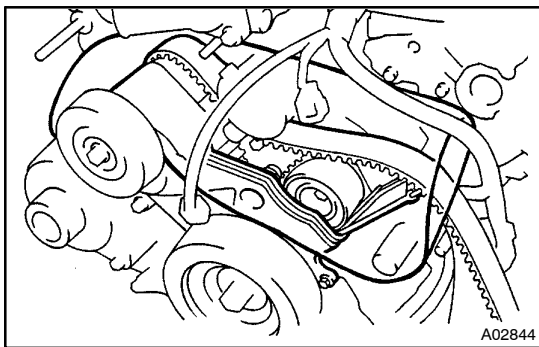


REMOVAL

1. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
2. REMOVE CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
3. REMOVE CAMSHAFT POSITION SENSOR (See page [IG-9](#))
4. DISCONNECT PS PUMP FROM ENGINE (See page [EM-76](#))
5. REMOVE FRONT EXHAUST PIPE (See page [EM-113](#))
6. REMOVE OIL DIPSTICK AND GUIDE FOR A/T
7. REMOVE IGNITION COILS (See page [IG-6](#))
8. REMOVE TIMING BELT REAR PLATES
9. REMOVE V-BANK COVER

Remove the V-bank covers.

- (1) Remove the 3 bolts, stud bolt, and RH No.1 timing belt rear plates.
- (2) Disconnect the wire clamp from the LH timing belt rear plate.
- (3) Remove the 3 bolts, stud bolt, LH No.1 and timing belt rear plates.



NOTICE:

- Be careful not to drop anything inside the timing belt cover.
- Do not allow the belt to come into contact with oil, water or dust.

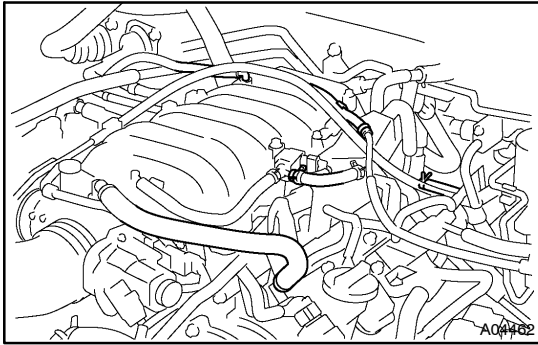
10. DISCONNECT FUEL INLET HOSE (See page [SF-24](#))

11. REMOVE INTAKE MANIFOLD ASSEMBLY

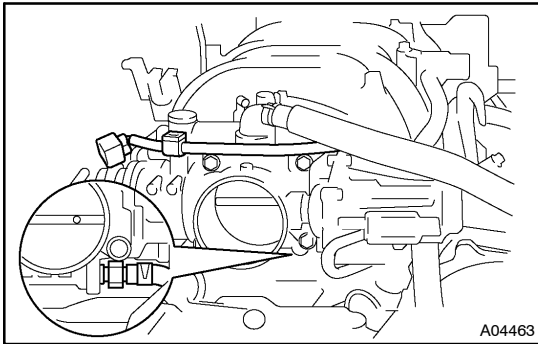
(a) Disconnect the accelerator cable.

(b) Disconnect these connectors:

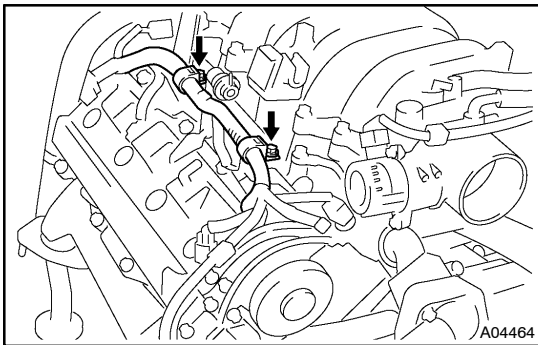
- Throttle position sensor connector
- Accelerator pedal position sensor connector
- Throttle motor connector
- VSV connector for EVAP
- 8 injector connectors
- ECT sensor
- Water sender gauge
- 8 ignition coil connector
- 2 oxygen sensor connector



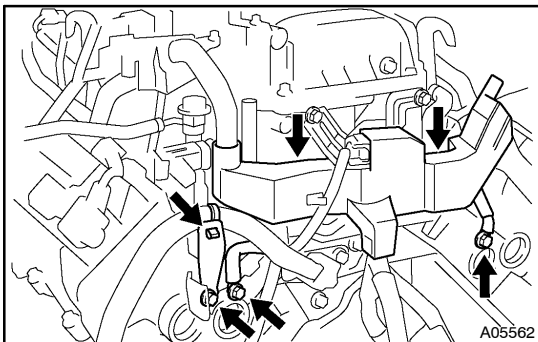
- (c) Disconnect these hoses:
- Fuel pressure regulator vacuum hose from fuel pressure regulator pipe.
 - PCV hose from PCV valve on LH cylinder head
 - EVAP hose (from charcoal canister) from VSV for EVAP
 - EVAP hose (from charcoal canister) from EVAP pipe on the intake manifold
 - EVAP hose (from intake air connector) from EVAP pipe on the intake manifold
 - PS air hose from intake manifold



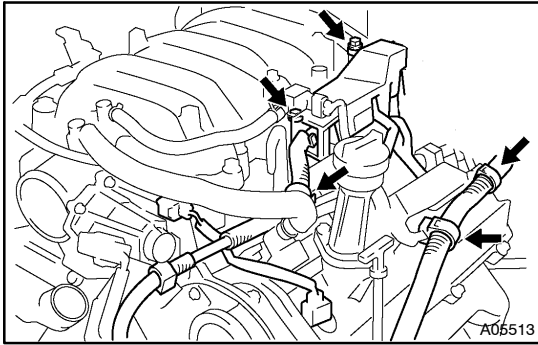
- (d) Disconnect the 2 wire clamp from the throttle body.
 (e) No.1 water bypass hose (from the front water by-pass joint).



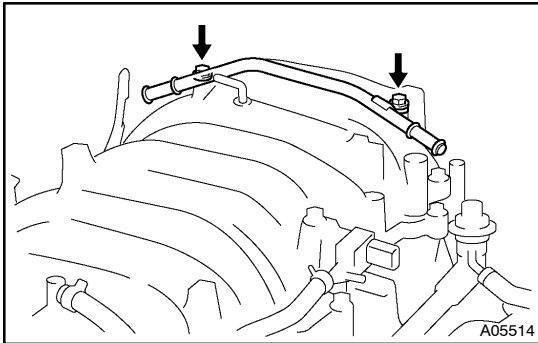
- (f) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.



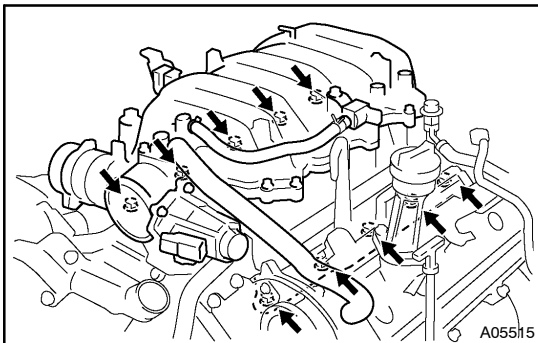
- (g) Remove the 2 bolts and disconnect the engine wire protector from the rear water bypass joint and RH cylinder head.
 (h) Remove the guide for A/T bracket from the LH cylinder head.
 (i) Remove the 2 ground cables from the RH and LH cylinder head.



- (j) Remove the 2 bolts and disconnect the engine wire protector from the intake manifold.
- (k) Remove the engine wire from the engine hanger.
- (l) Remove the engine wire from the wire bracket.

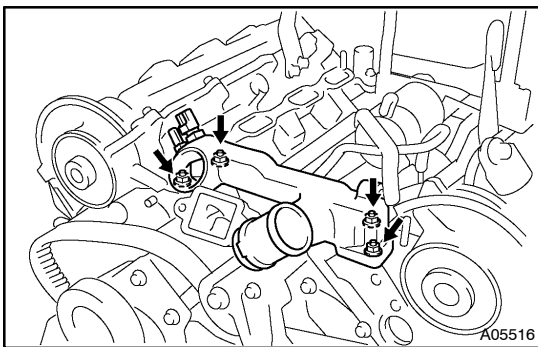


- (m) Remove the 2 bolts and EVAP pipe from the intake manifold.
- (n) Remove the RH rear and LH front V-bank cover brackets.



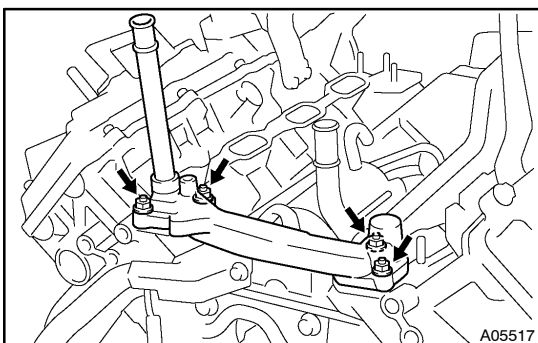
- (o) Remove the 6 bolts, 4 nuts, the intake manifold assembly and 2 gaskets.

12. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY (See page [CO-6](#))



13. REMOVE FRONT WATER BYPASS JOINT

Remove the 4 nuts, water bypass joint and 2 gaskets.

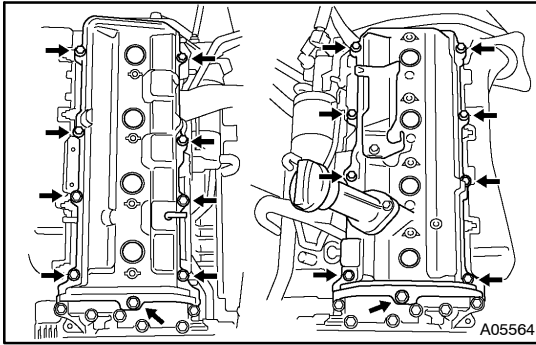


14. REMOVE REAR WATER BYPASS JOINT

Remove the 4 nuts, water bypass joint and 2 gaskets.

15. REMOVE ENGINE HANGERS

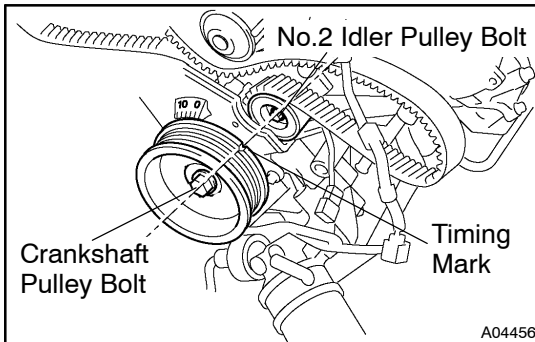
16. REMOVE OIL DIPSTICK AND GUIDE FOR A/T



17. REMOVE CYLINDER HEAD COVERS

Remove the 18 bolts, 18 seal washers, cylinder head cover and gasket. Remove the 2 cylinder head covers.

18. IF NECESSARY, REMOVE SEMI-CIRCULAR PLUGS AND CAMSHAFT HOUSING PLUGS



19. REMOVE CAMSHAFTS

NOTICE:

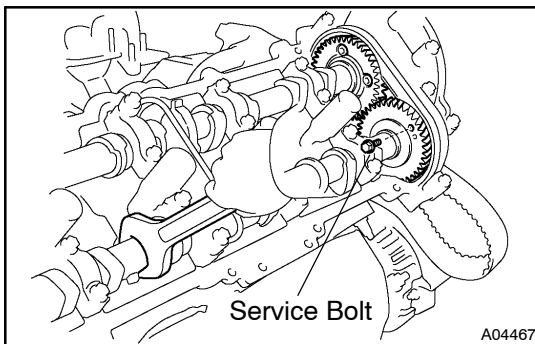
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following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

- (a) Check the crankshaft pulley position.

Check that the timing mark of the crankshaft pulley is in aligned with the centers of the crankshaft pulley bolt and idler pulley bolt.

NOTICE:

Having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft, causing damage. So always set the crankshaft pulley at the correct angle.



- (b) Remove the RH camshafts.

- (1) Boring the service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
- (2) Secure the sub-gear to the main gear with a service bolt.

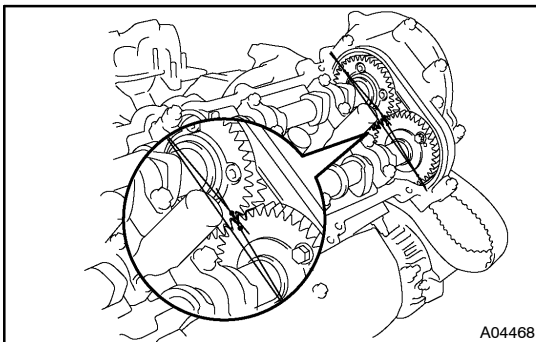
Recommended service bolt:

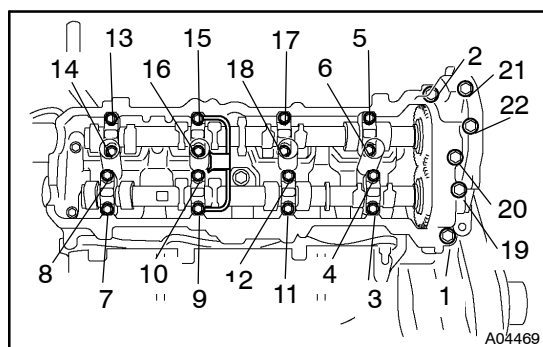
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm

HINT:

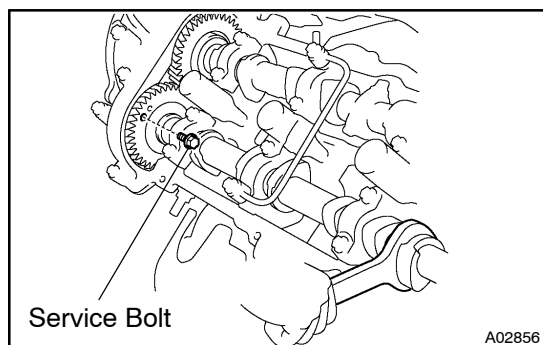
When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.

- (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.





- (4) Uniformly loosen and remove the 22 bearing cap bolts in several passes, in the sequence shown.
- (5) Remove the oil feed pipe, 9 bearing caps, cam shaft timing oil control valve and camshafts.



- (c) Remove the LH camshafts.
 - (1) Boring the service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

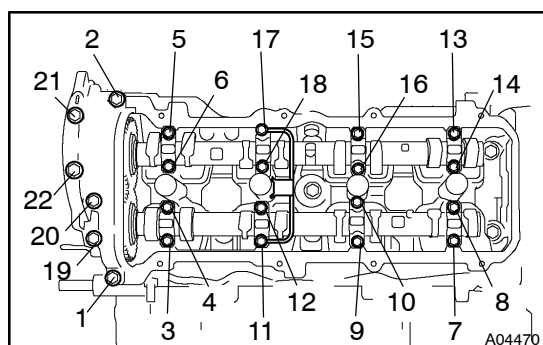
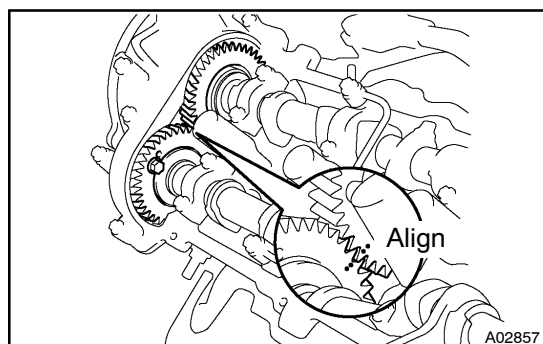
Recommended service bolt:

Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm

HINT:

When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.

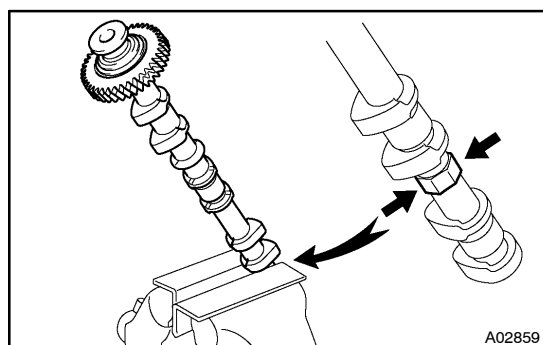
- (3) Align the timing mark (2 dot marks) of the camshaft drive gear by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.



- (4) Uniformly loosen and remove the 22 bearing cap bolts in several passes, in the sequence shown.
- (5) Remove the oil feed pipe, 9 bearing caps and camshafts.

HINT:

Arrange the bearing caps in correct order.

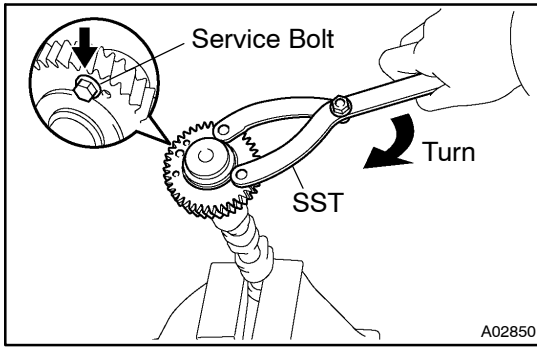


20. DISASSEMBLE EXHAUST CAMSHAFTS

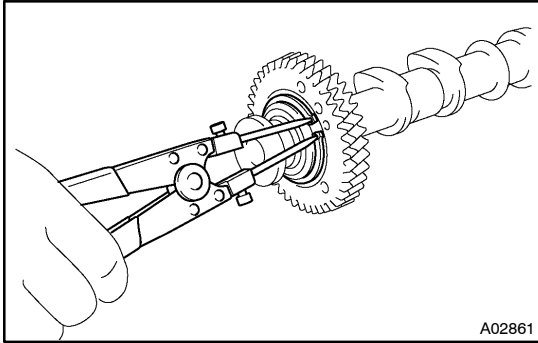
- (a) Mount the hexagon wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



- (b) Using SST, turn the sub-gear clockwise, and remove the service bolt.
SST 09960-10010 (09962-01000, 09963-00500)



- (c) Using snap ring pliers, remove the snap ring.
(d) Remove these parts:
- Wave washer
 - Camshaft sub-gear
 - Camshaft gear spring

HINT:

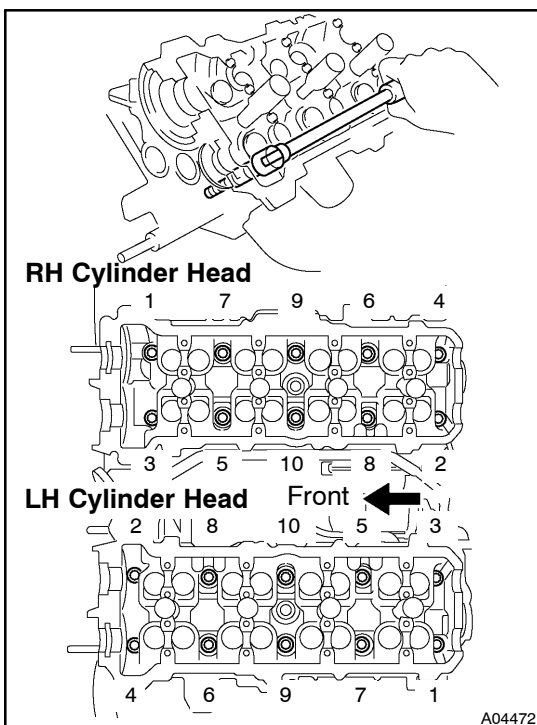
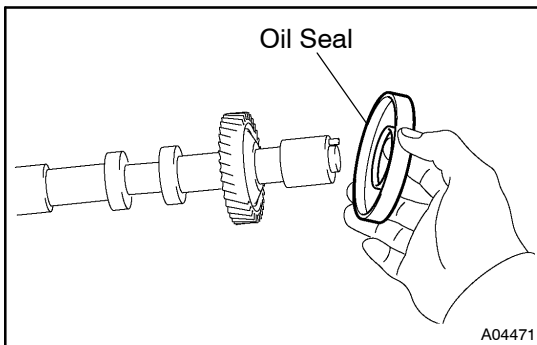
Arrange the camshaft sub-gears and gear spring (RH and LH sides).

NOTICE:

Be careful not to damage the camshaft timing tube.

21. REMOVE OIL SEAL FROM INTAKE CAMSHAFT

22. REMOVE SPARK PLUGS

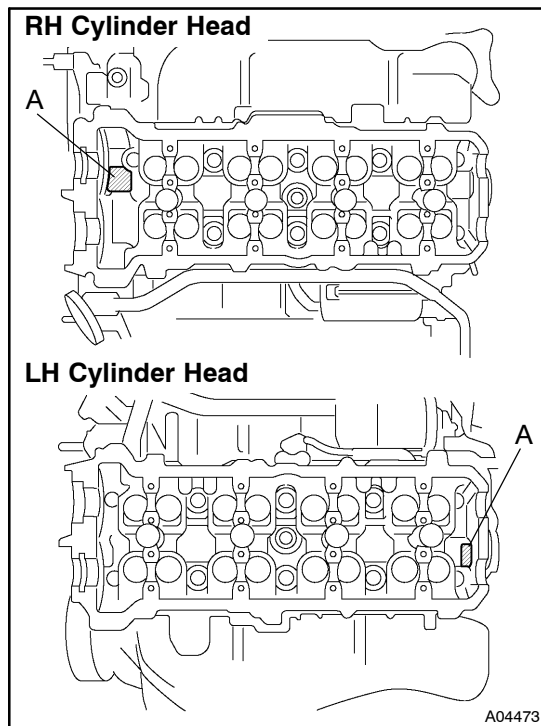


23. REMOVE CYLINDER HEAD AND EXHAUST MANIFOLD ASSEMBLIES

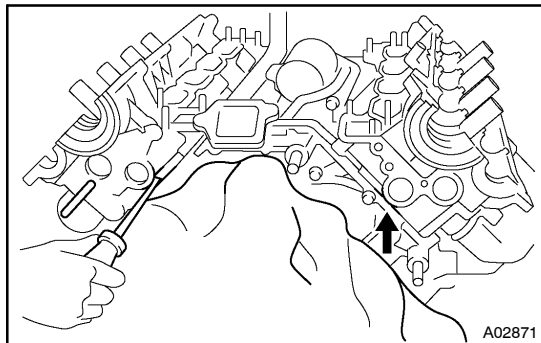
- (a) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in several passes, in the sequence shown, then do the other side as shown. Remove the 20 cylinder head bolts and plate washers.

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.



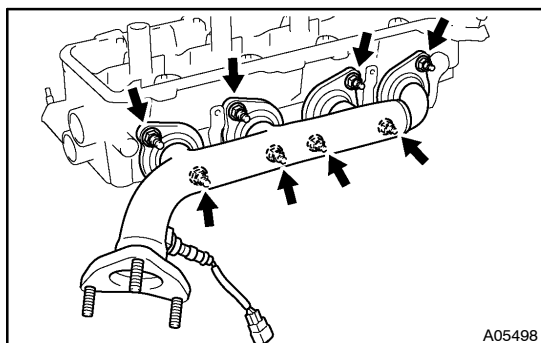
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

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

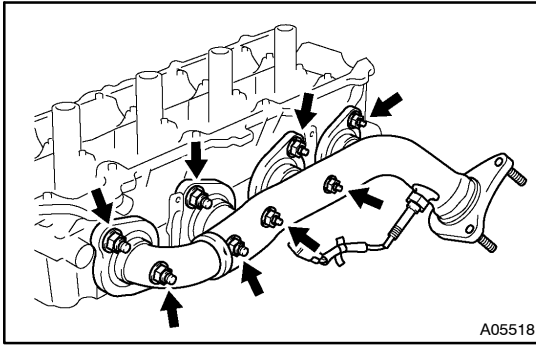
NOTICE:

- 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.



24. REMOVE RH EXHAUST MANIFOLD FROM CYLINDER HEAD

- (a) Remove the 4 bolts and heat insulator.
 (b) Remove the 8 nuts, exhaust manifold and gasket.

**25. REMOVE LH EXHAUST MANIFOLD FROM CYLINDER HEAD**

- (a) Remove the 4 bolts and heat insulator.
- (b) Remove the 8 nuts, exhaust manifold and gasket.