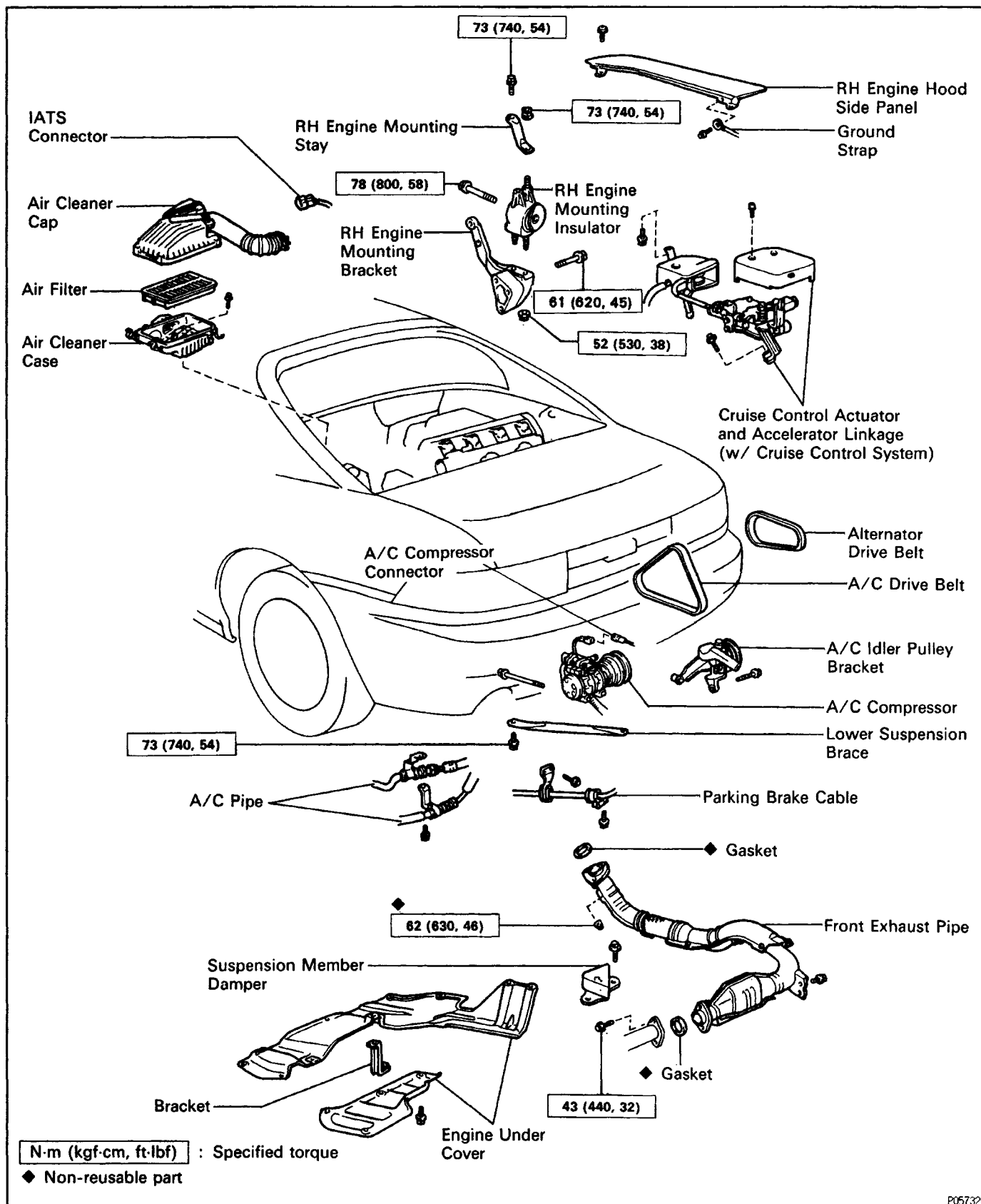
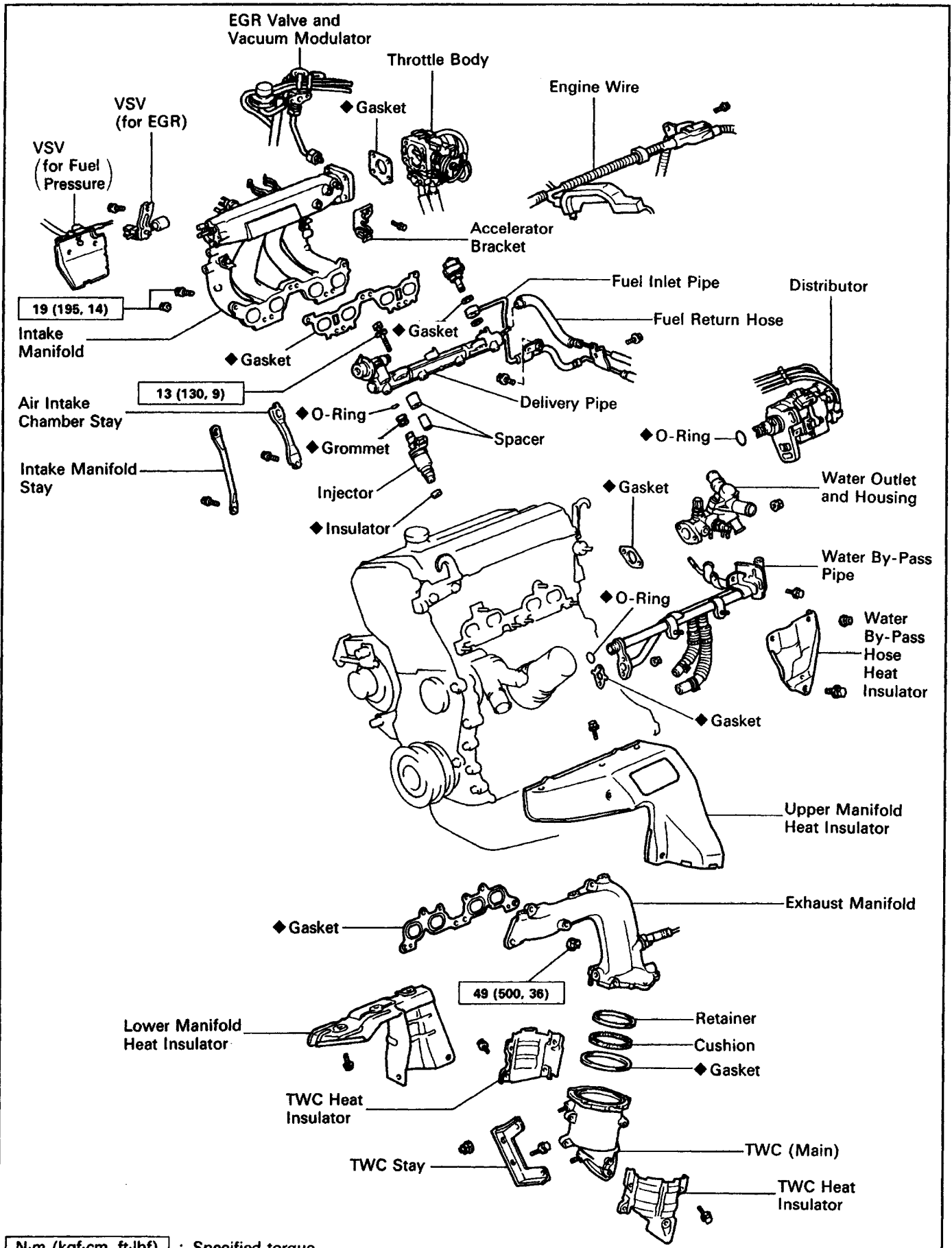


CYLINDER HEAD COMPONENTS FOR REMOVAL AND INSTALLATION

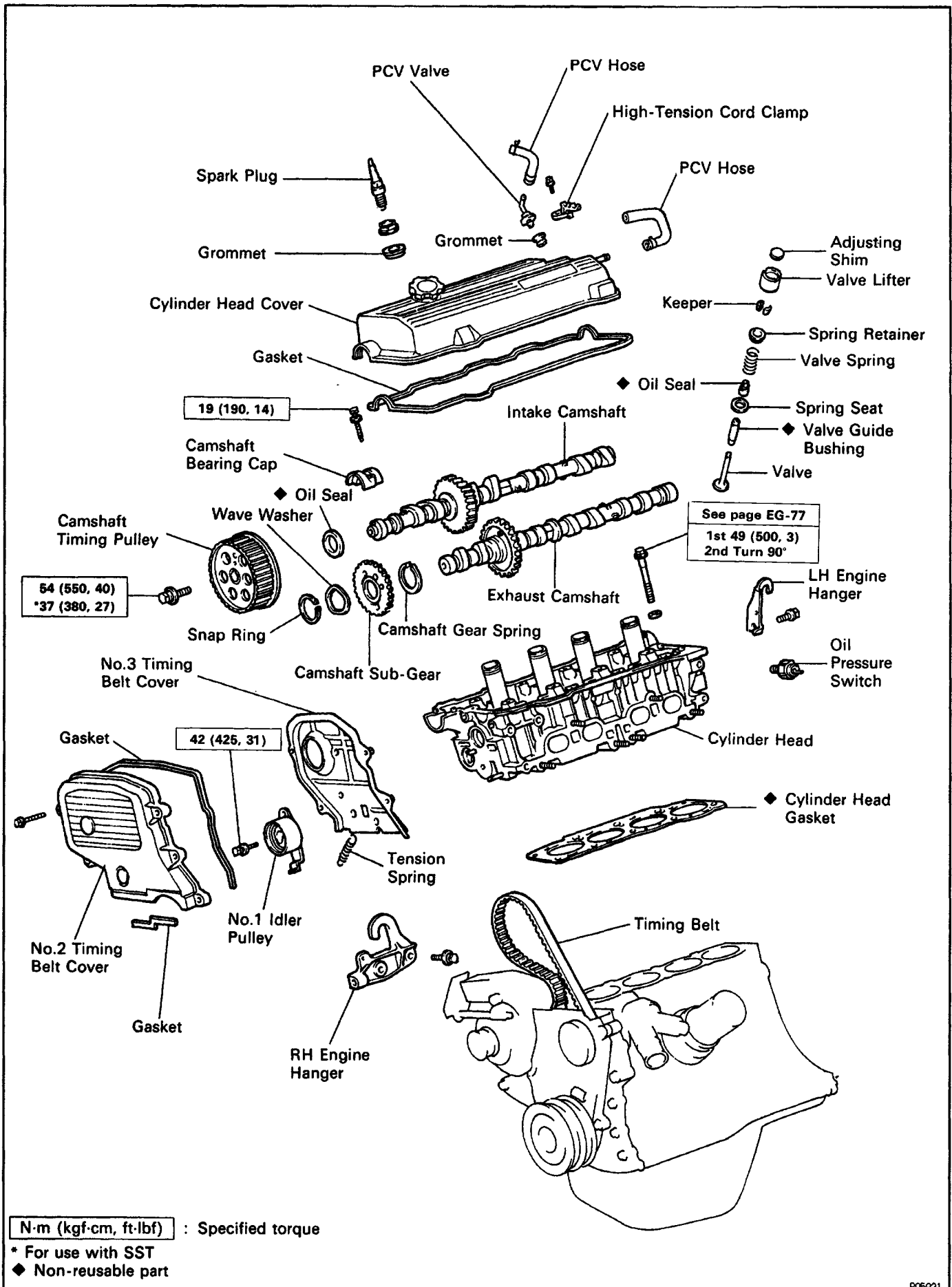
E011A-01

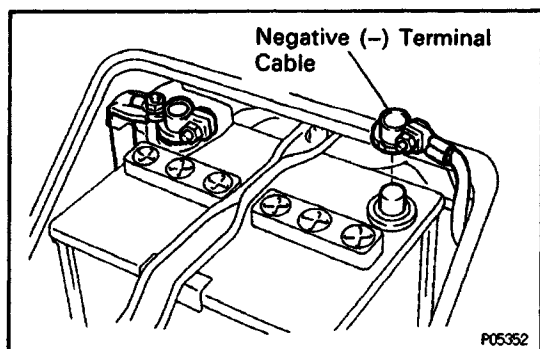




N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part





CYLINDER HEAD REMOVAL

(See Components for Removal and Installation)

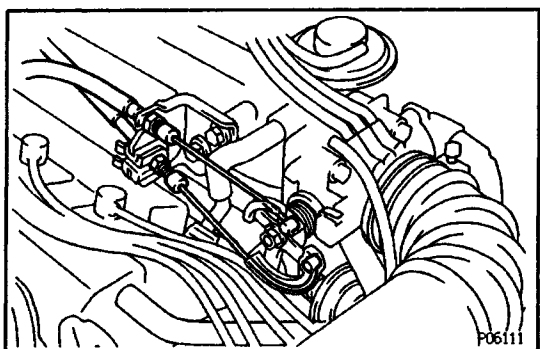
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Turn the ignition switch to 'LOCK'. Disconnect the negative terminal from the battery. Wait at least 20 seconds before proceeding with work.

2. DRAIN ENGINE COOLANT

3. REMOVE ENGINE UNDER COVERS

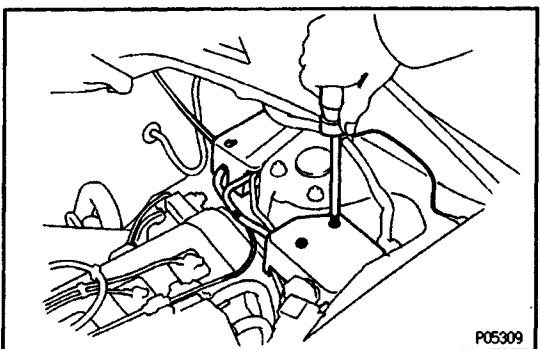
4. REMOVE ENGINE HOOD SIDE PANELS



5. DISCONNECT ACCELERATOR LINKAGE FROM THROTTLE BODY

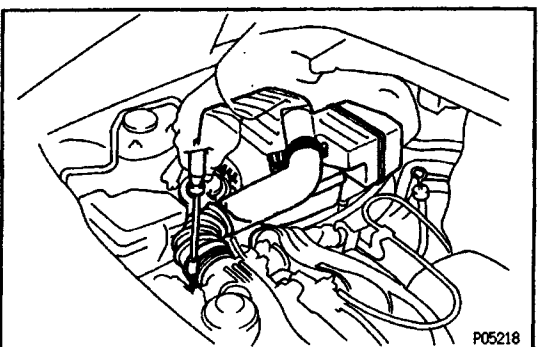
6. (A/T)

DISCONNECT THROTTLE CABLE FROM THROTTLE BODY



7. (w/ CRUISE CONTROL SYSTEM)

REMOVE CRUISE CONTROL ACTUATOR AND ACCELERATOR LINKAGE



8. REMOVE AIR CLEANER HOUSING

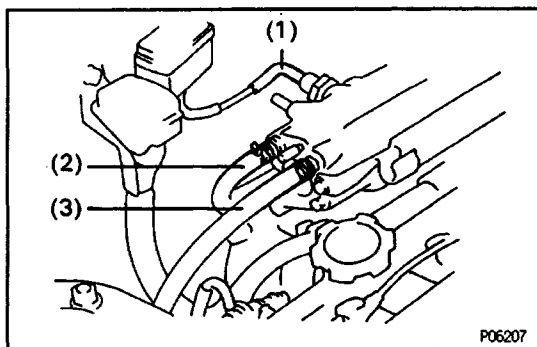
(a) Disconnect the IATS connector.

(b) Disconnect the air cleaner hose from the throttle body.

(c) Disconnect the four clamps, and remove the air cleaner cap.

(d) Remove the air filter.

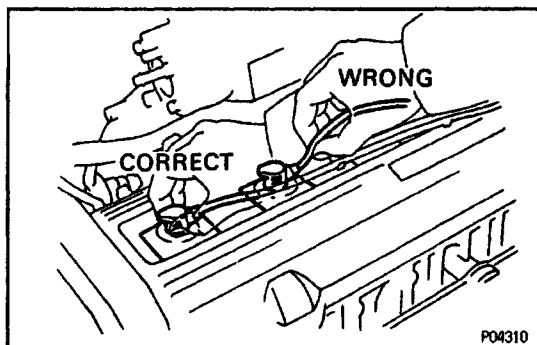
(e) Remove the three bolts and air cleaner case.



9. DISCONNECT HOSES AND GROUND STRAP

Disconnect the following hoses:

- (1) MAP vacuum hose from intake manifold
- (2) A/C idle-up air hose (from port F) from intake manifold
- (3) Brake booster vacuum hose from intake manifold

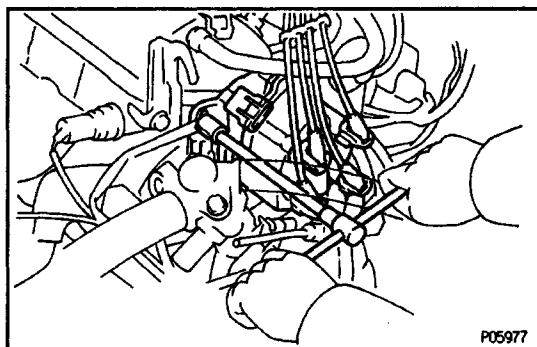


10. REMOVE DISTRIBUTOR

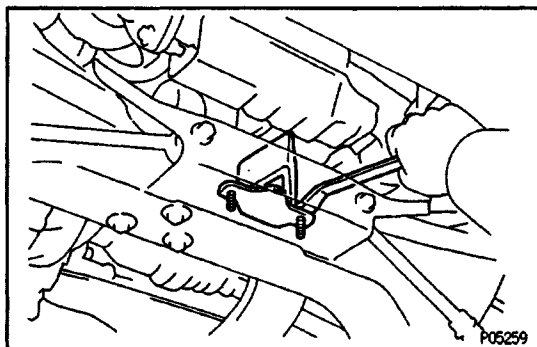
- (a) Disconnect the four high-tension cords from the clamp on the cylinder head.
- (b) Disconnect the four high-tension cords from the spark plugs.

Disconnect the high - tension cords at the rubber boot. Do not pull on the cords.

NOTICE: Pulling on or bending the cords may damage the conductor inside.



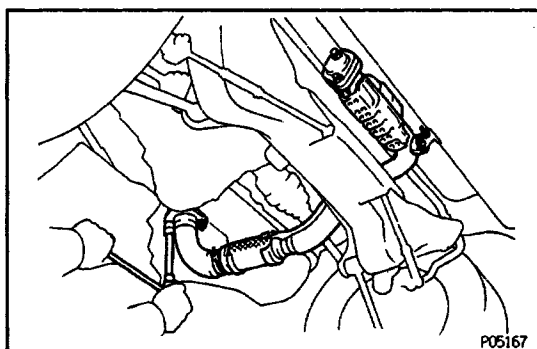
- (c) Remove the two bolts, and pull out the distributor.



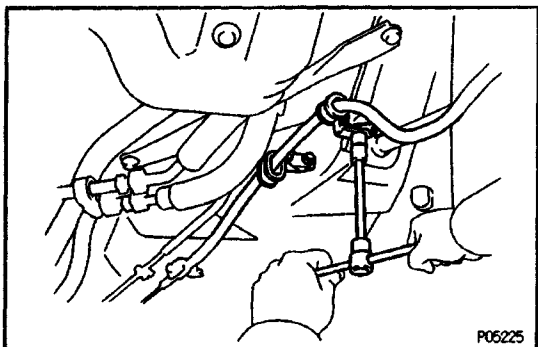
11. REMOVE FRONT EXHAUST PIPE

- (a) (CALIF. only)

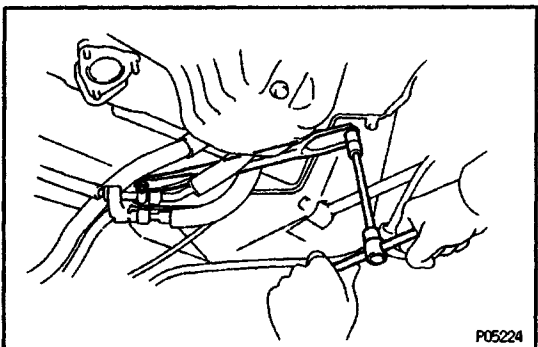
Remove the two bolts and damper.



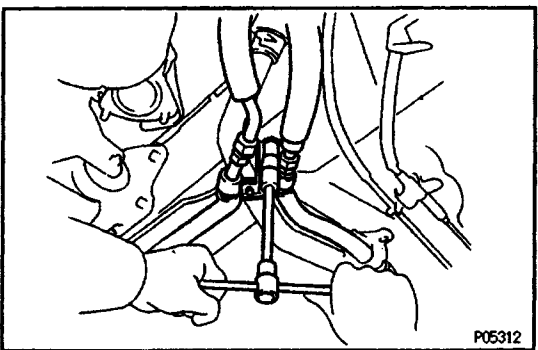
- (b) Remove the two bolts holding the front exhaust pipe to the tailpipe bracket.
- (c) Remove the two bolts holding the front exhaust pipe to the tailpipe.
- (d) Using a 14 mm deep socket wrench, remove the three nuts.
- (e) Remove the front exhaust pipe and two gaskets.

**12. DISCONNECT A/C COMPRESSOR FROM ENGINE**

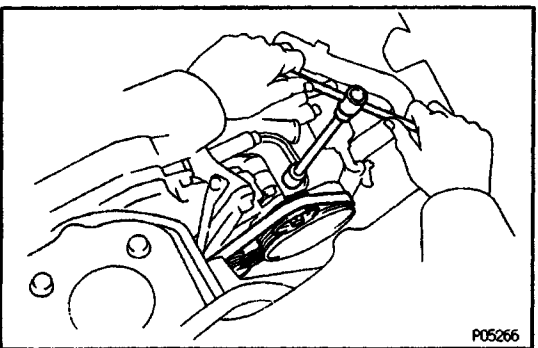
(a) Remove the three clamp bolts, and disconnect the parking brake cable.



(b) Remove the two bolts and lower suspension brace.

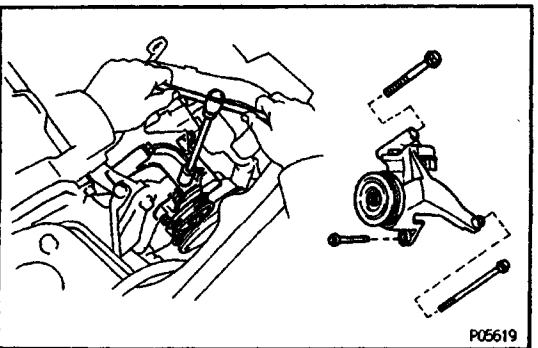


(c) Remove the clamp nut, and disconnect the two A/C pipes.



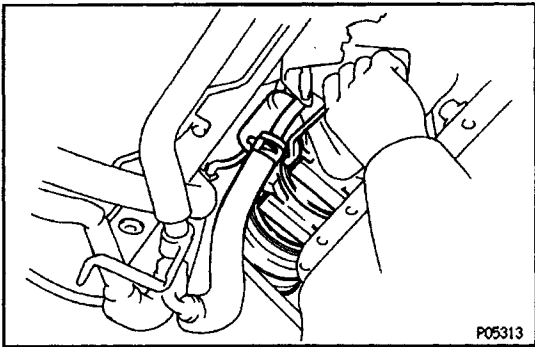
(d) Loosen the idler pulley nut.

(e) Loosen the adjusting bolt, and remove the drive belt.

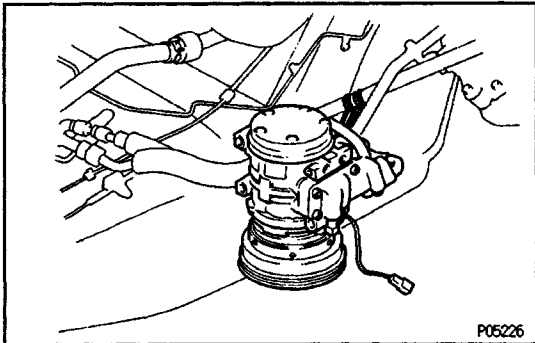


(f) Disconnect the A/C compressor connector.

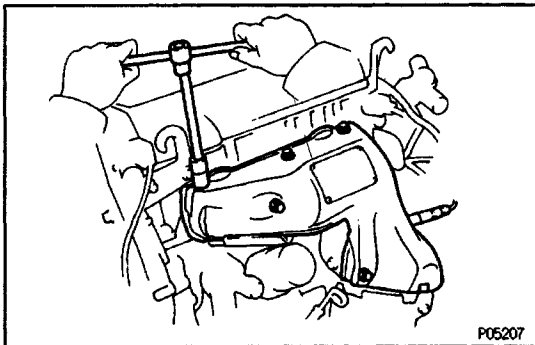
(g) Remove the three bolts and idler pulley bracket.



(h) Remove the two bolts, and disconnect the A/C compressor from the engine.



HINT: Suspend the A/C compressor to strut rod with a string.

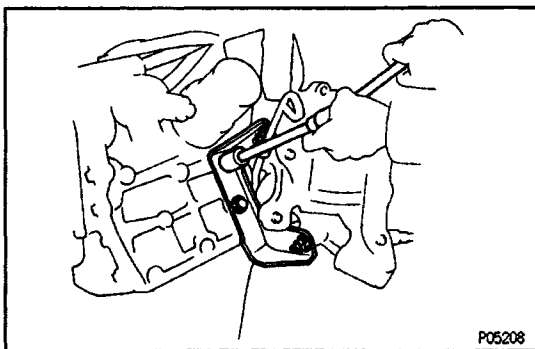


13. REMOVE EXHAUST MANIFOLD AND TWC ASSEMBLY

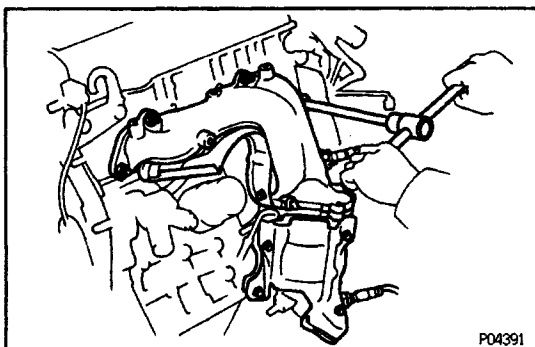
(a) Disconnect the following connectors:

- Oxygen sensor (main) connector (CALIF. only)
- Sub-oxygen sensor connector

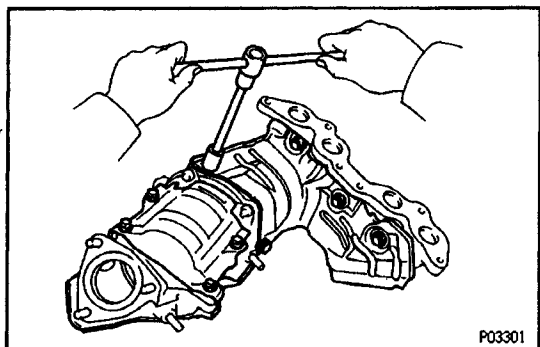
(b) Remove the six bolts and manifold upper heat insulator.



(c) Remove the two bolts, two nuts and TWC stay.

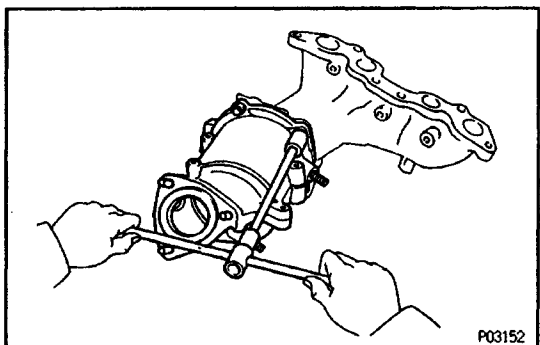


(d) Remove the six nuts, the exhaust manifold and TWC assembly.



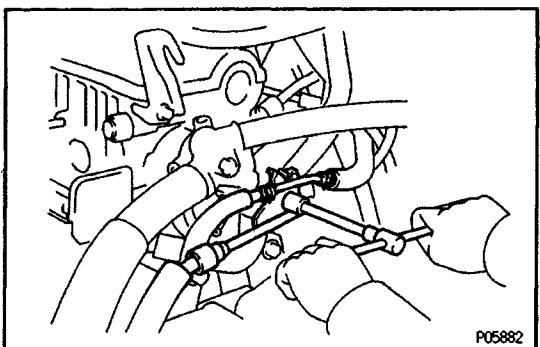
14. SEPARATE EXHAUST MANIFOLD AND TWC

- (a) Remove the five bolts and lower manifold heat insulator.
 (b) Remove the eight bolts and two TWC heat insulator.



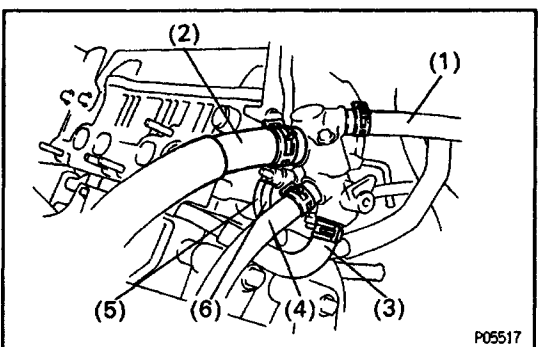
- (c) Remove the three bolts, two nuts, catalytic converter, gasket, retainer and cushion.

15. DISCONNECT OIL PRESSURE SWITCH CONNECTOR

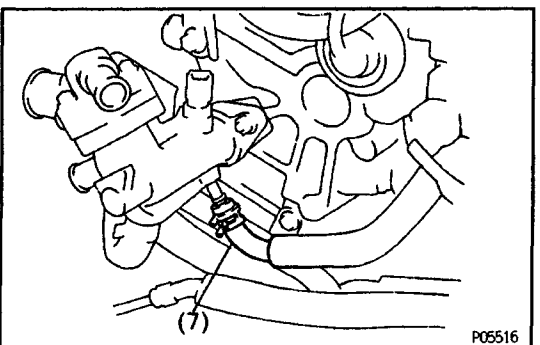


16. REMOVE WATER OUTLET AND HOUSING

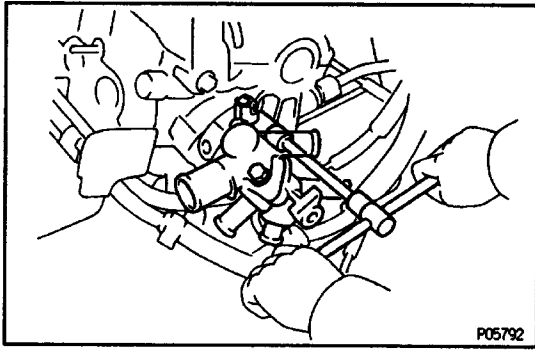
- (a) Remove the bolt, and disconnect the fuel inlet pipe (with the fuel return tube) from the water outlet housing.
 (b) Disconnect the following connectors:
- Water temperature sender gauge connector
 - ECTS connector



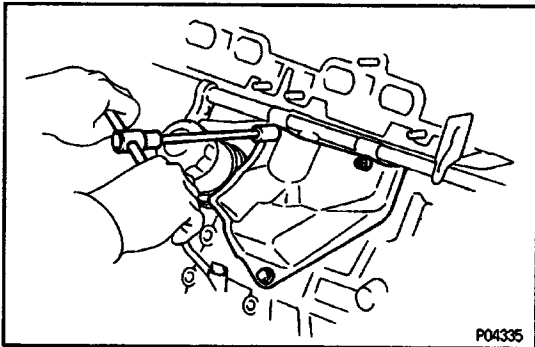
- (c) Disconnect the following hoses:
- (1) Water filler hose
 - (2) Radiator hose
 - (3) Water by-pass pipe hose
 - (4) Heater water hose
 - (5) Vacuum hose (from P port of throttle body) from upper port of TVS
 - (6) Vacuum hose (from charcoal canister) from lower port of TVS



- (7) IACV water by-pass hose

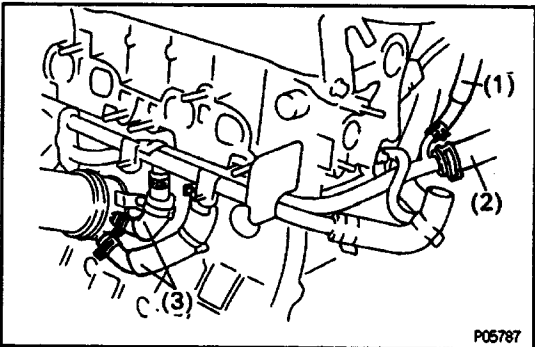


(d) Remove the two bolts, the water outlet, housing assembly and gasket.



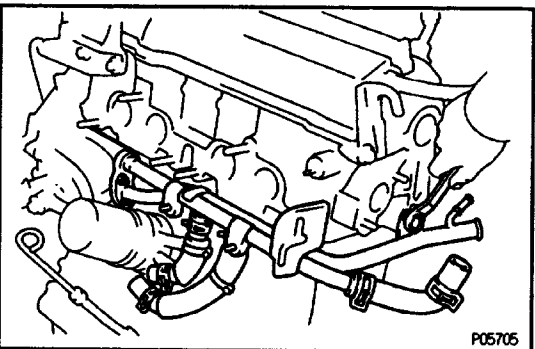
17. REMOVE WATER BY-PASS PIPE

(a) Remove the bolt, two nuts and water by-pass heat protector.



(b) Disconnect the following hoses:

- (1) IACV water by-pass hose
- (2) Heater water hose
- (3) Two oil cooler water by-pass hoses

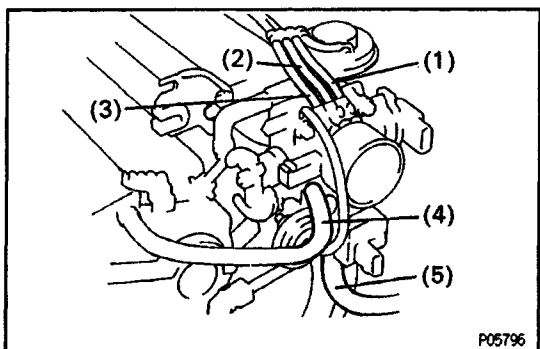


(c) Remove the two bolts, two nuts, water by-pass pipe and gasket.

(d) Remove the O-ring from the water by-pass hose.

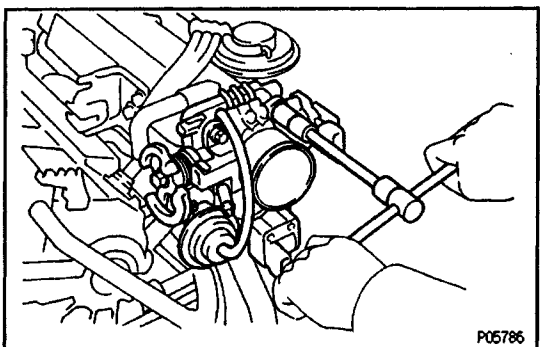
18. REMOVE THROTTLE BODY

(a) Disconnect the following connector:
 Throttle position sensor connector
 IACV connector



(b) Disconnect the following hoses:

- (1) Vacuum hose (from upper port of TVS) from port "P" of throttle body ,
- (2) Vacuum hose (from port "Q" of EGR vacuum modulator) from port "E" of throttle body
- (3) Vacuum hose (from port "R" of EGR vacuum modulator) from port "R" of throttle body
- (4) PCV hose (from cylinder head) from throttle body
- (5) Air hose (from A/C idle-up valve)



(c) Remove the four bolts, throttle body and gasket.

19. REMOVE EGR VALVE AND VACUUM MODULATOR

(a) (CALIF. only)

Disconnect EGR function sensor connector.

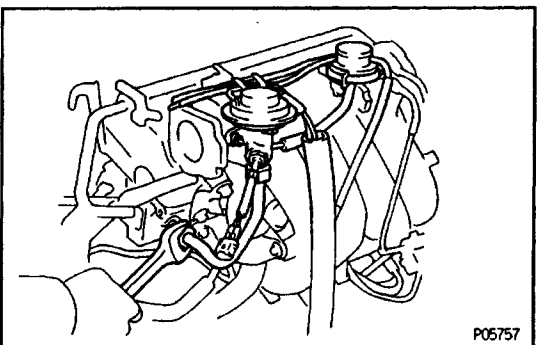
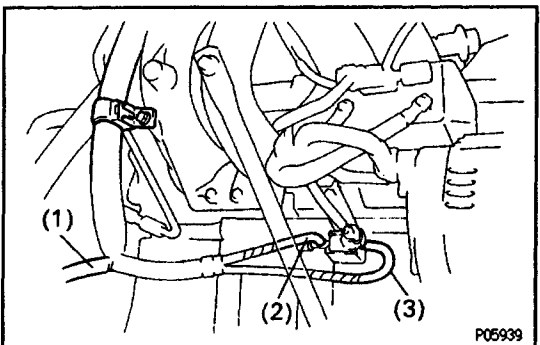
(b) Remove the bolt, and disconnect the vacuum hose clamp from the intake manifold.

(c) Remove the following hoses:

- (1) Vacuum hose from charcoal canister.
- (2) Vacuum hose (from EGR valve) from port E of VSV (for EGR)

(3) Vacuum hose (from "Q" port of EGR vacuum modulator) from port G of VSV (for EGR)

(d) Loosen the union nut of the EGR pipe, and remove two nuts, the EGR valve, vacuum modulator, vacuum hoses assembly and gasket.

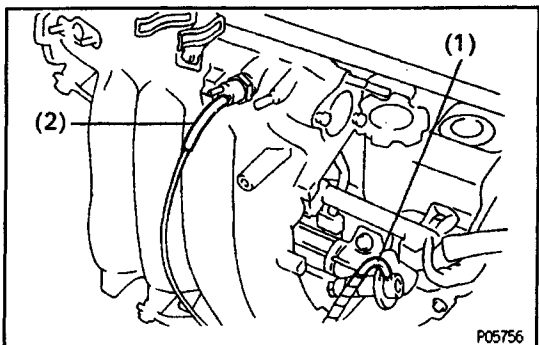


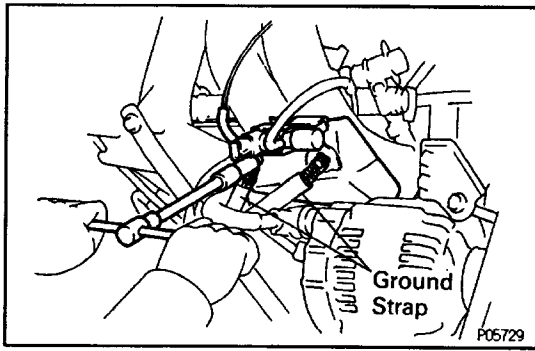
20. REMOVE VSV FOR FUEL PRESSURE

(a) Disconnect the VSV connector.

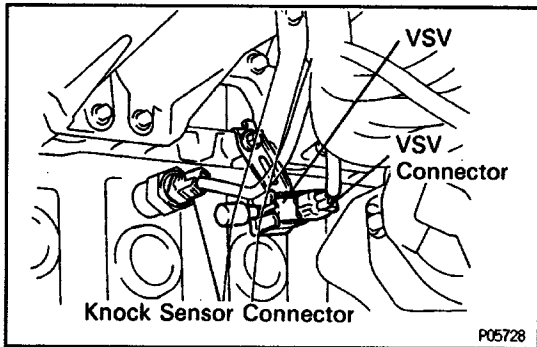
(b) Disconnect the following hoses:

- (1) Vacuum hose (from port E of VSV) from fuel pressure regulator
- (2) Vacuum hose (from port G of VSV) from gas filter.





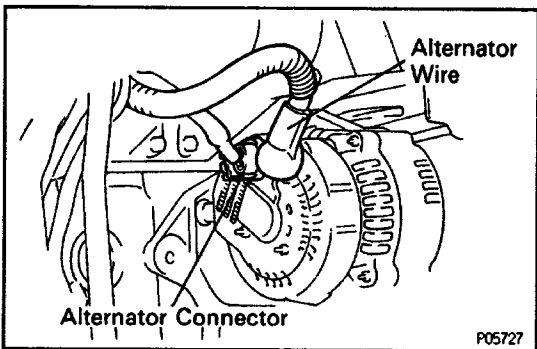
(c) Remove the two bolts, and VSV. Disconnect the two ground straps.



21. DISCONNECT KNOCK SENSOR CONNECTOR

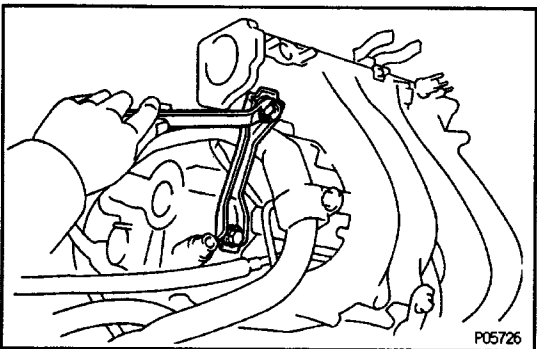
22. REMOVE EGR VSV

- Disconnect the VSV connector.
- Remove the bolt and VSV.

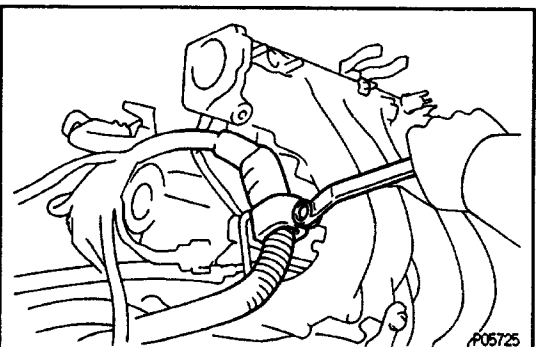


23. REMOVE INTAKE MANIFOLD

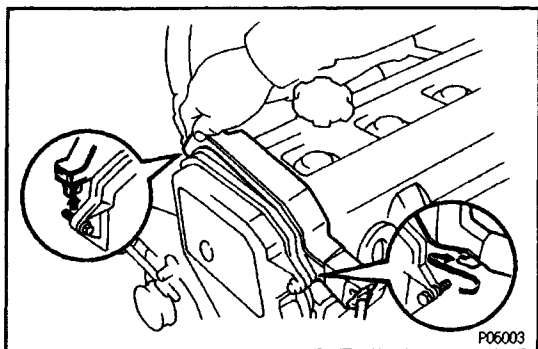
- Disconnect the alternator connector and wire.



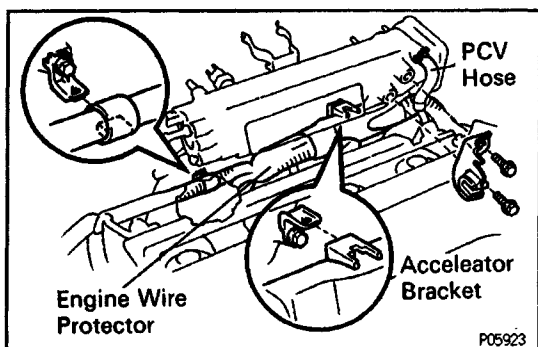
- Remove the two bolts and air intake chamber stay.



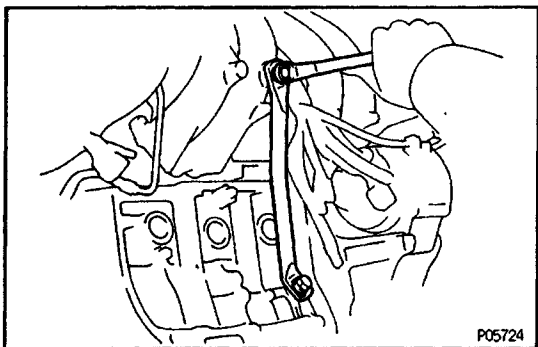
- Remove the bolt, and disconnect the engine wire protector from the RH side of the intake manifold.



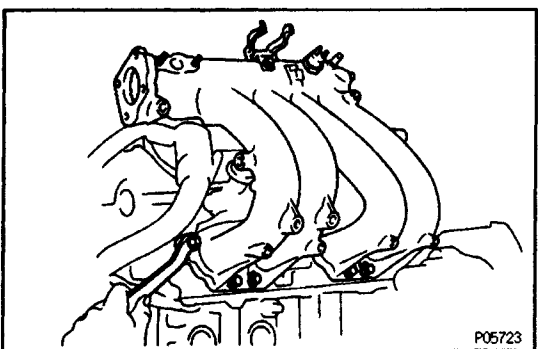
(d) Disconnect the engine wire protector between the No. 3 timing belt and cylinder head cover.



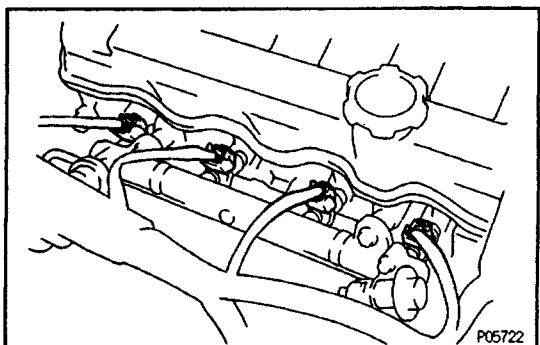
(e) Remove the two bolts and accelerator bracket.
 (f) Disconnect the PCV hose from the intake manifold.
 (g) Disconnect the engine wire protector from the two brackets on the front side of the intake manifold.



(h) Remove the two bolts and intake manifold stay.

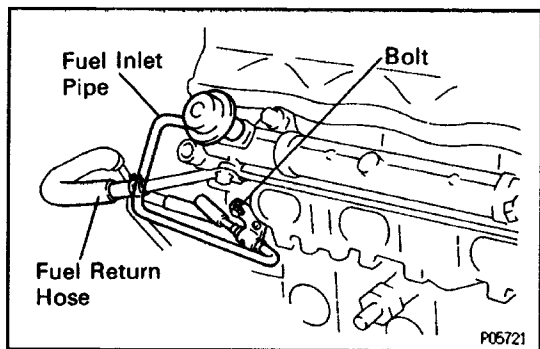


(i) Remove the six bolts, two nuts, intake manifold and gasket.

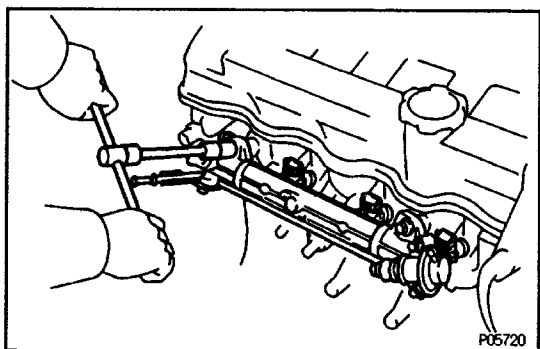


24. REMOVE DELIVERY PIPE AND INJECTORS

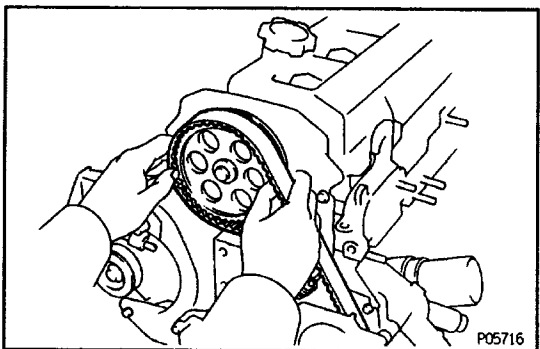
(a) Disconnect the injector connectors.



- (b) Disconnect fuel return hose.
- (c) Remove the bolt holding the fuel inlet pipe to the cylinder head.
- (d) Remove the pulsation damper and two gaskets, and disconnect the fuel inlet pipe from the delivery pipe.

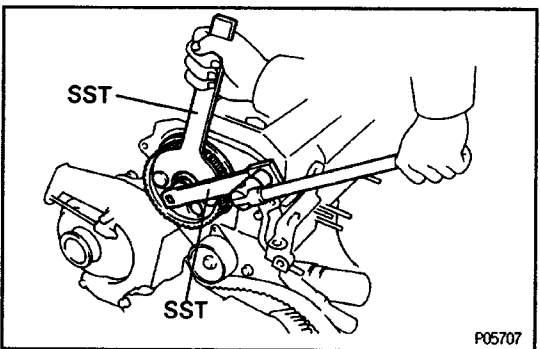


- (d) Remove the two bolts and delivery pipe together with the four injectors.
- NOTICE: Be careful not to drop the injectors when removing the delivery pipe.**
- (e) Remove the four insulators and two spacers from the cylinder head.
- (f) Pull out the four injectors from the delivery pipe.
- (g) Remove the O-ring and grommet from each injector.



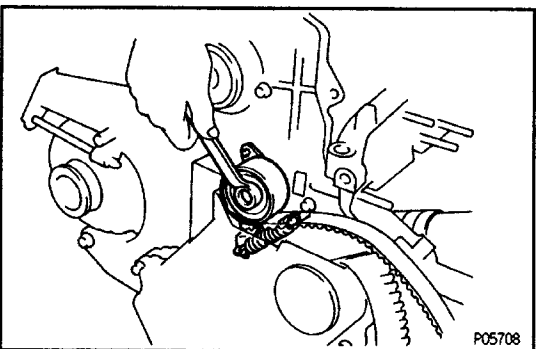
25. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEY

(See steps 10 to 17 in Timing Belt Removal)



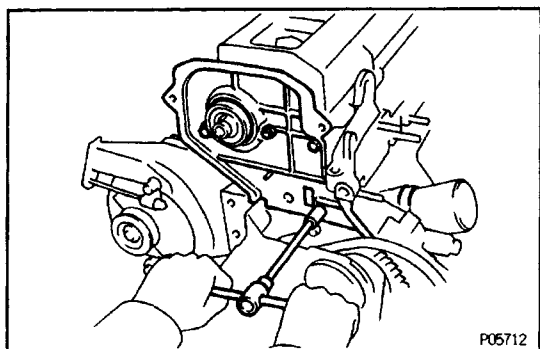
26. REMOVE CAMSHAFT TIMING PULLEY

Using SST, remove the bolt, and timing pulley.
SST 09249-63010,09278-54012

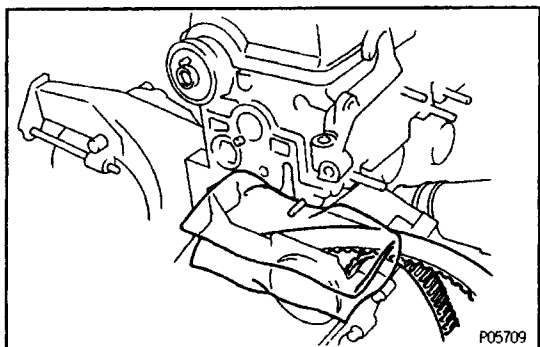


27. REMOVE NO.1 IDLER PULLEY AND TENSION SPRING

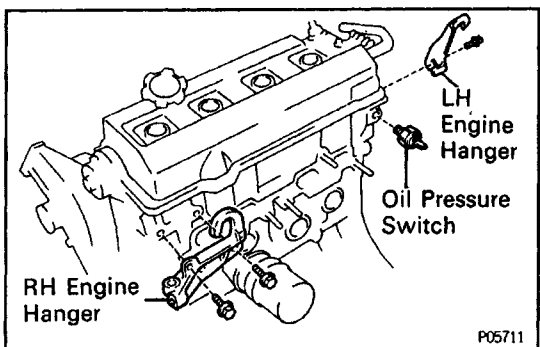
Remove the bolt, pulley and tension spring.

**28. REMOVE No.3 TIMING BELT COVER**

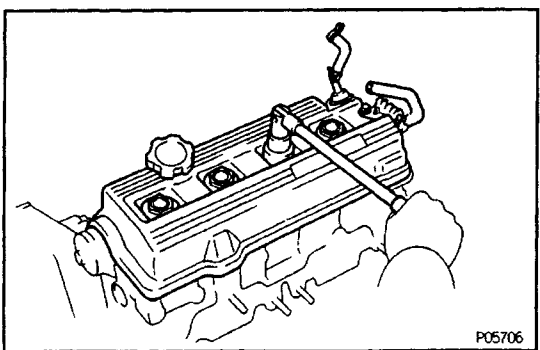
Remove the four bolts and timing and cover.

**NOTICE:**

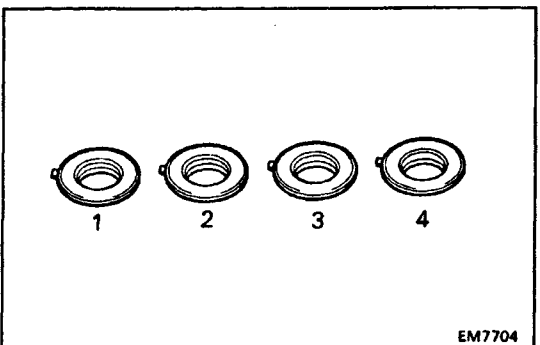
- Support the timing belt, so the meshing of crankshaft timing pulley and timing belt does not shift.
- Be careful not to drop anything inside the timing belt cover.
- Do not allow the belt to come into contact with oil, water or dust.

**29. REMOVE ENGINE HANGERS**

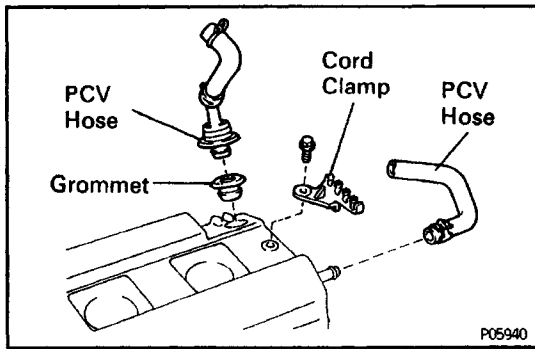
- Remove the two bolts and RH engine hanger.
- Remove the bolt and LH engine hanger.

30. REMOVE OIL PRESSURE SWITCH**31. REMOVE CYLINDER HEAD COVER**

Remove the four nuts, grommets, head cover and gasket.



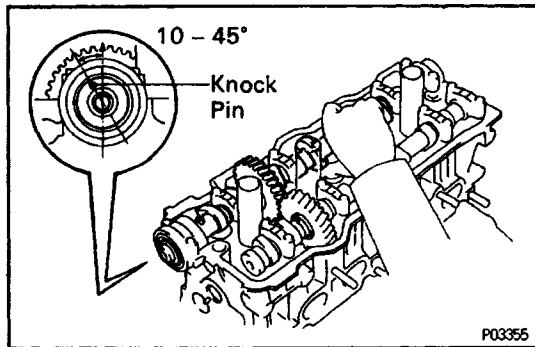
HINT: Arrange the grommets in correct order, so that they can be reinstalled into their original positions. This minimizes any possibility of oil leakage due to reuse of grommets.



32. REMOVE HIGH-TENSION CORD CLAMP, PCV VALVE AND HOSE

33. REMOVE CAMSHAFTS

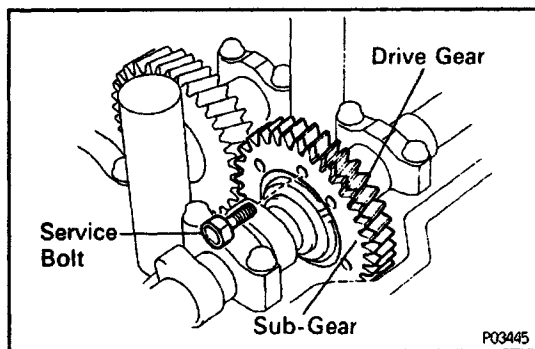
NOTICE: Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following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



A. Remove exhaust camshaft

(a) Set the knock pin of the intake camshaft at 10 - 45° BTDC of camshaft angle.

HINT: The above angle allows No.2 and No.4 cylinder cam lobes of the exhaust camshaft to push their valve lifters evenly.



(b) Secure the exhaust camshaft sub-gear to drive gear with a service bolt.

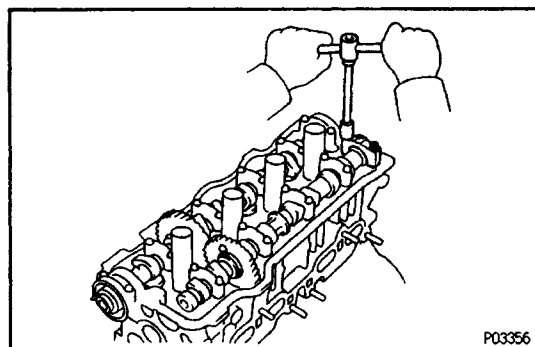
Recommended service bolt:

Thread diameter 6 mm

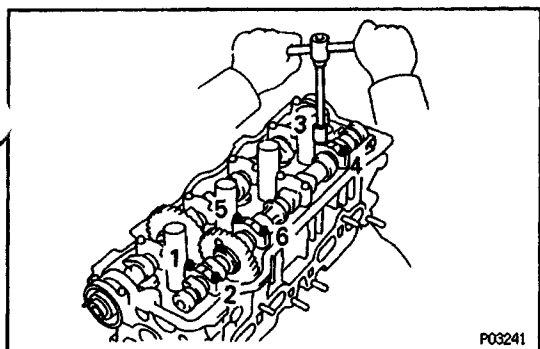
Thread pitch 1.0 mm

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.



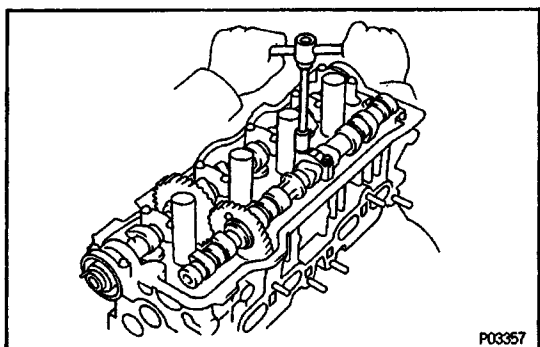
(c) Remove the two bolts and rear bearing cap.



(d) Uniformly loosen and remove the six bolts on the No. 1, No. 2 and No. 4 bearing caps in several passes, in the sequence shown.

NOTICE: Do not remove the No. 3 bearing cap bolts at this stage.

(e) Remove the No. 1, No. 2 and No. 4 bearing caps.



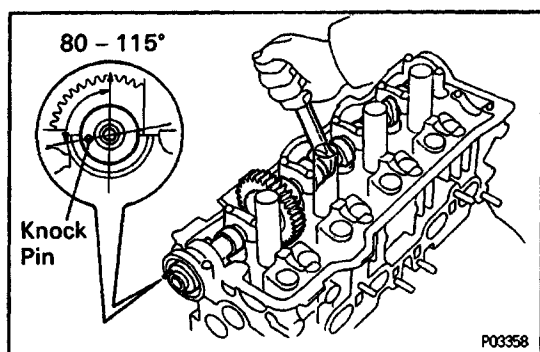
(f) Alternately loosen and remove the two bolts on the No. 3 bearing cap.

HINT:

- As the two No. 3 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, tighten the two No. 3 bearing cap bolts. Then reverse the order of above steps from (f) to (a) and reset the knock pin of the intake camshaft at 10 – 45° BTDC, and repeat steps from (b) to (f) once again.

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

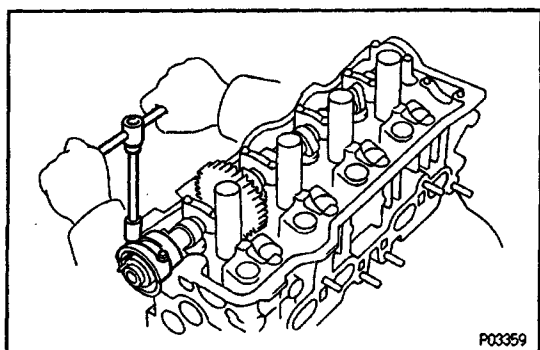
(g) Remove the No. 3 bearing cap and exhaust camshaft.



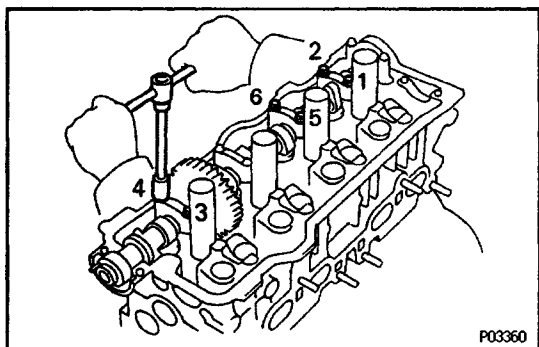
B. Remove intake camshaft

(a) Set the knock pin of the intake camshaft at 80 – 115° BTDC of camshaft angle.

HINT: The above angle allows the No. 1 and No. 3 cylinder cam lobes of intake camshaft to push their valve lifters evenly.



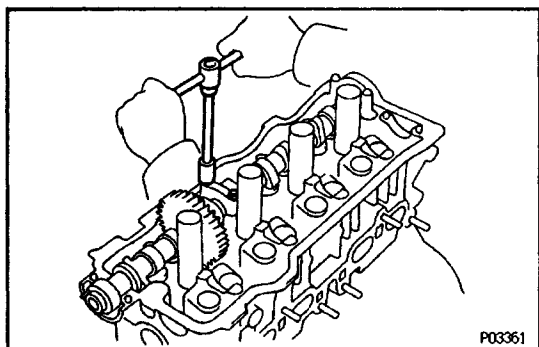
(b) Remove the two bolts, front bearing cap and oil seal.



(c) Uniformly loosen and remove the six bolts on the No. 1, No.3 and No.4 bearing caps in several passes, in the sequence shown. ,

NOTICE: Do not remove the No.2 bearing cap bolts at this stage.

(d) Remove the No.1, No.3 and No.4 bearing caps.



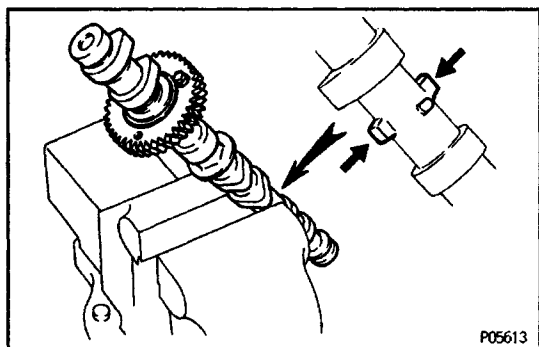
(e) Alternately loosen and remove the two bolts on the No.2 bearing cap.

HINT:

- As the two No.2 bearing cap bolts are loosened, make sure that the camshaft is lifted out straight and level, after breaking adhesion on the front bearing cap.
- If the camshaft is not being lifted out straight and level, retighten the two No.2 bearing cap bolts. Reverse the order of above steps from (e) to (a) and reset the knock pin of the intake camshaft at 80 – 115° BTDC, and repeat steps from (b) to (e) once again.

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

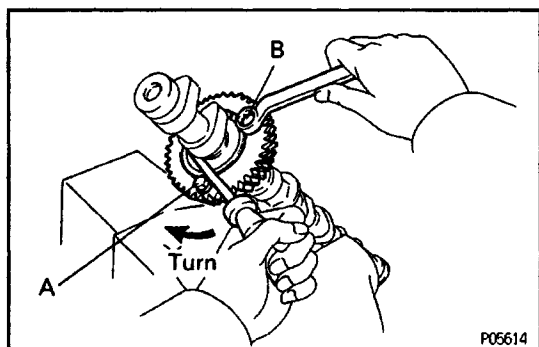
(f) Remove the No.2 bearing cap and camshaft.



34. DISASSEMBLE EXHAUST CAMSHAFT

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

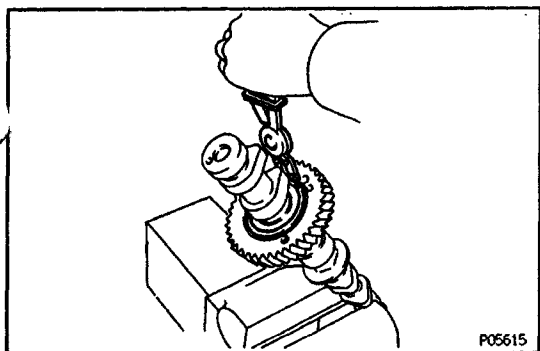
NOTICE: Be careful not to damage the camshaft.



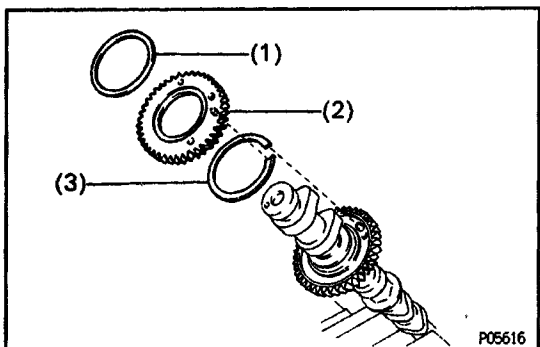
(b) insert service bolt A into the service hole of the camshaft sub-gear.

(c) Using a screwdriver, turn the sub-gear clockwise, and remove service bolt B.

NOTICE: Be careful not to damage the camshaft.

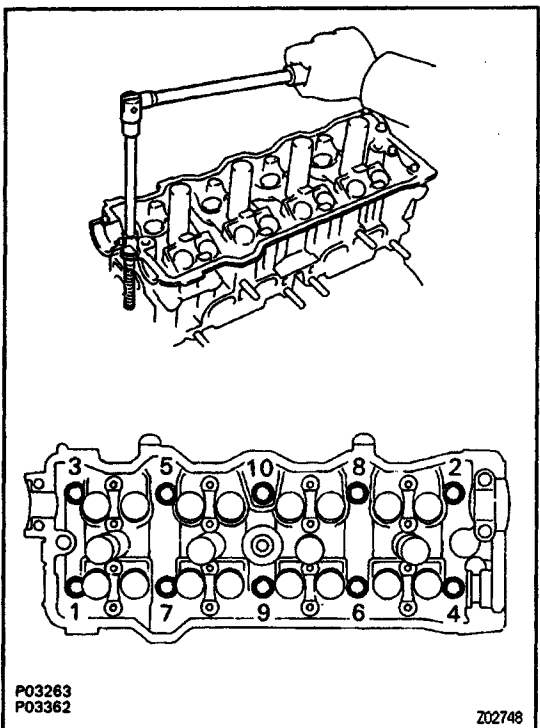


(d) Using snap ring pliers, remove the snap ring.



(e) Remove the following parts:

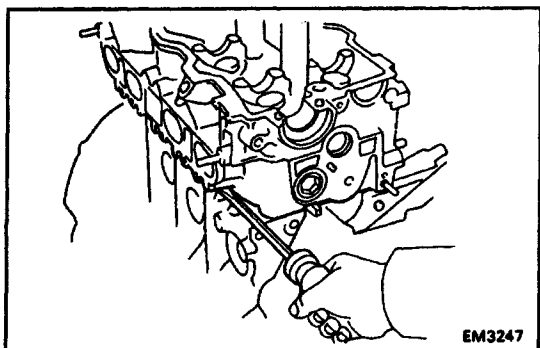
- (1) Wave washer
- (2) Camshaft sub-gear
- (3) Camshaft gear spring



35. REMOVE CYLINDER HEAD

(a) Uniformly loosen and remove the ten cylinder head bolts in several passes, in the sequence shown.

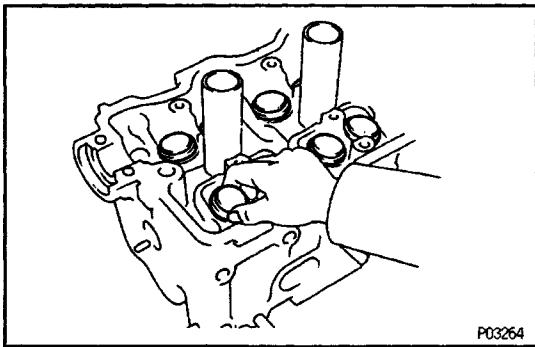
NOTICE: Cylinder head warpage or cracking could result from removing bolts in incorrect order.



(b) 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 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.

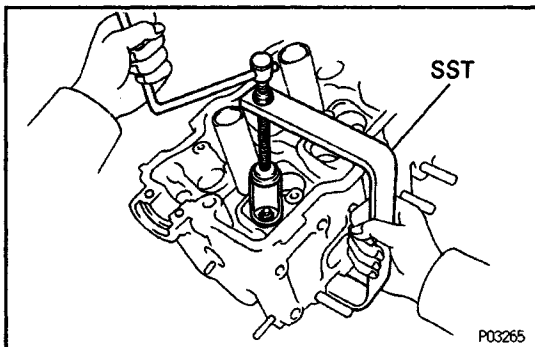
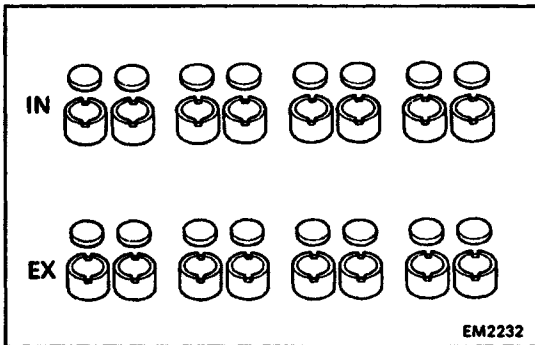


CYLINDER HEAD DISASSEMBLY

(See Components for Removal and Installation)

1. REMOVE VALVE LIFTERS AND SHIMS

HINT: Arrange the valve lifters and shims in correct order.



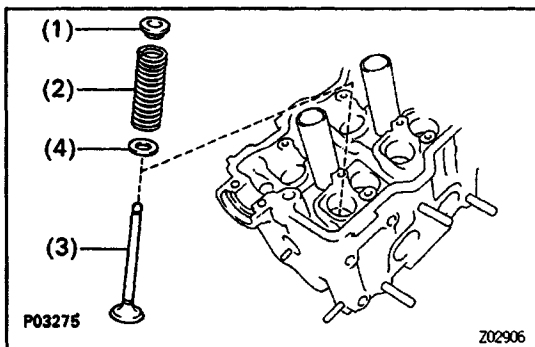
2. REMOVE VALVES

(a) Using SST, compress the valve spring and remove the two keepers.

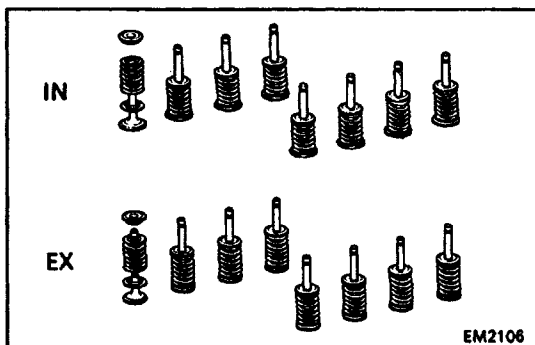
SST 09202-70010

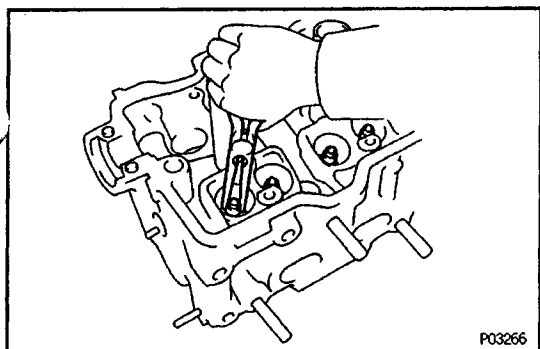
(b) Remove the following parts:

- (1) Spring retainer
- (2) Valve spring
- (3) Valve
- (4) Spring seat

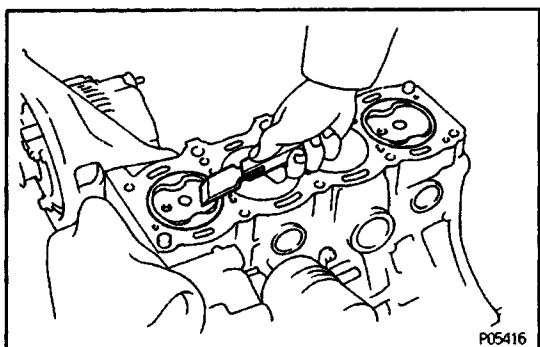


HINT: Arrange the valves, valve springs, spring seats and spring retainers in correct order.





(c) Using needle-nose pliers, remove the oil seal.

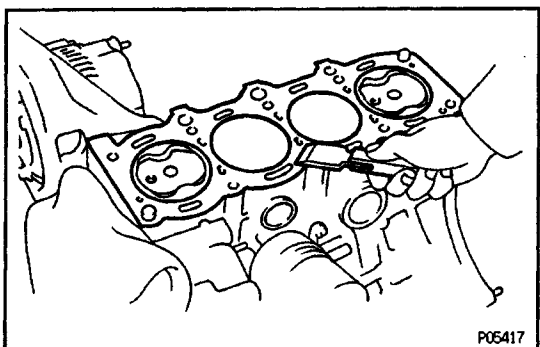


CYLINDER HEAD COMPONENTS INSPECTION AND REPAIR

DB11D-01

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

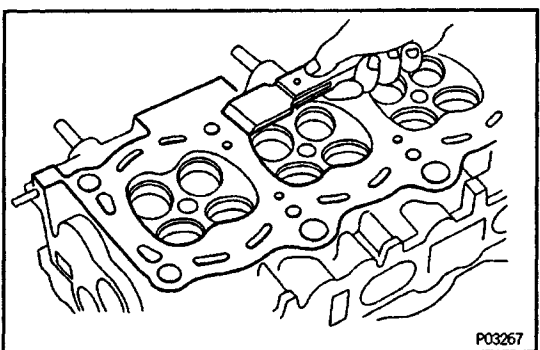
(a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



(b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION: Protect your eyes when using high - compressed air.

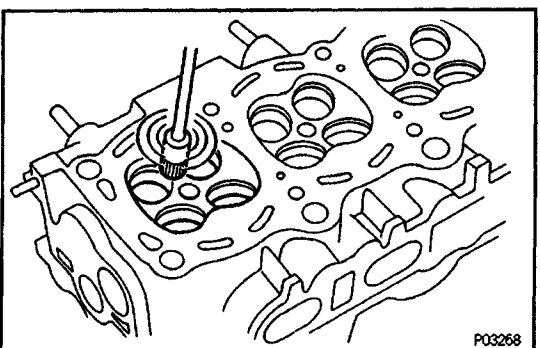


2. CLEAN CYLINDER HEAD

A. Remove gasket material

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

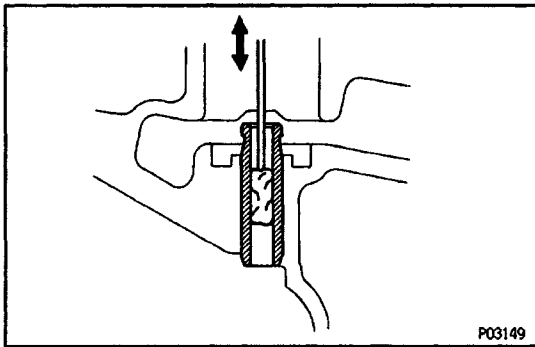
NOTICE: Be careful not to scratch the cylinder block contact surface.



B. Clean combustion chambers

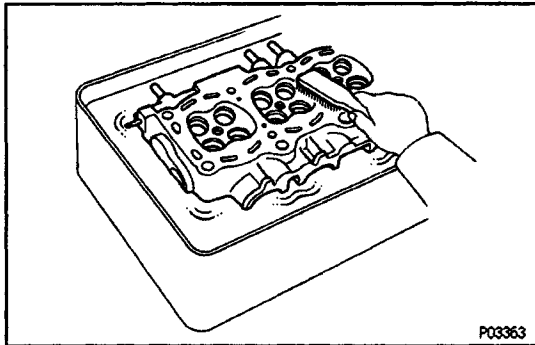
Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE: Be careful not to scratch the cylinder block contact surface.



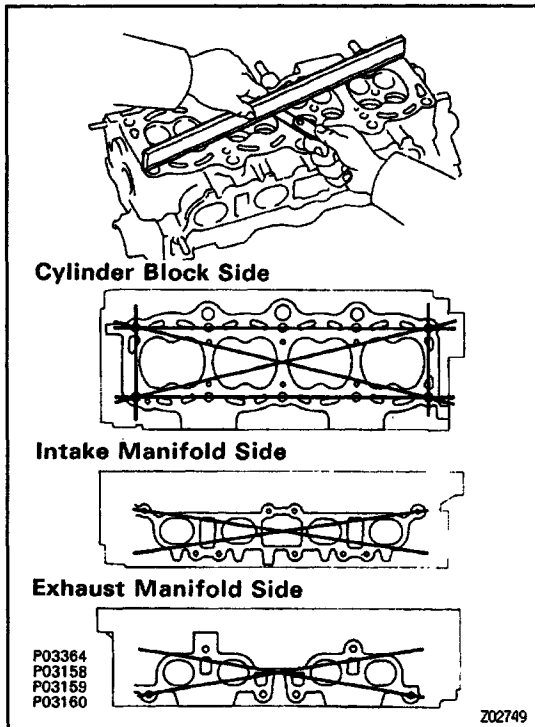
C. Clean valve guide bushings

Using a valve guide bushing brush and solvent, clean all the guide bushings.



D. Clean cylinder head

Using a soft brush and solvent, thoroughly clean the cylinder head.



3. INSPECT CYLINDER HEAD

A. Inspect for flatness

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

Maximum warpage:

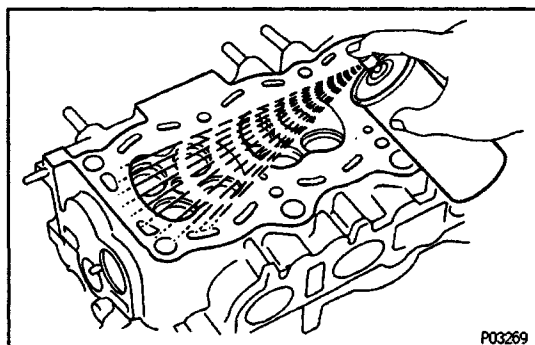
Cylinder block side

0.05 mm (0.0020 in.)

Manifold side

0.08 mm (0.0031 in.)

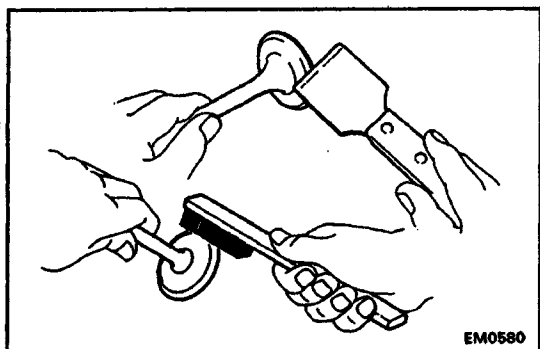
If warpage is greater than maximum, replace the cylinder head.



B. Inspect for cracks

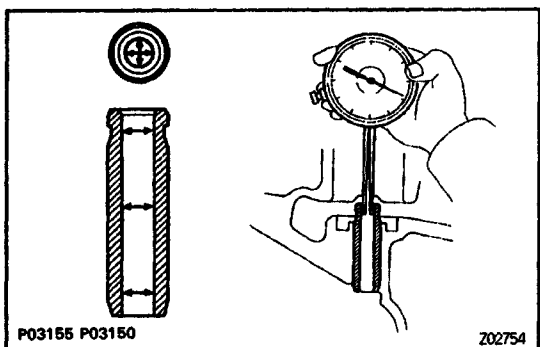
Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

If cracked, replace the cylinder head.



4. CLEAN VALVES

- (a) Using a gasket scraper, chip off any carbon from the valve head.
 (b) Using a wire brush, thoroughly clean the valve.

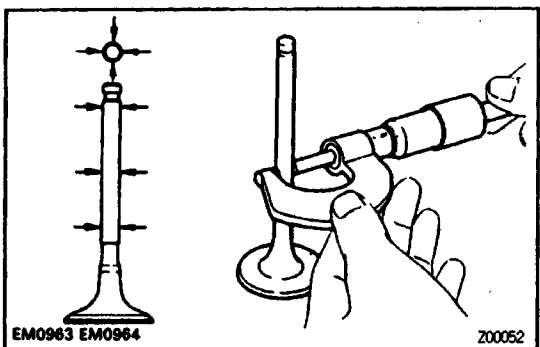


5. INSPECT VALVE STEMS AND GUIDE BUSHINGS

- (a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:

6.010 – 6.030 mm (0.2366 – 0.2374 in.)



- (b) . Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

Intake

5.970 – 5.985 mm (0.2350 – 0.2356 in.)

Exhaust

5.965 – 5.980 mm (0.2348 – 0.2354 in.)

- (c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

Standard oil clearance:

Intake

0.025 – 0.060 mm (0.0010 – 0.0024 in.)

Exhaust

0.030 – 0.065 mm (0.0012 – 0.0026 in.)

Maximum oil clearance:

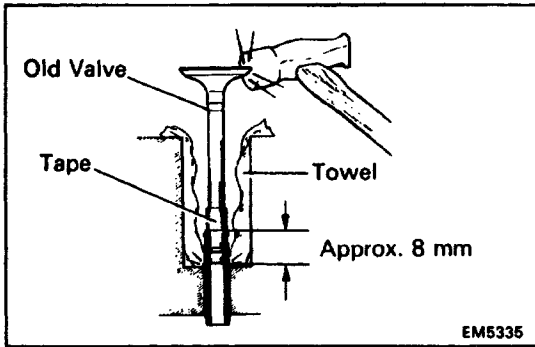
Intake

0.08 mm (0.0031 in.)

Exhaust

0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing.



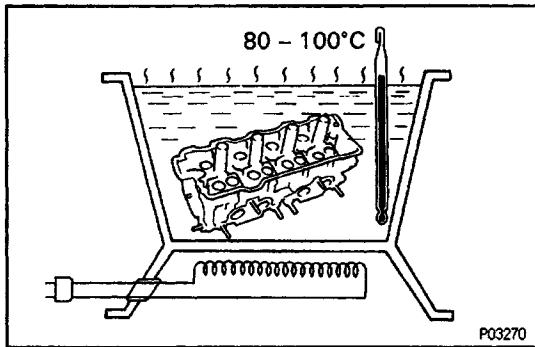
6. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

(a) (Exhaust (w/ Snap Ring))

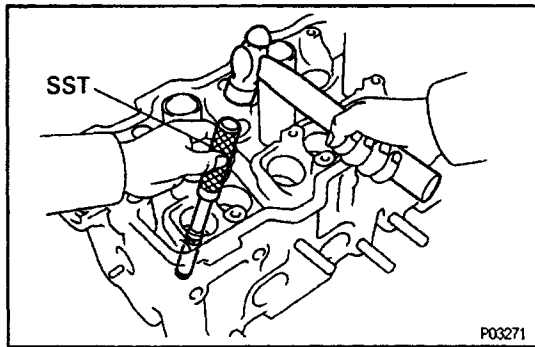
Insert an old valve wrapped with tape into the valve guide bushing, and break off the valve guide bushing by hitting it with a hammer. Remove the snap ring.

HINT: Wrap the tape approx. 8 mm (0.31 in.) from the valve stem end.

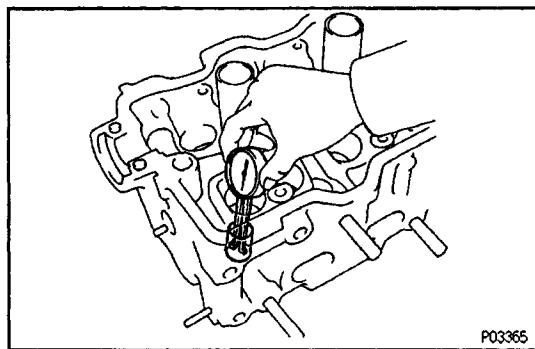
NOTICE: Be careful not to damage the valve lifter hole.



(b) Gradually heat the cylinder head to 80 – 100°C (176 – 212° F).



(c) Using SST and a hammer, tap out the guide bushing. SST 09201-70010



(d) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

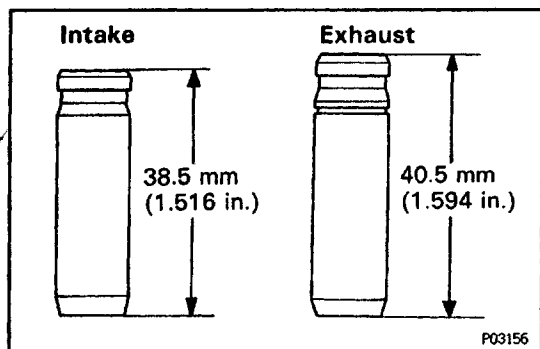
Both intake and exhaust

Bushing bore diameter mm (in.)	Bushing size
11.000 – 11.027 (0.4331 – 0.4342)	Use STD
11.050 – 11.077 (0.4350 – 0.4361)	Use O/S 0.05

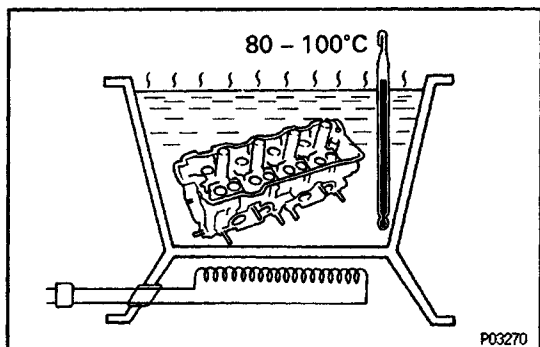
(e) Select a new guide bushing (STD or O/S 0.05). If the bushing bore diameter of the cylinder head is greater than 11.027 mm (0.4341 in.), machine the bushing bore to the following dimension:

11.050 – 11.077 mm (0.4350 – 0.4361 in.)

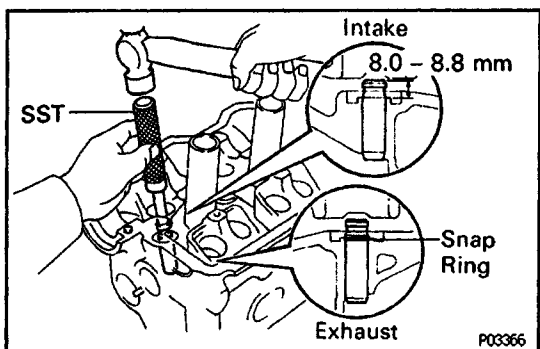
If the bushing bore diameter of the cylinder head is greater than 11.077 mm (0.4361 in.), replace the cylinder head.



HINT: Different the bushings are used for the intake and exhaust.



(f) Gradually heat the cylinder head to 80 - 100°C (176 - 212°F).



(g) (Intake)

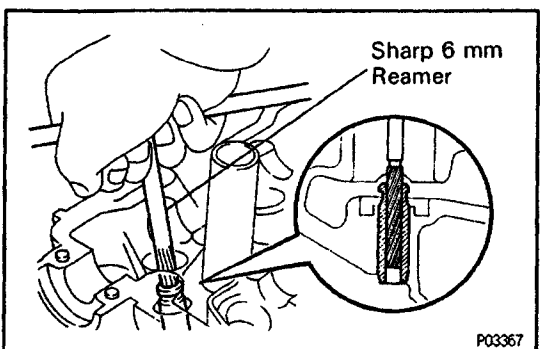
Using SST and a hammer, tap in a new guide bushing until there is 8.0 - 8.8 mm (0.315 - 0.346 in.) protruding from the cylinder head.

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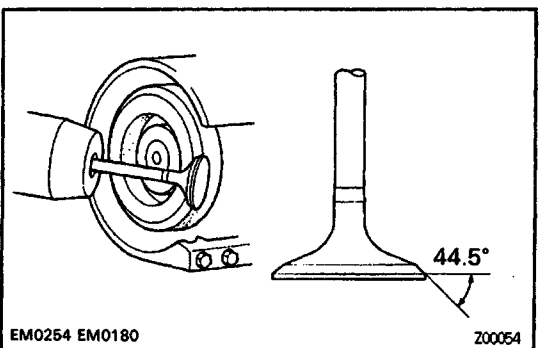
(h) (Exhaust)

Using SST and a hammer, tap in a new guide bushing until the snap ring makes contact with the cylinder head.

SST 09201-70010



(i) Using a sharp 6 mm reamer, ream the guide bushing to obtain the standard specified clearance (See step 5 above) between the guide bushing and valve stem.

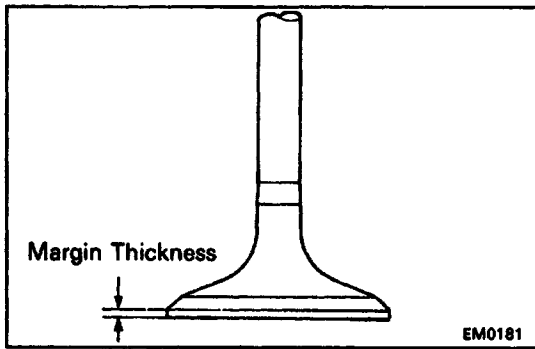


7. INSPECT AND GRIND VALVES

- Grind the valve enough to remove pits and carbon.
- Check that the valve is ground to the correct valve face angle.

Valve face angle:

44.5°



(c) Check the valve head margin thickness.

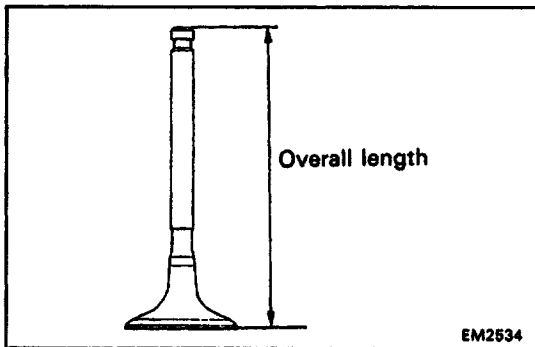
Standard margin thickness:

0.8 – 1.2 mm (0.031 – 0.047 in.)

Minimum margin thickness:

0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



(d) Check the valve overall length.

Standard overall length:

Intake

97.60 mm (3.8425 in.)

Exhaust

98.45 mm (3.8760 in.)

Minimum overall length:

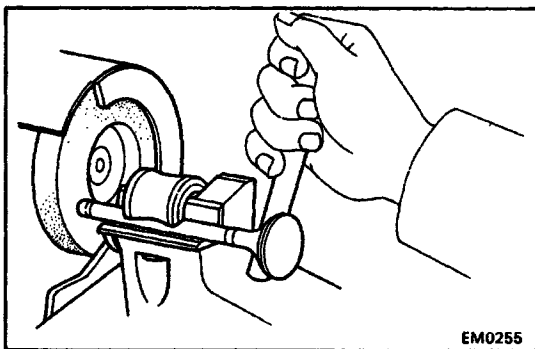
Intake

97.1 mm (3.823 in.)

Exhaust

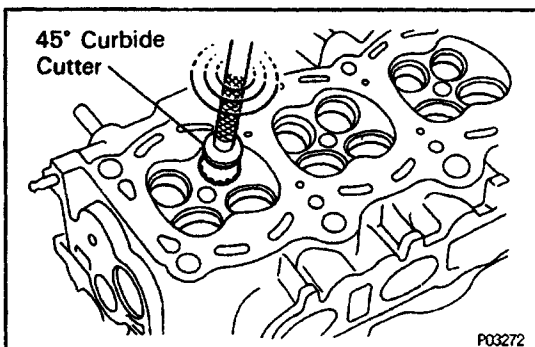
98.0 mm (3.858 in.)

If the overall length is less than minimum, replace the valve.



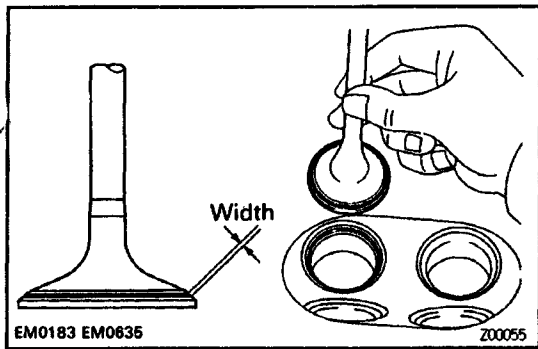
(e) Check the surface of the valve stem tip for wear. If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

NOTICE: Do not grind off more than minimum.



8. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



(b) Check the valve seating position.

Apply a light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.

(c) Check the valve face and seat for the following:

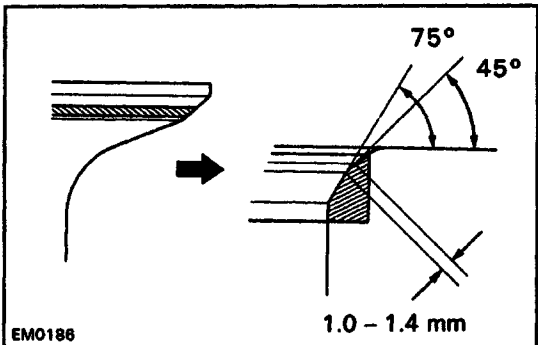
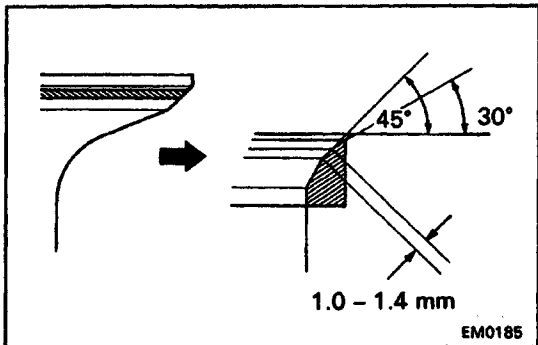
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.

- Check that the seat contact is in the middle of the valve face with the following width:

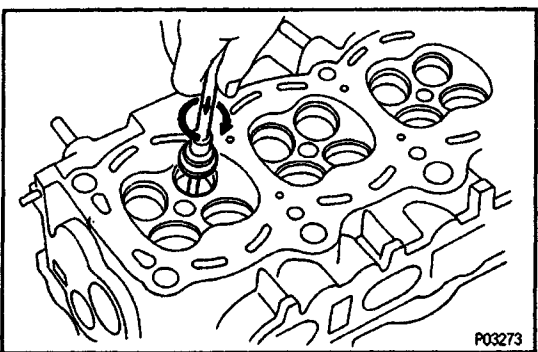
1.0 – 1.4 mm (0.039 – 0.055 in.)

If not, correct the valve seats as follows:

- (1) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

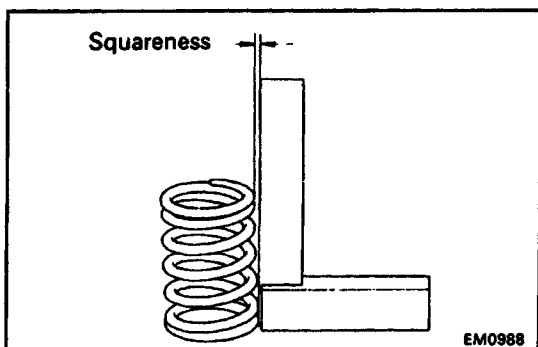


- (2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



(d) Hand-lap the valve and valve seat with an abrasive compound.

(e) After hand-lapping, clean the valve and valve seat.



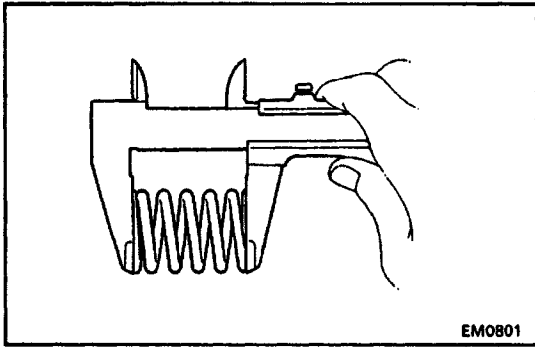
9. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the squareness of the valve spring.

Maximum squareness:

2.0 mm (0.079 in.)

If the deviation is greater than maximum, replace the valve spring.

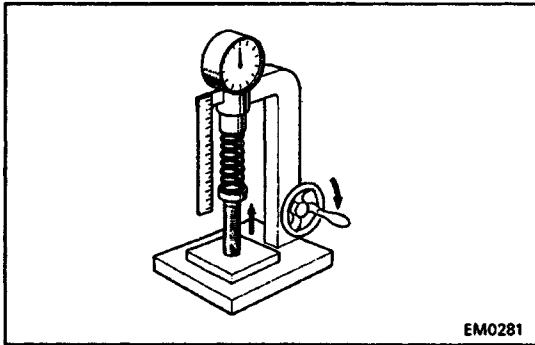


(b) Using a vernier caliper, measure the free length of the valve spring.

Free length:

41.9 mm (1.650 in.)

If the free length is not as specified, replace the valve spring.



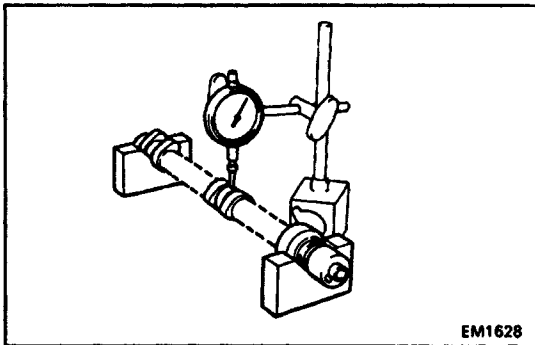
(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

164 – 189 N (16.7 – 19.3 kgf, 36.8 – 42.5 lbf)

at 34.7 mm (1.366 in.)

If the installed tension is not as specified, replace the valve spring.



10. INSPECT CAMSHAFTS AND BEARINGS

A. Inspect camshaft for runout

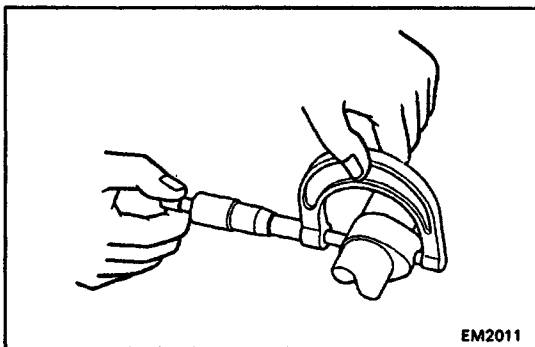
(a) Place the camshaft on V-blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout:

0.04 mm (0.0016 in.)

If the circle runout is greater than maximum, replace the camshaft.



6. Inspect cam lobes

Using a micrometer, measure the cam lobe height.

Standard cam lobe height:

Intake

42.01 – 42.11 mm (1.6539 – 1.6579 in.)

Exhaust

40.06 – 40.16 mm (1.5772 – 1.5811 in.)

Minimum cam lobe height:

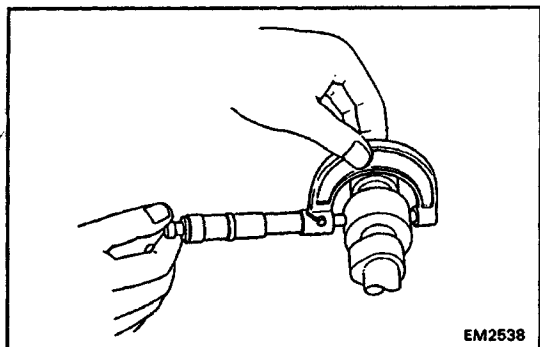
Intake

41.90 mm (1.6496 in.)

Exhaust

39.95 mm (1.5728 in.)

If the cam lobe height is less than minimum, replace the camshaft.



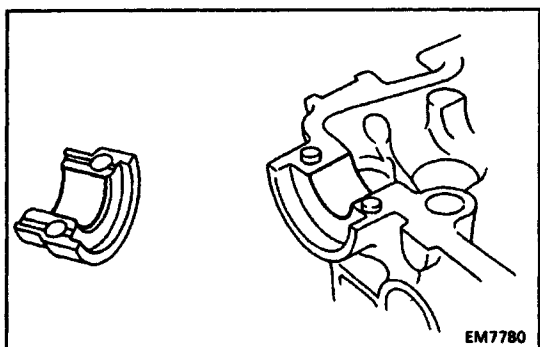
C. Inspect camshaft journals

Using a micrometer, measure the journal diameter.

Journal diameter:

26.959 – 26.975 mm (1.0614 – 1.0620 in.)

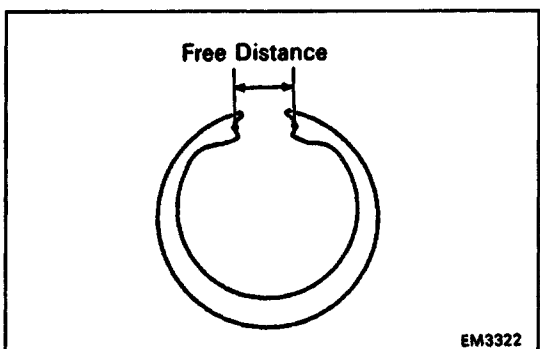
If the journal diameter is not as specified, check the oil clearance.



D. Inspect camshaft bearings

Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.



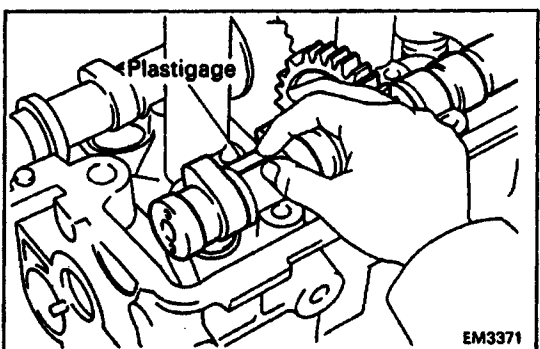
E. Inspect camshaft gear spring

Using a vernier caliper, measure the free distance between the spring ends.

Free distance:

22.5 – 22.9 mm (0.886 – 0.902 in.)

If the free distance is not as specified, replace the gear spring.

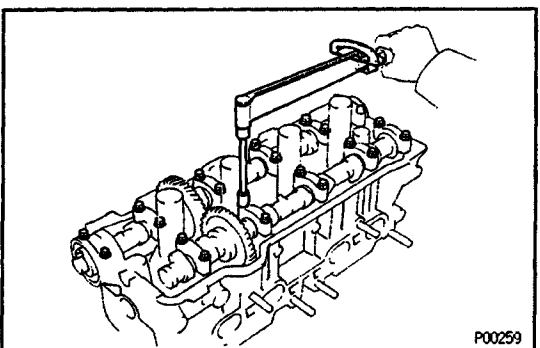


F. Inspect camshaft journal oil clearance

(a) Clean the bearing caps and camshaft journals.

(b) Place the camshafts on the cylinder head.

(c) Lay a strip of Plastigage across each of the camshaft journals.

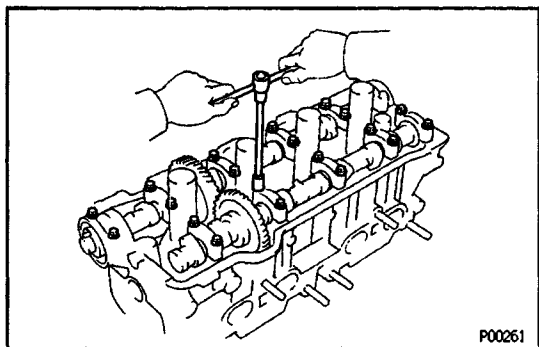


(d) Install the bearing caps.

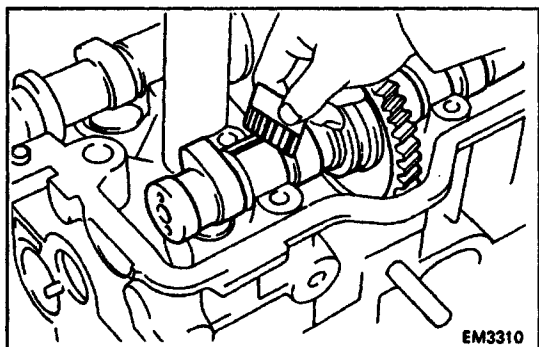
(See step 4 in Cylinder Head Installation)

Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)

NOTICE: Do not turn the camshaft.



(e) Remove the bearing caps.



(f) Measure the Plastigage at its widest point.

Standard oil clearance:

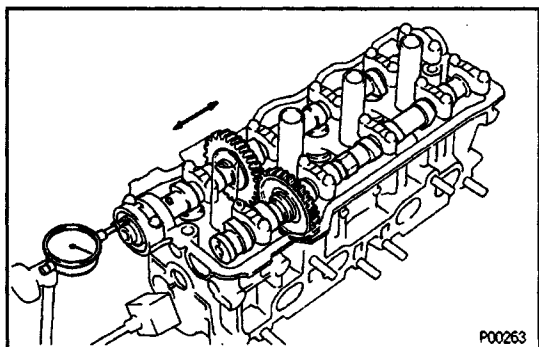
0.025 – 0.062 mm (0.0010 – 0.0024 in.)

Maximum oil clearance:

0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(g) Completely remove the Plastigage.



G. Inspect camshaft thrust clearance

(a) Install the camshaft.

(See step 4 in Cylinder Head Installation)

(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:

Intake

0.045 – 0.100 mm (0.0018 – 0.0039 in.)

Exhaust

0.030 – 0.085 mm (0.0012 – 0.0033 in.)

Maximum thrust clearance:

Intake

0.12 mm (0.0047 in.)

Exhaust

0.10 mm (0.0039 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

H. Inspect camshaft gear backlash

(a) Install the camshafts without installing the exhaust cam sub-gear.

(See step 4 in Cylinder Head Installation)

(b) Using a dial indicator, measure the backlash.

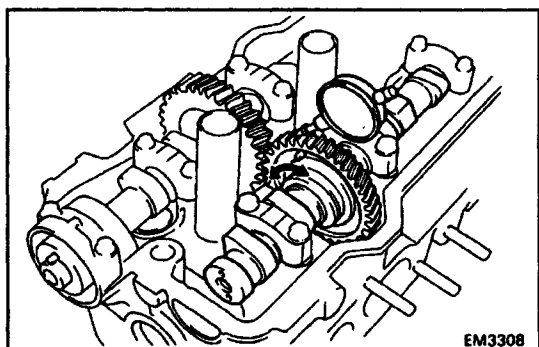
Standard backlash:

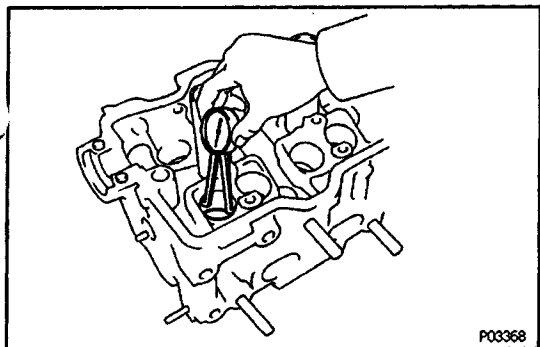
0.020 – 0.200 mm (0.0008 – 0.0079 in.)

Maximum backlash:

0.30 mm (0.0188 in.)

If the backlash is greater than maximum, replace the camshafts.



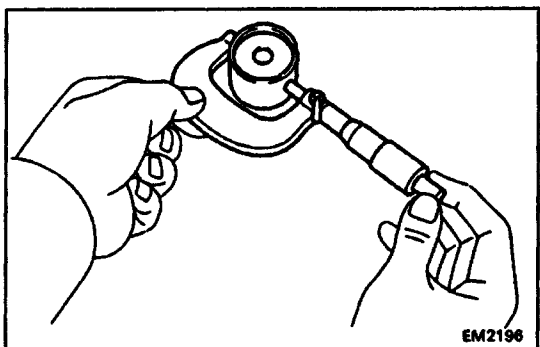


11. INSPECT VALVE LIFTERS AND LIFTER BORES

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:

31.000 – 31.018 mm (1.2205 – 1.2213 in.)



(b) Using a micrometer, measure the lifter diameter.

Lifter diameter:

30.966 – 30.976 mm (1.2191 – 1.2195 in.)

(c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

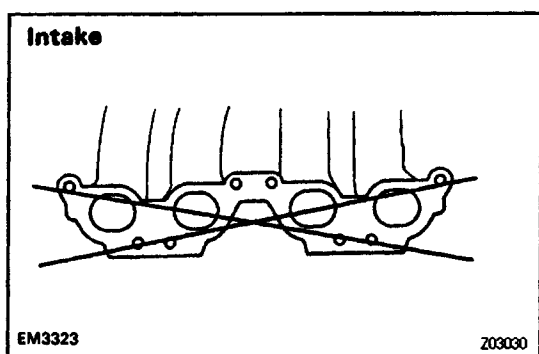
Standard oil clearance:

0.024 – 0.052 mm (0.0009 – 0.0020 in.)

Maximum oil clearance:

0.07 mm (0.0028 in.)

If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.



12. INSPECT MANIFOLDS

(Intake)

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

0.30 mm (0.0118 in.)

If warpage is greater than maximum, replace the manifold.

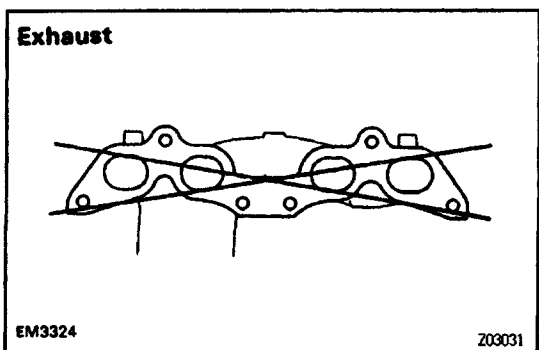
(Exhaust)

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage:

0.30 mm (0.0118 in.)

If warpage is greater than maximum, replace the manifold.

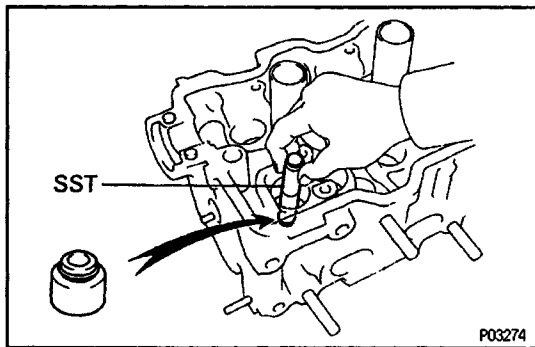


CYLINDER HEAD ASSEMBLY

(See Components for Removal and Installation)

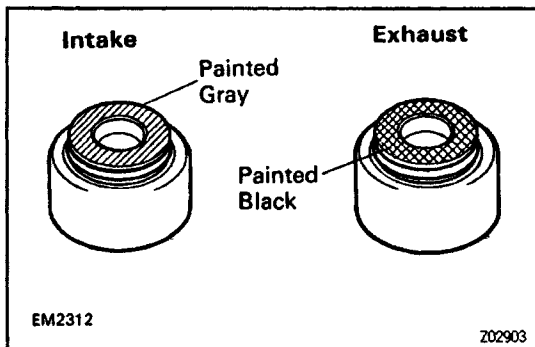
HINT:

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

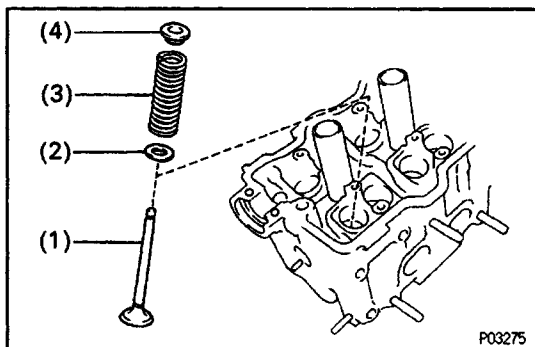


1. INSTALL VALVES

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

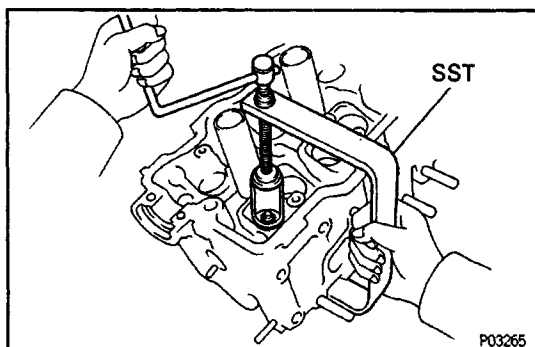


HINT: The intake valve oil seal is gray and the exhaust valve oil seal is black.

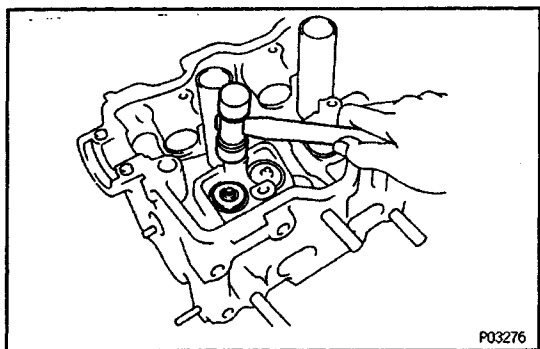


(b) Install the following parts:

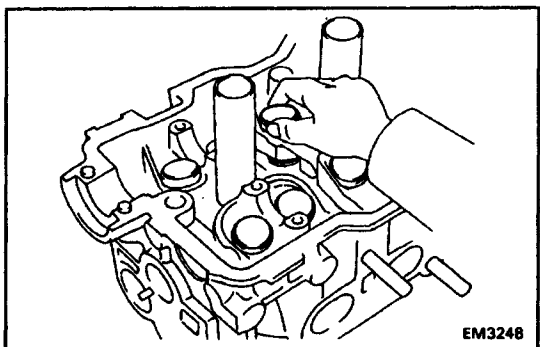
- (1) Valve
- (2) Spring seat
- (3) Valve spring
- (4) Spring retainer



(c) Using SST, compress the valve spring and place the two keepers around the valve stem.
SST 09202-70010

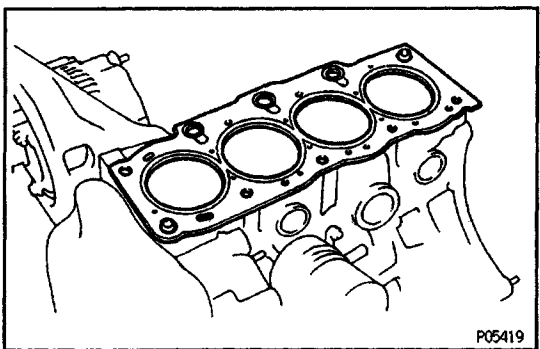


(d) Using a plastic-faced hammer, lightly tap the valve stem tip to assure proper fit.



2. INSTALL VALVE LIFTERS AND SHIMS

- (a) Install the valve lifter and shim.
- (b) Check that the valve lifter rotates smoothly by hand.



CYLINDER HEAD INSTALLATION

(See Components for Removal and Installation)

1. INSTALL CYLINDER HEAD

A. Place cylinder head on cylinder block

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

NOTICE: Be careful of the installation direction.

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

B. Install cylinder head bolts

HINT:

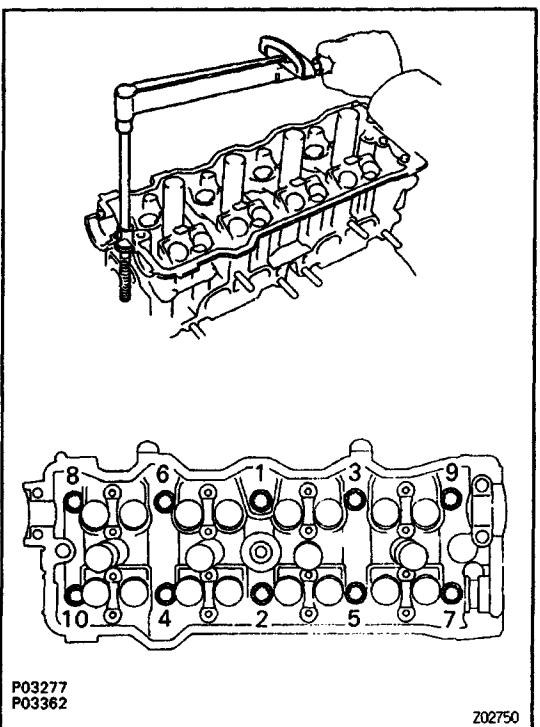
- The cylinder head bolts are tightened in two progressive steps (steps (b) and (d)).
- If any cylinder head bolt is broken or deformed, replace it.

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

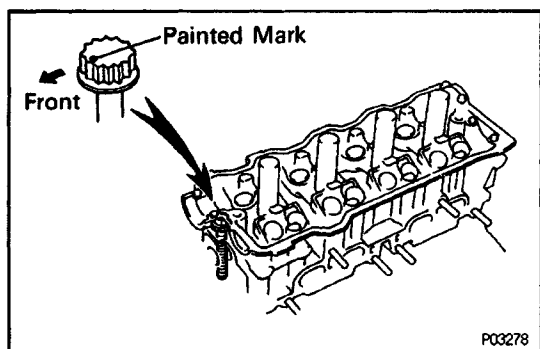
- (b) Install and uniformly tighten the ten cylinder head bolts and plate washers in several passes, in the sequence shown.

Torque: 49 N-m (500 kgf-cm, 36 ft-lbf)

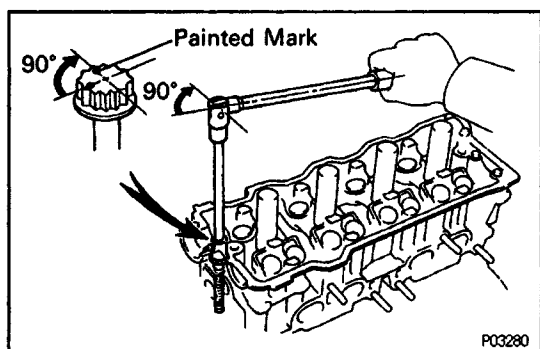
If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



Z02750

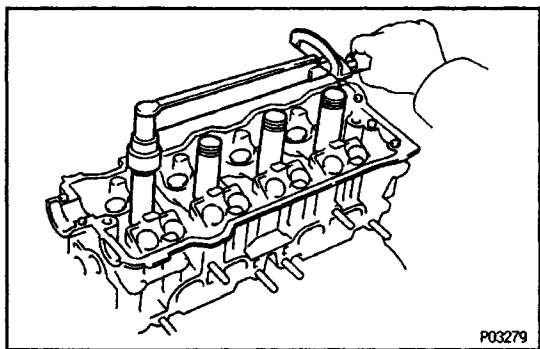


(c) Mark the front of the cylinder head bolt head with paint.



(d) Retighten the cylinder head bolts 90° in the numerical order shown.

(e) Check that the painted mark is now at a 90° angle to front.



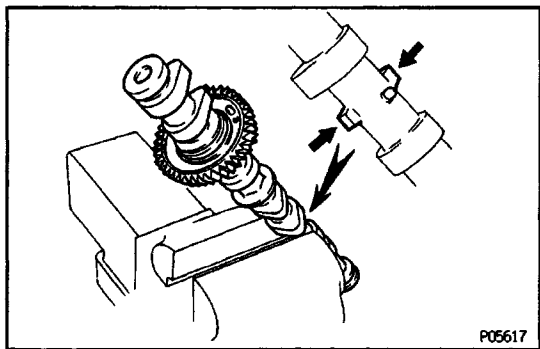
2. INSTALL SPARK PLUG TUBES

(a) Clean the cylinder head tube holes of any residual adhesive, oil or foreign particles. Remove any oil with kerosene or gasoline.

(b) Screw the threads of the spark plug tube coated with adhesive into the cylinder head.

(c) Using the spark plug tube nut and a 30 mm socket wrench, tighten the spark plug tubes.

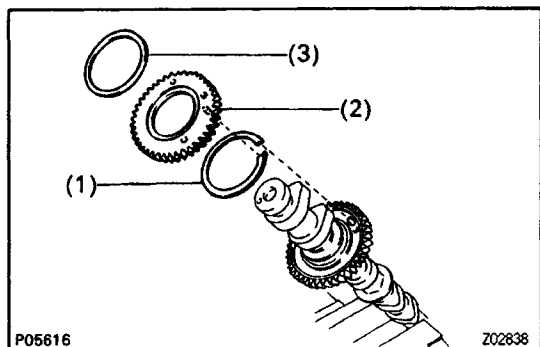
Torque: 39 N-m (400 kgf-cm, 29 ft-lbf)



3. ASSEMBLY EXHAUST CAMSHAFT

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

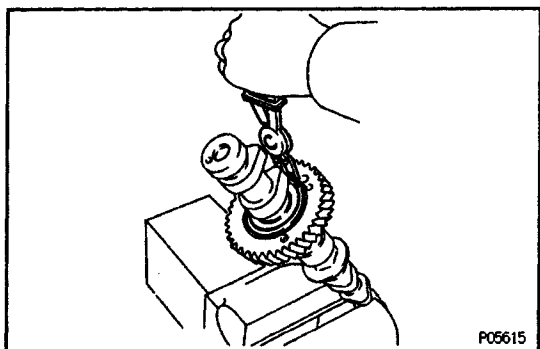
NOTICE: Be careful not to damage the camshaft.



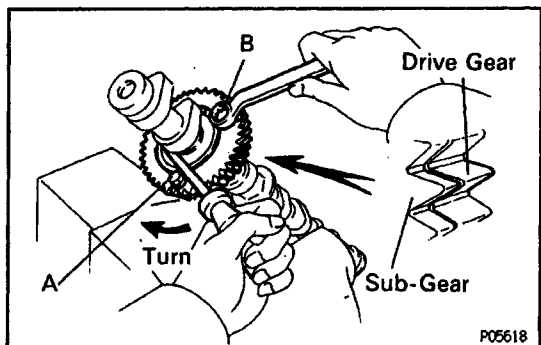
(b) Install the following parts:

- (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 service bolt A into the service hole of the camshaft sub-gear.

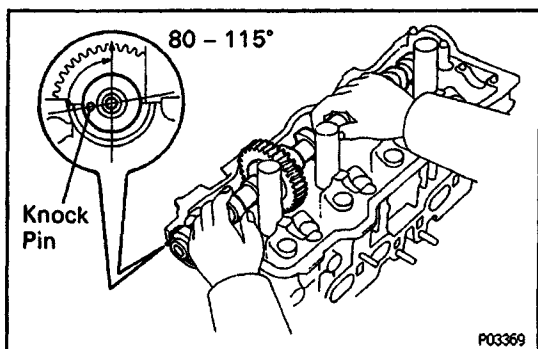
(e) Using a screwdriver, align the holes of the camshaft drive gear and sub-gear by turning camshaft sub-gear clockwise, and install service bolt B.

NOTICE: Be careful not to damage the camshaft.

(f) Align the gear teeth of the drive gear and sub-gear, and tighten service bolt B.

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, the following steps should be carried out.

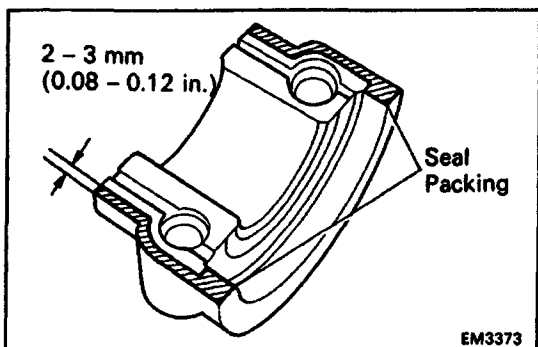


A. Install intake camshaft

(a) Apply Mp grease to the thrust portion of the camshaft.

(b) Place the intake camshaft at 80 – 115° BTDC of camshaft angle on the cylinder head.

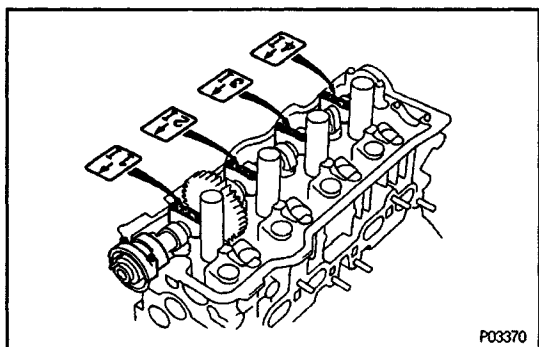
HINT: The above angle arrows the No.1 and No.3 cylinder cam lobes of the intake camshaft to push their valve lifters evenly.



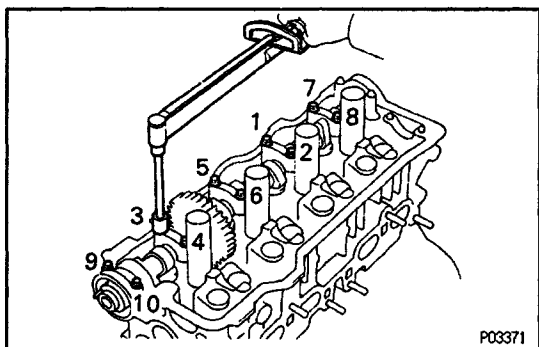
(c) Apply seal packing to the No.1 bearing cap as shown.

Seal packing:

Part No. 08826-00080 or equivalent



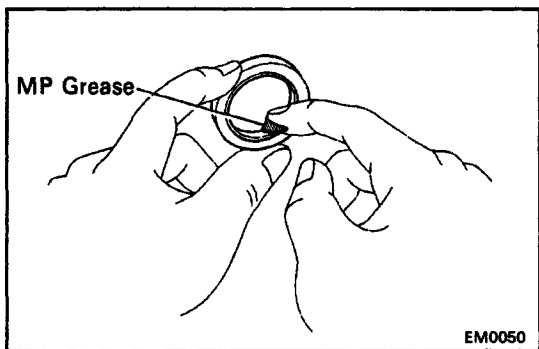
(d) Install the bearing caps in their proper locations.



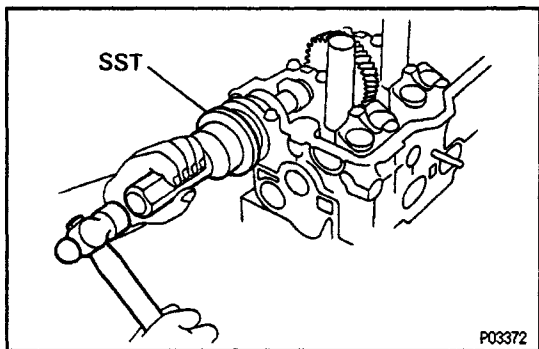
(e) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.

(f) Install and uniformly tighten the ten bearing cap bolts in several passes, in the sequence shown.

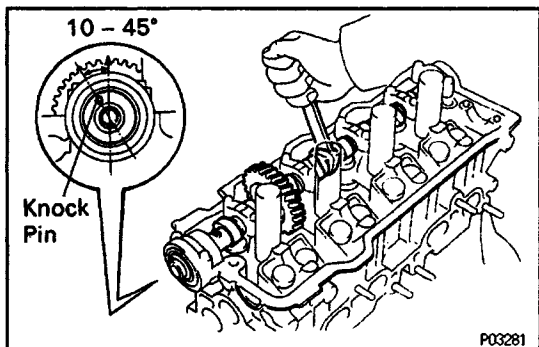
Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)



(g) Apply IMP grease to a new oil seal lip.



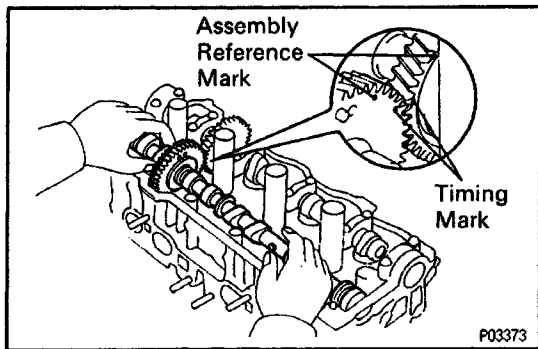
(h) Using SST, tap in the oil seal.
SST 09223-46011



B. Install exhaust camshaft

(a) Set the knock pin of the intake camshaft at 10 - 45° BTDC of camshaft angle.

HINT: The above angle allows the No.2 and No.4 cylinder cam lobes of the exhaust camshaft to push their valve lifters evenly.



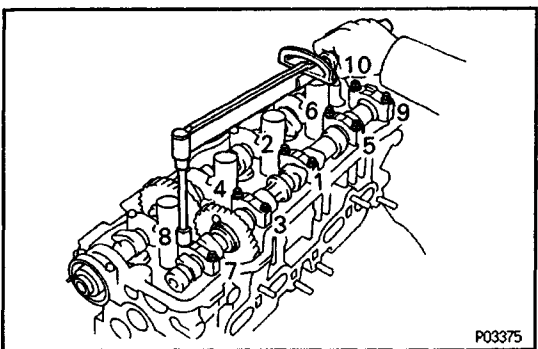
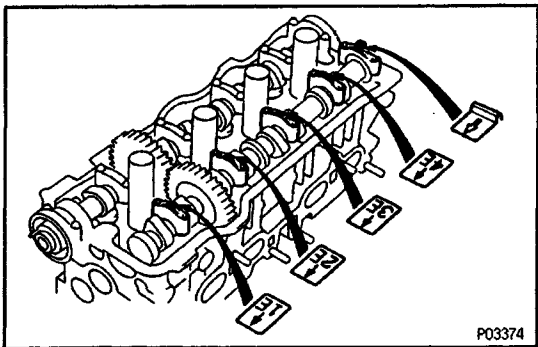
- (b) Apply MP grease to the thrust portion of the camshaft.
- (c) Engage the exhaust camshaft gear to the intake camshaft gear by matching the timing marks on each gear.
- (d) Roll down the exhaust camshaft onto the bearing journals while engaging gears with each other.

NOTICE: There are also assembly reference marks on each gear as shown in the illustration. Do not use these marks.

- (e) Turn the intake camshaft clockwise or counterclockwise little until the exhaust camshaft sits in the bearing journals evenly without rocking the camshaft on the bearing journals.

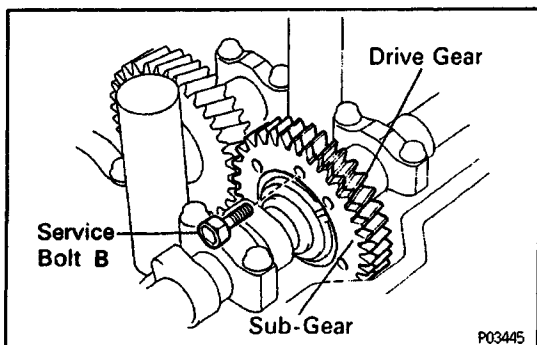
NOTICE: It is very important to replace the camshaft in the bearing journals evenly while tightening bearing caps in the subsequent steps.

- (f) Install the bearing caps in their proper locations.



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

Torque: 19 N-m (190 kgf-cm. 14 ft-lbf)

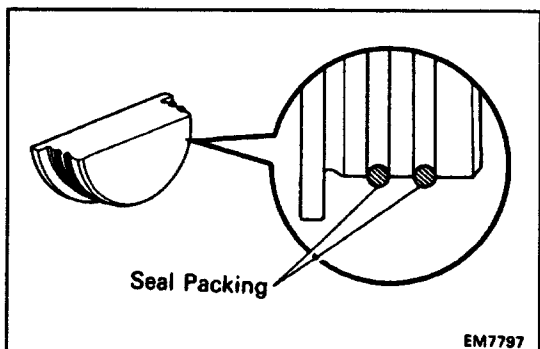


- (i) Remove service bolt B.

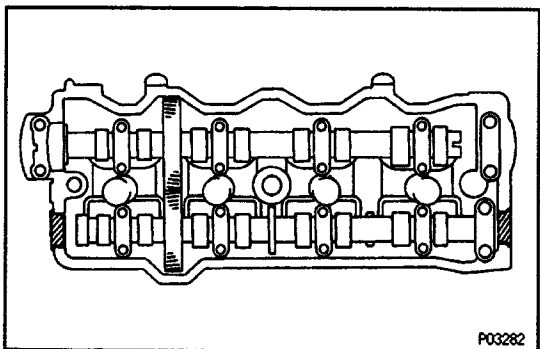
5. CHECK AND ADJUST VALVE CLEARANCE

(See Tune-Up)

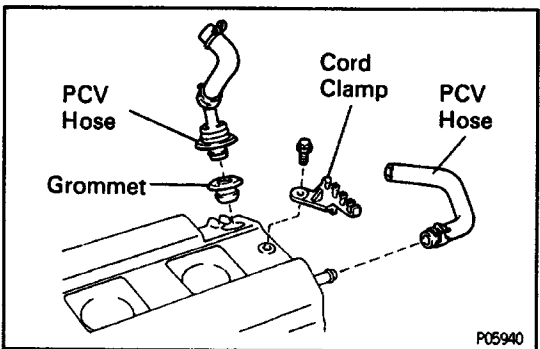
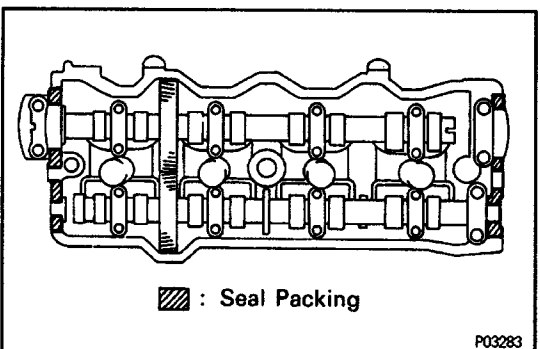
Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

Valve clearance (Cold):**Intake****0.19 – 0.29 mm (0.007 – 0.011 in.)****Exhaust****0.28 – 0.38 mm (0.011 – 0.015 in.)****6. INSTALL SEMI-CIRCULAR PLUGS**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semi-circular plug grooves.

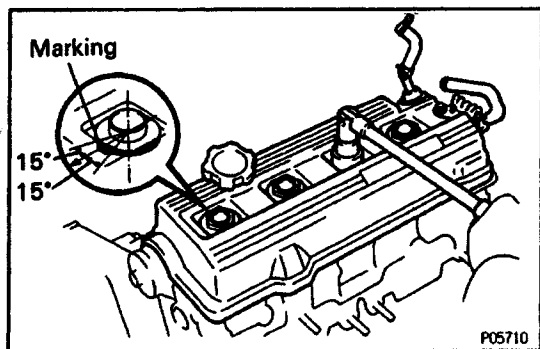
Seal packing:**Part No. 08826-00080 or equivalent**

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

**7. INSTALL PCV VALVE, PCV HOSE AND HIGH-TENSION CORD CLAMP****8. INSTALL CYLINDER HEAD COVER**

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the cylinder head as shown in the illustration.

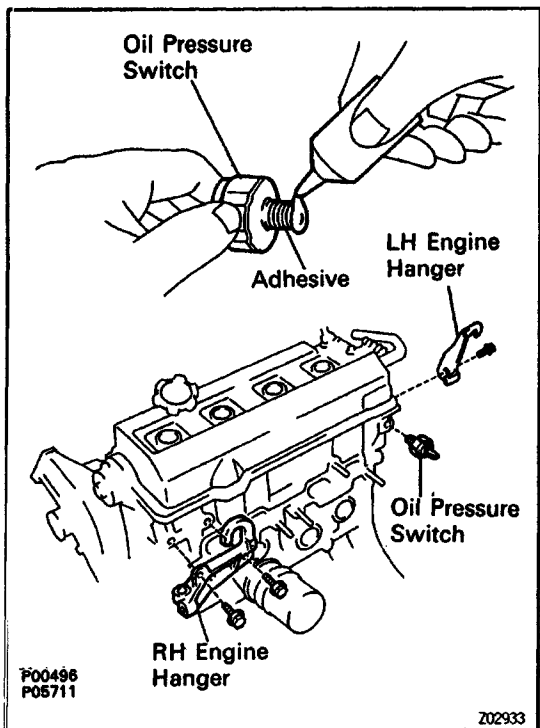
Seal packing:**Pert No. 08826-00080 or equivalent**



- (c) Install the gasket to the head cover.
- (d) install the head cover with the four grommets and nuts. Uniformly tighten the nuts in several passes.

Torque: 23 N-m (230 kgf-cm, 17 ft-lbf)

HINT: Install the grommets so that their markings are as shown in the illustration.



9. INSTALL OIL PRESSURE SWITCH

Apply adhesive to two or three threads.

Adhesive:

Part No. 08833-00080. THREE BOND 1324 or equivalent

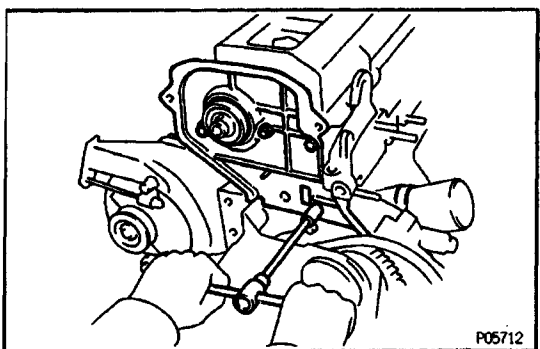
10. INSTALL ENGINE HANGERS

- (a) Install the RH engine hanger with the two bolts.

Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)

- (b) Install the LH engine hanger with the bolt.

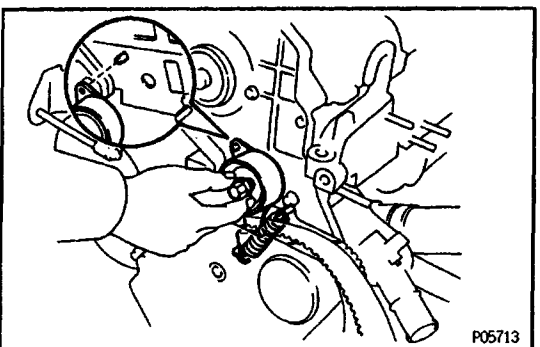
Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)



11. INSTALL NO.3 TIMING BELT COVER

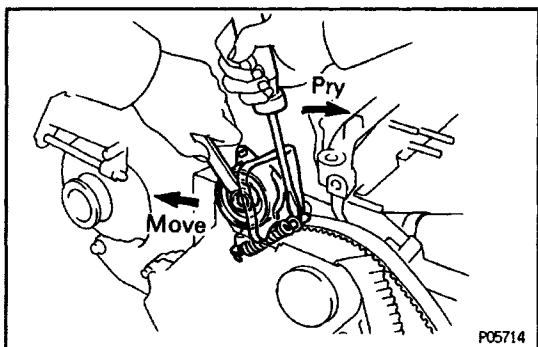
install the timing belt cover with the four bolts.

Torque: 7.8 N-m (80 kgf-cm, 69 in.-lbf)

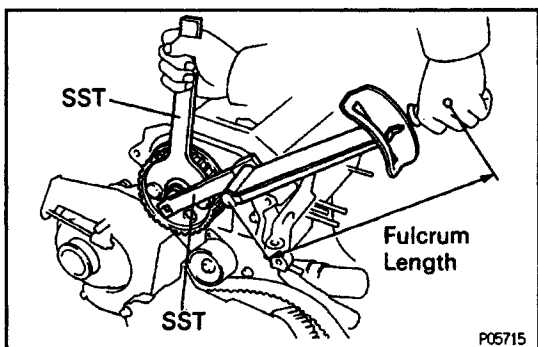


12. TEMPORARILY INSTALL NO.1 IDLER PULLEY AND TENSION SPRING

- (a) Align the bracket pin hole with the pivot pin.
- (b) Install the pulley with the bolt. Do not tighten the bolt yet.
- (c) Install the tension spring.



- (d) Pry the pulley toward the left as far as it will go and tighten the bolt.
- (e) Check that the idler pulley moves smoothly.



13. INSTALL CAMSHAFT TIMING PULLEY

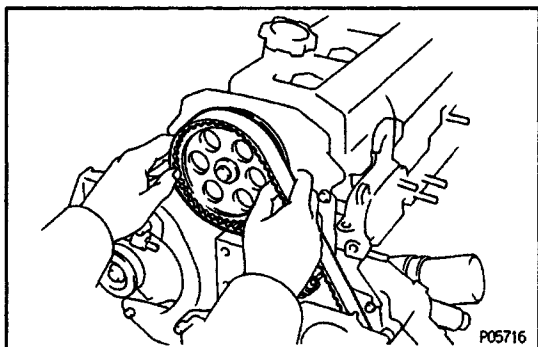
- (a) Align the camshaft knock pin with the knock pin groove of the pulley, and slide on the timing pulley.
 - (b) Using SST, install the pulley bolt.
- SST 09249-63010, 09278-54012

Torque:

54 N-m (550 kgf-cm, 40 ft-lbf)

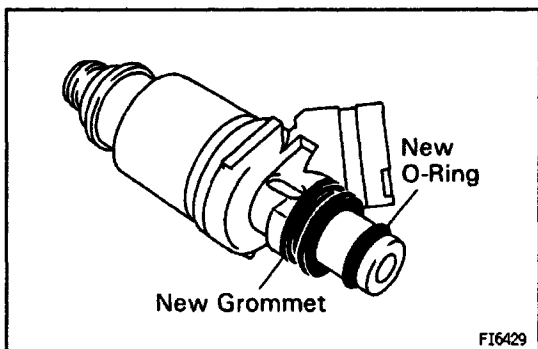
37 N-m (380 kgf-cm, 27 ft-lbf) for SST

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.)



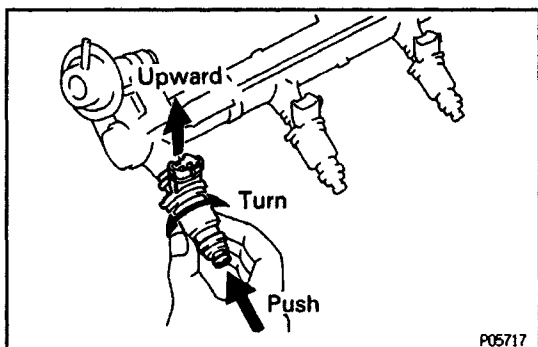
14. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEY

(See steps 10 to 22 in Timing Belt Installation)

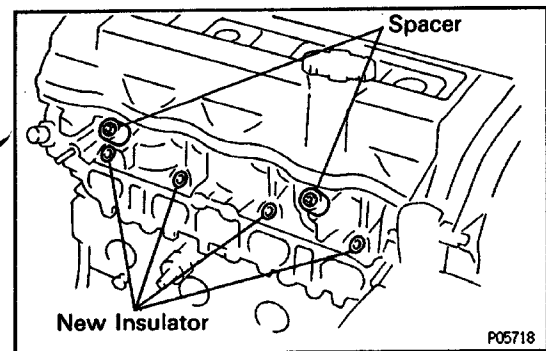


15. INSTALL INJECTORS AND DELIVERY PIPE

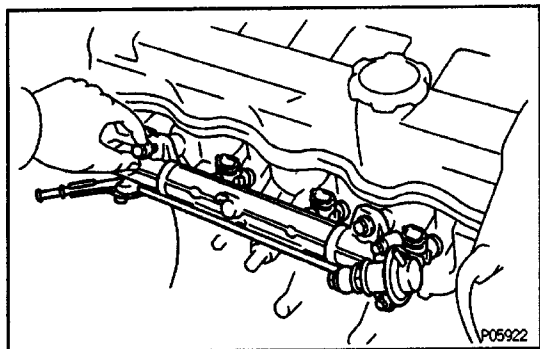
- (a) Install a new grommet to the injector.
- (b) Apply a light coat of gasoline to a new O-ring and install it to the injector.



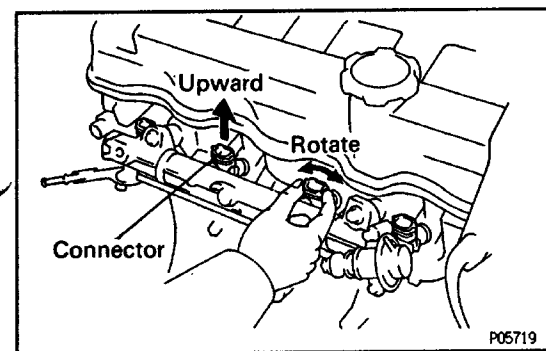
- (c) While turning the injector left and right, install it to the delivery pipes. Install the four injectors.
- (d) Position the injector connector upward.



- (e) Place four new insulators and the two spacers in position on the cylinder head.



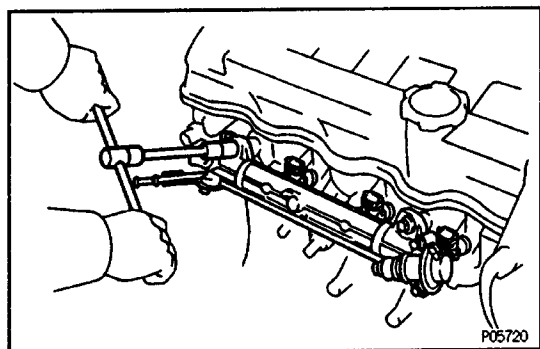
- (f) Place the four injectors together with the delivery pipe in position on the cylinder head.
 (g) Temporarily install the two bolts holding the delivery pipe to the cylinder head.



- (h) Check that the injectors rotate smoothly.

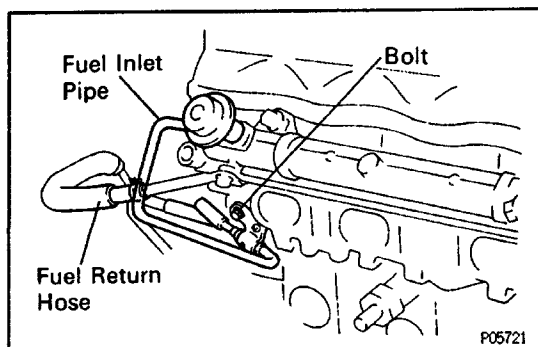
HINT: If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.

- (i) Position the injector connector upward.



- (j) Tighten the two bolts holding the delivery pipe to the cylinder head.

Torque: 13 N-m (130 kgf-cm, 9 ft-lbf)

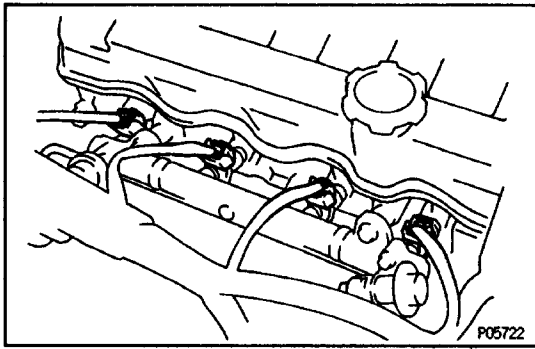


- (k) Connect the fuel inlet pipe to the delivery pipe with two new gaskets and the pulsation damper.

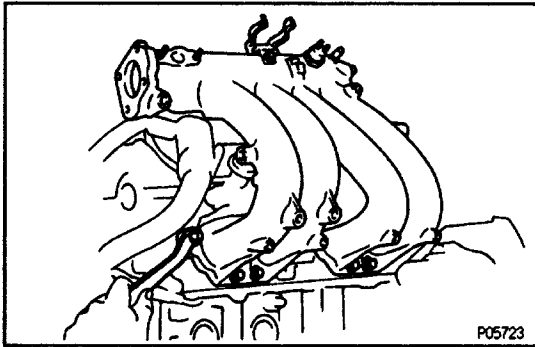
Torque: 34 N-m (350 kgf-cm, 25 ft-lbf)

- (l) Install the fuel inlet pipe to the cylinder head with the bolt.

- (m) Connect the fuel return hose.



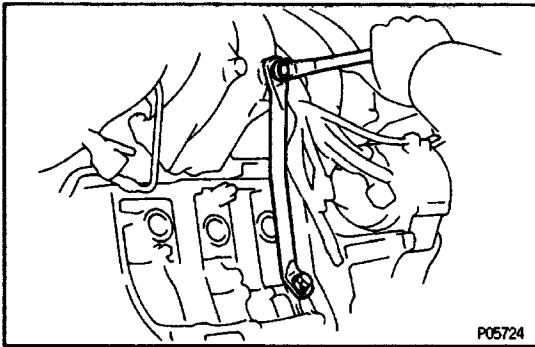
(n) Connect the four injector connectors.



16. INSTALL INTAKE MANIFOLD

(a) Install a new gasket and the intake manifold with the six bolts and two nuts. Uniformly tighten the bolts and nuts in several passes.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

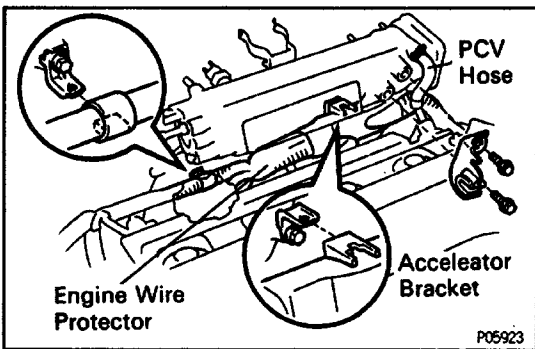


(b) Install the intake manifold stay with the two bolts.

Torque:

22 N-m (220 kgf-cm, 16 ft-lbf) for 12 mm head

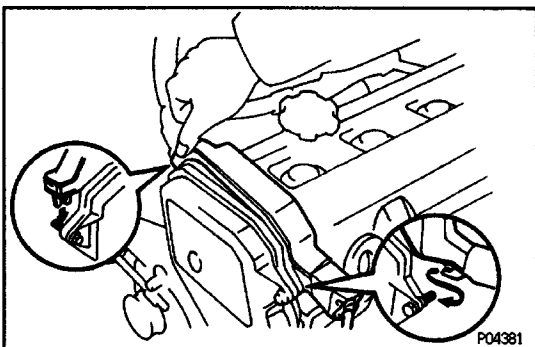
42 N-m (425 kgf-cm, 31 ft-lbf) for 14 mm head



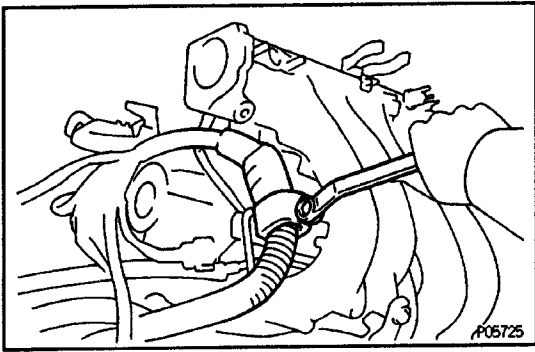
(c) Connect the the engine wire protector to the brackets on the front side of the intake manifold.

(d) Connect the PCV hose to the intake manifold.

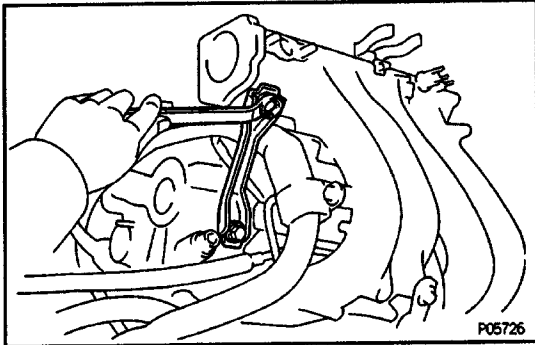
(e) Install the accelerator bracket with the two bolts.



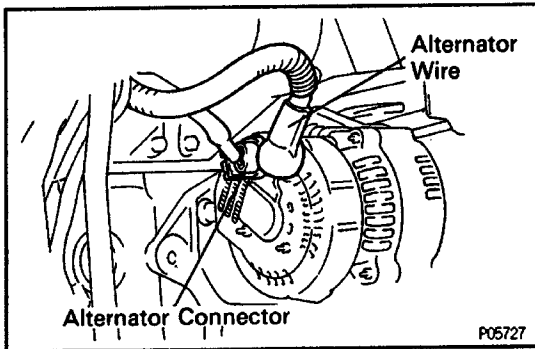
(f) Install the two clamps of the engine wire protector to each bolt.



(g) Install the engine wire protector with the bolt.



(h) Install the air intake chamber stay with the two bolts.
Torque: 42 N-m (425 kgf-cm, 31 ft-lbf)

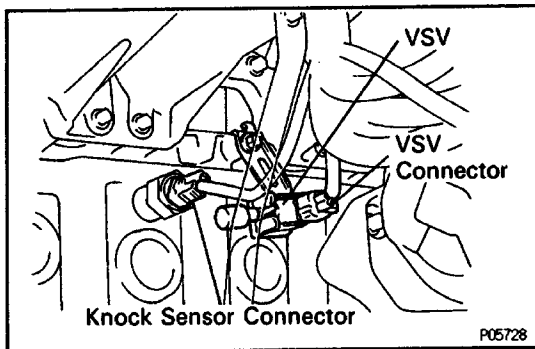


(i) Connect the alternator connector and wire.

17. INSTALL VSV FOR EGR

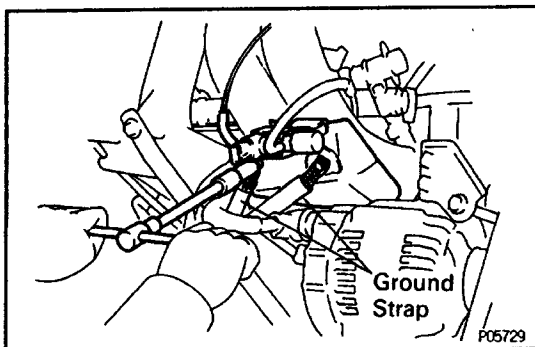
- (a) Install the VSV with the bolt.
- (b) Connect the VSV connector.

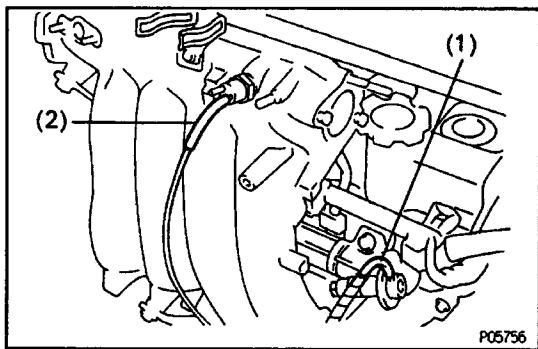
18. CONNECT KNOCK SENSOR CONNECTOR



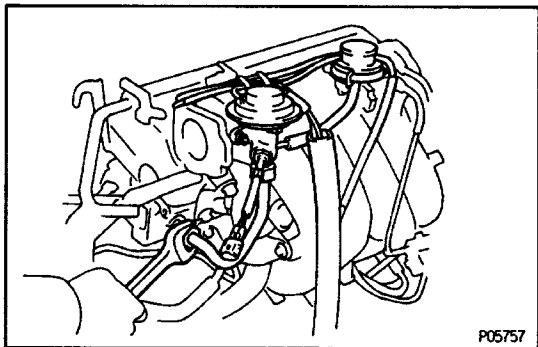
19. INSTALL VSV FOR FUEL PRESSURE

- (a) Install the VSV with the two bolts. Connect the two ground straps.





- (b) Connect the following hoses:
- (1) Vacuum hose (from port E of VSV) to fuel pressure regulator
 - (2) Vacuum hose (from port G of VSV) to gas filter.
- (c) Connect the VSV connector:



20. INSTALL EGR VALVE AND VACUUM MODULATOR

- (a) Install a new gasket and the EGR valve with the union nut and two nuts.

Torque:

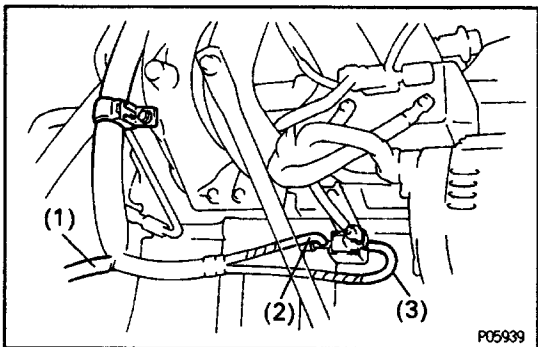
13 N-m (130 kgf-cm, 9 ft-lbf) for nut

59 N-m (600 kgf-cm, 43 ft-lbf) for union nut

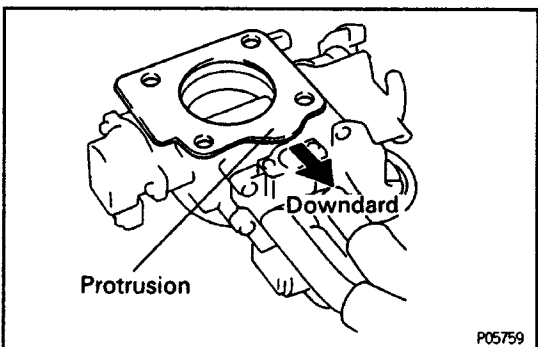
- (b) Install the vacuum modulator to the clamp.

- (c) (CALIF. only)

Connect the EGR function sensor connector.

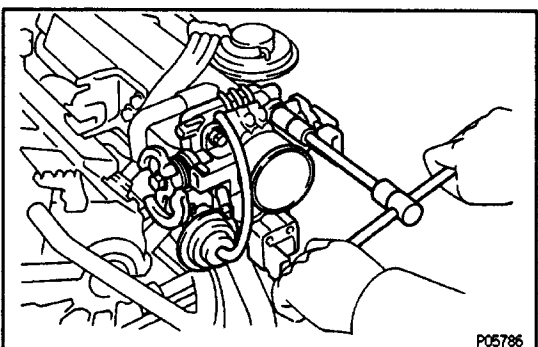


- (d) Install the vacuum hose clamp to the intake manifold with the bolt.
- (e) Connect the following hoses:
- (1) Vacuum hose to charcoal canister
 - (2) Vacuum hose (from EGR valve) to port E of VSV (for EGR)
 - (3) Vacuum hose (from port "a" of EGR vacuum modulator) to port G of VSV (for EGR)



21. INSTALL THROTTLE BODY

- (a) Place a new gasket on the throttle body, facing the protrusion downward.



- (b) Install the throttle body with the four bolts.

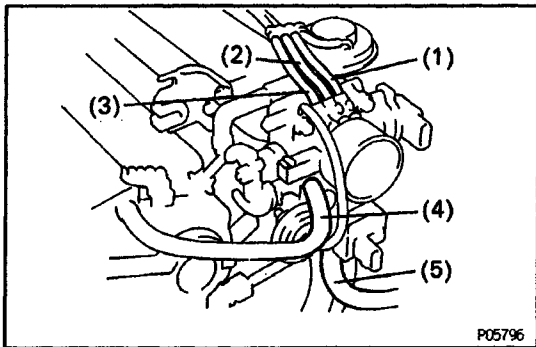
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

HINT: Different the bolt lengths are used for upper side and lower side.

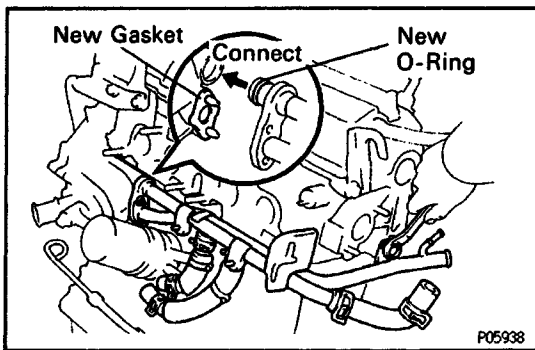
Bolt length:

45 mm (1.77 in.) for upper side

55 mm (2.17 in.) for lower side



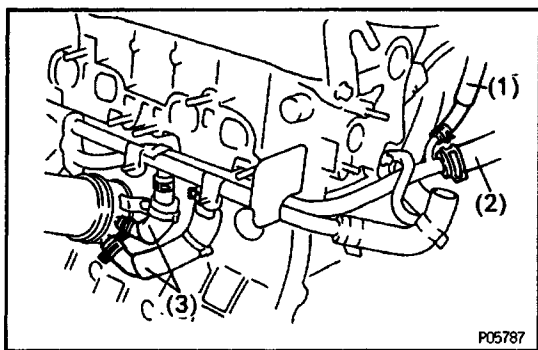
- (c) Connect the following hoses:
- (1) Vacuum hose (from upper port of TVS) to port "P" of throttle body
 - (2) Vacuum hose (from port "Q" of EGR vacuum modulator) to port "E" of throttle body
 - (3) Vacuum hose (from port "R" of EGR vacuum modulator) to port "R" of throttle body
 - (4) PCV hose (from cylinder head) to throttle body
 - (5) Air hose (port F of A/C idle-up valve)
- (d) Connect the following connectors:
- Throttle position sensor connector.
 - IACV connector.



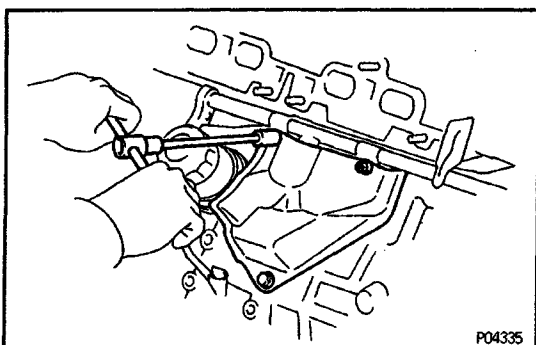
22. INSTALL WATER BY-PASS PIPE

- (a) Install a new gasket to the water pump cover.
- (b) Install a new O-ring to the by-pass pipe.
- (c) Apply soapy water on the O-ring.
- (d) Install the by-pass pipe with the two nuts and two bolts.

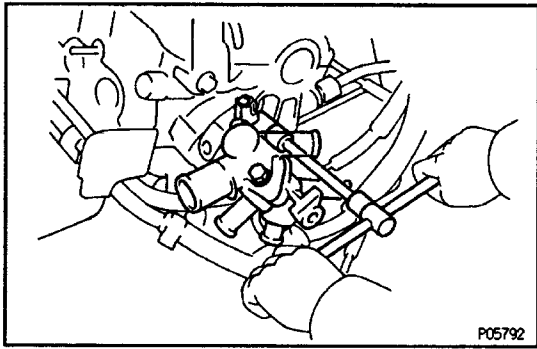
Torque: 8.8N-m (90 kgf-cm, 78 in-lbf) for nut



- (e) Connect the following hoses:
- (1) IACV water by-pass hose
 - (2) Heater water hose
 - (3) Two oil cooler water by-pass hoses



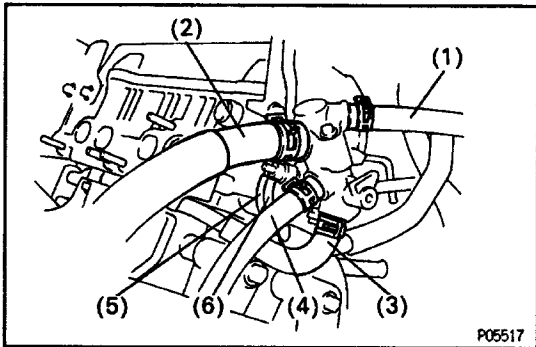
- (f) Install the oil cooler heat protector with the two nuts and bolt.



23. INSTALL WATER OUTLET AND HOUSING

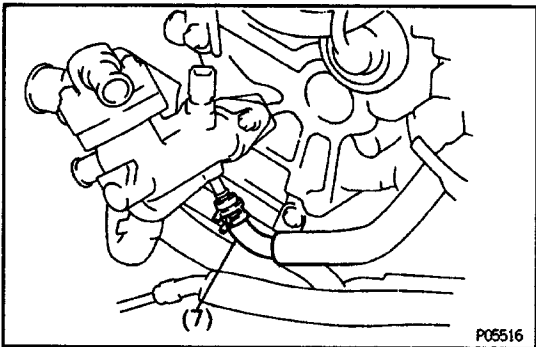
- (a) Install a new gasket, the water outlet and outlet housing with the two nuts.

Torque: 15 N-m (150 kgf-cm, 11 ft-lbf)



- (b) Connect the following hoses:

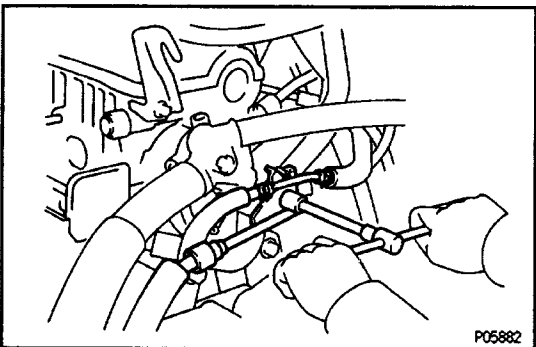
- (1) Water filler hose
- (2) Radiator hose
- (3) Water by-pass pipe hose
- (4) Heater water hose
- (5) Vacuum hose (from P port of throttle body) to upper port of TVS
- (6) Vacuum hose (from charcoal canister) to lower port of TVS



- (7) IACV water by-pass hose

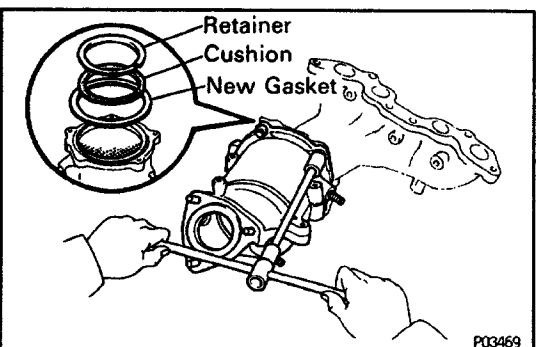
- (c) Connect the following connectors:

- Water temperature sender gauge connector
- ECTS connector



- (d) Install the fuel inlet pipe (with fuel return tube) with the bolt.

24. CONNECT OIL PRESSURE SWITCH CONNECTOR

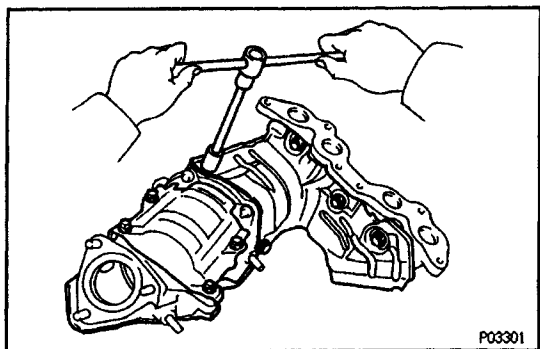


25. ASSEMBLE EXHAUST MANIFOLD AND TWC

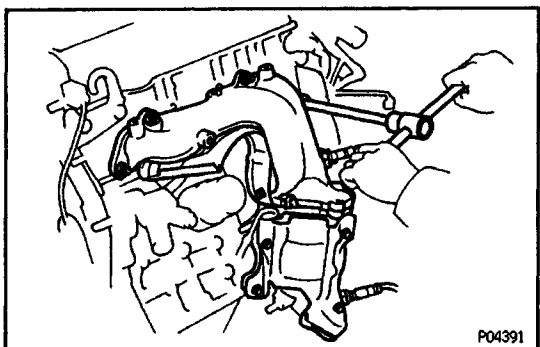
- (a) Place the cushion, retainer and a new gasket on the TWC.

- (b) Install the TWC to the exhaust manifold with the three bolts and two nuts.

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



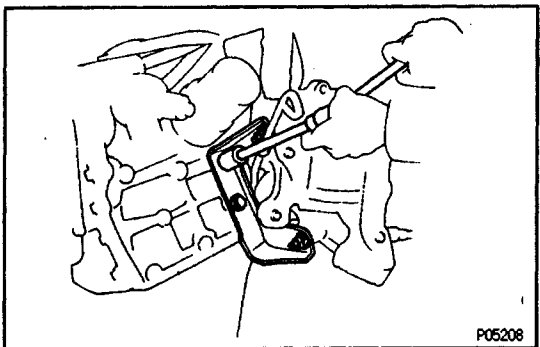
- (c) Install the lower manifold heat insulator with the five bolts.
- (d) Install the two TWC heat insulator with the eight bolts.



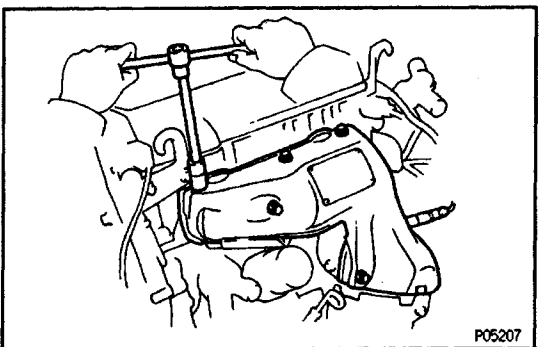
26. INSTALL EXHAUST MANIFOLD AND TWC ASSEMBLY

- (a) Install a new gasket, the exhaust manifold and TWC assembly with the six nuts. Uniformly tighten the nuts in several passes.

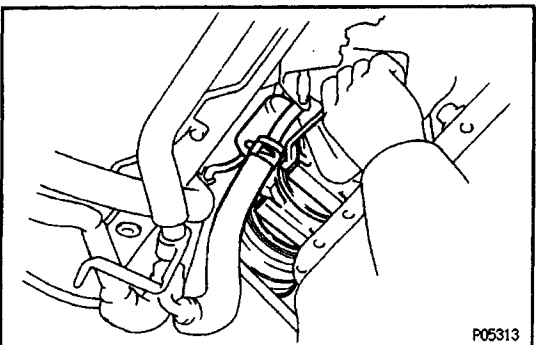
Torque: 49 N-m (500 kgf-cm, 36 ft-lbf)



- (b) Install the TWC stay with the two bolts and two nuts.
- Torque: 42 N-m (425 kgf-cm, 31 ft-lbf)**

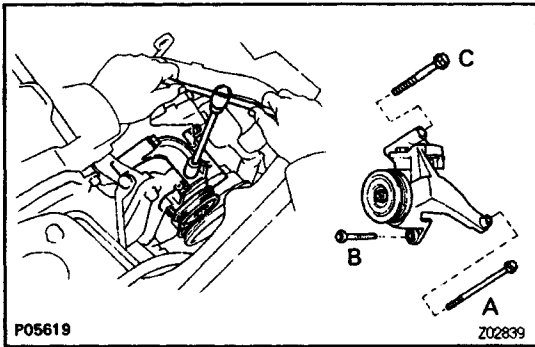


- (c) Install the upper manifold heat insulator with the six bolts.
- (d) Connect the following connectors:
- Oxygen sensor (main) connector
 - (CALIF. only)
 - Sub-oxygen sensor connector



27. INSTALL A/C COMPRESSOR

- (a) Temporarily install the A/C compressor with the two bolts



(b) Install the idler pulley bracket with the three bolts.

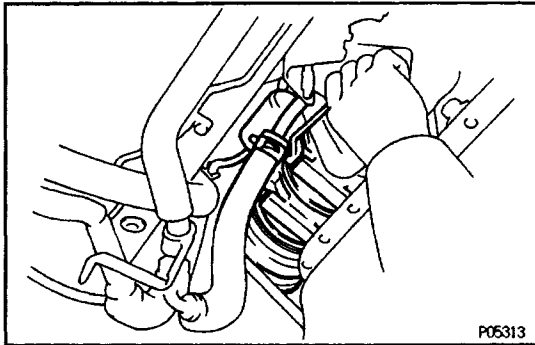
Torque:

25 N-m (250 kgf-cm, 18 ft-lbf) for A

27 N-m (275 kgf-cm, 20 ft-lbf) for B

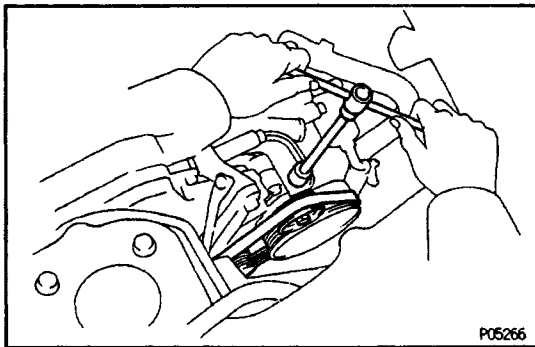
37 N-m (375 kgf-cm, 27 ft-lbf) for C

(c) Connect the A/C compressor connector.



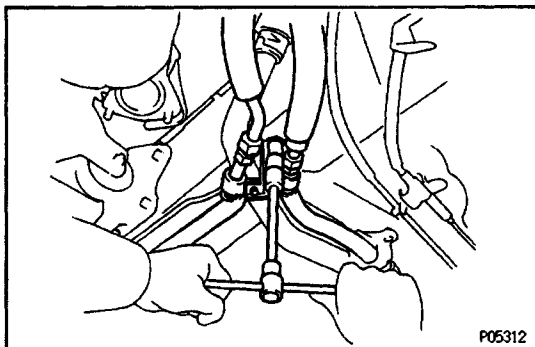
(d) Tighten the two bolts of the lower side of the A/C compressor.

Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)

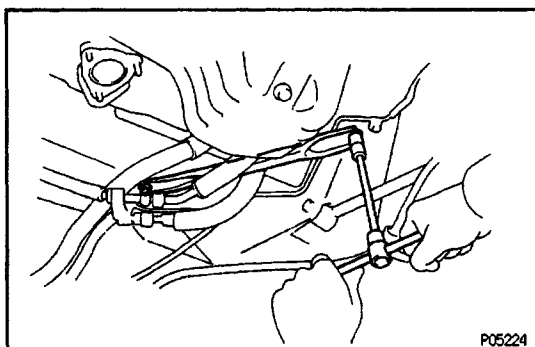


(e) Install the drive belt with the adjusting bolt.

(f) Tighten the idler pulley nut.

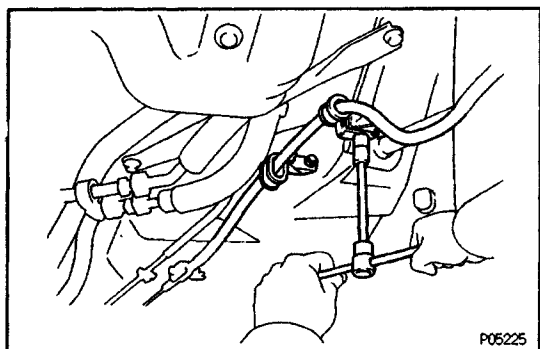


(g) Install the A/C pipes with the two clamps and nut.

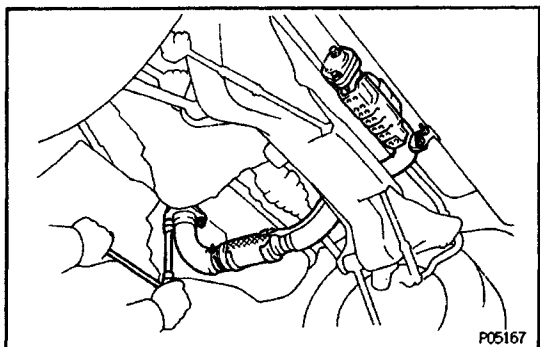


(h) Install the lower suspension brace with the two bolts.

Torque: 73 N-m (740 kgf-cm, 54 ft-lbf)



- (i) Install the parking brake cable with the two clamps and three bolts.



28. INSTALL FRONT EXHAUST PIPE

- (a) Place two new gaskets to the front and rear of the front exhaust pipe.
 (b) Using a 14 mm deep socket wrench, install the front exhaust pipe with three new nuts.

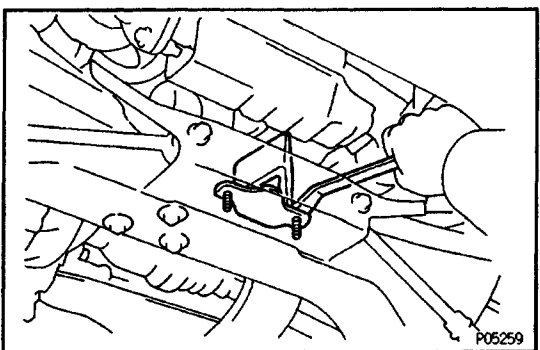
Torque: 62 N-m (630 kgf-cm, 46 ft-lbf)

- (c) Install the two bolts holding the front exhaust pipe to the tailpipe.

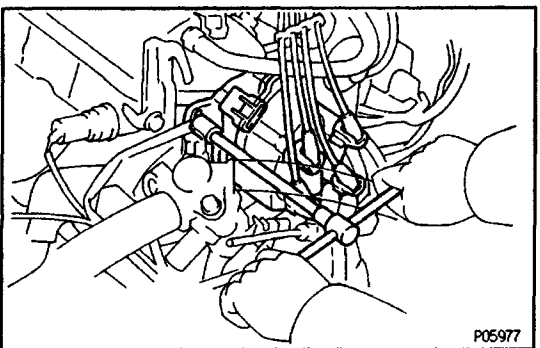
Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)

- (d) Install the two bolts holding the front exhaust pipe bracket to the tailpipe bracket.

Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)

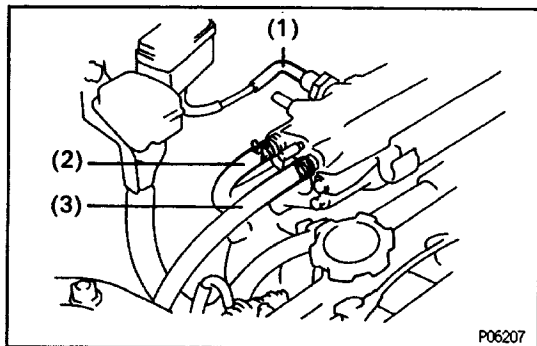


- (e) Install the damper with the two bolts.
Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)



29. INSTALL DISTRIBUTOR

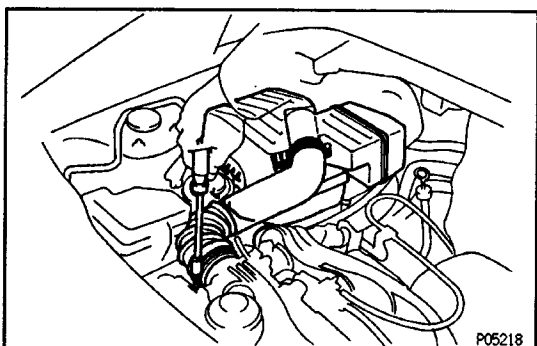
(See steps 3 to 6 Distributor Installation)



30. CONNECT HOSES AND GROUND STRAP

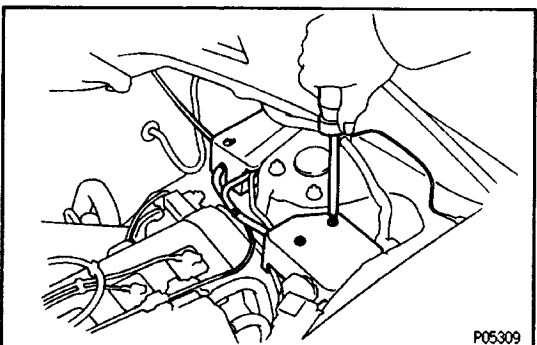
Connect the following hoses:

- (1) MAP vacuum hose to intake manifold
- (2) A/C idle-up air hose (from port F) to intake manifold
- (3) Brake booster vacuum hose to intake manifold

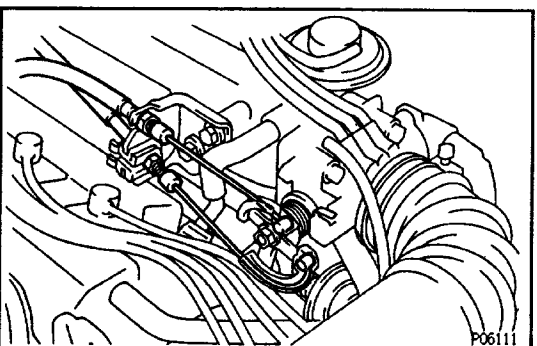


31. INSTALL AIR CLEANER CAP

- (a) Install the air filter.
- (b) Install the air cleaner cap with the four clamps.
- (c) Connect the air cleaner hose to the throttle body.
- (d) Connect the IATS connector.



32. (w/ CRUISE CONTROL SYSTEM) INSTALL CRUISE CONTROL ACTUATOR AND ACCELERATOR LINKAGE



33. CONNECT ACCELERATOR LINKAGE TO THROTTLE BODY

34. (A/T)

CONNECT THROTTLE CABLE TO THROTTLE BODY

35. FILL WITH ENGINE COOLANT

36. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

37. START ENGINE AND CHECK FOR LEAKS

38. PERFORM ENGINE ADJUSTMENT (See Tune-Up)

39. INSTALL ENGINE HOOD SIDE PANELS

40. PERFORM ROAD TEST

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

41. RECHECK ENGINE COOLANT LEVEL AND OIL LEVEL