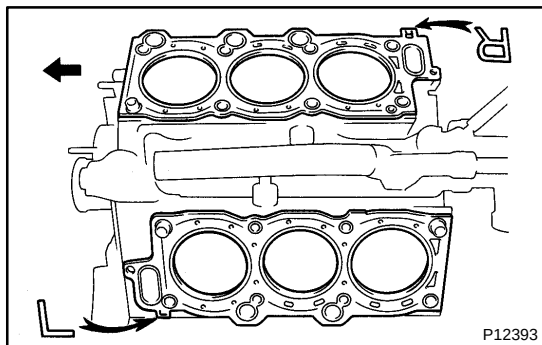




INSTALLATION

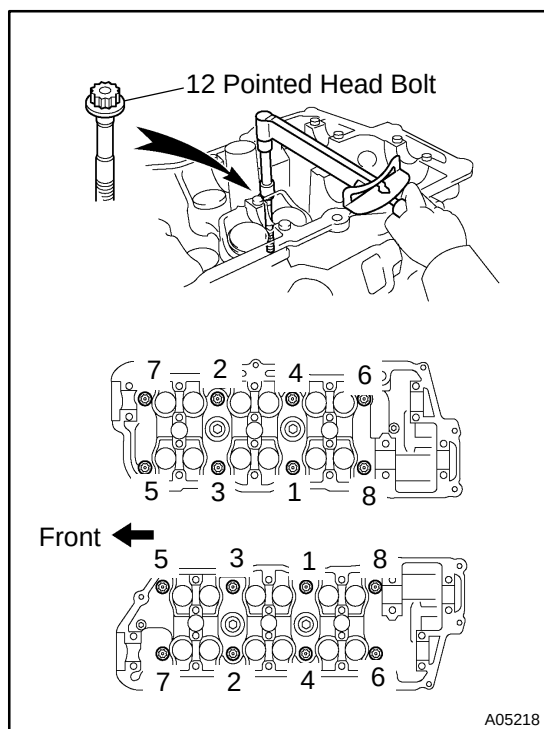
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- (a) Place 2 new cylinder head gaskets in position on the cylinder block.

NOTICE:

Be careful of the installation direction.

- (b) Place the 2 cylinder heads in position on the cylinder head gaskets.



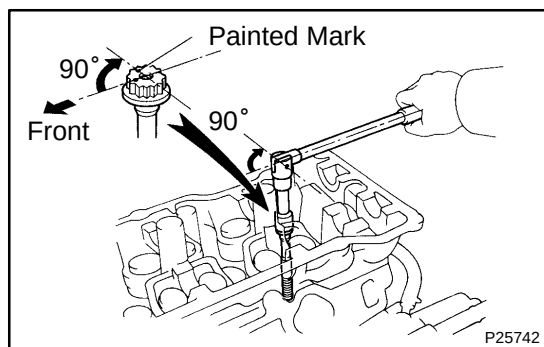
2. INSTALL 12 POINTED HEAD CYLINDER HEAD BOLTS

HINT:

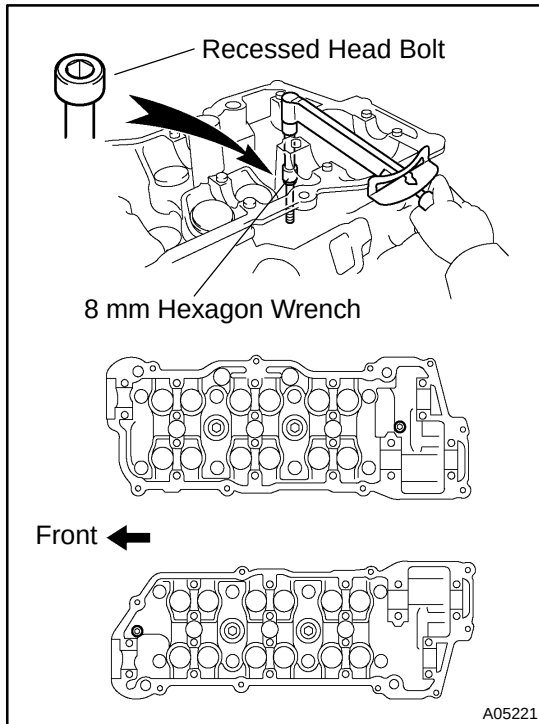
- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
 - If any bolt is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- (b) Install the plate washer to the cylinder head bolt.
- (c) Install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

Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

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



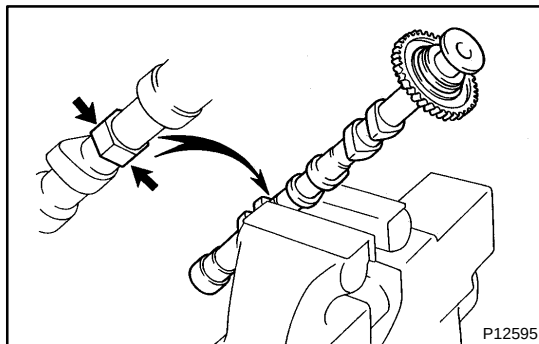
- (d) Mark the front of the cylinder head bolt head with paint.
- (e) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (f) Check that the painted mark is now at a 90° angle to the front.



3. INSTALL RECESSED HEAD CYLINDER HEAD BOLTS

- Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- Using an 8 mm hexagon wrench, install the cylinder head bolt on each cylinder head, then repeat for the other side, as shown.

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

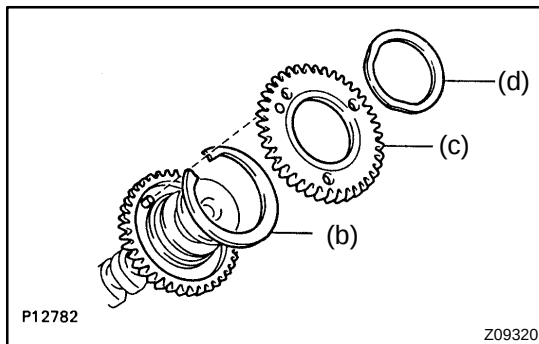


4. ASSEMBLE EXHAUST CAMSHAFTS

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

NOTICE:

Be careful not to damage the camshaft.



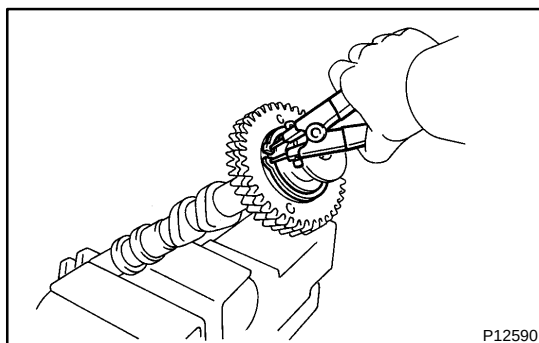
- Install the camshaft gear spring.

- Install the camshaft sub-gear.

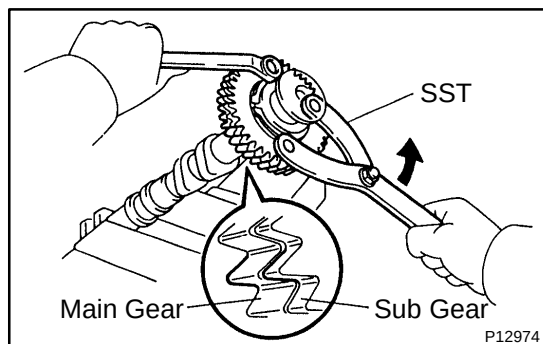
HINT:

Attach the pins on the gears to the gear spring ends.

- Install the wave washer.



- Using snap ring pliers, install the snap ring.

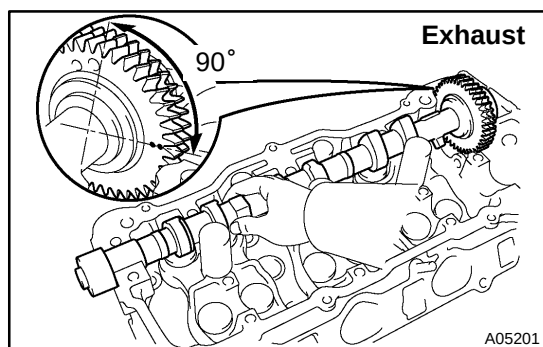


- (f) Using SST, align the holes of the camshaft main gear and sub-gear by turning camshaft sub-gear counterclockwise, and temporarily install a service bolt.
SST 09960-10010 (09962-01000, 09963-00500)
- (g) Align the gear teeth of the main gear and sub-gear, and tighten the service bolt.

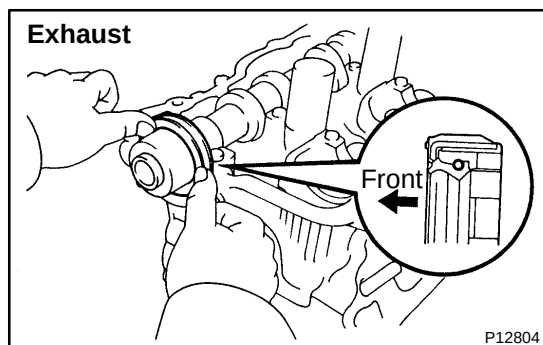
5. INSTALL CAMSHAFTS OF RH CYLINDER HEAD

NOTICE:

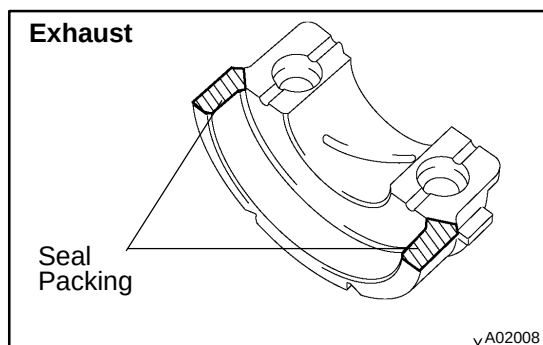
Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being installed. If the camshaft is not level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps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



- (a) Install the exhaust camshaft.
 - (1) Apply new engine oil to the thrust portion and journal of the camshaft.
 - (2) Place the exhaust camshaft at 90° angle of timing mark (2 dot marks) on the cylinder head.
 - (3) Apply MP grease to a new oil seal lip.

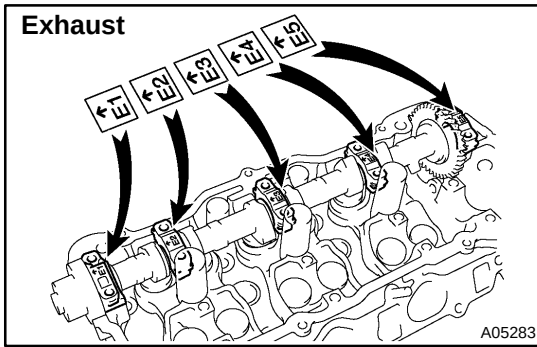


- (4) Install the oil seal to the camshaft.

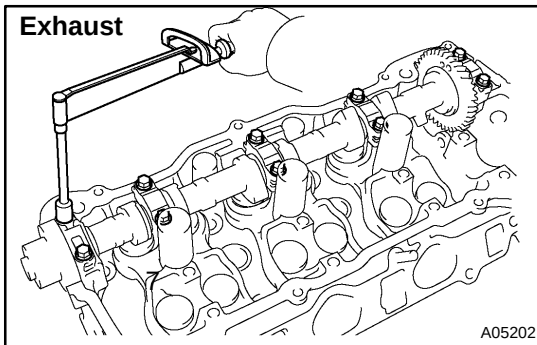


- (5) Remove any old packing (FIPG) material.
- (6) Apply seal packing to the No.1 bearing cap as shown.

Seal packing: Part No. 08826-00080 or equivalent

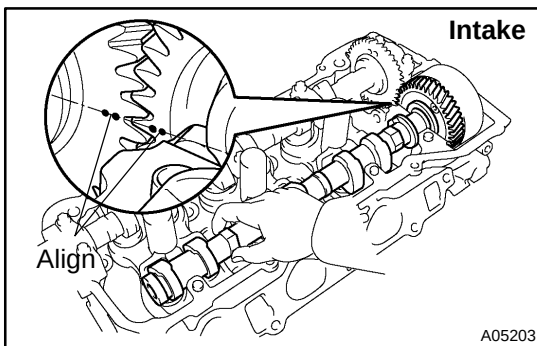


- (7) Install the 5 bearing caps in their proper locations.

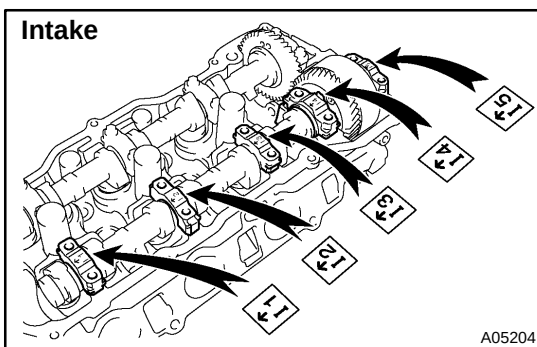


- (8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

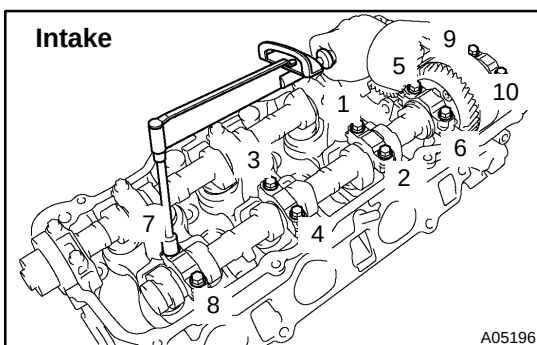
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



- (b) Install the intake camshaft.
- (1) Apply new engine oil to the thrust portion and journal of the camshaft.
- (2) Align the timing marks (2 dot marks) of the camshaft drive and driven gears.
- (3) Place the intake camshaft on the cylinder head.

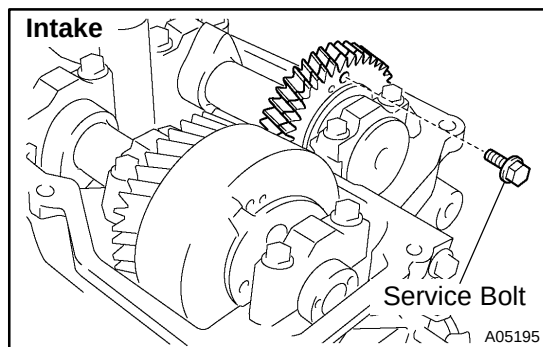


- (4) Install the 5 bearing caps in their proper locations.



- (5) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (6) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

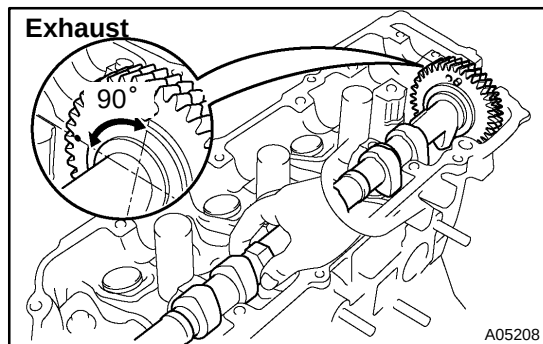


(7) Remove the service bolt.

6. INSTALL CAMSHAFTS OF LH CYLINDER HEAD

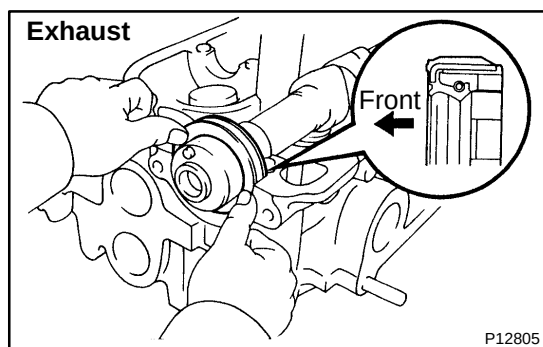
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being installed. If the camshaft is not level, 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.

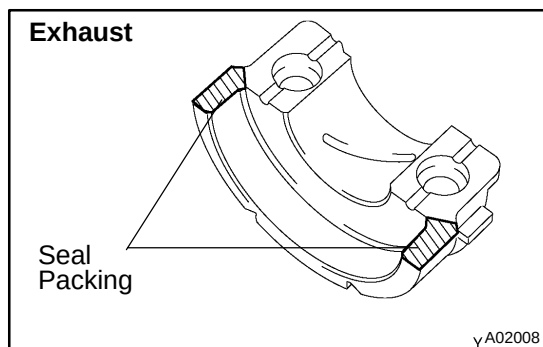


(a) Install the exhaust camshaft.

- (1) Apply new engine oil to the thrust portion and journal of the camshaft.
- (2) Place the exhaust camshaft at 90° angle of timing mark (1 dot mark) on the cylinder head.
- (3) Apply MP grease to a new oil seal lip.



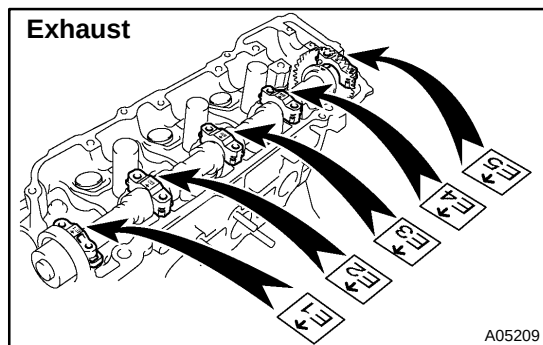
(4) Install the oil seal to the camshaft.



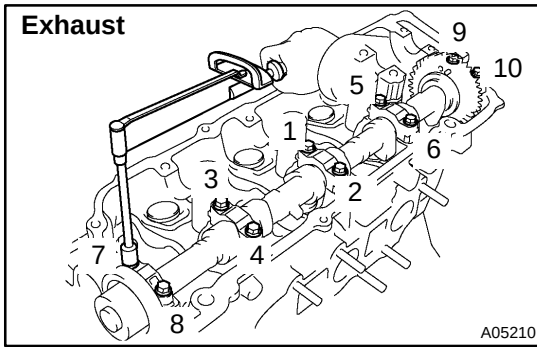
(5) Remove any old packing (FIPG) material.

(6) Apply seal packing to the No.1 bearing cap as shown.

Seal packing: Part No. 08826-00080 or equivalent

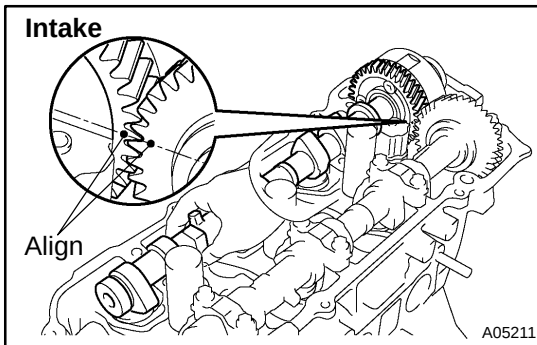


(7) Install the 5 bearing caps in their proper locations.

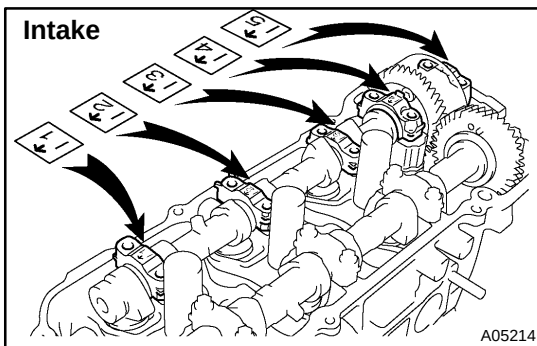


- (8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

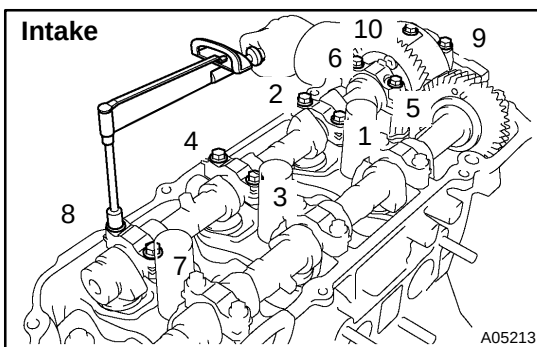
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



- (b) Install the intake camshaft.
 - (1) Apply new engine oil to the thrust portion and journal of the camshaft.
 - (2) Align the timing marks (1 dot mark) of the camshaft drive and driven gears.
 - (3) Place the intake camshaft on the cylinder head.

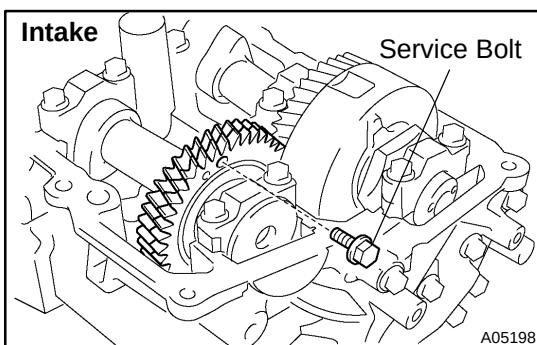


- (4) Install the 5 bearing caps in their proper locations.



- (5) Apply a light coat of engine oil on the threads and under the heads of bearing cap bolts.
- (6) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

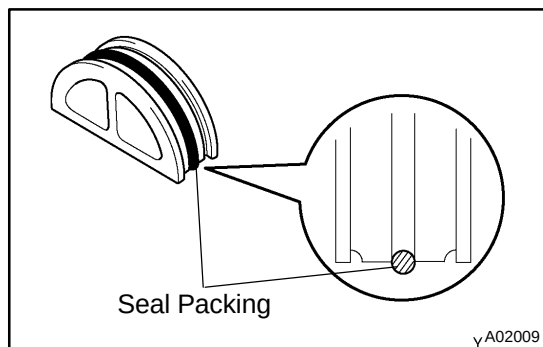
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



- (7) Remove the service bolt.

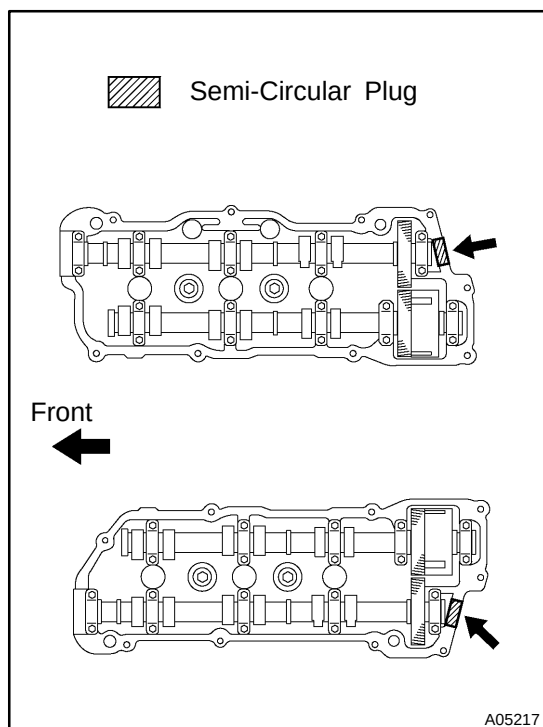
7. CHECK AND ADJUST VALVE CLEARANCE (See page [EM-4](#))

Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

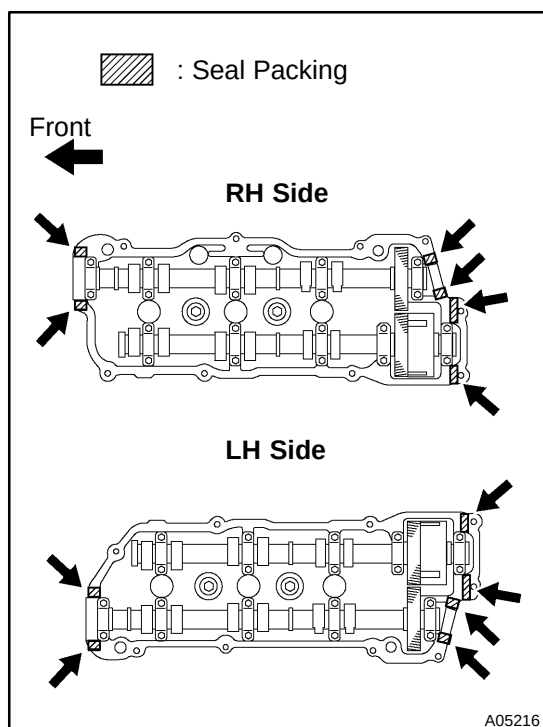


8. INSTALL SEMI-CIRCULAR PLUGS

- Remove any old packing (FIPG) material.
- Apply seal packing to the semi-circular plug grooves.
Seal packing: Part No. 08826-00080 or equivalent

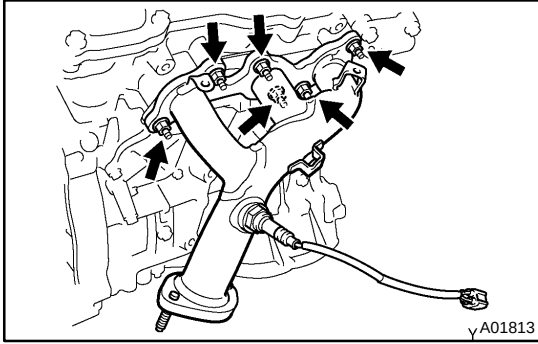


- Install the 2 semi-circular plugs to the cylinder heads.



9. INSTALL CYLINDER HEAD COVERS

- Apply seal packing to the cylinder heads as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent
- Install the gasket to the cylinder head cover.
- Install the cylinder head cover with the 8 bolts. Uniformly tighten the bolts in several passes. Install the 2 cylinder head covers.
Torque: 8.0 N·m (80 kgf·cm, 69 in·lbf)

**10. INSTALL RH EXHAUST MANIFOLD**

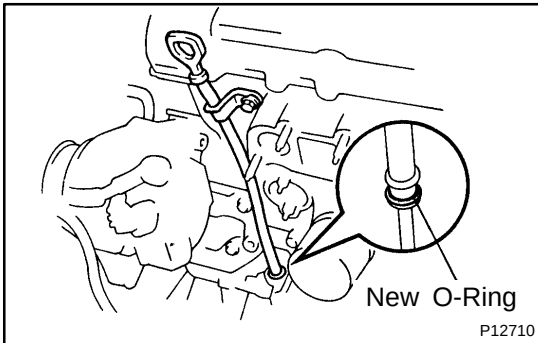
- (a) Install a new gasket and the exhaust manifold with the 6 nuts. Uniformly tighten the nuts in several passes.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

- (b) Install the heat insulator with 3 bolts.
 (c) Connect the oxygen sensor (bank 1 sensor 1) connector.

11. INSTALL PS PUMP BRACKET

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

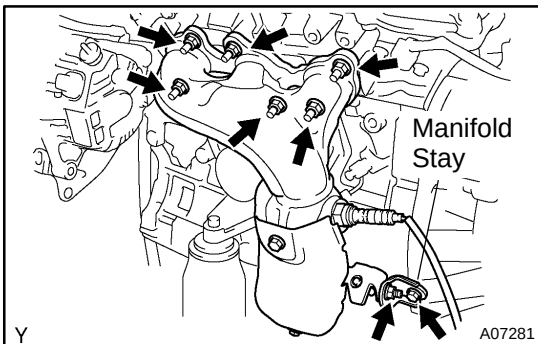
**12. INSTALL OIL DIPSTICK AND GUIDE**

- (a) Install a new O-ring to the dipstick guide.
 (b) Apply soapy water to the O-ring.
 (c) Push in the dipstick guide end into the guide hole of the No.1 oil pan.

- (d) Install the dipstick guide with the bolt.

Torque: 8.0 N·m (80 kgf·cm, 69 in·lbf)

- (e) Install the dipstick.

**13. INSTALL LH EXHAUST MANIFOLD**

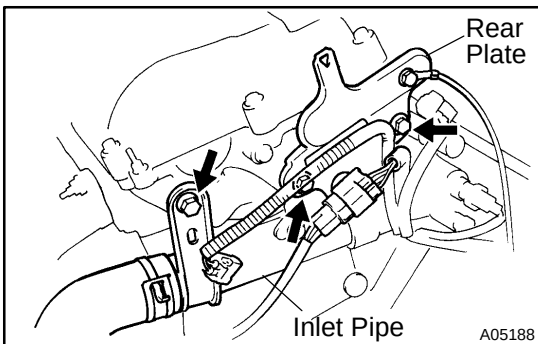
- (a) Install a new gasket and the exhaust manifold with the 6 nuts. Uniformly tighten the nuts in several passes.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

- (b) Install the exhaust manifold stay with the bolt and nut. Alternately tighten the bolt and nut.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

- (c) Install the heat insulator with 3 bolts.
 (d) Connect the oxygen sensor (bank 2 sensor 1) connector.

**14. INSTALL WATER INLET PIPE**

- (a) Install a new O-ring to the water inlet pipe.
 (b) Apply soapy water to the O-ring.
 (c) Connect the water inlet pipe to the water inlet.
 (d) Install the bolt holding the water inlet pipe to the cylinder head.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

15. INSTALL CYLINDER HEAD REAR PLATE

Torque: 8.0 N·m (80 kgf·cm, 69 in·lbf)

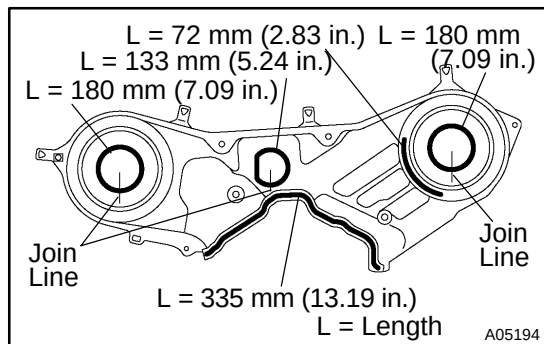
16. INSTALL ENGINE WIRE PROTECTOR**17. INSTALL CAMSHAFT TIMING OIL CONTROL VALVES****18. INSTALL CAMSHAFT POSITION SENSORS**

19. INSTALL NO.3 TIMING BELT COVER

- (a) Check that the timing belt cover gaskets have no cracks or peeling, etc.

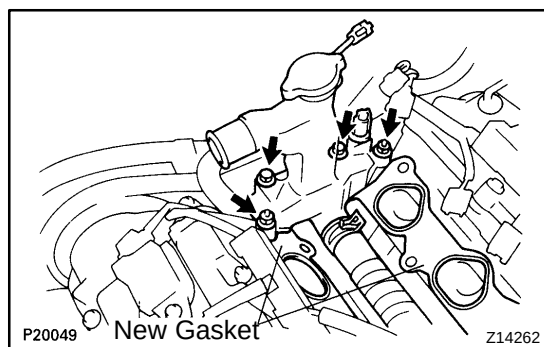
If the gaskets have cracks or peeling etc., replace them using these steps:

- Using a screwdriver and gasket scraper, remove all the old gasket material.
- Thoroughly clean all components to remove all the loose material.
- Remove the backing paper from a new gasket and install the gasket evenly to the part of the timing belt cover shaded black in the illustration.

**NOTICE:**

When joining 2 gaskets, do not leave a gap between them. Cut off any excess gasket.

- After installing the gasket, press down on it so that the adhesive firmly sticks to the timing belt cover.
- (b) Install the timing belt cover with the 6 bolts.
Torque: 8.5 N·m (85 kgf·cm, 74 in·lbf)
- (c) Install the 3 engine wire clamps to the timing belt cover.
- 20. INSTALL NO.2 IDLER PULLEY (See page EM-22)**
- 21. INSTALL CAMSHAFT TIMING PULLEYS (See page EM-22)**
- 22. INSTALL TIMING BELT (See page EM-22)**
- 23. INSTALL SPARK PLUGS**
- 24. INSTALL IGNITION COILS**

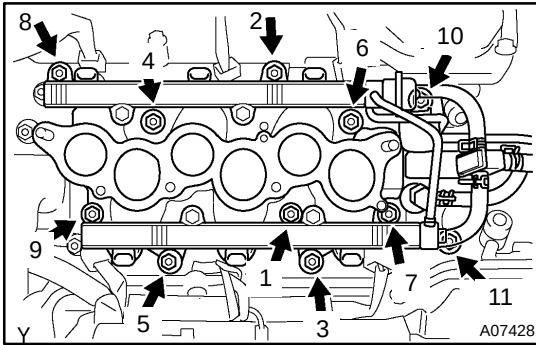
**25. INSTALL WATER OUTLET**

- (a) Install 2 new gaskets.
- (b) Connect the water outlet to the bypass hose.
- (c) Install the water outlet with the 2 bolts, 2 nuts and 2 plate washers. Alternately tighten the bolts and nuts.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

NOTICE:

Do not scratch the seal surface of the water outlet with the stud bolt.

- (d) Connect the ECT sender gauge connector.
- (e) Connect the ECT sensor connector.
- (f) Connect the ground strap connector.
- (g) Connect the upper radiator hose.
- (h) Connect the engine coolant reservoir hose.



26. INSTALL INTAKE MANIFOLD ASSEMBLY

- (a) Install the intake manifold, delivery pipe and injectors assembly with the 9 bolts, 2 plate washers and 2 nuts. Uniformly tighten the bolts and nuts in several passes and in the sequence shown.

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

- (b) Connect the fuel inlet hose to fuel filter.

CAUTION:

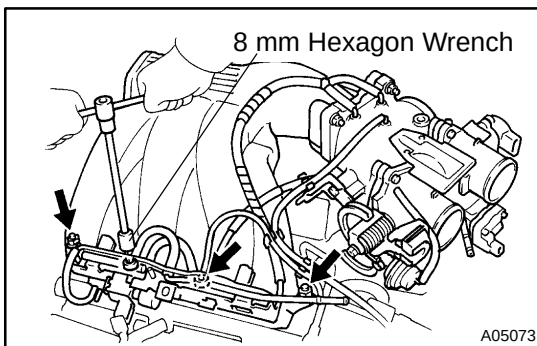
Perform connecting operations of the fuel tube connector (quick type) after observing the precaution (See page SF-1).

- (c) Connect the heater hose to the intake manifold.

27. RETIGHTEN WATER OUTLET MOUNTING BOLTS AND NUTS

Tighten the 2 bolts and 2 nuts.

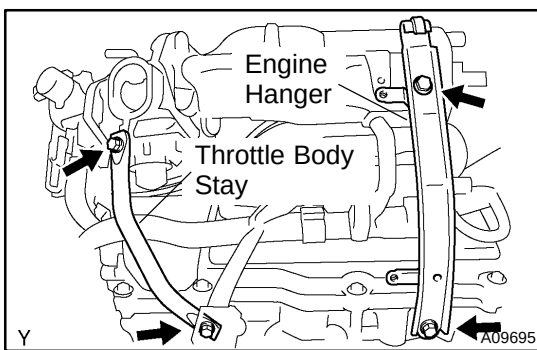
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



28. INSTALL AIR INTAKE CHAMBER ASSEMBLY

- (a) Using an 8 mm hexagon wrench, install a new gasket and the air intake chamber assembly with the 2 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

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



- (b) Install the No.1 engine hanger with the 2 bolts.
Torque: 39 N·m (400 kgf·cm, 19 ft·lbf)
- (c) Install the throttle body bracket with the 2 bolts.
Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)
- (d) Connect the PCV hose to the PCV valve on RH cylinder head.
- (e) Connect the ground strap and cable to intake air control valve for ACIS.
- (f) Connect the ground cable and strap with the nut.
Torque: 14.5 N·m (145 kgf·cm, 10 ft·lbf)
- (g) Connect the ground cable to air intake chamber.
- (h) Connect the brake booster vacuum hose to the throttle body.
- (i) Connect the 2 water bypass hoses to the throttle body.
- (j) Connect the air assist hose to the throttle body.
- (k) Connect the purge hose to the emission control valve set.
- (l) Connect the 2 vacuum hoses to the vacuum tank for ACIS.
- (m) Connect the engine wire clamp to the emission control valve set.

- (n) Install the PS pressure tube with the 2 nuts.
- (o) Connect the throttle position sensor connector.
- (p) Connect the IAC valve connector.
- (q) Connect the No. 1 VSV connector for the ACIS.
- (r) Connect the No.2 VSV connector for the ACIS.
- (s) Connect the VSV connector for the EVAP.
- (t) Connect the DLC1 to the bracket on the intake air control.
- (u) Connect the throttle cable.
- (v) Connect the accelerator cable.

29. INSTALL AIR CLEANER CAP HOSE WITH RESONATOR

30. INSTALL V-BANK COVER

- (a) Using a 5 mm hexagon wrench, install the V-bank cover with the 3 cap nuts.
- (b) Press down the V-bank cover fastener.

31. INSTALL FRONT EXHAUST PIPE (See page [EM-82](#))

32. INSTALL PS PUMP (See page [SR-22](#))

33. INSTALL GENERATOR DRIVE BELT (See page [CH-6](#))

34. INSTALL OUTER FR COWL TOP PANEL ASSEMBLY (See page [EM-82](#))

35. INSTALL RH FENDER APRON SEAL

36. FILL WITH ENGINE COOLANT

37. START ENGINE AND CHECK FOR LEAKS

38. VEHICLE ROAD TEST

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

39. RECHECK ENGINE COOLANT LEVEL