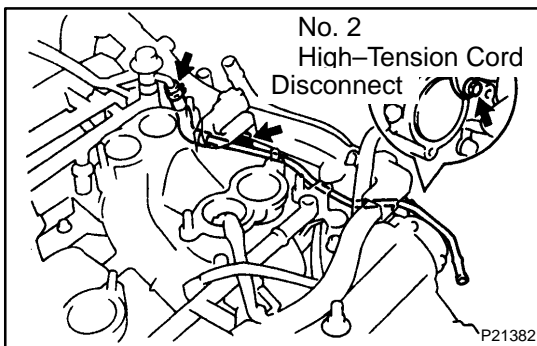
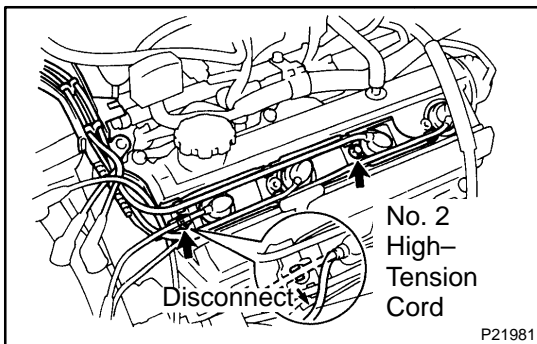


REMOVAL

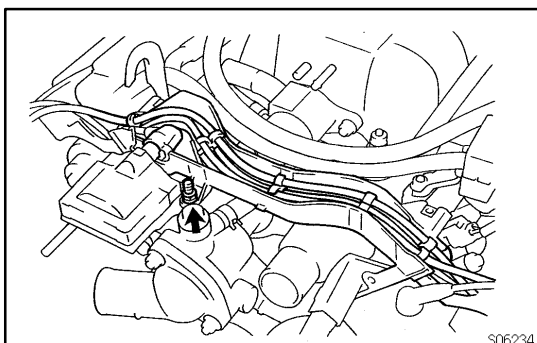
1. **DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS** (See page [EM-18](#))
2. **REMOVE CAMSHAFT TIMING PULLEYS** (See page [EM-18](#))
3. **DISCONNECT PS PUMP FROM ENGINE**
 - (a) Disconnect the PS air hose from the air intake chamber.
 - (b) Disconnect the PS pump from the engine (See page [EM-87](#)).
4. **DISCONNECT FRONT EXHAUST PIPE FROM 2 FRONT TWC** (See page [EC-17](#))



5. **REMOVE HIGH-TENSION CORDS, CORD CLAMPS AND CORD COVER ASSEMBLY**
 - (a) Disconnect the No. 2 high-tension cord from the cord clamp on the RH front high-tension cord clamp.
 - (b) Remove the 2 bolts holding the RH high-tension cord clamps to the RH cylinder head cover.



- (c) Disconnect the No. 1 high-tension cord from the cord clamp on the LH front high-tension cord clamp.
- (d) Remove the 2 bolts holding the LH high-tension cord clamps to the LH cylinder head cover.

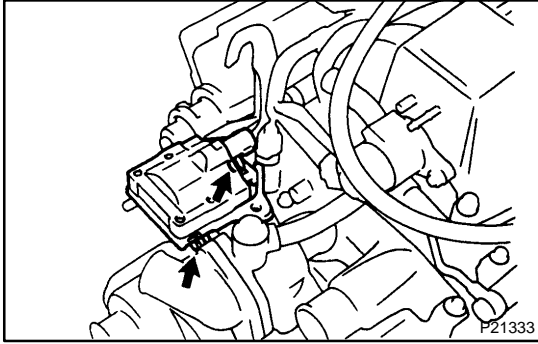


- (e) Remove the stud bolt holding the lower high-tension cord cover to the No. 2 ignition coil.
- (f) Disconnect the high-tension cords from the spark plugs, distributor caps and No. 2 ignition coil.

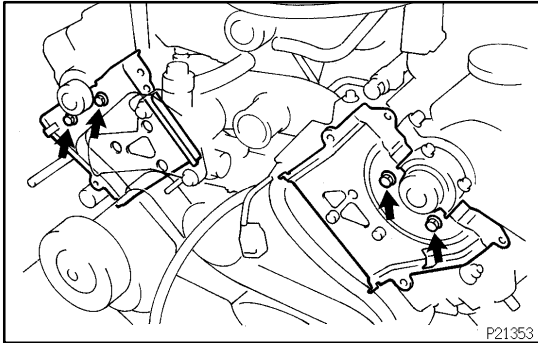
NOTICE:

Pulling on or bending the cords may damage the conductor inside.

- (g) Remove the high-tension cords, cord clamps and cord cover assembly.

**6. REMOVE NO. 2 IGNITION COIL**

- (a) Disconnect the ignition coil connector.
- (b) Remove the 2 bolts and ignition coil.

**7. REMOVE TIMING BELT REAR PLATES**

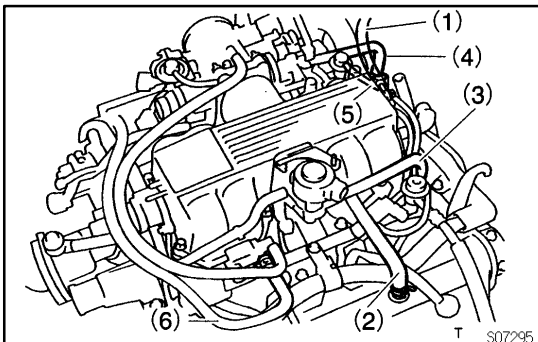
Remove the 2 bolts and rear plate. Remove the 2 rear plates.

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.

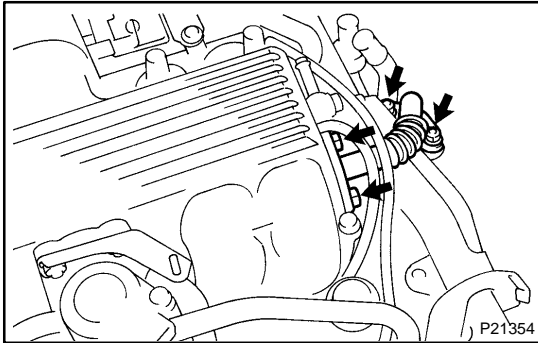
8. REMOVE AIR INTAKE CHAMBER ASSEMBLY

- (a) Disconnect these cables:
 - Accelerator cable
 - A/T throttle control cable
 - Cruise control actuator cable
- (b) Remove the 2 bolts and accelerator bracket.
- (c) Disconnect these connectors:
 - Throttle position sensor connector
 - w/ TRAC: Sub-throttle position sensor connector
 - w/ TRAC: Sub-throttle actuator connector
 - IAC valve connector
 - EGR valve connector
 - EGR gas temperature sensor connector
 - VSV connector for fuel pressure control
 - VSV connector for EVAP

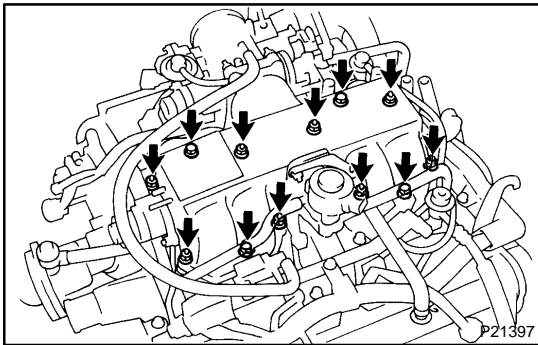


- (d) Disconnect these hoses:
 - (1) Brake booster vacuum hose from union on air intake chamber
 - (2) PCV hose from PCV valve on LH cylinder head
 - (3) Water bypass hose (from EGR valve) from rear water bypass joint
 - (4) Water bypass hose (from throttle body) from rear water bypass joint
 - (5) Vacuum hose (from VSV for fuel pressure control) from fuel pressure regulator

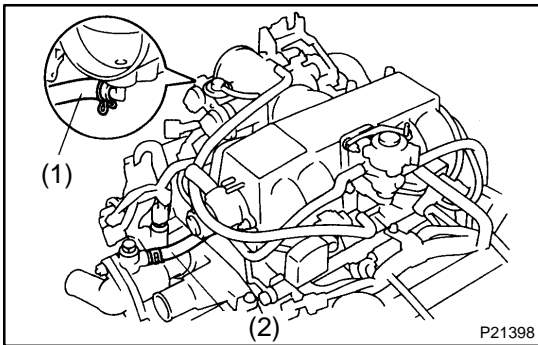
- (6) EVAP hose (from charcoal canister) from VSV for EVAP
- (e) Disconnect the heater hose from the water bypass pipe.



- (f) Remove the 2 bolts, 2 nuts, No.2 EGR pipe and 2 gaskets.



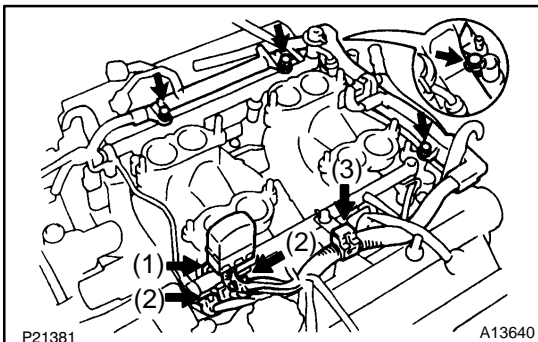
- (g) Remove the 4 bolts and 8 nuts.



- (h) Disconnect these hoses, and remove the air intake chamber assembly and 4 gaskets:
 - (1) PCV hose (from RH cylinder head) to throttle body
 - (2) Water bypass hose (from IAC valve) to water inlet housing

9. DISCONNECT FUEL INLET HOSE FROM DELIVERY PIPE (See page [SF-29](#))

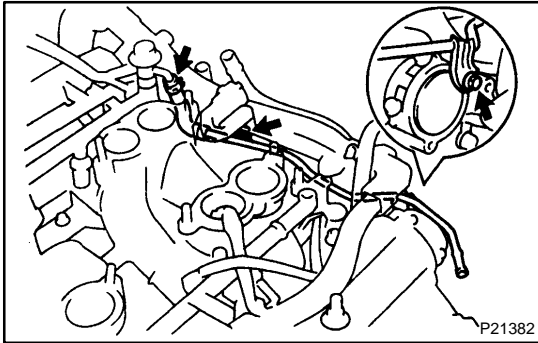
10. DISCONNECT FUEL RETURN HOSE FROM FUEL RETURN PIPE



11. DISCONNECT ENGINE WIRE FROM DELIVERY PIPES AND REAR WATER BYPASS JOINT

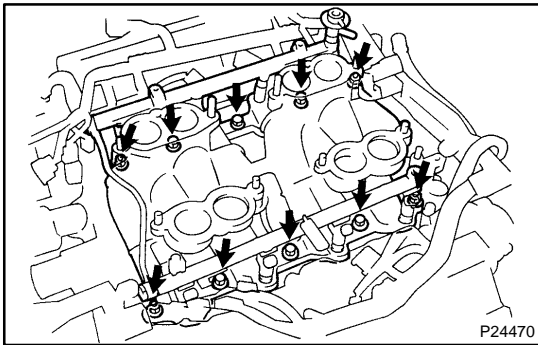
- (a) Disconnect the A/T throttle cable from the clamps on the engine hanger and engine wire protector.
- (b) Disconnect the connectors and clamp:
 - (1) DLC1 from connector bracket on LH delivery pipe
 - (2) 2 engine wire connectors from connector bracket on LH delivery pipe
 - (3) Engine wire clamp from wire bracket on LH delivery pipe

- (c) Remove the 2 bolts, and disconnect the engine wire protector from the RH delivery pipe.
- (d) Remove the 2 bolts, and disconnect the engine wire protector from the water bypass joint.



12. REMOVE FUEL RETURN PIPE

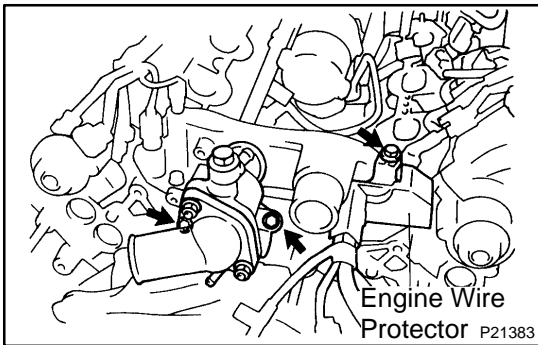
- (a) Disconnect the fuel hose from the fuel pressure regulator.
- (b) Remove the 2 bolts and fuel return pipe.



13. REMOVE INTAKE MANIFOLD ASSEMBLY

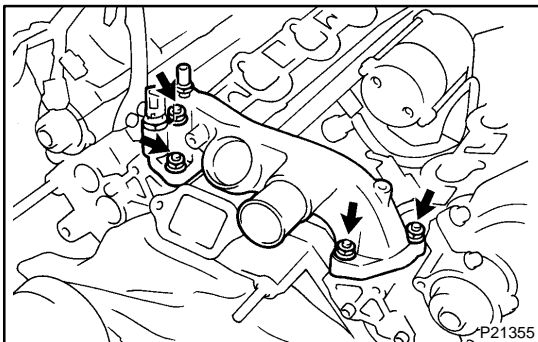
- (a) Disconnect the 8 injector connectors.
- (b) Remove the 6 bolts, 4 nuts, the intake manifold assembly and 2 gaskets.

14. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY (See page CO-9)

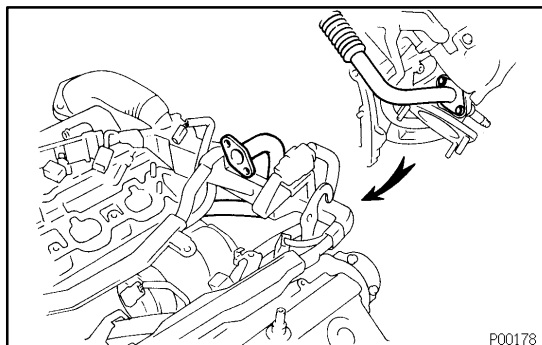


15. REMOVE FRONT WATER BYPASS JOINT

- (a) Disconnect these connectors:
 - ECT sensor connector
 - ECT sender gauge connector
- (b) Remove the bolt, and disconnect the engine wire protector from the water bypass joint.

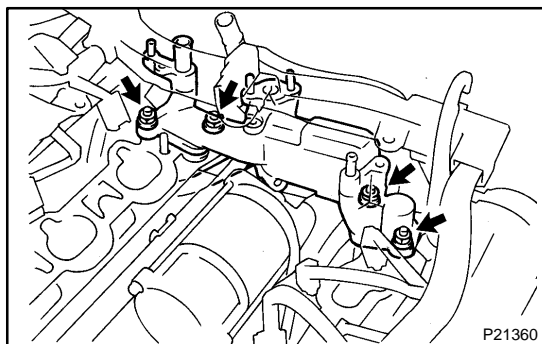


- (c) Remove the 4 nuts, water bypass joint and 2 gaskets.



16. REMOVE REAR WATER BYPASS JOINT AND NO. 1 EGR PIPE ASSEMBLY

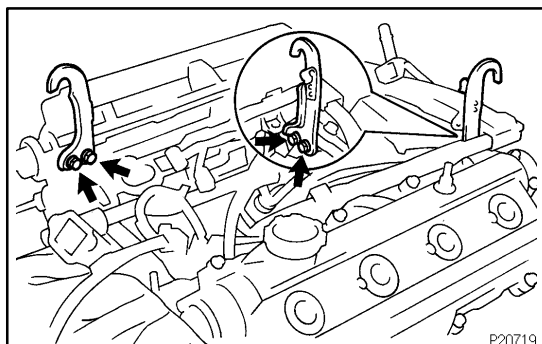
- (a) Remove the 2 bolts, nut and RH heat insulator (for the RH front side of the front exhaust pipe).
- (b) Remove the 2 bolts and RH heat insulator (for the RH front TWC).
- (c) Remove the 2 nuts holding the EGR pipe to the RH exhaust manifold.
- (d) Disconnect the heater hose from the water bypass joint.



- (e) Remove the 4 nuts, the water bypass joint, EGR pipe assembly and 2 gaskets.

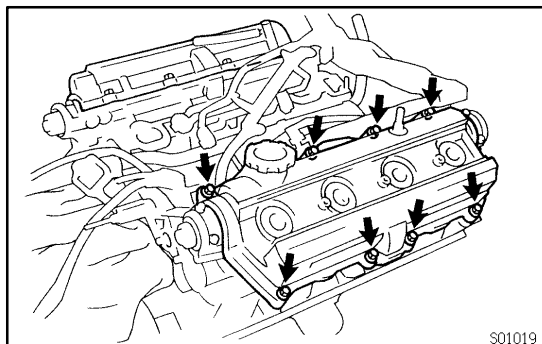
17. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM-87)

18. REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE (See page LU-9)



19. REMOVE ENGINE HANGERS

Remove the 4 bolts and engine hanger.



20. REMOVE CYLINDER HEAD COVERS

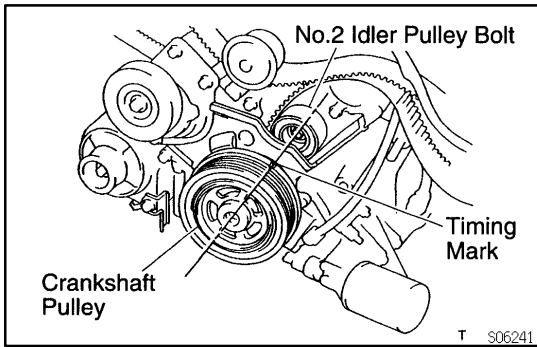
Remove the 8 bolts, 8 seal washers, cylinder head cover and gasket. Remove the 2 cylinder head covers.

21. IF NECESSARY, REMOVE SEMI-CIRCULAR PLUGS

22. REMOVE CAMSHAFTS

NOTICE:

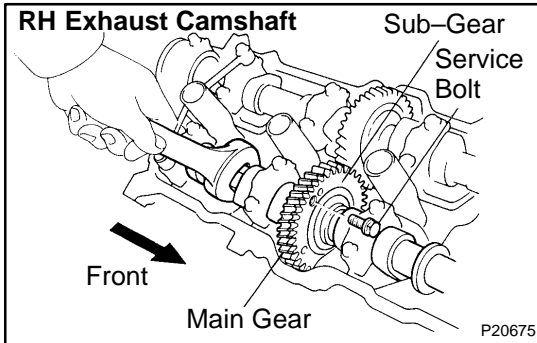
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following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



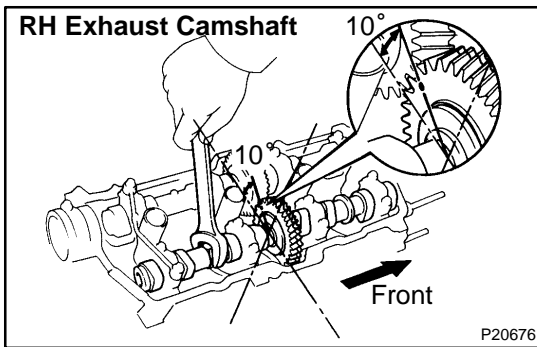
- (b) Remove the RH exhaust camshaft.
- (1) Boring a service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

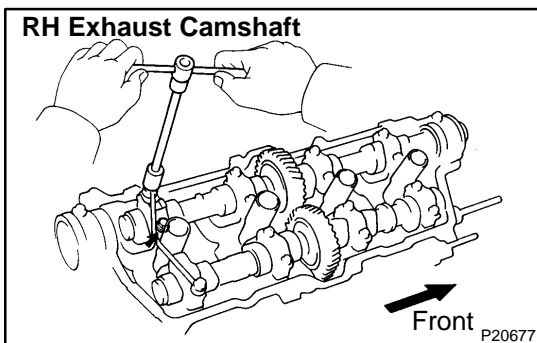
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm (0.63 - 0.79 in.)

HINT:

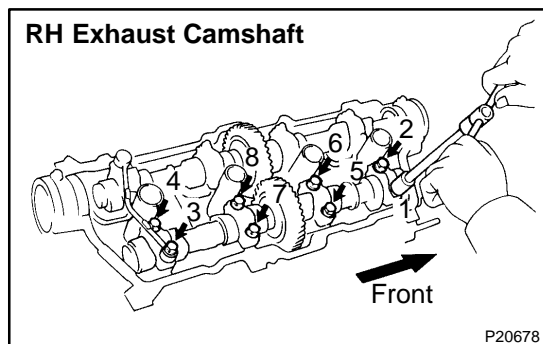
When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



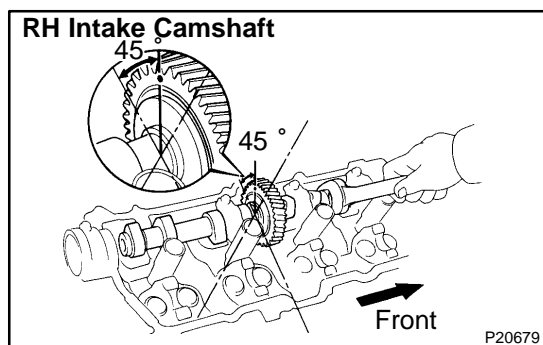
- (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.



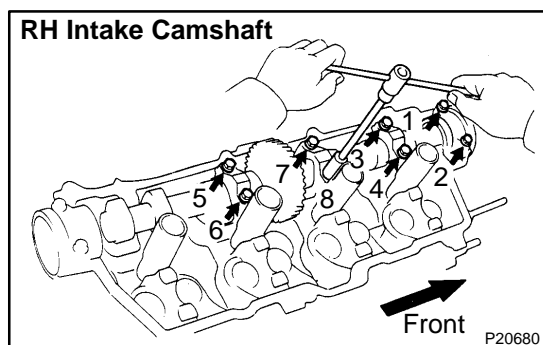
- (4) Alternately loosen and remove the 2 bearing cap bolts holding the intake camshaft side of the oil feed pipe to the cylinder head.



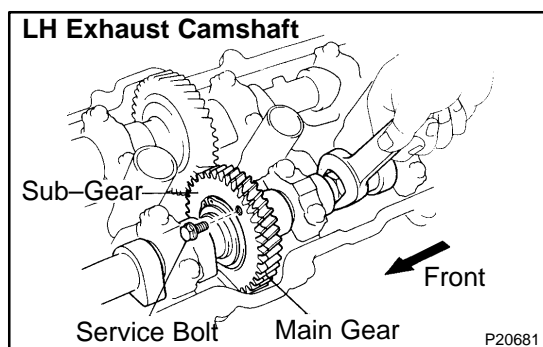
- (5) Uniformly loosen and remove the 8 bearing cap bolts in several passes, in the sequence shown.
- (6) Remove the oil feed pipe, 4 bearing caps and exhaust camshaft.



- (c) Remove the RH intake camshaft.
 - (1) Remove the rear bearing cap.
 - (2) Set the timing mark (1 dot mark) of the camshaft drive gear at approx. 45° angle by turning the hexagon wrench head portion of the intake camshaft with a wrench.



- (3) Uniformly loosen and remove the 8 bearing cap bolts in several passes, in the sequence shown.
- (4) Remove the 4 bearing caps, oil seal and intake camshaft.



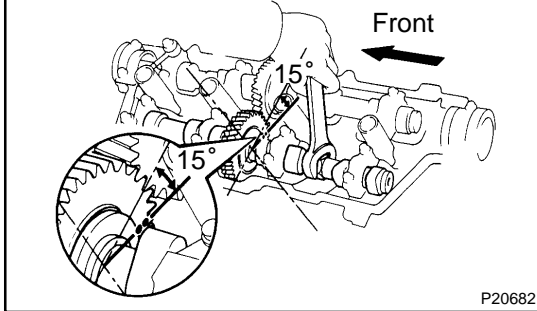
- (d) Remove the LH exhaust camshaft.
 - (1) Boring a service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

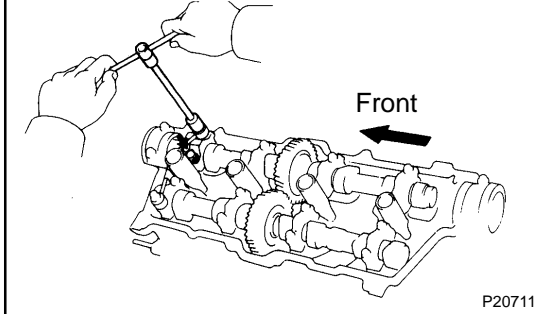
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm (0.63 – 0.79 in.)

HINT:

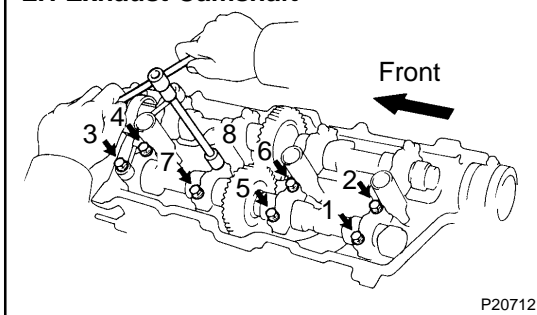
When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.

LH Exhaust Camshaft

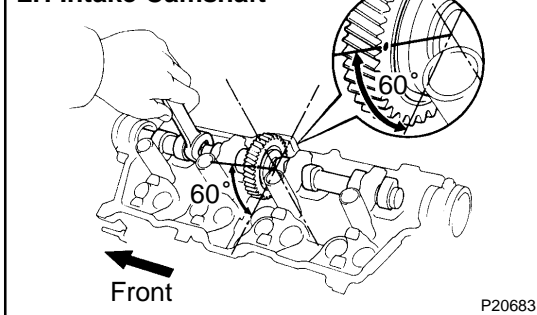
- (3) Set the timing mark (2 dot marks) of the camshaft drive gear at approx. 15° angle by turning the hexagonal wrench head portion of the exhaust camshaft with a wrench.

LH Exhaust Camshaft

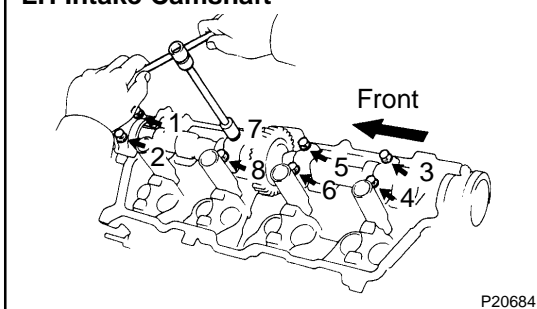
- (4) Alternately loosen and remove the 2 bearing cap bolts holding the intake camshaft side of the oil feed pipe to the cylinder head.

LH Exhaust Camshaft

- (5) Uniformly loosen and remove the 8 bearing cap bolts in several passes, in the sequence shown.
 (6) Remove the oil feed pipe, 4 bearing caps and exhaust camshaft.

LH Intake Camshaft

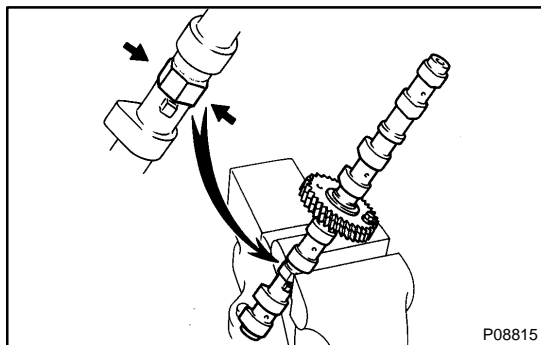
- (e) Remove the LH intake camshaft.
 (1) Remove the bearing cap second from the front.
 (2) Set the timing mark (1 dot mark) of the camshaft drive gear at approx. 60° angle by turning the hexagonal wrench head portion of the intake camshaft with a wrench.

LH Intake Camshaft

- (3) Uniformly loosen and remove the 8 bearing cap bolts in several passes, in the sequence shown.
 (4) Remove the 4 bearing caps, oil seal and intake camshaft.

HINT:

Arrange the bearing caps in correct order.

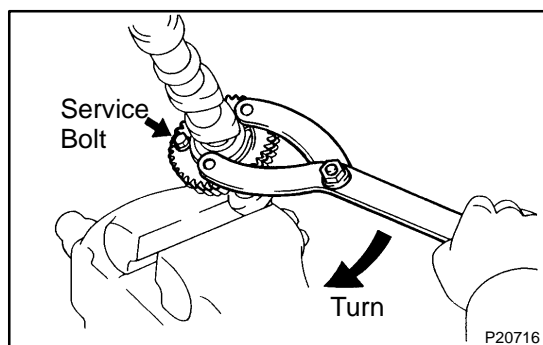


23. DISASSEMBLE EXHAUST CAMSHAFTS

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

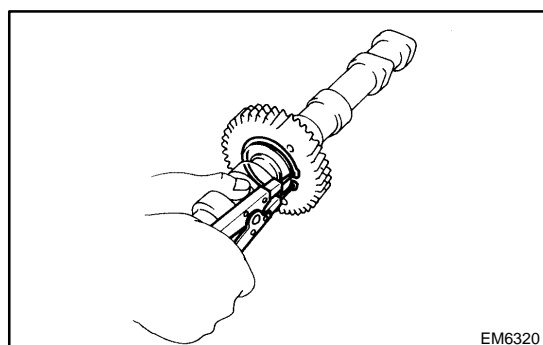
NOTICE:

Be careful not to damage the camshaft.



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

SST 09960-10010 (09962-01000, 09963-00500)



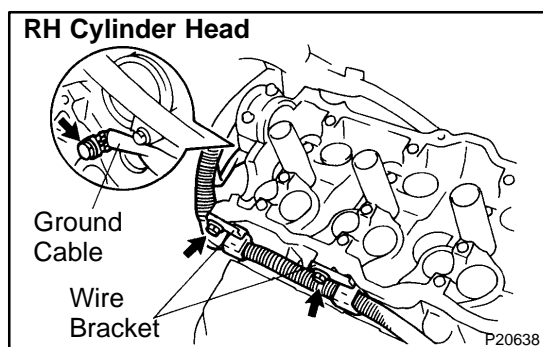
- (c) Using snap ring pliers, remove the snap ring.

- (d) Remove these parts:

- Wave washer
- Camshaft sub-gear
- Camshaft gear spring

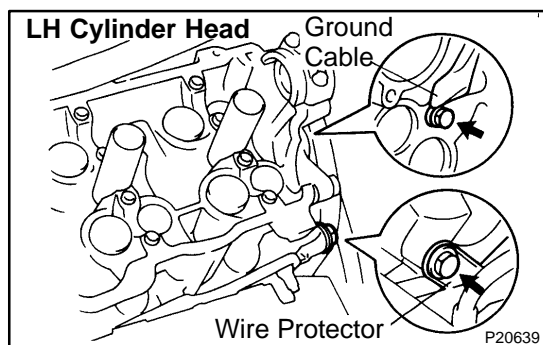
HINT:

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

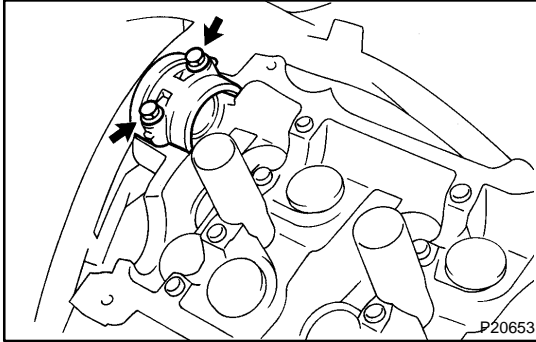


24. REMOVE CYLINDER HEAD AND EXHAUST MANIFOLD ASSEMBLIES

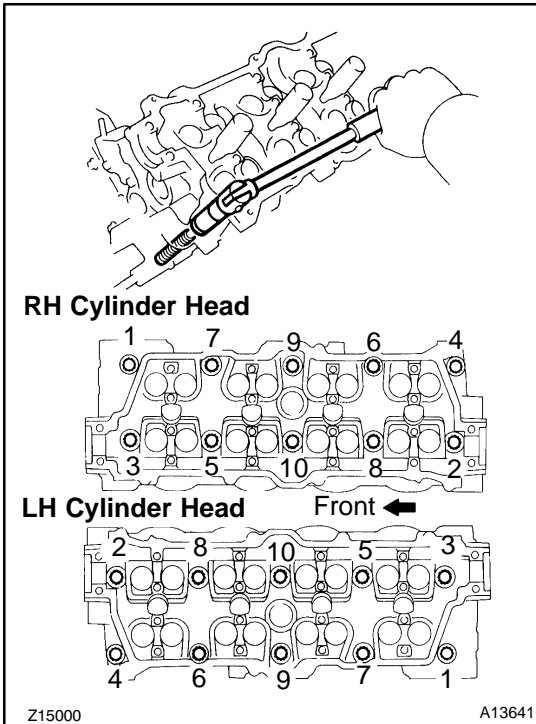
- (a) Disconnect the 2 heated oxygen sensor connectors.
- (b) Remove the bolt, and disconnect the ground cable from the RH cylinder head.
- (c) Remove the 2 bolts, and disconnect the engine wire from the RH cylinder head.



- (d) Remove the bolt, and disconnect the ground strap from the LH cylinder head.
- (e) Remove the bolt, and disconnect the engine wire protector from the LH cylinder head.



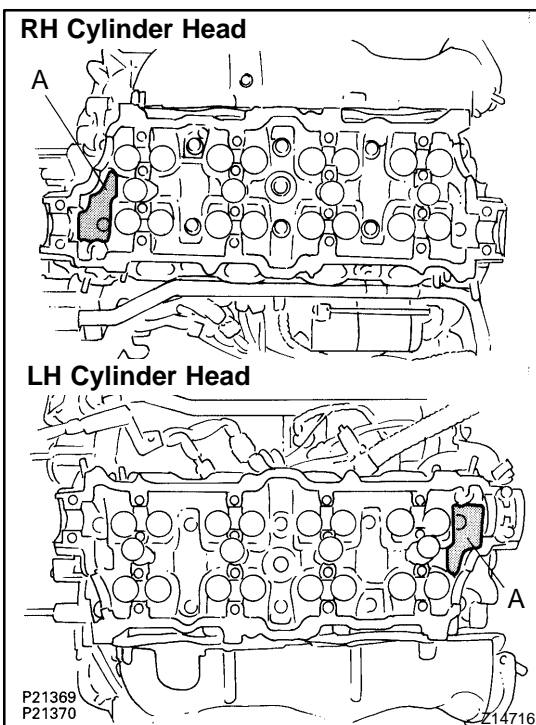
- (f) Remove the 2 bolts, seal washers, bearing cap and camshaft housing plug from the RH cylinder head.



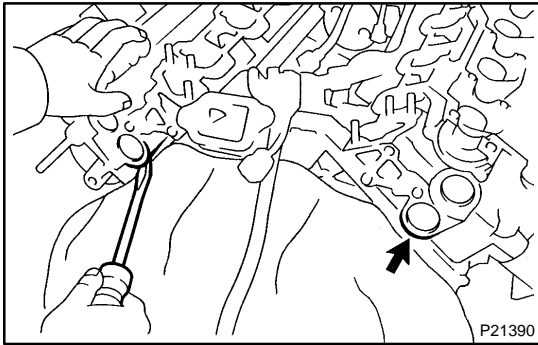
- (g) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in several passes, in the sequence shown, then do the other side as shown. Remove the 20 cylinder head bolts and plate washers.

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.**



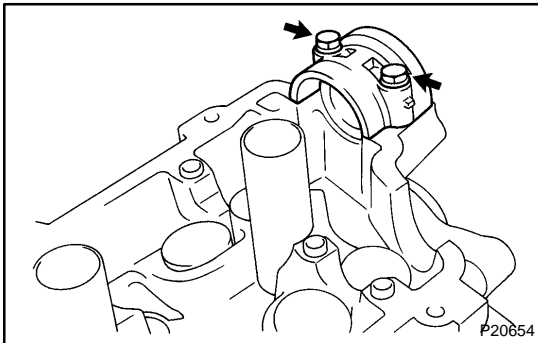
- (h) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

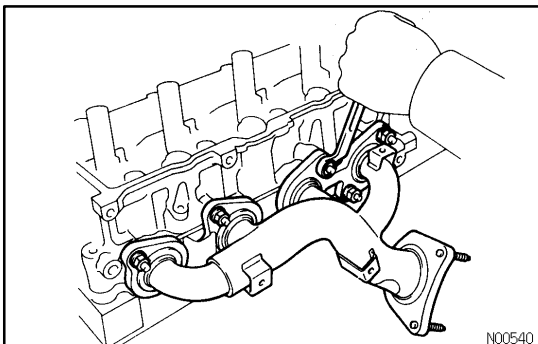
If the cylinder head is lift off, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

**25. REMOVE BEARING CAP FROM LH CYLINDER HEAD**

Remove the 2 bolts, seal washers, bearing cap and camshaft housing plug from the cylinder head.

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

- (a) Remove the 3 bolts and heat insulator.
(b) Remove the 8 nuts, exhaust manifold and gasket.

27. REMOVE RH EXHAUST MANIFOLD FROM CYLINDER HEAD

- (a) Remove the 3 bolts and heat insulator.
(b) Remove the 8 nuts, exhaust manifold and gasket.