

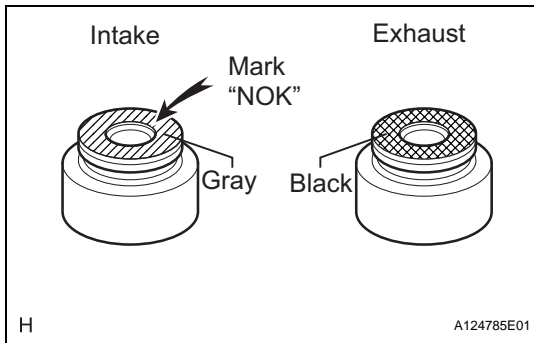
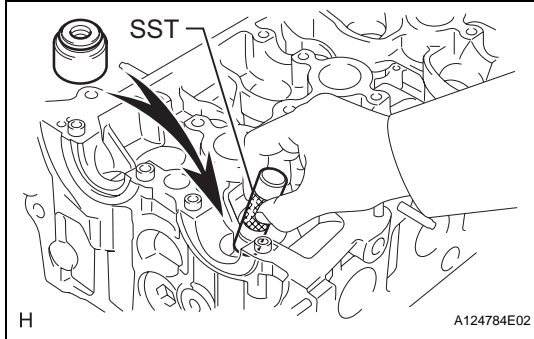
REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace oil seals with new ones.

1. INSTALL VALVE STEM OIL SEAL

- (a) Using SST, push in a new oil seal.
SST 09201-41020



HINT:

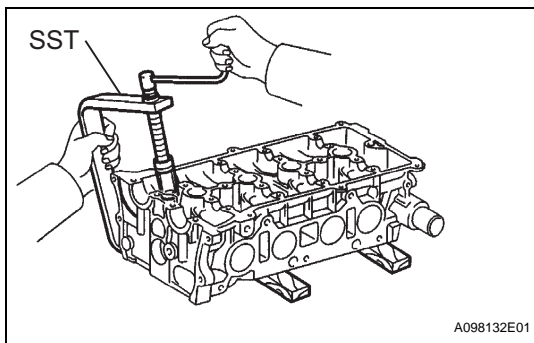
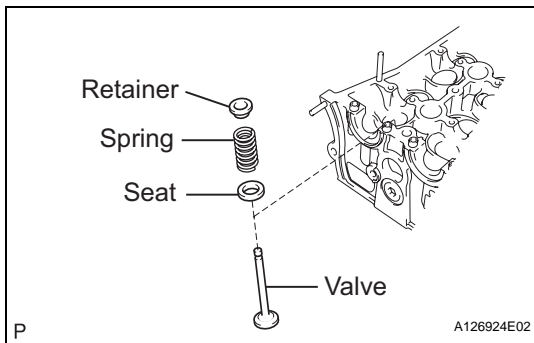
The intake valve oil seal is gray and the exhaust valve oil seal is black.

NOTICE:

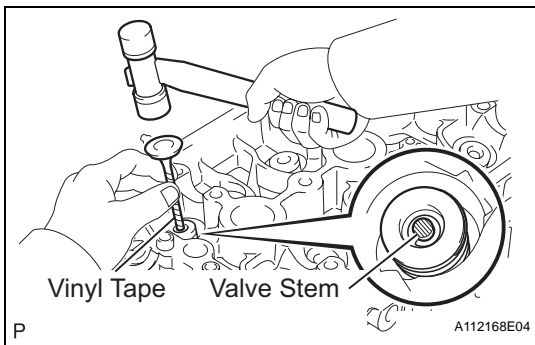
Pay close attention when installing the intake and exhaust oil seals. For example, installing the intake oil seal into the exhaust or installing the exhaust oil seal to the intake can cause installation problems later.

2. INSTALL INTAKE VALVE

- (a) Place the cylinder head on wooden blocks.
(b) Install the valve, seat, spring and retainer onto the cylinder head.



- (c) Using SST, compress the spring, and place the 2 retainer locks around the valve stem.
SST 09202-70020 (09202-00010)



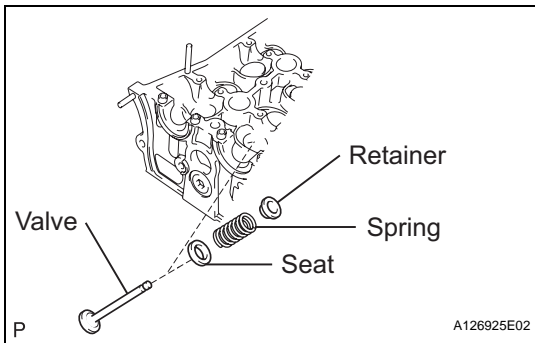
- (d) Using a plastic-faced hammer and discarded valve (with its tip wrapped with tape), lightly tap the installed valve to fit it into place.

NOTICE:

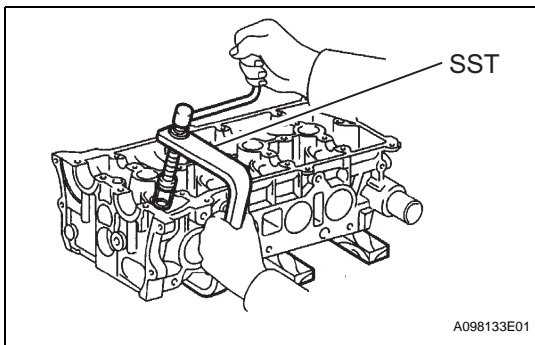
Be careful not to damage the valve stem tip.

3. INSTALL EXHAUST VALVE

- (a) Place the cylinder head on wooden blocks.

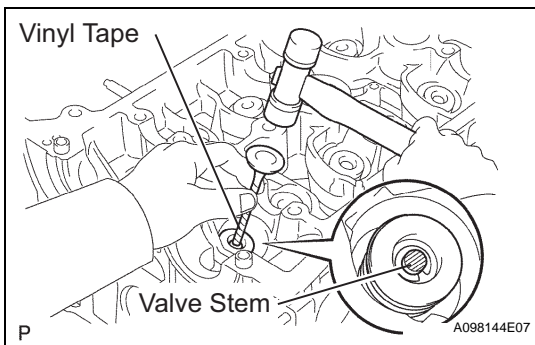


- (b) Install the valve, seat, spring and retainer onto the cylinder head.



- (c) Using SST, compress the spring, and place the 2 retainer locks around the valve stem.

SST 09202-70020 (09202-00010)



- (d) Using a plastic-faced hammer and discarded valve (with its tip wrapped with tape), lightly tap the installed valve to fit it into place.

NOTICE:

Be careful not to damage the valve stem tip.

4. INSTALL VALVE LIFTER

- (a) Assemble the valve lifter and the tip of the valve stem with a light coat of engine oil applied.

NOTICE:

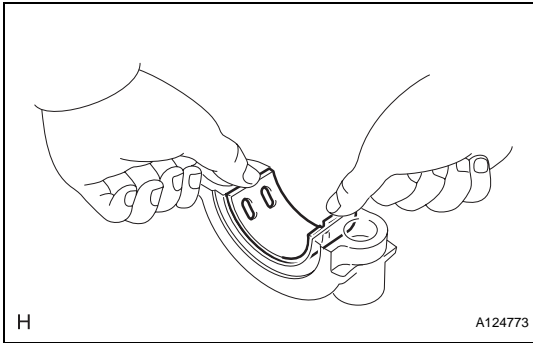
Install the valve lifters in their original places.

5. INSTALL NO. 1 CAMSHAFT BEARING

- (a) Clean the contact surface of the bearing and the bearing cap.

NOTICE:

Do not apply engine oil to the contact surfaces of the camshaft bearing and bearing cap.



- (b) Align the bearing claw with the claw groove of No. 1 and No. 2 bearing cap, and push in the No. 1 camshaft bearing.

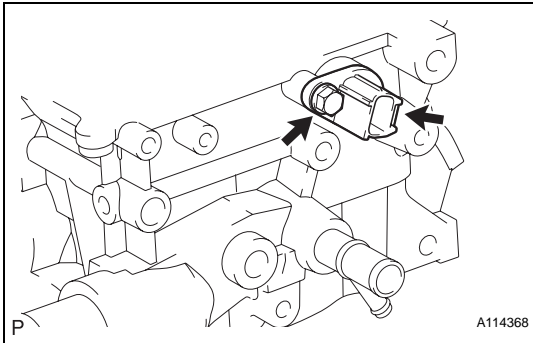
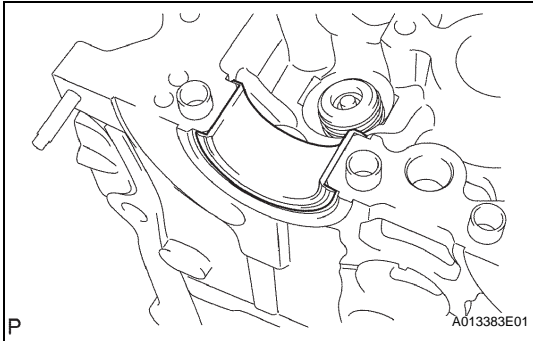
6. INSTALL NO. 2 CAMSHAFT BEARING

- (a) Clean the contact surface of the bearing and the bearing cap.

NOTICE:

Do not apply engine oil to the contact surfaces of the camshaft bearing and cylinder block.

- (b) Install the No. 2 camshaft bearing onto the cylinder head.



7. INSTALL CAMSHAFT POSITION SENSOR

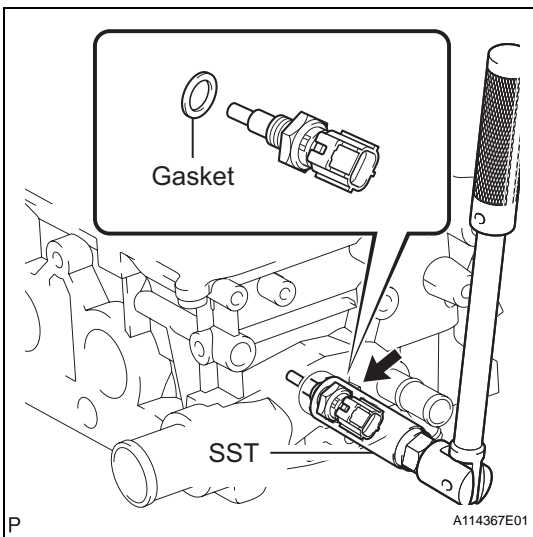
- (a) Install the camshaft position sensor with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

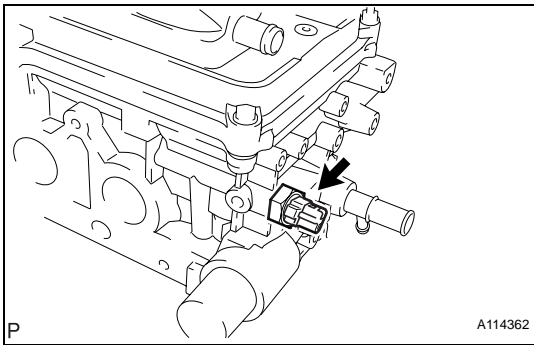
8. INSTALL ENGINE COOLANT TEMPERATURE SENSOR

- (a) Using SST, install a new gasket and the ECT sensor.

SST 09817-33190

Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)





9. INSTALL OIL PRESSURE SWITCH

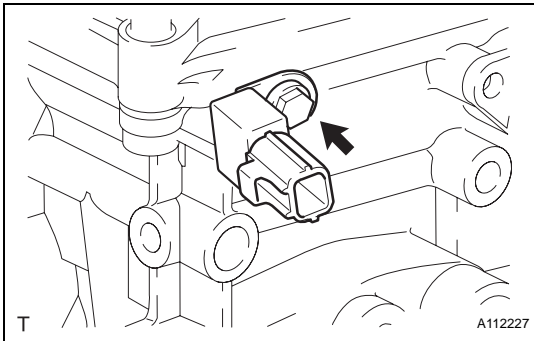
- (a) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

- (b) Using a 24 mm deep socket wrench, install the oil pressure switch.

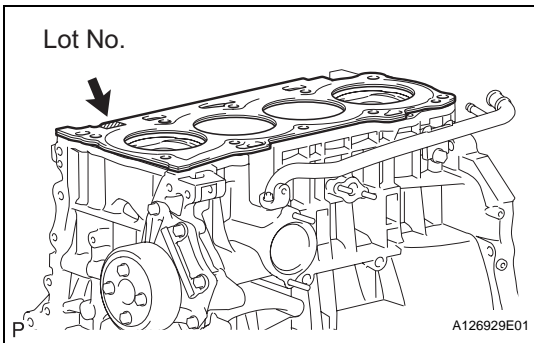
Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)



10. INSTALL RADIO SETTING CONDENSER

- (a) Install the condenser with the bolt.

Torque: 10 N*m (102 kgf*cm, 7 ft.*lbf)



INSTALLATION

1. INSTALL CYLINDER HEAD GASKET

- (a) Place a new gasket on the cylinder block surface with the Lot No. stamp facing upward.

NOTICE:

- Remove any oil from contact surface.
- Be careful of the installation direction.

2. INSTALL CYLINDER HEAD SUB-ASSEMBLY

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

NOTICE:

Place the cylinder head gently in order to avoid damaging the gasket.

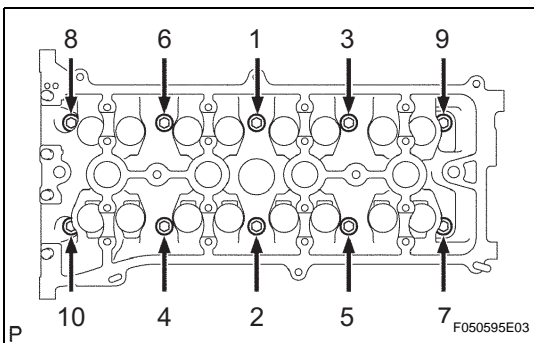
- (b) Install the cylinder head bolts.

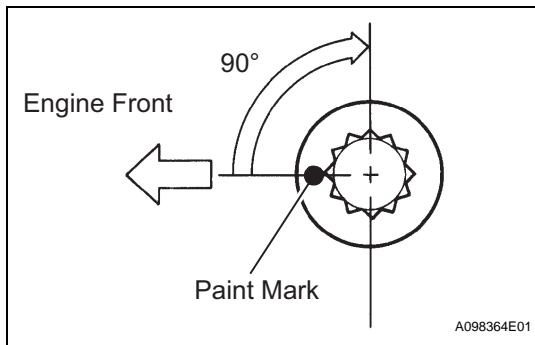
NOTICE:

The cylinder head bolts are tightened in 2 successive steps.

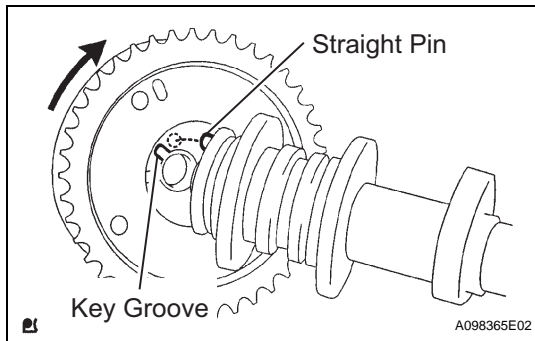
- (1) Apply a light coat of engine oil to the threads and under the heads of the cylinder head set bolts.
- (2) Using several steps, uniformly install and tighten the 10 cylinder head set bolts and plate washers with a 10 mm bi-hexagon wrench in the order shown in the illustration.

Torque: 70 N*m (714 kgf*cm, 52 ft.*lbf)





- (c) Mark the front of the cylinder head bolts with paint.
- (d) Retighten the cylinder head bolts by 90° as shown in the illustration.
- (e) Check that the paint mark is now at a 90° angle to the front.



3. INSTALL CAMSHAFT TIMING GEAR ASSEMBLY

- (a) Put the camshaft timing gear and camshaft together with the straight pin and key groove misaligned, as shown in the illustration.
- (b) Turn the camshaft timing gear as shown in the illustration while pushing it gently against the camshaft. Push further at the position where the pin fits into the groove.

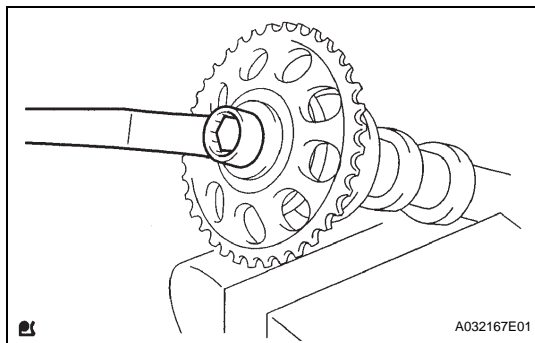
NOTICE:

Be sure not to turn the camshaft timing gear to the retard angle side (the right angle).

- (c) Check that there is no clearance between the gear fringe and camshaft.
- (d) Tighten the flange bolt with the camshaft timing gear fixed in place.

Torque: 54 N*m (551 kgf*cm, 40 ft.*lbf)

- (e) Check that the camshaft timing gear can move to the retard angle side (the right direction) and is locked in the most retarded position.



4. INSTALL NO. 2 CAMSHAFT TIMING SPROCKET

- (a) Clamp the camshaft in a vise, then install the camshaft timing sprocket with the bolt.

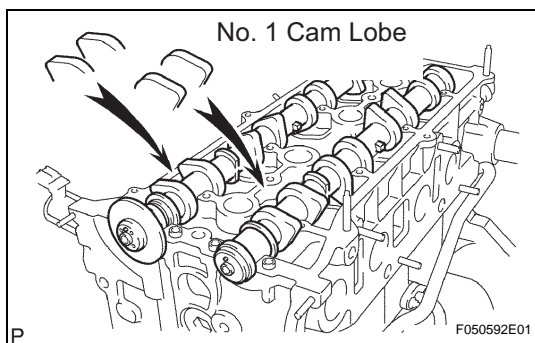
Torque: 54 N*m (551 kgf*cm, 40 ft.*lbf)

NOTICE:

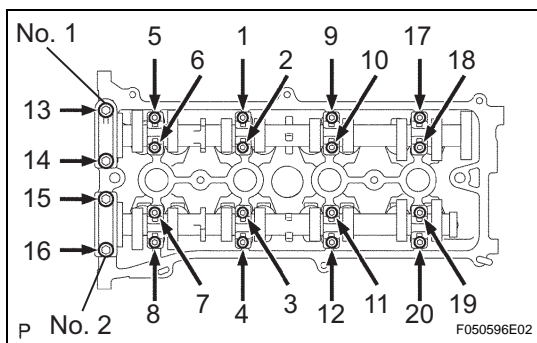
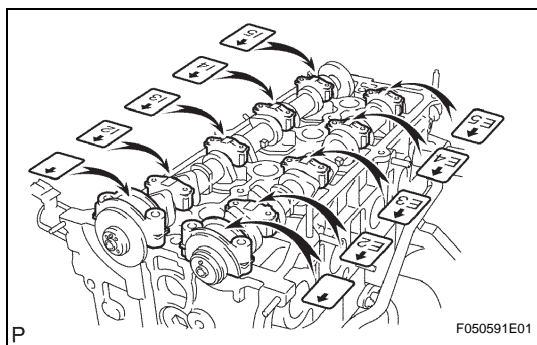
Do not damage the camshaft.

5. INSTALL CAMSHAFT

- (a) Apply a light coat of engine oil to the journal portion of the camshaft.



- (b) Place the 2 camshafts on the cylinder head with the No. 1 cam lobes facing the directions shown in the illustration.



- (c) Examine the front marks and numbers, and check that the order is as shown in the illustration. Then install the bearing caps onto the cylinder head.
- (d) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts.

- (e) Using several steps, uniformly tighten the 20 bearing cap bolts in the sequence shown in the illustration.

Torque: 29.5 N*m (301 kgf*cm, 22 ft.*lbf) for No. 1 and No. 2 bearing cap
 9.0 N*m (92 kgf*cm, 80 in.*lbf) for No. 3 bearing cap

NOTICE:

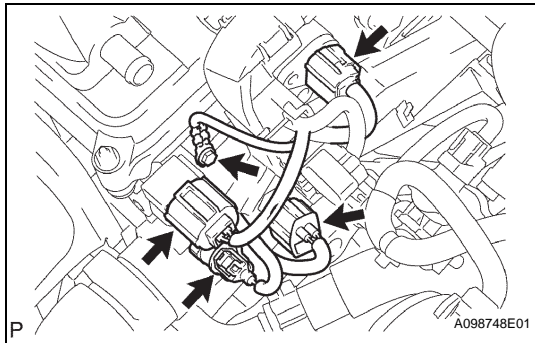
Install the camshaft with the timing mark of the camshaft timing gear on top.

6. INSTALL NO. 1 CHAIN VIBRATION DAMPER (See page [EM-33](#))
7. INSTALL CHAIN SUB-ASSEMBLY (See page [EM-33](#))
8. INSTALL CHAIN TENSIONER SLIPPER (See page [EM-34](#))
9. INSTALL TIMING CHAIN GUIDE (See page [EM-34](#))
10. INSTALL NO. 1 CRANKSHAFT POSITION SENSOR PLATE (See page [EM-35](#))
11. INSTALL TIMING CHAIN COVER SUB-ASSEMBLY (See page [EM-35](#))
12. INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY (See page [EM-37](#))
13. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY (See page [EM-38](#))
14. INSTALL ENGINE MOUNTING BRACKET RH (See page [EM-38](#))
15. INSTALL CRANKSHAFT PULLEY (See page [EM-38](#))
16. INSTALL OIL PAN SUB-ASSEMBLY (See page [EM-39](#))
17. INSTALL CRANKSHAFT POSITION SENSOR (See page [ES-402](#))
18. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY (See page [EM-40](#))
19. INSTALL SPARK PLUG (See page [EM-16](#))
20. INSTALL IGNITION COIL ASSEMBLY (See page [IG-9](#))
21. INSTALL IDLER PULLEY (See page [EM-41](#))

22. INSTALL ENGINE MOUNTING INSULATOR RH (See page [EM-41](#))
23. INSTALL RADIATOR RESERVOIR (See page [EM-112](#))
24. INSTALL GENERATOR ASSEMBLY (See page [CH-15](#))
25. INSTALL FAN AND GENERATOR V BELT (See page [EM-7](#))
26. INSTALL FRONT SUSPENSION MEMBER REINFORCEMENT RH (See page [EM-7](#))

27. CONNECT ENGINE WIRE

- (a) Connect the ground cable with the bolt.
Torque: 8.4 N*m (86 kgf*cm, 74 in.*lbf)
- (b) Connect the camshaft position sensor connector.
- (c) Connect the engine coolant temperature sensor connector.
- (d) Connect the engine oil pressure switch connector.
- (e) Connect the radio setting condenser connector.
- (f) Connect the heater water inlet hose.



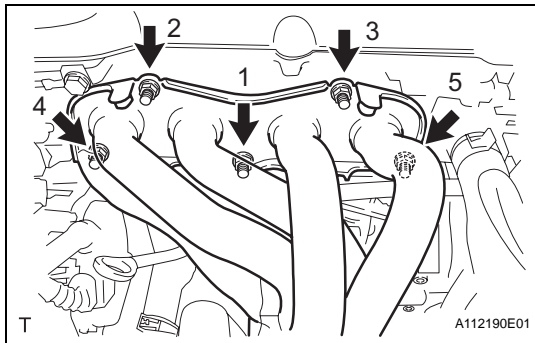
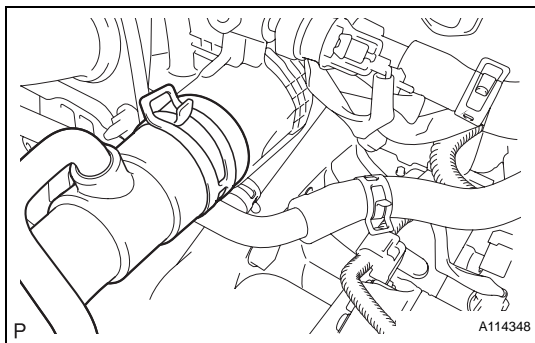
28. CONNECT NO. 1 RADIATOR HOSE

- (a) Connect the hose to the cylinder head.

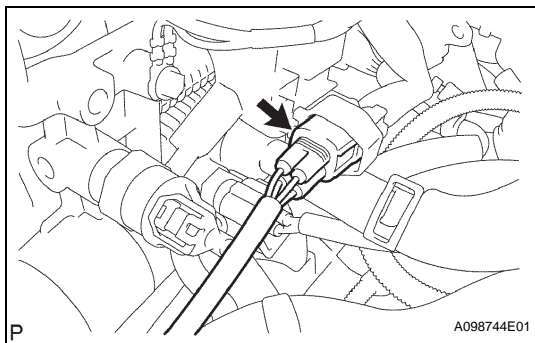
29. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page [ES-396](#))

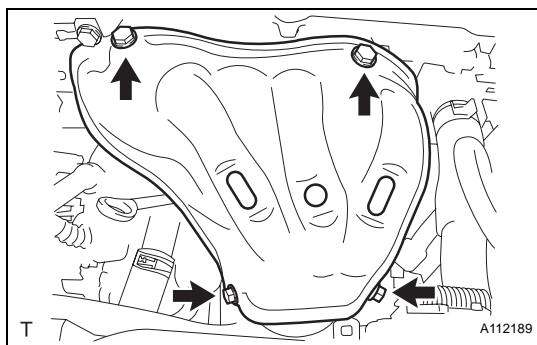
30. INSTALL EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY

- (a) Install a new gasket onto the cylinder head.
- (b) Temporarily tighten the exhaust manifold converter with the 5 nuts.
- (c) Tighten the 5 nuts in the sequence shown in the illustration.
Torque: 37 N*m (377 kgf*cm, 27 ft.*lbf)



- (d) Connect the air-fuel ratio sensor connector.

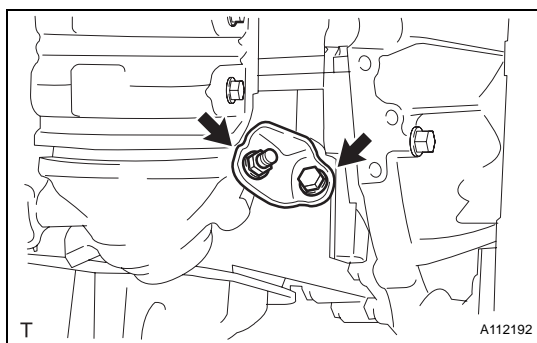




31. INSTALL NO. 1 EXHAUST MANIFOLD HEAT INSULATOR

- (a) Install the exhaust manifold heat insulator with the 4 bolts.

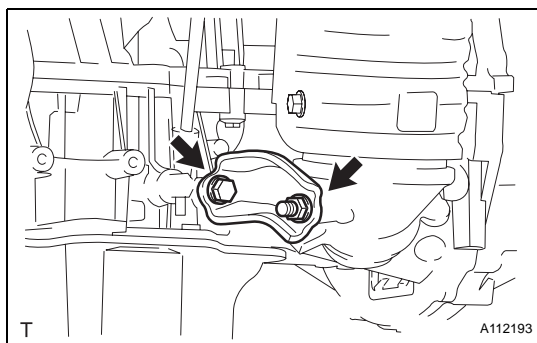
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)



32. INSTALL NO. 2 MANIFOLD STAY

- (a) Install the stay with the bolt and nut.

Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)



33. INSTALL MANIFOLD STAY

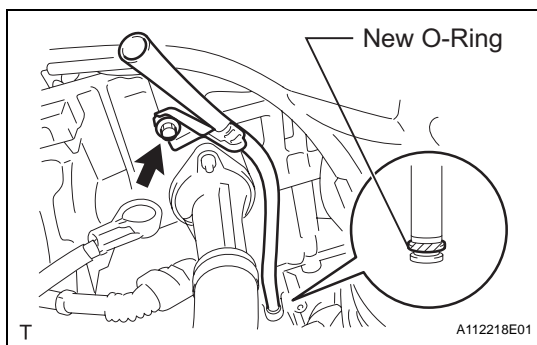
- (a) Install the stay with the bolt and nut.

Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)

34. INSTALL FRONT EXHAUST PIPE (See page [EX-4](#))

35. INSTALL OIL DIPSTICK GUIDE

- (a) Apply a light coat of engine oil to a new O-ring and install it onto the guide.



- (b) Install the guide with the bolt.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

36. INSTALL OIL DIPSTICK

37. INSTALL INTAKE MANIFOLD INSULATOR (See page [ES-421](#))

38. INSTALL INTAKE MANIFOLD (See page [ES-421](#))

39. INSTALL FUEL DELIVERY PIPE SUB-ASSEMBLY (See page [FU-13](#))

40. INSTALL THROTTLE BODY (See page [ES-413](#))

41. INSTALL AIR CLEANER CAP (See page [ES-413](#))

42. ADD ENGINE OIL (See page [LU-4](#))

43. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

44. CHECK FOR FUEL LEAKS

45. ADD ENGINE COOLANT (See page [CO-6](#))

46. CHECK FOR ENGINE COOLANT LEAKS

- (a) Check for engine coolant leaks (see page [CO-1](#)).