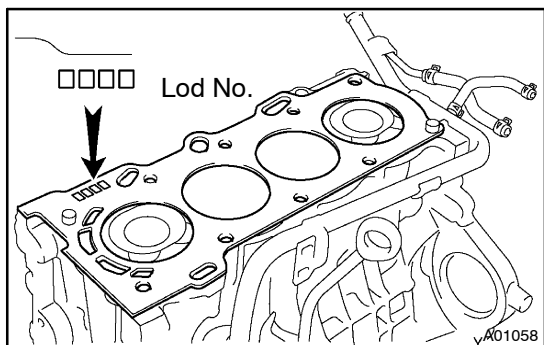


INSTALLATION

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



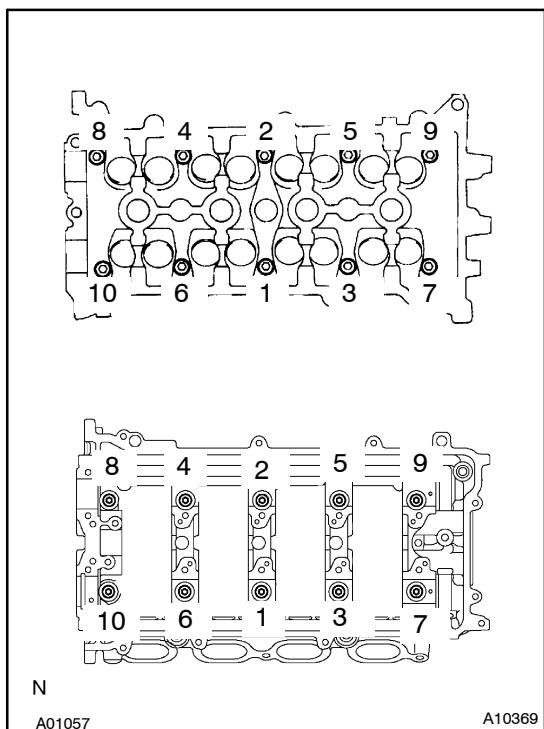
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- Place a new cylinder head gasket on the cylinder block surface with the Lod No. stamp upward.

NOTICE:

Be careful of the installation direction.

- Place the cylinder head quietly in order not to damage the gasket with the bottom part of the head.



2. INSTALL CYLINDER HEAD BOLTS

HINT:

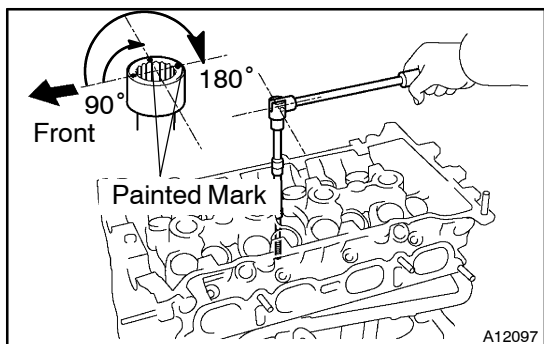
- The cylinder head bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any cylinder head bolt is broken or deformed, replace it.
- Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
 - Using a 12 mm bi-hexagon wrench, install and uniformly tighten the 10 cylinder head bolts and plate washers, in several passes, in the sequence shown.

Torque:

1ZZ-FE: 49 N·m (500 kgf·cm, 36 ft·lbf)

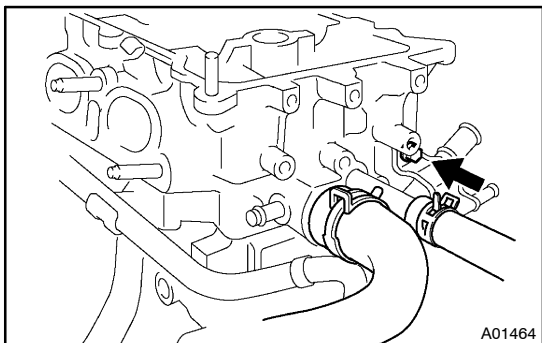
2ZZ-GE: 35 N·m (375 kgf·cm, 26 ft·lbf)

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



- Mark the front of the cylinder head bolt with paint.
- 1ZZ-FE:
Retighten the cylinder head bolts 90° in the numerical order shown.
- 2ZZ-GE:
Retighten the cylinder head bolts 180° in the numerical order shown.
- 1ZZ-FE:
Check that the paint mark is not at a 90° angle to the front.

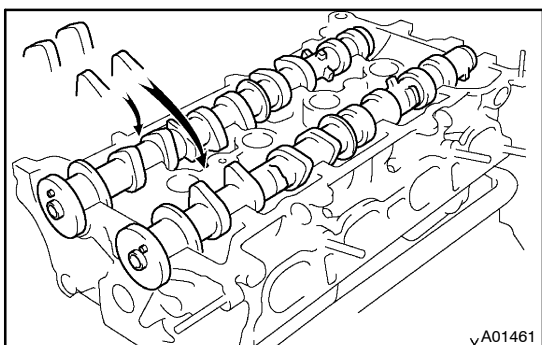
- (g) 2ZZ-GE:
Check that the paint mark is not at a 180° angle to the front.



- (h) Install the bolt holding the water bypass pipe to the cylinder head.

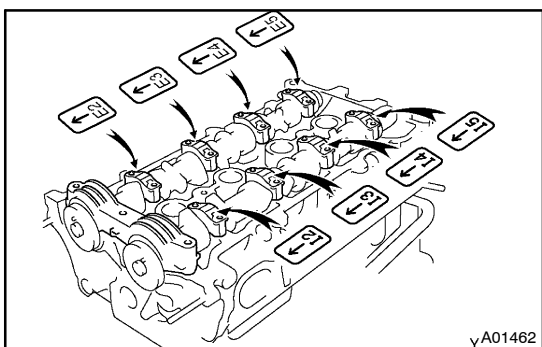
Torque: 9.0 N·m (92 kgf·cm, 80 in·lbf)

- (i) Connect the upper radiator hose to the water hose unions.
(j) Connect the heater hose to the water hose unions.



3. INSTALL CAMSHAFTS

- (a) Place the 2 camshafts on the cylinder head with the No. 1 cam lobes facing as shown the illustration.

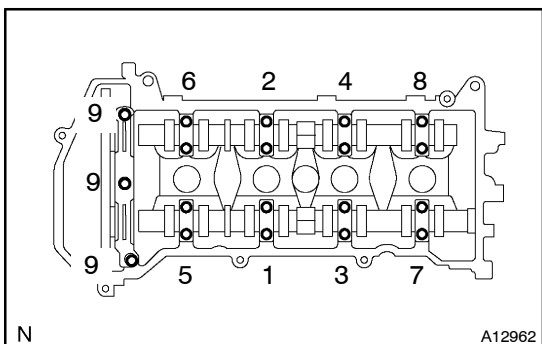


- (b) Install the bearing caps in their proper locations.

HINT:

- 1ZZ-FE:
No. 3 camshaft bearing cap has a number and front mark.
- 2ZZ-GE:
No. 2, No.3 camshaft bearing cap has a number and front mark.

- (c) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.

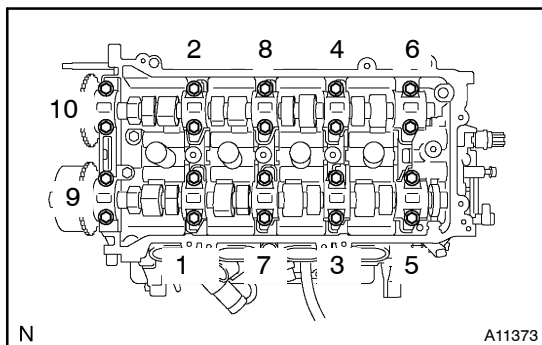


- (d) 1ZZ-FE:
Install and uniformly tighten the 19 bearing cap bolts.
After tightening the No. 1 camshaft bearing cap, tighten then in several passes, in the sequence shown.

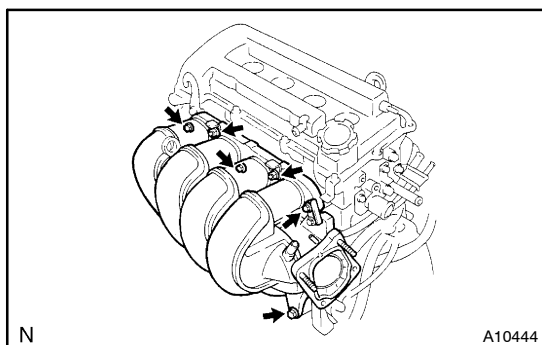
Torque:

No. 1 23 N·m (235 kgf·cm, 17 ft·lbf)

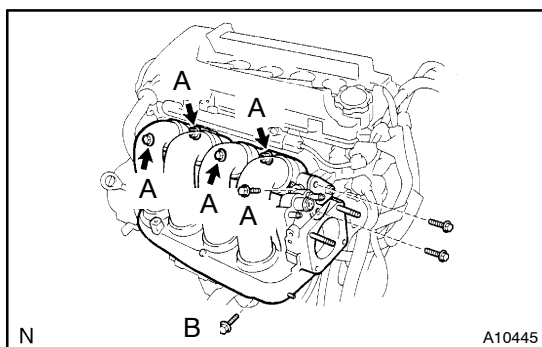
No. 3 13 N·m (133 kgf·cm, 10 ft·lbf)



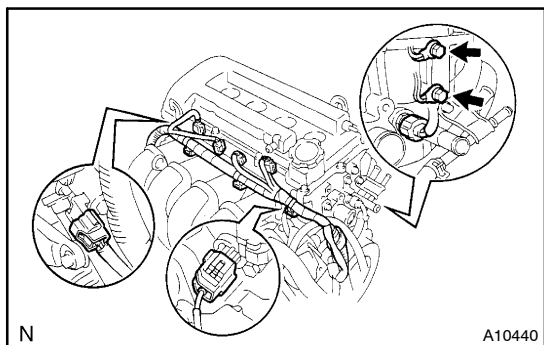
- (e) **2ZZ-GE:**
Install and uniformly tighten the 20 bearing cap bolts. After tightening the No. 1 camshaft bearing cap, tighten then in several passes, in the sequence shown.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)
4. **CHECK AND ADJUST VALVE CLEARANCE**
(See [page EM-4](#))
 5. **INSTALL CAMSHAFT TIMING SPROCKETS AND VALVE TIMING CONTROLLER ASSEMBLY**
(See [page EM-26](#))
 6. **INSTALL OIL FILTER CAP**
 7. **INSTALL GROMMET AND PCV VALVE**
 8. **INSTALL WATER TEMPERATURE SENSOR**
(See [page FI-54](#))
 9. **INSTALL CAMSHAFT POSITION SENSOR**
(See [page G-10](#))



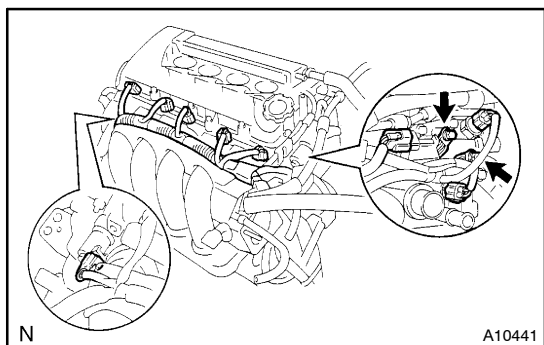
10. **1ZZ-FE:**
INSTALL INTAKE MANIFOLD
 - (a) Install a new gasket, the intake manifold with the 4 bolts and 2 nuts.
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)
 - (b) Connect the brake booster vacuum hose.
 - (c) Connect the EVAP hose for ORVR.



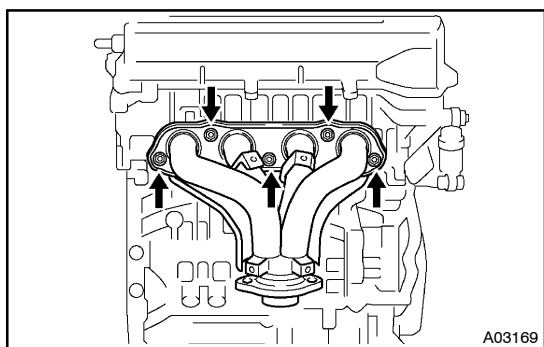
11. **2ZZ-GE:**
INSTALL INTAKE MANIFOLD
 - (a) Install the intake manifold insulator to the cylinder block.
 - (b) Install a new gasket, the intake manifold with the 4 bolts and 2 nuts.
Torque:
A: 27 N·m (275 kgf·cm, 20 ft·lbf)
B: 46 N·m (469 kgf·cm, 34 ft·lbf)
 - (c) Install the stay with the 2 bolts and nut.
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)
 - (d) Install the oil dipstick and guide with the bolt.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)
 - (e) Connect the brake booster vacuum hose.
 - (f) Connect the EVAP hose for ORVR.

**12. 1ZZ-FE:****CONNECT ENGINE WIRE TO CYLINDER HEAD**

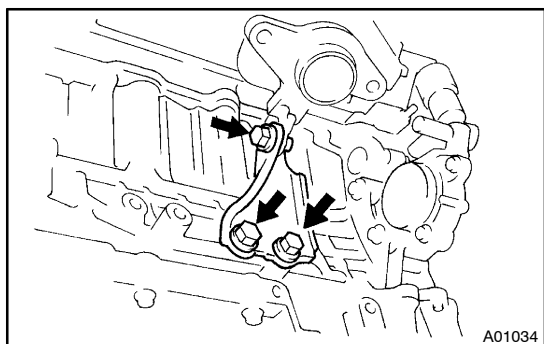
- Connect the 2 clamps of engine wire to the intake manifold.
- Connect the 2 ground cables.
- Connect the oil control valve for VVT connector.
- Connect the camshaft position sensor connector.
- Connect the ECT sensor connector.

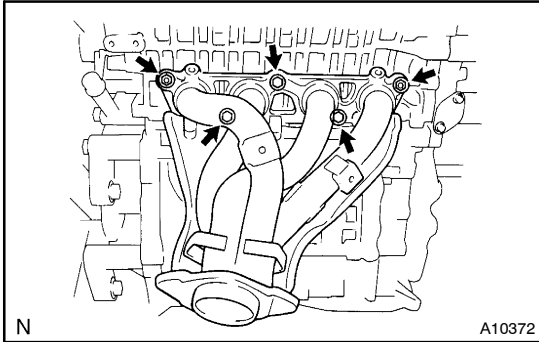
**13. 2ZZ-GE:****CONNECT ENGINE WIRE TO CYLINDER HEAD**

- Install the intake manifold insulator No. 2.
- Connect the 2 ground cables.
- Connect the oil pressure switch connector.
- Connect the oil control valve for VVT connector.
- Connect the oil control valve for VVTL connector.
- Connect the camshaft position sensor connector.
- Connect the ECT sensor connector.
- Install the accelerator cable bracket with the 2 bolts.

14. INSTALL INJECTORS (See page FI-24)**15. INSTALL THROTTLE BODY (See page FI-36)****16. INSTALL PCV HOSES****17. INSTALL SPARK PLUGS (See page IG-1)****18. INSTALL IGNITION COIL (See page IG-7)****19. 1ZZ-FE:****INSTALL EXHAUST MANIFOLD**

- Install the lower heat insulator with the 3 bolts.
Torque: 12 N·m (123 kgf·cm, 9 ft·lbf)
- Install a new gasket, and the exhaust manifold with the 5 nuts. Uniformly tighten the nuts in several passes.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)
- Install the upper heat insulator with the 6 bolts.
Torque: 12 N·m (123 kgf·cm, 9 ft·lbf)
- Install the exhaust manifold stay with the 3 bolts.
Torque: 49 N·m (500 kgf·cm, 37 ft·lbf)



**20. 2ZZ-GE:****INSTALL EXHAUST MANIFOLD**

- (a) Install the lower heat insulator with the 4 bolts.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
- (b) Install the exhaust manifold with the 3 bolts and 2 nuts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
- (c) Install the upper heat insulator with the 5 bolts.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
- (d) Install the exhaust manifold stay with 4 bolts.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

21. INSTALL EXHAUST PIPE**22. INSTALL ALTERNATOR AND DRIVE BELT****(See page CH-5)****23. CONNECT ACCELERATOR CABLE****24. INSTALL AIR CLEANER ASSEMBLY****25. INSTALL ENGINE ECU BOX****26. INSTALL BATTERY****27. FILL WITH ENGINE COOLANT (See page CO-2)****28. START ENGINE AND CHECK FOR LEAKS****29. RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL**