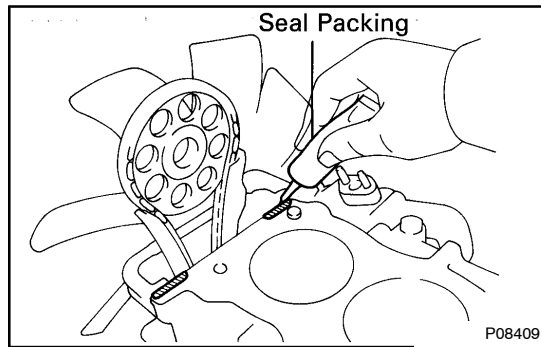




## INSTALLATION

### 1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

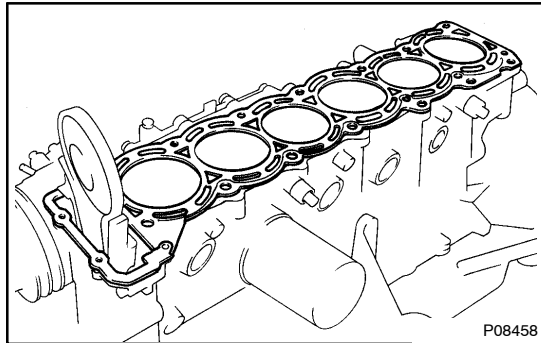
- (a) Apply seal packing to the 2 locations as shown.

**Seal packing:**

**Part No. 08826-00080 or equivalent**

**NOTICE:**

**Do not apply too much seal packing**



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

**NOTICE:**

**Be careful of the installation direction.**

- (c) Place the cylinder head on the cylinder head gasket.

### 2. INSTALL CYLINDER HEAD BOLTS

**HINT:**

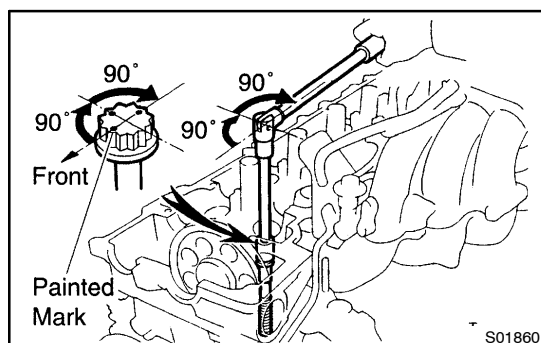
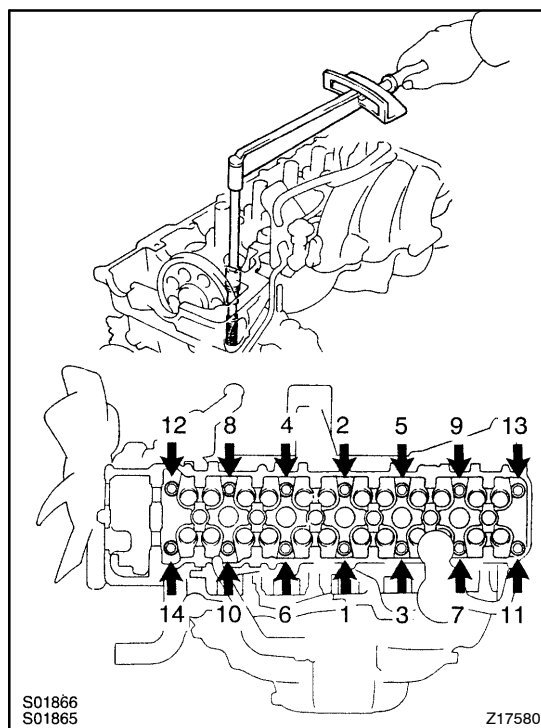
- The cylinder head bolts are tightened in 3 progressive steps (steps (b), (d) and (e)).
- If any cylinder head bolt is broken or deformed, replace it.

- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

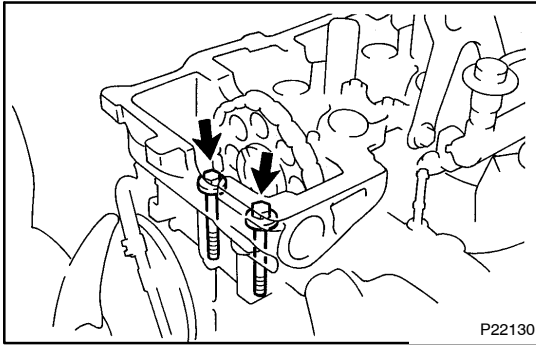
- (b) Install and uniformly tighten the 14 cylinder head bolts and plate washers in several passes, in the sequence shown.

**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

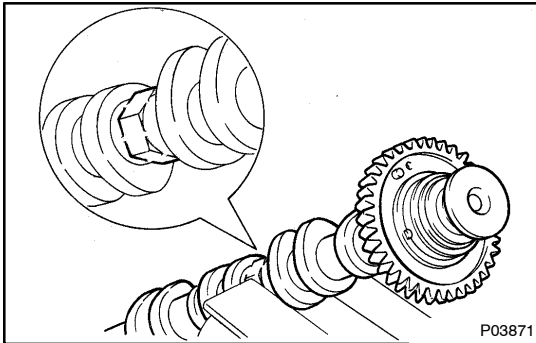
If any of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



- (c) Mark the front of the cylinder head bolt head with paint.
- (d) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (e) Retighten the cylinder head bolts by an additional 90°.
- (f) Check that the painted mark is now facing rearward.



- (g) Install the 2 bolts.  
**Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**

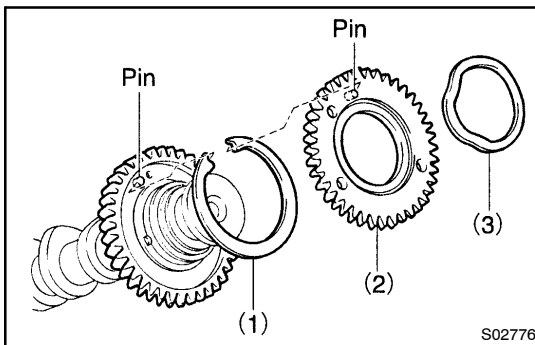


### 3. ASSEMBLE EXHAUST CAMSHAFT

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

**NOTICE:**

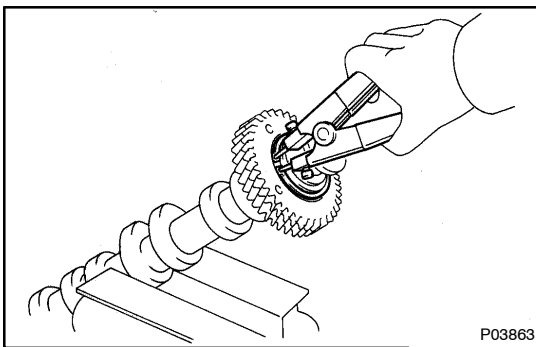
**Be careful not to damage the camshaft.**



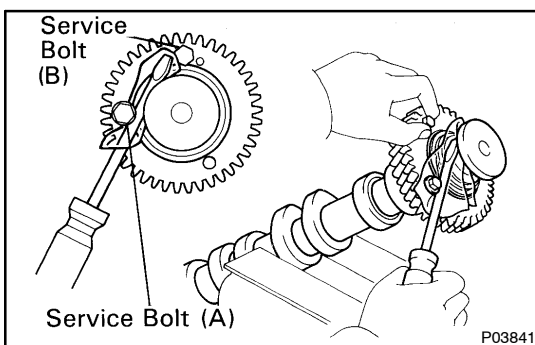
- (b) Install these parts:
- (1) Camshaft gear spring
  - (2) Camshaft sub-gear
  - (3) Wave washer

**HINT:**

Align the pins on the gears with the spring ends.



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



- (d) Insert a service bolt (A) into the service hole of the camshaft sub-gear.
- (e) Using a screwdriver, align the holes of the camshaft main gear and sub-gear by turning camshaft sub-gear clockwise, and install a service bolt (B).

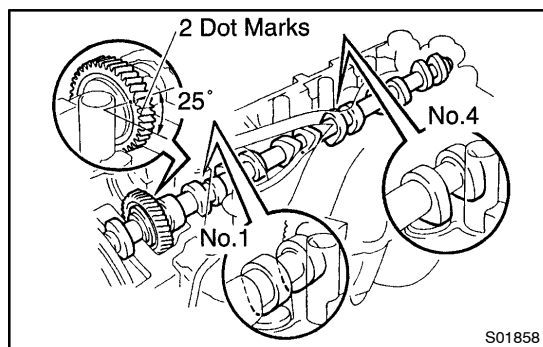
**NOTICE:**

**Be careful not to damage the camshaft.**

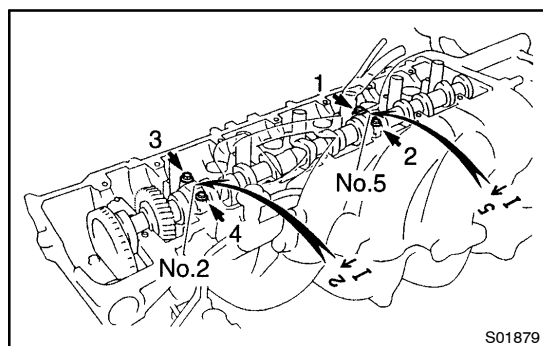
#### 4. INSTALL CAMSHAFTS

##### NOTICE:

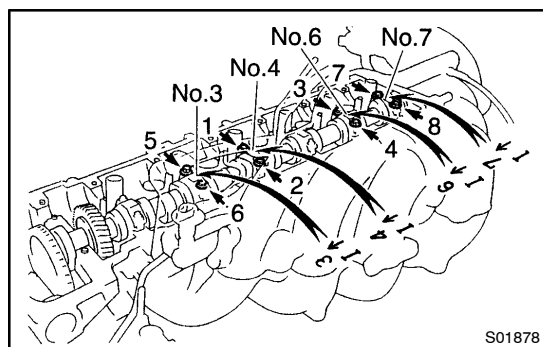
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, these steps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



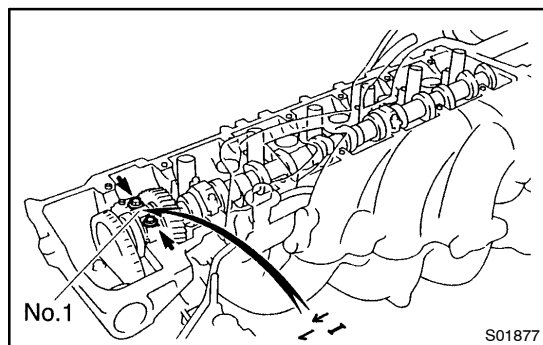
- (a) Install the intake camshaft.
- (1) Apply engine oil to the thrust portion of the intake camshaft.
  - (2) Lightly place the intake camshaft on top of the cylinder head as shown in the illustration so that the No.1 and No.4 cylinder cam lobes face downward.



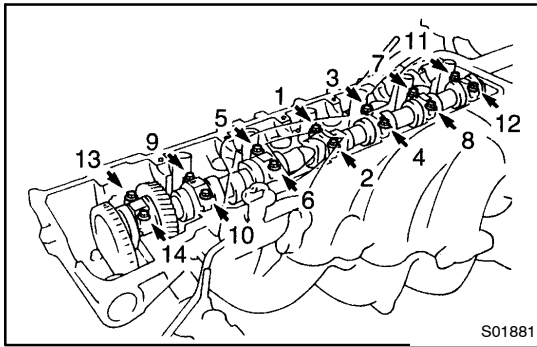
- (3) Lightly push the camshaft towards the front without applying excessive force.
- (4) Place the No.2 and No.5 bearing caps in their proper location.
- (5) Temporarily tighten the 4 bearing cap bolts uniformly in several passes, in the sequence shown until the bearing caps are snug with the cylinder head.



- (6) Place the No.3, No.4, No.6 and No.7 bearing caps in their proper location.
- (7) Temporarily tighten the 8 bearing cap bolts, uniformly in several passes, in the sequence shown until the bearing

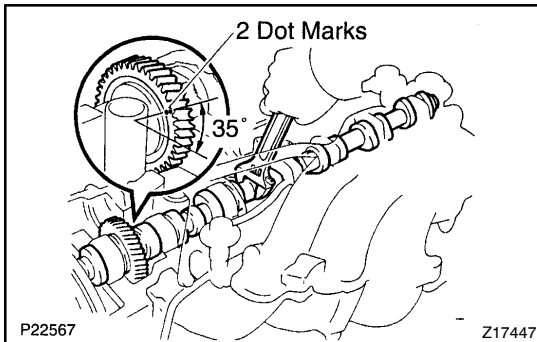


- (8) Place the No.1 bearing cap in its proper location. When doing this, check that there is no gap between the cylinder head and the contact surface of bearing cap.
- (9) Temporarily tighten the bearing cap bolts, alternately on the left and right sides in several passes.



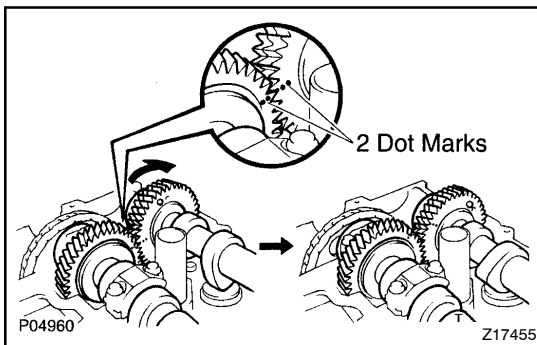
- (10) Uniformly tighten the 14 bearing cap bolts in several passes, in the sequence shown.

**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

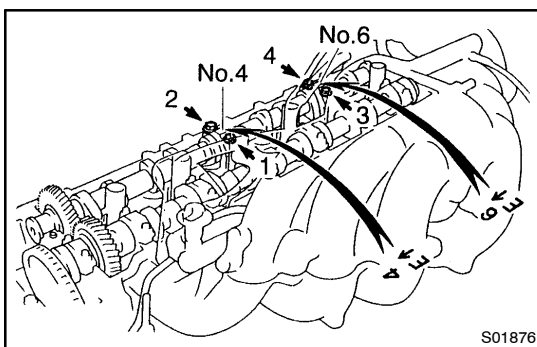


- (b) Install the exhaust camshaft.

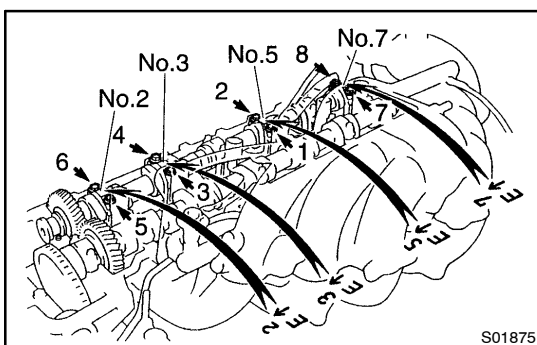
- (1) Set the timing mark (2 dot marks) of the camshaft drive gear at approx. 35° angle by turning the hexagon wrench head portion of the intake camshaft with a wrench.



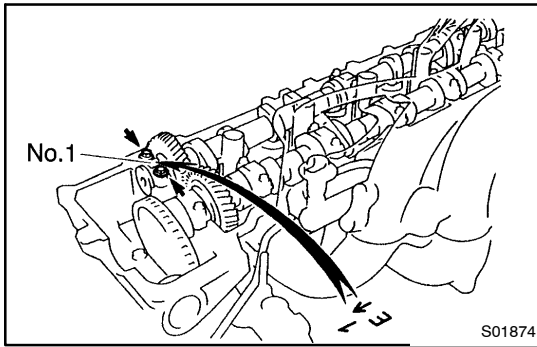
- (2) Apply engine oil to thrust portion of the exhaust camshaft.  
 (3) Engage the exhaust camshaft gear to the intake camshaft gear by matching the timing marks (2 dot marks) on each gear.  
 (4) Roll down the exhaust camshaft onto the bearing journals while engaging gears with each other.



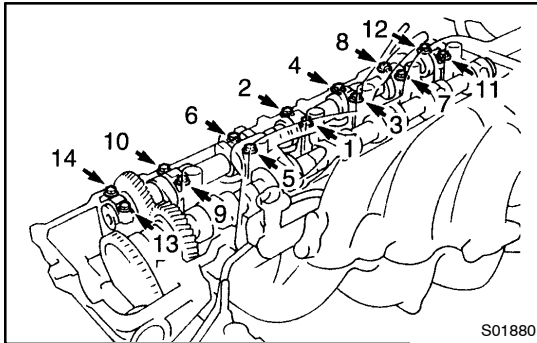
- (5) Lightly push the intake camshaft towards the front without applying excessive force.  
 (6) Install the No.4 and No.6 bearing caps in their proper location.  
 (7) Temporarily tighten the 4 bearing cap bolts uniformly in several passes, in the sequence shown until the bearing caps are snug with the cylinder head.



- (8) Place the No.2, No.3, No.5 and No.7 bearing caps in their proper location.  
 (9) Temporarily tighten the 8 bearing cap bolts uniformly in several passes, in the sequence shown.

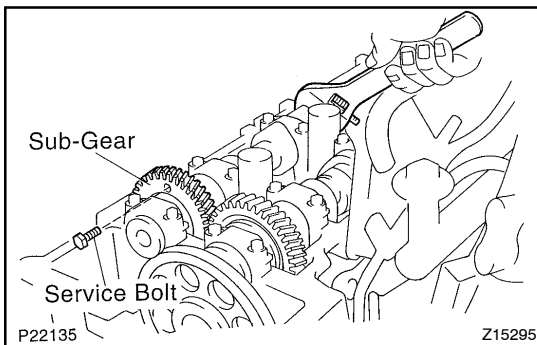


- (10) Place the No.1 bearing cap in its proper location. When doing this, check that there is no gap between the cylinder head and the contact surface of bearing cap.
- (11) Temporarily tighten the bearing cap bolts, alternately on the left and right sides in several passes.

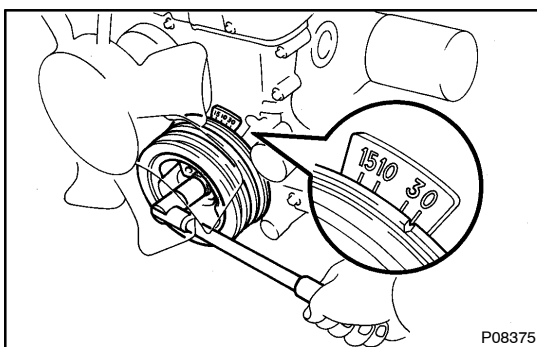


- (12) Uniformly tighten the 14 bearing cap bolts in several passes, in the sequence shown.

**Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)**

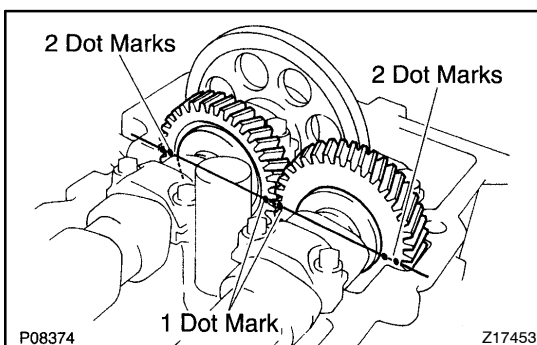


- (13) Bring the service bolt installed in the driven sub-gear upward by turning the hexagon wrench head portion of the camshaft with a wrench.
- (14) Remove the service bolt.
- (15) Check that the intake and exhaust camshafts turn smoothly.

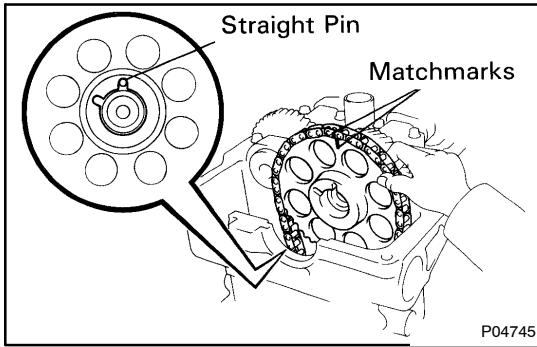


## 5. SET NO.1 CYLINDER TO TDC/COMPRESSION

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



- (b) Turn the camshafts so that the timing marks with 1 and 2 dots will be in straight line on the cylinder head surface as shown in the illustration.

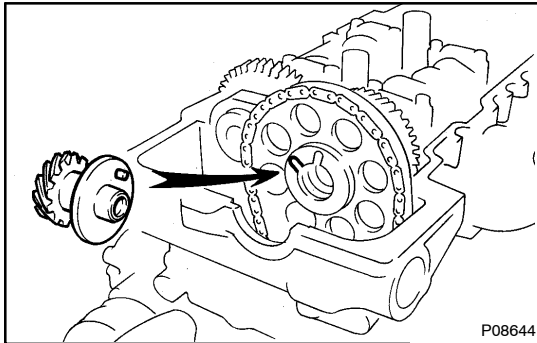


## 6. INSTALL CAMSHAFT TIMING GEAR

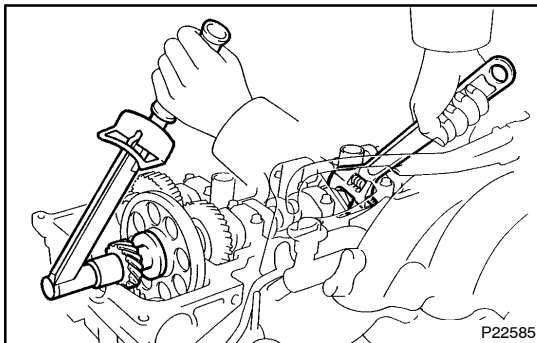
### HINT:

Check that the matchmarks on the camshaft timing gear and timing chain are aligned.

- (a) Place the gear over the straight pin of the intake camshaft.

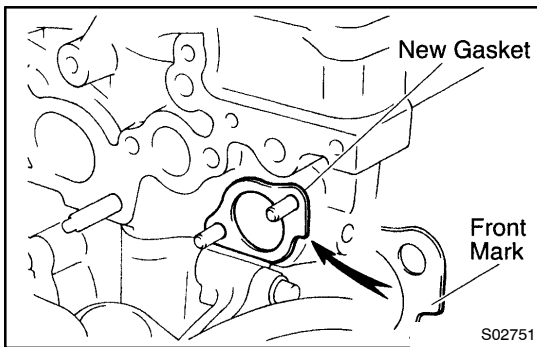


- (b) Align the straight pin of distributor gear with the straight pin groove of the intake camshaft gear as shown.



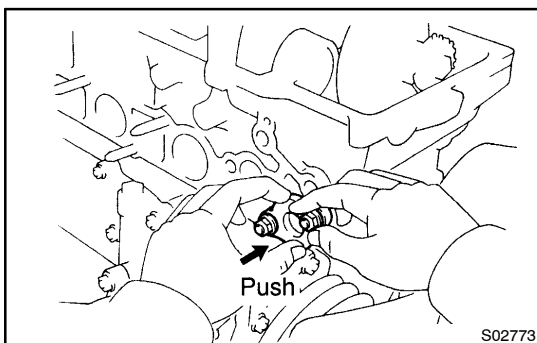
- (c) Hold the intake camshaft with a wrench, install and torque the bolt.

**Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)**



## 7. INSTALL CHAIN TENSIONER

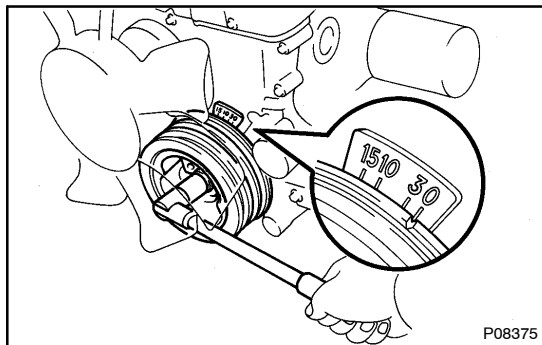
- (a) Place a new gasket so that the front mark is toward the front side.



- (b) Push the tensioner by hand until it touches the head installation surface, then install the 2 nuts.

- (c) Tighten the 2 nuts.

**Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**

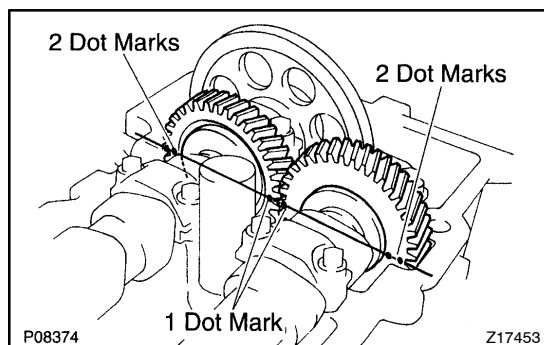


## 8. CHECK VALVE TIMING

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

### NOTICE:

**Always turn the crankshaft clockwise.**



- (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.

## 9. CHECK AND ADJUST VALVE CLEARANCE

(See page [EM-4](#))

Turn the camshaft and position the cam lobe upward and check and adjust the valve clearance.

## 10. INSTALL SPARK PLUGS

### 11. INSTALL SEMI-CIRCULAR PLUG

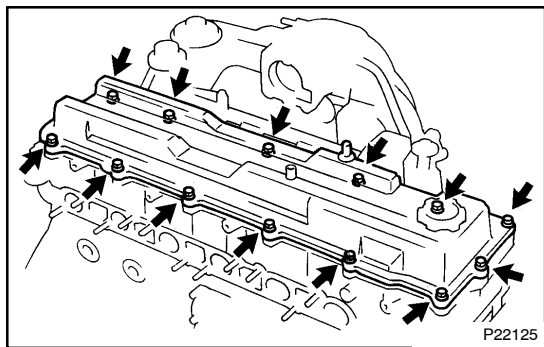
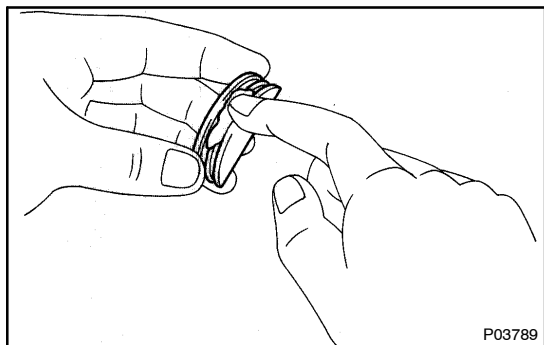
- (a) Remove any old packing (FIPG) material.  
(b) Apply seal packing to the cylinder head installation surface of the semi-circular plug.

#### Seal packing:

**Part No. 08826-00080 or equivalent**

- (c) Install the semi-circular plug to the cylinder head.

## 12. RESET NO.1 CYLINDER TO TDC/COMPRESSION



## 13. INSTALL CYLINDER HEAD COVER

- (a) Install the gasket to the cylinder head cover.  
(b) Install the cylinder head cover with the 13 bolts.

**Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)**

- (c) Connect the PCV hose to the PCV valve.

## 14. INSTALL WATER BYPASS OUTLET AND PIPE

- (a) Install a new O-ring to the bypass outlet.  
(b) Install 2 new O-rings to the bypass pipe.  
(c) Apply soapy water to the O-rings.  
(d) Assemble the bypass outlet and pipe.  
(e) Install the bypass outlet and pipe with the 2 bolts.

**Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)**

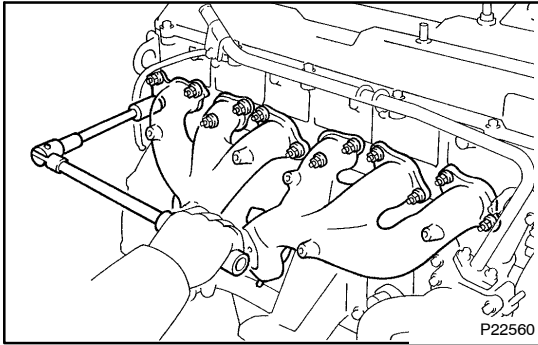
## 15. INSTALL HEATER PIPE

Install a new gasket, the heater pipe and ground cable with the 2 bolts and 2 nuts.

#### Torque:

**20 N·m (200 kgf·cm, 14 ft·lbf) for bolt**

**21 N·m (210 kgf·cm, 15 ft·lbf) for nut**



- 16. INSTALL NO.1 AND NO.2 EXHAUST MANIFOLDS**  
 (a) Install a new gasket and No.1 exhaust manifold with 6 new nuts.

**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

- (b) Install a new gasket and No.2 exhaust manifold with 7 new nuts.

**Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)**

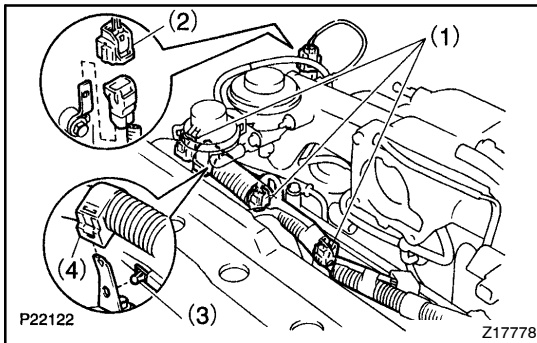
- (c) Install the No.1 heat insulator with the 3 bolts.  
 (d) Install the No.2 heat insulator with the 3 bolts.

**17. INSTALL FRONT EXHAUST PIPE (See page EM-73)**

**18. INSTALL NO.2 WATER BYPASS PIPE**

Install the bypass pipe with the 3 bolts.

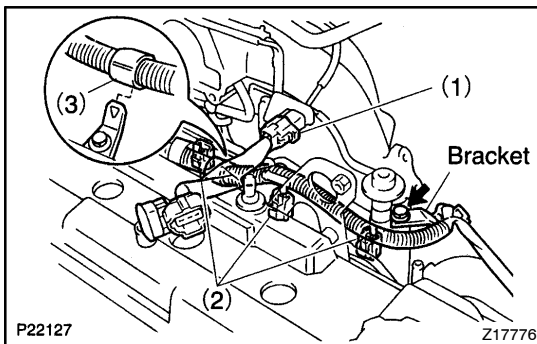
**Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)**



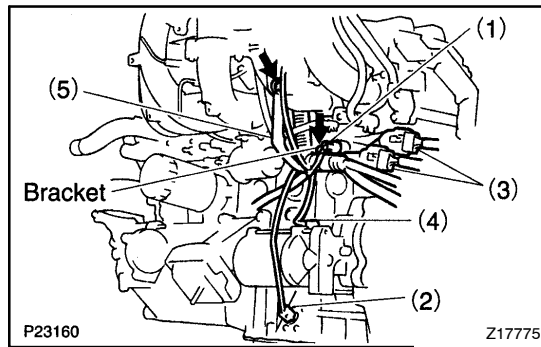
**19. CONNECT ENGINE WIRE**

- (a) Place the engine wire on the intake manifold.  
 (b) Connect these connectors and clamps:

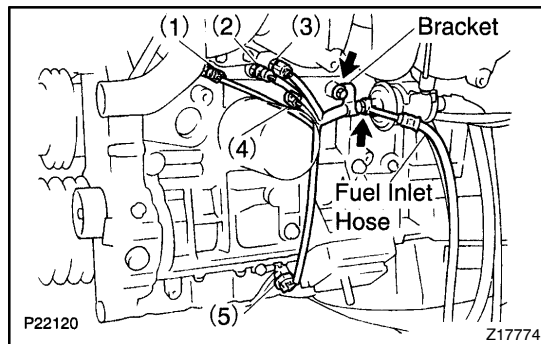
- (1) 3 injector connectors  
 (2) EGR gas temperature sensor connector  
 (3) Clamp of No.6 injector wire to bracket  
 (4) Engine wire clamp to bracket



- (c) Connect the connectors and clamp:  
 (1) Connector for emission control valve set assembly  
 (2) 3 injector connectors  
 (3) Engine wire clamp to bracket  
 (d) Install the engine wire bracket to the intake manifold with the bolt.  
 (e) Connect the engine wire bracket to the cylinder block with the bolt.  
 (f) Connect the PNP switch connector and heated oxygen sensor (bank 1 sensor 1, 2) connectors.



- (g) Connect the connectors and cable:
- (1) Knock sensor 2 connector
  - (2) Oil level sensor connector
  - (3) 2 connectors to transmission
  - (4) Starter connector
  - (5) Ground cable
- (h) Connect the engine wire bracket to the cylinder block with the bolt.



- (i) Connect these connectors:
- (1) ECT sender gauge connector
  - (2) ECT cut switch connector
  - (3) ECT sensor connector
  - (4) Knock sensor 1 connector
  - (5) Crankshaft position sensor connector

## 20. CONNECT FUEL INLET HOSE

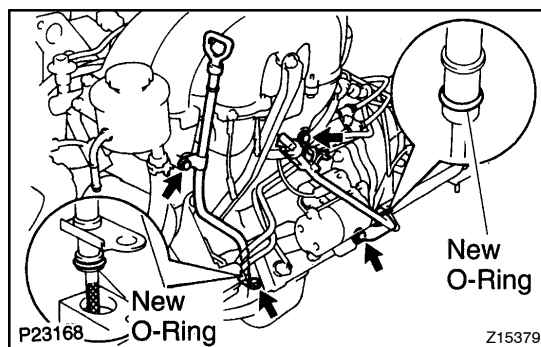
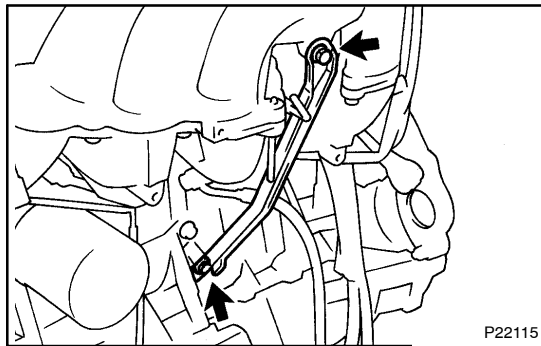
Connect the fuel inlet hose to the fuel filter with 2 new gaskets and the union bolt.

**Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)**

## 21. INSTALL INTAKE MANIFOLD STAY

Install the intake manifold stay with the 2 bolts.

**Torque: 36 N·m (360 kgf·cm, 26 ft·lbf)**



## 22. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE

- (a) Install a new O-ring to the dipstick guide.
- (b) Apply a light coat of engine oil on the O-ring.
- (c) Push in the dipstick guide into the guide hole of the oil pan.
- (d) Install the dipstick guide with the 2 bolts.

**Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)**

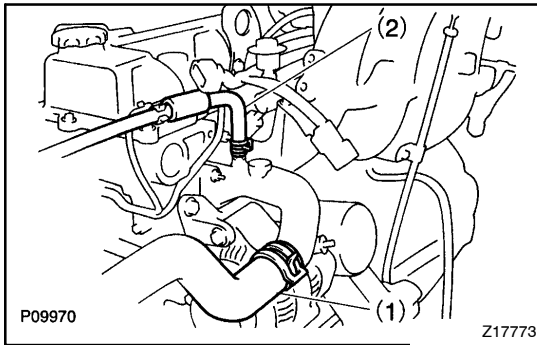
## 23. INSTALL OIL DIPSTICK AND GUIDE FOR A/T

- (a) Install a new O-ring to the dipstick guide.
- (b) Apply a light coat of engine oil on the O-ring.
- (c) Push in the dipstick guide into the guide hole of the oil pan.
- (d) Install the dipstick guide with the 2 bolts.

**Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)**

## 24. INSTALL THROTTLE BODY (See page [SF-44](#))

## 25. INSTALL GENERATOR AND DRIVE BELTS (See page [CH-16](#))

**26. CONNECT HOSES**

Connect these hoses:

- (1) Radiator inlet hose
- (2) No.3 water bypass hose

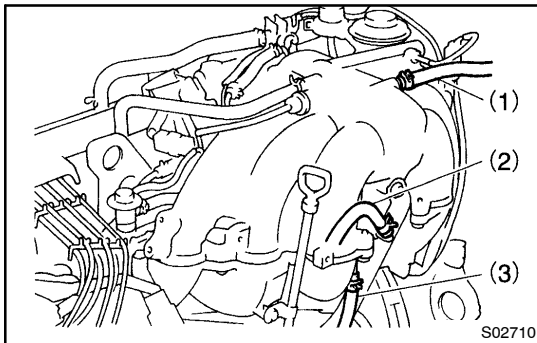
**27. CONNECT PS RESERVOIR**

Connect the reservoir with the 3 bolts.

**Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)**

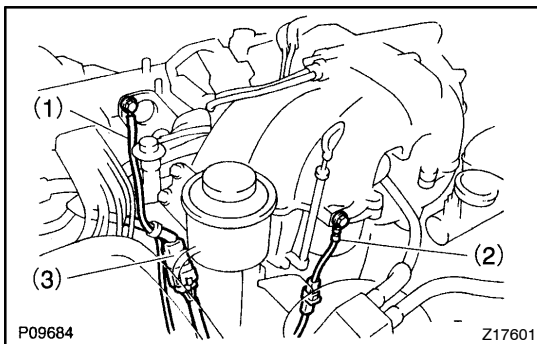
**28. INSTALL DISTRIBUTOR WITH HIGH-TENSION CORDS (See page IG-1)****29. INSTALL NO.2 AND NO.3 CYLINDER HEAD COVERS**

Install the head covers with the 4 bolts.

**30. INSTALL HEATER VALVE AND ENGINE WIRE TO COWL PANEL (See page EM-73)****31. CONNECT HEATER HOSES****32. CONNECT HOSES**

Connect these hoses:

- (1) Brake booster vacuum hose
- (2) EVAP hose
- (3) Fuel return hose

**33. CONNECT ENGINE GROUND STRAPS**

Connect these ground straps:

- (1) Ground strap to No.1 engine hanger
- (2) Ground strap to air intake chamber
- (3) Connector on intake manifold

**34. CONNECT CABLES**

Connect the throttle cable, accelerator cable and cruise control actuator cable.

**35. INSTALL AIR CLEANER HOSE AND CAP****36. INSTALL BATTERY TRAY AND BATTERY****37. FILL WITH ENGINE COOLANT****38. START ENGINE AND CHECK FOR LEAKS****39. ADJUST IGNITION TIMING (See page EM-9)****40. RECHECK ENGINE COOLANT LEVEL**