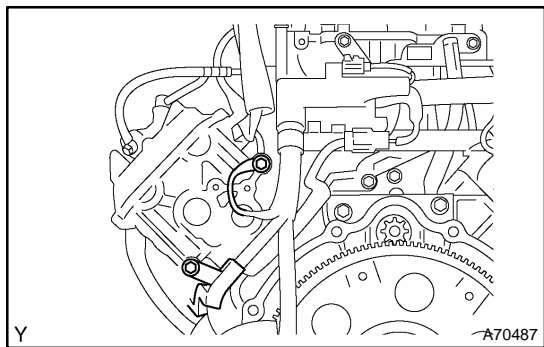


## REPLACEMENT

1. **WORK FOR PREVENTING GASOLINE FROM SPILLING OUT (See page 11-1 )**
2. **REMOVE TIMING BELT (See page 14-107 )**
3. **REMOVE CAMSHAFT (LH BANK) (See page 14-141 )**
4. **DISCONNECT FUEL HOSE**
5. **DISCONNECT FUEL HOSE NO.2**
6. **DISCONNECT FUEL VAPOR FEED HOSE ASSY**
7. **SEPARATE ENGINE WIRE**
  - (a) Disconnect 8 fuel injector connectors.
  - (b) Remove the 3 bolts and separate engine wire harness.
8. **DISCONNECT WATER BY-PASS HOSE NO.7**
9. **DISCONNECT WATER BY-PASS HOSE**
10. **REMOVE INTAKE MANIFOLD ASSY**
  - (a) Remove the 6 bolts and 4 nuts.
  - (b) Remove the intake manifold assy and 2 gaskets.
11. **REMOVE WATER INLET HOUSING**
  - (a) Remove the 2 bolts.
  - (b) Remove the water inlet housing and gasket from engine.
12. **REMOVE WATER BY-PASS JOINT FR**
  - (a) Remove the 4 nuts.
  - (b) Remove the water by-pass joint and 2 gaskets.
13. **REMOVE WATER BY-PASS PIPE SUB-ASSY**
  - (a) Remove the bolt and water by-pass.
14. **REMOVE WATER BY-PASS JOINT RR**
  - (a) Remove the 4 nuts, water by-pass joint and 2 gaskets.

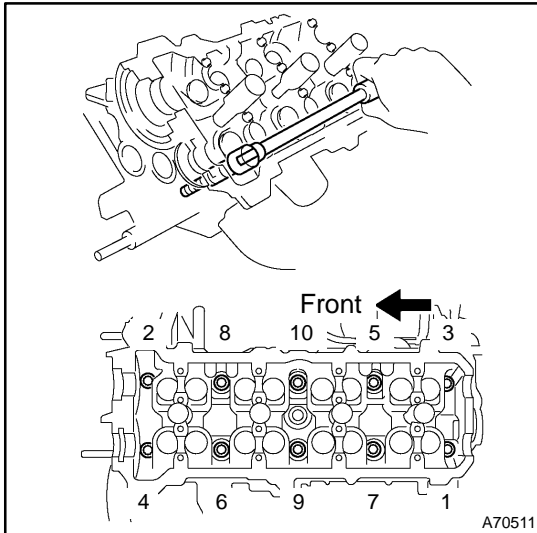


### 15. **DISCONNECT WIRE, ENGINE**

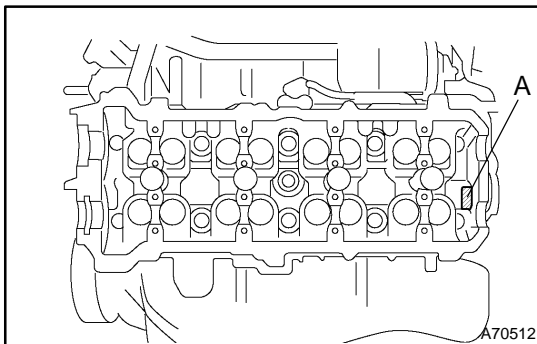
- (a) Remove the 2 bolts as shown in the illustration.

### 16. **SEPARATE FRONT EXHAUST PIPE**

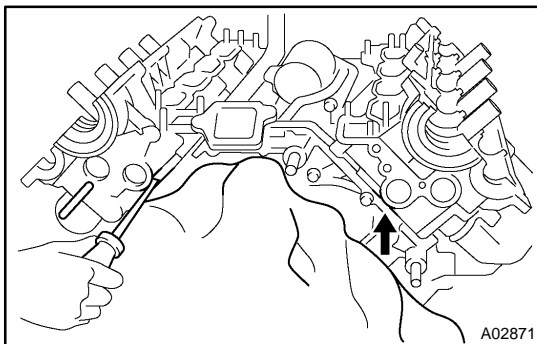
- (a) Remove the 2 bolts and separate the front exhaust pipe.

**17. REMOVE CYLINDER HEAD SUB-ASSY**

- (a) Uniformly loosen and remove the sequence shown. Remove the 10 cylinder head bolts and plate washers.

**NOTICE:**

- Cylinder head warpage or cracking could result from removing bolts in incorrect order.
- Do not drop the plate washer for cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.



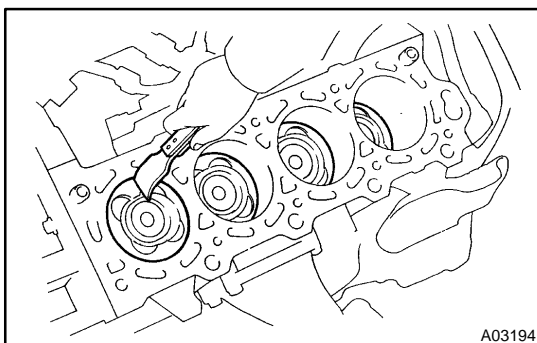
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the cylinder head on wooden blocks on a bench.

**HINT:**

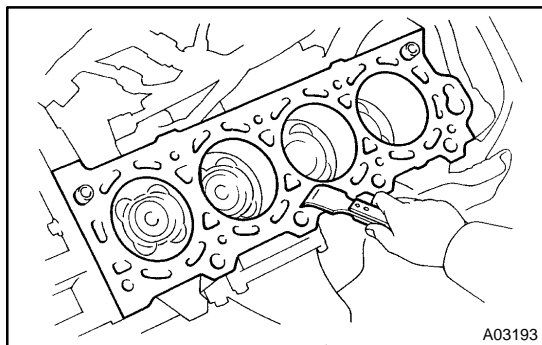
If the cylinder head is lift off, pry between the cylinder head and cylinder block with a screwdriver.

**NOTICE:**

- Be careful not to damage the contact surfaces of the cylinder head and cylinder block.
- The cylinder head should not be tilted so as to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.

**18. REMOVE CYLINDER HEAD GASKET NO.2****19. CLEAN CYLINDER BLOCK SUB-ASSY**

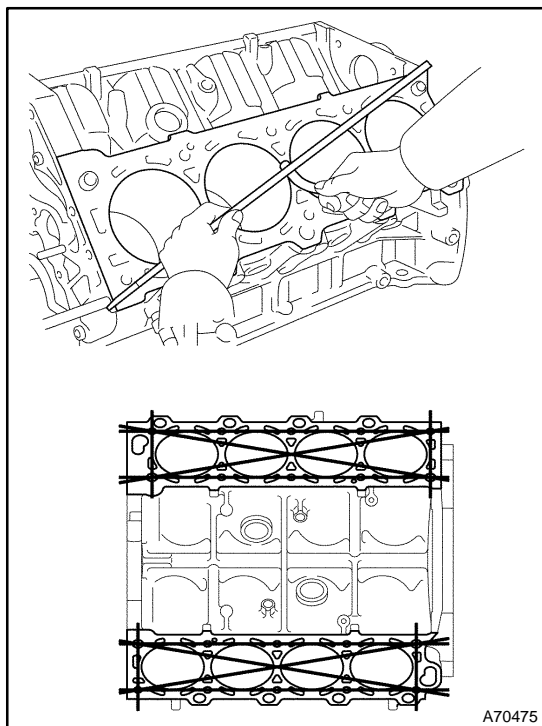
- (a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

**CAUTION:**

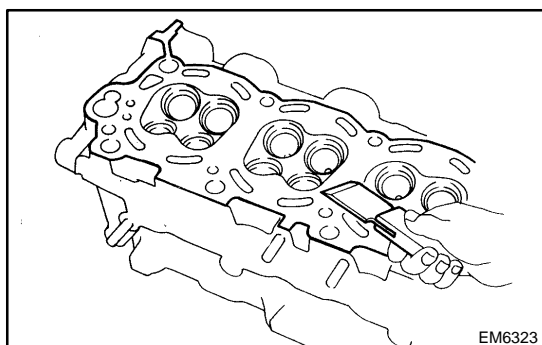
**Protect your eyes when using high pressure compressed air.**

**20. INSPECT CYLINDER BLOCK FOR FLATNESS**

- (a) Inspect for flatness.  
Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head and main bearing cap for warpage.

**Maximum warpage: 0.07 mm (0.0028 in.)**

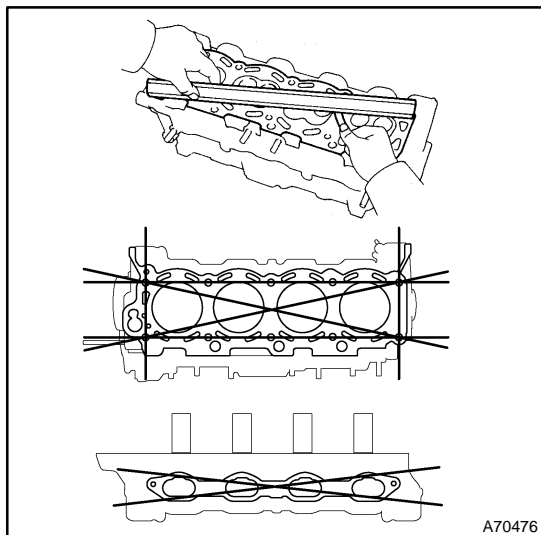
If warpage is greater than maximum, replace the cylinder block.

**21. CLEAN CYLINDER HEAD SUB-ASSY**

- (a) Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

**NOTICE:**

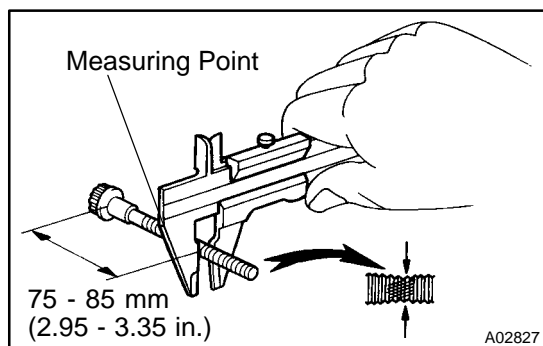
**Be careful not to scratch the cylinder block contact surface.**

**22. INSPECT CYLINDER HEAD FOR FLATNESS**

- (a) Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

**Maximum warpage: 0.10 mm (0.0039 in.)**

If warpage is greater than maximum, replace the cylinder head.

**23. INSPECT CYLINDER HEAD SET BOLT**

- (a) Using vernier calipers, measure the thread outside diameter of the bolt.

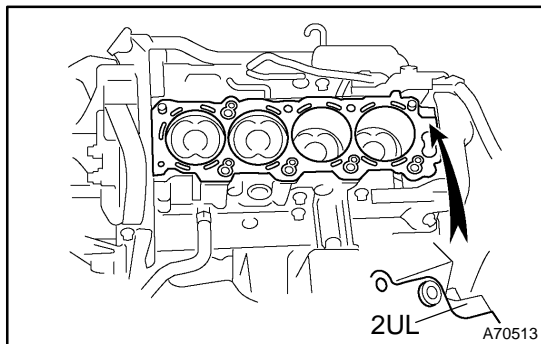
**Standard outside diameter:**

**9.810 - 9.960 mm (0.3862 - 0.3921 in.)**

**Minimum outside diameter:**

**9.700 mm (0.3819 in.)**

If the diameter is less than minimum, replace the bolt.

**24. INSTALL CYLINDER HEAD GASKET**

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

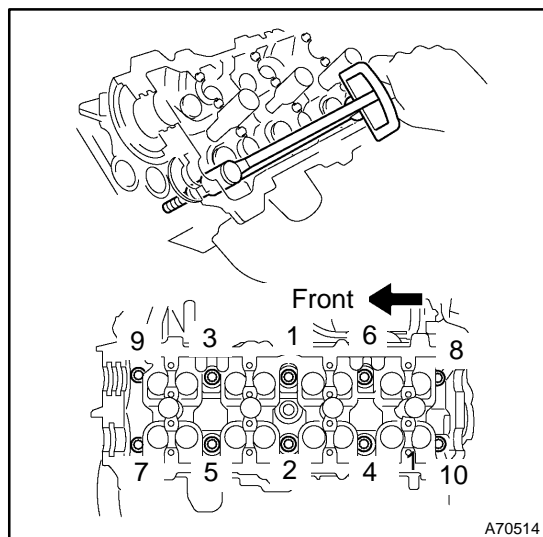
**HINT:**

On the rear side of the cylinder head gasket are marks to distinguish the LH and RH banks, a "2UR" mark for the RH bank and a "2UL" mark for the LH bank.

**NOTICE:**

**Be careful of the installation direction.**

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



## 25. INSTALL CYLINDER HEAD SUB-ASSY

### HINT:

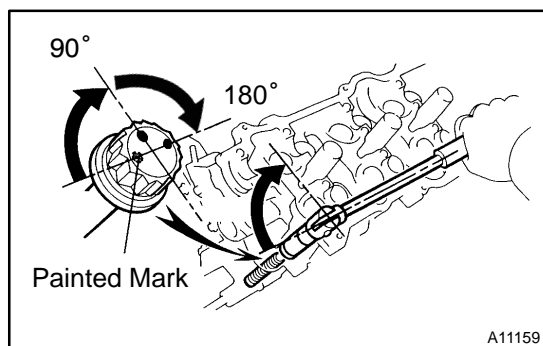
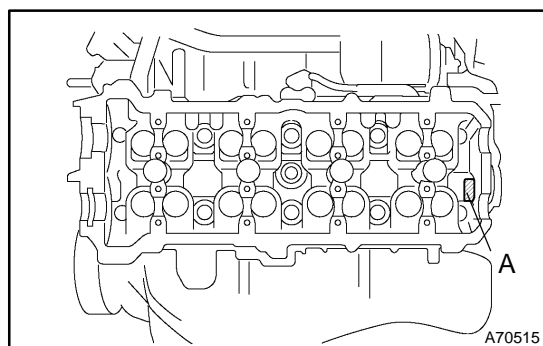
- The cylinder head bolts are tightened in 2 progressive steps.
  - If any cylinder head bolt is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
  - (b) Install the plate washer to the cylinder head bolt.
  - (c) Install and uniformly tighten the 10 cylinder head bolts, and plate washers, in the sequence shown.

**Torque: 32 N·m (325 kgf·cm, 24 ft·lbf)**

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

### NOTICE:

**Do not drop the plate washer for cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.**

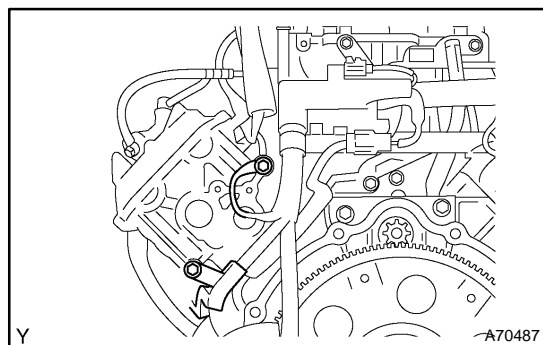


- (d) Mark the front of the cylinder head bolt head with paint.
- (e) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (f) Retighten the cylinder head bolts by an additional 90°.
- (g) Check that the painted mark is now at a 180° angle to front.

## 26. INSTALL FRONT EXHAUST PIPE

- (a) Place the new gasket to the front exhaust pipe.
- (b) Install the 2 nuts and front exhaust pipe.

**Torque: 62 N·m (632 kgf·cm, 46 ft·lbf)**



## 27. CONNECT WIRE, ENGINE

- (a) Connect the engine wire with 2 bolts as shown in the illustration.

28. **INSTALL WATER BY-PASS JOINT RR (See page 14-21 )**
29. **INSTALL WATER BY-PASS JOINT FR(See page 14-21 )**
30. **INSTALL WATER INLET HOUSING**
  - (a) Install the new gasket and water inlet housing with 2 bolts.  
**Torque: 18 N·m (185 kgf·cm, 13 in·lbf)**
31. **INSTALL WATER BY-PASS PIPE SUB-ASSY**
  - (a) Install a new O-ring to the water by-pass pipe.
  - (b) Apply soapy water to the O-ring.
  - (c) Push in the water by-pass pipe end into the pipe hole of the water pump.
  - (d) Install the water by-pass pipe with the bolt.  
**Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**
32. **INSTALL INTAKE MANIFOLD ASSY**
  - (a) Install the 2 new gaskets to cylinder head.
  - (b) Install the intake manifold assy with the 6 bolts and 2 nuts.  
**Torque:**  
**Bolt 18 N·m (185 kgf·cm, 13 ft·lbf)**  
**Nut 18 N·m (185 kgf·cm, 13 ft·lbf)**
33. **CONNECT WATER BY-PASS HOSE**
34. **CONNECT WATER BY-PASS HOSE NO.7**
35. **INSTALL ENGINE WIRE**  
**Torque: 8.2 N·m (83 kgf·cm, 72 in·lbf)**
36. **CONNECT FUEL VAPOR FEED HOSE ASSY**
37. **CONNECT FUEL HOSE NO.2**
38. **CONNECT FUEL HOSE**
39. **INSTALL CAMSHAFT (LH BANK)(See page 14-141 )**
40. **INSTALL TIMING BELT (See page 14-107 )**