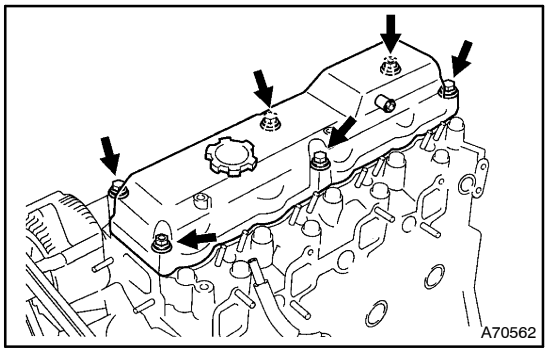
CAMSHAFT (14B)

1416Y–01

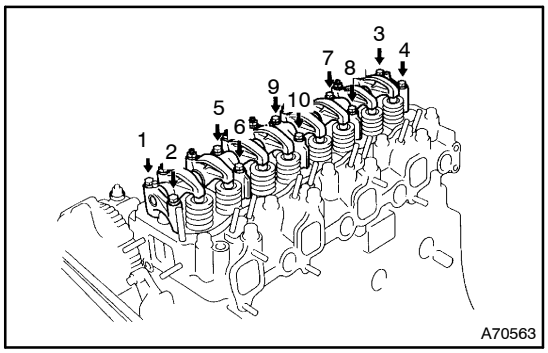
REPLACEMENT

1. DISCONNECT BATTERY NEGATIVE TERMINAL
2. DRAIN ENGINE COOLANT
3. DRAIN ENGINE OIL
4. REMOVE RADIATOR ASSY (See page 16–11)
5. SET NO. 1 CYLINDER TO TDC/COMPRESSION
6. REMOVE NOZZLE ASSY (See page 11–7)



7. REMOVE CYLINDER HEAD COVER SUB–ASSY

(a) Remove the 4 bolts, 2 nuts, 6 cushions, cylinder head cover and gasket.

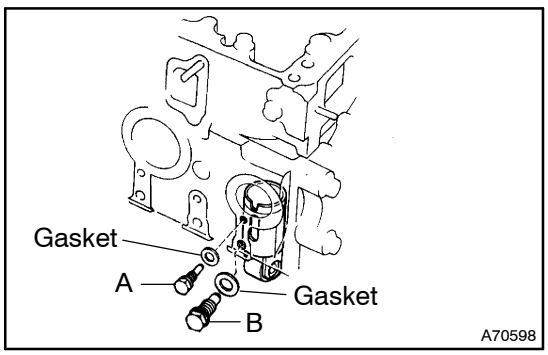


8. REMOVE VALVE ROCKER SHAFT ASSY

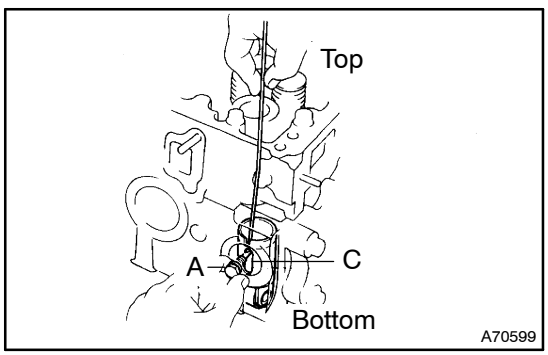
(a) Loosen the lock nuts and adjusting screws.

(b) Uniformly loosen the 10 bolts and remove them, in several passes, in the order shown.

(c) Remove the valve rocker shaft assy.



(d) Remove the bolts (A), (B) and gaskets.



(e) Using a wire, lift up the valve lifter until long hole (C) of the valve lifter moves up to the position of the installation hole for the bolt (A).

HINT:

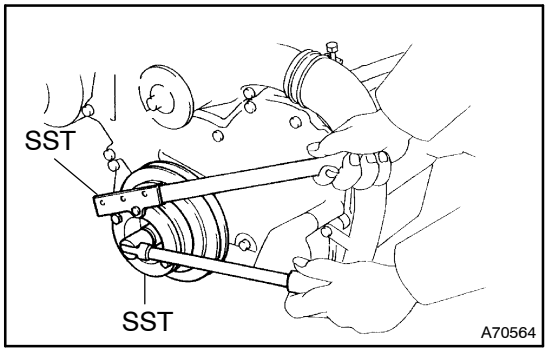
If the lifter is lifted up too high it may miss the position.

(f) Install the bolt (A).

(g) Check that bolt (A) prevents the valve lifter from falling.

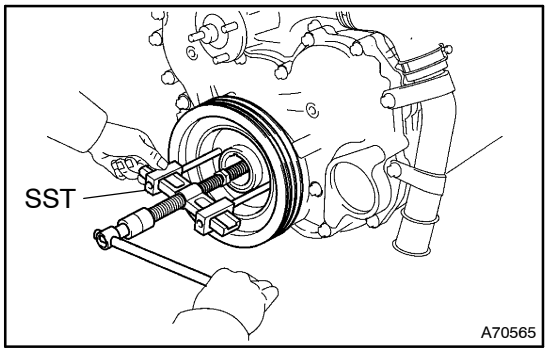
NOTICE:

Be careful not to scratch the valve lifter.

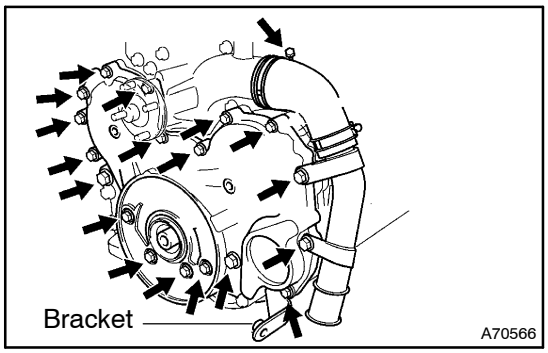


9. REMOVE CRANKSHAFT PULLEY

(a) Using SST, remove the mount bolt.
SST 09213–58013 (90201–08131, 91111–50845), 09330–00021

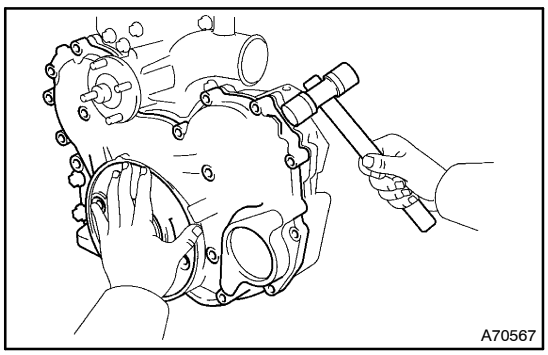


(b) Using SST, remove the crankshaft pulley.
SST 09950–50013 (09951–05010, 09952–05010, 09953–05010, 09953–05020, 09954–05030)



10. REMOVE TIMING GEAR COVER

(a) Remove the 2 bolts holding the radiator pipe to the timing gear cover.
(b) Disconnect the radiator hose from the water pump. Then remove the radiator pipe.
(c) Remove the bolt and oil stick guide.
(d) Remove the 15 mount bolts and bracket.



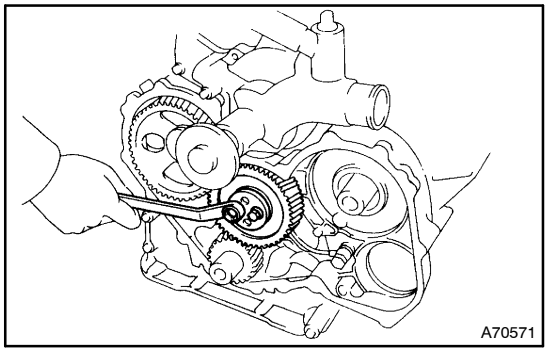
(e) Using a plastic–faced hammer, lightly tap out the timing gear cover.
(f) Remove the timing gear cover gasket.
(g) Using a plastic–faced hammer, lightly tap out the gear and remove the injection pump drive gear.

11. REMOVE INJECTION PUMP DRIVE GEAR

(a) Remove the injection pump drive gear.

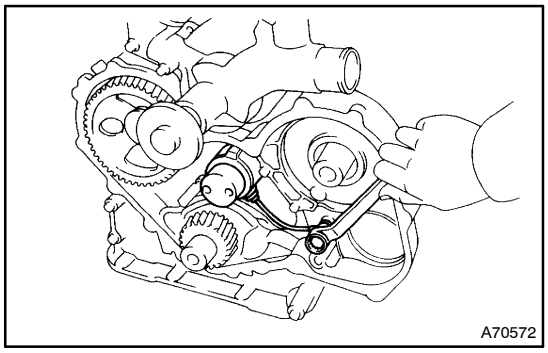
12. REMOVE VACUUM PUMP ASSY

(a) Disconnect the vacuum pump hose.
(b) Remove the 2 bolts and vacuum pump.
(c) Remove the 2 O–rings.



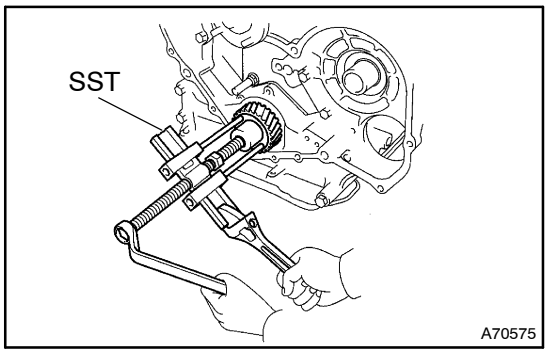
13. REMOVE IDLE GEAR NO.1

(a) Remove the 2 bolts, thrust plate and idle gear.



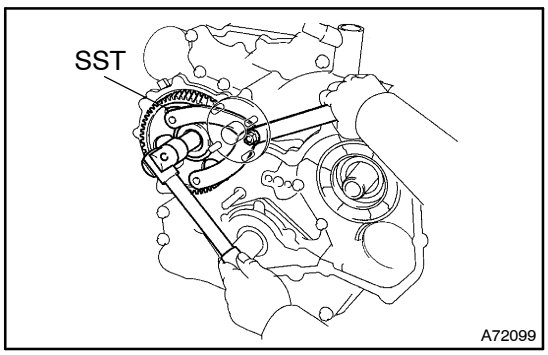
14. REMOVE IDLE GEAR SHAFT SUB–ASSY

(a) Remove the union bolt and idle gear shaft.



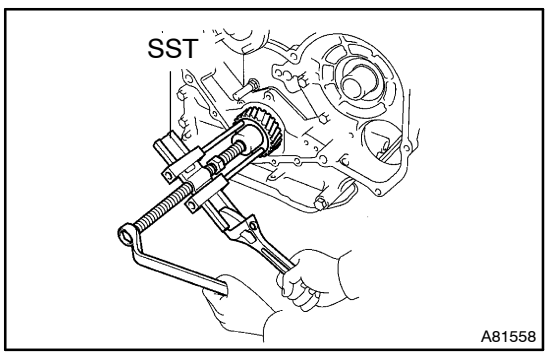
15. REMOVE CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Using SST, remove the timing gear.
SST 09950–50013 (09951–05010, 09952–05010, 09953–05010, 09953–05020)



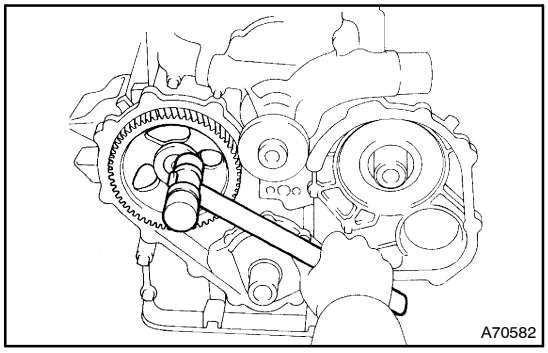
16. REMOVE CAMSHAFT

(a) Using SST, remove the mounting bolt and plate washer.
SST 09960–10010 (09962–01000, 09963–01000),



(b) Using SST, remove the timing gear.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04051)

(c) Remove the camshaft.



17. INSTALL CAMSHAFT

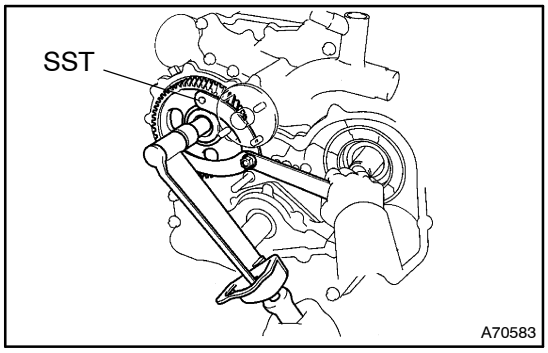
(a) Install the camshaft.

(b) Align the timing gear set key with the key groove of the timing gear.

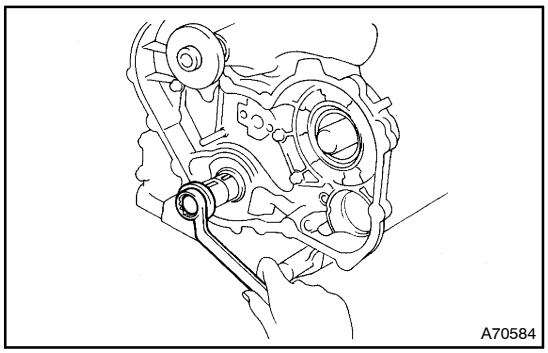
(c) Using a plastic–faced hammer, lightly tap in the camshaft timing gear.

NOTICE:

Avoid any impact to the camshaft.



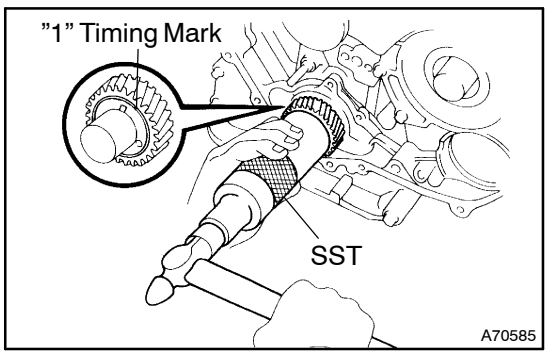
(d) Using SST, install the plate washer and mount bolt.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 37.5 N·m (382 kgf·cm, 28 ft·lbf)



18. INSTALL CRANKSHAFT TIMING GEAR OR SPROCKET

(a) Check that the set key on crankshaft faces upward.

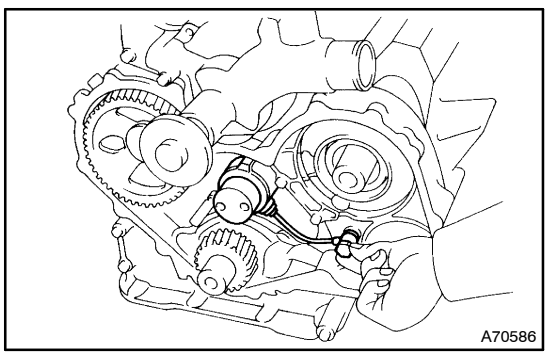
If not, turn the crankshaft with a crankshaft pulley mount bolt.



(b) Put the timing gear on the crankshaft withe timing mark 1 of the timing gear facing forward.

(c) Align the timing gear set key with the key groove of the crankshaft timing gear.

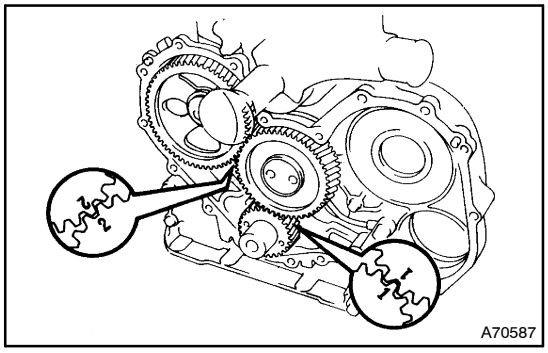
(d) Using SST and a hammer, tap in the crankshaft timing gear.
SST 09608–06041



19. INSTALL IDLE GEAR SHAFT SUB–ASSY

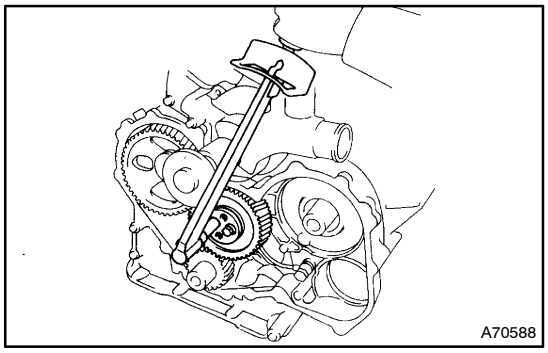
NOTICE:

Do not tighten the union bolt.



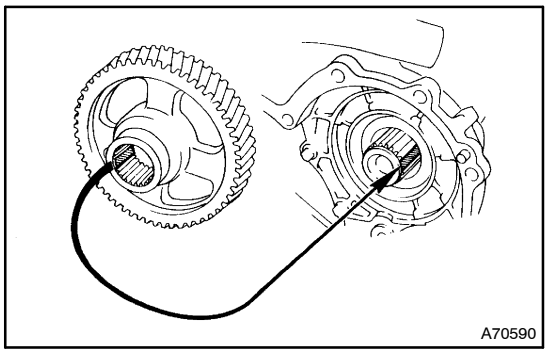
20. INSTALL IDLE GEAR NO.1

(a) Align idle gear timing marks 1 and 2 with crankshaft gear timing mark 1 and camshaft gear timing mark 2 respectively, and mesh the gears.



(b) Apply a light coat of engine oil on the threads and under the bolt heads.

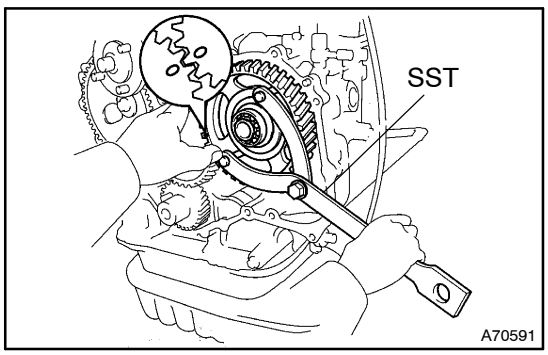
(c) Install the thrust plate with the 2 bolts.
Torque: 47.5 N·m (484 kgf·cm, 35 ft·lbf)



21. INSTALL INJECTION PUMP DRIVE GEAR

(a) Apply MP grease to the drive gear spline, bearing and injection pump spline.

(b) Align the spline toothless portions of the injection pump drive gear and injection pump, and install the injection pump drive gear.



(c) Using SST, align idle gear timing mark 0 with injection pump drive gear timing mark 0, and mesh the gears.
SST 09960–10010 (09962–01000, 09963–01000)

22. INSTALL VACUUM PUMP ASSY

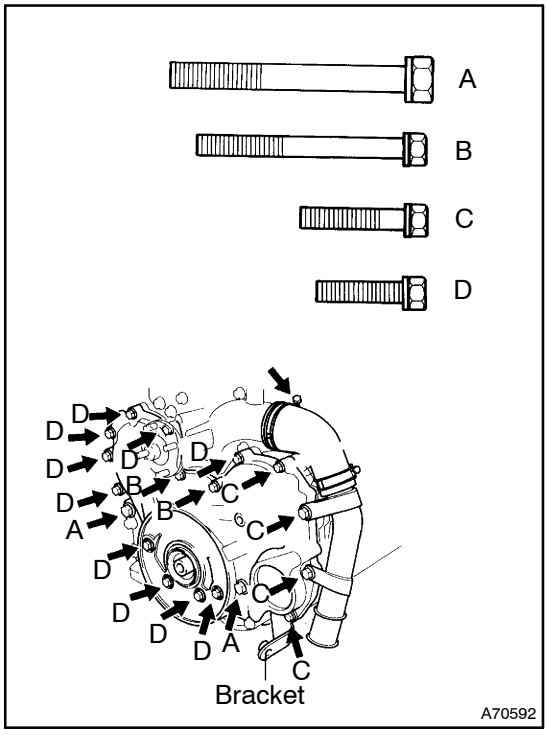
(a) Install 2 new O–rings to the vacuum pump.

(b) Install the vacuum pump with the 2 bolts.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(c) Connect the vacuum pump hose.

23. INSPECT TIMING GEAR BACKLASH

24. INSPECT IDLE GEAR NO. 1 THRUST CLEARANCE



25. INSTALL TIMING GEAR COVER

(a) Install a new gasket and the timing gear cover.

(b) Align the 2 knock pins of the oil pump, and lightly tap in the timing gear cover using a plastic–faced hammer.

(c) Install the bracket and 15 mount bolts.

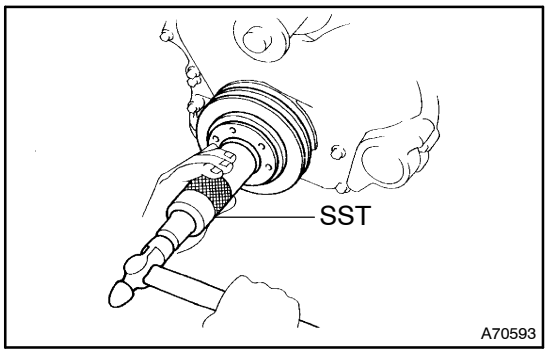
Torque:
44 N·m (449 kgf·cm, 32 ft·lbf) for 14 mm head
21 N·m (214 kgf·cm, 15 ft·lbf) for 12 mm head

HINT:
Bolt length:
A 80 mm (3.15 in.) for 14 mm head
B 77 mm (3.03 in.) for 12 mm head
C 40 mm (1.57 in.) for 12 mm head
D 35 mm (1.38 in.) for 12 mm head

(d) Connect the radiator hose to the water pump.

(e) Install the radiator pipe with the 2 bolts.

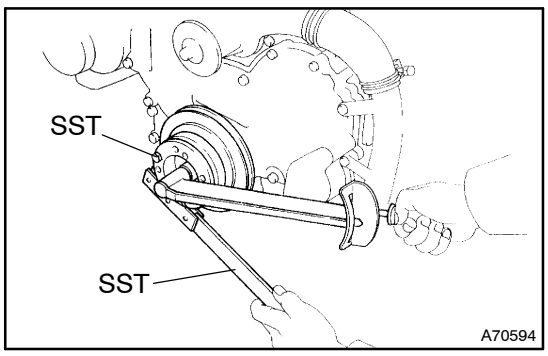
Torque: 18.5 N·m (189 kgf·cm, 14 ft·lbf)



26. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley.

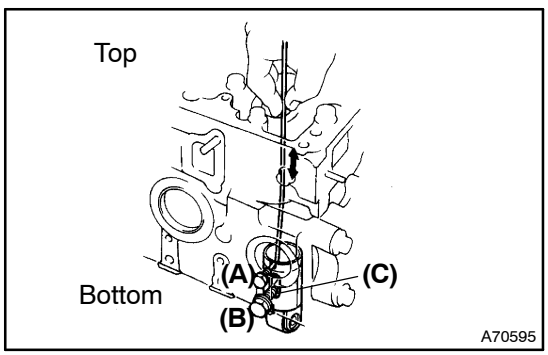
(b) Using SST and a hammer, tap in the pulley.
SST 09608–06041



(c) Apply a light coat of engine oil on the threads and under the bolt head.

(d) Using SST, install and torque the pulley mount bolt.
SST 09213–58012 (90201–08131, 91111–50845), 09330–00021

Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)



27. INSTALL VALVE ROCKER SHAFT ASSY

(a) Remove the bolt (A) and let the lifter slide down.

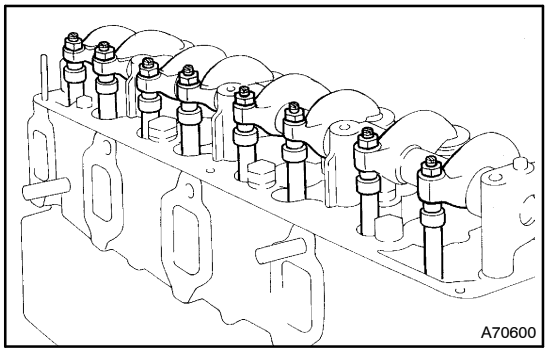
(b) Install the bolts (A) and (B) with new gaskets.

Torque:
9.4 N·m (96 kgf·cm, 6.8 in.·lbf) for Bolt A
37.5 N·m (382 kgf·cm, 28 ft·lbf) for Bolt B

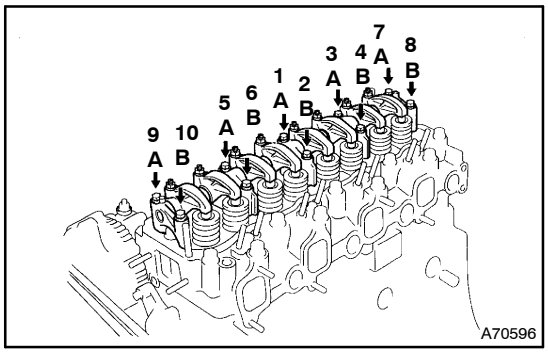
HINT:
When installing bolt (B), check that the hole for bolt (B) is aligned with long hole (C) of the valve lifter.

(c) Check that the valve lifter can move up and down within the limit of long hole (C).

NOTICE:
Be careful not to scratch the valve lifter.



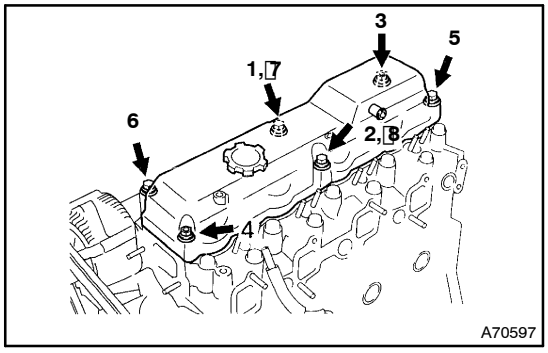
(d) Place the rocker shaft assembly on the cylinder head.
(e) Align the rocker arm adjusting screws with the heads of the push rods.



(f) Install the 10 bolts and uniformly tighten them, in several passes, in the order shown.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

HINT:
Bolt length:
63 mm (2.48 in.) for A
53 mm (2.08 in.) for B

28. INSPECT VALVE CLEARANCE (See page 14–10)
29. ADJUST VALVE CLEARANCE (See page 14–10)



30. INSTALL CYLINDER HEAD COVER SUB–ASSY
(a) Install the gasket to the cylinder head cover.
(b) Install the cylinder head cover and uniformly tighten it with the 6 cuhsions, 4 bolts and 2 nuts, in several passes, in the order shown.
Torque: 10.5 N·m (107 kgf·cm, 8 ft·lbf)

31. INSTALL NOZZLE ASSY (See page 11–7)
32. INSTALL RADIATOR ASSY (See page 16–11)
33. ADJUST PARKING BRAKE SHOE CLEARANCE (CENTER PARKING BRAKE) (See page 33–11)
34. INSPECT AND ADJUST PARKING BRAKE LEVER TRAVEL (See page 33–11)
35. ADD ENGINE OIL
36. REFILL ENGINE COOLANT
37. BLEED FUEL (See page 11–4)
38. CONNECT BATTERY NEGATIVE TERMINAL
39. CHECK ENGINE OIL LEVEL

40. CHECK FOR ENGINE COOLANT LEAKS
41. CHECK FOR ENGINE OIL LEAKS
42. INSPECT FOR FUEL LEAKS
43. INSPECT VALVE CLEARANCE (See page 14–10)