

## INSTALLATION

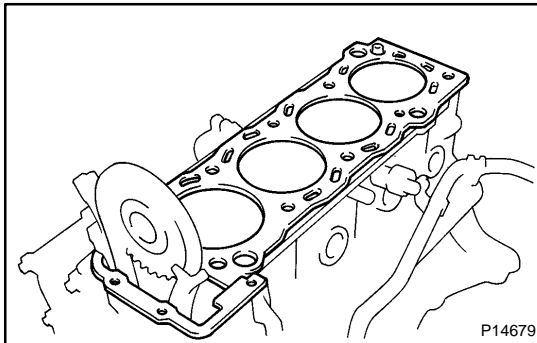
### 1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- (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 in position on the cylinder block.

**NOTICE:**

**Be careful of the installation direction.**

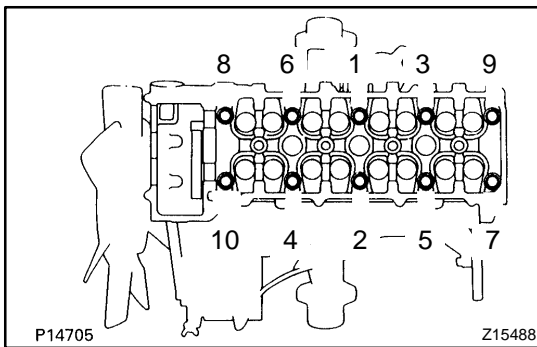
- (c) Place the cylinder head in position on the cylinder head gasket.

### 2. INSTALL CYLINDER HEAD BOLTS

**HINT:**

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

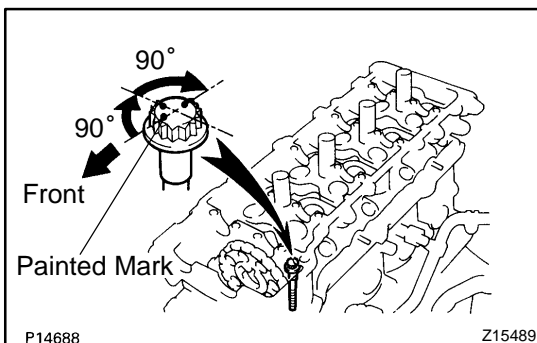
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.



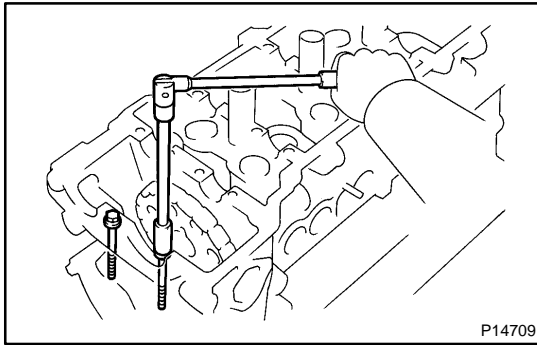
- (b) Install and uniformly tighten the 10 cylinder head bolts and plate washers in several passes, in the sequence shown.

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

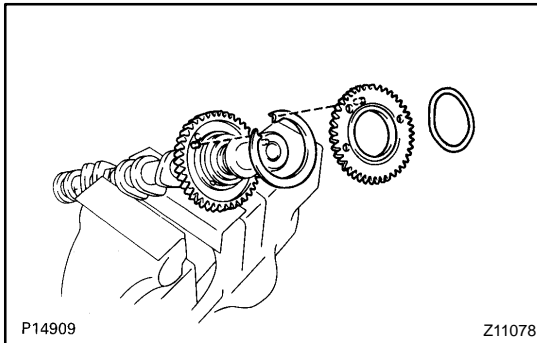
If any of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



- (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 the camshaft gear spring, the camshaft sub-gear and the wave washer.

#### HINT:

Align the pins on the gears with the spring ends.

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

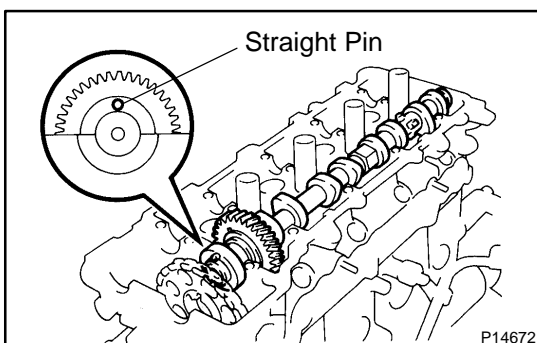
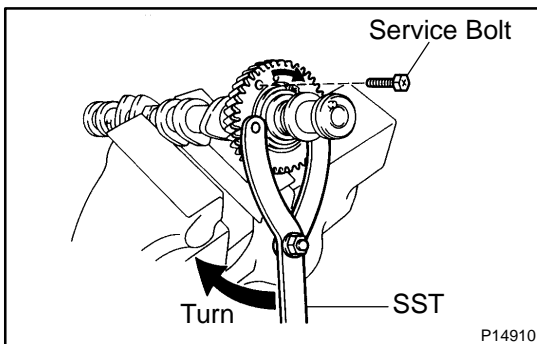
- (d) Using SST, align the holes of the camshaft main gear and sub-gear by turning sub-gear clockwise, and install a service bolt.

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

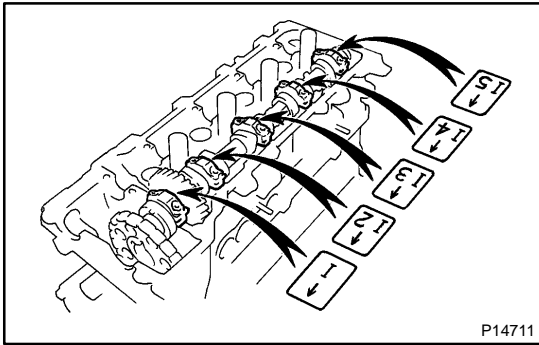
### 4. INSTALL CAMSHAFTS

#### NOTICE:

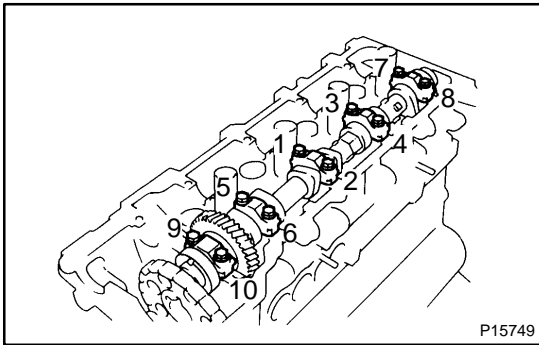
**Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, these steps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



- (a) Install the intake camshaft.
- (1) Apply MP grease to the thrust portion of the intake camshaft.
  - (2) Place the intake camshaft with knock pin facing upward of camshaft angle on the cylinder head.

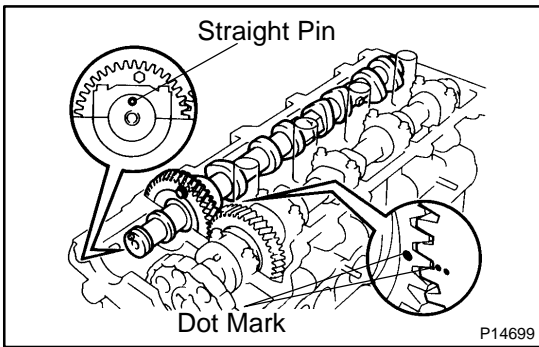


(3) Install the bearing caps in their proper locations.



(4) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.  
 (5) Install and uniformly tighten the 10 bearing cap bolts in several passes, in the sequence shown.

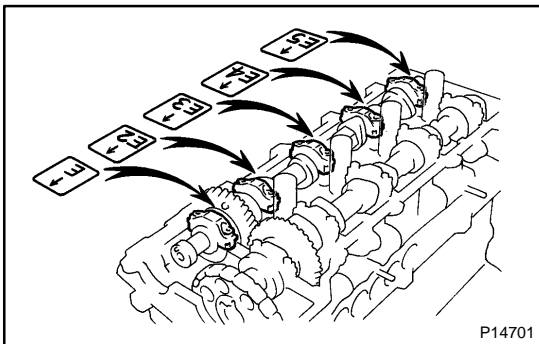
**Torque: 15.5 N·m (160 kgf·cm, 12 ft·lbf)**



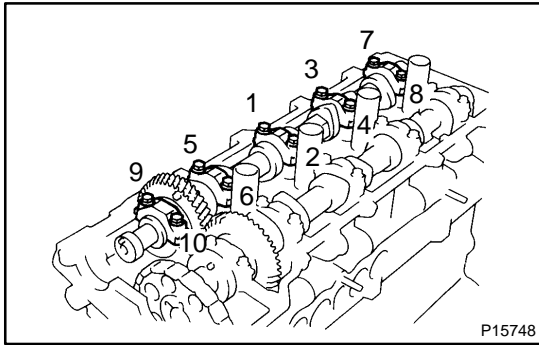
(b) Install the exhaust camshaft.  
 (1) Apply MP grease to the thrust portion of the exhaust camshaft.  
 (2) Engage the exhaust camshaft gear to the intake camshaft gear by matching the timing marks (1 and 2 dots) on each gear.

**NOTICE:**  
**There are also timing marks (for TDC) on each gear as shown in the illustration. Do not use these marks.**

(3) Roll down the exhaust camshaft onto the bearing journals while engaging gears with each other.



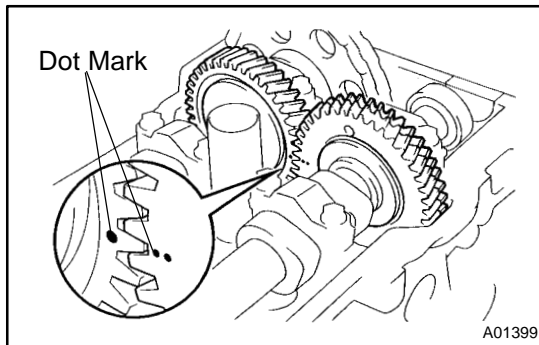
(4) Install the bearing caps in their proper locations.



- (5) Apply light coat of engine oil on the threads and under the heads of the bearing cap bolts.
- (6) Install and uniformly tighten the 10 bearing cap bolts in several passes, in the sequence shown.

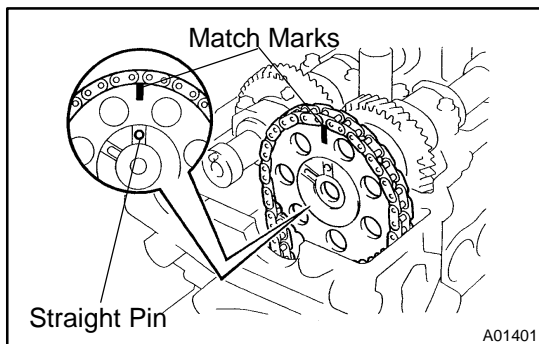
**Torque: 15.5 N·m (160 kgf·cm, 12 ft·lbf)**

- (7) Remove the service bolt.
- (8) Check that the intake and exhaust camshafts turn smoothly.



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

- (a) Turn the crankshaft pulley clockwise, and align its groove with 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.



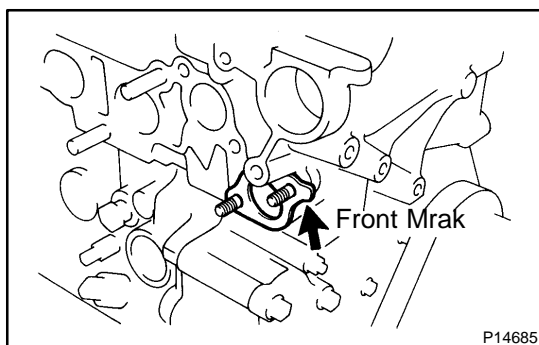
#### 6. INSTALL CAMSHAFT TIMING GEAR

HINT:

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

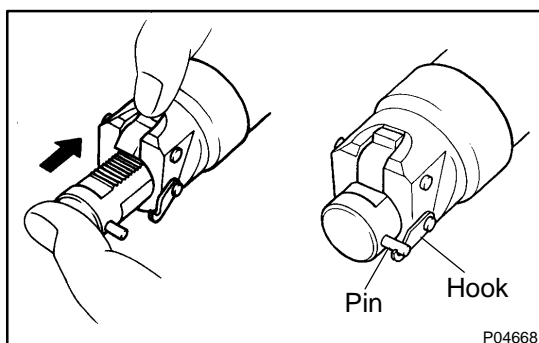
- (a) Place the gear over the straight pin of the intake camshaft.
- (b) Hold the intake camshaft with a wrench, install and torque the bolt.

**Torque: 73.5 N·m (750 kgf·cm, 54 ft·lbf)**



#### 7. INSTALL CHAIN TENSIONER

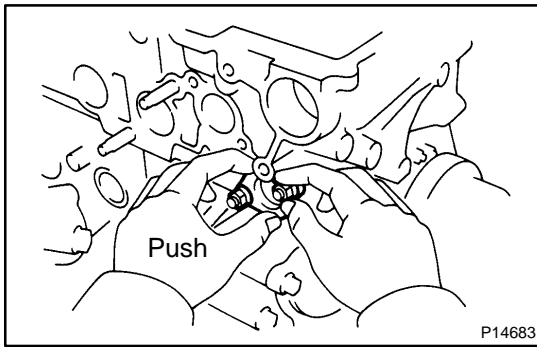
- (a) Place a new gasket so that the front mark is toward the front side.



- (b) Release the ratchet pawl, fully push in the plunger and apply the hook to the pin so that the plunger cannot spring out.
- (c) Turn the crankshaft pulley clockwise to provide some slack for the chain on the tensioner side.

**NOTICE:**

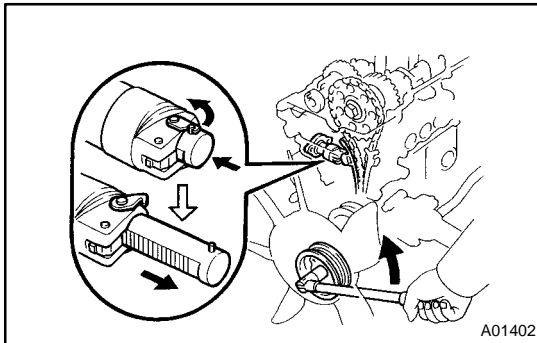
**Do not turn the pulley counterclockwise.**



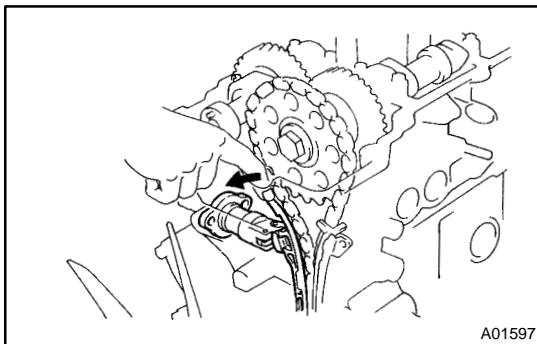
- (d) Push the tensioner by hand until it touches the head installation surface, then install the 2 nuts.
- (e) Tighten the 2 nuts.  
**Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)**
- (f) Check that the hook of the tensioner is not released.

**NOTICE:**

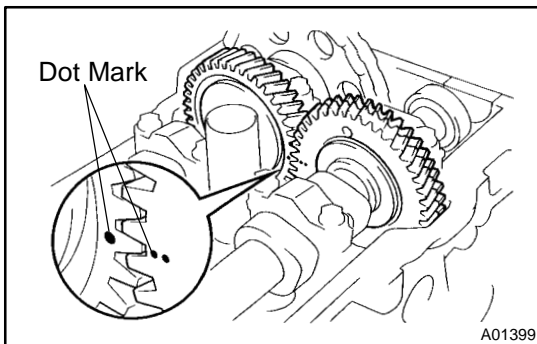
If the plunger springs out during installation of the chain tensioner, repeat the operation in step (b) before installing the tensioner.

**8. SET CHAIN TENSIONER**

Turn the crankshaft to the left so that the hook of the chain tensioner is released from the pin of the plunger, causing the plunger to spring out and the slipper to be pushed in to the chain.

**HINT:**

If the plunger does not spring out, press the slipper into the chain tensioner with a screwdriver or your finger so that the hook is released and the plunger springs out.

**9. CHECK VALVE TIMING**

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

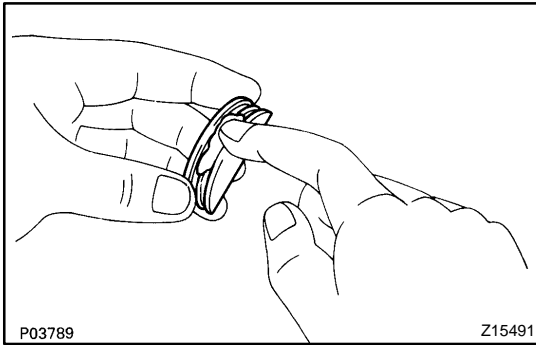
**NOTICE:**

**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.

**10. CHECK AND ADJUST VALVE CLEARANCE (See page EM-5)****11. INSTALL SPARK PLUGS**

**12. INSTALL SEMI-CIRCULAR PLUGS**

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

**Seal packing: Part No. 08826-00080 or equivalent**

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

**13. INSTALL CYLINDER HEAD COVER****14. INSTALL IGNITION COILS (WITH IGNITER)**

Install the 4 ignition coils (with igniter) with the 4 bolts.

**Torque: 7.5 N·m (77 kgf·cm, 66 in.-lbf)**

**15. INSTALL ENGINE WIRE BRACKETS****16. INSTALL FRONT ENGINE HANGER**

**Torque: 42 N·m (420 kgf·cm, 30 ft·lbf)**

**17. INSTALL CYLINDER HEAD REAR COVER**

Install a new gasket and the rear cover with the 3 bolts.

**Torque: 13.5 N·m (135 kgf·cm, 10 ft·lbf)**

**18. INSTALL WATER OUTLET**

- (a) Install a new gasket and the water outlet with the 2 bolts.

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

- (b) Connect the upper radiator hose.

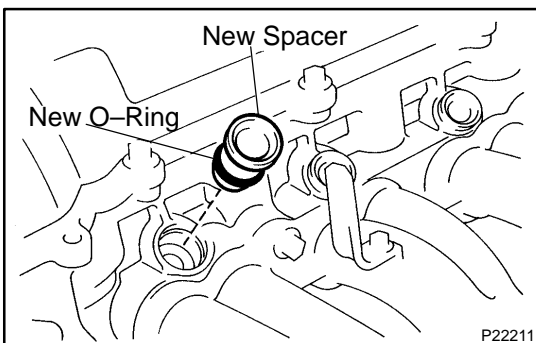
**19. INSTALL EXHAUST MANIFOLD**

Install a new gasket and the exhaust manifold with the 6 nuts.

**20. INSTALL FRONT EXHAUST PIPE****21. INSTALL INTAKE MANIFOLD**

Install a new gasket and the intake manifold with the 3 bolts and 2 nuts.

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

**22. INSTALL INJECTORS AND DELIVERY PIPE (See page SF-20)****HINT:**

When using a new cylinder head, spacers must be installed. Apply a light coat of gasoline to a new O-ring and install it to a new spacer.

**23. INSTALL FUEL RETURN PIPE****24. INSTALL FUEL INLET PIPE**

Install the fuel inlet pipe and 4 new gaskets with 2 union bolts.

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

**25. CONNECT INJECTOR CONNECTORS****26. INSTALL AIR INTAKE CHAMBER ASSEMBLY**

- (a) Install a new gasket and the air intake chamber assembly with the 3 bolts and 2 nuts.  
**Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)**
- (b) Connect the EVAP hose to throttle body.
- (c) Connect the brake booster vacuum hose to union.
- (d) Connect the water bypass hose to water bypass pipe.
- (e) Connect the water bypass hose to cylinder head rear cover.

**27. INSTALL INTAKE CHAMBER STAY****Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)****28. CONNECT ENGINE WIRE****29. INSTALL PCV HOSES****30. w/ PS:****INSTALL PS PUMP AND BRACKET**

- (a) Install the PS pump bracket with the 4 bolts.

**Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)**

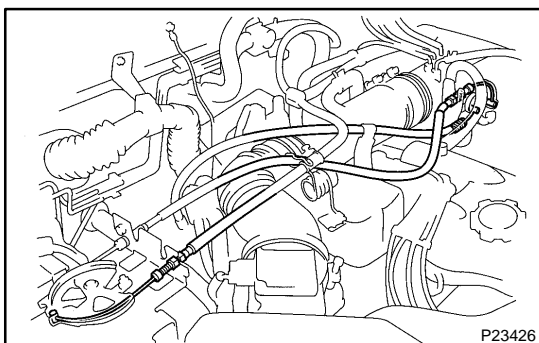
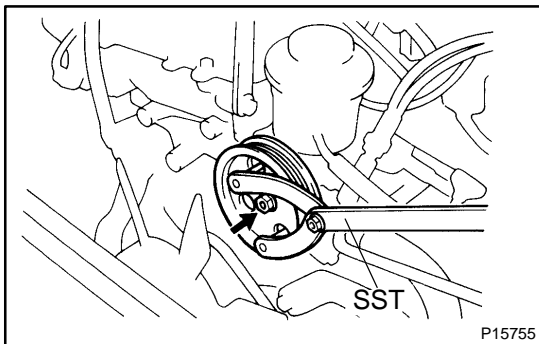
- (b) Connect the PS pump to the bracket with the 2 bolts.

**Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)**

- (c) Connect the 2 air hoses to the throttle body and air intake chamber.

- (d) Using SST, install the PS pump pulley with the nut.

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

**Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)****31. w/ PS:****INSTALL DRIVE BELT IDLER PULLEY FOR PS PUMP****Torque: 20 N·m (200 kgf-cm, 14 ft-lbf)****32. INSTALL DRIVE BELT FOR PS PUMP**(See page [SR-3](#))**33. INSTALL OIL DIPSTICK GUIDE****Torque: 20 N·m (200 kgf-cm, 15 ft-lbf)****34. INSTALL INTAKE AIR CONNECTOR****Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)****35. INSTALL AIR CLEANER CAP, MAF METER AND RESONATOR ASSEMBLY****36. CONNECT CABLES:**

- (a) Connect the accelerator cable to the throttle body.

**(b) A/T:**

Connect the throttle cable to the throttle body.

**(c) w/ Cruise Control System:**

Connect the cruise control cable to the actuator, and install the actuator cover.

**37. FILL WITH ENGINE COOLANT****38. START ENGINE AND CHECK FOR LEAKS****39. VEHICLE ROAD TEST**

Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

**40. RECHECK ENGINE COOLANT LEVEL**