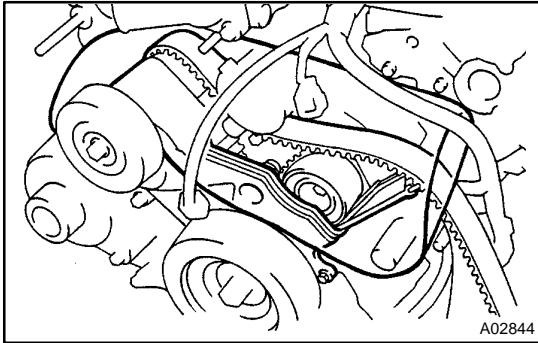


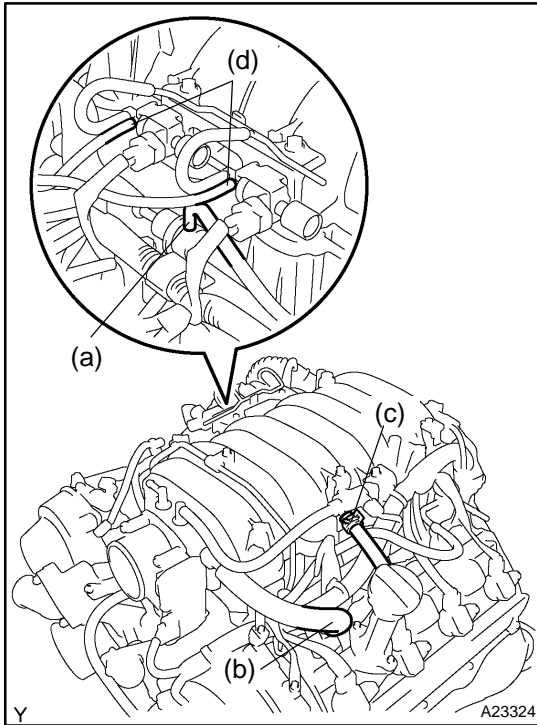
REMOVAL

1. DRAIN ENGINE COOLANT
2. REMOVE THROTTLE BODY COVER
3. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page [EM-16](#))

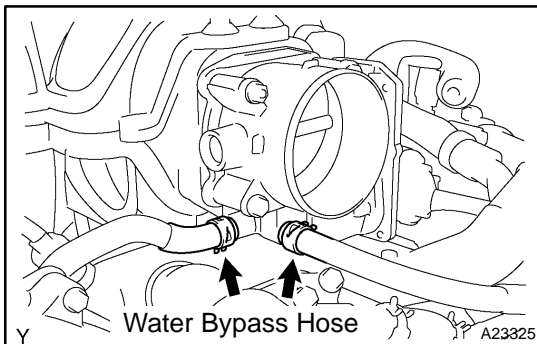


NOTICE:

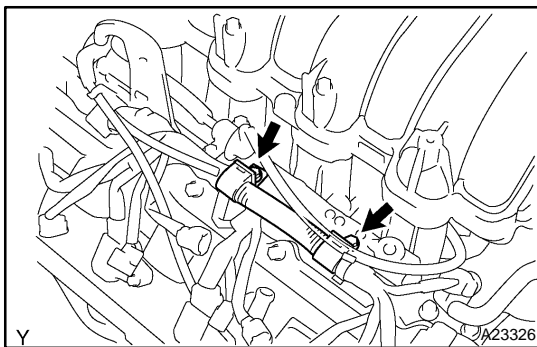
- Be careful not to drop anything inside the timing belt cover.
 - Do not allow the belt to come into contact with oil, water or dust.
4. REMOVE CAMSHAFT TIMING PULLEYS (See page [EM-16](#))
 5. REMOVE CAMSHAFT POSITION SENSOR (See page [IG-8](#))
 6. DISCONNECT PS PUMP FROM ENGINE (See page [EM-79](#))
 7. REMOVE FRONT EXHAUST PIPE (See page [EM-126](#))
 8. REMOVE OIL DIPSTICK AND GUIDE FOR A/T
 9. REMOVE IGNITION COILS (See page [IG-5](#))
 10. REMOVE TIMING BELT REAR PLATES
 - (a) Remove the 3 bolts, stud bolt and RH No.1 timing belt rear plates.
 - (b) Disconnect the wire clamp from the LH timing belt rear plate.
 - (c) Remove the 3 bolts, stud bolt and LH No.1 timing belt rear plates.
 11. DISCONNECT FUEL INLET HOSE (See page [SF-27](#)) AND FUEL RETURN HOSE
 12. DISCONNECT CONNECTORS FROM INTAKE MANIFOLD
 - (a) Disconnect the throttle control connector.
 - (b) Disconnect the VSV connector for EVAP.
 - (c) Disconnect the 8 injector connectors.
 - (d) Disconnect the ECT sensor connector.
 - (e) Disconnect the 2 VSV connectors for the air injection system.
 - (f) Disconnect the 8 ignition coil connectors.
 - (g) Disconnect the 2 air fuel ratio sensor connectors.

**13. DISCONNECT HOSES FROM INTAKE MANIFOLD**

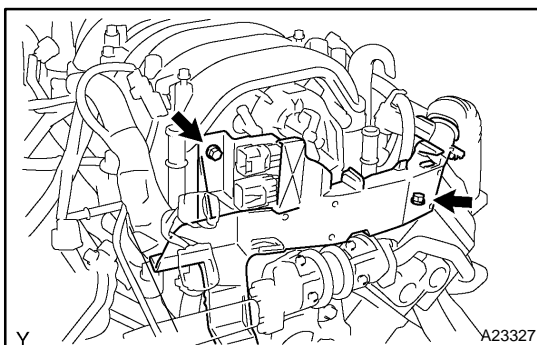
- (a) Disconnect the vacuum hose from the fuel pressure regulator.
- (b) Disconnect the PCV hose from the PCV valve on the LH cylinder head.
- (c) Disconnect the EVAP hose (from charcoal canister) from the VSV for the EVAP.
- (d) Disconnect the 2 vacuum hoses from the VSV for the air injection system.

**14. REMOVE INTAKE MANIFOLD ASSEMBLY**

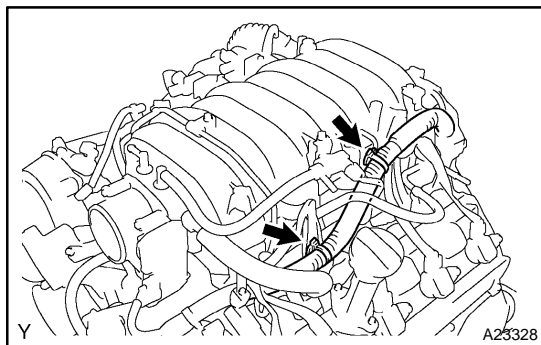
- (a) Disconnect the 2 water bypass hoses from the throttle body.



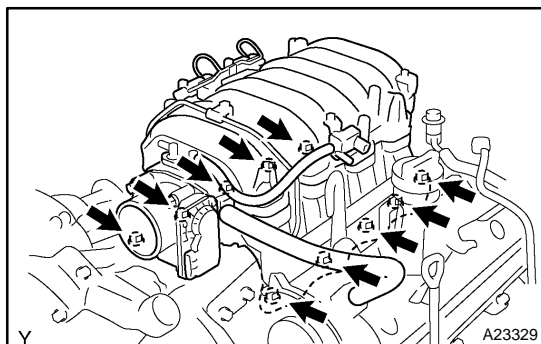
- (b) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.



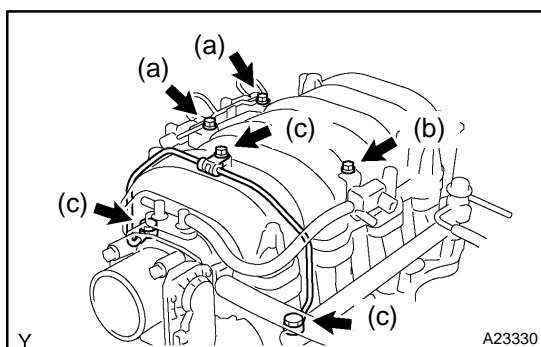
- (c) Remove the 2 bolts holding the engine wire protector from the intake manifold and cylinder head.
- (d) Remove the 2 bolts and ground cables from the RH and LH cylinder heads.
- (e) Remove the bolt and throttle body cover bracket from the intake manifold.



- (f) Disconnect the engine wire from the engine hanger and wire bracket.
- (g) Remove the wire bracket from the intake manifold.

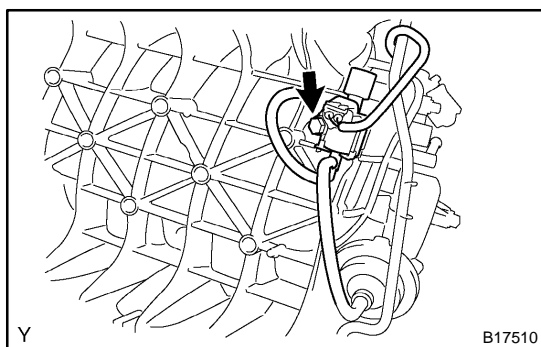


- (h) Remove the 6 bolts, 4 nuts, intake manifold assembly and 2 gaskets.

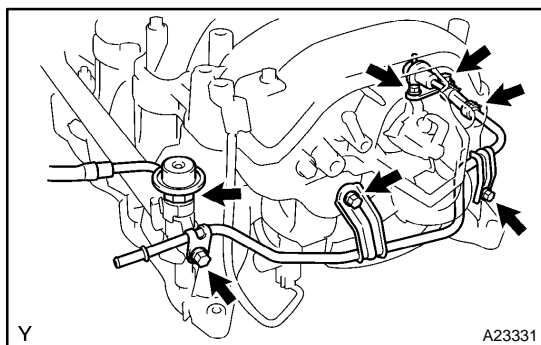


15. DISASSEMBLE INTAKE MANIFOLD

- (a) Remove the 2 bolts and VSVs for the air injection system.
- (b) Disconnect the EVAP hose from the upper intake manifold, and remove the VSV for EVAP.
- (c) Remove the bolt, 2 unions, 4 gaskets and front fuel pipe from the intake manifold.
- (d) Remove the throttle body (see page [SF-44](#)).

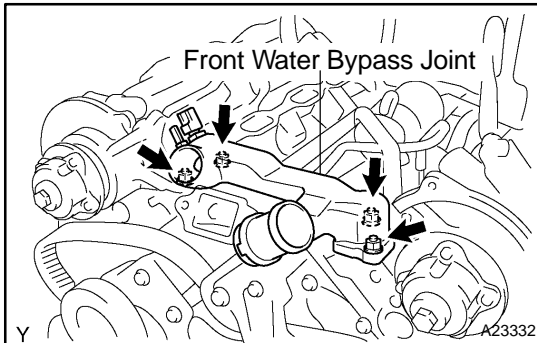


- (e) Remove the bolt and VSV for ACIS from the intake manifold.

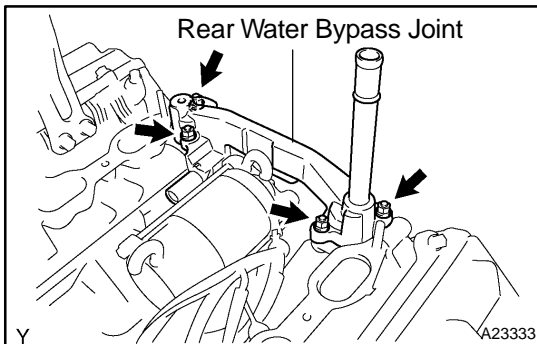


- (f) Disconnect the fuel return hose from the fuel pressure regulator.
- (g) Remove the 3 bolts and fuel return pipe from the intake manifold.
- (h) Remove the 2 bolts, fuel pressure regulator and O-ring.
- (i) Remove the fuel pressure pulsation damper and 2 gaskets.
- (j) Remove the 2 delivery pipes and 8 injectors (see page [SF-27](#)).

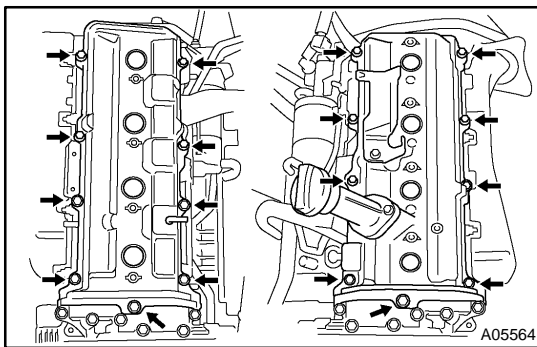
16. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY (See page [CO-6](#))
17. REMOVE AIR PUMP ASSEMBLY (See page [EC-23](#))
18. REMOVE NO.2 AIR SWITCHING VALVES
(See page [EC-23](#))



19. REMOVE FRONT WATER BYPASS JOINT
Remove the 4 nuts, water bypass joint and 2 gaskets.



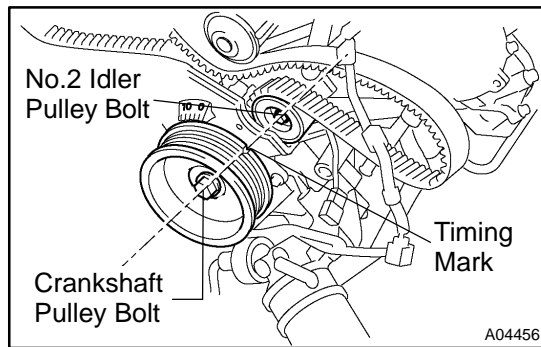
20. REMOVE REAR WATER BYPASS JOINT
Remove the 4 nuts, water bypass joint and 2 gaskets.
21. REMOVE ENGINE HANGERS



22. REMOVE CYLINDER HEAD COVERS
Remove the 18 bolts, seal washers, RH and LH cylinder head covers and 2 gaskets.
23. IF NECESSARY, REMOVE SEMI-CIRCULAR PLUGS AND CAMSHAFT HOUSING PLUGS
24. REMOVE CAMSHAFTS

NOTICE:

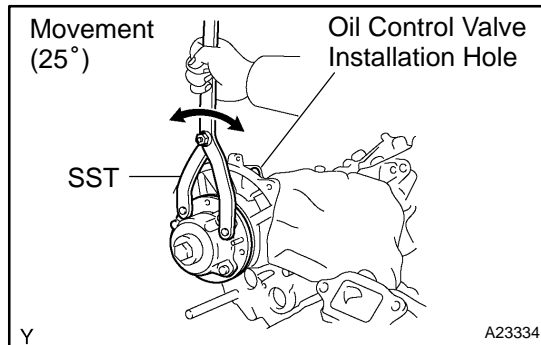
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following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



- (a) Check the crankshaft pulley position.
Check that the timing mark of the crankshaft pulley is 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.

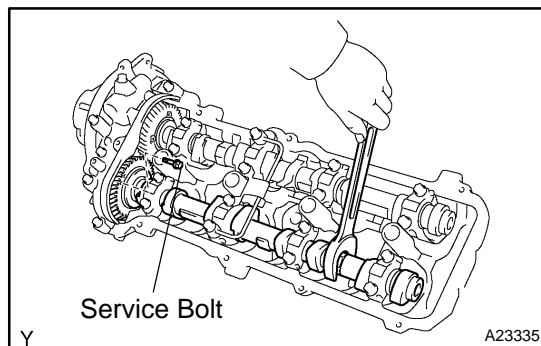


- (b) Release the oil from the front bearing caps.
Using SST, rotate the camshaft timing tube from left to right 2 to 3 times within its VVT-i range (25°) and use a waste cloth to collect the oil from the camshaft timing oil control valve installation hole.

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NOTICE:

Approximately 20 cc (1.2 cu in.) of oil will be ejected. Take care not to spill it.



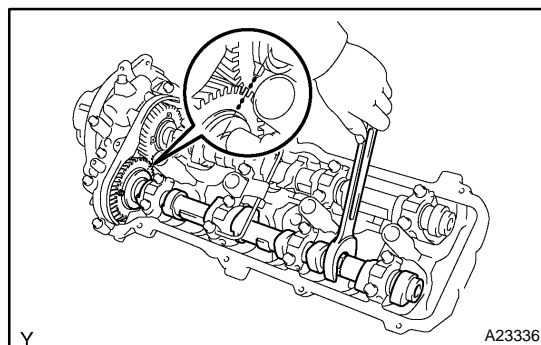
- (c) Remove the LH camshafts.
(1) Bring the service bolt hole of the sub-gear upward by turning the hexagon head portion of the exhaust camshaft with a wrench.
(2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

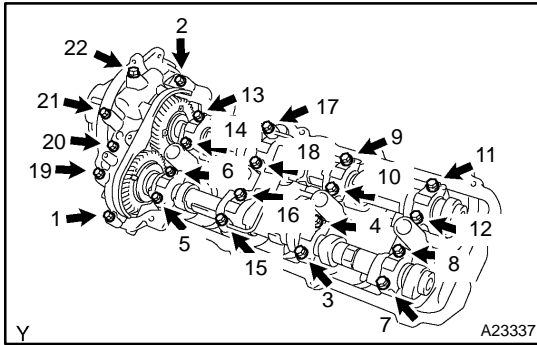
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)

HINT:

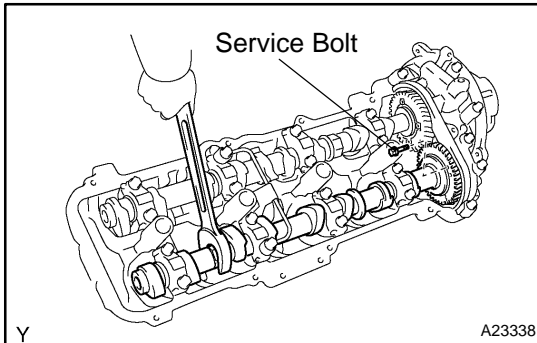
When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



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



- (4) Uniformly loosen the 22 bearing cap bolts in several steps, in the sequence shown.
- (5) Remove the 22 bearing cap bolts, 4 seal washers, oil feed pipe, 9 bearing caps, camshaft housing plug, oil control valve filter and 2 camshafts.



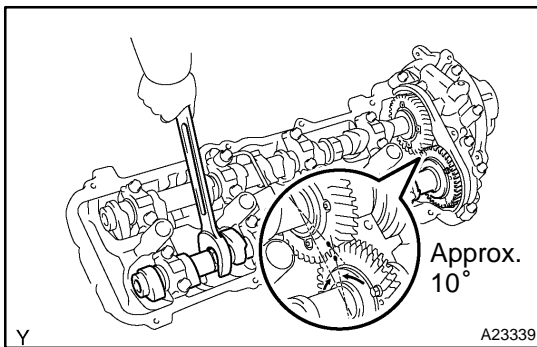
- (d) Remove the RH camshafts.
 - (1) Bring the service bolt hole of the sub-gear upward by turning the hexagon head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

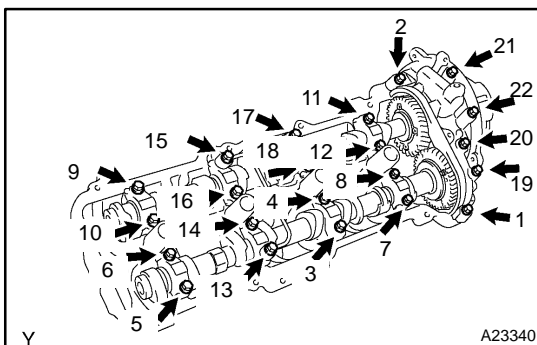
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 to 20 mm (0.63 to 0.79 in.)

HINT:

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



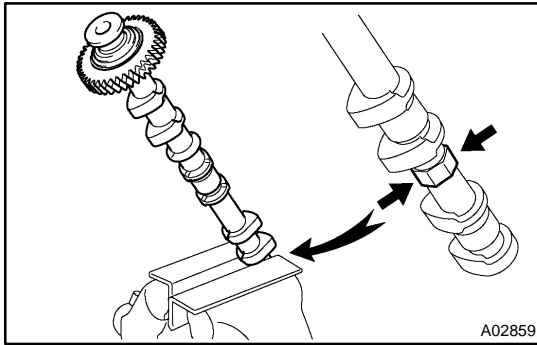
- (3) Set the timing mark (1-dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagon head portion of the exhaust camshaft with a wrench.



- (4) Uniformly loosen the 22 bearing cap bolts in several steps, in the sequence shown.
- (5) Remove the 22 bearing cap bolts, 4 seal washers, oil feed pipe, 9 bearing caps, camshaft housing plug, strainer and 2 camshafts.

HINT:

Arrange the bearing caps for RH and LH sides.

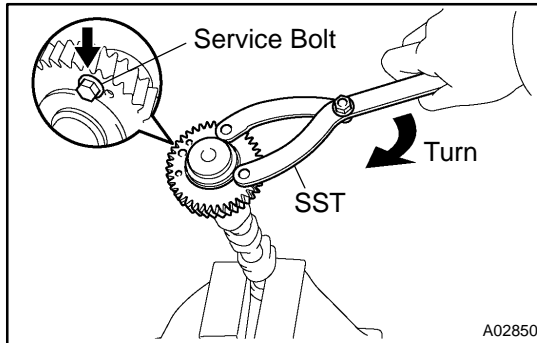


25. DISASSEMBLE EXHAUST CAMSHAFTS

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

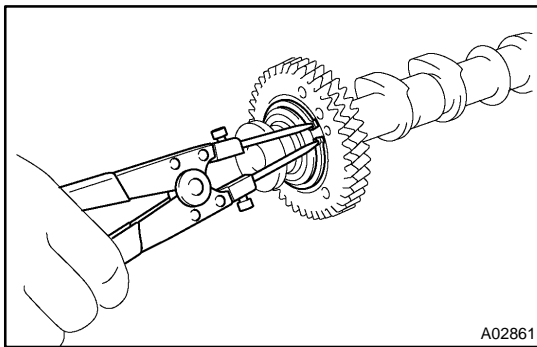
NOTICE:

Be careful not to damage the camshaft.



- (b) Using SST, turn the sub-gear clockwise, and remove the service bolt.

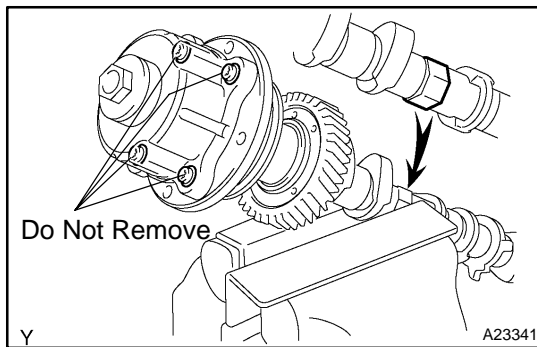
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- (c) Using snap ring pliers, remove the snap ring.
 (d) Remove the wave washer.
 (e) Remove the camshaft sub-gear.
 (f) Remove the camshaft gear spring.

NOTICE:

Be careful not to damage the camshaft.

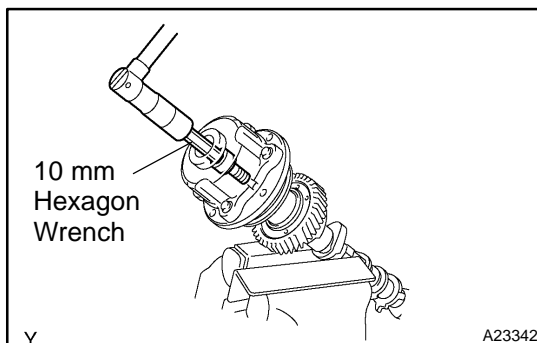


26. REMOVE CAMSHAFT TIMING TUBE FROM INTAKE CAMSHAFT

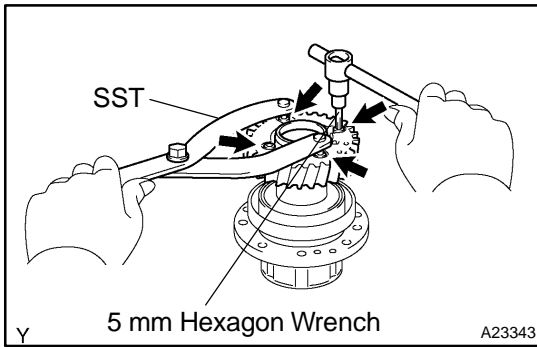
- (a) Mount the hexagon head portion of the intake camshaft in a vise.

NOTICE:

- Be careful not to damage the camshaft.
- The 4 bolts shown in the illustration determine back-lash of the gear in the timing tube, so do not remove them. If any of the 4 bolts are removed, install a new timing tube assembly.



- (b) Remove the screw plug and seal washer.
 (c) Using a 10 mm hexagon wrench, and remove the bolt.
 (d) Pull out the timing tube and drive gear assembly from the camshaft.



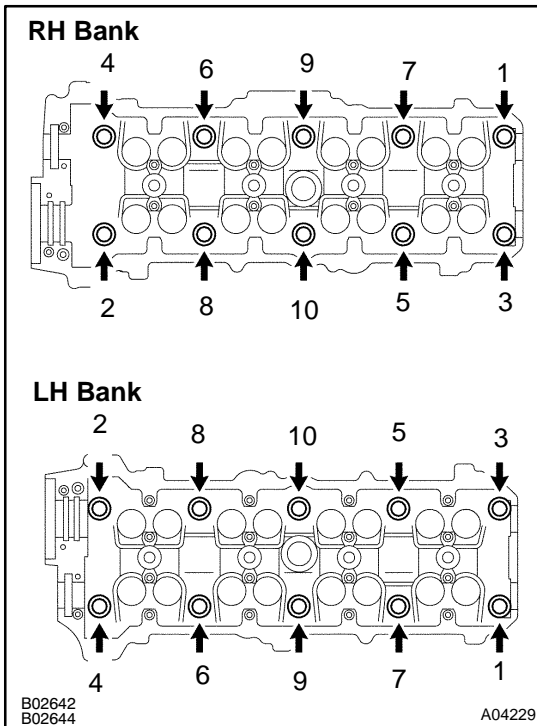
- (e) Using SST and a 5 mm hexagon wrench, remove the 4 bolts, drive gear and oil seal.

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NOTICE:

Be careful not to damage the timing tube.

27. REMOVE SPARK PLUGS

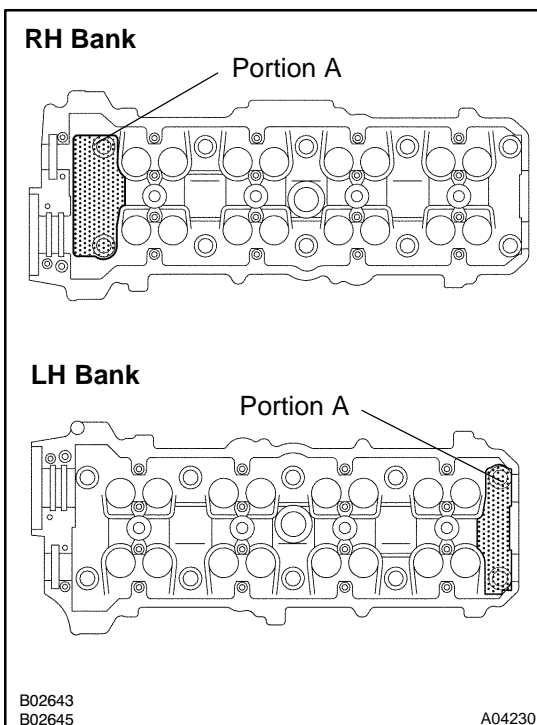


28. REMOVE CYLINDER HEAD AND EXHAUST MANIFOLD ASSEMBLIES

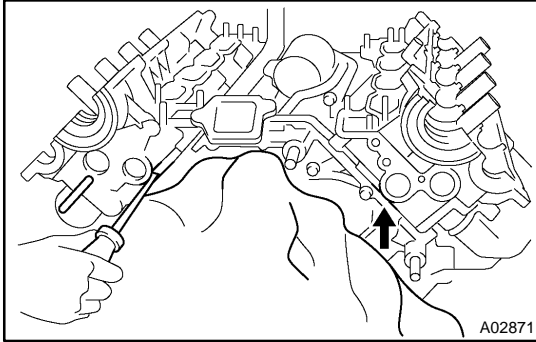
- (a) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in several steps, in the sequence shown, then perform the same procedure to the other side as shown. Remove the 20 cylinder head bolts and plate washers.

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.**



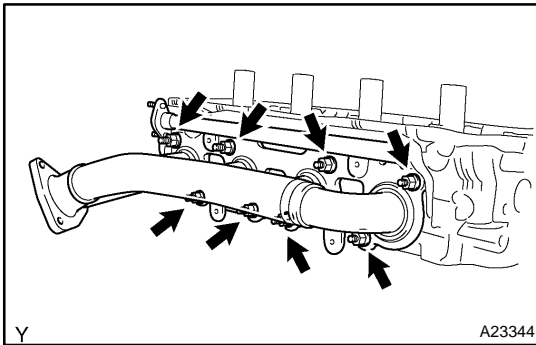
- (b) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

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

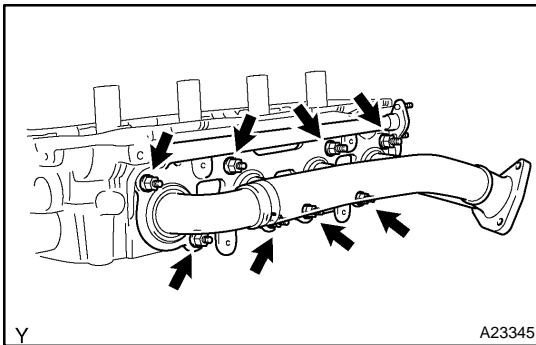
NOTICE:

- 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.



29. REMOVE RH EXHAUST MANIFOLD FROM CYLINDER HEAD

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



30. REMOVE LH EXHAUST MANIFOLD FROM CYLINDER HEAD

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