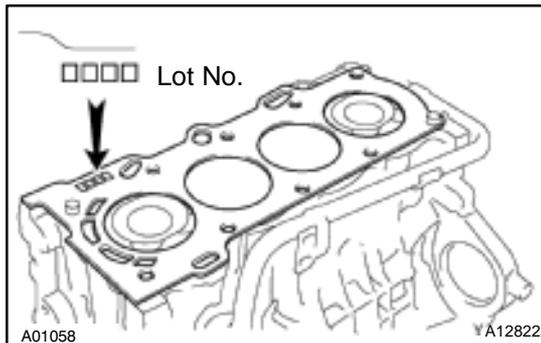


## INSTALLATION

### 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.



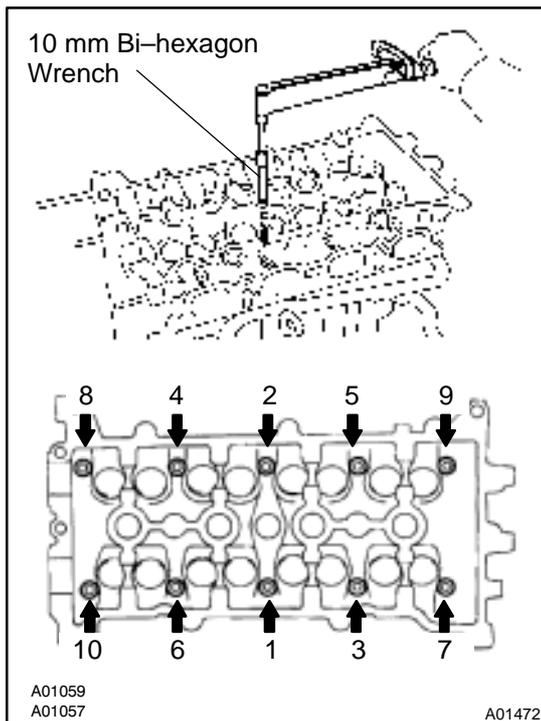
### 1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- Place a new cylinder head gasket on the cylinder block surface with the lot No. 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

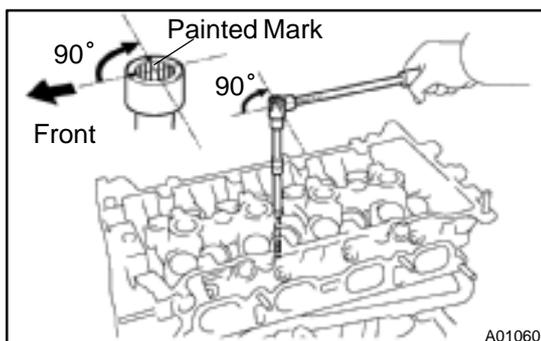
#### HINT:

- The cylinder head bolts are tightened in 2 steps (steps (b) and (d)).
- If any cylinder head bolt is broken or deformed, replace it.

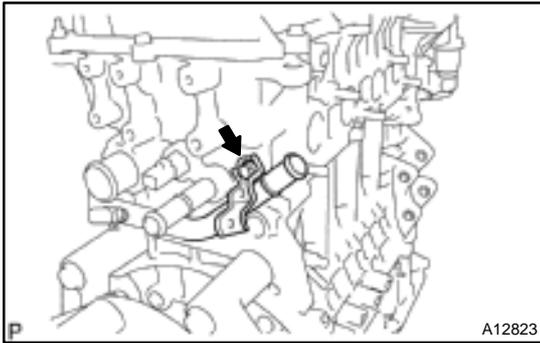
- Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- Using a 10 mm bi-hexagon wrench, install and uniformly tighten the 10 cylinder head bolts and plate washers in several passes, in the sequence shown.

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

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



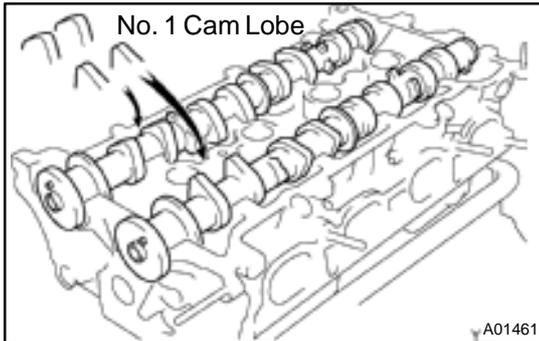
- Mark the front of the cylinder head bolt with paint.
- Retighten the cylinder head bolts 90° in the numerical order shown.
- Check that the painted mark is not at a 90° angle to the front.



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

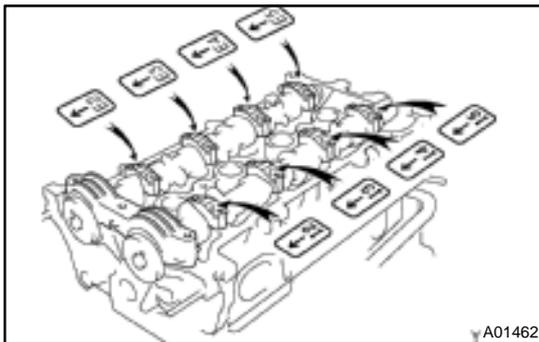
**Torque: 9 N·m (92 kgf·cm, 80 in.-lbf)**

- (g) Connect the upper radiator hose to the water hose union.  
 (h) Connect the heater hose to the water hose union.



### 3. INSTALL CAMSHAFTS

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

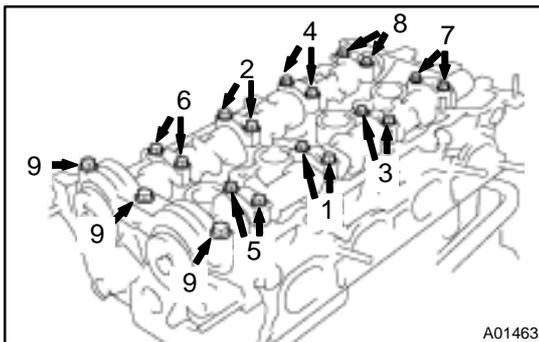


- (b) Install the bearing caps in their proper locations.

HINT:

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) Install and uniformly tighten the 19 bearing cap bolts. After tightening the No. 1 camshaft bearing cap, tighten them in several passes, in the sequence shown.

**Torque:**

**23 N·m (235 kgf·cm, 17 ft·lbf) for No. 1**

**13 N·m (133 kgf·cm, 10 ft·lbf) for No. 3**

#### 4. CHECK AND ADJUST VALVE CLEARANCE

(See page [EM-4](#))

#### 5. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE

(See page [SF-42](#))

#### 6. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE

FILTER (See page [SF-42](#))

#### 7. INSTALL CAMSHAFT TIMING SPROCKET AND VVT

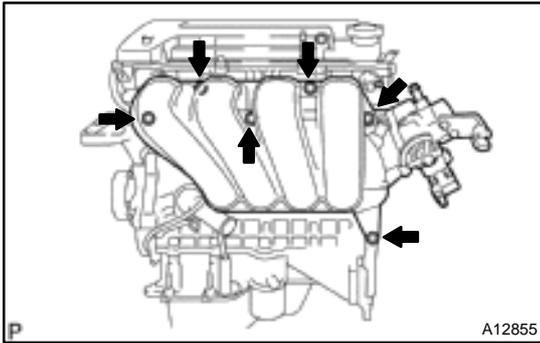
TIMING SPROCKET (See page [EM-20](#))

#### 8. INSTALL TIMING CHAIN (See page [EM-20](#))

#### 9. INSTALL CAMSHAFT POSITION SENSOR

(See page [IG-5](#))

#### 10. INSTALL OIL FILLER CAP



### 11. INSTALL INTAKE MANIFOLD AND THROTTLE BODY ASSEMBLY

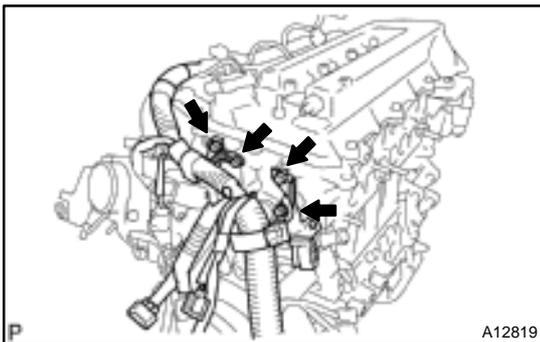
- (a) Install a new gasket to the intake manifold.
- (b) Install the intake manifold and throttle body assembly with the 2 brackets, 4 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

**Torque: 30 N·m (306 kgf-cm, 22 ft-lbf)**

- (c) Connect the 2 vacuum hoses to the intake manifold.
- (d) Connect the 2 water hoses to the throttle body.

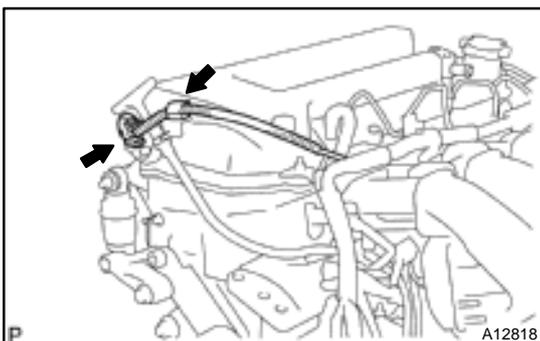
### 12. INSTALL PCV VALVE AND HOSES

- (a) Install the PCV valve with the grommet.
- (b) Install the PCV hoses.

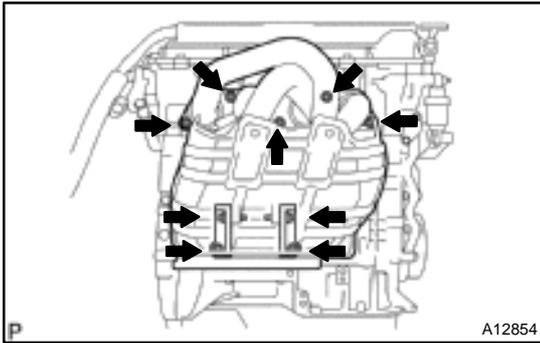


### 13. CONNECT ENGINE WIRE

- (a) Install the engine wire with the 2 bolts.
- (b) Install the 2 ground straps with the 2 bolts.
- (c) Connect the noise filter.
- (d) Connect the throttle position sensor connector.
- (e) Connect the IAC valve connector.
- (f) Connect the ECT sensor connector.
- (g) Connect the camshaft position sensor connector.
- (h) Connect the oil pressure switch connector and wire.
- (i) Connect the knock sensor connector.
- (j) Connect the crankshaft position sensor connector.
- (k) Connect the camshaft timing oil control valve connector.



- (l) Connect the heated oxygen sensor (bank 1 sensor 1) wire to the wire bracket.

**14. INSTALL EXHAUST MANIFOLD**

- (a) Install a new gasket and the exhaust manifold with the 5 nuts.

**Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)**

- (b) Install the 2 exhaust manifold stays with the 4 bolts.

**Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)**

- (c) Place the upper heat insulator on the exhaust manifold.

- (d) Install the 2 heated oxygen sensors (bank 1 sensor 1, bank 2 sensor 1).

**Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)**

- (e) Install the upper heat insulator with the 4 bolts.

- (f) Connect the 2 heated oxygen sensors.

**15. INSTALL INJECTORS (See page [SF-27](#))****16. INSTALL SPARK PLUGS (See page [IG-1](#))****17. INSTALL IGNITION COILS (See page [IG-4](#))****18. INSTALL GENERATOR (See page [CH-17](#))****19. INSTALL ENGINE UNIT (See page [EM-59](#))**