

INSTALLATION

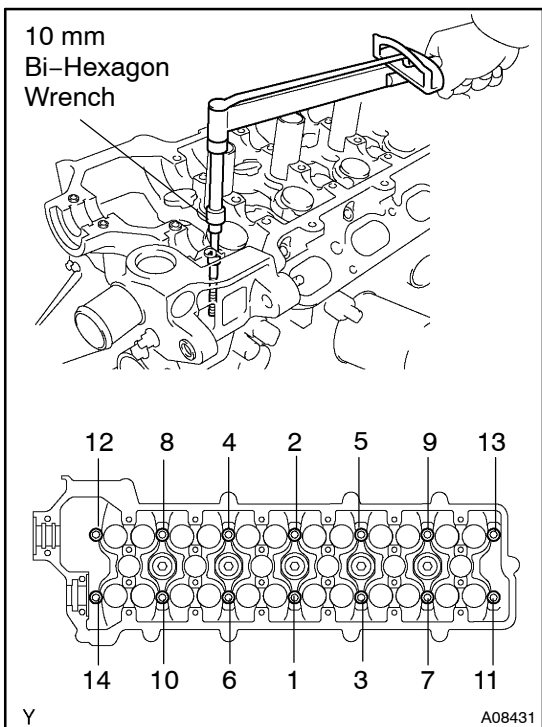
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

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

NOTICE:

Be careful of the installation direction.

- (b) Place the cylinder head in position on the cylinder head gasket.



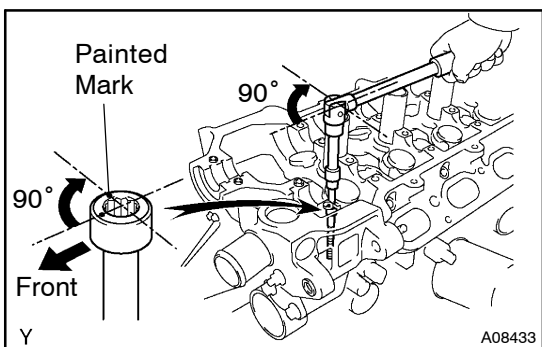
2. INSTALL CYLINDER HEAD BOLTS

HINT:

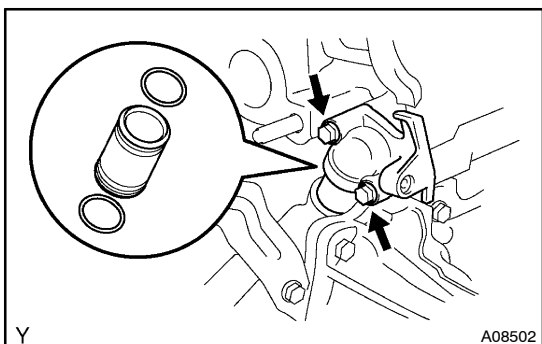
- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
 - If any cylinder head bolt is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts and plate washers.
 - (b) Install the plate washer to the cylinder head bolt.
 - (c) Install and uniformly tighten the 14 cylinder head bolts and plate washers, in several passes, in the sequence shown.

Torque: 50 N·m (500 kgf·cm, 36 ft·lbf)

If any of the cylinder head bolt does not meet the torque specification, replace the cylinder head bolt.



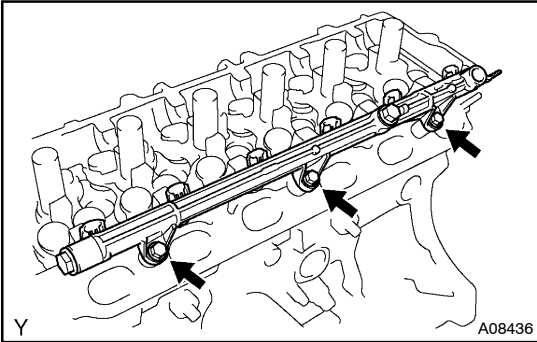
- (d) Mark the front of the cylinder head bolt with paint.
- (e) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (f) Check that the painted mark is now at a 90° angle to the front.



3. INSTALL WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE

- (a) Install 2 new O-rings to the No.1 water bypass pipe.
- (b) Install a new gasket, the No.1 water bypass pipe and water bypass outlet with the 2 bolts.

Torque: 9 N·m (90 kgf·cm, 78 in·lbf)



4. INSTALL INJECTORS AND DELIVERY PIPE

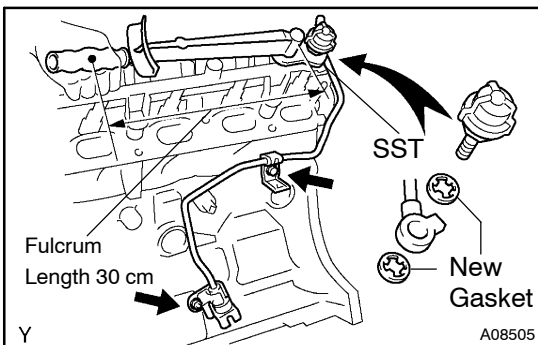
- Place the 3 spacers and 6 insulators in position on the cylinder head.
- Attach the 6 injectors and delivery pipe assembly to the cylinder head.
- Temporarily install the 3 bolts holding the delivery pipe to the cylinder head.
- Check that the injectors rotate smoothly.

HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O-ring. Replace the O-ring.

- Tighten the 3 bolts holding the delivery pipe to the cylinder head.

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)



5. CONNECT NO.1 FUEL PIPE

- Connect the No.1 fuel pipe to the LH engine mounting bracket with the nut by hand.
- Tighten the fuel pressure pulsation damper with 2 new gaskets by hand.
- Using SST, tighten the fuel pressure pulsation damper.
SST 09612-24014 (09617-24011)

Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)

HINT:

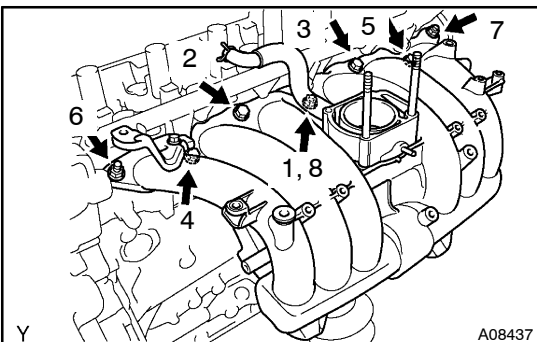
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

- Tighten the bolt holding the No.1 fuel pipe to the cylinder head.

Torque: 8.5 N·m (85 kgf·cm, 74 in·lbf)

- Tighten the the nut holding the No.1 fuel pipe to the LH engine mounting bracket.

Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)



6. INSTALL INTAKE MANIFOLD

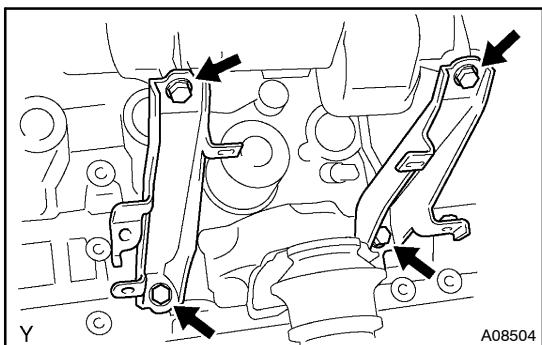
- Install 6 new gasket to the intake manifold.
- Install the intake manifold with the 4 bolts and 3 nuts, in several passes, in the sequence shown.

Torque: 28 N·m (280 kgf·cm, 20 ft·lbf)

- A/T:

Connect the oil dipstick guide for the A/T with the bolt.

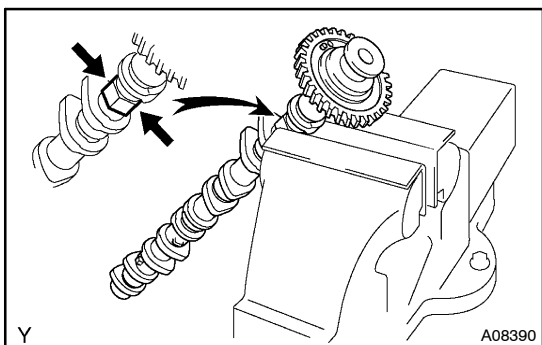
- Connect the brake booster vacuum hose.



7. INSTALL NO.1 AND NO.2 AIR INTAKE CHAMBER STAYS

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

8. INSTALL THROTTLE BODY (See page FI-41)

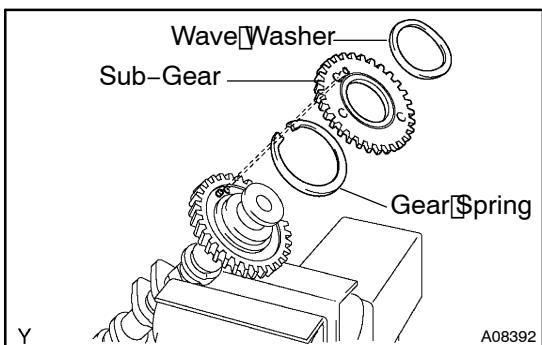


9. ASSEMBLE INTAKE CAMSHAFT

(a) Mount the hexagonal wrench head portion of the camshaft in a vise.

NOTICE:

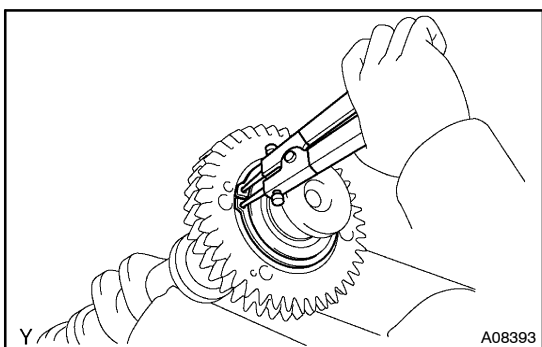
Be careful not to damage the camshaft.



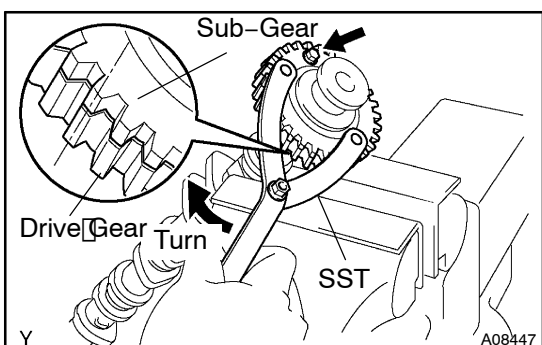
(b) Install the camshaft gear spring, camshaft sub-gear and wave washer.

HINT:

Align the pins on the gears with the spring ends.



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



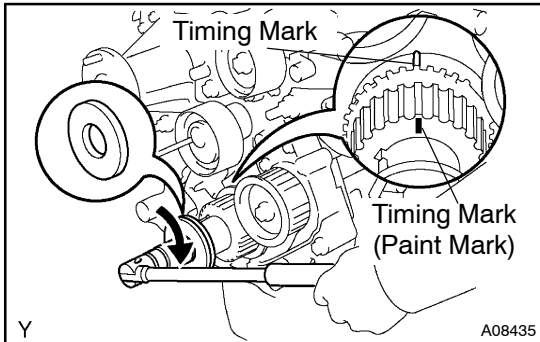
(d) Using SST, align the holes of the camshaft drive gear and sub-gear by turning camshaft sub-gear clockwise, and install a service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

(e) Align the gear teeth of the drive gear and sub-gear, and tighten the service bolt.

10. INSTALL CAMSHAFTS**NOTICE:**

Since the thrust clearance of the camshaft is small, the camshaft must be kept leveled while it is being installed. If the camshaft is not kept leveled, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.

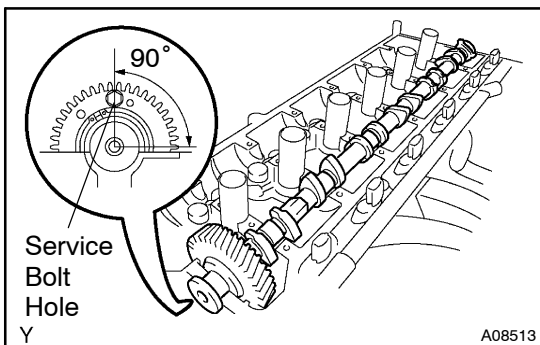


- (a) Set the No.1 cylinder to the approx. 60° BTDC/compression.

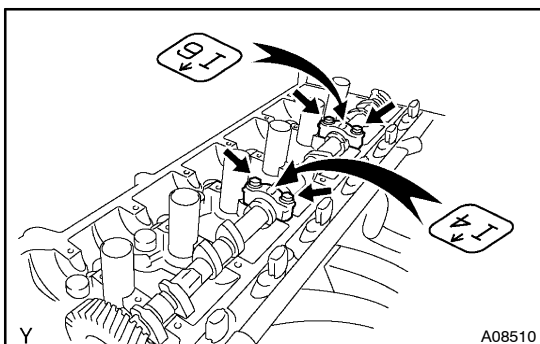
Using the crankshaft pulley bolt and plate washer, turn the crankshaft, and align the timing mark (paint mark) of the crankshaft timing pulley with the timing mark of the timing belt case.

NOTICE:

Having the crankshaft at the wrong angle can cause the piston head and valve head to come into contact with each other. Thus results in damage, when you install the camshafts. So, always set the crankshaft at the correct angle.



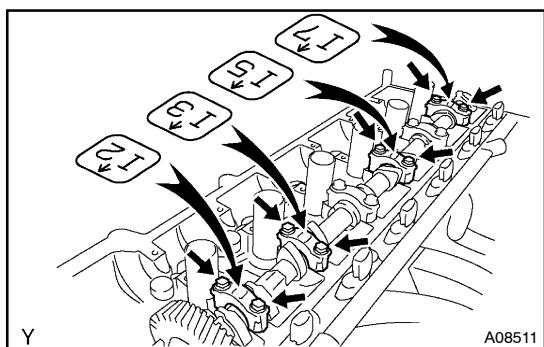
- (b) Install the intake camshaft.
- (1) Apply engine oil to the cam and gear of the camshaft, and the journal of the cylinder head.
 - (2) Place the intake camshaft as shown in the illustration so that the service bolt holes of the intake camshaft gears are directly above.



- (3) Place the No.4 and No.6 bearing caps in their proper locations.
- (4) Temporarily tighten the 4 bearing cap bolts uniformly and alternately in several passes until the bearing caps are snug with the cylinder head.

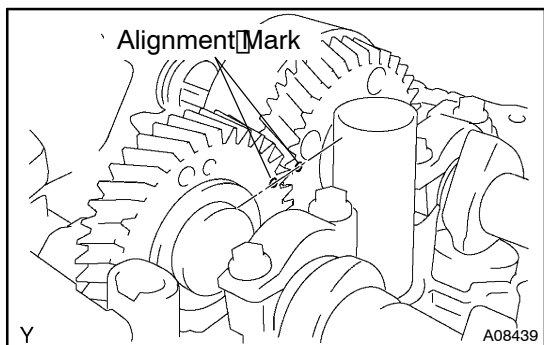
NOTICE:

While tightening the bolts, install the camshaft by keeping it leveled.

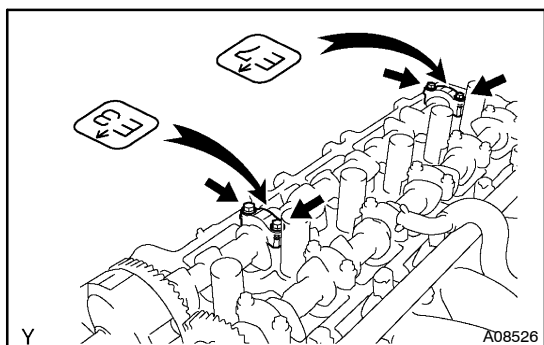


- (5) Place the No. 2, No. 3, No. 5 and No. 7 bearing caps in their proper locations.
- (6) Temporarily tighten the 8 bearing cap bolts, alternately tightening the right and left bolts uniformly.
- (7) Uniformly tighten the 12 bearing cap bolts, in several passes.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



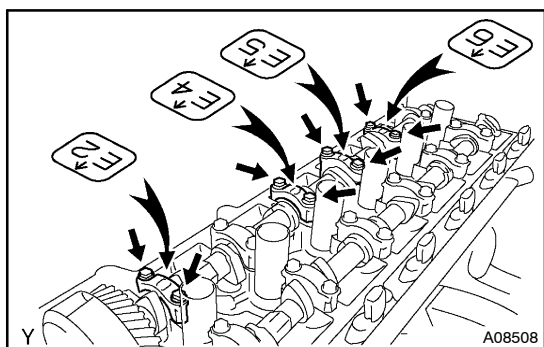
- (c) Install the exhaust camshaft.
 - (1) Apply engine oil to the cam and gear of the camshaft, and the journal of the cylinder head.
 - (2) Engage the exhaust camshaft gear to the intake camshaft gear by matching the alignment marks on each gear.
 - (3) Roll down the exhaust camshaft onto the bearing journals while engaging gears with each other.



- (4) Place the No. 3 and No. 7 bearing caps in their proper locations.
- (5) Temporarily tighten the 4 bearing cap bolts uniformly and alternately in several passes until the bearing caps are snug with the cylinder head.

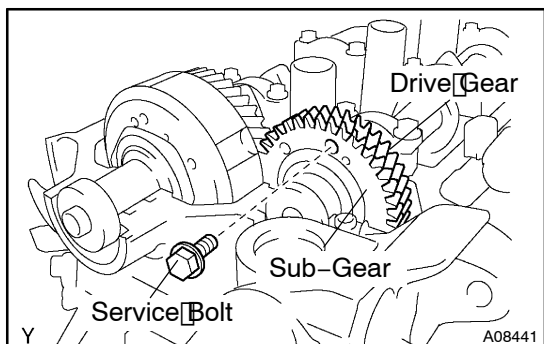
NOTICE:

While tightening the bolts, install the camshaft by keeping it leveled.

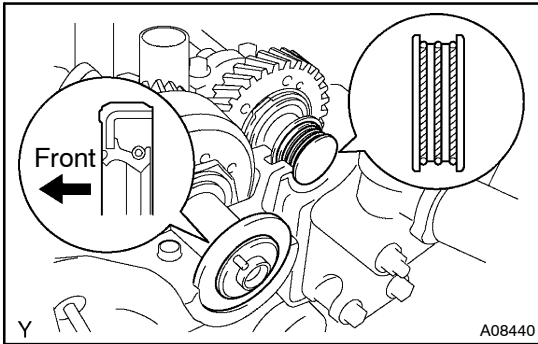


- (6) Place the No. 2, No. 4, No. 5 and No. 6 bearing caps in their proper locations.
- (7) Temporarily tighten the 8 bearing cap bolts alternately tightening the right and left bolts uniformly.
- (8) Uniformly tighten the 12 bearing cap bolts, in several passes.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



- (9) Remove the service bolt.
- (d) Check and adjust the valve clearance. (See page EM-6)
Turn the camshaft and position the cam lobe upward, and inspect and adjust the valve clearance.



- (e) Install a new oil seal to the camshaft.

NOTICE:

- Do not rotate the lip.
- Install the oil seal to the deepest of the cylinder head.
- Avoid any flakes or dust on the lip.

- (f) Install the semi-circular plug.

- (1) Remove any old packing (FIPG) material.
- (2) Apply a seal packing to the semi-circular plug grooves.

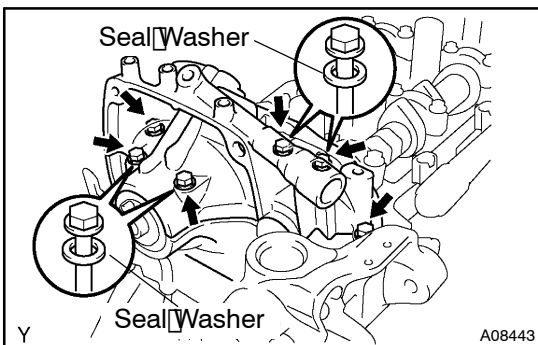
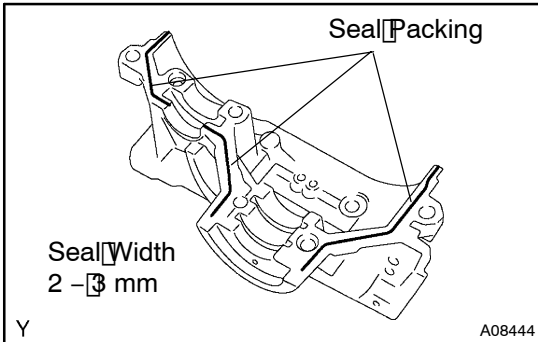
Seal packing: Part No. 08826-00080 or equivalent

- (g) Install the No.1 camshaft bearing cap.

- (1) Remove any old packing (FIPG) material from the bearing cap and cylinder head.
- (2) Apply a seal packing to the bearing cap as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise, the material must be removed and reapplied.
- Immediately remove the nozzle from the tube and reinstall the cap.



- (3) Install 4 new seal washers as shown in the illustration.

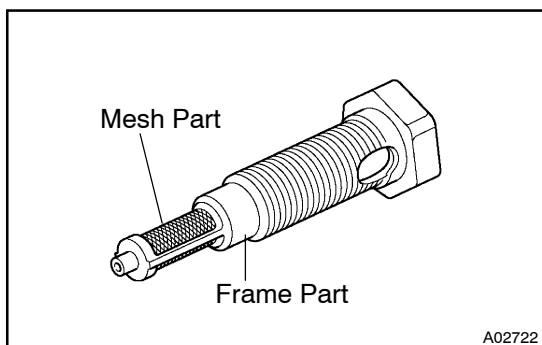
- (4) Install the No.1 bearing cap with the 6 bolts.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

NOTICE:

- Check that there is no clearance between the surfaces contacting with the No.1 camshaft bearing cap and cylinder head.
- If the No.1 camshaft bearing cap fits in the cylinder head tightly, push the bearing cap by hand. Do not hit in the bearing cap with a hammer or the likes.

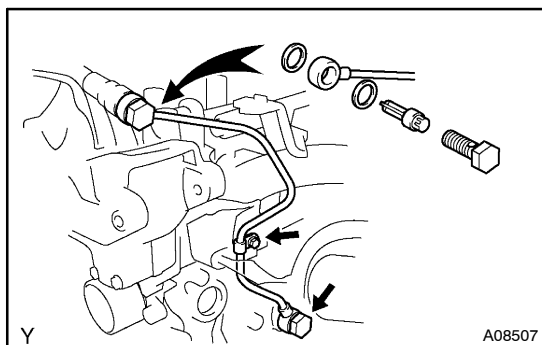
11. **INSTALL CAMSHAFT TIMING OIL CONTROL VALVE**
(See page FI-44)

**12. INSTALL NO.1 OIL PIPE**

- (a) Install the oil control valve filter to the union bolt.

NOTICE:

In case of touching the filter, avoid holding the mesh part and hold the frame part.



- (b) Install the oil pipe to the No.1 camshaft bearing cap with 2 new gaskets and the union bolt.

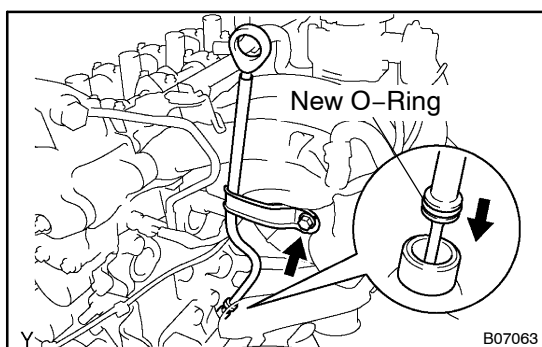
Torque: 64.5 N·m (645 kgf·cm, 47 ft·lbf)

- (c) Install the oil pipe to the cylinder block with 2 new gaskets and the union bolt.

Torque: 64.5 N·m (645 kgf·cm, 47 ft·lbf)

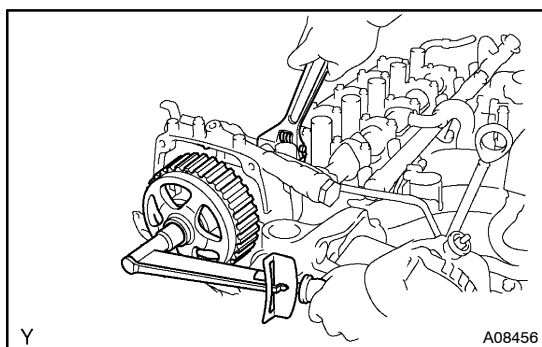
- (d) Install the bolt holding the oil pipe to the cylinder head.

Torque: 8.5 N·m (85 kgf·cm, 74 in·lbf)

**13. INSTALL OIL DIPSTICK AND GUIDE**

- (a) Install a new O-ring to the dipstick guide.
 (b) Apply engine oil on the O-ring.
 (c) Push in the dipstick guide together with the dipstick into the hole of the oil dipstick guide support.
 (d) Install the dipstick guide with the bolt.

Torque: 5.5 N·m (55 kgf·cm, 48 in·lbf)

**14. INSTALL CAMSHAFT TIMING PULLEY****NOTICE:**

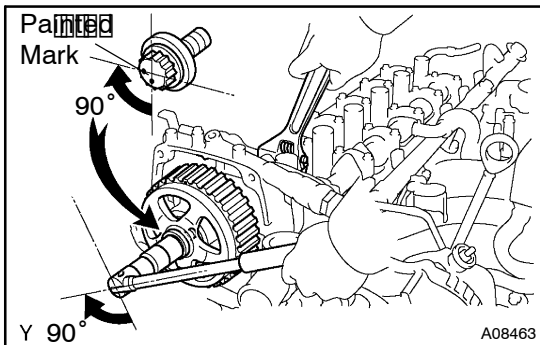
NEVER reuse the cam-pulley set bolt.

HINT:

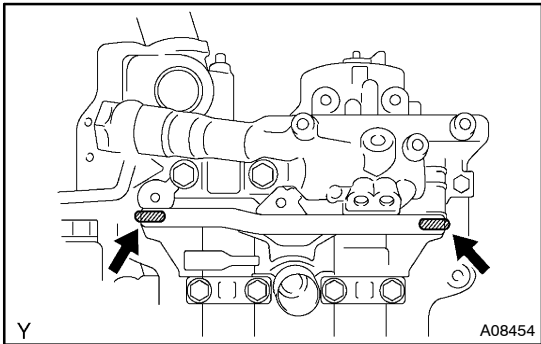
The cam-pulley set bolt is tightened in 2 progressive steps (steps (b) and (d)).

- (a) Align the camshaft knock pin with the groove in the pulley, and slide on the pulley.
 (b) Hold the hexagon portion of the camshaft with a wrench, and tighten a new cam-pulley set bolt.

Torque: 35 N·m (350 kgf·cm, 25 ft·lbf)



- (c) Mark the timing pulley bolt with paint.
- (d) Retighten the timing pulley bolt by 90°.
- (e) Check that the painted mark is now at a 90° angle to (d).



15. INSTALL CYLINDER HEAD COVER

- (a) Remove any old packing (FIPG) material.
- (b) Apply a seal packing to the cylinder head as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- (c) Install the gasket to the head cover.
- (d) Install the head cover with the 11 bolts.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

16. INSTALL AIR CLEANER INLET DUCT BRACKET

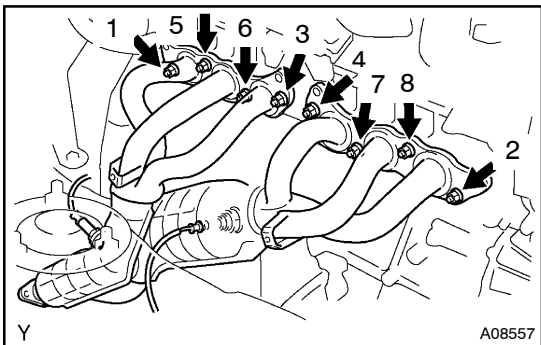
Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)

17. INSTALL TIMING BELT (See page EM-26)

18. RHD:

INSTALL STEERING SLIDING YOKE

(See page SR-23)



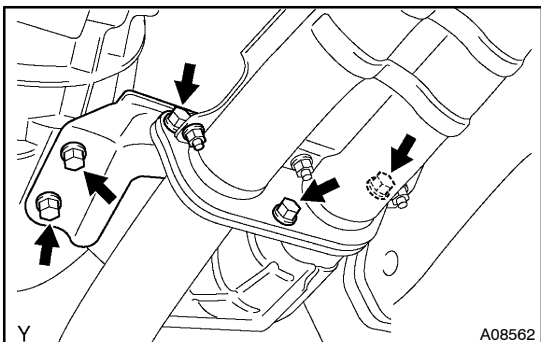
19. INSTALL EXHAUST MANIFOLD

- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the exhaust manifold with 8 new nuts, in several passes, in the sequence shown.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

- (c) Connect the 2 oxygen sensor connectors.
- (d) Install the 2 heat insulators with the 6 bolts.

Torque: 18.5 N·m (190 kgf·cm, 14 ft·lbf)



- (e) Temporarily install the exhaust manifold stay to the transmission with the 2 bolts.

- (f) Install 2 new gaskets to front end of the front exhaust pipe, and connect the front exhaust pipe to the exhaust manifold with the 3 bolts, a new retainer and a new nut.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

- (g) Tighten the 2 bolts holding the exhaust manifold stay to the transmission.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

20. M/T:**INSTALL CYLINDER HEAD REAR PLATE**

Install a new gasket, the rear plate and No.2 water bypass pipe with the bolt and 2 nuts.

Torque: 13 N·m (130 kgf·cm, 90 ft·lbf)

21. CONNECT HEATER HOSE TO CYLINDER HEAD REAR PLATE**22. INSTALL NO.3 WATER BYPASS PIPE**

Torque: 8.5 N·m (85 kgf·cm, 74 in·lbf)

23. INSTALL SPARK PLUGS (See page G-1)**24. INSTALL IGNITION COILS (See page G-6)****25. CONNECT ENGINE WIRE TO CYLINDER HEAD****26. INSTALL NO.2 CYLINDER HEAD COVER**

Torque: 8.5 N·m (85 kgf·cm, 74 in·lbf)

27. INSTALL PCV HOSE**28. INSTALL ALTERNATOR (See page CH-15)****29. INSTALL NO.3 CYLINDER HEAD COVER**

Torque: 7.5 N·m (75 kgf·cm, 65 in·lbf)

30. INSTALL AIR CLEANER ASSEMBLY

Torque: 7.5 N·m (75 kgf·cm, 65 in·lbf)

31. INSTALL AIR CLEANER INLET

Torque: 5 N·m (50 kgf·cm, 43 in·lbf)

32. FILL WITH ENGINE COOLANT**33. START ENGINE AND CHECK FOR LEAK****34. INSTALL NO.1 ENGINE UNDER COVER****35. ROAD TEST**

Check abnormal noise, shock, slippage, correct shift points and smooth operation.

36. RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL