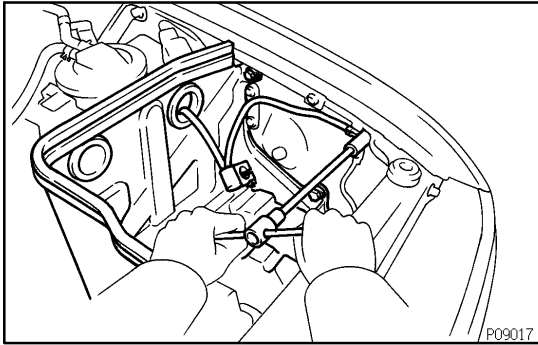
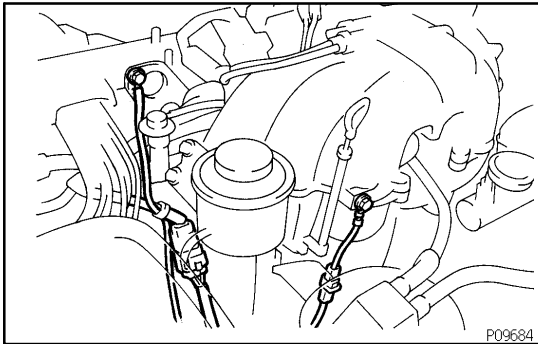


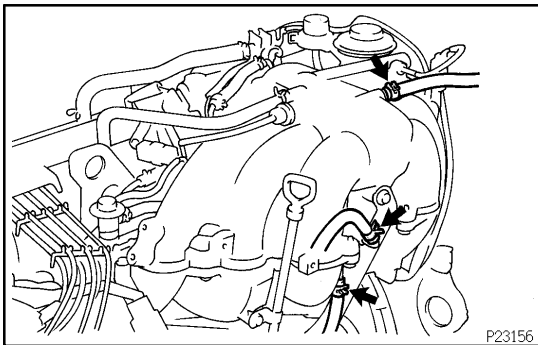


REMOVAL

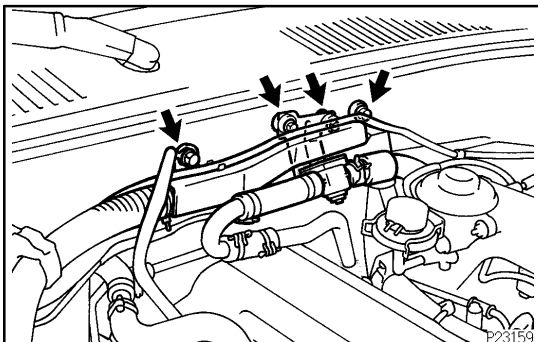
1. **DRAIN ENGINE COOLANT**
2. **REMOVE BATTERY AND BATTERY TRAY**
 - (a) Disconnect the battery cables.
 - (b) Remove the nuts, hold-down clamp and battery.
 - (c) Remove the bolt and disconnect the ground strap.
 - (d) Remove the 5 bolts and battery tray.
3. **REMOVE AIR CLEANER HOSE AND CAP**
4. **DISCONNECT CRUISE CONTROL ACTUATOR CABLE FROM THROTTLE BODY**
5. **DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY**
6. **DISCONNECT THROTTLE CABLE FROM THROTTLE BODY**



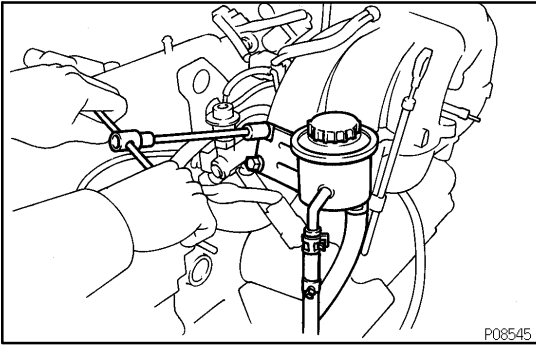
7. **DISCONNECT ENGINE GROUND STRAPS**
 - (a) Disconnect the ground strap from the No. 1 engine hangar.
 - (b) Disconnect the ground strap from the air intake chamber.
8. **DISCONNECT CONNECTOR ON INTAKE MANIFOLD FROM LH FENDER APRON**



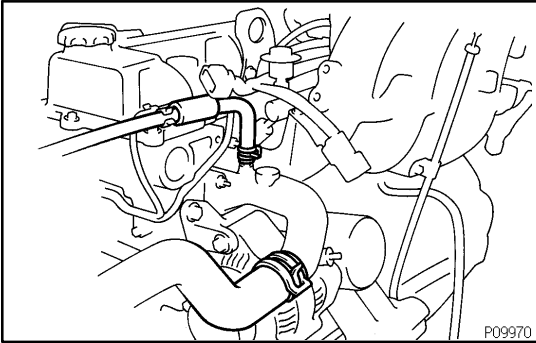
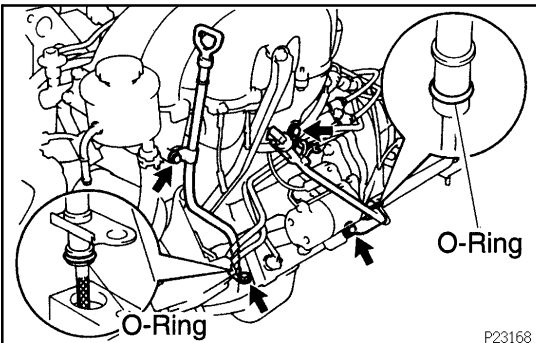
9. **DISCONNECT BRAKE BOOSTER VACUUM HOSE**
10. **DISCONNECT EVAP HOSE**
11. **DISCONNECT FUEL RETURN HOSE**
12. **DISCONNECT HEATER HOSES**



13. **DISCONNECT ENGINE WIRE AND HEATER VALVE FROM COWL PANEL**
 - (a) Remove the 2 bolts and disconnect the engine wire and ground strap.
 - (b) Remove the 2 bolts and disconnect the heater valve.
14. **REMOVE NO. 2 AND NO. 3 CYLINDER HEAD COVERS**
Remove the 4 bolts and head covers.
15. **REMOVE DISTRIBUTOR (See page IG-10)**

**16. DISCONNECT PS RESERVOIR TANK**

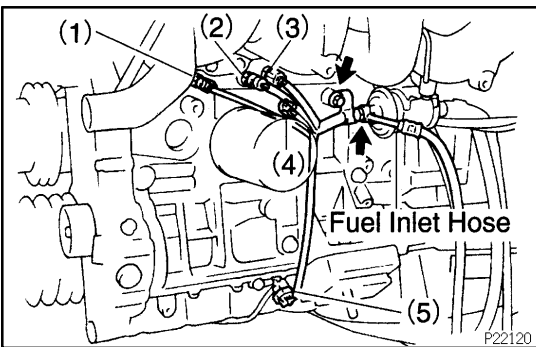
Remove the 3 bolts and disconnect the reservoir tank.

**17. DISCONNECT RADIATOR INLET HOSE****18. DISCONNECT NO. 3 WATER BYPASS HOSE****19. REMOVE GENERATOR (See page CH-8)****20. REMOVE THROTTLE BODY (See page SF-45)****21. REMOVE OIL DIPSTICKS AND GUIDES FOR ENGINE AND TRANSMISSION**

- (a) Remove the 2 mounting bolts.
- (b) Pull out the dipstick together with dipstick guide.
- (c) Remove the O-ring from the dipstick guide.

22. REMOVE INTAKE MANIFOLD STAY

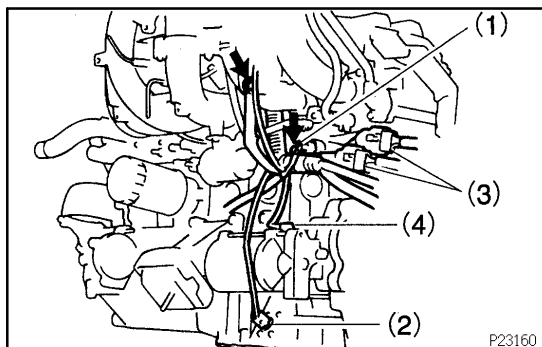
Remove the 2 bolts and intake manifold stay.

**23. DISCONNECT FUEL INLET HOSE**

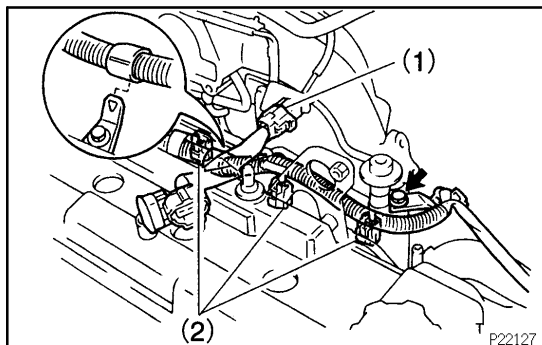
Remove the union bolt and 2 gaskets, and disconnect the fuel inlet hose from the fuel filter.

24. DISCONNECT ENGINE WIRE

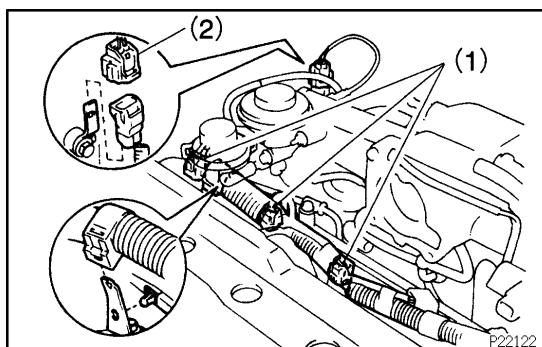
- (a) Disconnect the connectors.
 - (1) Disconnect the ECT sender gauge connector.
 - (2) Disconnect the ECT cut switch connector.
 - (3) Disconnect the ECT sensor connector.
 - (4) Disconnect the knock sensor connector.
 - (5) Disconnect the crankshaft position sensor connector.
- (6) Remove the bolt and disconnect the engine wire from the cylinder block.



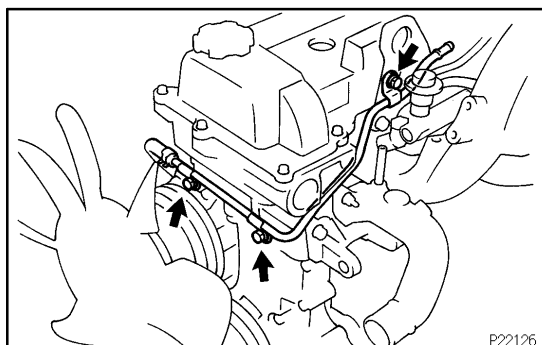
- (b) Disconnect the connectors.
 - (1) Disconnect the knock sensor connector.
 - (2) Disconnect the oil level sensor connector.
 - (3) Disconnect the 2 connectors from the transmission.
 - (4) Disconnect the starter connector.
- (c) Disconnect the 2 heated oxygen sensor connectors.
- (d) Disconnect the PNP switch connector.
- (e) Remove the 2 bolts and disconnect the engine wire from the intake manifold and cylinder block.
- (f) Disconnect the PCV hose from the PCV valve.
- (g) Remove the bolt holding the engine wire to the intake manifold.



- (h) Disconnect the connectors.
 - (1) Disconnect the connector for the emission control valve set assembly.
 - (2) Disconnect the 3 injector connectors.
- (i) Disconnect the engine wire clamp.

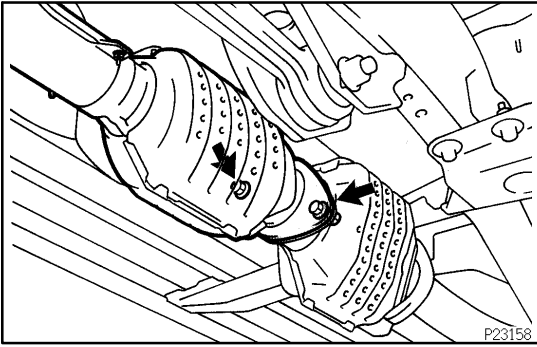


- (j) Disconnect the engine wire clamp.
- (k) Disconnect the connectors.
 - (1) Disconnect the 3 injector connectors.
 - (2) Disconnect the EGR gas temp. sensor connector.
- (l) Disconnect the clamp of the No. 6 injector wire from the bracket.
- (m) Disconnect the engine wire from the cylinder head and intake manifold.

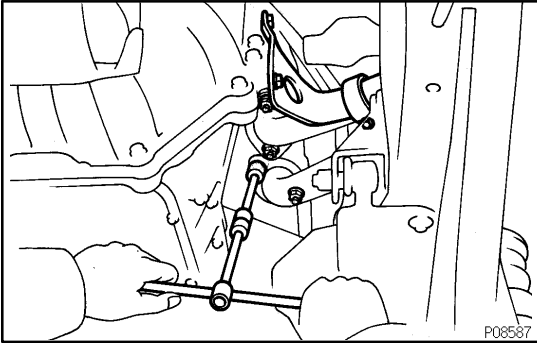


25. DISCONNECT NO. 2 WATER BYPASS PIPE

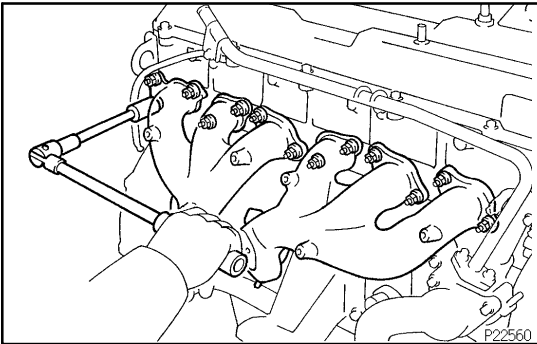
Remove the 3 bolts, and disconnect the bypass pipe from the cylinder head.

**26. REMOVE FRONT EXHAUST PIPE**

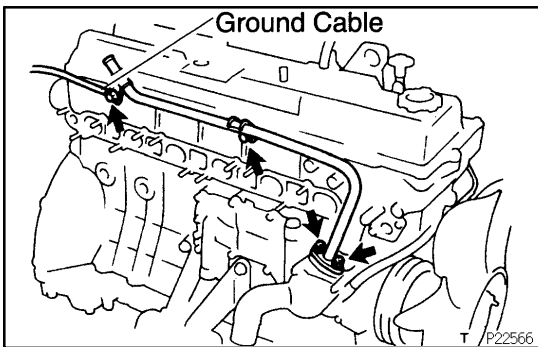
- (a) Disconnect the heated oxygen sensor connector.
- (b) Remove the 2 nuts and 2 bolts holding the front exhaust pipe to the rear TWC.
- (c) Disconnect the front exhaust pipe, and remove the gasket.



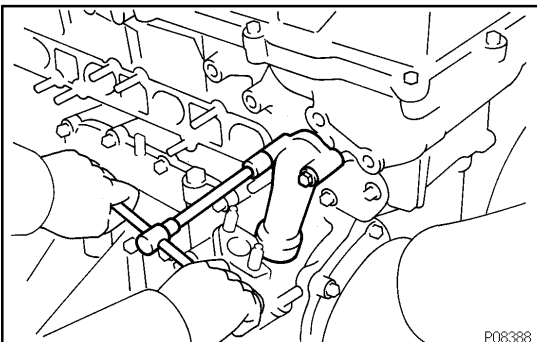
- (d) Loosen the clamp bolt and disconnect the clamp from the No. 1 support bracket.
- (e) Remove the 2 bolts and No. 1 support bracket.
- (f) Remove the 4 nuts, front exhaust pipe and 2 gaskets.

**27. REMOVE NO. 1 AND NO. 2 EXHAUST MANIFOLDS**

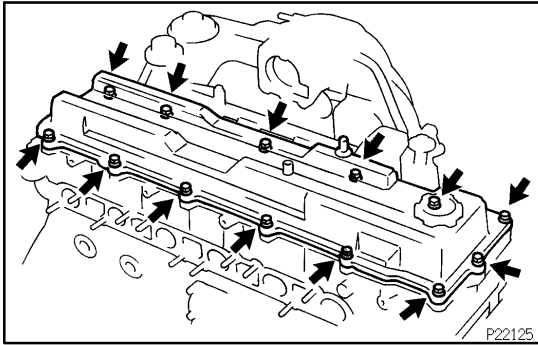
- (a) Remove the 6 bolts, No. 1 heat insulator and No. 2 heat insulator.
- (b) Remove the 13 nuts, No. 1 exhaust manifold, No. 2 exhaust manifold and 2 gaskets.

**28. REMOVE HEATER PIPE**

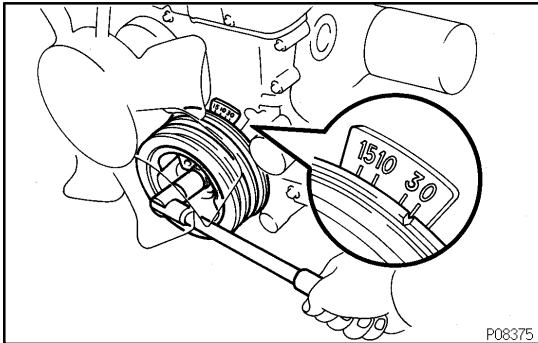
Remove the 2 bolts, 2 nuts, ground cable, heater pipe and gasket.

**29. REMOVE WATER BYPASS OUTLET AND PIPE**

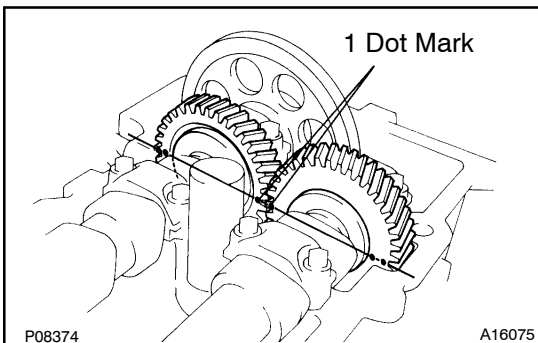
- (a) Remove the 2 bolts and water bypass outlet and pipe.
- (b) Remove the 3 O-rings from the water bypass outlet and pipe.

**30. REMOVE CYLINDER HEAD COVER**

Remove the 13 bolts, cylinder head cover and gasket.

31. REMOVE SPARK PLUGS**32. SET NO. 1 CYLINDER TO TDC/COMPRESSION**

- (a) Turn the crankshaft pulley and align its groove with the "0" mark on the timing chain cover.

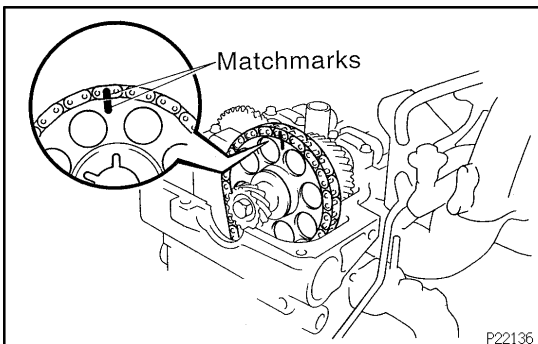


- (b) Check that the timing marks (1 and 2 dots) of the camshaft drive and driven gears are in straight line on the cylinder head surface as shown in the illustration.

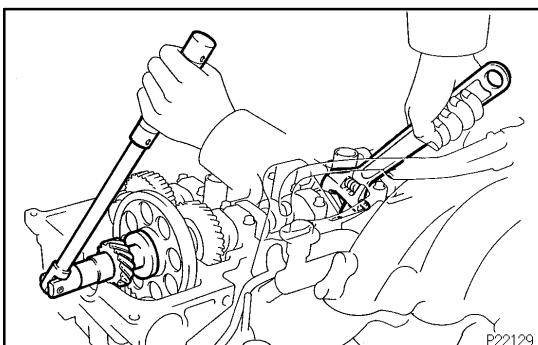
If not, turn the crankshaft 1 revolution (360°) and align the marks as above.

33. REMOVE CHAIN TENSIONER

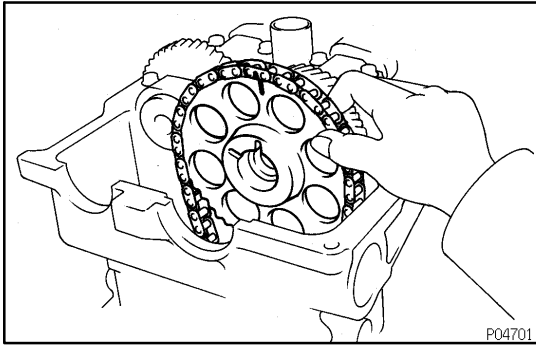
Remove the 2 nuts, chain tensioner and gasket.

**34. REMOVE CAMSHAFT TIMING GEAR**

- (a) Remove the semi-circular plug.
- (b) Place the matchmarks on the camshaft timing gear and timing chain.



- (c) Hold the intake camshaft with a wrench, remove the bolt and distributor gear.



- (d) Remove the camshaft timing gear and chain from the intake camshaft and leave on the slipper and damper.

35. 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.

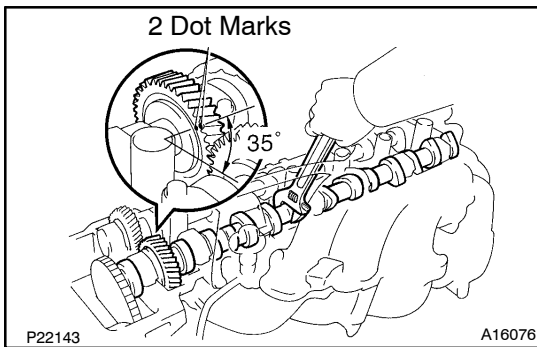
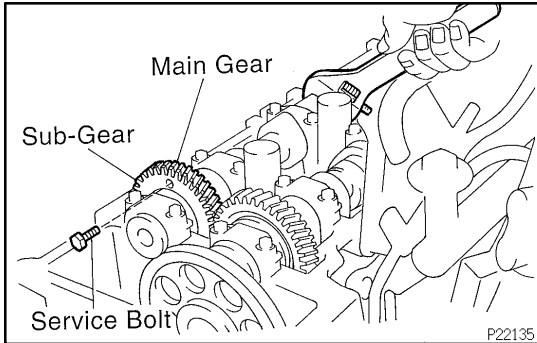
- (a) Remove the exhaust camshaft.
- (1) Bring the service bolt hole of the driven sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the exhaust camshaft sub-gear to the main gear with a service bolt.

Recommended service bolt:

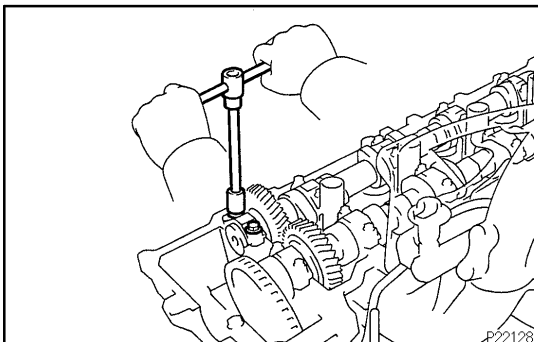
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm (0.63 – 0.79 in.)

HINT:

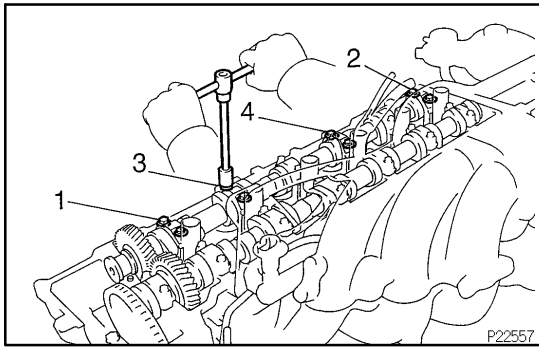
When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



- (3) Set the timing mark (2 dot marks) of the camshaft driven gear at approx. 35° angle by turning the hexagon wrench head portion of the intake camshaft with a wrench.



- (4) Lightly push the camshaft towards the rear without applying excessive force.
- (5) Loosen and remove the No. 1 bearing cap bolts, alternately loosening the left and right bolts uniformly.

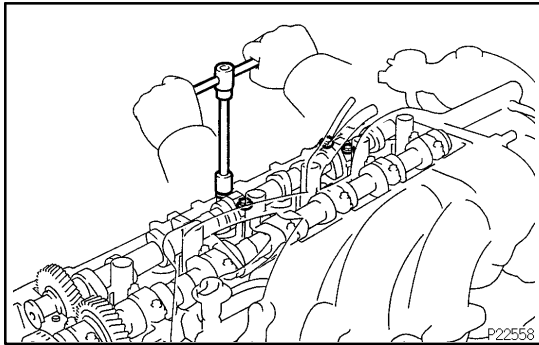


- (6) Loosen and remove the No. 2, No. 3, No. 5 and No. 7 bearing cap bolts, alternately loosening the left and right bolts uniformly in several passes, in the sequence shown.

NOTICE:

Do not remove the No. 4 and No. 6 bearing cap bolts at this stage.

- (7) Remove the 4 bearing caps.



- (8) Alternately and uniformly loosen and remove the No. 4 and No. 6 bearing cap bolts.

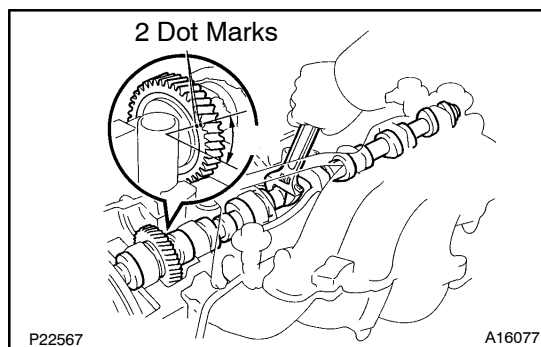
HINT:

- As the 4 No. 4 and No. 6 bearing cap bolts are loosened, make sure that the camshaft is lifted out straight and level.
- If the camshaft is not being lifted out straight and level, retighten the 4 No. 4 and No. 6 bearing cap bolts. Then reverse the order of above steps from (g) to (e) and repeat steps from (c) to (h) once again.

NOTICE:

Do not pry on or attempt to force the camshaft with a tool or other object.

- (9) Remove the 2 bearing caps and exhaust camshaft.

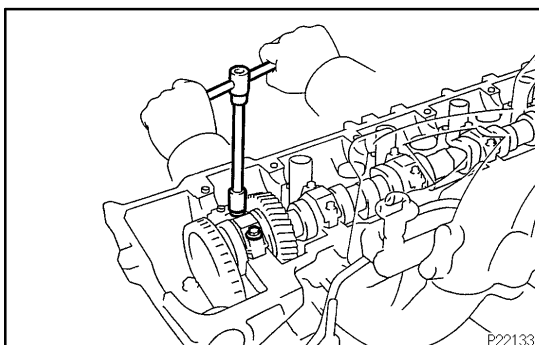


- (b) Remove the intake camshaft.

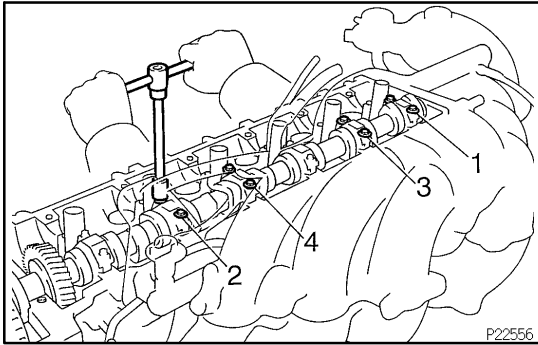
- (1) Set the timing mark (2 dot marks) of the camshaft drive gear at approx. 25° angle by turning the hexagon wrench head portion of the intake camshaft with a wrench.

HINT:

The above angle arrows the No. 1 and No. 4 cylinder cam lobes of the intake camshaft to push their valve lifters evenly.



- (2) Lightly push the intake camshaft towards the front without applying excessive force.
- (3) Loosen and remove the No. 1 bearing cap bolts, alternately loosening the left and right bolts uniformly.

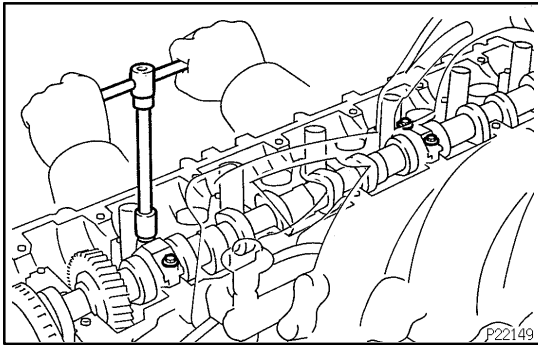


- (4) Loosen and remove the No. 3, No. 4, No. 6 and No. 7 bearing cap bolts, alternately loosening the left and right bolts uniformly in several passes, in the sequence shown.

NOTICE:

Do not remove the No. 2 and No. 5 bearing cap bolts at this stage.

- (5) Remove the 4 bearing caps.



- (6) Alternately and uniformly loosen and remove the No. 2 and No. 5 bearing cap bolts.

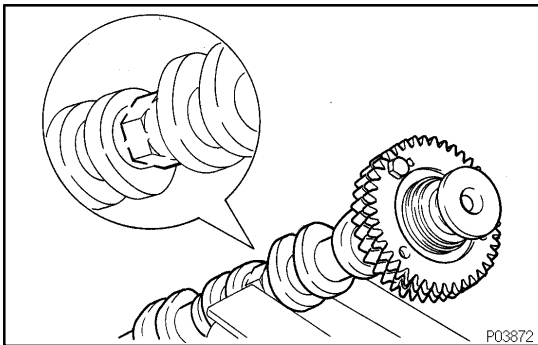
HINT:

- As the 4 No. 2 and No. 5 bearing cap bolts are loosened, make sure that the camshaft is lifted out straight and level.
- If the camshaft is not being lifted out straight and level, re-tighten the 4 No. 2 and No. 5 bearing cap bolts. Then reverse the order of above steps from (e) to (c) and repeat steps from (a) to (f) once again.

NOTICE:

Do not pry on or attempt to force the camshaft with a tool or other object.

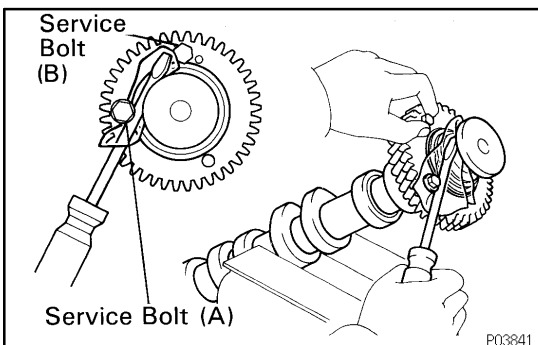
- (7) Remove the 2 bearing caps and exhaust camshaft.

**36. DISASSEMBLE EXHAUST CAMSHAFT**

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

NOTICE:

Be careful not to damage the camshaft.

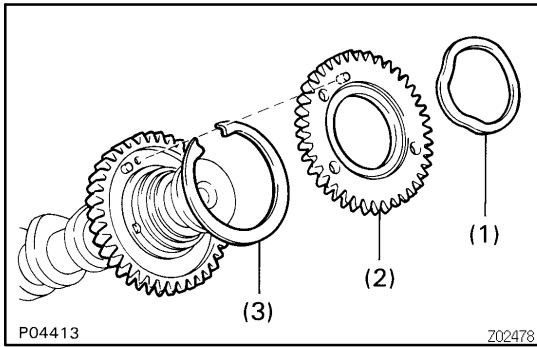


- (b) Insert a service bolt (A) into the service hole of the camshaft sub-gear.
- (c) Using a screwdriver, turn the sub-gear clockwise, and remove the service bolt (B).

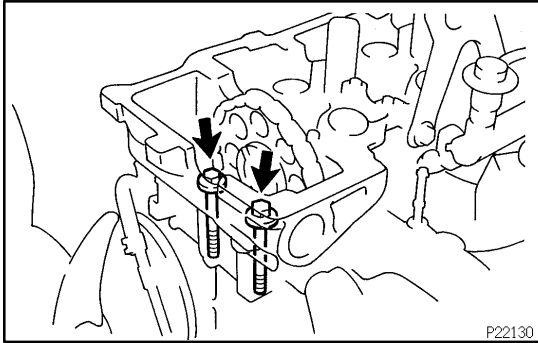
NOTICE:

Be careful not to damage the camshaft.

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

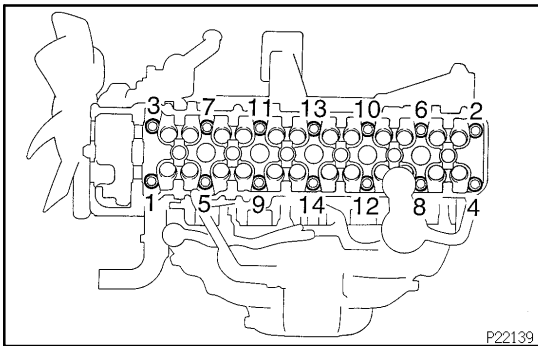


- (e) Remove the wave washer (1), camshaft sub-gear (2) and camshaft gear spring (3).



37. REMOVE CYLINDER HEAD AND INTAKE MANIFOLD ASSEMBLY

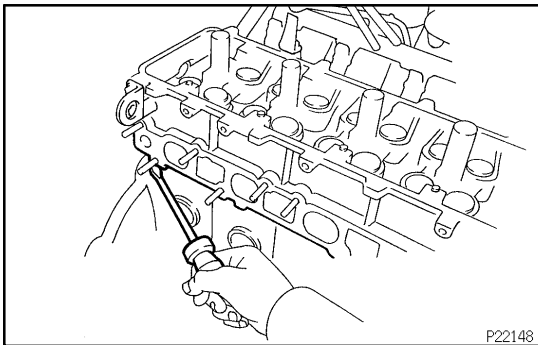
- (a) Remove the 2 bolts in front of the head before the other head bolts are removed.



- (b) Uniformly loosen and remove the 14 cylinder head bolts, in several passes, in the sequence shown.

NOTICE:

Cylinder head warpage or cracking could result from removing bolts in incorrect order.



- (c) 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 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.