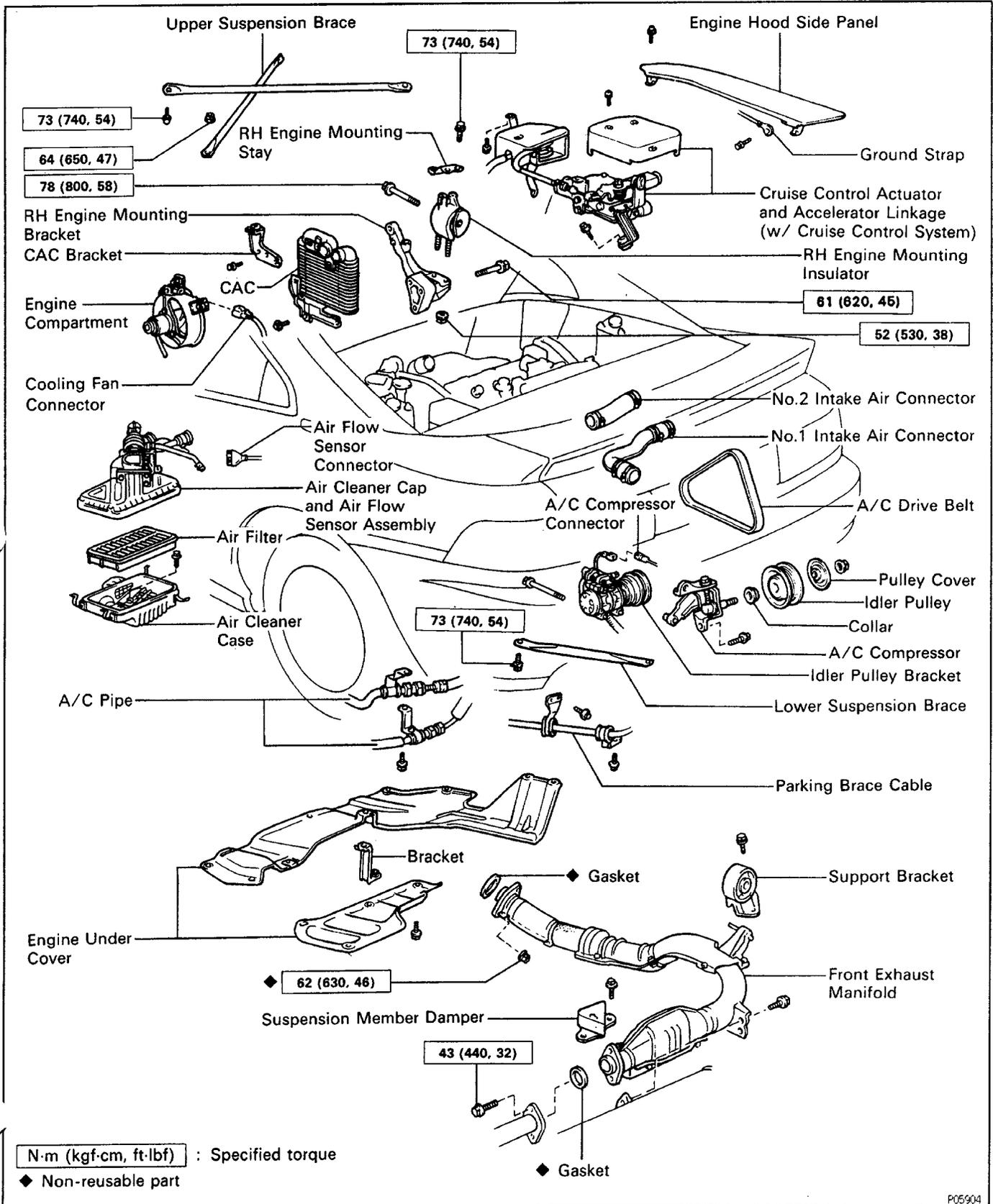
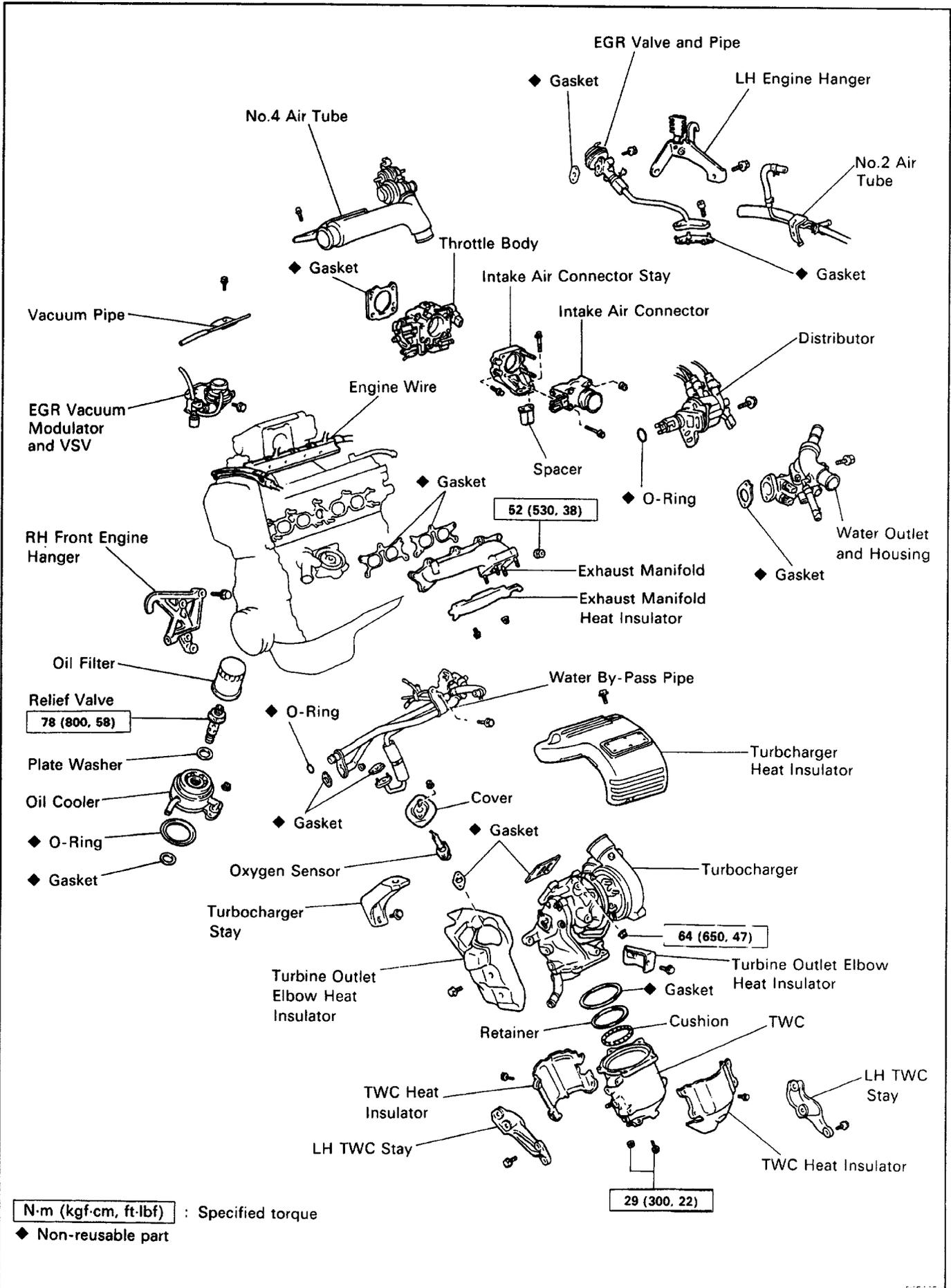
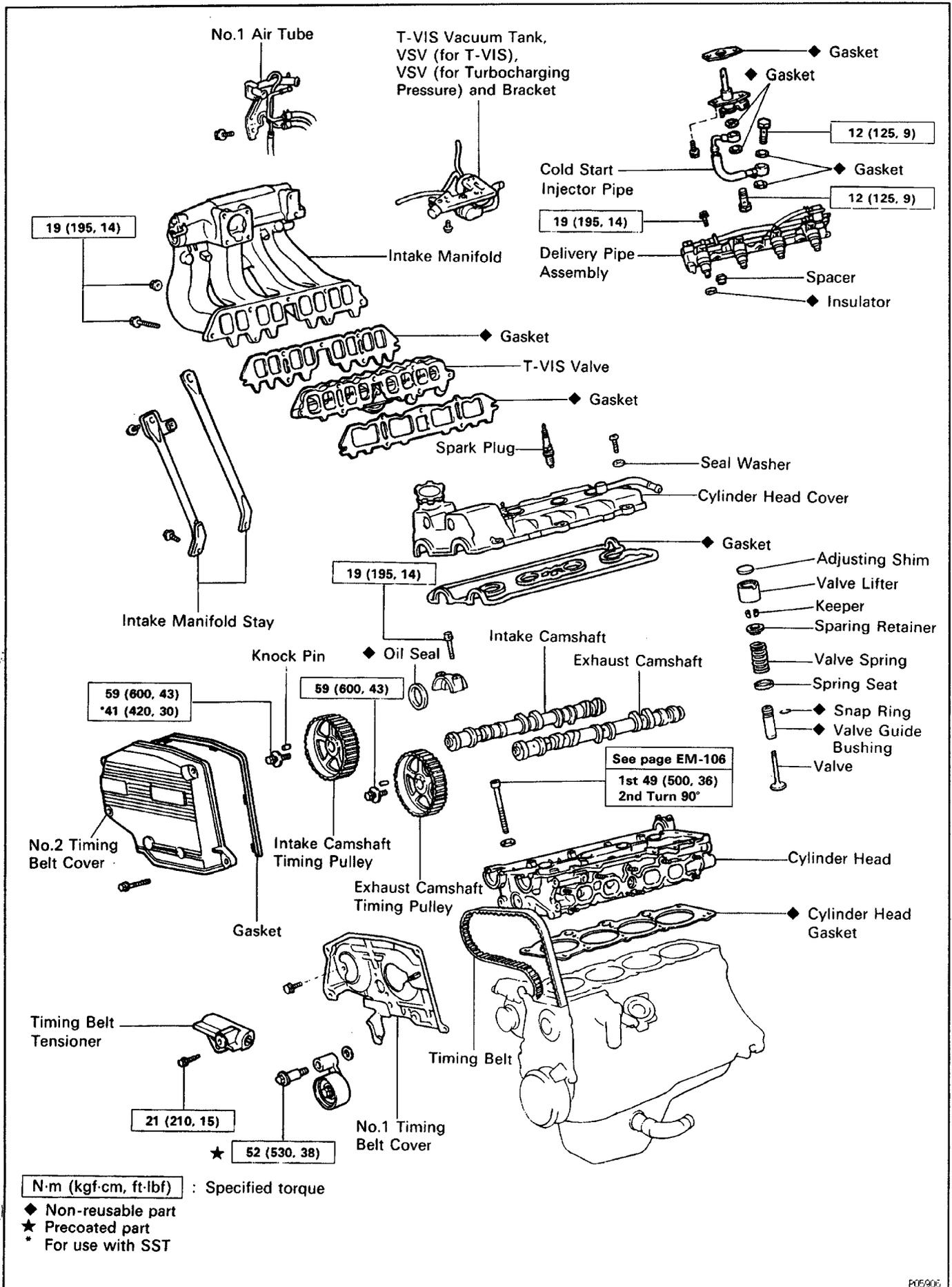
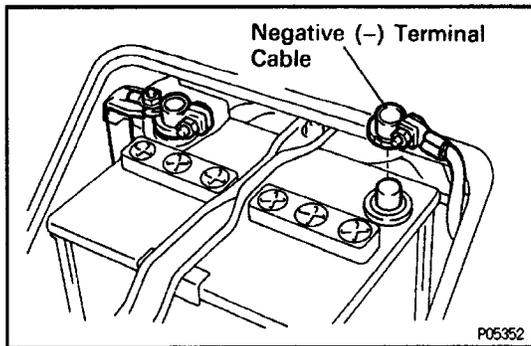


CYLINDER HEAD COMPONENTS FOR REMOVAL AND INSTALLATION









REMOVAL OF CYLINDER HEAD

(See Components for Removal and Installation)

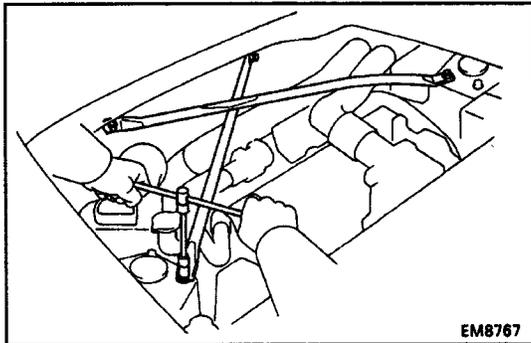
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

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

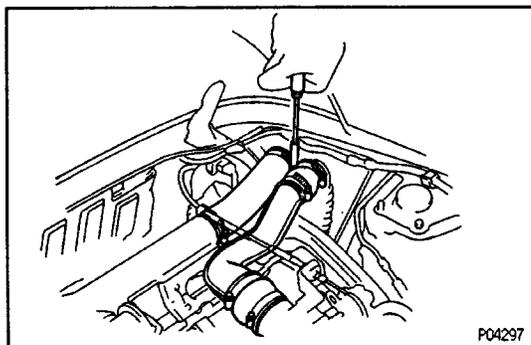
3. REMOVE ENGINE UNDER COVERS

4. REMOVE ENGINE HOOD SIDE PANELS

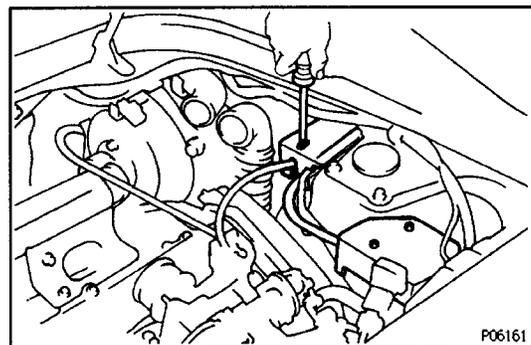


5. REMOVE UPPER SUSPENSION BRACE

Remove the two bolts, two nuts and upper brace.



6. REMOVE N4.1 AND NO.2 INTAKE AIR CONNECTORS

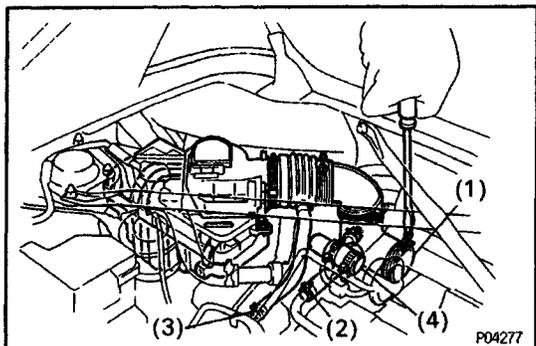


7. (w/ CRUISE CONTROL SYSTEM)

REMOVE CRUISE CONTROL ACTUATOR AND ACCELERATOR LINKAGE

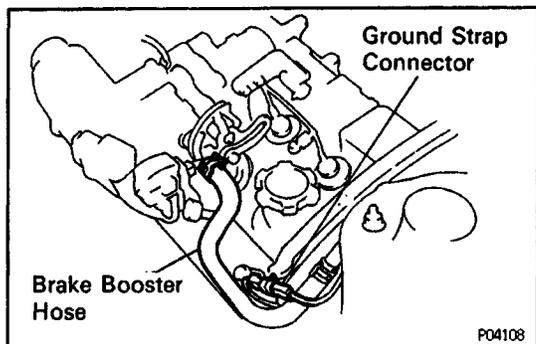
8. (w/o CRUISE CONTROL SYSTEM)

DISCONNECT ACCELERATOR LINKAGE FROM THROTTLE BODY



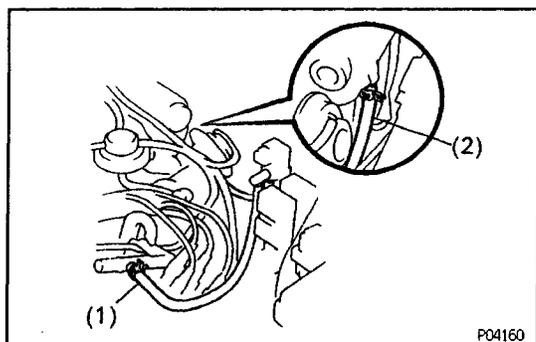
8. REMOVE AIR CLEANER HOUSING

- (a) Disconnect the air flow sensor connector.
- (b) Disconnect the following hoses:
 - (1) Air cleaner hose from turbocharger
 - (2) PCV hose from cylinder head cover
 - (3) Air hose from No.2 air hose
 - (4) Air hose from air by-pass valve
- (c) Disconnect the four clamps, and remove the air cleaner cap and air flow sensor assembly.
- (d) Remove the air filter.
- (e) Remove the three bolts and air cleaner case.



10. DISCONNECT GROUND STRAP CONNECTOR

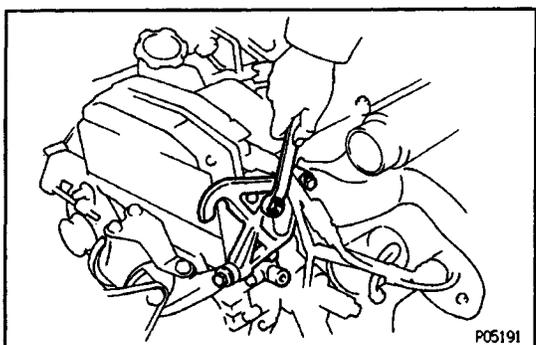
11. DISCONNECT BRAKE BOOSTER VACUUM HOSE



12. DISCONNECT A/C IDLE-UP AIR HOSES

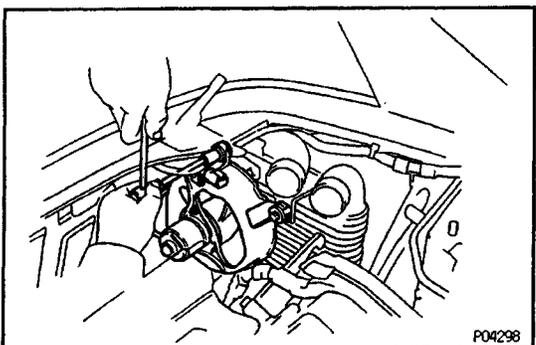
Disconnect the following hose:

- (1) Air hose from No.2 air tube
- (2) Air hose from intake manifold



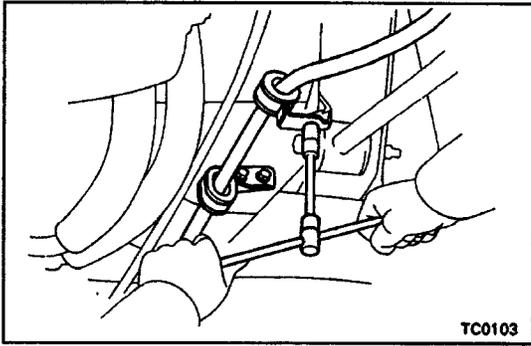
13. REMOVE RH FRONT ENGINE HANGER

Remove the four bolts and engine hanger.



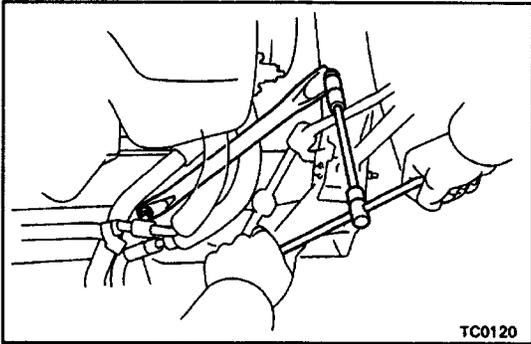
14. REMOVE ENGINE COMPARTMENT ELECTRIC COOLING FAN

- (a) Disconnect the cooling fan connector.
- (b) Loosen the three bolts, and remove the cooling fan.

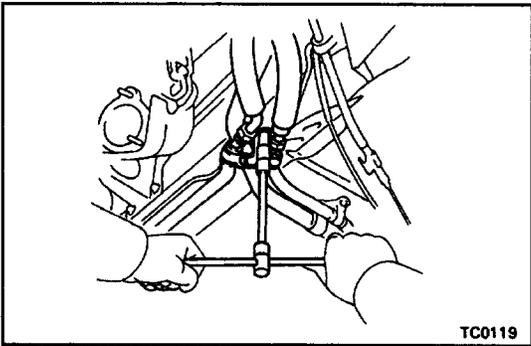


15. DISCONNECT A/C COMPRESSOR FROM ENGINE

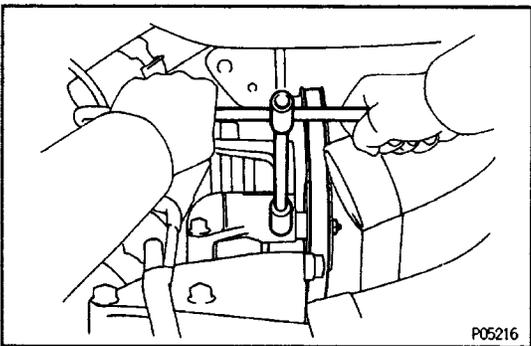
(a) Remove the three clamp bolts, and disconnect the parking brake cable.



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

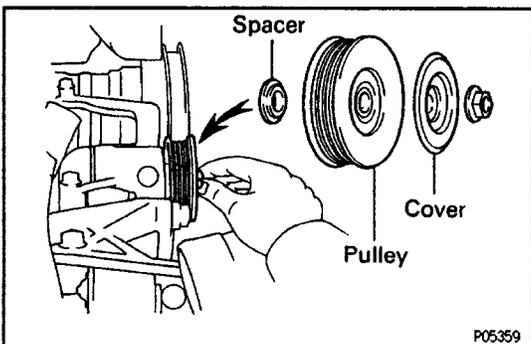


(c) Remove the clamp nut, and disconnect the two A/C pipes.

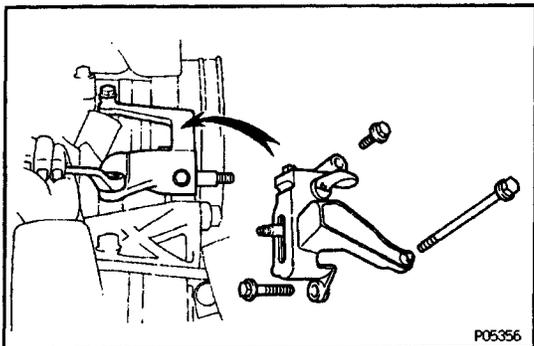


(d) Loosen the idler pulley nut.

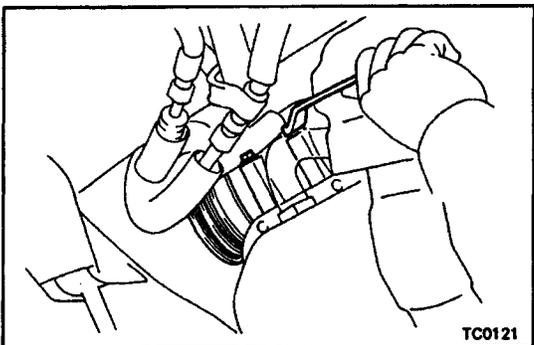
(e) Loosen the adjusting bolt, and remove the drive belt.



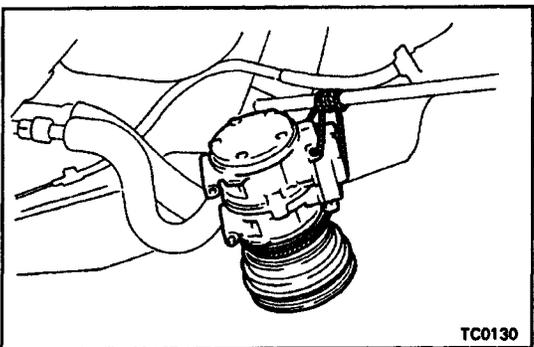
(f) Remove the nut, pulley cover, idler pulley and spacer.



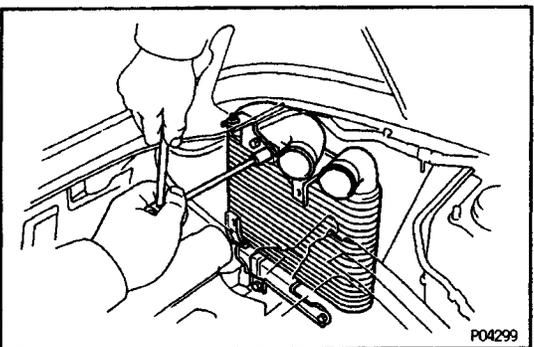
- (g) Disconnect the A/C compressor connector.
- (h) Remove the three bolts and idler pulley bracket.



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

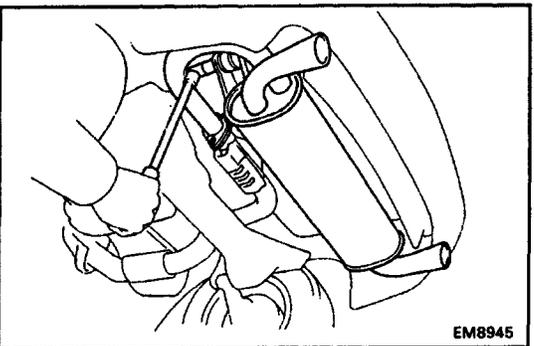


HINT: Suspend the A/C compressor to strut rod with a string.



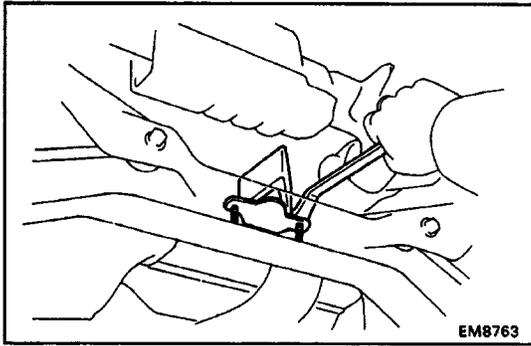
16. REMOVE CAC

- (a) Remove the two bolts holding the CAC to the upper bracket.
- (b) Remove the three bolts, upper bracket and CAC.

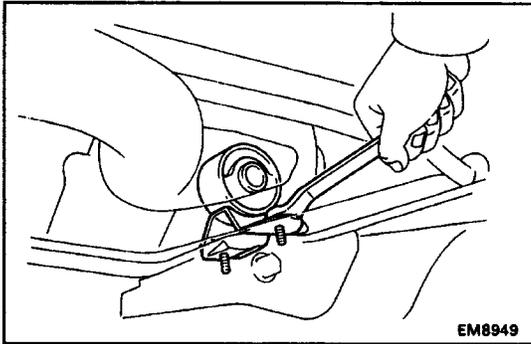


17. REMOVE TAILPIPE

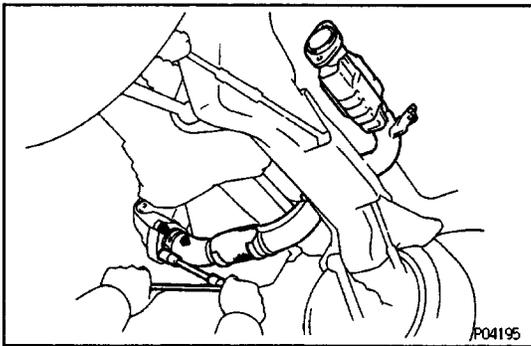
- (a) Remove the two bolts holding the front exhaust pipe to the tailpipe bracket.
- (b) Remove the two bolts holding the front exhaust pipe to the tailpipe.
- (c) Remove the two bolts, tailpipe and gasket.

**18. REMOVE FRONT EXHAUST PIPE**

(a) Remove the two bolts and damper.

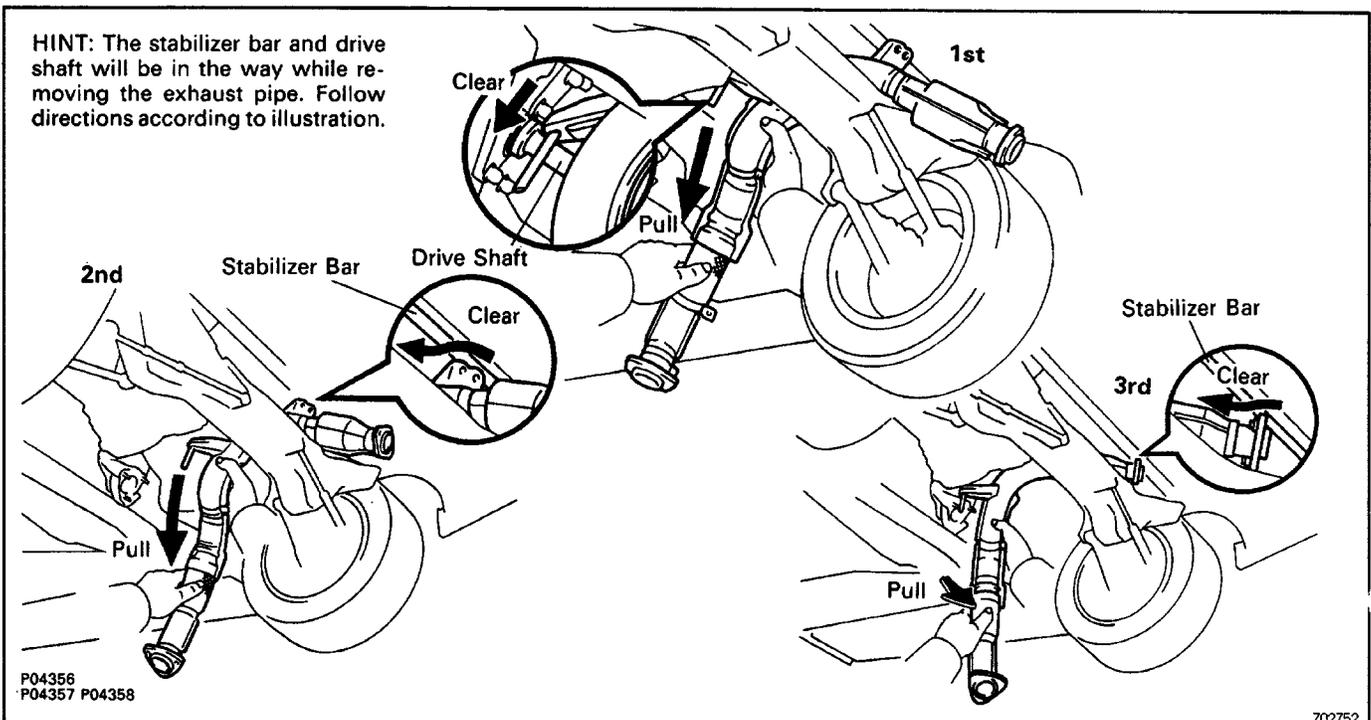


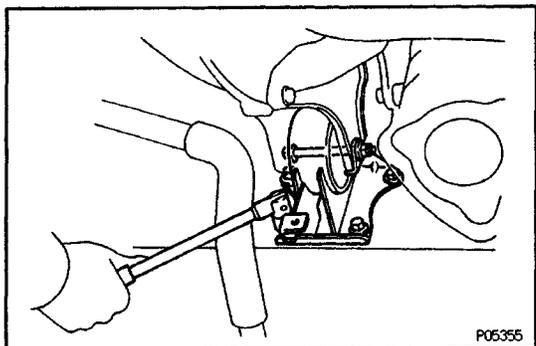
(b) Remove the two bolts and support bracket.



(c) Using a 14 mm deep socket wrench, remove the three nuts.

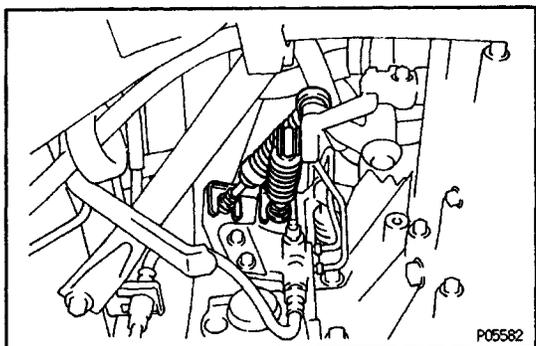
(d) Remove the front exhaust pipe and gasket.





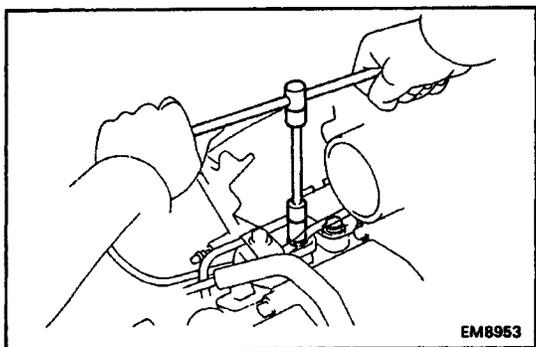
19. REMOVE FRONT ENGINE MOUNTING INSULATOR

- (a) Remove the through bolt and nut holding the mounting insulator to the mounting bracket.
- (b) Remove the four bolts and mounting insulator.

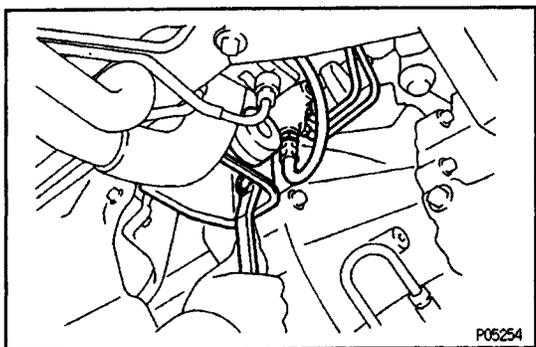


20. REMOVE FRONT ENGINE MOUNTING BRACKET AND CLUTCH RELEASE CYLINDER

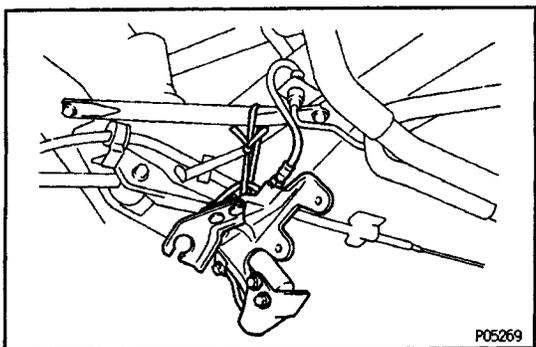
- (a) Disconnect the two transaxle control cables from the transaxle.



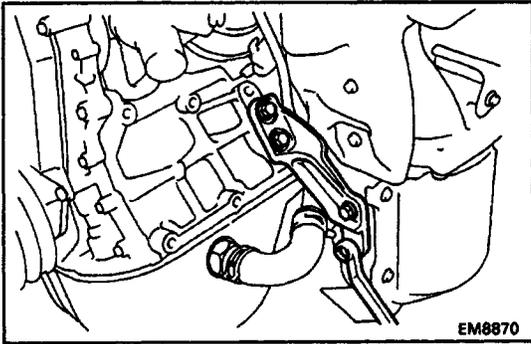
- (b) Remove the two bolts holding the clutch release cylinder to the transaxle.



- (c) Remove the two bolts and mounting bracket.
- (d) Disconnect the clutch release cylinder from the transaxle.
Remove the three bolts and stiffener plate.

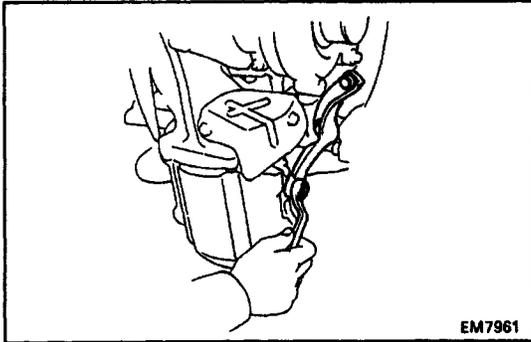


HINT: Suspend the clutch release cylinder to the suspension brace with a string.

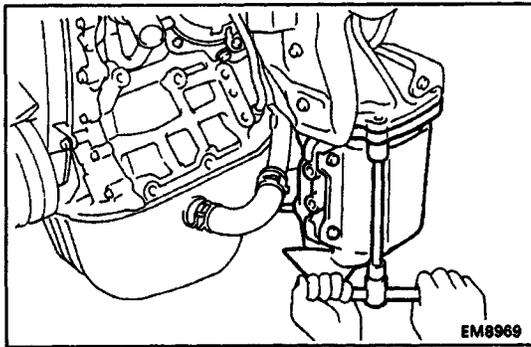


21. REMOVE MAIN TWC

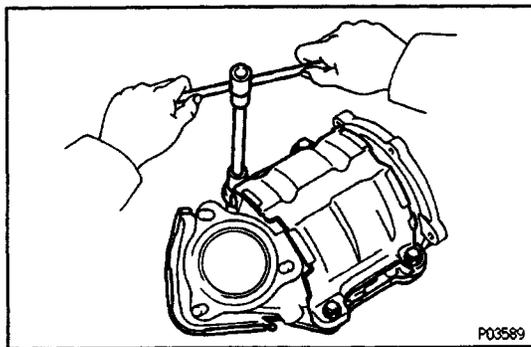
(a) Remove the four bolts and RH TWC stay.



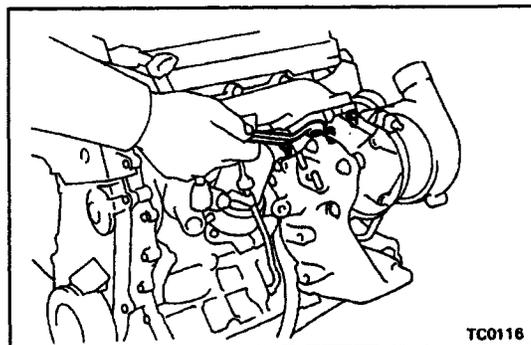
(b) Remove the three bolts and LH TWC stay.



(c) Remove the three bolts, two nuts, TWC, gasket, retainer and cushion.

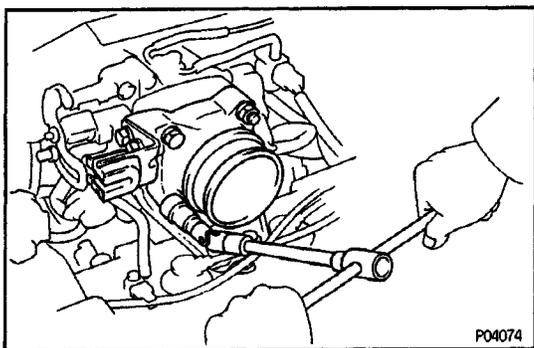


(d) Remove the nine bolts and two heat insulators from the TWC.

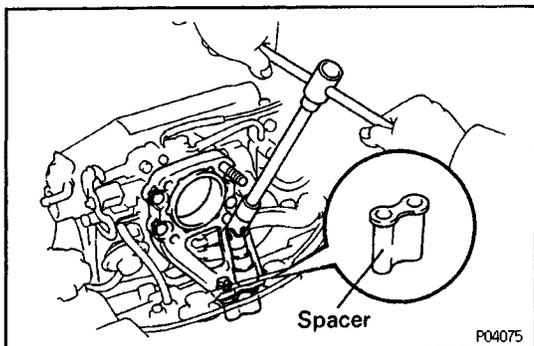


22. REMOVE TURBOCHARGER

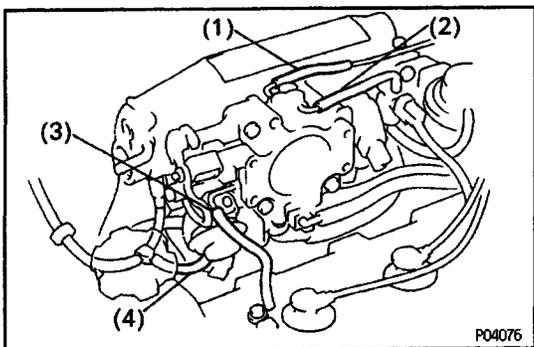
(See Turbocharger Removal under Turbocharger System)

**23. REMOVE INTAKE AIR CONNECTOR**

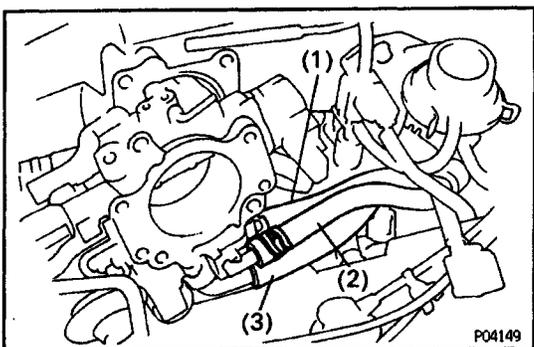
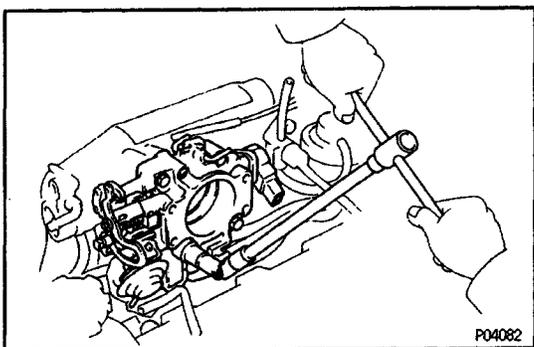
Remove the two bolts, two nuts and intake air connector.

**24. REMOVE INTAKE AIR CONNECTOR STAY**

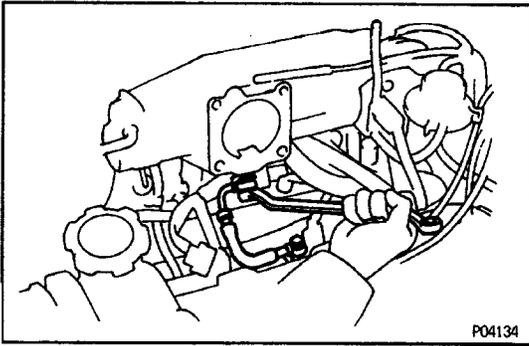
- (a) Remove the six bolts and intake air connector stay.
- (b) Remove the spacer.

**25. REMOVE THROTTLE BODY**

- (a) Disconnect the following connector:
 - Throttle position sensor connector
 - IACV connector
- (b) Disconnect the following hoses:
 - (1) Vacuum hose from port "P" of throttle body
 - (2) Vacuum hose from port "E" of throttle body
 - (3) PCV hose from port PCV of throttle body
 - (4) Vacuum hose from throttle body opener
- (c) Remove the four bolts, and disconnect the throttle body from the intake manifold.
- (d) Remove the throttle body gasket.



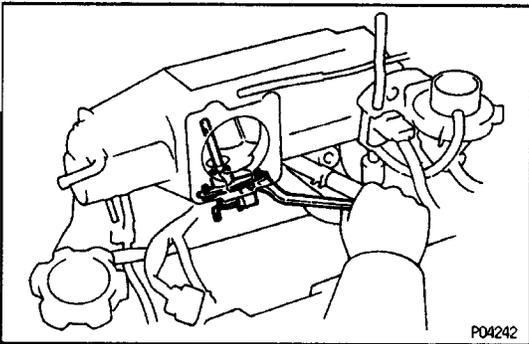
- (e) Disconnect the following hoses from the throttle body, and remove the throttle body:
 - (1) Water by-pass hose (from upper side of No.1 air tube)
 - (2) Water by-pass hose (from lower side of No. 1 air tube)
 - (3) Air hose (from No. 1 air tube)

**26. REMOVE COLD START INJECTOR PIPE**

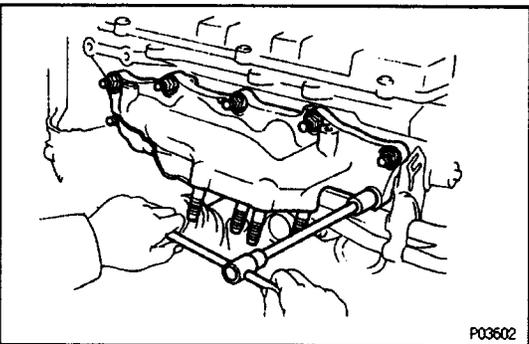
Remove the two union bolts, four gaskets and cold start injector pipe.

CAUTION:

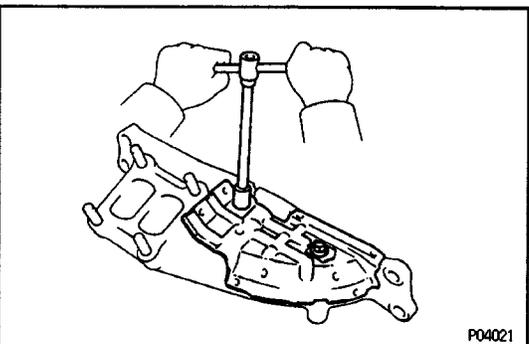
- Put a suitable container or shop towel under the Injector pipe.
- Slowly loosen the union bolts.

**27. REMOVE COLD START INJECTOR**

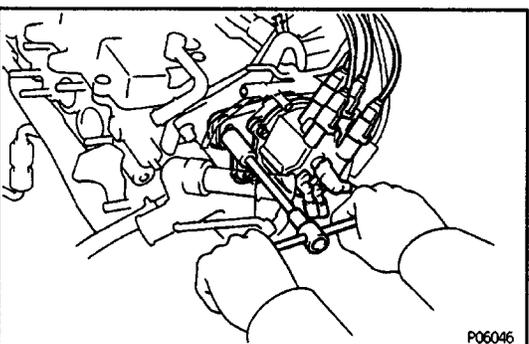
- Disconnect the cold start injector connector.
- Remove the two bolts, cold start injector and gasket.

**28. REMOVE EXHAUST MANIFOLD**

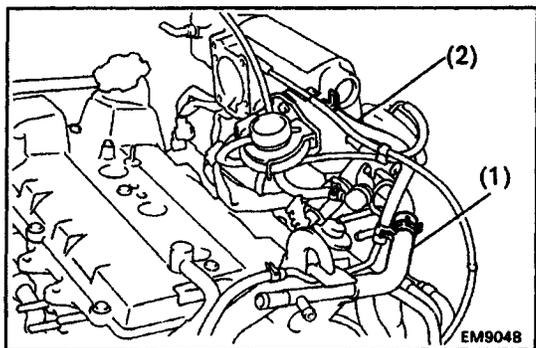
- Remove the nine nuts, exhaust manifold and gasket.



- Remove the bolt, nut and heat insulator.

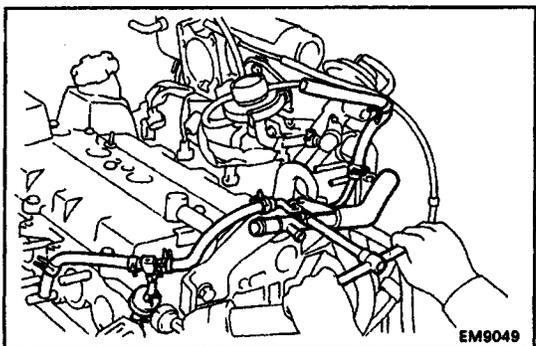
**29. REMOVE DISTRIBUTOR**

- Disconnect the high-tension cords from the spark plugs and ignition coil.
- Remove the two hold-down bolt, and pull out the distributor.
- Remove the O-ring from the distributor housing.

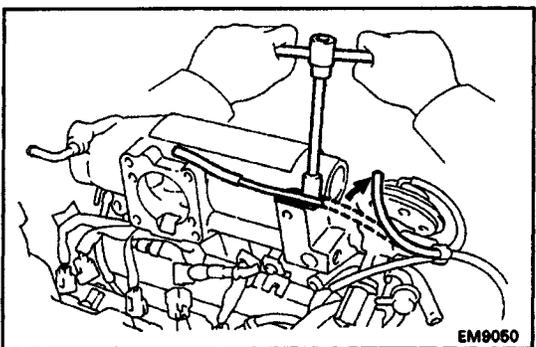


30. REMOVE NO.2 AIR TUBE

- (a) Disconnect the following hoses:
- (1) Air hose from No. 1 air tube
 - (2) Air hose from intake manifold

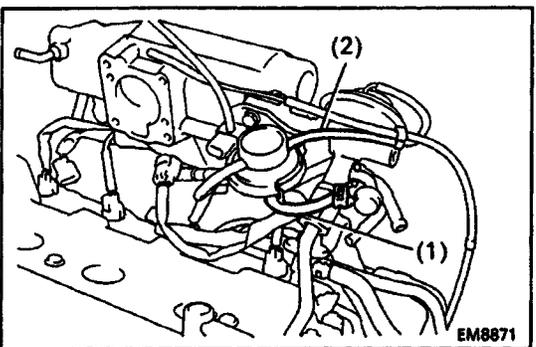


- (b) Remove the bolt and No.2 air tube.



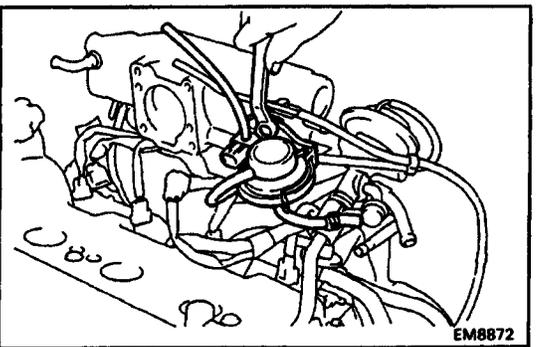
31. REMOVE LH ENGINE HANGER

Remove the two bolts and engine hanger.



32. REMOVE EGR VACUUM MODULATOR AND VSV

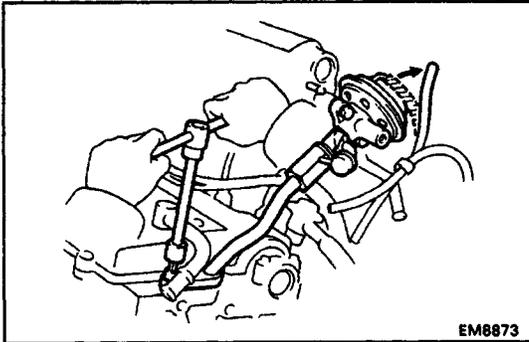
- (a) Disconnect the VSV connector.
- (b) Disconnect the following hoses:
- (1) EGR hose from EGR valve
 - (2) Vacuum hose from EGR vacuum modulator



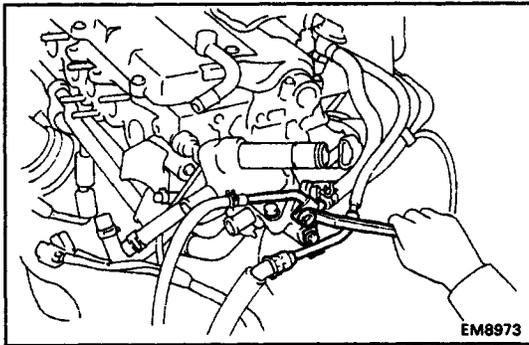
- (c) Remove the bolt, the vacuum modulator and VSV assembly.

**33. REMOVE VACUUM PIPE**

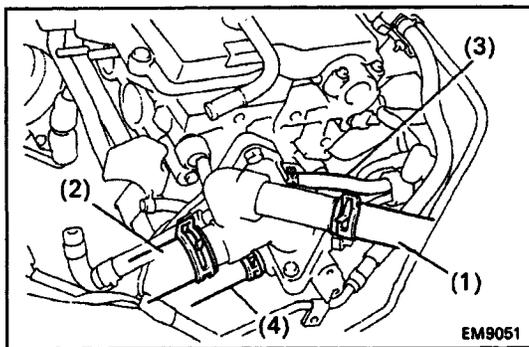
- (a) Disconnect the vacuum hose from the vacuum pipe.
- (b) Remove the bolt and vacuum pipe.

**34. REMOVE EGR VALVE AND PIPE**

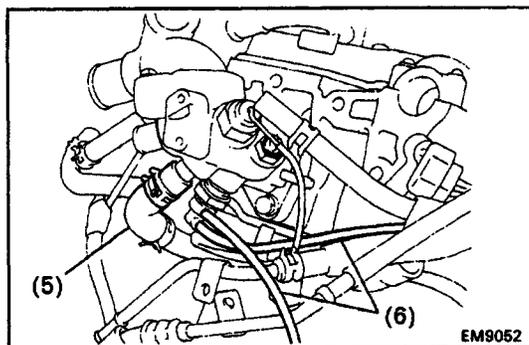
- (a) Disconnect the vacuum hose from the EGR valve.
- (b) Remove the four bolts, the EGR valve, pipe assembly and two gaskets.

**35. REMOVE WATER OUTLET AND HOUSING**

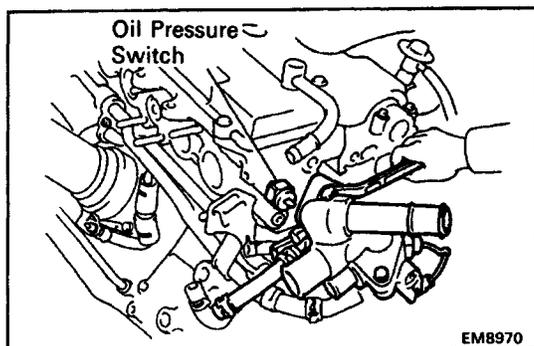
- (a) Disconnect the following connectors:
 - Water temperature sender gauge connector
 - ECTS connector
 - Cold start injector time switch connector
- (b) Remove the bolt, and disconnect the fuel inlet hose.
- (c) Remove the bolt, and disconnect the fuel return hose.



- (d) Disconnect the following hoses:
 - (1) Water filler hose
 - (2) Radiator hose
 - (3) Water by-pass pipe hose from IACV
 - (4) Heater water hose

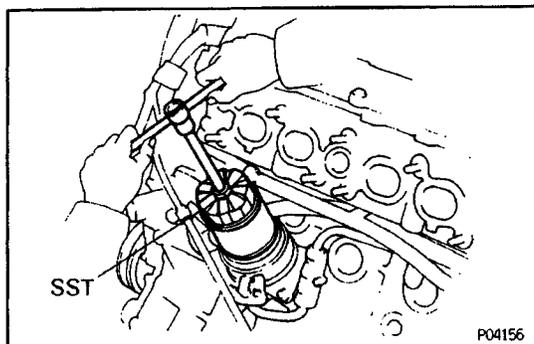


- (5) Water by-pass hose from water by-pass pipe
- (6) Two TVS (for EVAP) vacuum hoses



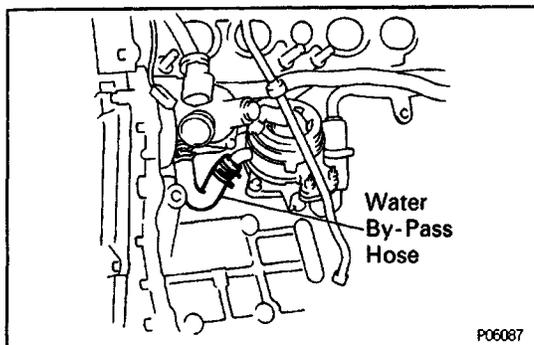
- (e) Remove the two bolts, the water outlet, housing assembly and gasket.

36. REMOVE OIL PRESSURE SWITCH

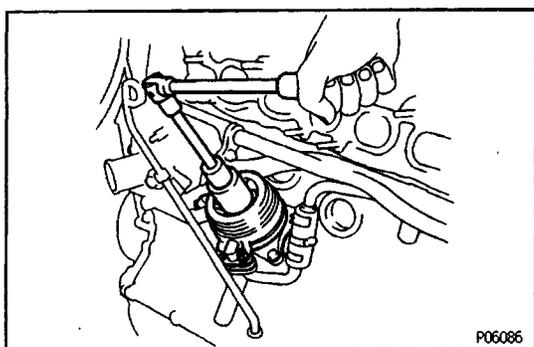


37. REMOVE OIL COOLER

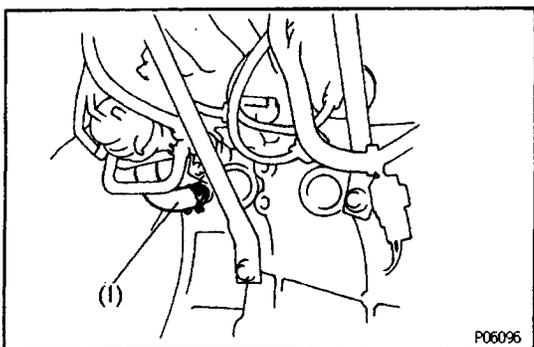
- (a) Using SST, remove the oil filter.
SST 09228-06500



- (b) Disconnect the water by-pass hose from the oil cooler.

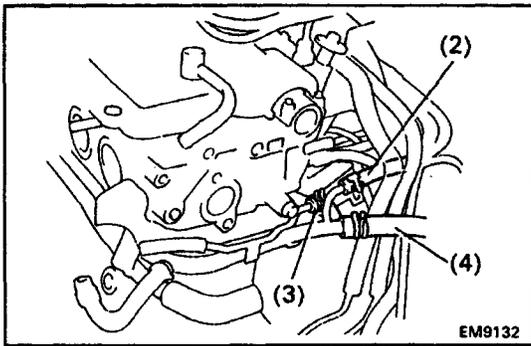


- (c) Remove the relief valve and plate washer.
(d) Remove the two nuts and oil cooler.
(e) Remove the O-ring and gasket from the oil cooler.

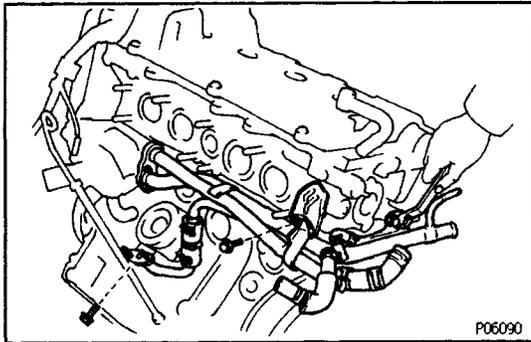


38. REMOVE WATER BY-PASS PIPE

- (a) Disconnect the following hoses:
(1) Water by-pass hose from cylinder block



- (2) Water by-pass hoses from No.1 air tube
- (3) Air hose from turbocharging pressure VSV
- (4) Heater water hose

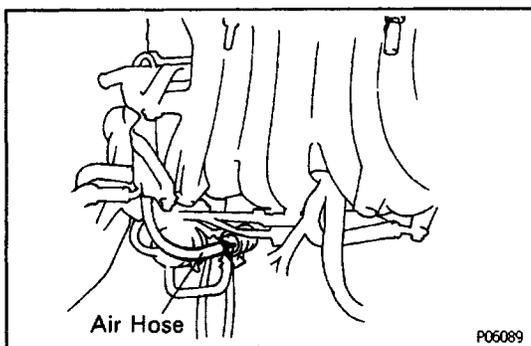


- (b) Remove the three bolts, two nuts, water by-pass pipe, gasket and O-ring.



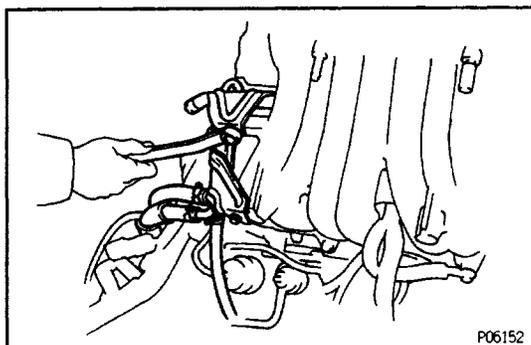
39. REMOVE INTAKE MANIFOLD STAYS

- Remove the two bolts and manifold stay. Remove the two manifold stays.

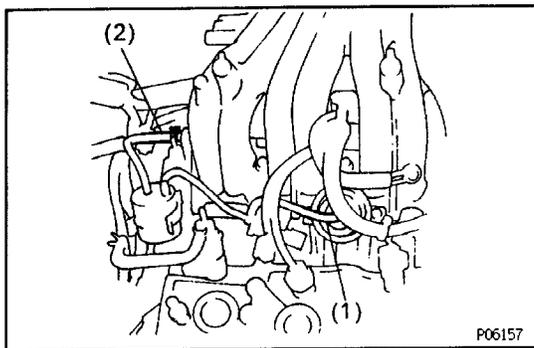


40. REMOVE NO.1 AIR TUBE

- (a) Disconnect the air hose from the VSV (for turbocharging pressure).

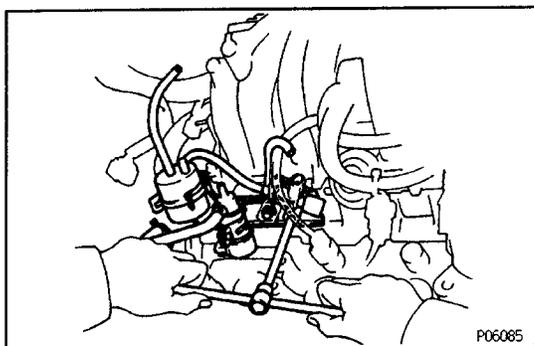


- (b) Remove the two bolts and air tube.

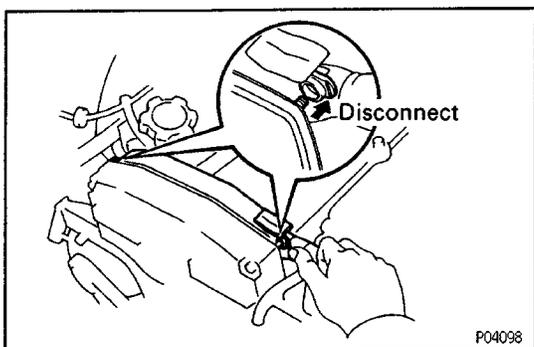


41. REMOVE T - VIS VACUUM TANK, VSV (FOR T - VIS), VSV (FOR TURBOCHARGING PRESSURE) AND BRACKET

- (a) Disconnect the following connectors:
 - VSV (for T-VIS) connector
 - VSV (for turbocharging pressure) connector
- (b) Disconnect the following hoses:
 - (1) Vacuum hose (from VSV for T-VIS) from T-VIS actuator
 - (2) Vacuum hose (from T-VIS vacuum tank) from intake manifold

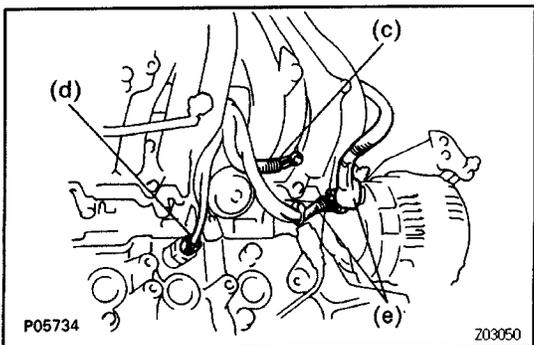


- (c) Remove the two bolts, the T-VIS vacuum tank, VSV (for T-VIS), VSV (for turbocharging pressure) and bracket assembly.

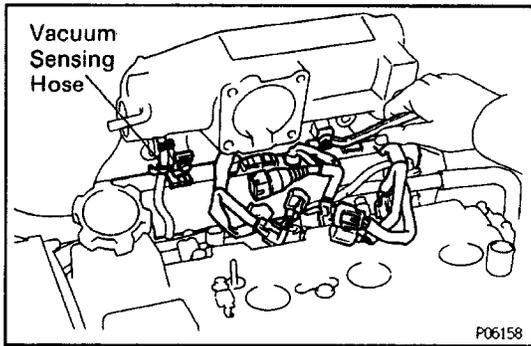


42. DISCONNECT ENGINE WIRE FROM INTAKE MANIFOLD

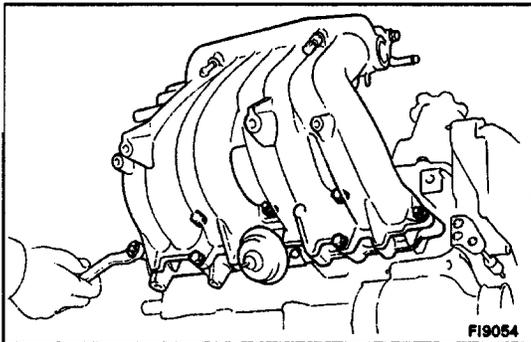
- (a) Disconnect the two engine wire clamps from the mounting bolts on the No.2 timing belt covers.
- (b) Disconnect the injector connector.



- (c) Remove the bolt, and disconnect the ground strap.
- (d) Disconnect the knock sensor connector.
- (e) Disconnect the alternator wire and connector.

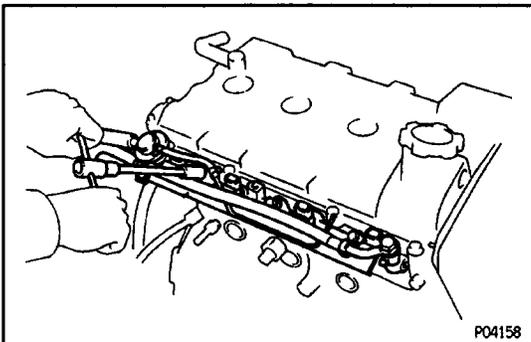


- (f) Disconnect the vacuum sensing hose from the intake manifold.
- (g) Remove the two bolts, and disconnect the engine wire from the intake manifold.



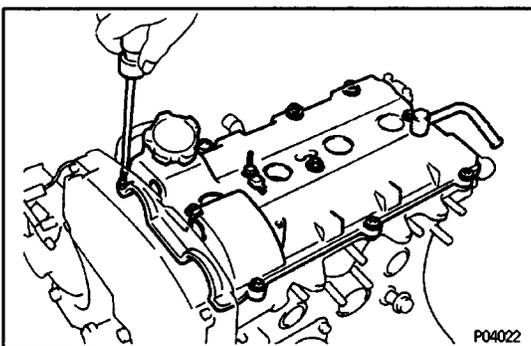
43. REMOVE INTAKE MANIFOLD AND T-VIS VALVE

Remove the four bolts, three nuts, intake manifold, T-VIS valve and two gaskets.



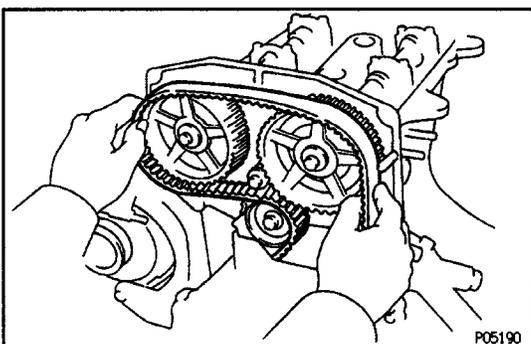
44. REMOVE DELIVERY PIPE ASSEMBLY

- (a) Remove the three bolts and delivery pipe assembly.
- (b) Remove the four insulators and three spacers.



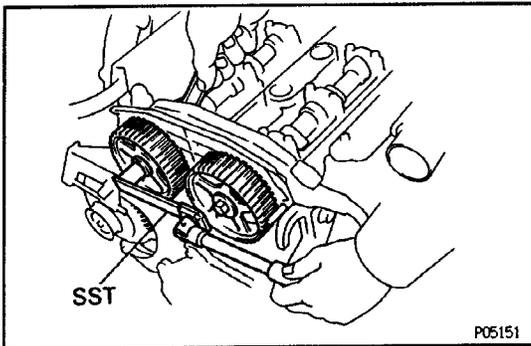
45. REMOVE CYLINDER HEAD COVER

Remove the ten screws, seal washers, head cover and two gaskets.

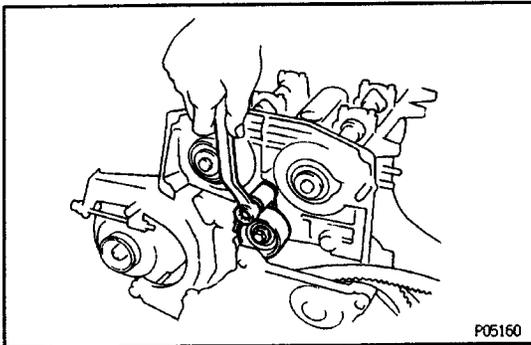


46. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS

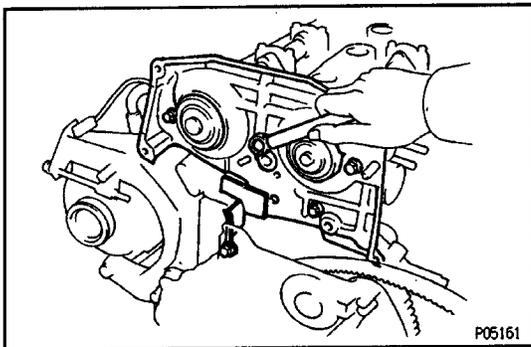
(See 11,13,16 to 18 and 23 to 26 under Timing Belt Removal)

**47. REMOVE CAMSHAFT TIMING PULLEYS**

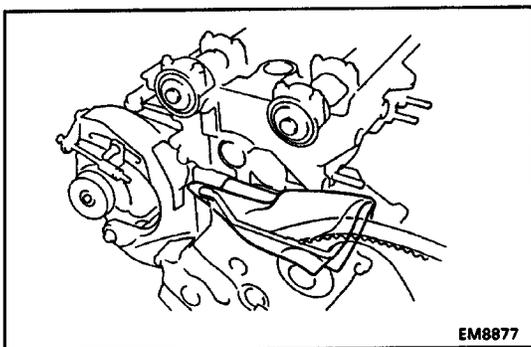
- (a) Hold the hexagon wrench head portion of the camshaft with a wrench, and loosen the pulley bolt.
HINT (Intake camshaft timing pulley): Use SST.
SST 09249-63010
- (b) Remove the bolt, timing pulley and pin. Remove the two timing pulleys.
HINT: Arrange the intake and exhaust timing pulleys.

**48. REMOVE NO.1 IDLER PULLEY**

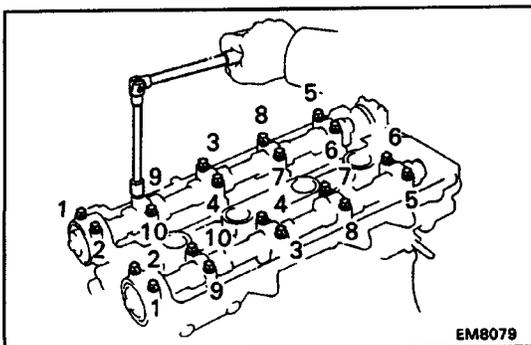
Remove the pivot bolt, pulley and plate washer.

**49. REMOVE NO.3 TIMING BELT COVER**

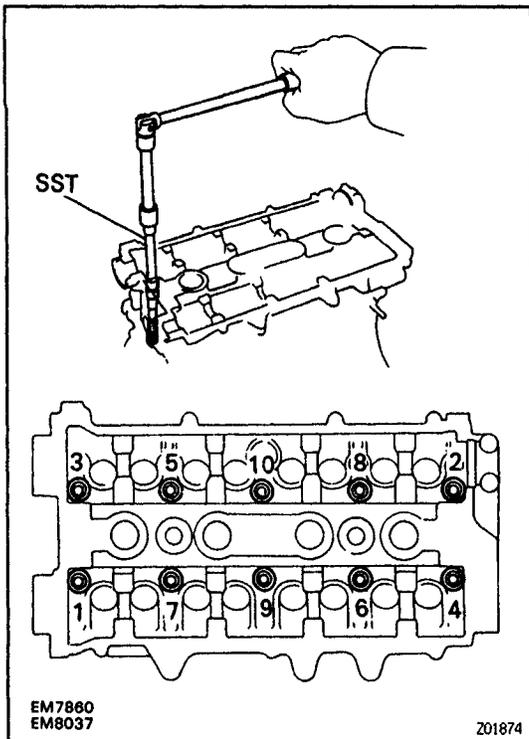
Remove the five bolts and timing belt cover.

**HINT:**

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

**50. REMOVE CAMSHAFTS**

Uniformly loosen and remove the ten bearing cap bolts in several passes, in the sequence shown, and remove the five bearing caps, oil seal and camshaft. Remove the intake and exhaust camshafts.

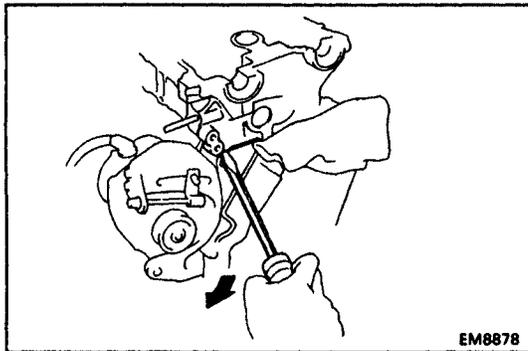


51. REMOVE CYLINDER HEAD

- (a) Using SST, uniformly loosen and remove the ten cylinder head bolts in several passes, in the sequence shown.

SST 09043 - 38100

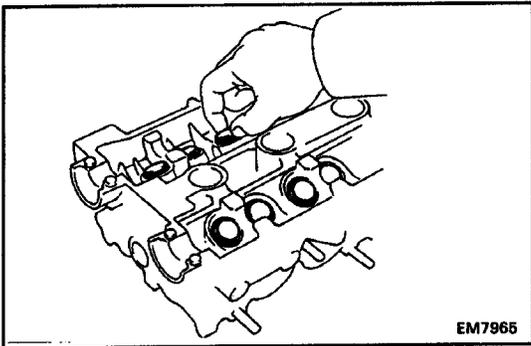
HINT: Cylinder head warpage or cracking could result from removing in the incorrect order.



- (b) Lift the cylinder head from the dowels on the cylinder block, and place the cylinder head on wooden blocks on a bench.

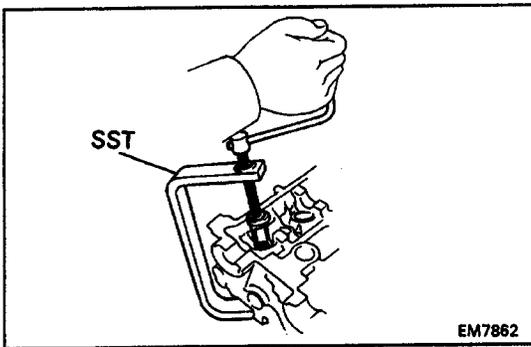
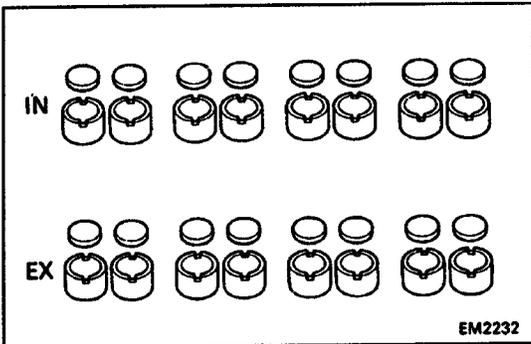
HINT: If the cylinder head is difficult to lift off, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE: Be careful not to damage the contact surfaces of the cylinder head and cylinder block.



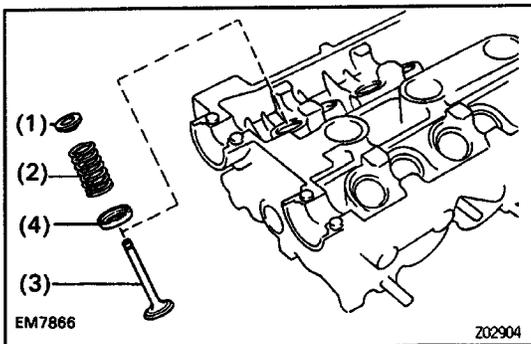
CYLINDER HEAD DISASSEMBLY
 (See Components for Removal and Installation)
1. REMOVE VALVE LIFTERS AND SHIMS

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



2. REMOVE VALVES

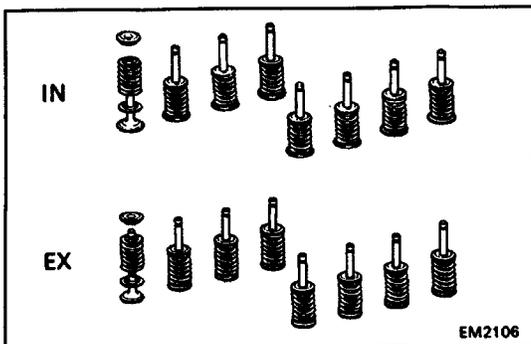
- (a) Using SST, compress the valve spring and remove the two keepers.
 SST 09202-70010

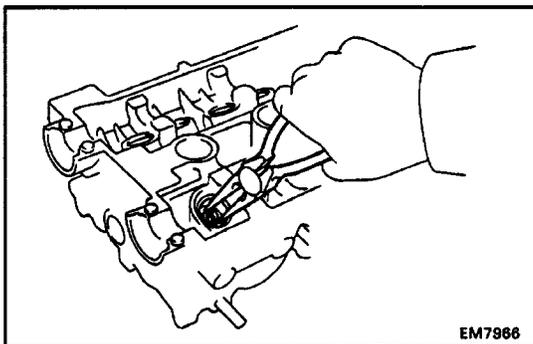


- (b) Remove the following parts:

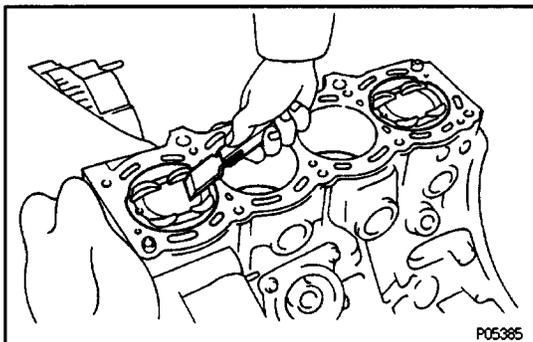
- (1) Spring retainer
- (2) Valve spring
- (3) Valve
- (4) Spring seat

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





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

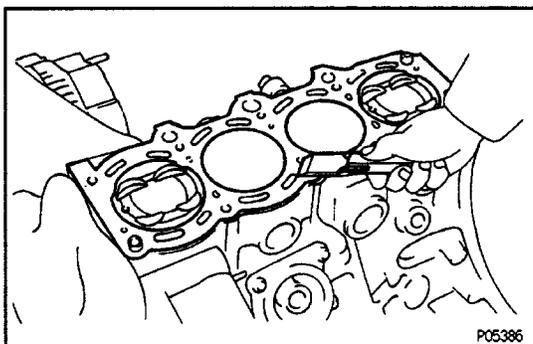


CYLINDER HEAD COMPONENTS INSPECTION AND REPAIR

EGOWF-01

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

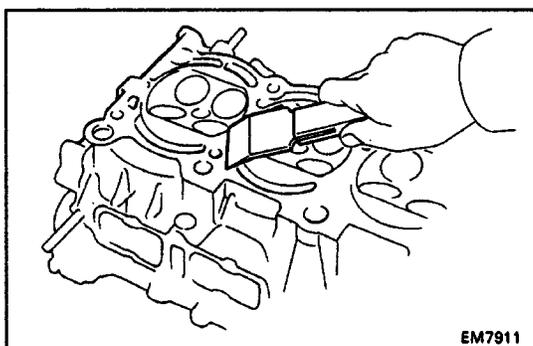
(a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



(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.

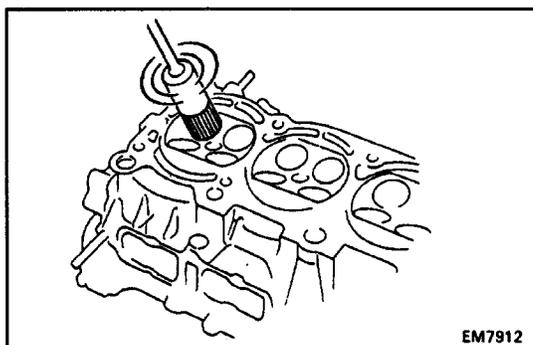


2. CLEAN CYLINDER HEAD

A. Remove gasket material

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

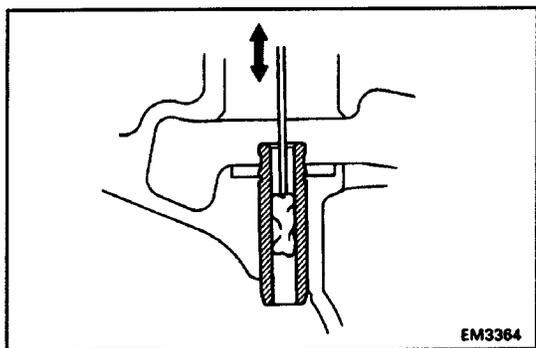
NOTICE: Be careful not to scratch the cylinder block contact surface.



B. Clean combustion chambers

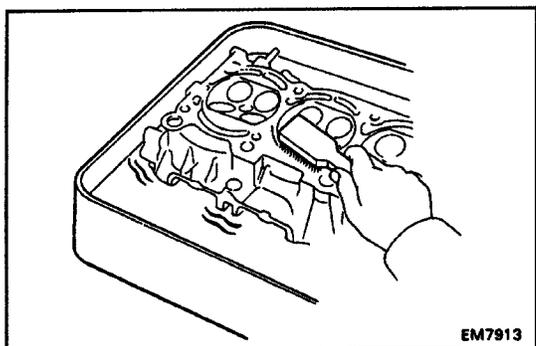
Using a wire brush, remove all the carbon from the combustion chambers.

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



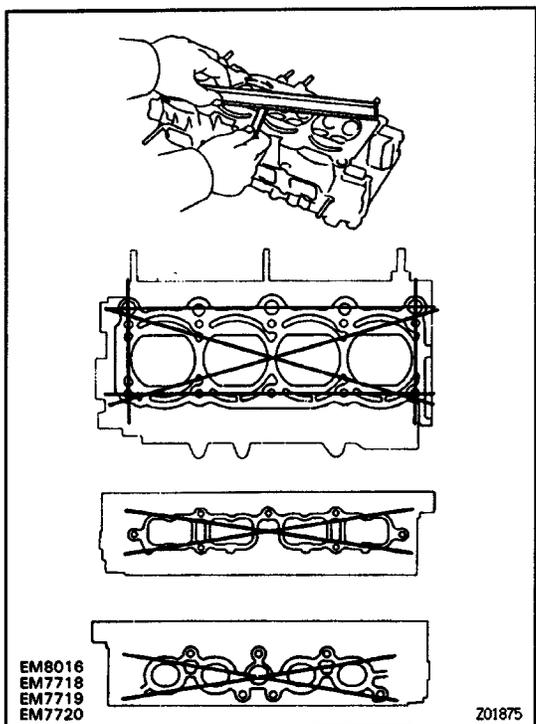
C. Clean valve guide bushings

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 precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block, T-VIS valve and the manifold for warpage.

Maximum warpage:

Cylinder block side

0.20 mm (0.0079 in.)

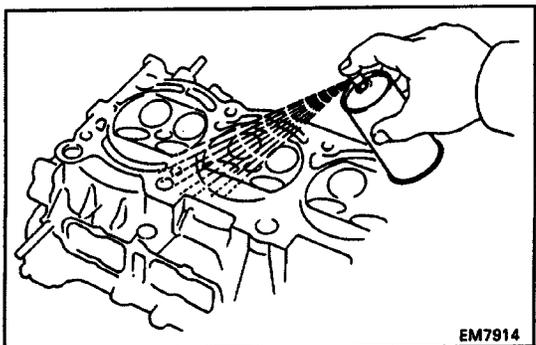
T - VIS valve side

0.20 mm (0.0079 in.)

Exhaust manifold side

0.30 mm (0.0118 in.)

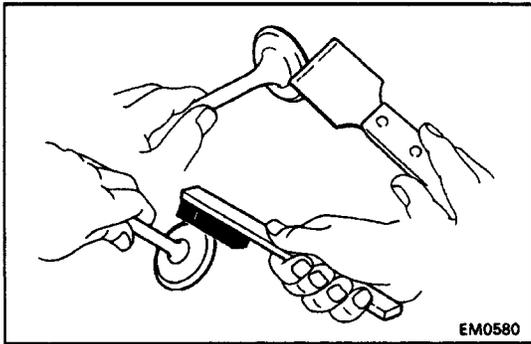
If warpage is greater than maximum, replace the cylinder head.



B. Inspect for cracks

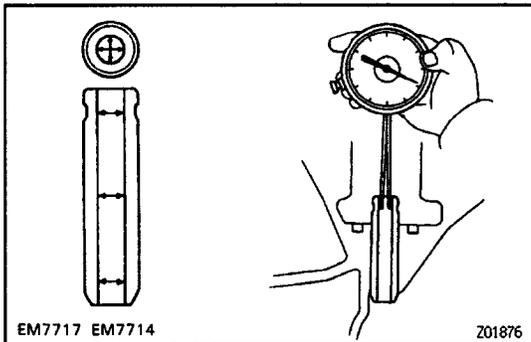
Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

If cracked, replace the cylinder head.



4. CLEAN VALVES

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

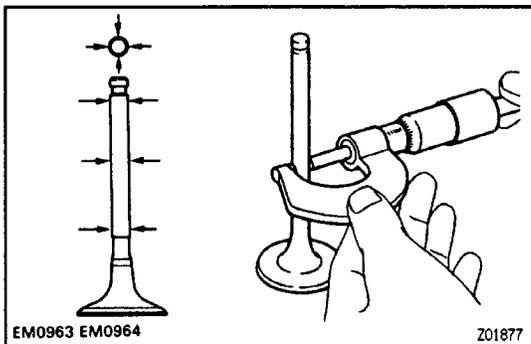


5. INSPECT VALVE STEMS AND GUIDE BUSHINGS

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

Bushing inside diameter:

6.000–6.018 mm (0.2362–0.2369 in.)



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

Valve stem diameter:

Intake

5.960 – 5.975 mm (0.2346 – 0.2352 in.)

Exhaust

5.955 – 5.970 mm (0.2344 – 0.2350 in.)

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

Standard oil clearance:

Intake

0.025 – 0.058 mm (0.0010 – 0.0023 in.)

Exhaust

0.030 – 0.063 mm (0.0012 – 0.0025 in.)

Maximum oil clearance:

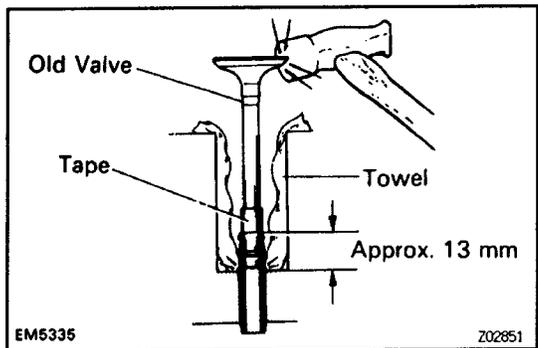
Intake

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.

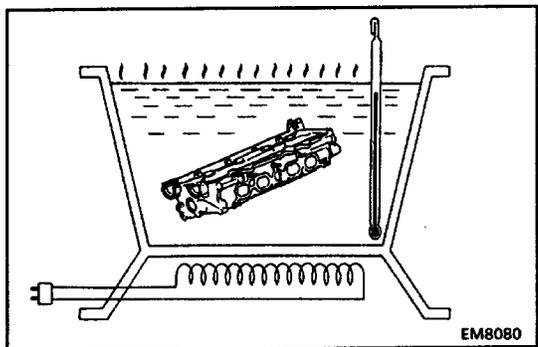


6. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

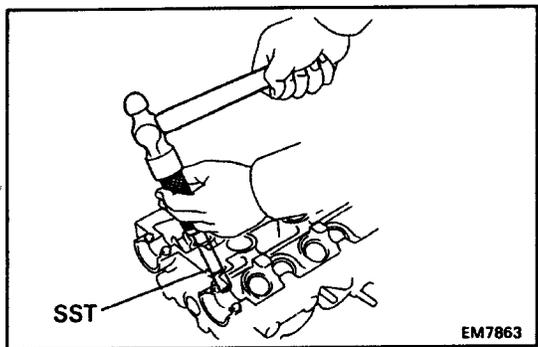
(a) (w/ Snap Ring)

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. 13 mm (0.51 in.) from the valve stem end.

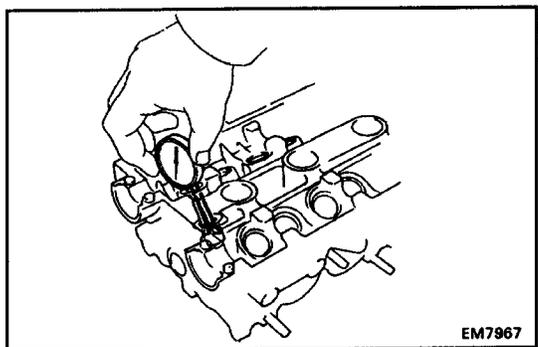
NOTICE: Be careful not to damage the valve lifter hole.



(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.

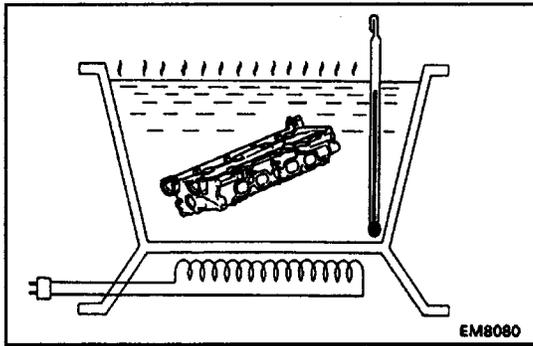
(e) Select a new guide bushing (STD or O/S 0.05).

If the bushing bore diameter of the cylinder head is greater than 11.006 mm (0.4333 in.), machine the bushing bore to the following dimension:
11.038 - 11.056 mm (0.4346 - 0.4353 in.)

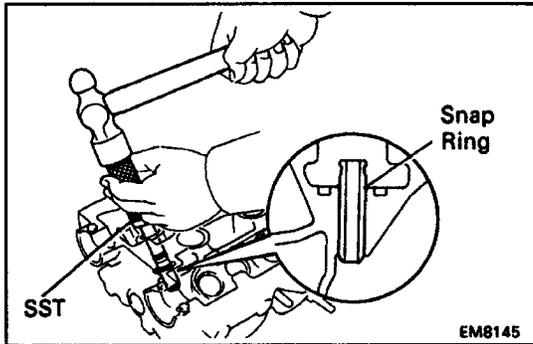
If the bushing bore diameter of the cylinder head is greater than 11.056 mm (0.4353 in.), replace the cylinder head.

Both intake and exhaust

Bushing bore diameter mm (in)	Bushing size
10.988 - 11.006 (0.432fi - 0.4333)	Use STD
11.038 - 11.056 (0.4346 - 0.4353)	Use O/S 0.05

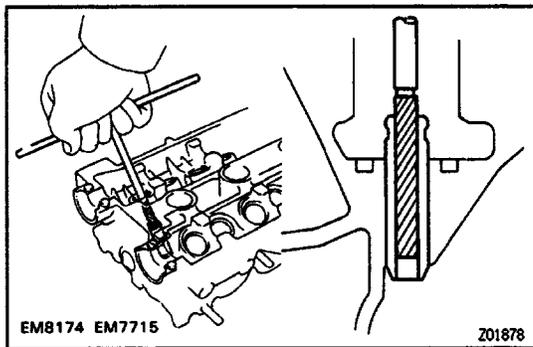


- (f) Gradually heat the cylinder head to 80–100°C (176–212° F).

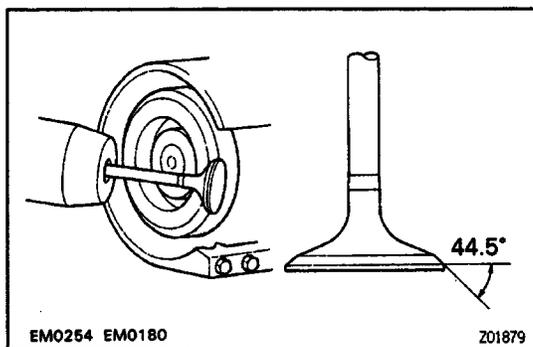


- (g) Using SST and a hammer, tap in a new guide bushing until the snap ring makes contact with the cylinder head.

SST 09201- 70010



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

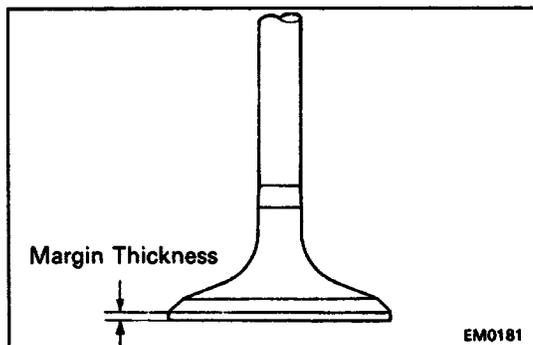


7. INSPECT AND GRIND VALVES

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

Valve face angle:

44.5°



- (c) Check the valve head margin thickness.

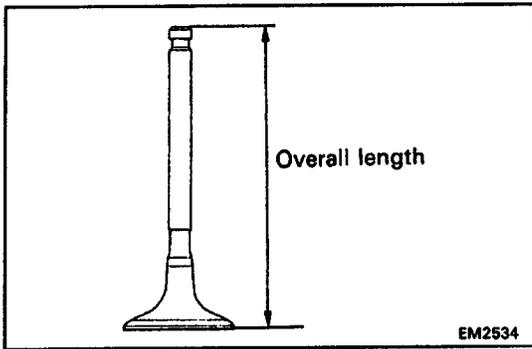
Standard margin thickness:

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

105.50 mm (4.1535 in.)

Exhaust

99.55 mm (3.9193 in.)

Minimum overall length:

Intake

104.80 mm (4.1260 in.)

Exhaust

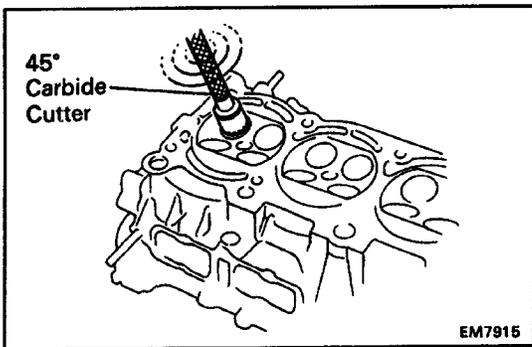
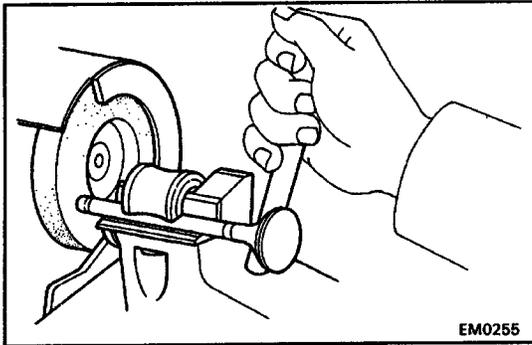
98.85 mm (3.8917 in.)

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.

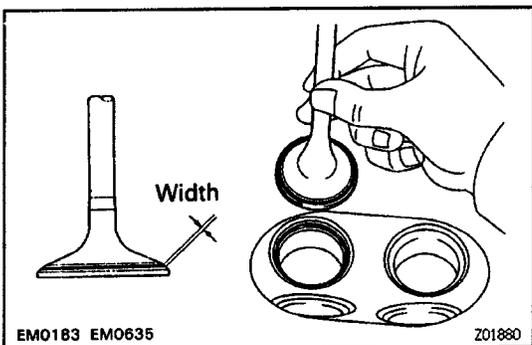
NOTICE: Do not grind off more than minimum.



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.

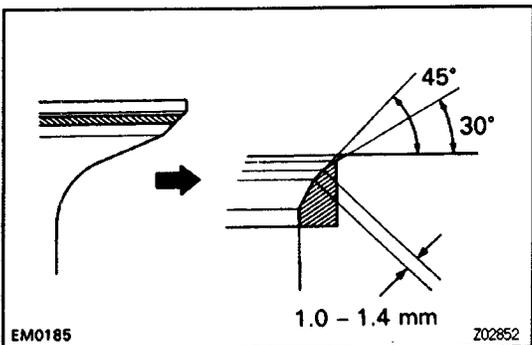
(c) Check the valve face and seat for the following:

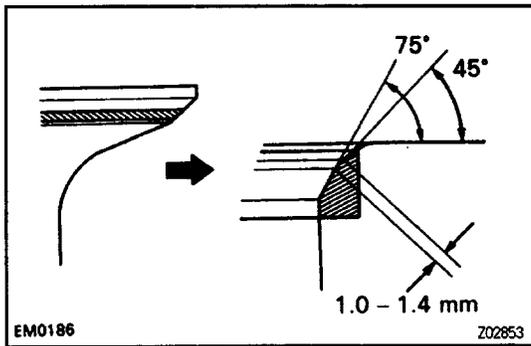
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 380° around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

1.0 – 1.4 mm (0.039 – 0.055 in.)

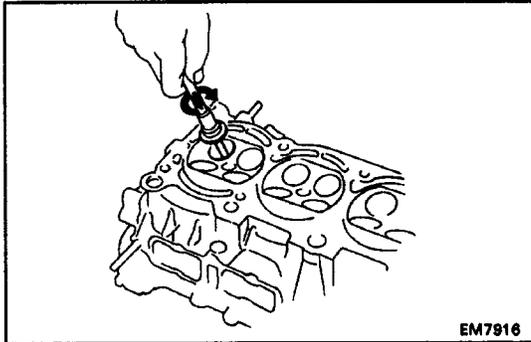
If not, correct the valve seats as follows:

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

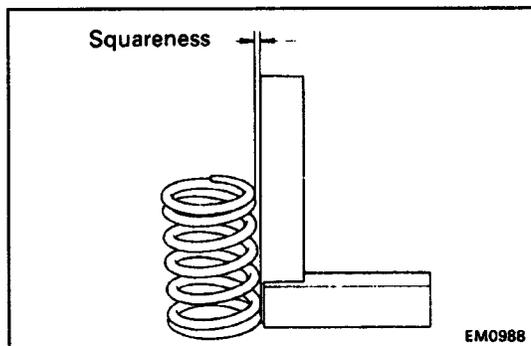




- (2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



- (d) Hand-lap the valve and valve seat with an abrasive compound.
 (e) After hand-lapping, clean the valve and valve seat.



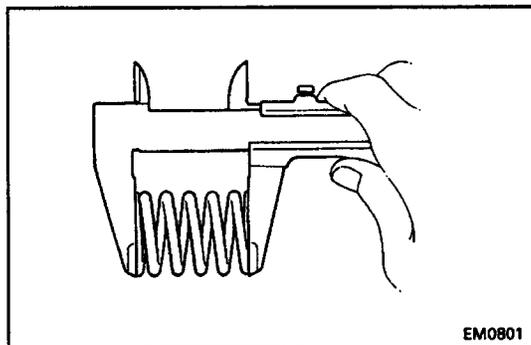
9. INSPECT VALVE SPRINGS

- (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.

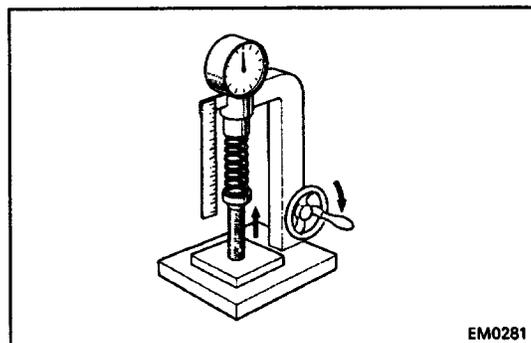


- (b) Using a vernier caliper, measure the free length of the valve spring.

Free length: .

44.43 mm (1.7492 in.)

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



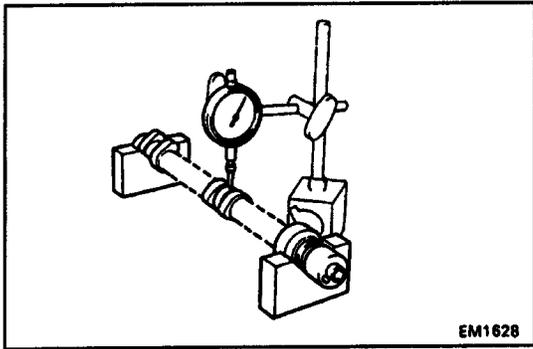
- (c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

201 - 236 N (20.5 - 24.1 kgf, 45.2 - 53.1 lbf)

at 34.4 mm (1.354 in.)

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



10. INSPECT CAMSHAFTS AND BEARINGS

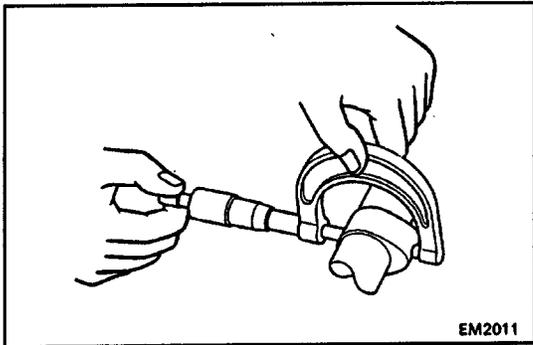
A. Inspect camshaft for runout

- Place the camshaft on V – blocks.
- Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout:

0.06 mm 10.0024 in.)

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



B. Inspect cam lobes

Using a micrometer, measure the cam lobe height.

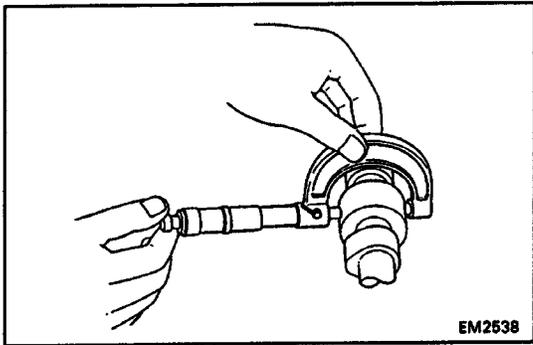
Standard cam lobe height:

41.010 – 41.110 mm (1.6146 – 1.6185 in.)

Minimum cam lobe height:

39.90 mm, (1.5709 in.)

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



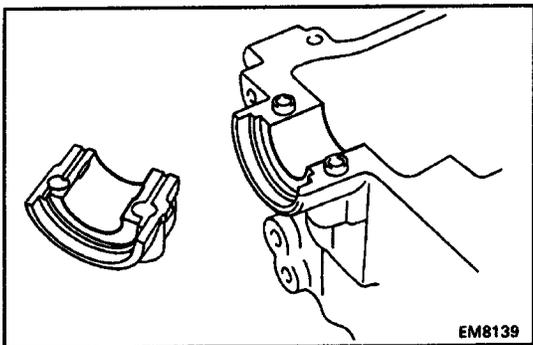
C. Inspect camshaft journals

Using a micrometer, measure the journal diameter.

Journal diameter:

26.959 – 26.975 mm (1.0614 – 1.0620 in.)

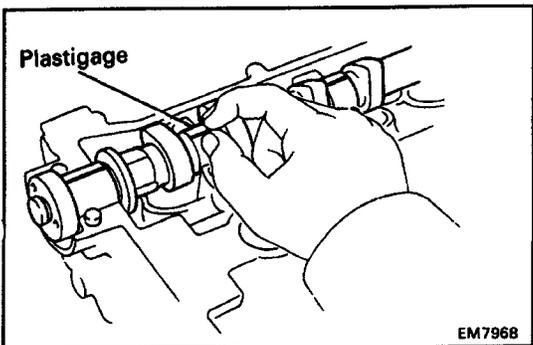
If the journal diameter is not as specified, check the oil clearance.



D. Inspect camshaft bearings

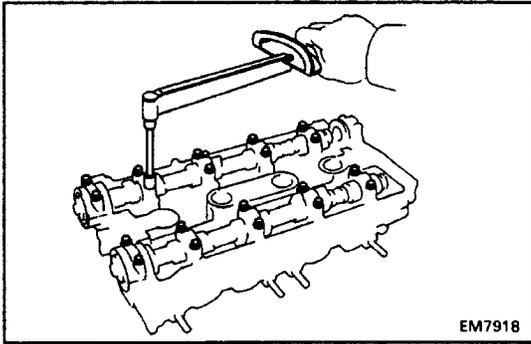
Check that bearings for flaking and scoring.

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

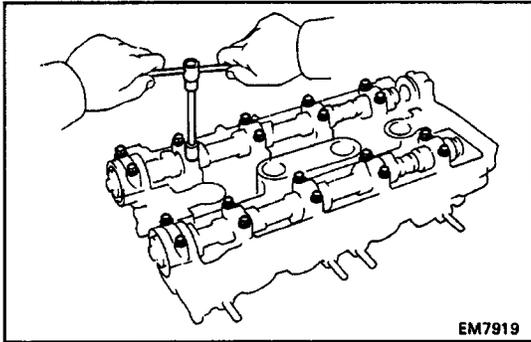


E. Inspect camshaft journal oil clearance

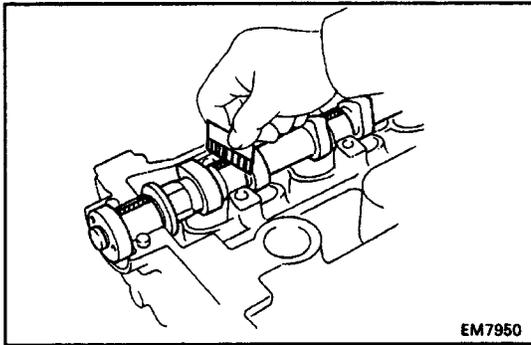
- Clean the bearing caps and camshaft journals.
- Place the camshafts on the cylinder head.
- Lay a strip of Plastigage across each of the camshaft journals.



- (d) Install the bearing caps.
 (See step 2 in Cylinder Head Installation)
Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)
NOTICE: Do not turn the camshaft.



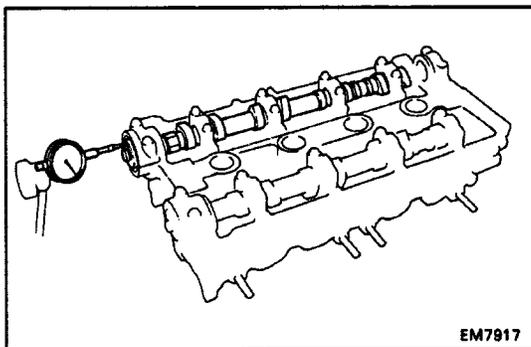
- (e) Remove the bearing caps.



- (f) Measure the Plastigage at its widest point.
Standard oil clearance:
 0.025 – 0.062 mm (0.0010 – 0.0024 in.)
Maximum oil clearance:
 0.08 mm (0.0031 in.)

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

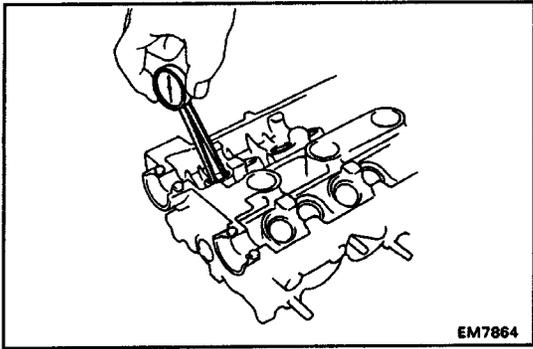
- (g) Completely remove the Plastigage.



F. Inspect camshaft thrust clearance

- (a) Install the camshaft.
 (See step 2 in Cylinder Head Installation)
- (b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.
Standard thrust clearance:
 0.120 – 0.240 mm (0.0047 – 0.0094 in.)
Maximum thrust clearance:
 0.30 mm (0.0118 in.)

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

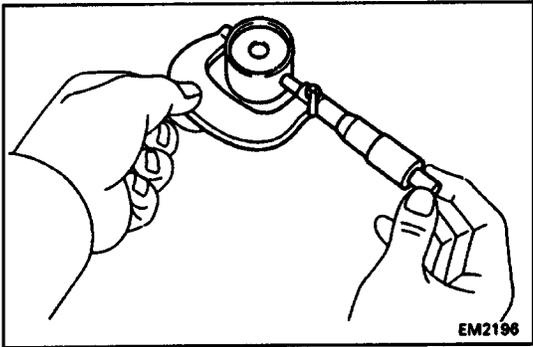


11. INSPECT VALVE LIFTERS AND LIFTER BORES

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

Lifter bore diameter:

28.000 – 28.021 mm (1.1024 – 1.1032 in.)



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

Lifter diameter:

27.975 – 27.985 mm (1.1014 – 1.1018 in.)

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

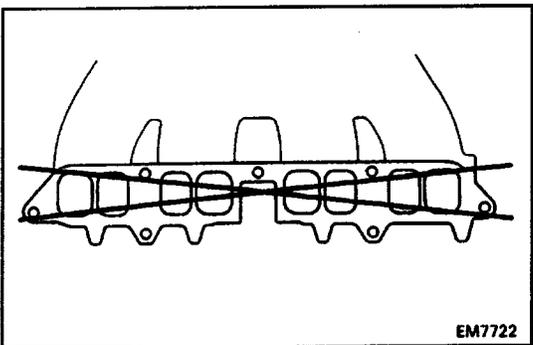
Standard oil clearance:

0.015 – 0.046 mm (0.0005 – 0.0018 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

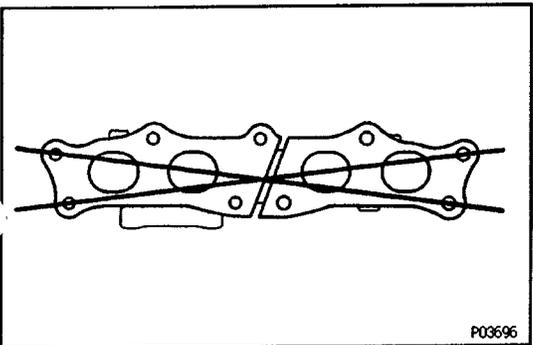
(intake manifold)

Using precision straight edge and feeler gauge, measure the surface contacting the T – VIS valve for warpage.

Maximum warpage:

0.20 mm (0.0079 in.)

If warpage is greater than maximum, replace the intake manifold.



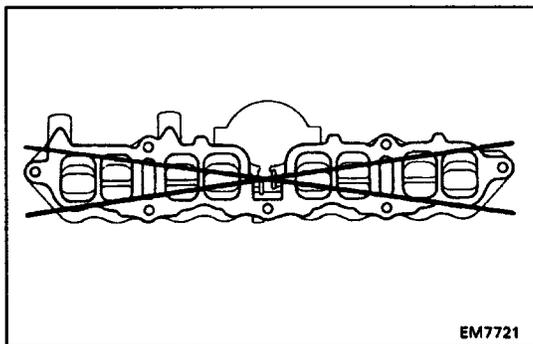
(Exhaust manifold)

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

Maximum warpage:

0.20 mm (0.0079 in.)

If warpage is greater than maximum, replace the exhaust manifold.



TOYOTA-VARIABLE INDUCTION SYSTEM (T-VIS) COMPONENTS INSPECTION

1. INSPECT T-VIS VALVE

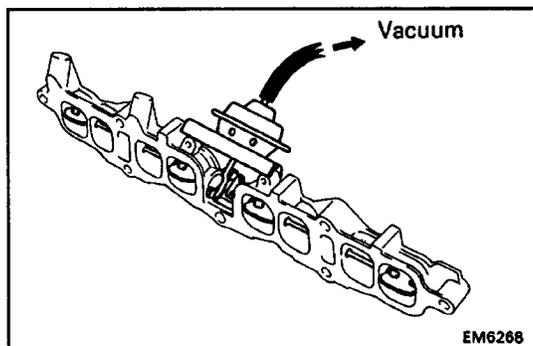
A. Inspect for flatness

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

Maximum warpage:

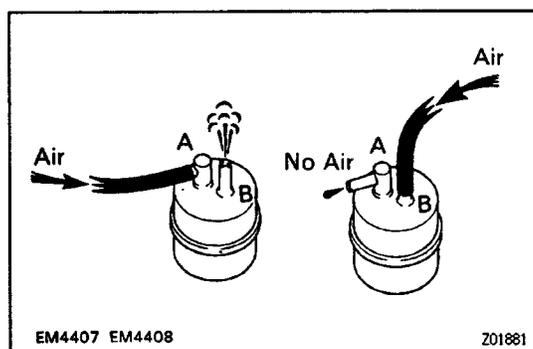
0.20 mm (0.0079 in.)

If warpage is greater than maximum, replace the T-VIS valve.



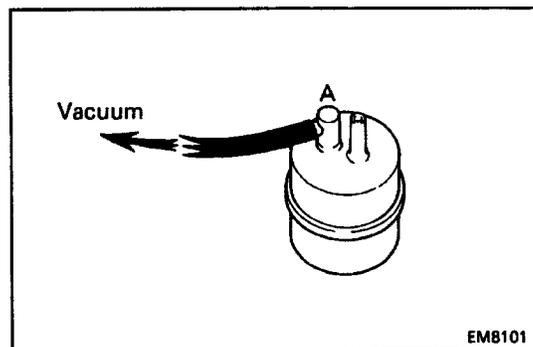
B. Inspect for operation

- (a) With 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum applied to the actuator, check that the control valve moves smoothly to the fully closed position.
 - (b) With the vacuum released, check that the control valve fully opens quickly.
- If operation is not as specified, replace the T-VIS valve.

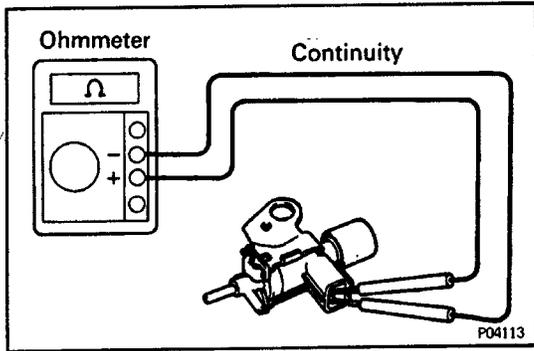


2. INSPECT VACUUM TANK

- (a) Check that air flows from port A to port B.
- (b) Check that air does not flow from ports B to A.



- (c) Apply 67.7 kPa (500 mmHg, 19.69 in.Hg) of vacuum to port A, and check that there is no change in vacuum after one minute.
- If operation is not as specified, replace the vacuum tank.



3. INSPECT VSV

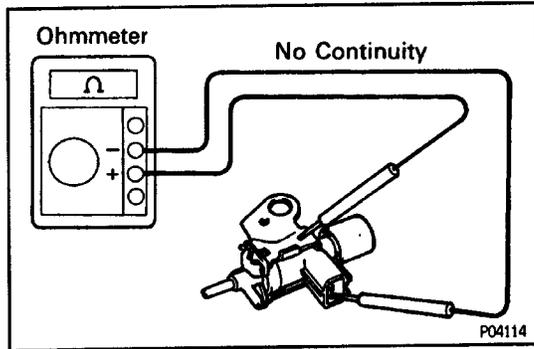
A. Inspect VSV for open circuit

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold):

33–39 Ω

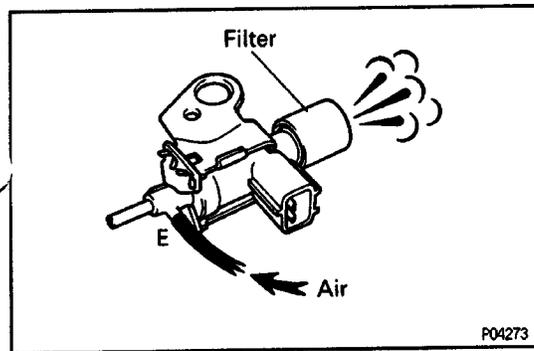
If there is no continuity, replace the VSV.



B. Inspect VSV for ground

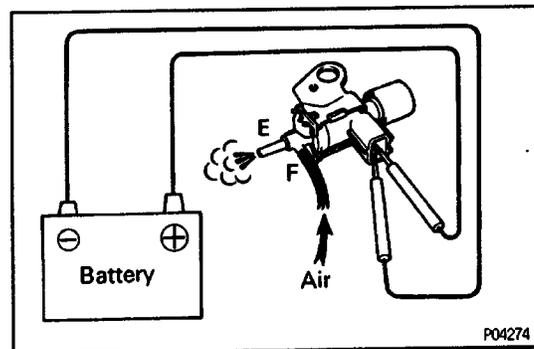
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



C. Inspect VSV operation

(a) Check that the air flows from port E to the filter.



(b) Apply battery voltage across the terminals.

(c) Check that the air flows from port E to port F.

If operation is not as specified, replace the VSV.

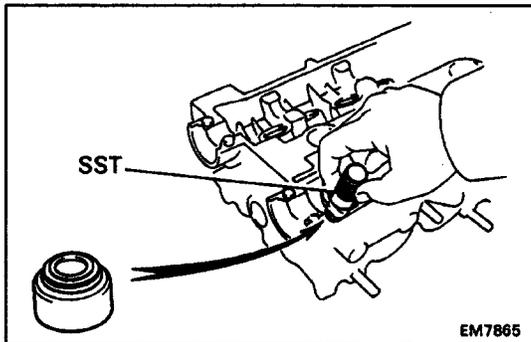
CYLINDER HEAD ASSEMBLY

EGQWH-01

(See Components for Removal and Installation)

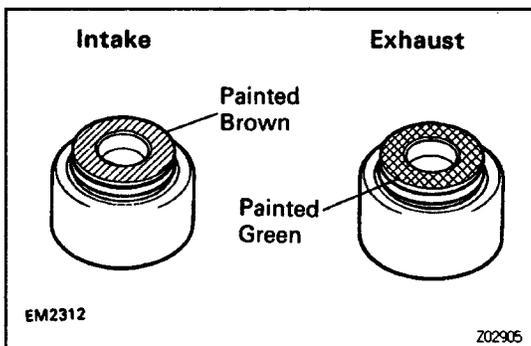
HINT:

- 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.

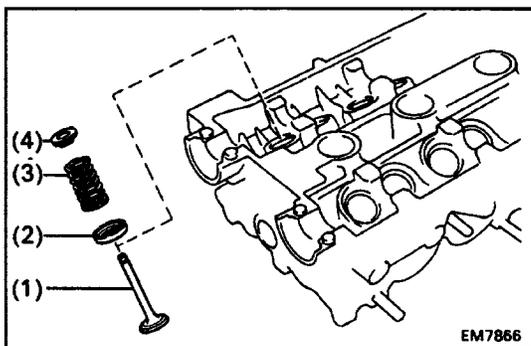


1. INSTALL VALVES

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

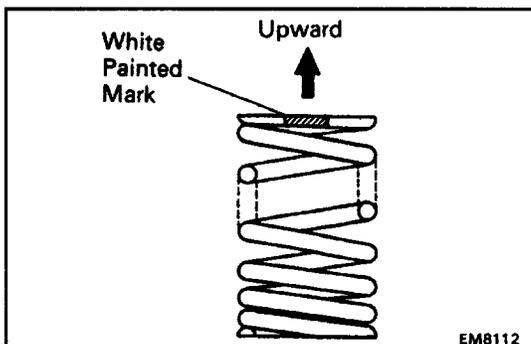


HINT: The intake valve oil seal is brown and the exhaust valve oil seal is green.

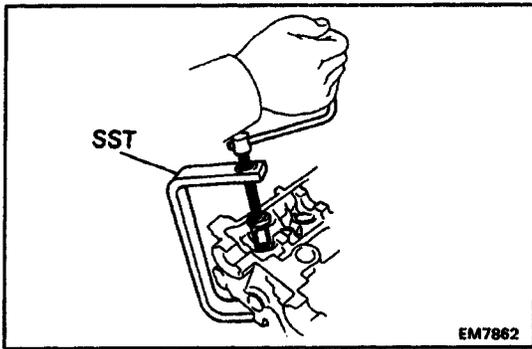


- (b) Install the following parts:

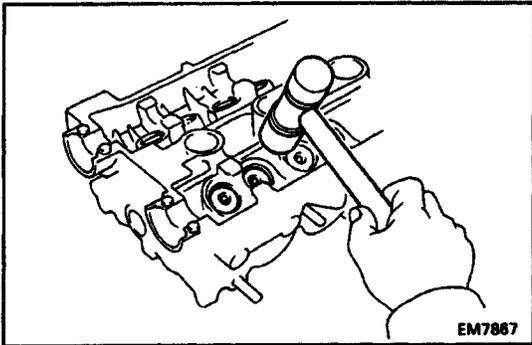
- (1) Valve
- (2) Spring seat
- (3) Valve spring
- (4) Spring retainer



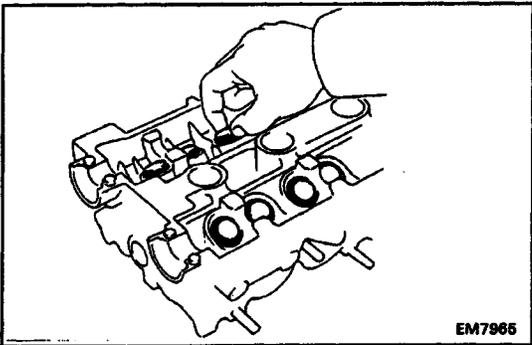
HINT: Install the valve spring, facing the white painted mark upward.



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

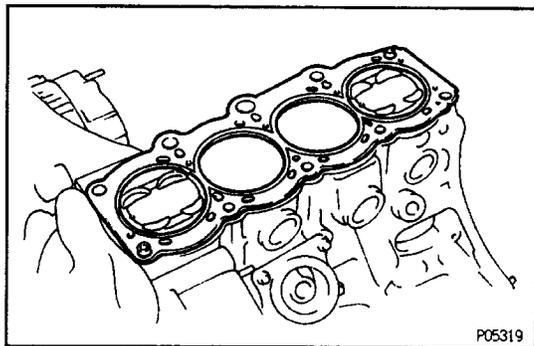


- (d) Using a plastic-faced hammer, lightly tap the valve stem tip to assure proper fit.



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.

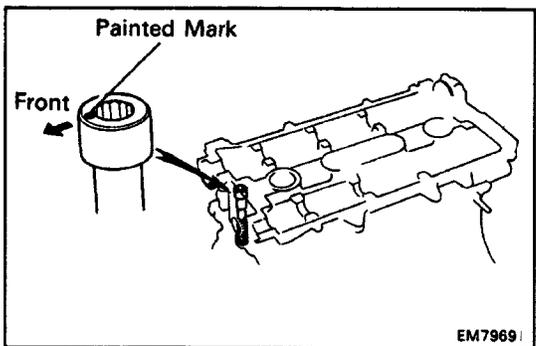
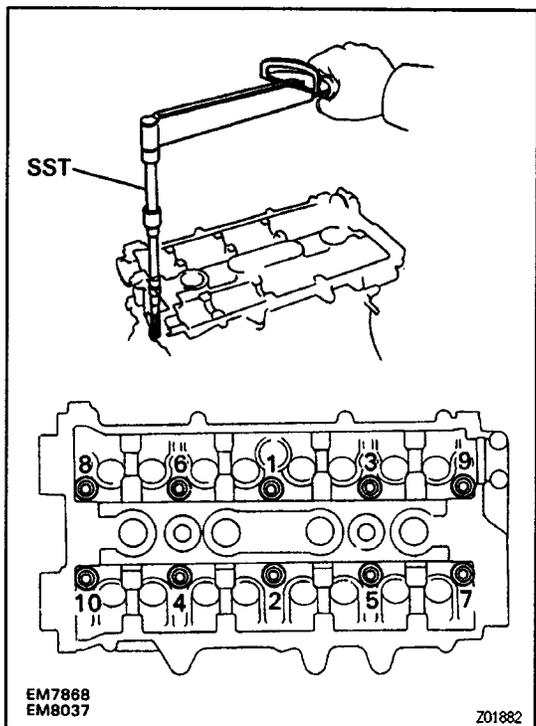
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

- (b) Using SST, install and uniformly tighten the ten cylinder head bolts in several passes, in the sequence shown.

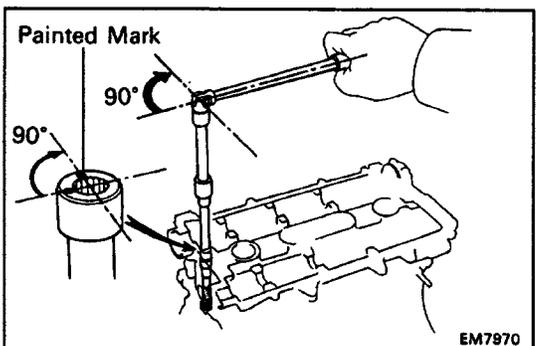
SST 09043 - 38100

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.

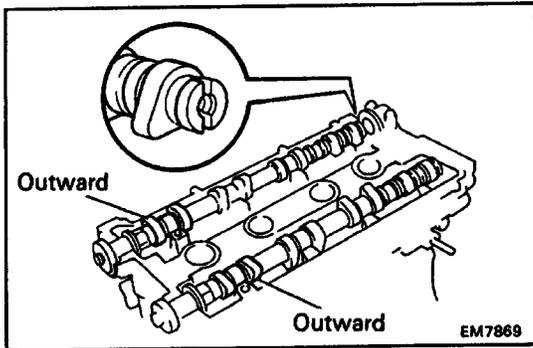


- (c) Mark the front of the cylinder head bolt head with paint.



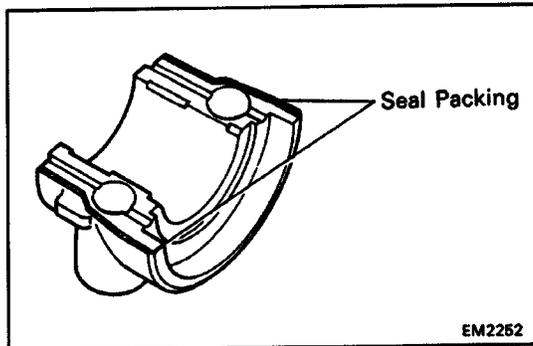
- (d) Retighten the cylinder head bolts 90° in the numerical order shown.

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

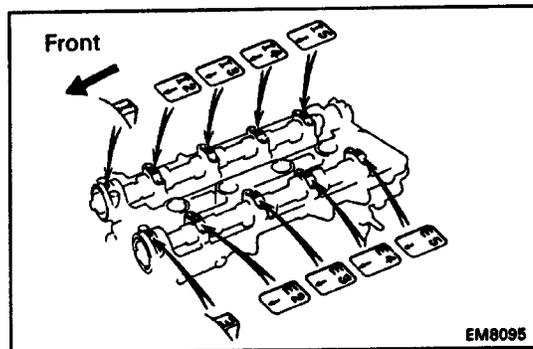


2. INSTALL CAMSHAFTS

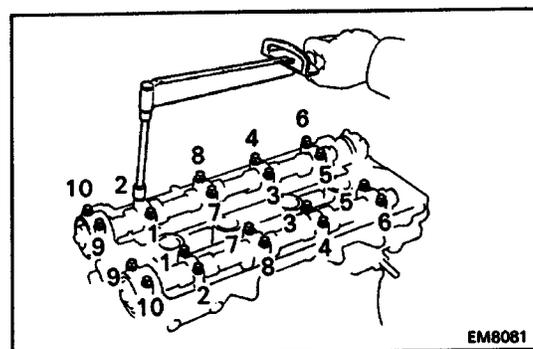
- (a) Place the camshaft on the cylinder head with the No. 1 cam lobe facing outward as shown.



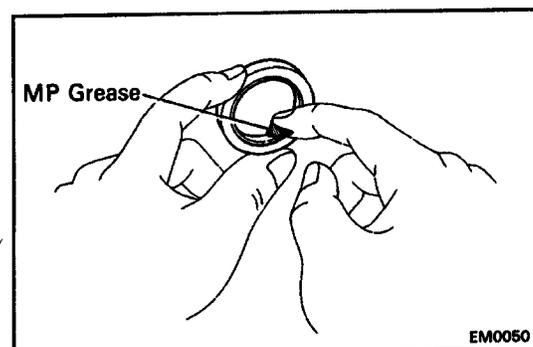
- (b) Apply seal packing to the No. 1 bearing cap as shown.
Seal packing: Part No. 08826-00080 or equivalent



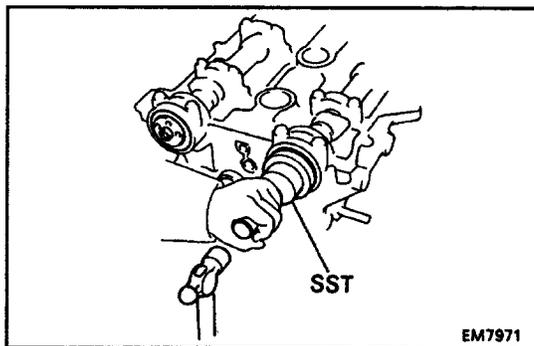
- (c) Install the bearing caps in their proper locations.
HINT: Each bearing cap has a number and front mark.



- (d) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(e) Install and uniformly tighten the ten bearing cap bolts on one side in several passes, in the sequence shown.
Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)



- (f) Apply MP grease to a new oil seal lip.



- (9) Using SST, tap in the two camshaft oil seals.
SST 09223-50010

3. ADJUST VALVE CLEARANCE (See Tune-Up)

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

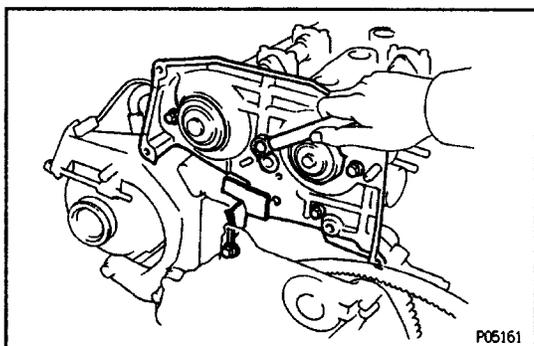
Valve clearance (Cold):

Intake

0.15 – 0.25 mm (0.006 – 0.010 in.)

Exhaust

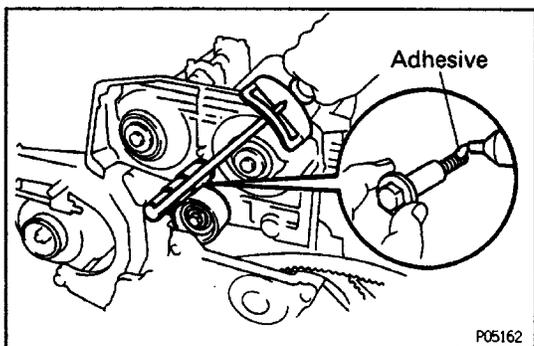
0.28 – 0.38 mm (0.011 – 0.015 in.)



4. INSTALL NO-3 TIMING BELT COVER

Install the No.3 belt cover with the five bolts.

Torque: 8.8 N-m (90 kgf-cm, 78 ft-lbf)



5. INSTALL NO.1 IDLER PULLEY

- (a) Apply adhesive two or three threads of the pivot bolt.

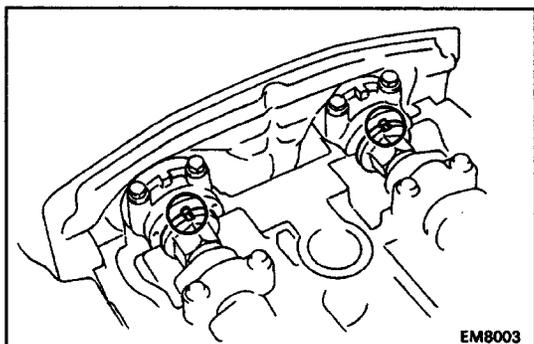
Adhesive:

**Part No. 08833-00080, THREE BOND 1344,
LOCTITE 242 or equivalent**

- (b) Install the plate washer and pulley with the pivot bolt.

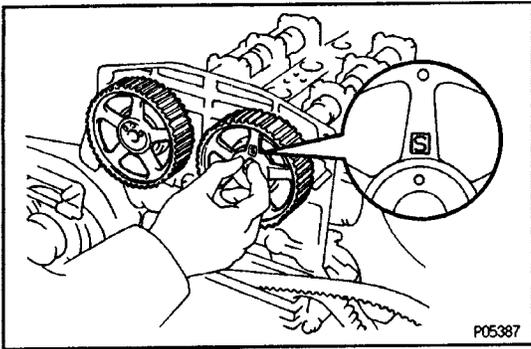
Torque: 52 N-m (530 kgf-cm, 38 ft-lbf)

- (c) Check that the idler pulley moves smoothly.

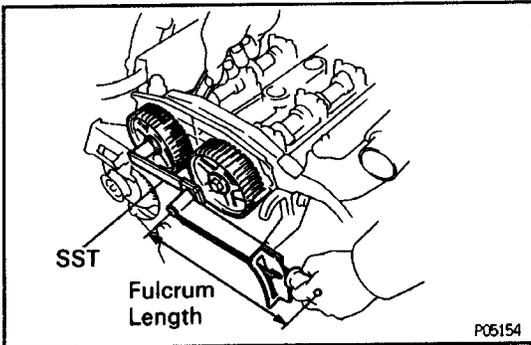


6. INSTALL CAMSHAFT TIMING PULLEY

- (a) Using a wrench, turn and align the groove of the camshaft with the dot mark of the No.1 camshaft bearing cap.



- (b) Slide the timing pulley onto the camshaft facing mark "S" upward.
- (c) Align the pin holes of the camshaft and timing pulley, and insert the knock pin.



- (d) Hold the hexagon wrench portion of the camshaft with a wrench and tighten the bolts.

Torque:

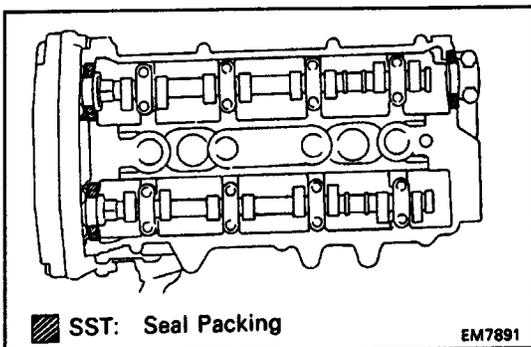
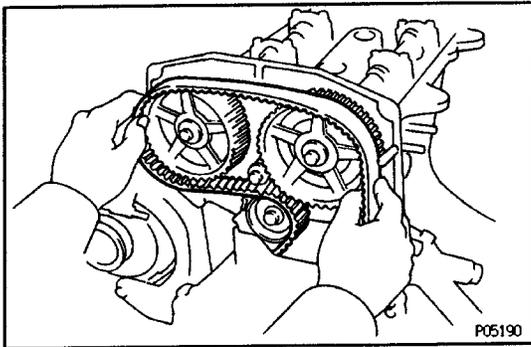
59 N-m (600 kgf-cm, 43 ft-lbf)

41 N-m (420 kgf-cm, 30 ft-lbf) for SST

HINT (Intake camshaft timing pulley):

- Use SST.
- SST 09249-63010
- Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

7. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS (See steps 10 to 16, 21 to 23 and 27 in Timing Belt Installation)



8. INSTALL CYLINDER HEAD COVER

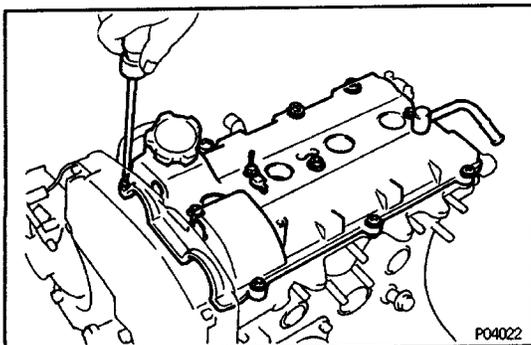
- (a) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing:

Part No. 08826-0080 or equivalent

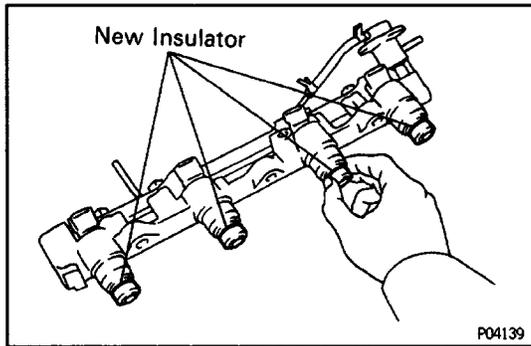
■ SST: Seal Packing

EM7891



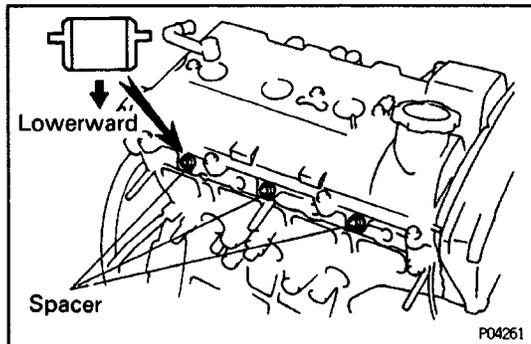
- (b) Install the two gaskets to the head cover.
- (c) Install the head cover with the twelve seal washers and screws. Uniformly tighten the screw in several passes.

Torque: 2.5 N-m (25 kgf-cm, 21 in.·lbf)

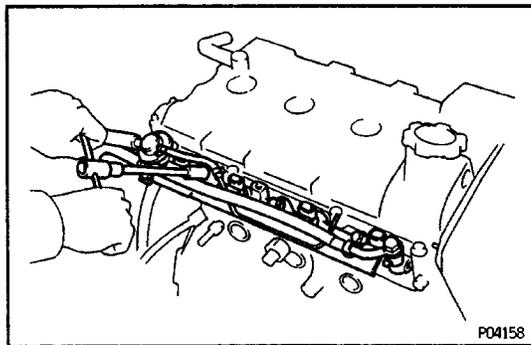


9. INSTALL DELIVERY PIPE ASSEMBLY

(a) Install four new insulators to the delivery pipe.

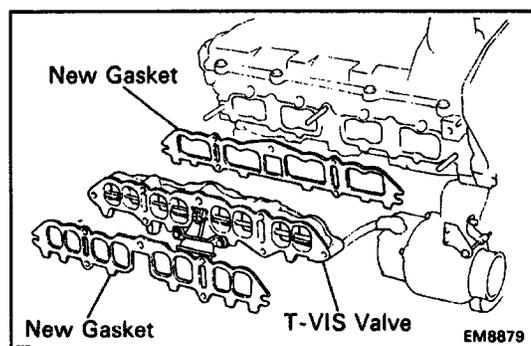


(b) Install the three spacers to the cylinder head.



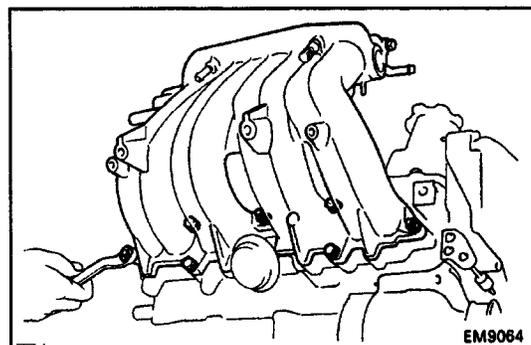
(c) Attach the delivery pipe assembly to the cylinder head.

(d) Install the delivery pipe assembly with the three bolts.
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)



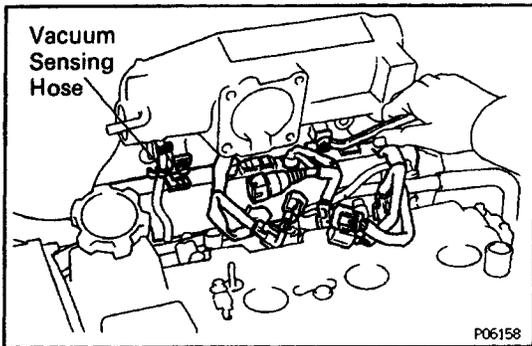
10. INSTALL T-VIS VALVE AND INTAKE MANIFOLD

(a) Place a new gasket, the T-VIS valve and the other new gasket on the cylinder head.



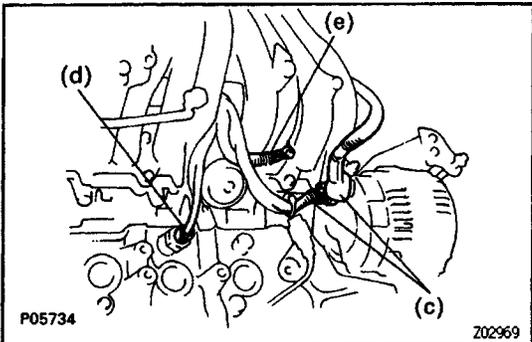
(b) Install the intake manifold with the four bolts and three nuts. Uniformly tighten the bolts and nuts in several passes.

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

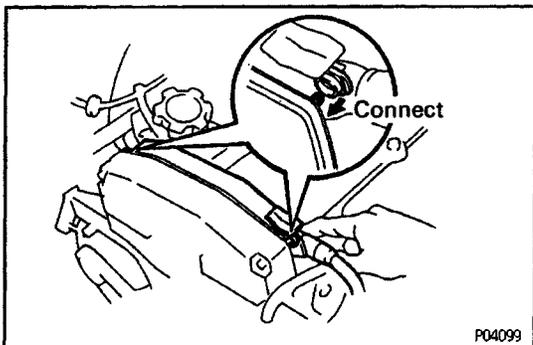


11. INSTALL ENGINE WIRE TO INTAKE MANIFOLD

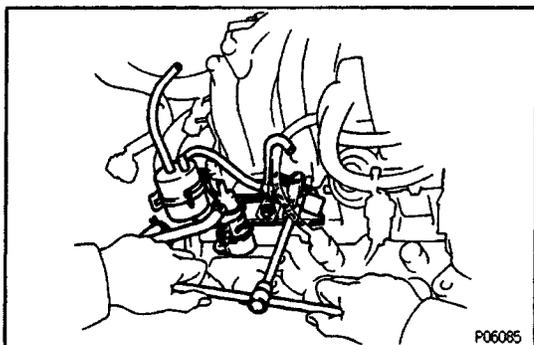
- (a) Install the engine wire clamp to the intake manifold with the two bolts.
- (b) Connect the vacuum sensing hose to the intake manifold.



- (c) Connect the alternator wire and connector.
- (d) Connect the knock sensor connector.
- (e) Connect the ground strap with the bolt.
- (f) Connect the injector connectors.
HINT: No.1 and No.3 injector connectors are brown, No.2 and No.4 injector connectors are gray.

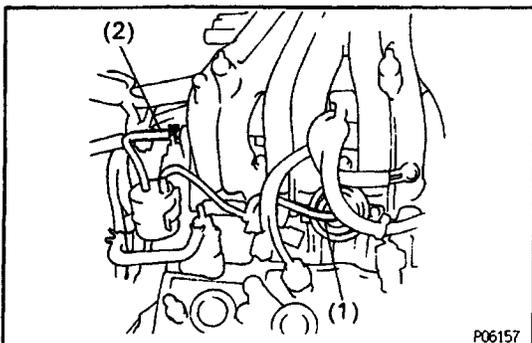


- (g) Install the two clamps to the mounting bolts of the No. 2 timing belt cover.

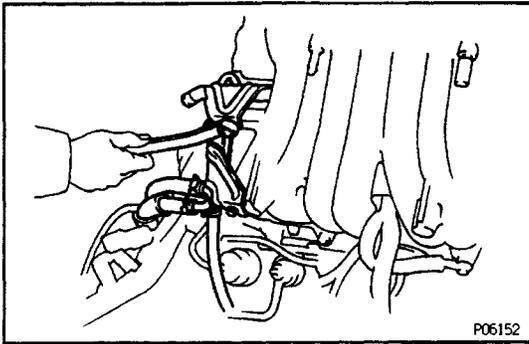


12. INSTALL T-VIS VACUUM TANK, VSV (FOR T-VIS) AND VSV (FOR TURBOCHARGING PRESSURE) ASSEMBLY

- (a) Install the T-VIS vacuum tank, VSV (for T-VIS) and VSV (for turbocharging pressure) assembly with the two bolts.

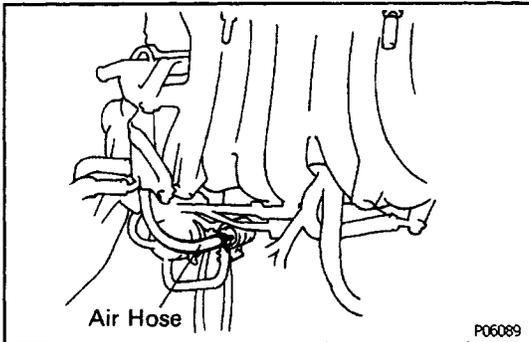


- (b) Connect the following hoses:
 - (1) Vacuum hose (from VSV for T-VIS) to T-VIS actuator
 - (2) Vacuum hose (from T - VIS vacuum tank) to intake manifold
- (c) Connect the following connectors:
 - VSV (for T-VIS) connector
 - VSV (for turbocharging pressure) connector

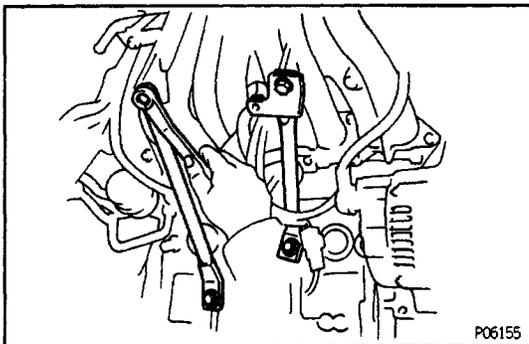


13. INSTALL NO.1 AIR TUBE

(a) Install the air tube with the two bolts.



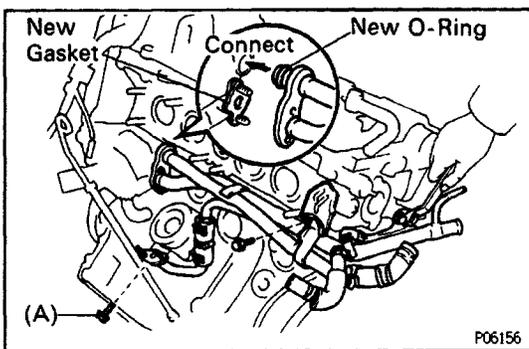
(b) Connect the air hose to the VSV (for turbocharging pressure).



14. INSTALL INTAKE MANIFOLD STAYS

Install the manifold stay with the two bolts. Install the two manifold stays.

Torque: 25 N-m (260 kgf-cm, 19 ft-lbf)



15. INSTALL WATER BY-PASS PIPE

(a) Install a new O-ring to the pipe.

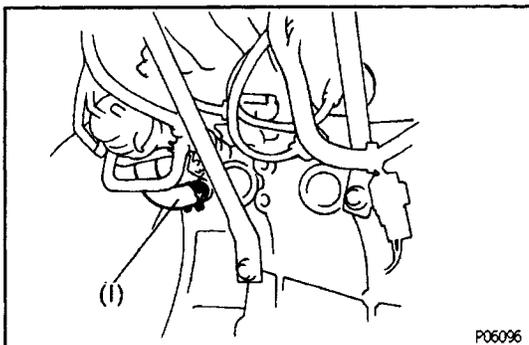
(b) Apply soapy water on the O-ring.

(c) Install a new gasket to the water pump.

(d) Install the water by-pass pipe with the two nuts and two bolts.

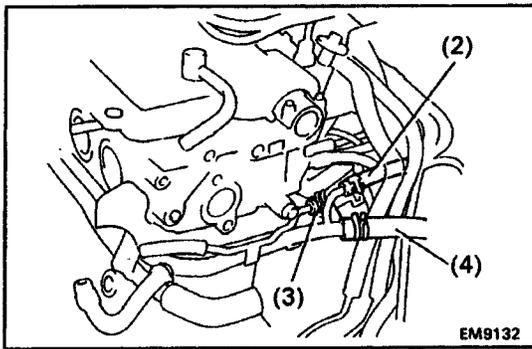
Torque (Nuts): 7.8 N-m (80 kgf-cm, 69 in.·lbf)

(e) Temporarily install the bolt (A).

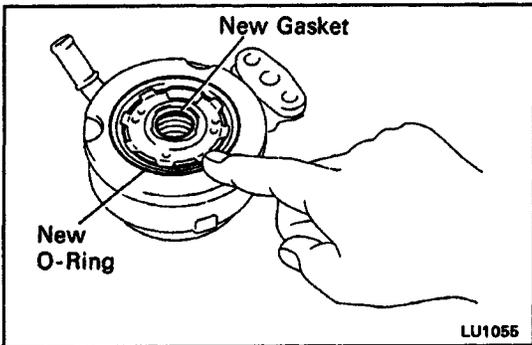


(f) Connect the following hoses:

(1) Water by-pass hose to cylinder block

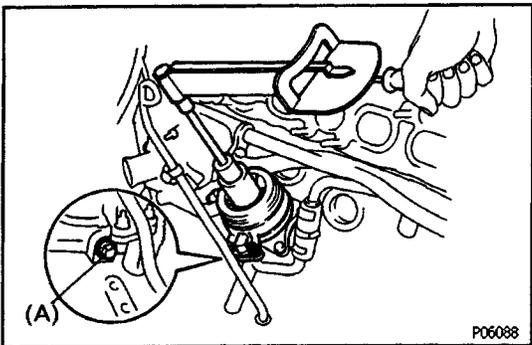


- (2) Water by-pass hose to No.1 air tube
- (3) Air hose to VSV (for turbocharging pressure)
- (4) Heater water hose

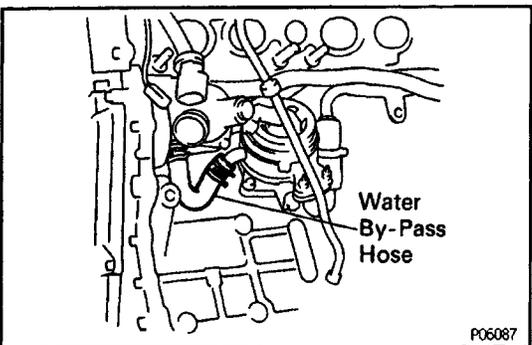


16. INSTALL OIL COOLER

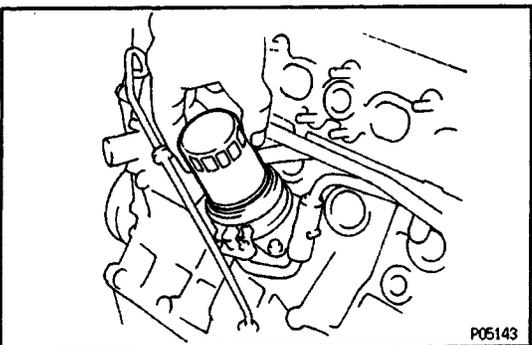
- (a) Install a new O-ring and gasket to the oil cooler.
- (b) Place a new gasket on the water by-pass pipe.



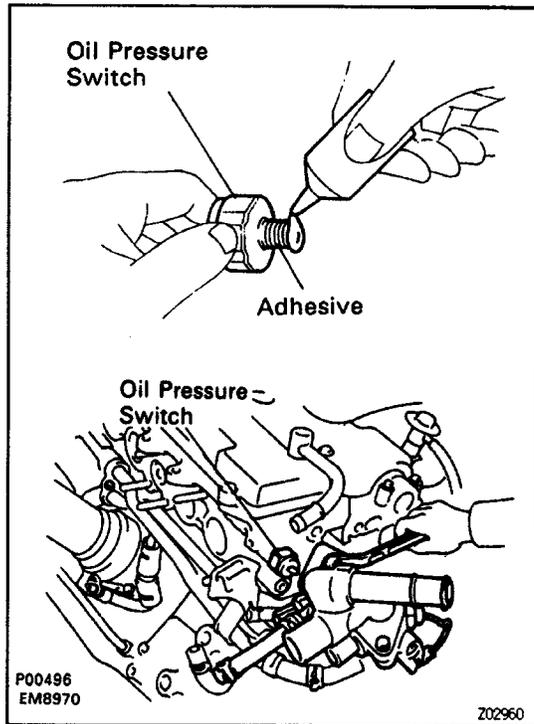
- (c) Temporarily install the oil cooler with the two nuts.
- (d) Apply a light coat of engine oil on the threads and under the head of the relief valve.
- (e) Install the plate washer and relief valve.
Torque: 78 N-m (800 kgf-cm, 58 ft-lbf)
- (f) Tighten the two nuts.
Torque: 7.8 N-m (80 kgf-cm, 69 in.·lbf)
- (g) Tighten the bolt (A).



- (h) Connect the water by-pass hose to the oil cooler.



- (i) Install the oil filter.
(See Replacement of Oil and Oil Filter under Lubrication System)

**17. INSTALL OIL PRESSURE SWITCH**

Apply adhesive to two or three threads.

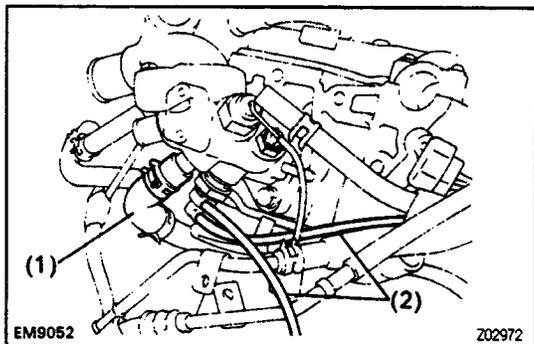
Adhesive:

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

18. INSTALL WATER OUTLET AND HOUSING

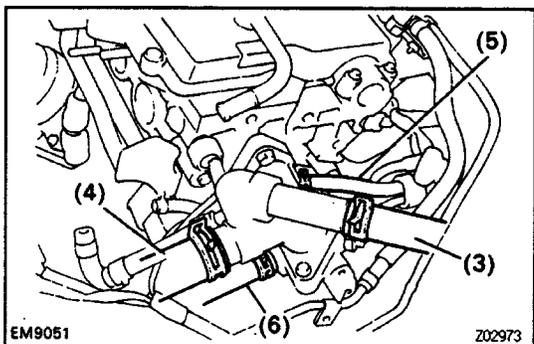
(a) Install a new gasket and the water outlet and housing assembly with the two bolts.

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



(b) Connect the following hoses:

- (1) Water by-pass hose to water by-pass pipe
- (2) Two TVS (for EVAP) vacuum hoses

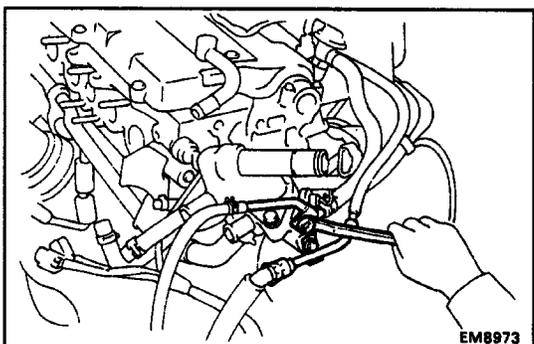


(3) Water filler hose

(4) Radiator hose

(5) Water by-pass pipe hose to IACV

(6) Heater water hose

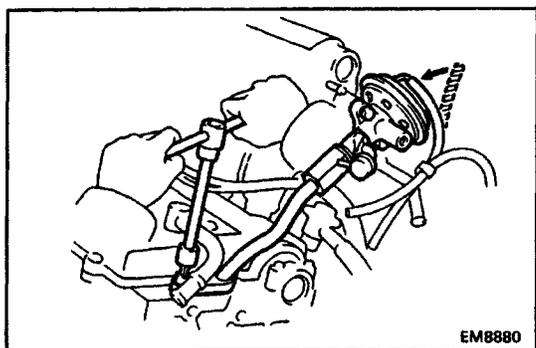


(c) Install the fuel inlet hose with the bolt.

(d) Install the fuel return hose with the bolt.

(e) Connect the following connectors:

- Water temperature sender gauge connector
- ECTS connector
- Cold start injector time switch connector



19. INSTALL EGR VALVE AND PIPE

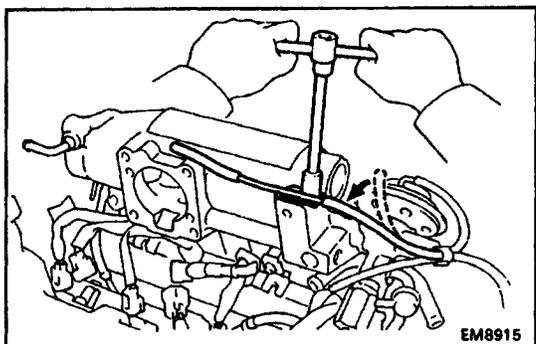
- (a) Install two new gaskets, the EGR valve and pipe assembly with the four bolts.

Torque:

19 N-m (195 kgf-cm, 14 ft-lbf) for intake manifold

25 N-m (260 kgf-cm, 19 ft-lbf) for cylinder head

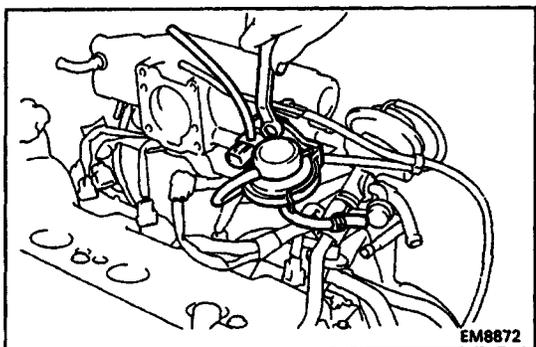
- (b) Connect the vacuum hose to the EGR valve.



20. INSTALL VACUUM PIPE

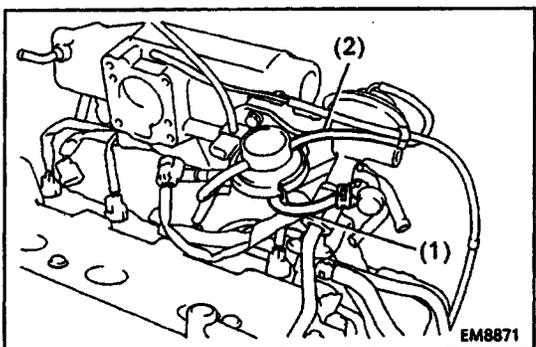
- (a) Install the vacuum pipe with the bolt.

- (b) Connect the vacuum hose to the vacuum pipe.



21. INSTALL EGR VACUUM MODULATOR AND VSV

- (a) Install the EGR vacuum modulator and VSV assembly with the bolt.



- (b) Connect the following hoses:

(1) EGR hose to EGR valve

(2) Vacuum hose to EGR vacuum modulator

- (c) Connect the EGR connector.



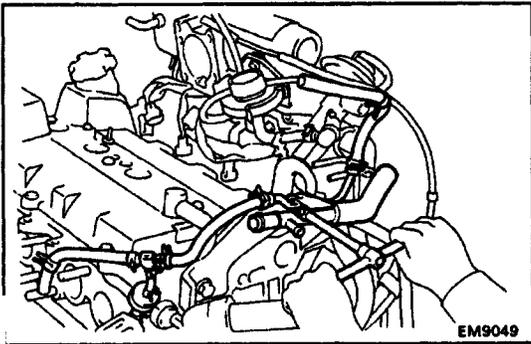
22. INSTALL LH ENGINE HANGER

Install the LH engine hanger with the two bolts.

Torque:

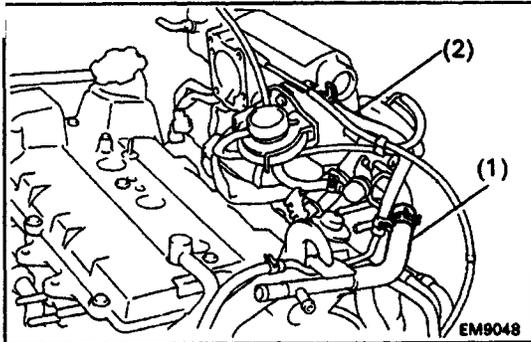
13 N-m (130 kgf-cm, 9 ft-lbf) for 12 mm head

19 N-m (195 kgf-cm, 14 ft-lbf) for 14 mm head



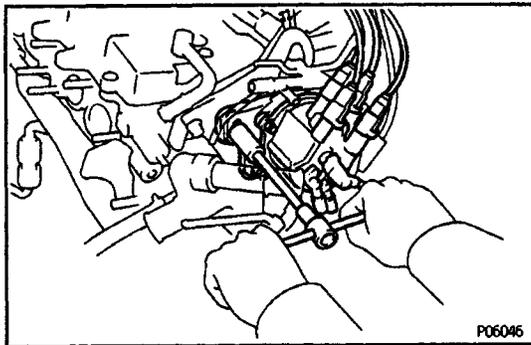
23. INSTALL NO.2 AIR TUBE

(a) Install the No.2 air tube with the bolt.



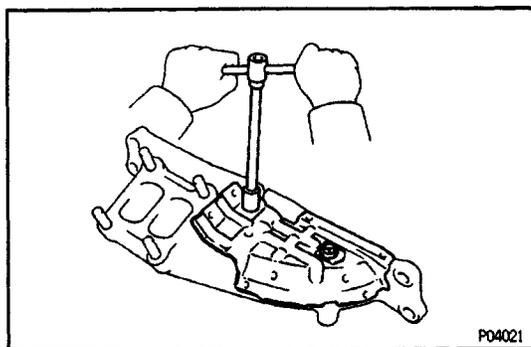
(b) Connect the following hoses:

- (1) Air hose to No. 1 air tube
- (2) Air hose to intake manifold



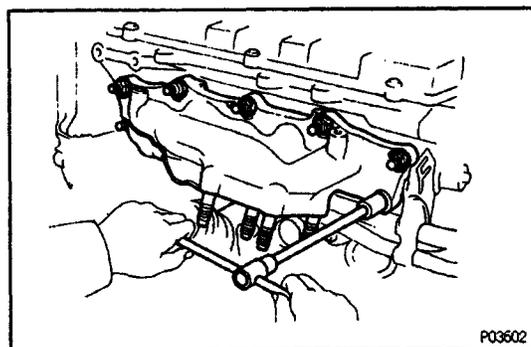
24. INSTALL DISTRIBUTOR

(See Distributor Installation in IG section)



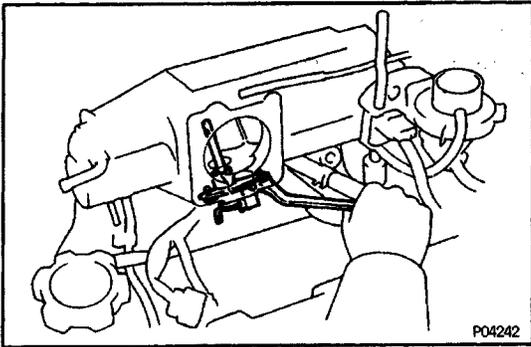
26. INSTALL EXHAUST MANIFOLD

(a) Install the heat insulator with the bolt and nut.



(b) Install a new gasket and the exhaust manifold with the seven nuts. Uniformly tighten the nuts in several passes.

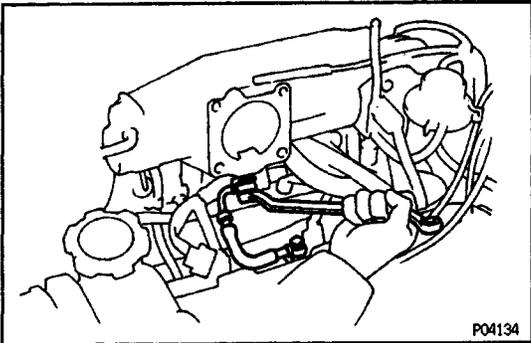
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

**26. INSTALL COLD START INJECTOR**

- (a). Install a new gasket and the cold start injector with the two bolts.

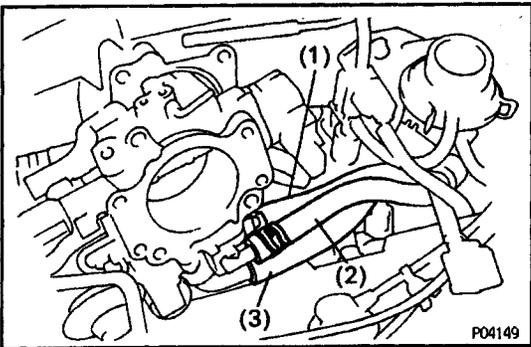
Torque: 5.9 N-m (60 kgf-cm, 52 in.-lbf)

- (b) Connect the cold start injector connector.

**27. INSTALL. COLD START INJECTOR PIPE**

Install the cold start injector pipe with four new gaskets and two union bolts.

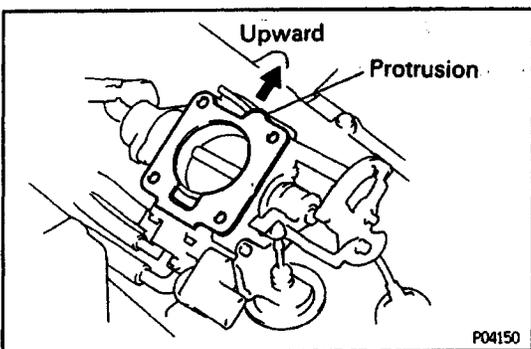
Torque: 12 N-m (125 kgf-cm, 9 ft-lbf)

**28. INSTALL THROTTLE BODY**

- (a) Connect the following hoses to the throttle body.

- (1) Water by-pass hose (from upper side of No. 1 air tube)
- (2) Water by-pass hose (from lower side of No. 1 air tube)
- (3) Air hose (from No. 1 air tube)

- (b) Install a new gasket to the throttle body.



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

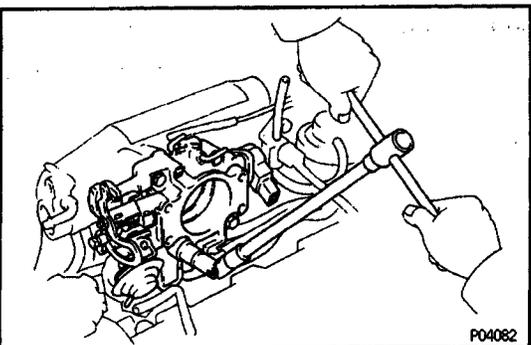
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

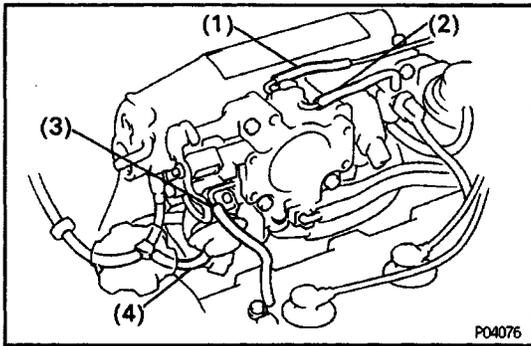
HINT: Different bolt lengths are used for the upper and lower sides.

Bolt length:

45 mm (1.77 in.) for upper bolt

70 mm (2.76 in.) for lower bolt



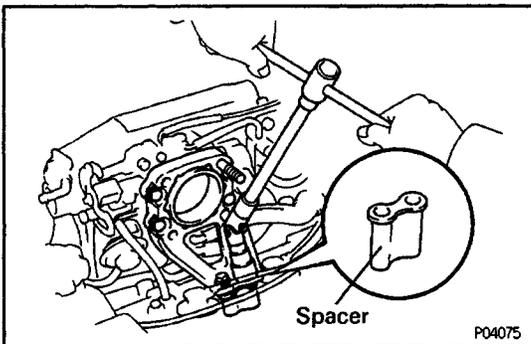


(d) Connect the following hoses:

- (1) Vacuum hose to port "P" of throttle body
- (2) Vacuum hose to port "E" of throttle body
- (3) PCV hose to port PCV of throttle body
- (4) Vacuum hose to throttle body opener

(e) Connect the following connector:

- Throttle position sensor connector
- IACV connector

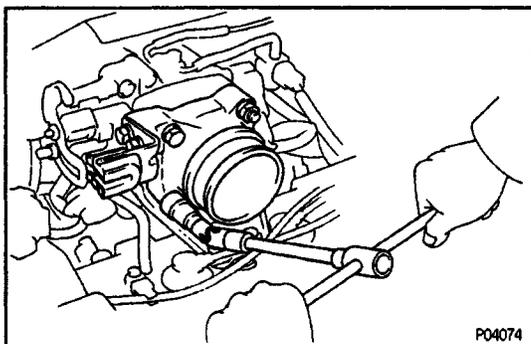


29. INSTALL INTAKE AIR CONNECTOR STAY

- (a) Install the spacer.
- (b) Install the intake air connector stay with the six bolts.

Torque:

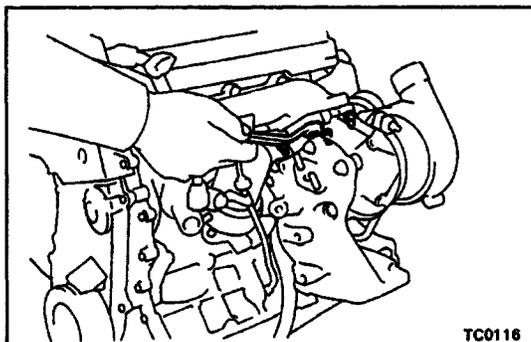
- 7.8 N-m (80 kgf-cm, 69 in.-lbf) for 10 mm head
- 19 N-m (195 kgf-cm, 14 ft-lbf) for 12 mm head



30. INSTALL INTAKE AIR CONNECTOR

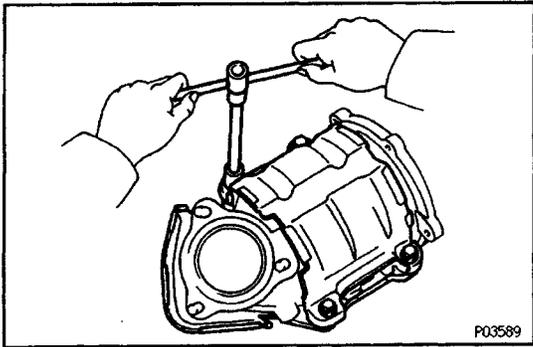
Install the intake air connector with the two bolts and two nuts.

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



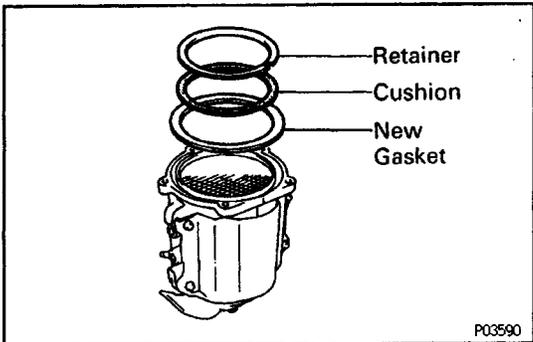
31. INSTALL TURBOCHARGER

(See Turbocharger Removal under Turbocharger System)

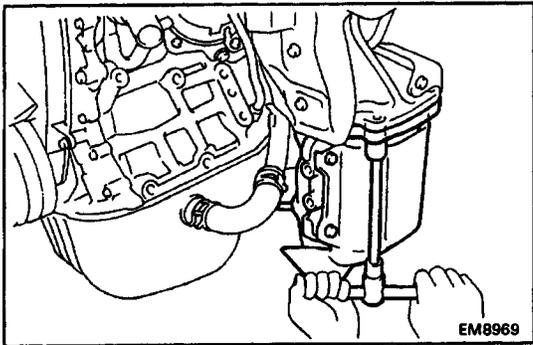


32. INSTALL MAIN TWC

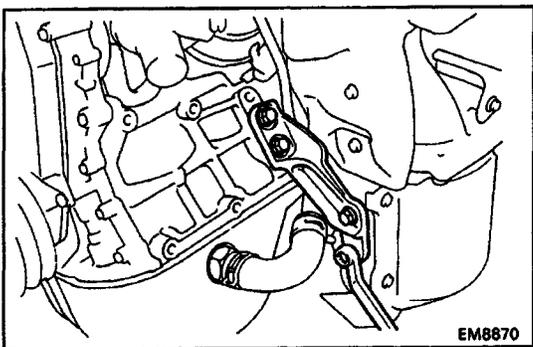
- (a) Install the two heat insulator to the TWC with the nine bolts.



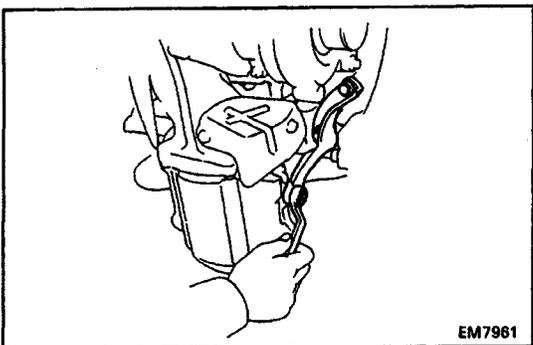
- (b) Place the cushion, retainer and a new gasket on the TWC.



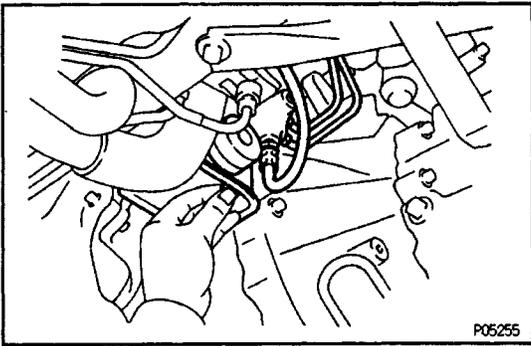
- (c) Install the TWC with the three bolts and two nuts.
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)



- (d) install the RH TWC stay with the four bolts.
Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)

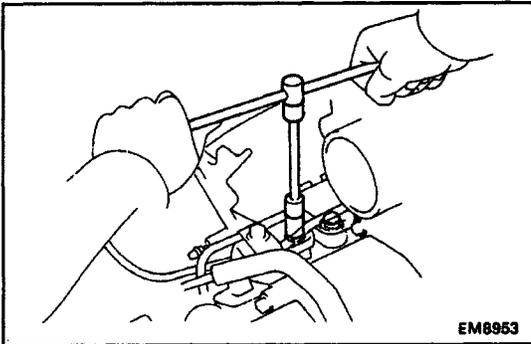


- (e) Install the LH TWC stay with the three bolts.
Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)

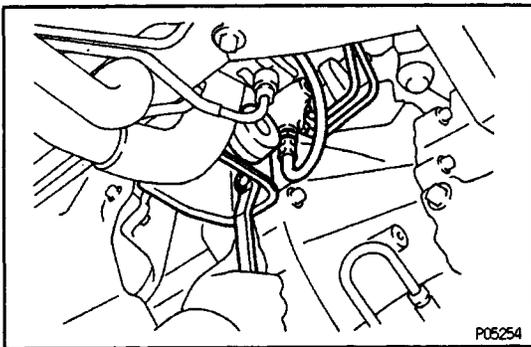


33. INSTALL CLUTCH RELEASE CYLINDER AND FRONT ENGINE MOUNTING BRACKET

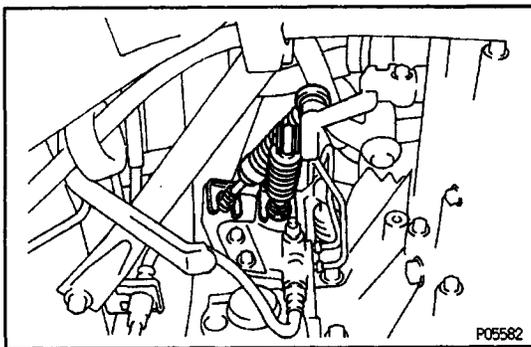
- (a) Temporarily install the release cylinder and mounting bracket with the two bolts.



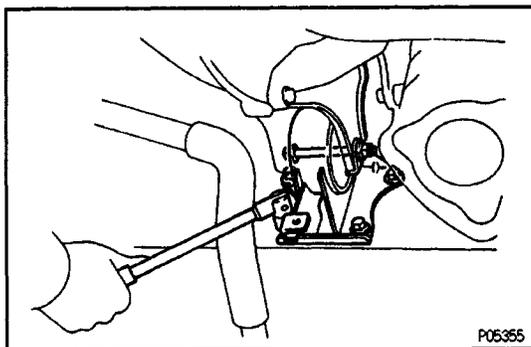
- (b) Install the clutch release cylinder with the two bolts.
Torque: 12 N-m (120 kgf-cm, 9 ft-lbf)



- (c) Tighten the two bolts holding the clutch release cylinder to the transaxle.
Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)



- (d) Connect the two transaxle control cables to the transaxle.



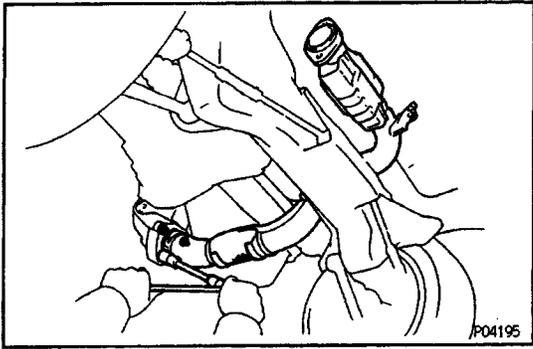
34. INSTALL FRONT ENGINE MOUNTING INSULATOR

- (a) Install the mounting insulator to the body with the four bolts.

Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)

- (b) Install the mounting insulator to the mounting bracket with the through bolt and nut.

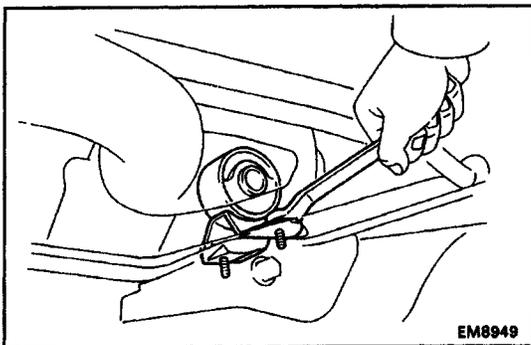
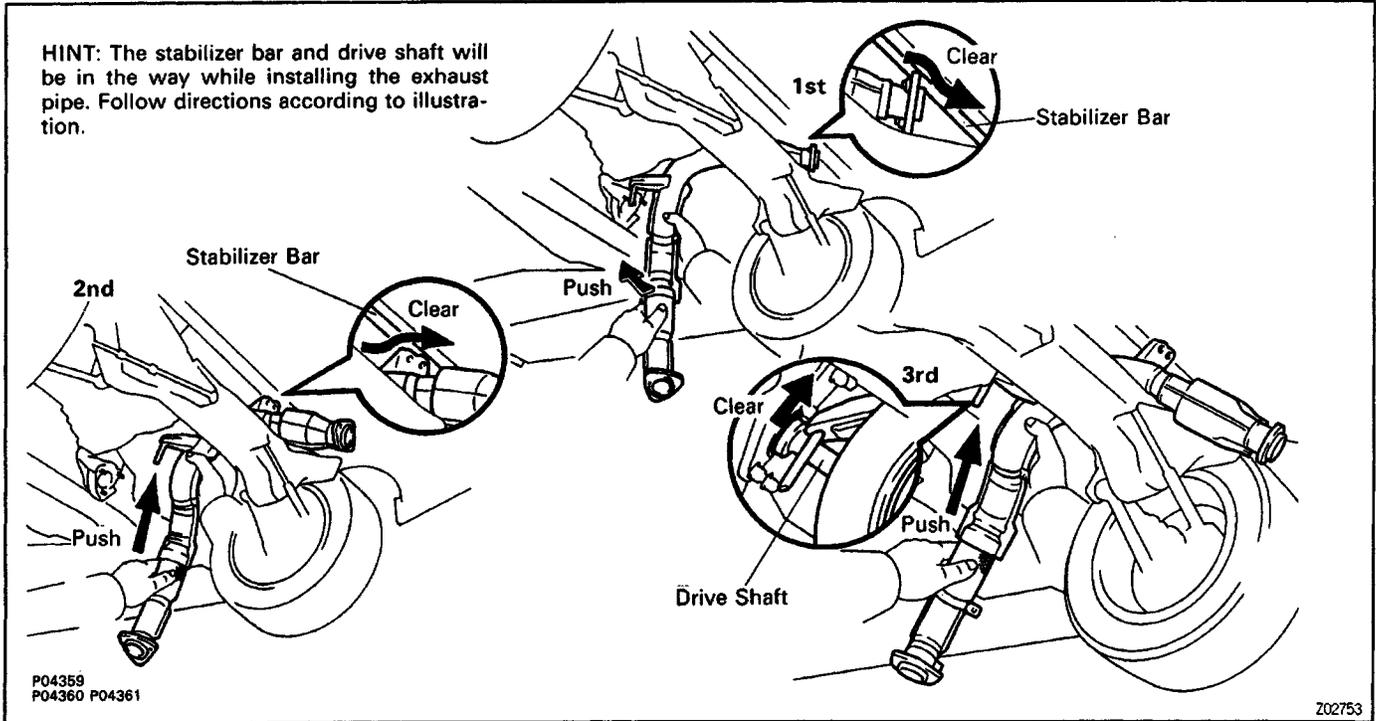
Torque: 96 N-m (980 kgf-cm, 71 ft-lbf)



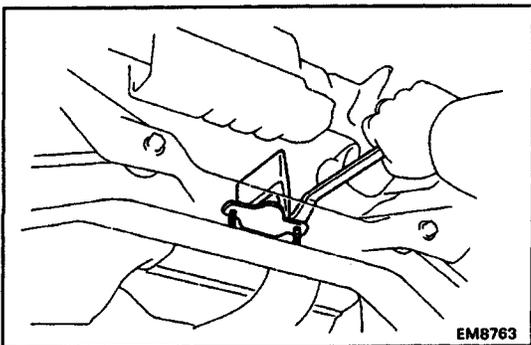
35. INSTALL FRONT EXHAUST PIPE

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

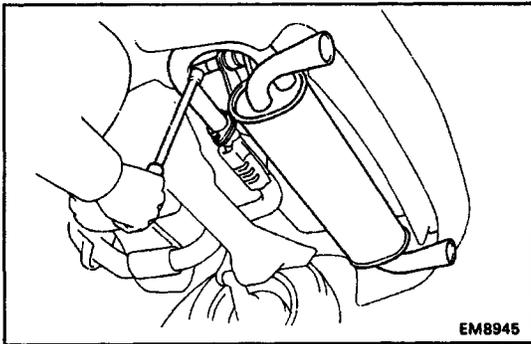
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)



- (c) Install the support bracket with the two bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

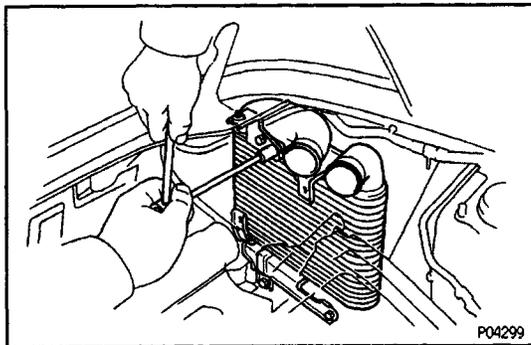


- (d) Install the damper with the two bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



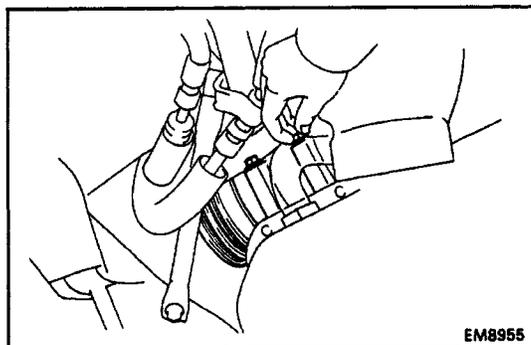
36. INSTALL TAILPIPE

- (a) Place a new gasket to the rear of the front exhaust pipe.
- (b) Install the tailpipe to the body bracket with the two bolts and nut.
Torque: 66 N-m (670 kgf-cm, 48 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)



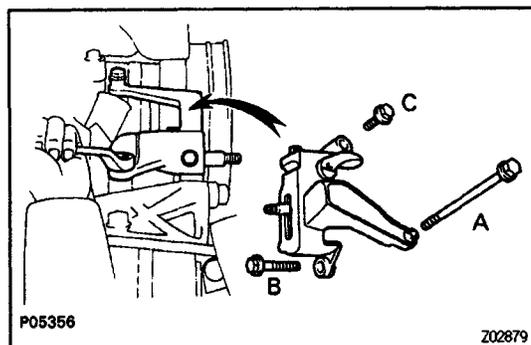
37. INSTALL CAC

Install the CAC and upper bracket with the five bolts.



38. INSTALL A/C COMPRESSOR

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



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

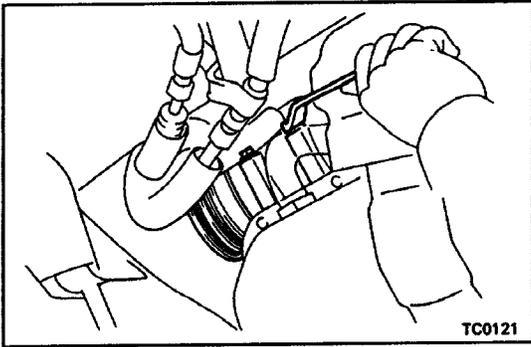
Torque:

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

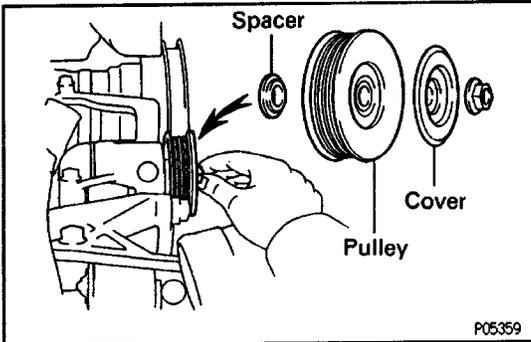
27 N-m (275 kgf-cm, 20 ft-lbf) for B

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

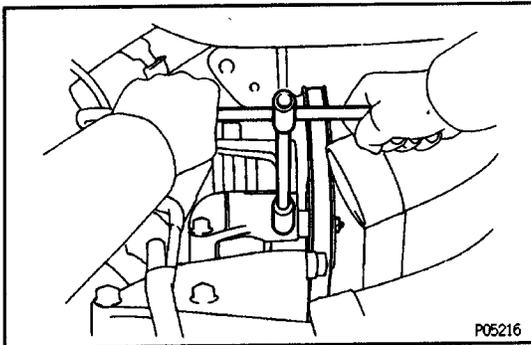
- (c) Connect the A/C compressor connector.



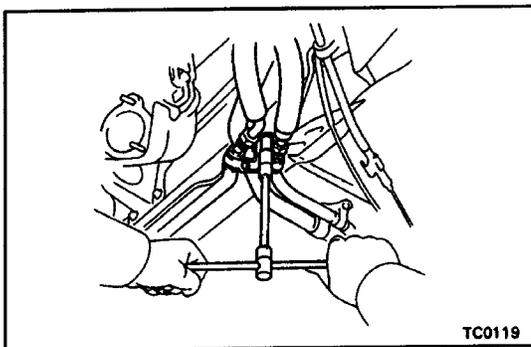
- (d) Tighten the two bolts of the lower side of the A/C compressor.
Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)



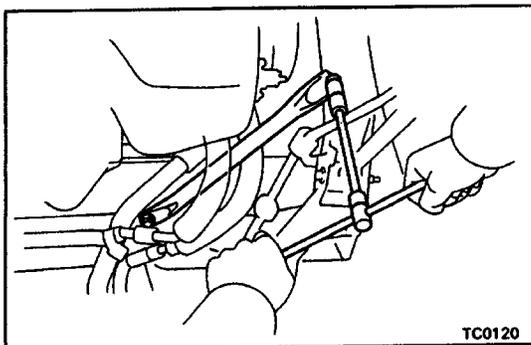
- (e) Temporarily install the spacer, idler pulley and pulley cover with the nut.



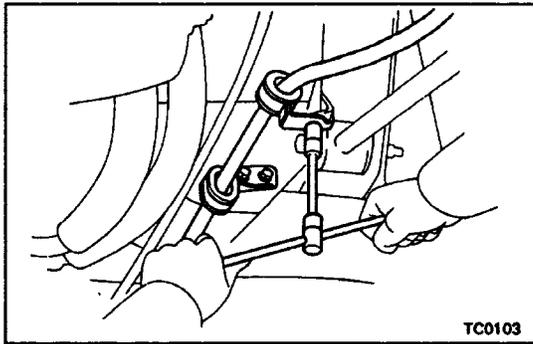
- (f) Install the drive belt with the adjusting bolt.
 (g) Tighten the idler pulley nut.



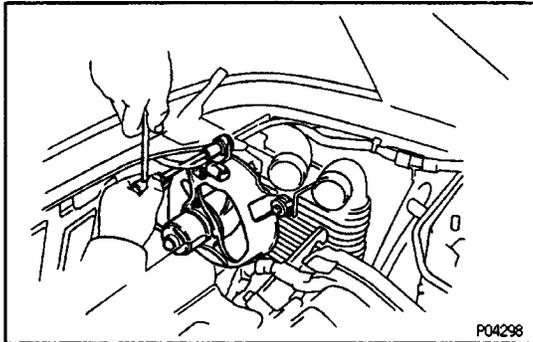
- (h) Install the A/C pipes with the two clamps and nut.



- (i) Install the lower suspension brace with the two bolts.
Torque: 73 N-m (740 kgf-cm, 54 ft-lbf)

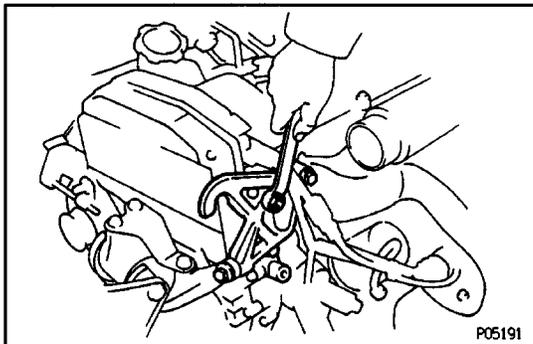


- (j) Install the parking brake cable with the two clamps and three bolts.



39. INSTALL ENGINE COMPARTMENT ELECTRIC COOLING FAN

- (a) Install the cooling fan with the three bolts.
 (b) Connect the cooling fan connector.



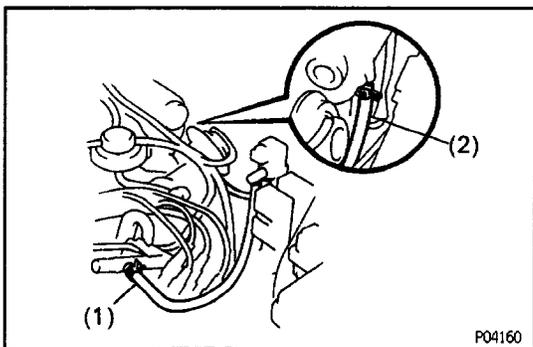
40. INSTALL RH FRONT ENGINE HANGER

Install the engine hanger with the four bolts.

Torque:

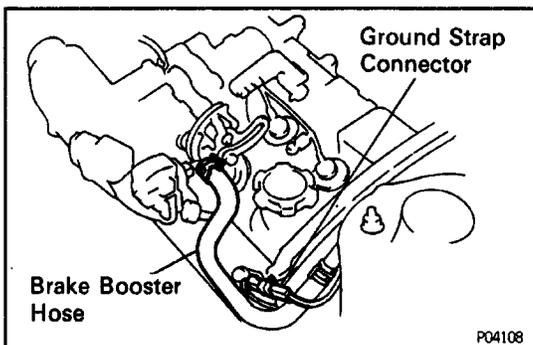
39 N-m (400 kgf-cm, 29 ft-lbf) for cylinder head

61 N-m (620 kgf-cm, 45 ft-lbf) for mounting bracket



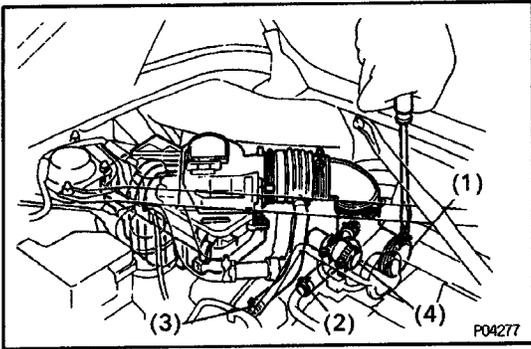
41. CONNECT A/C IDLE-UP AIR HOSES

- (1) Air hose to No.2 air tube
 (2) Air hose to intake manifold

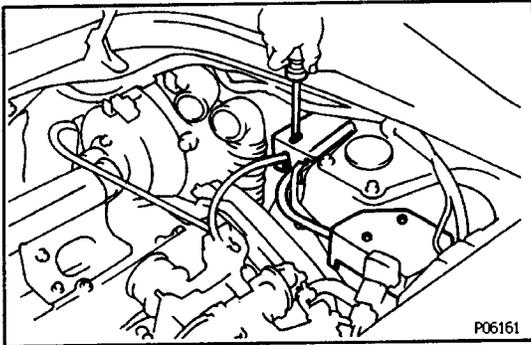
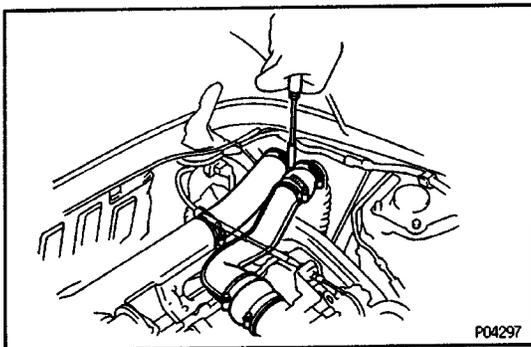
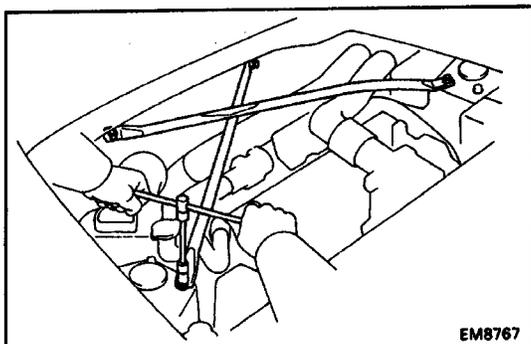


42. CONNECT BRAKE BOOSTER VACUUM HOSE

43. CONNECT GROUND STRAP CONNECTOR

**44. INSTALL AIR CLEANER HOUSING**

- (a) Install the air cleaner case with the three bolts.
- (b) Install the air filter.
- (c) Install the air cleaner cap and air flow sensor assembly with the four clips.
- (d) Connect the following hoses:
 - (1) Air cleaner hose to turbocharger
 - (2) PCV hose to cylinder head cover
 - (3) Air hose to No.2 air tube
 - (4) Air hose to air by-pass valve
- (e) Connect the air flow sensor connector.

**45. (w/ CRUISE CONTROL SYSTEM)****INSTALL CRUISE CONTROL ACTUATOR AND ACCELERATOR LINKAGE****46. (w/o CRUISE CONTROL SYSTEM)****CONNECT ACCELERATOR LINKAGE TO THROTTLE BODY****47. INSTALL NO.1 AND NO.2 INTAKE AIR CONNECTORS****48. INSTALL UPPER SUSPENSION BRACE**

Install the upper brace with the two bolts and two nuts.

Torque:

73 N-m (740 kgf-cm, 54 ft-lbf) for bolt

64 N-m (650 kgf-cm, 47 ft-lbf) for nut

49. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

50. FILL WITH ENGINE COOLANT

51. START ENGINE AND CHECK FOR LEAKS

52. ADJUST IGNITION TIMING

53. INSTALL ENGINE HOOD SIDE PANELS

54. INSTALL ENGINE UNDER COVERS

55. PERFORM ROAD TEST

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

58. RECHECK ENGINE COOLANT AND OIL LEVELS