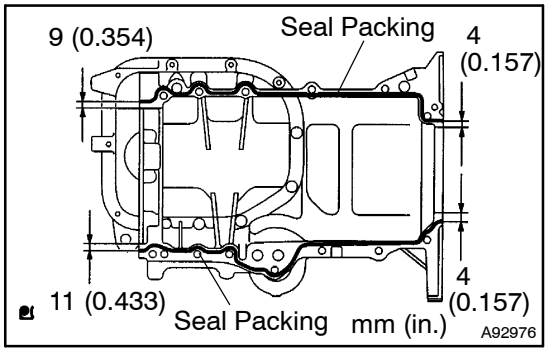
If the length is greater than maximum, replace the head bolt.

42. INSTALL OIL PAN SUB–ASSY

(a) Using a Torx socket wrench E5, install the 4 stud bolts.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

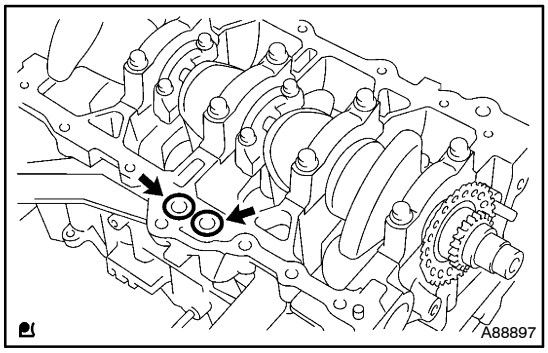




(b) Apply a continuous bead of seal packing (Diameter 2.0 to 3.0 mm (0.079 to 0.118 in.)) to the oil pan as illustrated.
Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

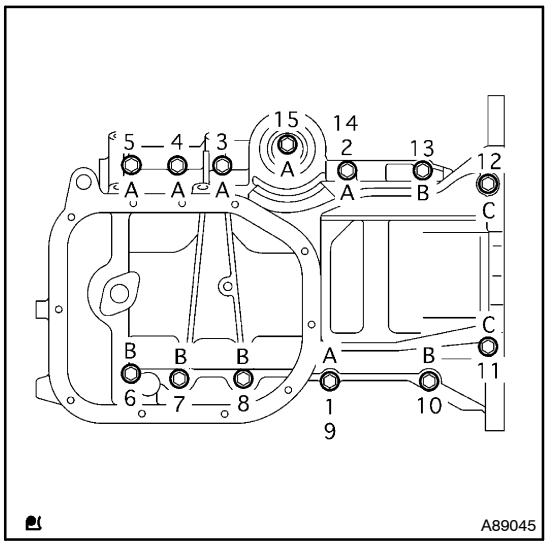
- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes, and tighten the bolts within 15 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours of installation.**



(c) Install 2 new O–rings to the cylinder block, then install the oil pan.

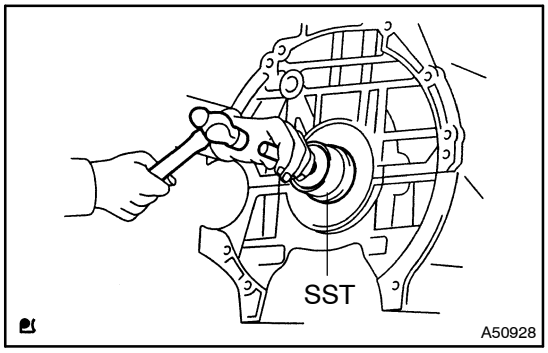
NOTICE:

- **Clean the contact surface of the new O–rings.**
- **Be careful that the O–rings are not jammed when installing the oil pan.**



(d) Using several steps, temporarily tighten the 13 bolts in the sequence shown in the illustration, then tighten the bolts with the specified torque.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

HINT:
The bolt length is as follows.
Bolt A 46 mm (1.81 in.)
Bolt B 85 mm (3.35 in.)
Bolt C 140.7 mm (5.54 in.)



43. INSTALL ENGINE REAR OIL SEAL

(a) Apply a light coat of multipurpose grease No. 2 to the lip of a new oil seal.

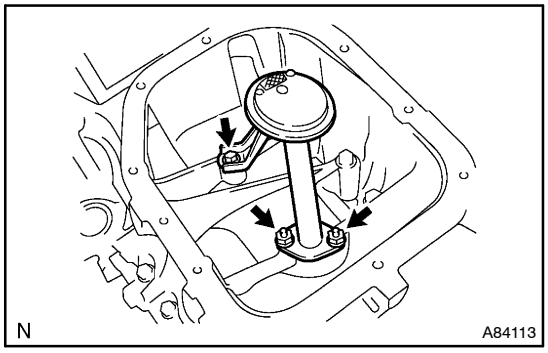
NOTICE:

Keep the lip free of foreign objects.

(b) Using SST, uniformly tap in the oil seal until its surface is flush with the cylinder block edge.
SST 09223–56010

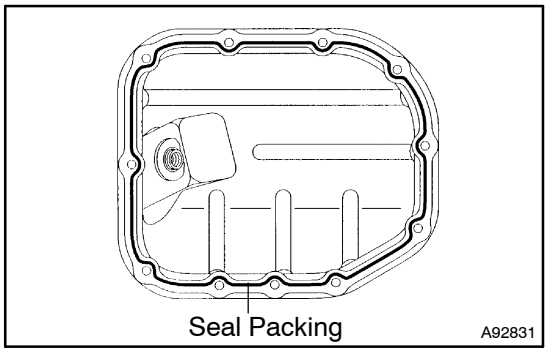
NOTICE:

- **Be careful not to tap the oil seal at an angle.**
- **Wipe off extra grease on the crankshaft.**



44. INSTALL OIL STRAINER SUB–ASSY

(a) Install a new gasket, then install the oil strainer with the bolt and 2 nuts.
Torque: 11 N·m (112 kgf·cm, 8.1 ft·lbf)

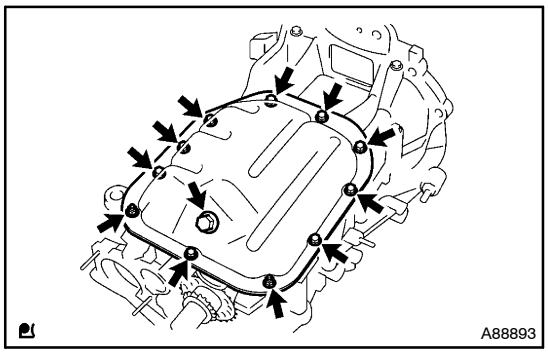


45. INSTALL OIL PAN SUB–ASSY NO.2

(a) Apply a continuous bead of seal packing (Diameter 2.5 to 3.5 mm (0.0984 to 0.1378 in.)) to the oil pan as illustrated.
Seal packing: Part No. 08826–00080 or equivalent

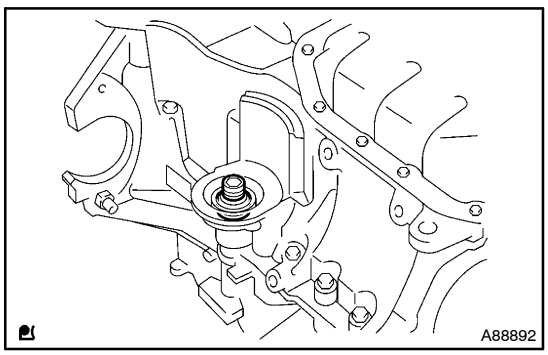
NOTICE:

- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes, and tighten the bolts within 15 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours of installation.**



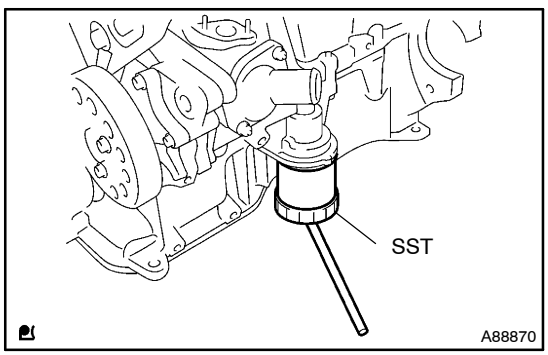
(b) Install the oil pan No. 2 with the 9 bolts and 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

(c) Install a new gasket and oil pan drain plug.
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)



46. INSTALL OIL FILTER UNION

(a) Using a 12 mm socket hexagon wrench, install the oil filter union.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



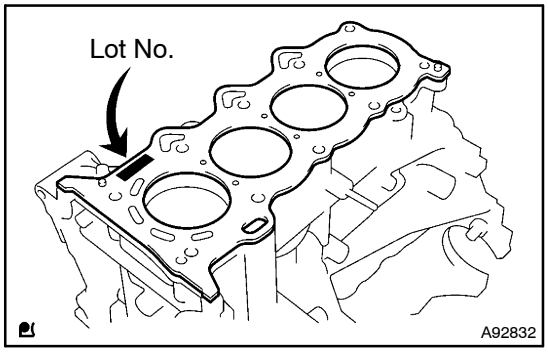
47. INSTALL OIL FILTER SUB–ASSY

(a) Clean the oil filter installation surface of the engine.

(b) Apply a light coat of engine oil to the O–ring of a new oil filter.

(c) Install the O–ring by hand until it contacts the seat.

(d) Using SST, tighten it by an additional 3/4 turn.
SST 09228–06501



48. INSTALL CYLINDER HEAD GASKET

(a) Place a new head gasket on the cylinder block with the Lot No. facing upward.

Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Be careful of the installation direction.**
- **Do not damage the cylinder head gasket when installing.**

49. INSTALL CYLINDER HEAD SUB–ASSY

HINT:

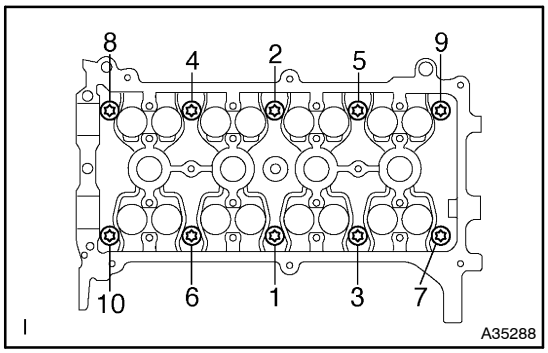
The cylinder head bolts are tightened in 2 successive steps.

(a) Install the cylinder head to the cylinder block.

NOTICE:

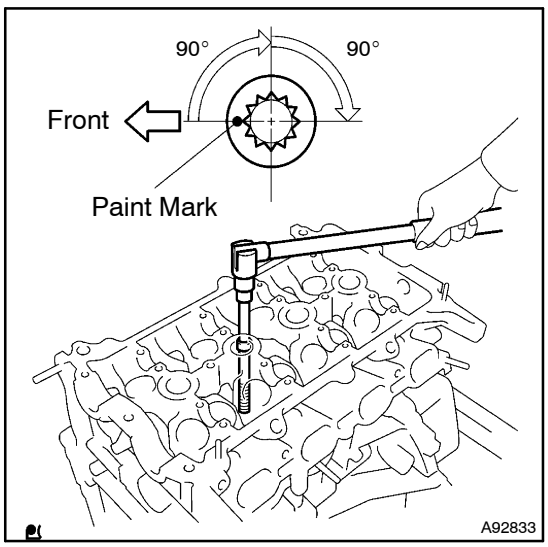
Do not damage the cylinder head gasket at the bottom of the cylinder head.

(b) Apply a light coat of engine oil to the threads and seating of the cylinder head bolts.



(c) Using several steps, temporarily install the cylinder head bolts with an 8 mm bi–hexagon wrench in the sequence shown in the illustration, then tighten the bolts with the specified torque.

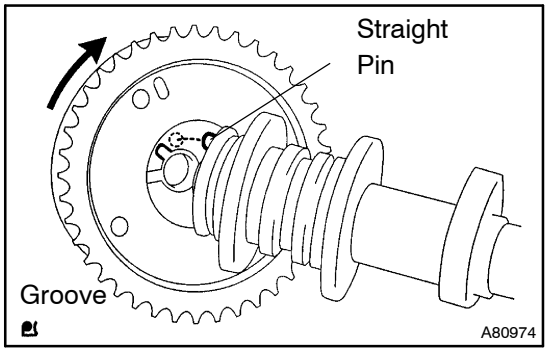
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



(d) Mark the front of the cylinder head bolts with paint.

(e) Retighten the bolts by additional 90° in the same sequence as step (c), then retighten them by one more additional 90°.

(f) Check that each paint mark is now at the 180° angle to the front.



50. INSTALL CAMSHAFT TIMING GEAR ASSY

(a) Put the camshaft timing gear assembly and camshaft together with the straight pin off the groove as illustrated.

(b) Turn the camshaft timing gear assembly in the direction shown (to the left) while pushing it lightly into the camshaft. Push further at the position where the pin fits into the groove.

NOTICE:

Do not turn the camshaft timing gear to the retard direction (to the right).

(c) Check that there is no clearance between the camshaft timing gear assembly and fringe.

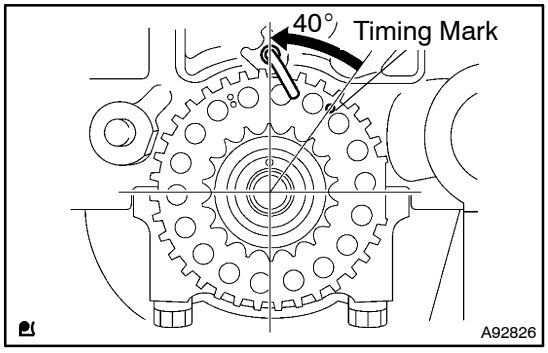
(d) Tighten the bolt with the camshaft timing gear fixed.

Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

NOTICE:

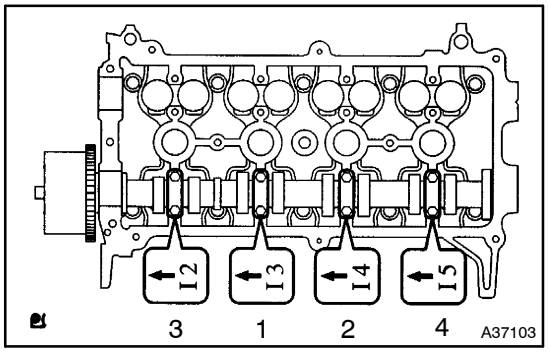
If the camshaft timing gear is locked at the most retarded position, unlock the lock pin inside the timing gear, then tighten the bolts.

(e) Check that the camshaft timing gear moves to the retard direction (to the right) and it is locked at the most retarded position.



51. INSTALL CAMSHAFT

(a) Turn the crankshaft by 40° counterclockwise from the TDC/compression.



(b) Apply engine oil to the cam and cylinder head journal.

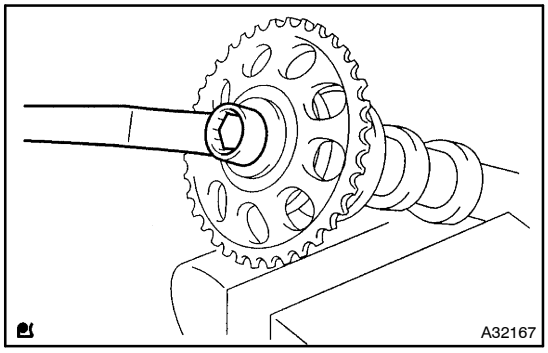
(c) Place the camshaft on the cylinder head with the timing mark on the camshaft timing gear facing upward.

(d) Check the front marks and numbers on the bearing cap No. 2, then tighten the bolts uniformly in several steps in the sequence shown in the illustration.

Torque: 13 N·m (130 kgf·cm, 9.6 ft·lbf)

NOTICE:

Tighten the bolts uniformly keeping the camshaft level.



52. INSTALL CAMSHAFT TIMING GEAR OR SPROCKET

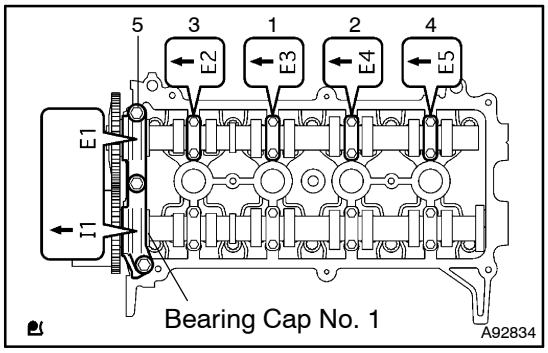
(a) Clamp the hexagonal lobe of the camshaft in a vise (using an aluminum protector).

(b) Align the knock pin of the camshaft No. 2 and the pin groove of the camshaft timing gear, then install the camshaft timing gear with the bolt.

Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

NOTICE:

Do not damage the camshaft.



53. INSTALL NO.2 CAMSHAFT

(a) Apply engine oil to the cam and cylinder head journal.

(b) Place the camshaft No. 2 on the cylinder head with the timing mark on the camshaft timing gear facing upward.

(c) Check the front marks and numbers on the bearing cap No. 2, then tighten the bolts uniformly in several steps in the sequence shown in the illustration.

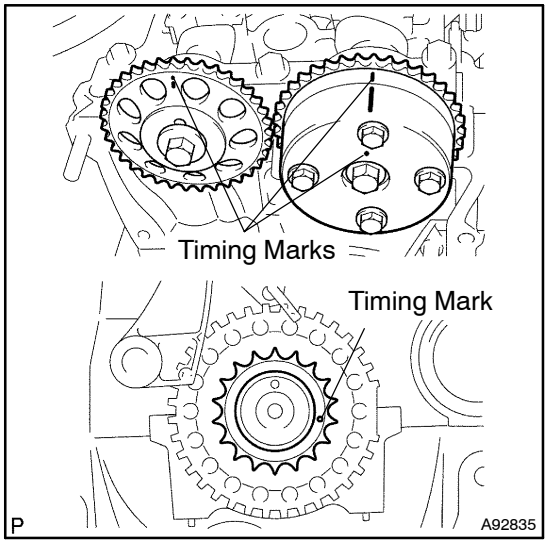
Torque: 13 N·m (130 kgf·cm, 9.6 ft·lbf)

NOTICE:

Tighten the bolts uniformly keeping the camshaft level.

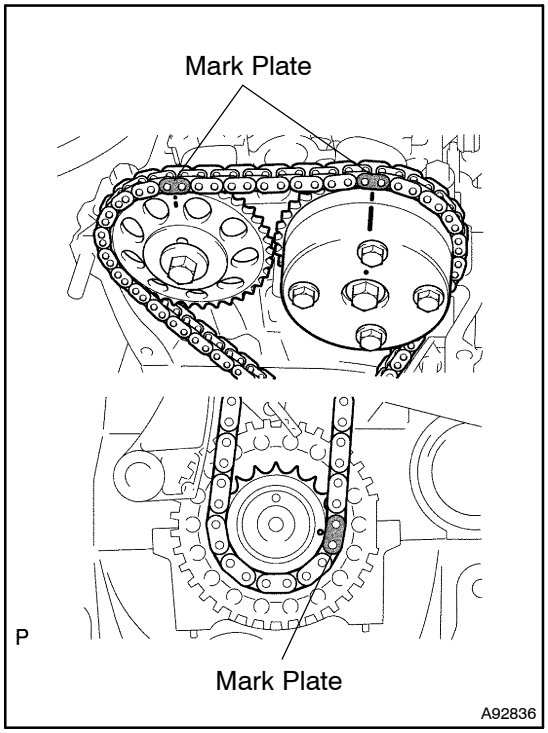
(d) Install the camshaft bearing cap No. 1.

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



54. INSTALL CHAIN SUB–ASSY

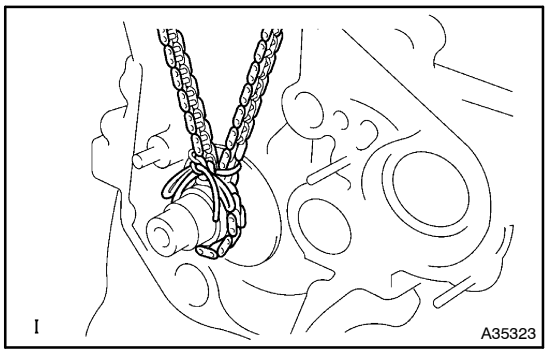
(a) Check that the timing marks are located as illustrated.



(b) Install the chain so the timing mark and the mark plate of the chain are aligned.

HINT:

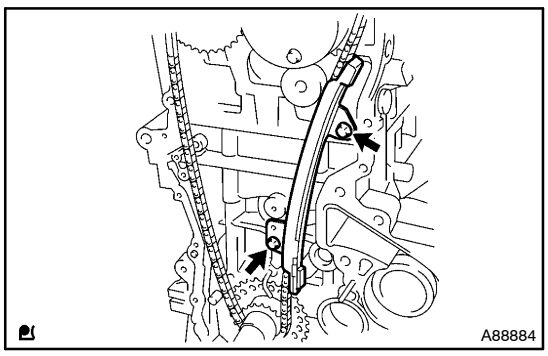
- The camshaft side Orange
- The crankshaft side Yellow



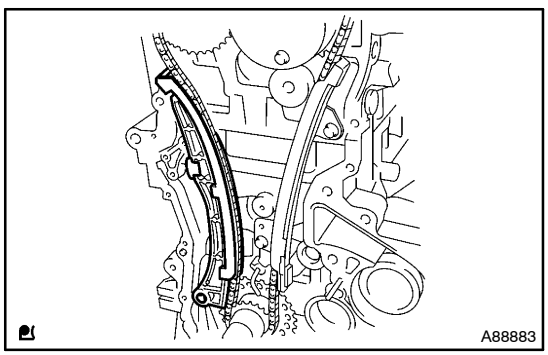
(c) To prevent misalignment of the mark plate and timing mark, tie the chain around the crankshaft timing sprocket with a string.

HINT:

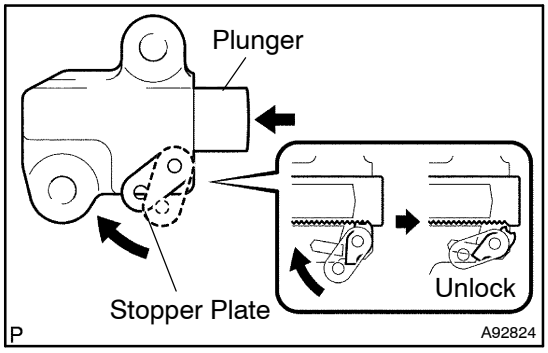
Tie the chain to prevent misalignment of the timing marks.



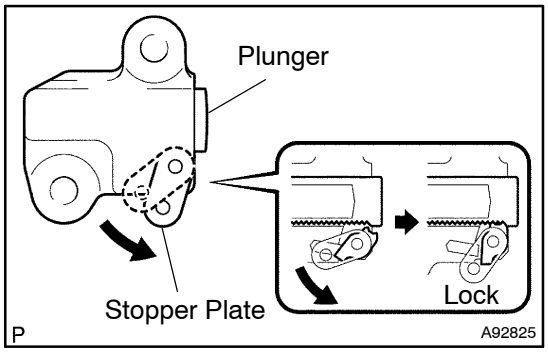
(d) Install the chain vibration damper with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



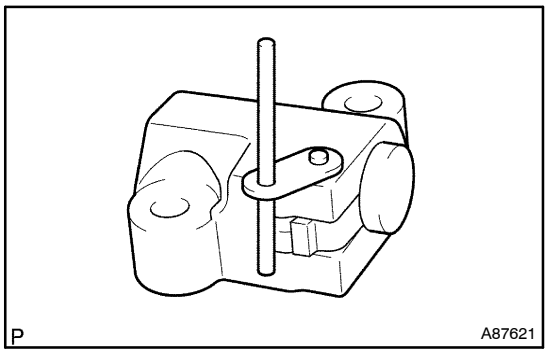
(e) Remove the string, then install the chain tensioner stopper.



(f) Install the chain tensioner.
(1) Lift up the stopper plate, then unlock the plunger.
(2) Push in the plunger to the end with the plunger unlocked.

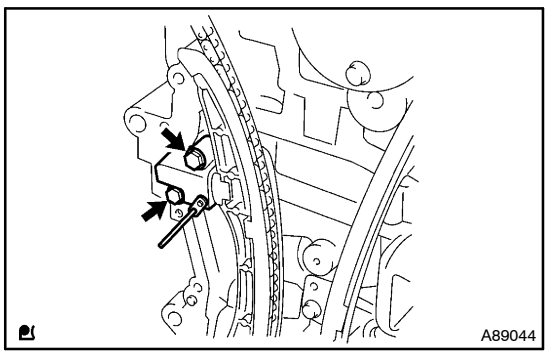


(3) Lift down the stopper plate with the plunger pushed to the end, then lock the plunger.

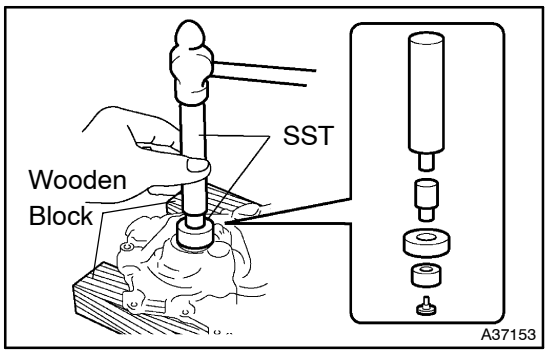


(4) Insert a 3.0 mm diameter bar into the hole of the stopper plate with the plunger locked.

HINT:
If the stopper plate is not completely lifted down and a 3.0 mm diameter bar cannot be inserted, unlock and pull out the plunger slightly. The stopper plate will be completely lifted down and a 3.0 mm diameter bar can be inserted easily.



(5) Install the chain tensioner with the 2 bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)
(6) Remove the 3.0 mm diameter bar from the chain tensioner.



55. INSTALL OIL PUMP SEAL

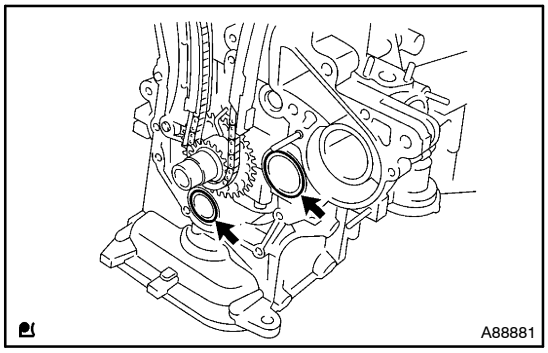
(a) Using SST, uniformly tap in a new oil seal until its surface is flush with the oil pump edge.
SST 09950–60010 (09951–00250, 09951–00380, 09952–06010), 09950–70010 (09951–07100)

NOTICE:
Be careful not to tap the oil seal at an angle.

(b) Apply a ligft coat of multipurpose grease No. 2 to the lip of the new oil seal.

NOTICE:

Keep the lip free of foreign objects.



56. INSTALL OIL PUMP ASSY

(a) Install 2 new O–rings to the 2 locations as shown in the illustration.

(b) Apply seal packing to the engine body and oil pump as shown in the illustration below.

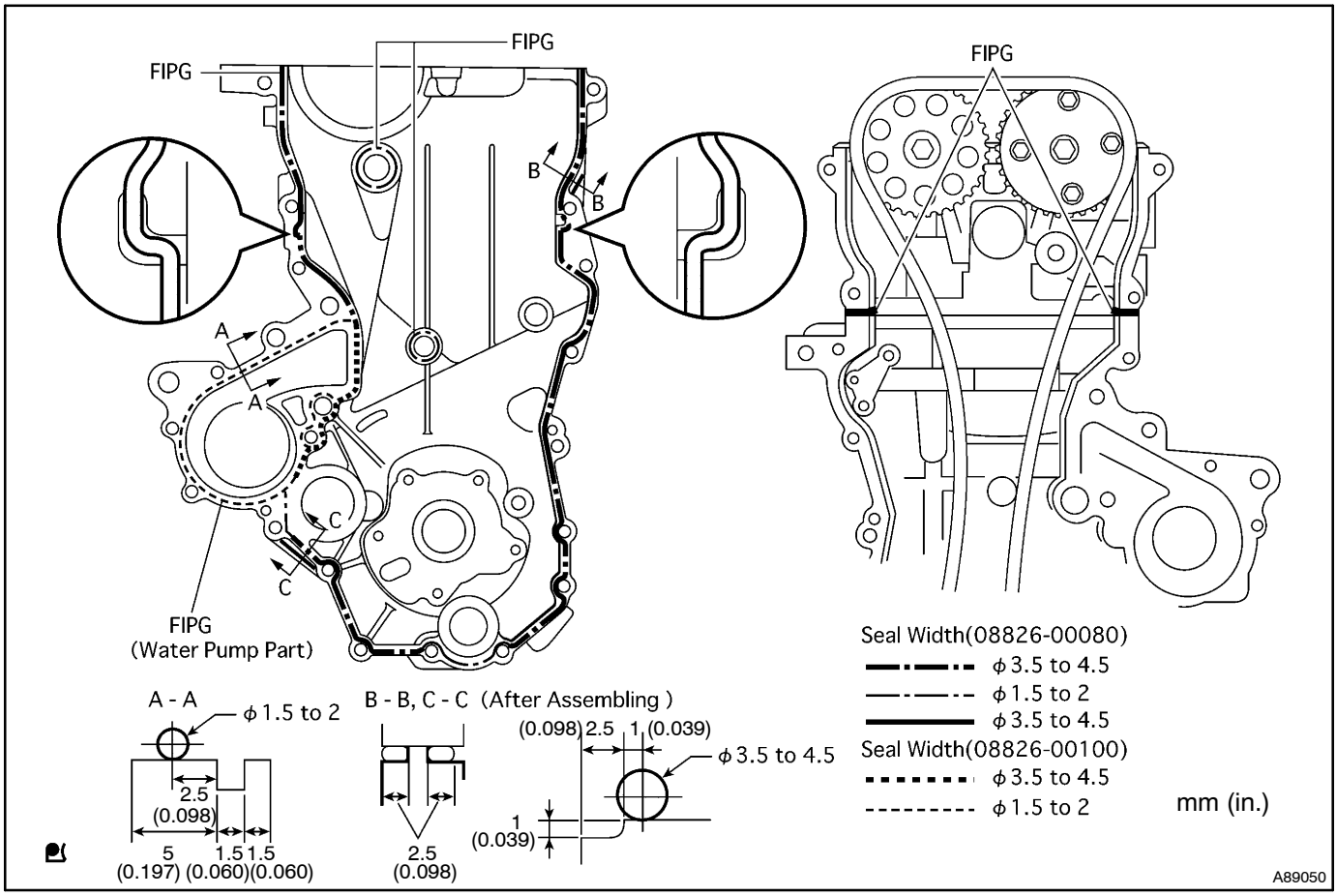
Seal packing:

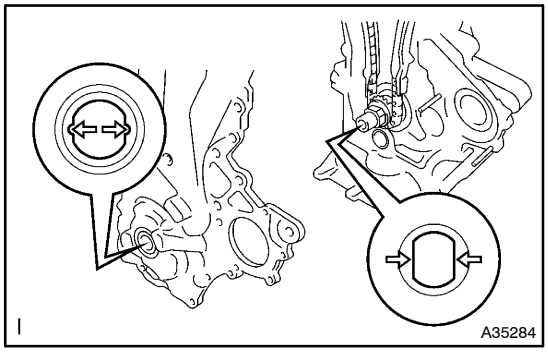
Water pump part part No. 08826–00100 or equivalent

Other part part No. 08826–00080 or equivalent

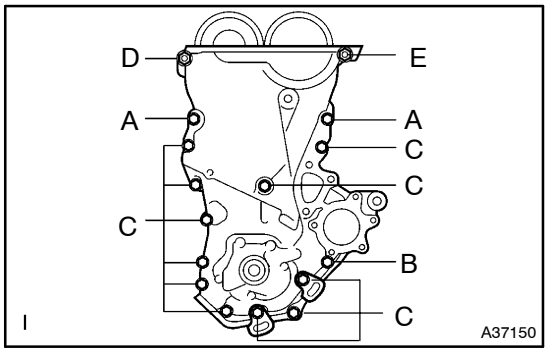
NOTICE:

- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes, and tighten the bolts within 15 minutes after applying seal packing.**
- **Do not expose the seal packing to engine oil within 2 hours of installation.**





(c) Align the keyway of the oil pump drive rotor with the rectangular portion of the crankshaft, then slide the oil pump assembly into place.



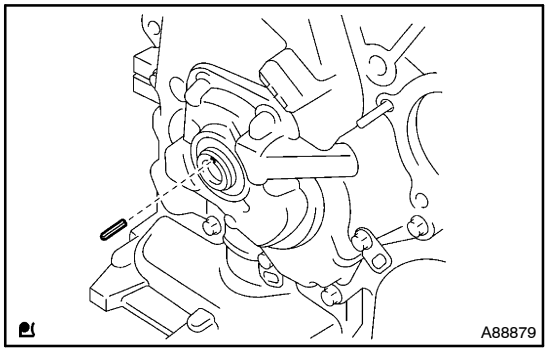
(d) Install the oil pump assembly with the 15 bolts and nut as illustrated.

Torque:
32 N·m (326 kgf·cm, 24 ft·lbf) for bolt A
11 N·m (112 kgf·cm, 8.1 ft·lbf) for bolt B
11 N·m (112 kgf·cm, 8.1 ft·lbf) for bolt C
24 N·m (245 kgf·cm, 18 ft·lbf) for nut D
24 N·m (245 kgf·cm, 18 ft·lbf) for bolt E

NOTICE:

- **Be careful that the chain does not contact the seal packing when installing the oil pump assembly.**
- **Install the engine mounting bracket RH and water pump assembly within 15 minutes after installing the oil pump assembly.**

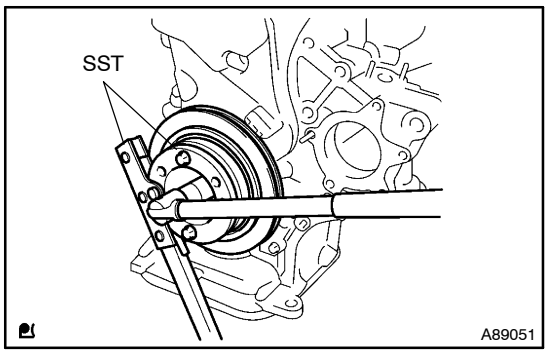
HINT:
The bolt length is as follows.
Bolt A 30 mm (1.18 in.)
Bolt B 35 mm (1.38 in.)
Bolt C 20 mm (0.79 in.)
Bolt E 20 and 14 mm (0.79 and 0.55 in.) double ended bolt



57. INSTALL CRANKSHAFT DAMPER SUB–ASSY

(a) Install the crankshaft straight pin to the crankshaft.

(b) Align the hole of the crankshaft damper with the straight pin, then install the crankshaft damper.



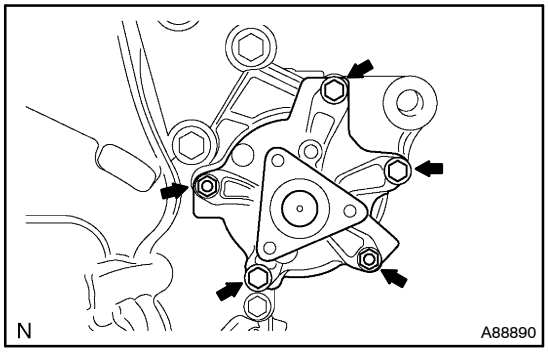
(c) Using SST, hold the crankshaft damper and tighten the crankshaft bolt.

SST 09213–58013 (91111–50845), 09330–00021

Torque: 128 N·m (1305 kgf·cm, 95 ft·lbf)

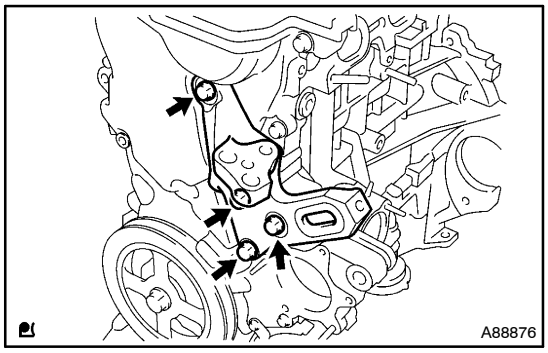
NOTICE:

When installing SST, be careful that the bolt which holds SST does not interfere with the chain cover.

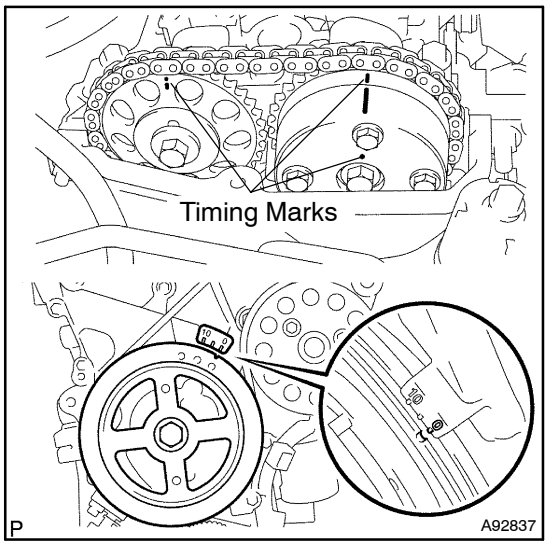


58. INSTALL WATER PUMP ASSY

(a) Install a new gasket, then install the water pump assembly with the 3 bolts and 2 nuts.
Torque: 11 N·m (112 kgf·cm, 8.1 ft·lbf)



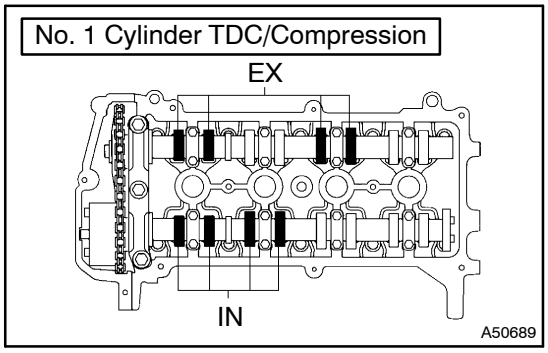
59. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET
Torque: 55 N·m (561 kgf·cm, 41 ft·lbf)



60. INSPECT VALVE CLEARANCE
NOTICE:
Inspect and adjust the valve clearance when the engine is cold.

(a) Set the No. 1 cylinder to the TDC/compression.
(1) Turn the crankshaft damper clockwise, then align its timing mark notch with the timing mark ”0” of the chain cover.
(2) Check that the timing marks of the camshaft timing gear are located as illustrated.

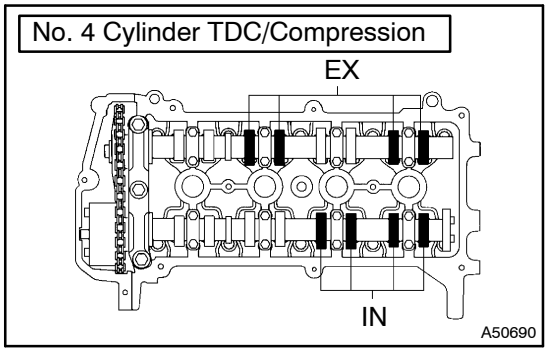
HINT:
If not, turn the crankshaft to align the marks.



(b) Check the valves indicated in the illustration.
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
Valve clearance (Cold):
Intake 0.17 to 0.23 mm (0.007 to 0.009 in.)
Exhaust 0.27 to 0.33 mm (0.011 to 0.013 in.)

HINT:
If the clearance is not as specified, record the out–of–specification measurement, then adjust the valve clearance.

(c) Turn the crankshaft clockwise by 1 complete revolution (360°) and set the No. 4 cylinder to the TDC/compression.

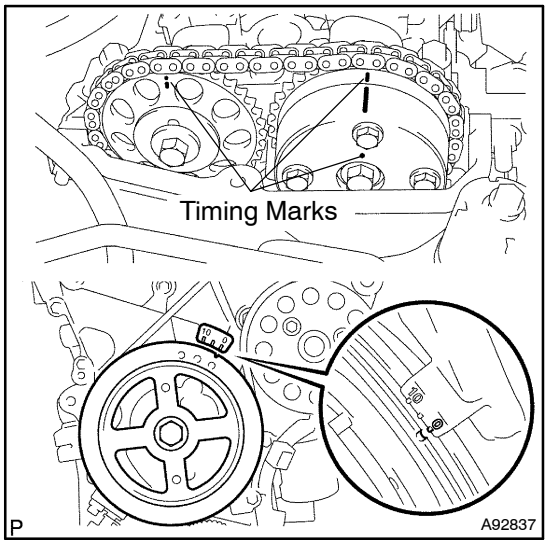


(d) Check the valves indicated in the illustration.

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

Valve clearance (Cold):
Intake 0.17 to 0.23 mm (0.007 to 0.009 in.)
Exhaust 0.27 to 0.33 mm (0.011 to 0.013 in.)

HINT:
If the clearance is not as specified, record the out–of–specification measurement, then adjust the valve clearance.



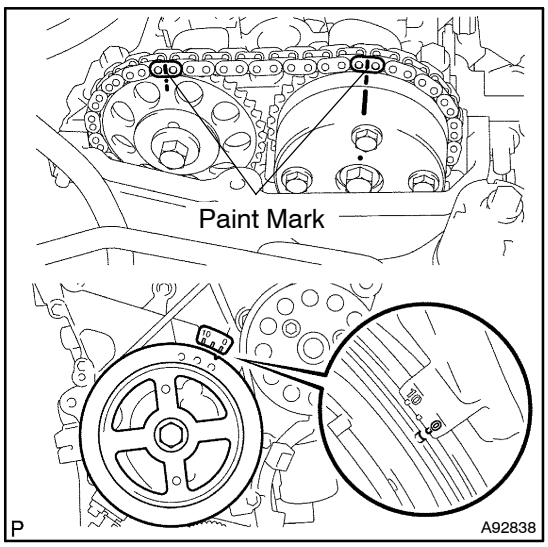
61. ADJUST VALVE CLEARANCE

(a) Set the No. 1 cylinder to the TDC/compression.

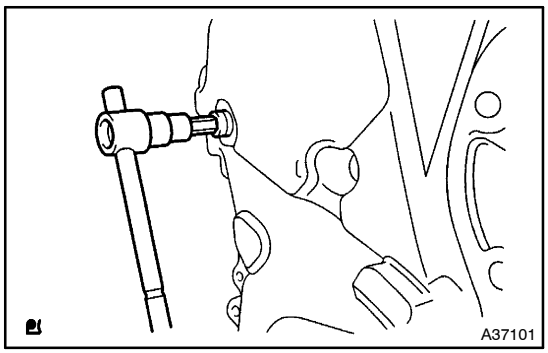
(1) Turn the crankshaft damper clockwise, then align its timing mark notch with the timing mark ”0”.

(2) Check that the timing marks of the camshaft timing gear are located as illustrated.

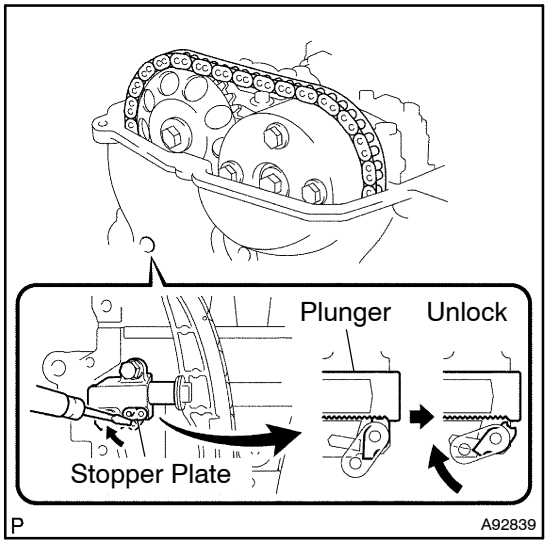
HINT:
If not, turn the crankshaft to align the marks.



(3) Put the paint marks on the timing chain plates which align with timing marks of the camshaft timing gear.



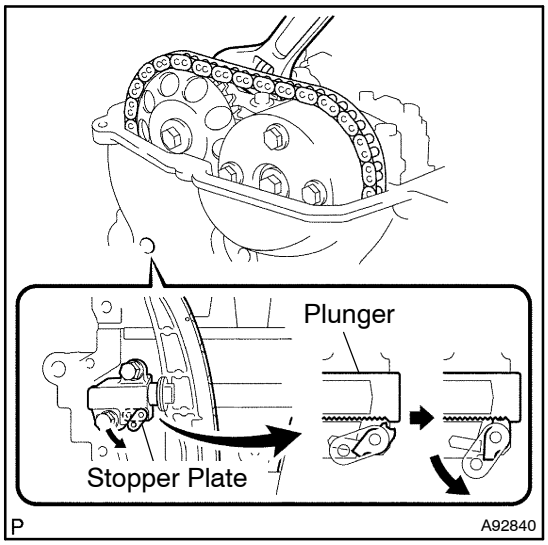
(b) Using 8 mm socket hexagon wrench, remove the service hole screw plug.



(c) Insert a screwdriver into the service hole of the chain tensioner to hold the stopper plate of the chain tensioner upward.

HINT:

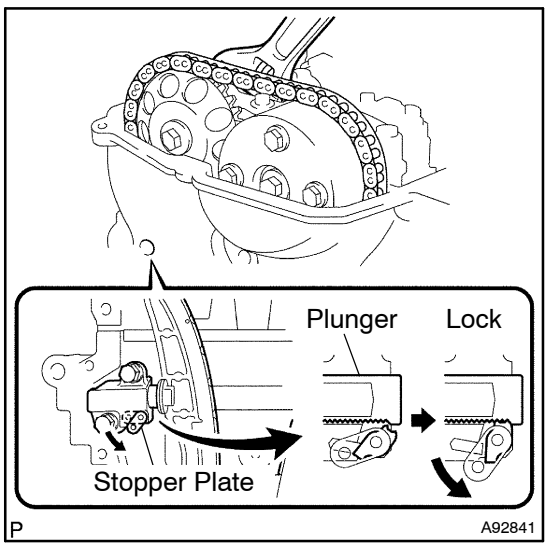
Lifting up the stopper plate of the chain tensioner unlocks the plunger.



(d) Keeping the stopper plate of the chain tensioner lifted, slightly rotate the hexagonal lobe of the camshaft No. 2 to the right with an adjustable wrench so the plunger of the chain tensioner is pushed.

HINT:

When the camshaft No. 2 is slightly rotated to the right, the plunger is pushed.



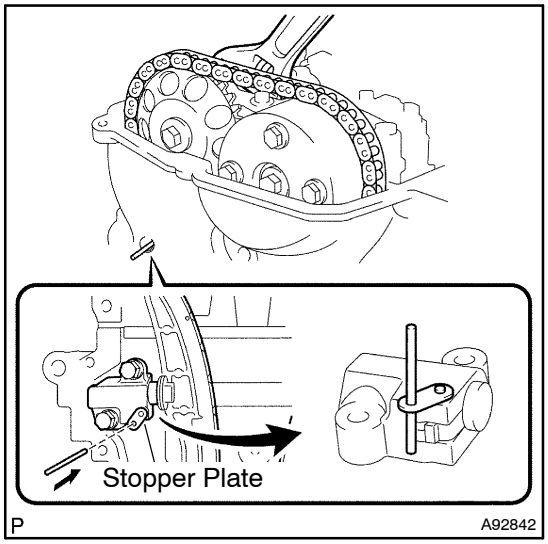
(e) Keeping the adjustable wrench installed, remove the screwdriver with the plunger pushed.

NOTICE:

Do not move the adjustable wrench.

HINT:

Removing the screwdriver lifts down the stopper plate and locks the plunger.

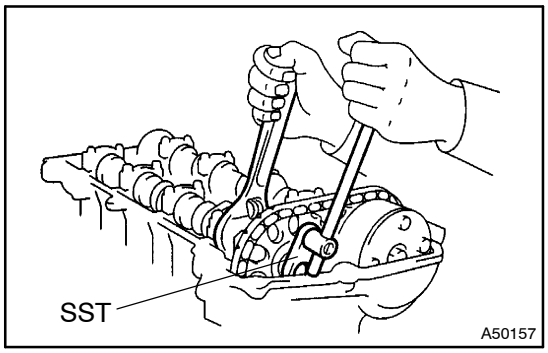


(f) Insert a 3.0 mm diameter bar into the hole of the stopper plate with the stopper plate of the chain tensioner lifted down and locked.

HINT:

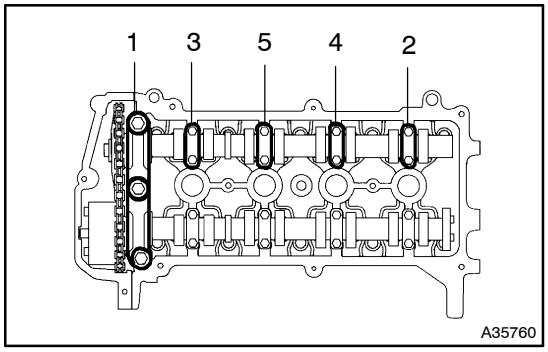
If a 3.0 mm diameter bar cannot be inserted into the hole of the stopper plate, rotate the camshaft No. 2 slightly to the left and right. Then a 3.0 mm diameter bar can be inserted easily.

(g) Secure the 3.0 mm diameter bar with tape.



(h) Hold the hexagonal lobe of the camshaft No. 2 with the adjustable wrench.

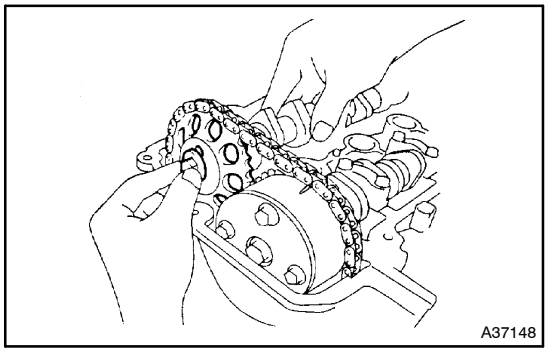
(i) Using SST, loosen the bolt.
SST 09023–38400



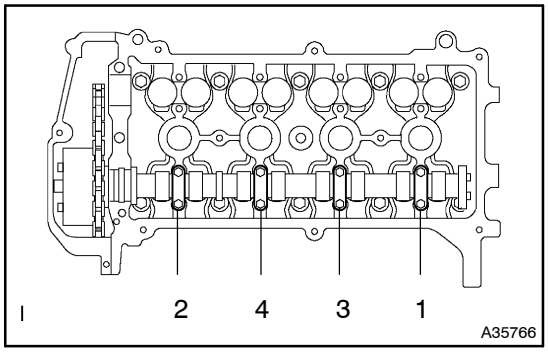
(j) Remove the camshaft bearing caps No. 1 and No. 2 in the sequence shown in the illustration.

NOTICE:

Uniformly loosen the bolts keeping the camshaft No. 2 level.



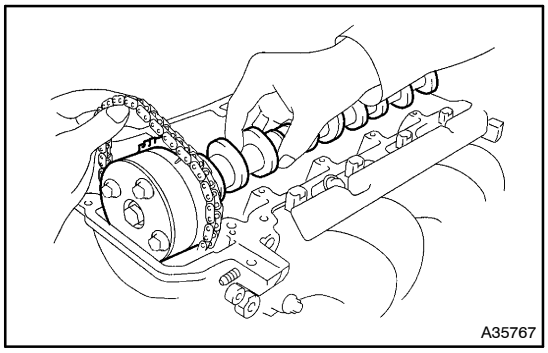
(k) Remove the bolt when the camshaft No. 2 is lifted slightly, then remove the camshaft No. 2 and camshaft timing gear.



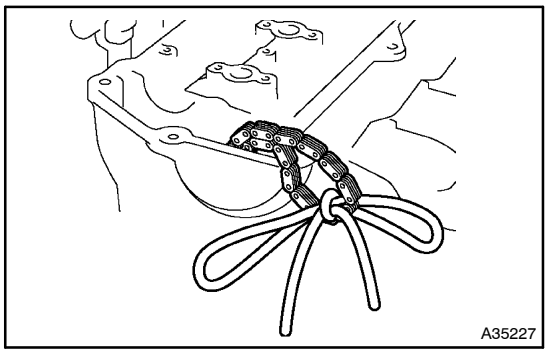
(l) Remove the camshaft bearing caps No. 2 in the sequence shown in the illustration.

NOTICE:

Uniformly loosen the bolts keeping the camshaft level.



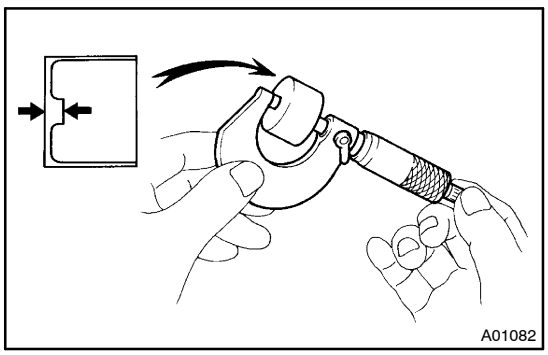
(m) Hold the timing chain by hand, then remove the camshaft.



(n) Tie the timing chain with a string or wire.

NOTICE:

Prevent foreign object from getting into the engine compartment with a shop rag.



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

(p) Calculate the thickness of the valve lifter so that the valve clearance comes within the specified value.

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

Specified value (Cold):

Intake A = B + (C – 0.20 mm (0.008 in.))

Exhaust A = B + (C – 0.30 mm (0.012 in.))

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

EXAMPLE (Intake):
Measured valve clearance = 0.40 mm (0.0158 in.)
0.40 mm (0.0158 in.) – 0.20 mm (0.0079 in.) = 0.20 mm (0.0079 in.)
(Measured – Specification = Excess clearance)
Used lifter measurement = 5.25 mm (0.2067 in.)
0.20 mm (0.0079 in.) + 5.25 mm (0.2067 in.) = 5.45 mm (0.2146 in.)
(Excess clearance + Used lifter = Ideal new lifter)
Closest new lifter = 5.45 mm (0.2146 in.)
Select No. 46 lifter (5.46 mm (0.2150 in.))

HINT:

- The 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.)
- Refer to the New Lifter Thickness table on the next 2 pages.

Valve Lifter Selection Chart (Intake)

Measured clearance mm (in.) \ Installed 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 – 0.030 (0.0000 – 0.0012)											06	06	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	46	48	50	52	54	56
0.031 – 0.050 (0.0012 – 0.0020)								06	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
0.051 – 0.070 (0.0020 – 0.0028)							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	46	48	50	52	54	56	58	60
0.071 – 0.090 (0.0028 – 0.0035)						06	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
0.091 – 0.110 (0.0036 – 0.0043)					06	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
0.111 – 0.130 (0.0044 – 0.0051)				06	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	52	54	56	58	60	62	64	66
0.131 – 0.149 (0.0052 – 0.0059)			06	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
0.150 – 0.250 (0.0059 – 0.0098)																																																									
0.251 – 0.270 (0.0099 – 0.0106)	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	74		
0.271 – 0.290 (0.0107 – 0.0114)	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	74			
0.291 – 0.310 (0.0115 – 0.0122)	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	74				
0.311 – 0.330 (0.0122 – 0.0130)	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	74					
0.331 – 0.350 (0.0130 – 0.0138)	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	74						
0.351 – 0.370 (0.0138 – 0.0146)	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	74								
0.371 – 0.390 (0.0146 – 0.0154)	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	74	74									
0.391 – 0.410 (0.0154 – 0.0161)	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	74	74											
0.411 – 0.430 (0.0162 – 0.0169)	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	74	74													
0.431 – 0.450 (0.0170 – 0.0177)	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	74	74															
0.451 – 0.470 (0.0178 – 0.0185)	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	74	74																	
0.471 – 0.490 (0.0185 – 0.0193)	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	74	74																			
0.491 – 0.510 (0.0193 – 0.0201)	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	74	74																					
0.511 – 0.530 (0.0201 – 0.0209)	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	74	74																							
0.531 – 0.550 (0.0209 – 0.0217)	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	74	74																									
0.551 – 0.570 (0.0217 – 0.0224)	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	74	74																											
0.571 – 0.590 (0.0225 – 0.0232)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																											
0.591 – 0.610 (0.0233 – 0.0240)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																											
0.611 – 0.630 (0.0241 – 0.0248)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																											
0.631 – 0.650 (0.0248 – 0.0256)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74																											
0.651 – 0.670 (0.0256 – 0.0264)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74																											
0.671 – 0.690 (0.0264 – 0.0272)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74																											
0.691 – 0.710 (0.0272 – 0.0280)	56	58	60	62	64	66	68	70	72	72	74	74	74	74																											
0.711 – 0.730 (0.0280 – 0.0287)	58	60	62	64	66	68	70	72	74	74	74	74																													
0.731 – 0.750 (0.0288 – 0.0295)	60	62	64	66	68	70	72	74	74	74																													
0.751 – 0.770 (0.0296 – 0.0303)	62	64	66	68	70	72	74	74																															
0.771 – 0.790 (0.0304 – 0.0311)	64	66	68	70	72	74	74																																
0.791 – 0.810 (0.0311 – 0.0319)	66	68	70	72	74	74																																	
0.811 – 0.830 (0.0319 – 0.0327)	68	70	72	74	74																																		
0.831 – 0.850 (0.0327 – 0.0335)	70	72	74	74																																			
0.851 – 0.870 (0.0335 – 0.0343)	72	74	74																																				
0.871 – 0.890 (0.0343 – 0.0350)	74	74																																					
0.891 – 0.910 (0.0351 – 0.0358)	74																																						

Intake valve clearance (Cold):
0.17 to 0.23 mm (0.007 to 0.009 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.) lifter with a new No. 46 lifter.

New Lifter Thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter 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)		

Valve Lifter Selection Chart (Exhaust)

Measured clearance mm (in.) \ Installed 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 – 0.030 (0.0000 – 0.0012)																					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	36	38	40	42	44	46
0.031 – 0.050 (0.0012 – 0.0020)																		06	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	38	40	42	44	46	48
0.051 – 0.070 (0.0020 – 0.0028)															06	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
0.071 – 0.090 (0.0028 – 0.0035)														06	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
0.091 – 0.110 (0.0036 – 0.0043)												06	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
0.111 – 0.130 (0.0044 – 0.0051)											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
0.131 – 0.150 (0.0052 – 0.0059)										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
0.151 – 0.170 (0.0059 – 0.0067)								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
0.171 – 0.190 (0.0067 – 0.0075)						06	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
0.191 – 0.210 (0.0075 – 0.0083)					06	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
0.211 – 0.230 (0.0083 – 0.0091)				06	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	52	54	56	58	60	62	64	66
0.231 – 0.249 (0.0091 – 0.0098)			06	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
0.250 – 0.350 (0.0098 – 0.0138)																																																									
0.351 – 0.370 (0.0138 – 0.0146)	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	74								
0.371 – 0.390 (0.0146 – 0.0154)	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	74								
0.391 – 0.410 (0.0154 – 0.0161)	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	74									
0.411 – 0.430 (0.0162 – 0.0169)	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	74										
0.431 – 0.450 (0.0170 – 0.0177)	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	74											
0.451 – 0.470 (0.0178 – 0.0185)	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	74	74												
0.471 – 0.490 (0.0185 – 0.0193)	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	74	74														
0.491 – 0.510 (0.0193 – 0.0201)	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	74	74																
0.511 – 0.530 (0.0201 – 0.0209)	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	74	74																		
0.531 – 0.550 (0.0209 – 0.0217)	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	74	74																				
0.551 – 0.570 (0.0217 – 0.0224)	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	74	74																						
0.571 – 0.590 (0.0225 – 0.0232)	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	74	74																								
0.591 – 0.610 (0.0233 – 0.0240)	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	74	74																									
0.611 – 0.630 (0.0241 – 0.0248)	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	74	74																										
0.631 – 0.650 (0.0248 – 0.0256)	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	74	74																											
0.651 – 0.670 (0.0256 – 0.0264)	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	74	74																												
0.671 – 0.690 (0.0264 – 0.0272)	44	46	48	50	52	54	56	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																												
0.691 – 0.710 (0.0272 – 0.0280)	46	48	50	52	54	56	58	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																												
0.711 – 0.730 (0.0280 – 0.0287)	48	50	52	54	56	58	60	62	64	64	66	66	68	68	70	70	72	72	74	74	74	74																												
0.731 – 0.750 (0.0288 – 0.0295)	50	52	54	56	58	60	62	64	66	66	68	68	70	70	72	72	74	74	74	74																												
0.751 – 0.770 (0.0296 – 0.0303)	52	54	56	58	60	62	64	66	68	68	70	70	72	72	74	74	74	74																												
0.771 – 0.790 (0.0304 – 0.0311)	54	56	58	60	62	64	66	68	70	70	72	72	74	74	74	74																												
0.791 – 0.810 (0.0311 – 0.0319)	56	58	60	62	64	66	68	70	72	72	74	74	74	74																												
0.811 – 0.830 (0.0319 – 0.0327)	58	60	62	64	66	68	70	72	74	74	74	74																												
0.831 – 0.850 (0.0327 – 0.0335)	60	62	64	66	68	70	72	74	74	74																												
0.851 – 0.870 (0.0335 – 0.0343)	62	64	66	68	70	72	74	74																														
0.871 – 0.890 (0.0343 – 0.0350)	64	66	68	70	72	74	74																															
0.891 – 0.910 (0.0351 – 0.0358)	66	68	70	72	74	74																																
0.911 – 0.930 (0.0359 – 0.0366)	68	70	72	74	74																																	
0.931 – 0.950 (0.0367 – 0.0374)	70	72	74	74																																		
0.951 – 0.970 (0.0374 – 0.0382)	72	74	74																																			
0.971 – 0.990 (0.0382 – 0.0390)	74	74																																				
0.991 – 1.010 (0.0390 – 0.0398)	74																																					

Exhaust valve clearance (Cold):

0.27 to 0.33 mm (0.011 to 0.013 in.)

EXAMPLE: The 5.340 mm (0.2102 in.) lifter is installed, and the measured clearance is 0.440 mm (0.0173 in.).
Replace the 5.340 mm (0.2102 in.) lifter with a new No. 48 lifter.

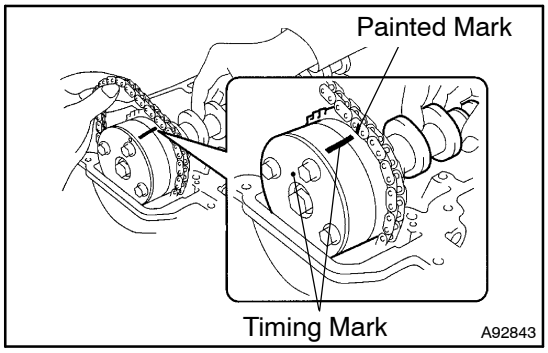
New Lifter Thickness mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter 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)		

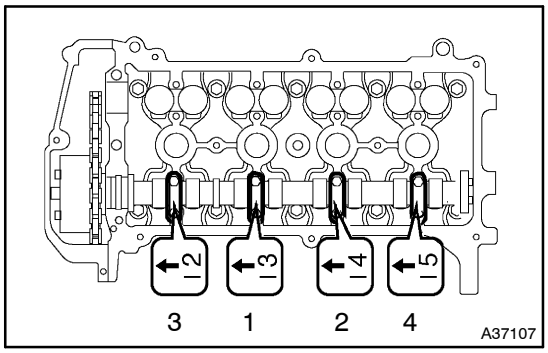
A92521

(r) Install the selected valve lifter.

(s) Apply engine oil to the cam and cylinder head journal.



(t) Hold the chain as illustrated, then install the camshaft and camshaft timing gear assembly so that the pain mark of the chain and the timing mark of the camshaft timing gear assembly are aligned.

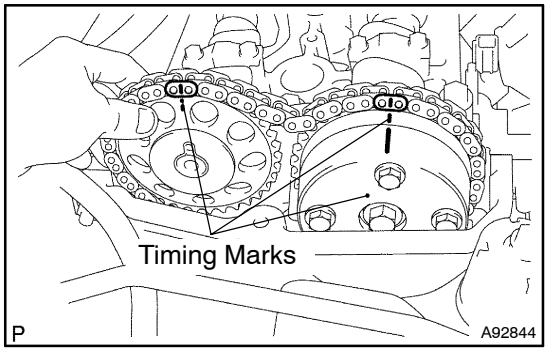


(u) Check the front marks and numbers on the bearing cap No. 2, then tighten the bolts uniformly in several steps in the sequence shown in the illustration.

Torque: 13 N·m (130 kgf·cm, 9.6 ft·lbf)

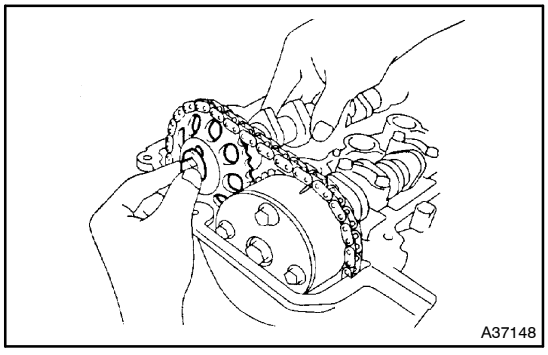
NOTICE:

Tighten the bolts uniformly keeping the camshaft level.

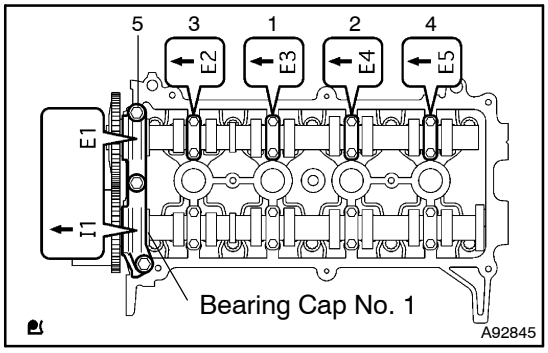


(v) Hold the chain as illustrated, then install the camshaft No. 2 and camshaft timing gear so that the pain mark of the chain and the timing mark of the camshaft timing gear are aligned.

(w) Align the knock pin of the camshaft No. 2 with the pin groove of the camshaft timing gear.

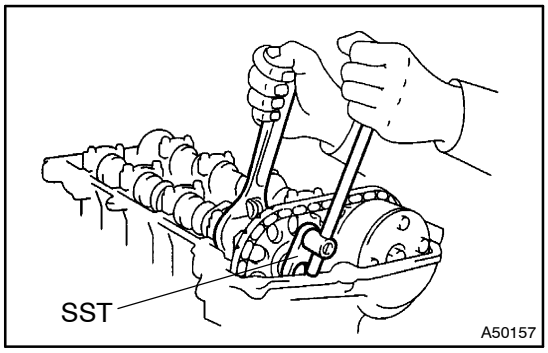


(x) Temporarily tighten the camshaft timing chain with the bolt.



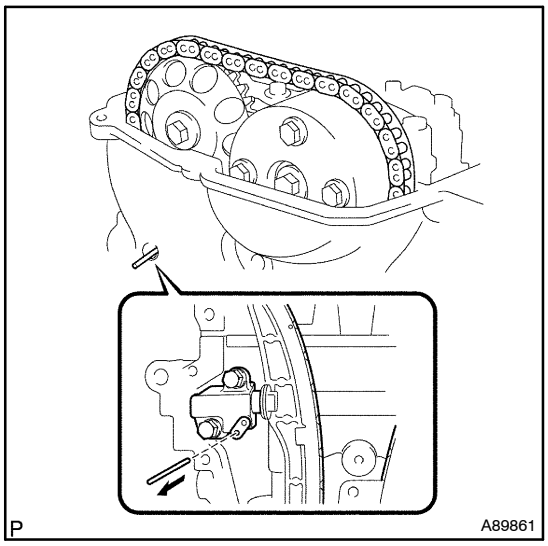
(y) Check the front marks and numbers on the bearing caps No. 1 and No. 2, then tighten the bolts uniformly in several steps in the sequence shown in the illustration.
Torque:
23 N·m (235 kgf·cm, 17 ft·lbf) for Bearing Cap No. 1
13 N·m (130 kgf·cm, 9.6 ft·lbf) for Bearing Cap No. 2

NOTICE:
Tighten the bolts uniformly keeping the camshaft level.

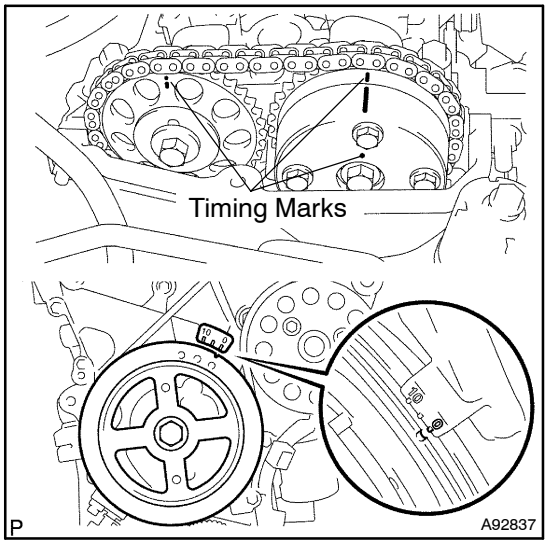


(z) Hold the hexagonal lobe of the camshaft No. 2 with the adjustable wrench.

(aa) Using SST, tighten the bolt.
SST 09023–38400
Torque: 64 N·m (653 kgf·cm, 47 ft·lbf)

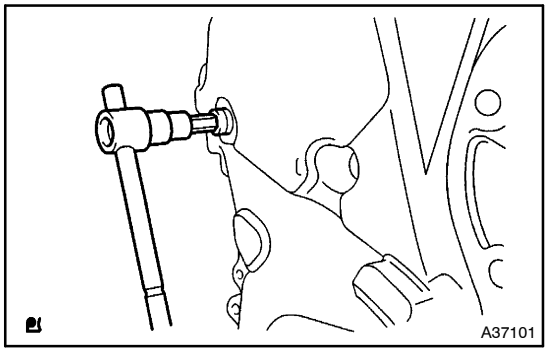


(ab) Remove the 3.0 mm diameter bar from the chain tensioner.



(ac) Turn the crankshaft damper clockwise, then align its timing mark notch with the timing mark ”0”.

(ad) Check that the timing marks are located as illustrated.



(ae) Apply adhesive to 2 or 3 threads of the service hole screw plug bolt end.
Adhesive:
Part No. 08833–00070, THREE BOND 1324, or equivalent

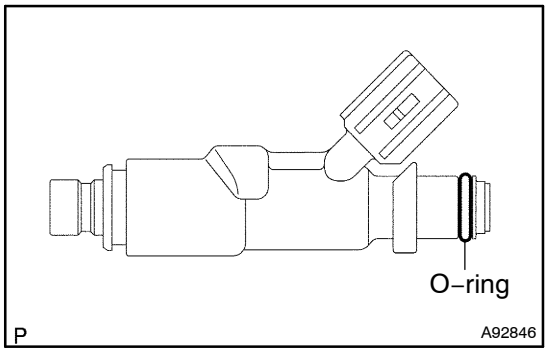
NOTICE:
Remove any oil from the bolts and bolt holes.

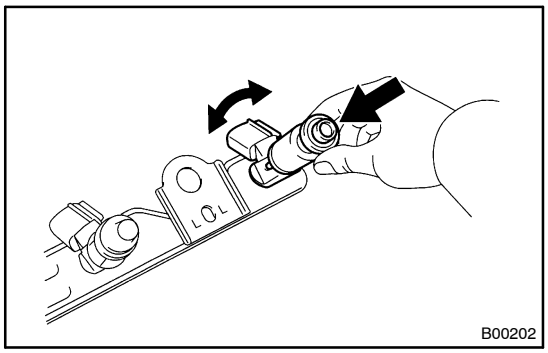
(af) Using an 8 mm socket hexagon wrench, install the service hole screw plug.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

62. INSTALL FUEL INJECTOR ASSY

(a) Install a new O–ring to the fuel injector.

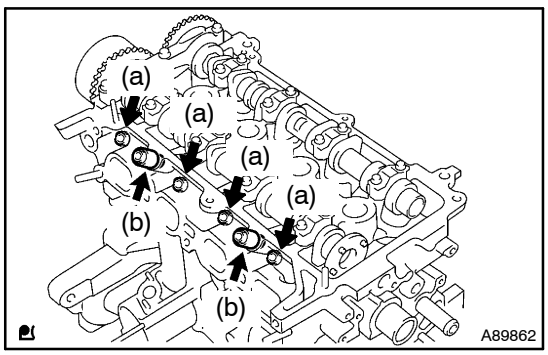
(b) Apply gasoline to the O–ring.





(c) While turning the fuel injector clockwise and counter-clockwise, push it to the fuel delivery pipe.

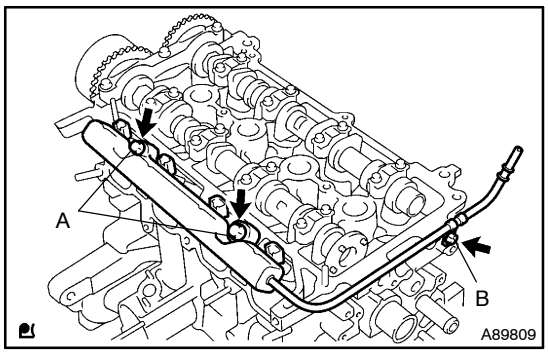
NOTICE:
- **Do not twist the O–ring.**
- **After installing the fuel injector, check that it turns smoothly. If not, replace the O–ring with a new one and reinstall the fuel injector.**



63. INSTALL FUEL DELIVERY PIPE SUB–ASSY

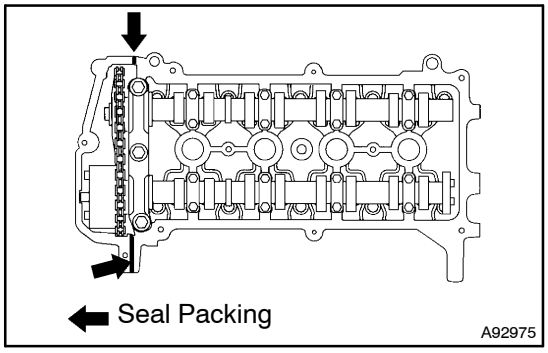
(a) Install the 4 new insulators to the cylinder head.

(b) Install the 2 delivery pipe spacers to the cylinder head.



(c) Install the delivery pipe together with the injectors using the 3 bolts.
Torque:
19 N·m (194 kgf·cm, 14 ft·lbf) for bolt A
9.0 N·m (92 kgf·cm, 80 in.·lbf) for bolt B

NOTICE:
- **Do not drop the fuel injectors.**
- **After installing the delivery pipe, check that it is installed securely by turning the fuel injectors.**



64. INSTALL CYLINDER HEAD COVER SUB–ASSY

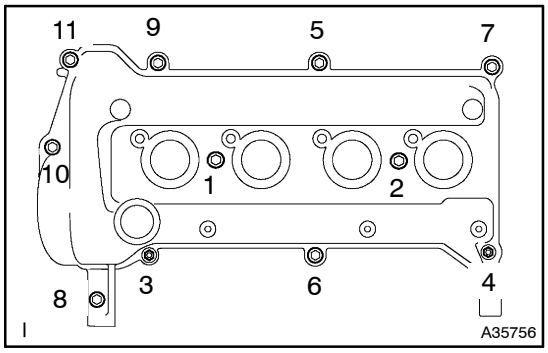
(a) Install the cylinder head gasket to the cylinder head cover.

(b) Apply seal packing to the 2 locations as shown in the illustration, then install the cylinder head cover.

Seal packing: Part No. 08826–00080 or equivalent

NOTICE:

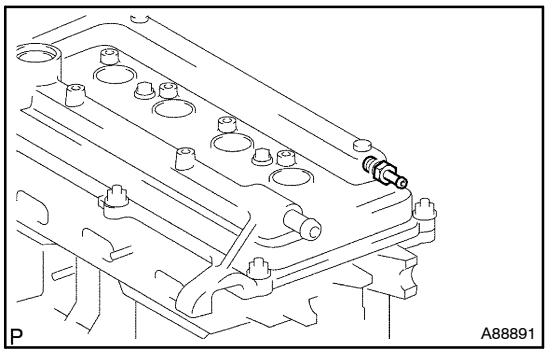
- **Remove any oil from the contact surface.**
- **Install the cylinder head cover within 3 minutes after applying seal packing.**



(c) Temporarily tighten the 9 bolts and 2 nuts on the cylinder head cover.

(d) Using several steps, tighten the bolts and nuts with the specified torque in the sequence shown in the illustration.

Torque: 10 N·m (102 kgf·cm, 7.4 ft·lbf)

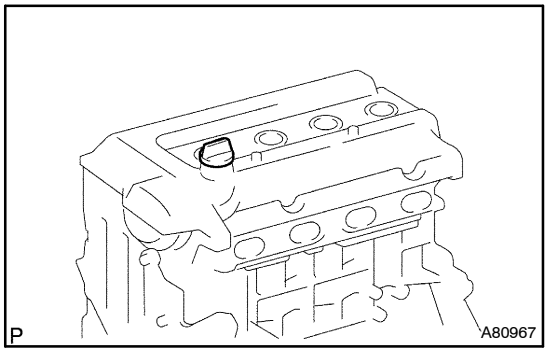


65. INSTALL VENTILATION VALVE SUB–ASSY

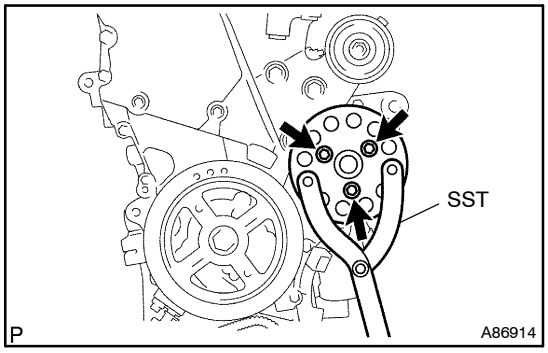
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

66. INSTALL OIL FILLER CAP GASKET

(a) Install the oil filler cap gasket to the oil filler cap.



67. INSTALL OIL FILLER CAP SUB–ASSY

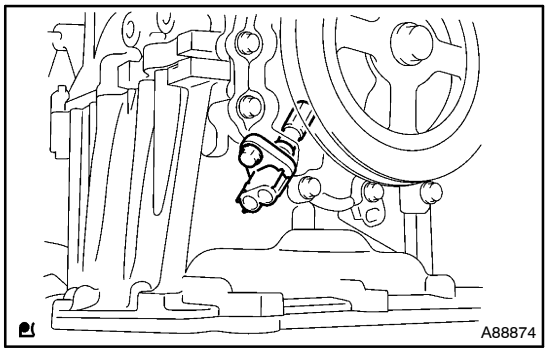


68. INSTALL WATER PUMP PULLEY

(a) Temporarily install the water pump pulley with the 3 bolts.

(b) Using SST, secure the water pump pulley.
SST 09960–10010 (09962–01000, 09963–00600)

(c) Tighten the 3 bolts with the specified torque.
Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)



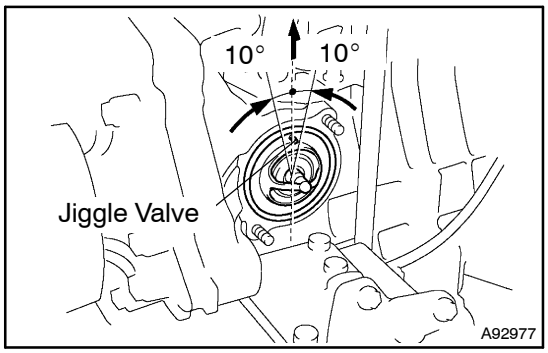
69. INSTALL CRANK POSITION SENSOR

(a) Apply a light coat of engine oil to the O–ring.

NOTICE:

If the O–ring is damaged, replace the crank position sensor.

(b) Install the crank position sensor with the bolt.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



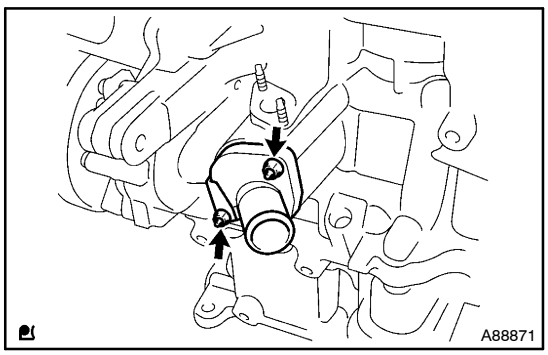
70. INSTALL THERMOSTAT

(a) Install a new gasket to the thermostat.

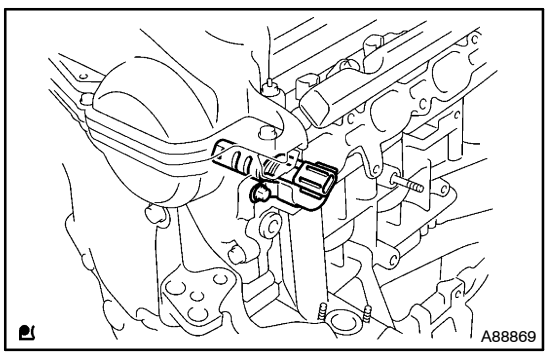
(b) Install the thermostat with the jiggle valve facing upward.

HINT:

The jiggle valve may be set within 10° at either side as illustrated.



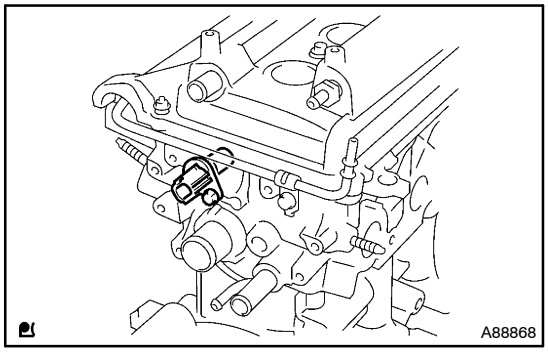
(c) Install the water inlet with the 2 nuts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)



71. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSY

(a) Apply a light coat of engine oil to the O–ring.

(b) Install the camshaft timing oil control valve assembly with the bolt.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)



72. INSTALL CAM POSITION SENSOR

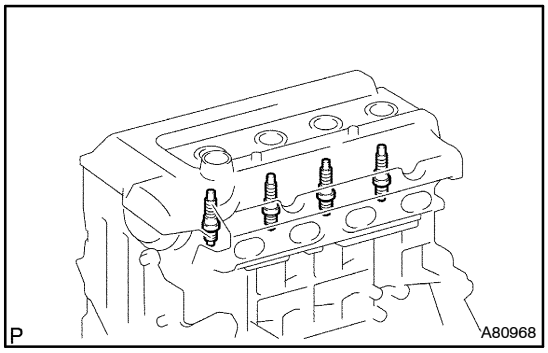
(a) Apply a light coat of engine oil to the O–ring.

NOTICE:

If the O–ring is damaged, replace the camshaft position sensor.

(b) Install the camshaft position sensor with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



73. INSTALL SPARK PLUG

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)