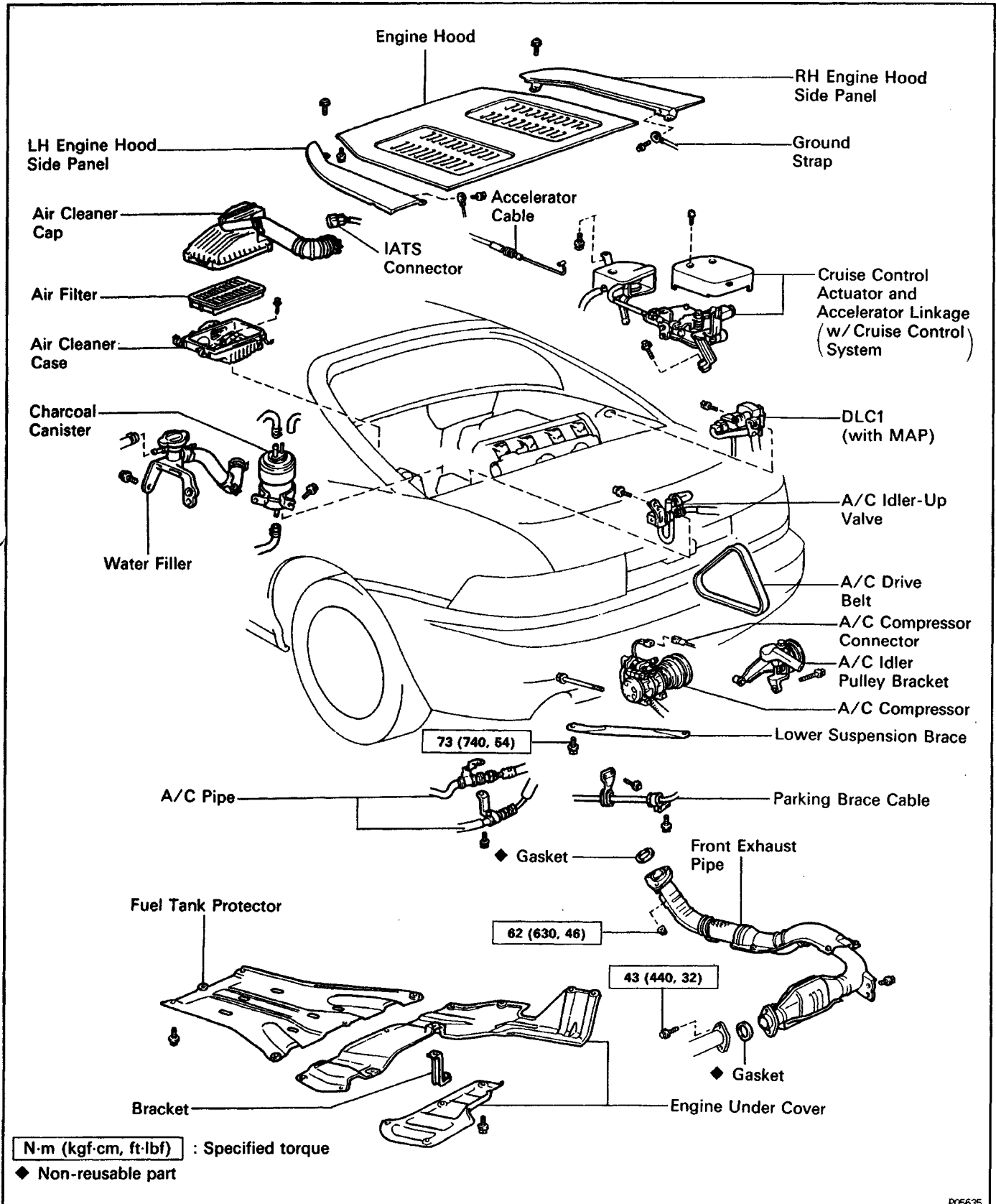
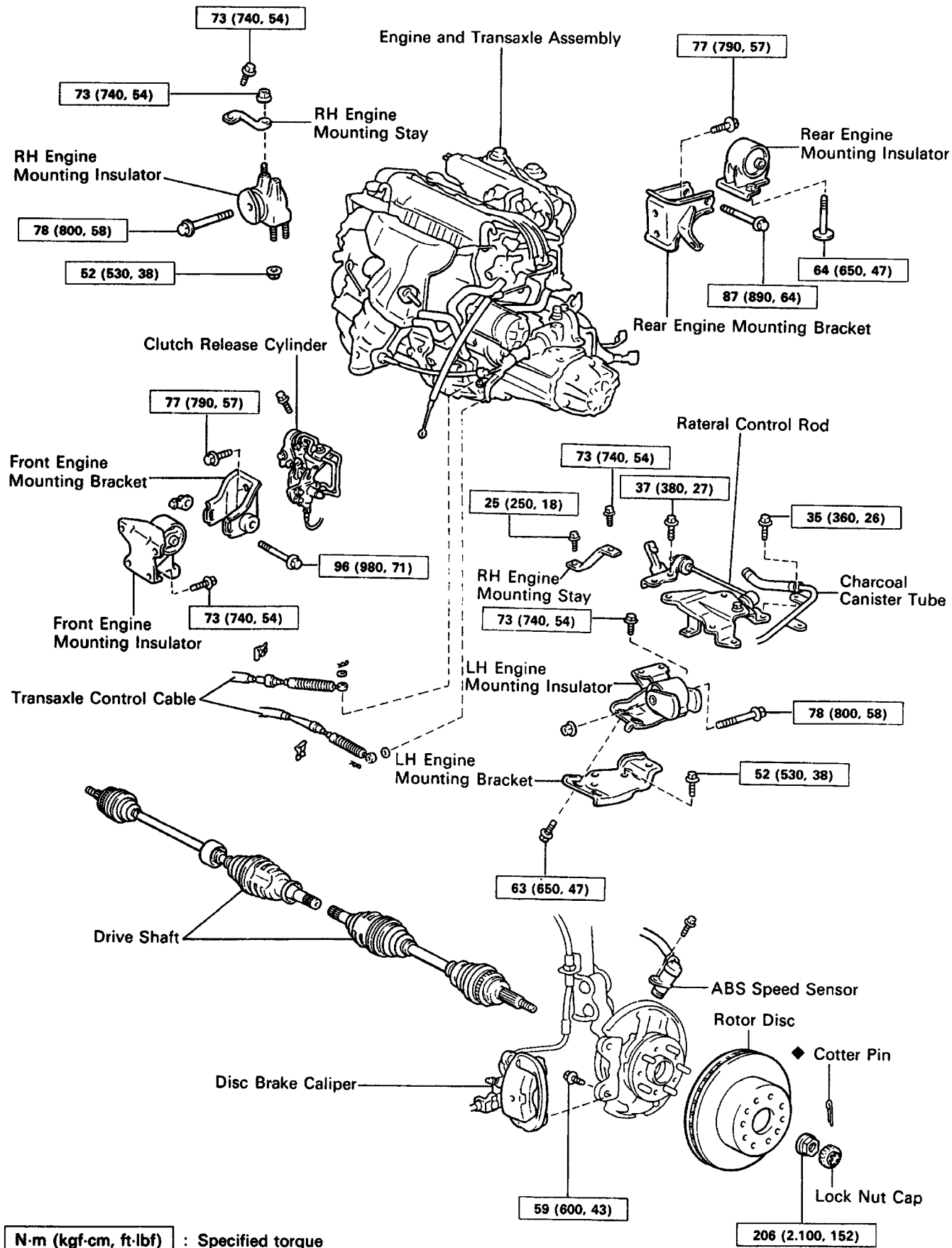


# CYLINDER BLOCK COMPONENTS FOR ENGINE REMOVAL AND INSTALLATION

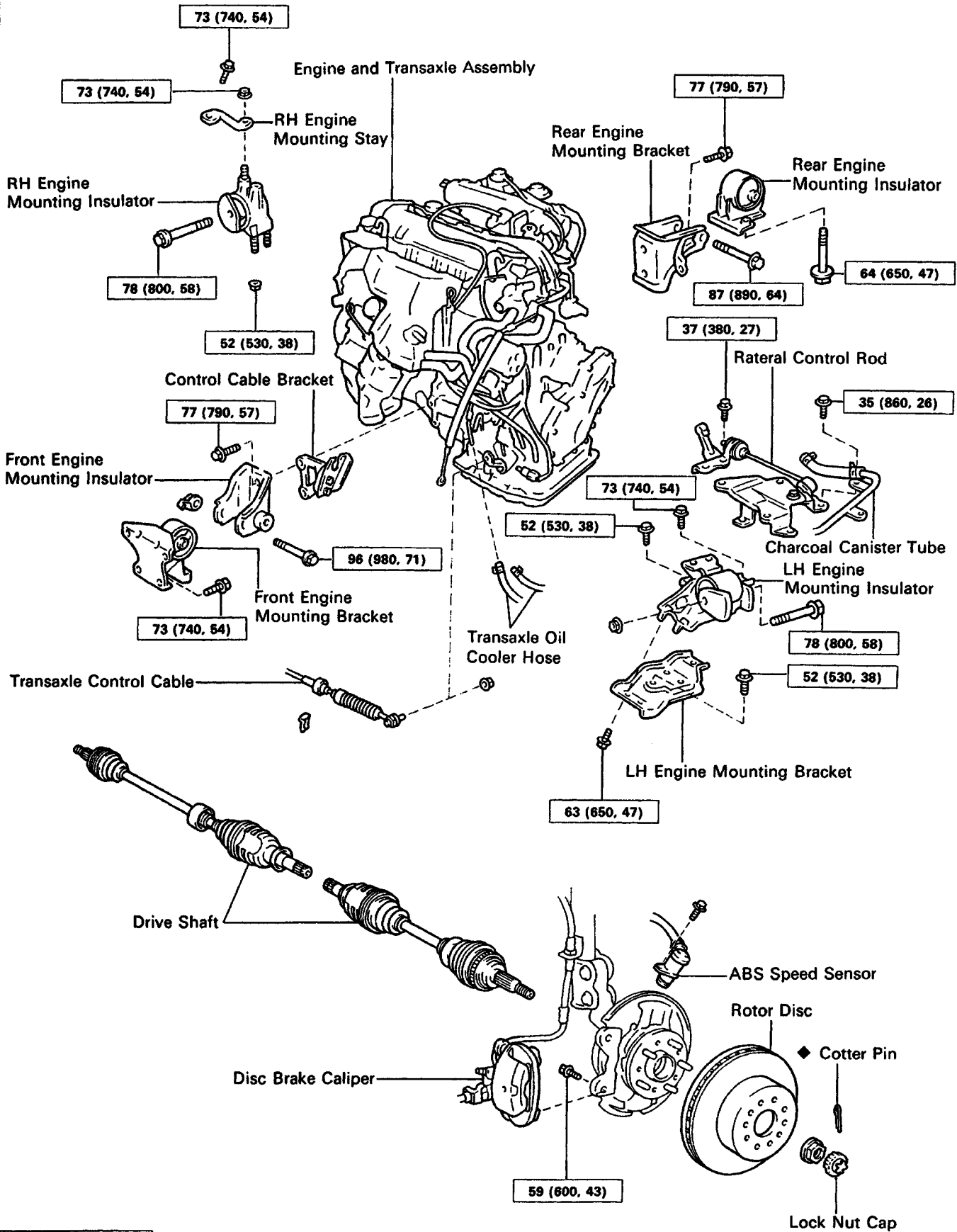


M/T



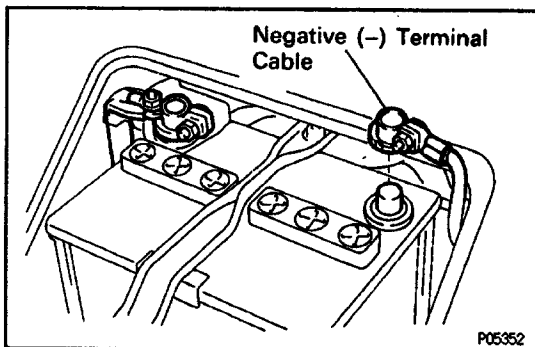
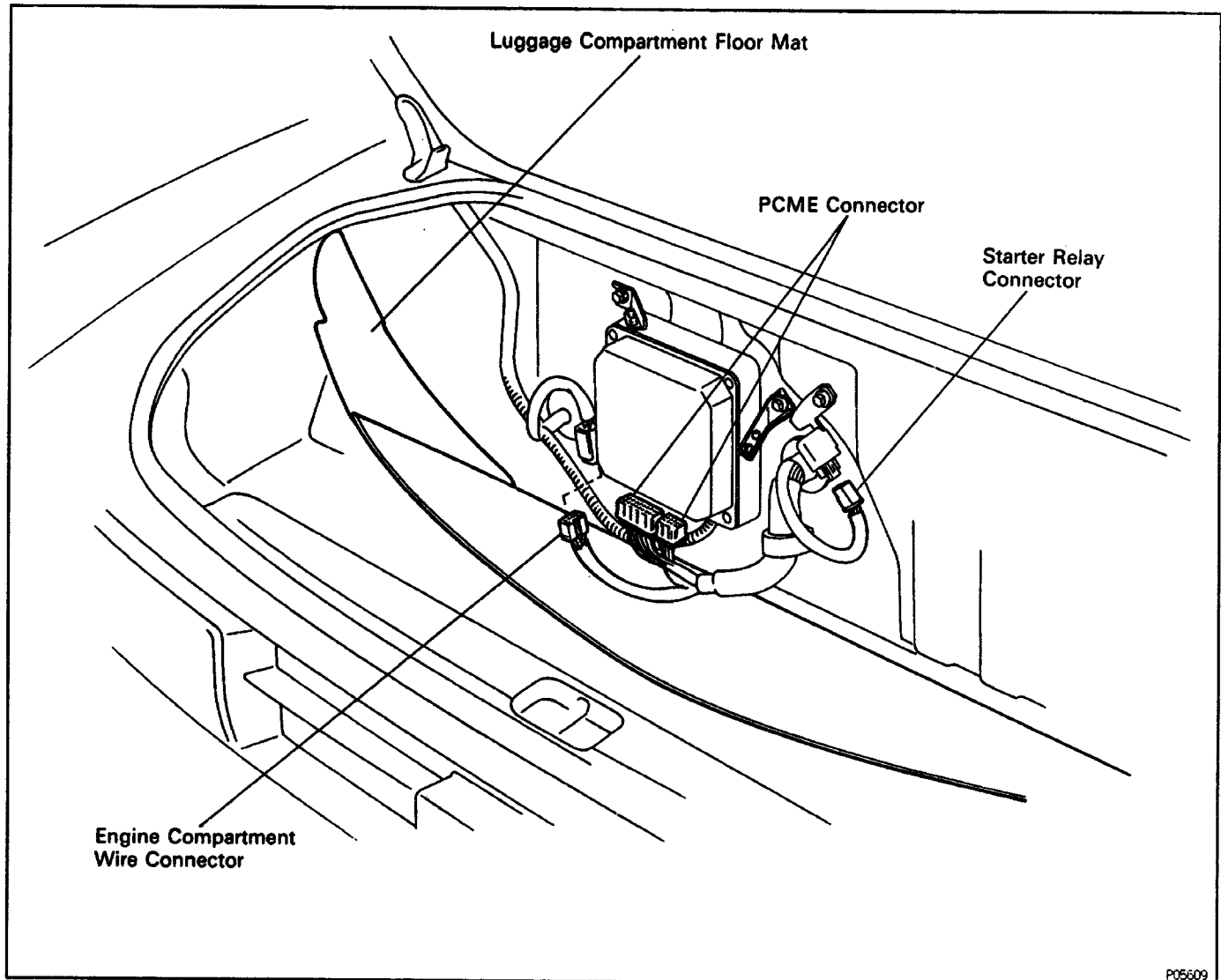
**N-m (kgf-cm, ft-lbf) : Specified torque**  
 ◆ Non-reusable part

A/T



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

◆ Non-reusable part



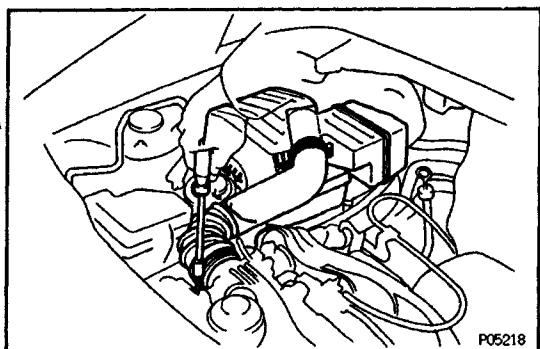
## ENGINE REMOVAL

(See Components for Engine Removal and Installation)

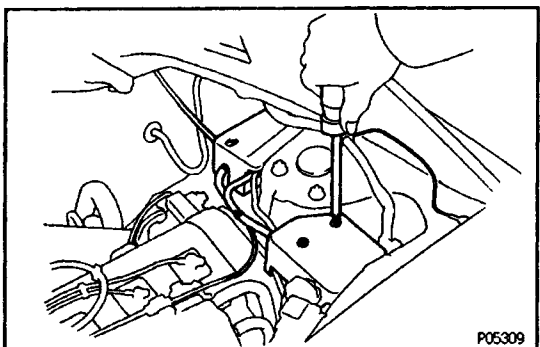
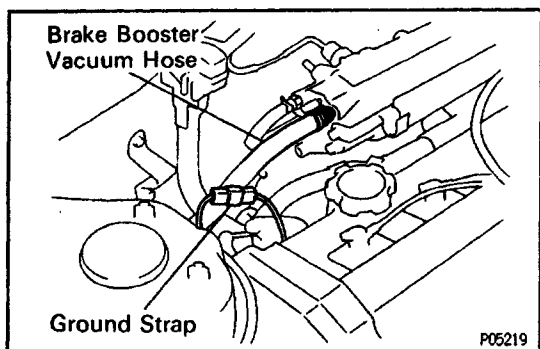
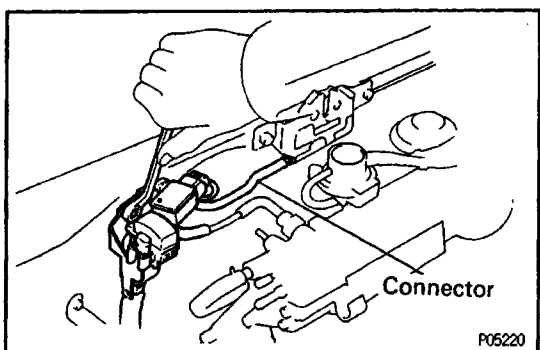
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

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

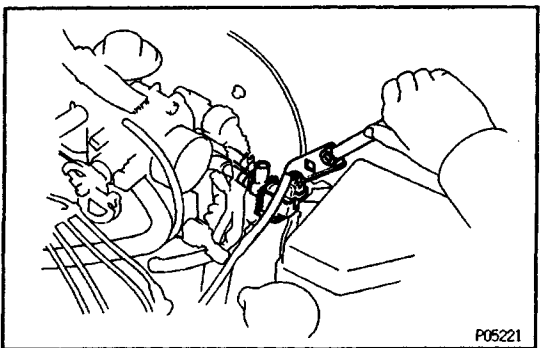
2. REMOVE ENGINE HOOD
3. REMOVE ENGINE HOOD SIDE PANELS
4. REMOVE ENGINE UNDER COVERS
5. DRAIN ENGINE COOLANT
6. DRAIN ENGINE OIL
7. DRAIN TRANSAXLE OIL

**8. REMOVE AIR CLEANER HOUSING**

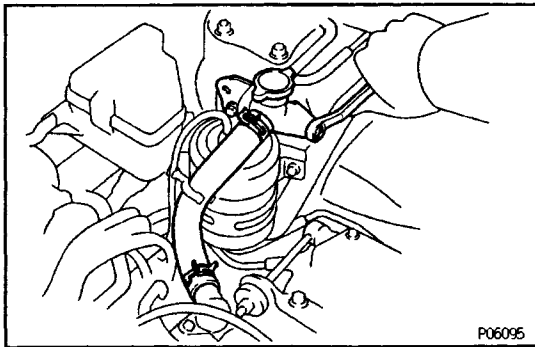
- (a) Disconnect the IATS connector.
- (b) Disconnect the air cleaner hose from the throttle body.
- (c) Disconnect the four clamps, and remove the air cleaner cap.
- (d) Remove the air filter.
- (e) Remove the three bolts and air cleaner case.

**9. DISCONNECT ACCELERATOR LINKAGE FROM THROTTLE BODY****10. (w/ CRUISE CONTROL SYSTEM) REMOVE CRUISE CONTROL ACTUATOR AND ACCELERATOR LINKAGE****11. DISCONNECT GROUND STRAP CONNECTOR****12. DISCONNECT BRAKE BOOSTER VACUUM HOSE****13. DISCONNECT DATA LINK CONNECTOR 1 AND MAP**

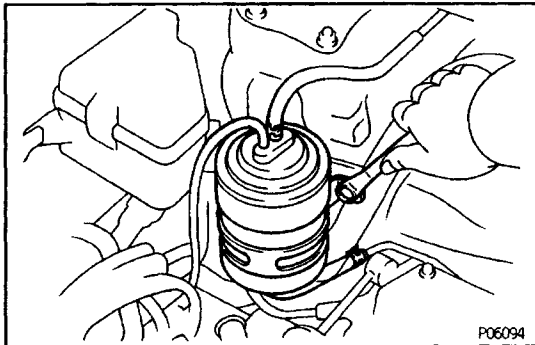
- (a) Disconnect the engine hood curtesy switch connector.
- (b) Remove the bolt, and disconnect the data link connector and MAP from the body.

**14. DISCONNECT A/C IDLE-UP VALVE FROM BODY**

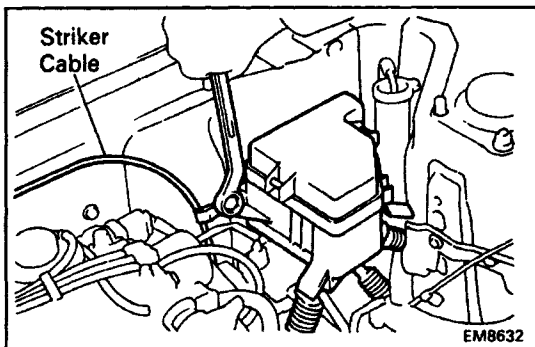
Remove the bolt, and disconnect the A/C idle-up from the body.

**15. REMOVE WATER FILLER**

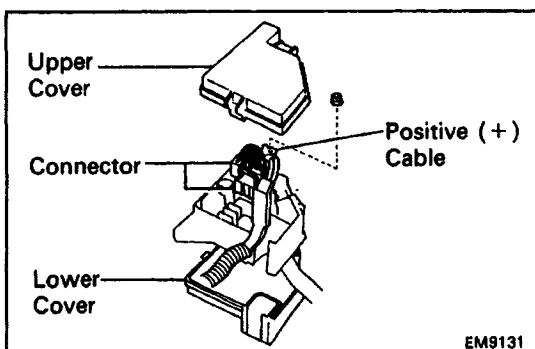
- (a) Disconnect the following hose:
  - (1) Water filler hose
  - (2) Coolant reservoir hose
- (b) Remove the two bolts and water filler.

**16. REMOVE CHARCOAL CANISTER**

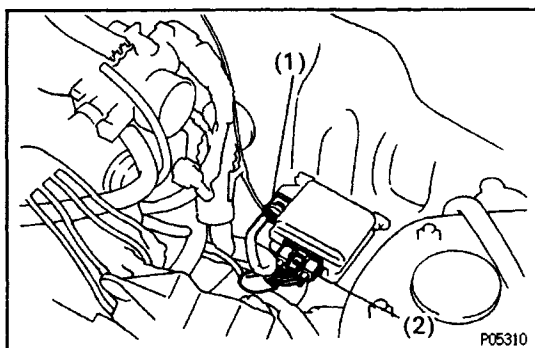
- (a) Disconnect the three hoses from the charcoal canister.
- (b) Remove the two bolts and charcoal canister.

**17. REMOVE ENGINE RELAY BOX, AND DISCONNECT ENGINE WIRE**

- (a) Remove the two bolts and relay box. Disconnect the luggage compartment striker cable.

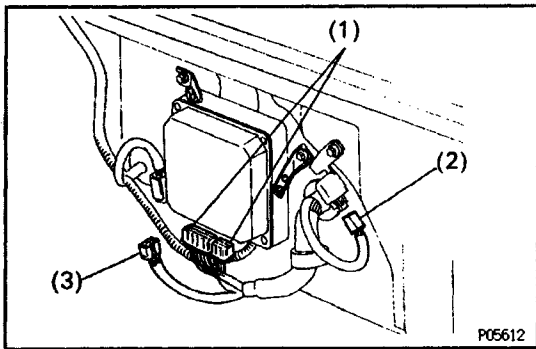


- (b) Remove the upper and lower covers from the relay box.
- (c) Disconnect the positive (+) cable and two connectors of the engine wire from the relay box.

**18. DISCONNECT CONNECTORS**

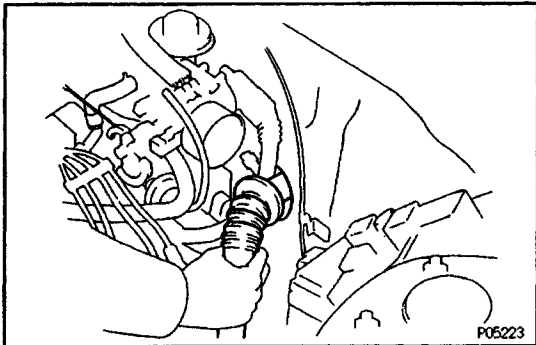
Disconnect the following connector and cord:

- (1) Noise filter connector
- (2) Igniter connector

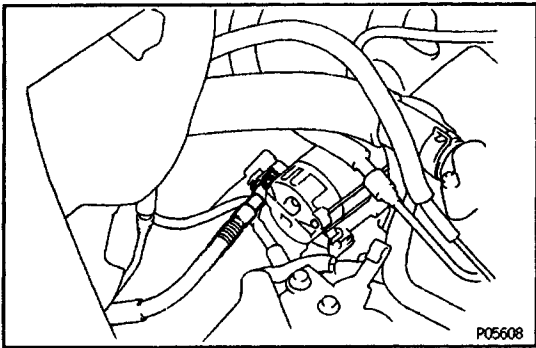


## 19. DISCONNECT ENGINE WIRE FROM LUGGAGE COMPARTMENT

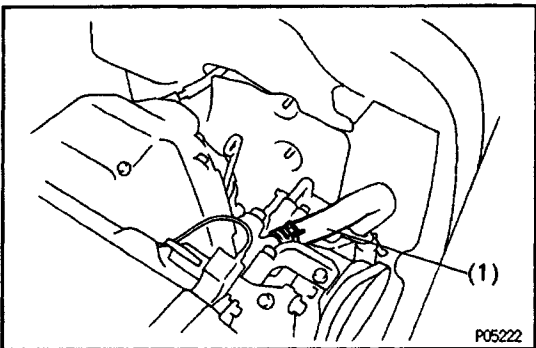
- (a) Disconnect the following connectors:
- (1) Two PCME (& T) connectors
  - (2) Starter relay connector
  - (3) Engine compartment wire connector



- (b) Pull out the engine wire from the luggage compartment.

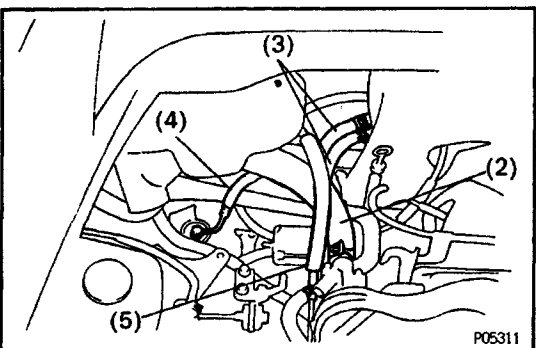


## 20. DISCONNECT STARTER CABLE

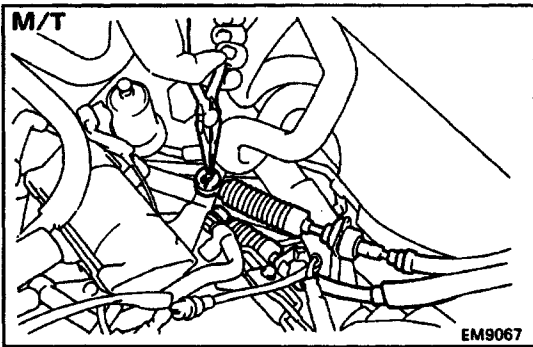


## 21. DISCONNECT HOSES

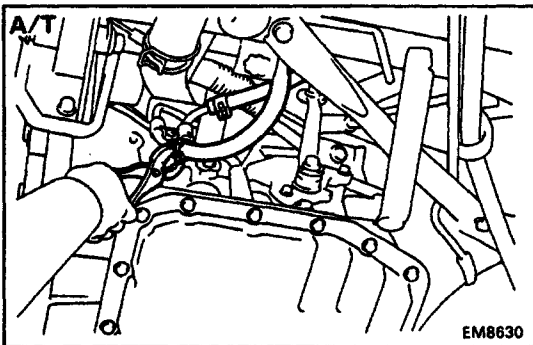
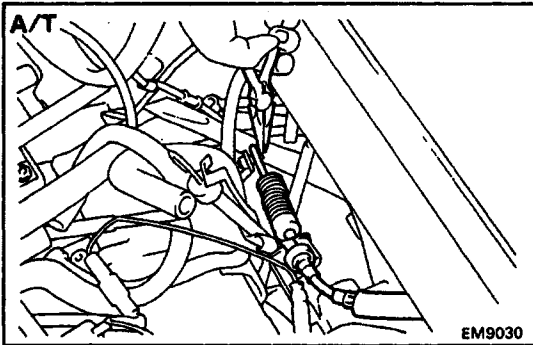
- (a) Disconnect the following connectors:
- (1) Radiator hose from water inlet



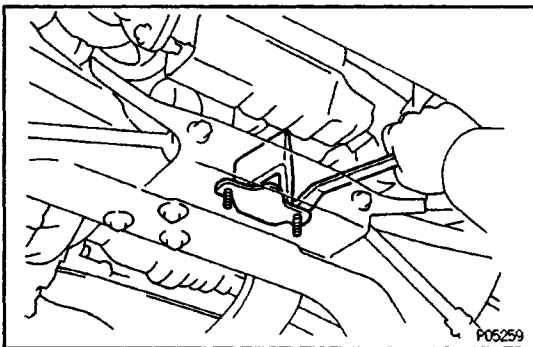
- (2) Radiator hose from water outlet
  - (3) Two heater water hoses
  - (4) Fuel inlet hose from fuel filter
  - (5) Fuel return hose
- CAUTION: Catch leaking fuel in a container.**



## 22. DISCONNECT TRANSAXLE CONTROL CABLE (S) FROM TRANSAXLE



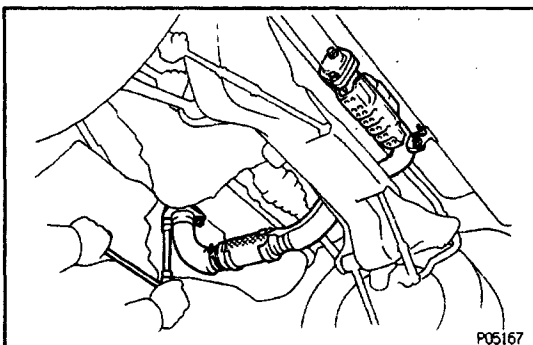
## 23. (A/T) DISCONNECT TRANSAXLE OIL COOLER HOSES



## 24. REMOVE EXHAUST PIPE

(a) (CALIF. only)

Remove the two bolts and damper.

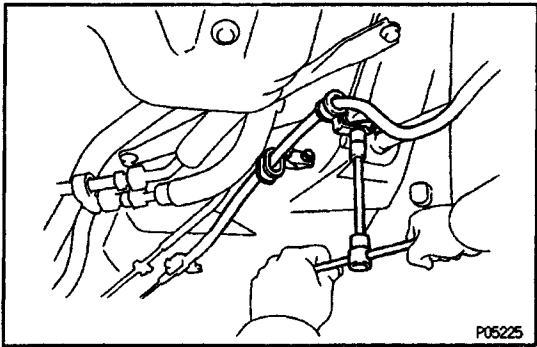


- (b) Remove the two bolts holding the front exhaust pipe bracket to the tailpipe bracket.
- (c) Remove the two bolts holding the front exhaust pipe to the tailpipe.
- (d) Using a 14 mm deep socket wrench, remove the three nuts holding the front exhaust pipe to the TWC.
- (e) Remove the front exhaust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

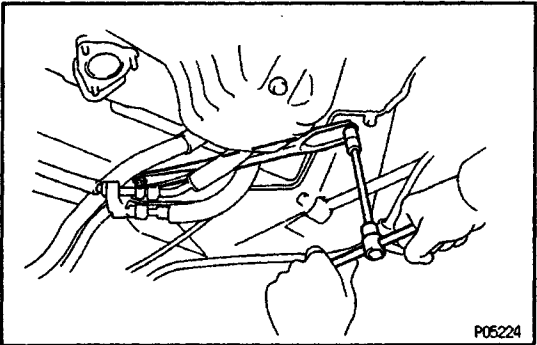


**25. DISCONNECT A/C COMPRESSOR FROM ENGINE**

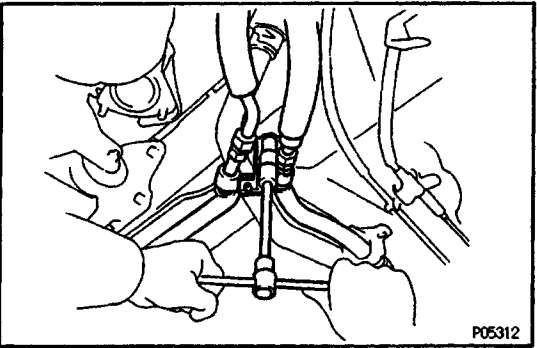
- (a) Remove the three clamp bolts, and disconnect the parking brake cable.



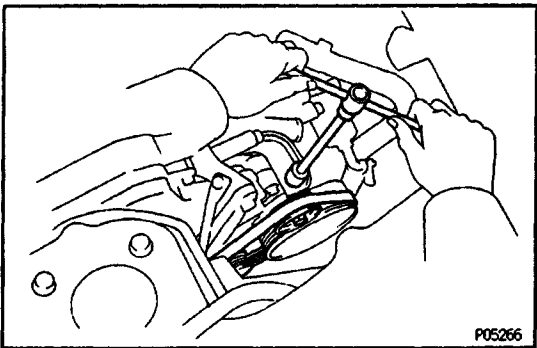
- (b) Remove the two bolts and lower suspension brace.



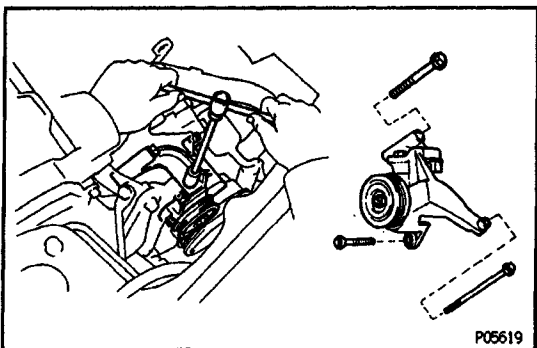
- (c) Remove the clamp nut, and disconnect the two A/C pipes.

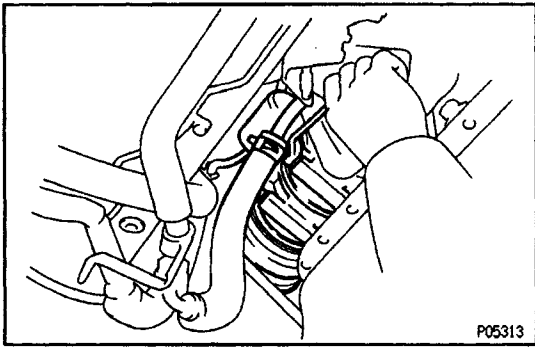


- (d) Loosen the idler pulley nut.  
 (e) Loosen the adjusting bolt, and remove the drive belt.

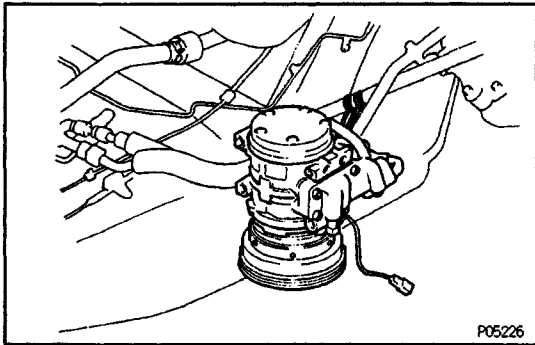


- (f) Disconnect the A/C compressor connector.  
 (g) Remove the three bolts and idler pulley bracket.

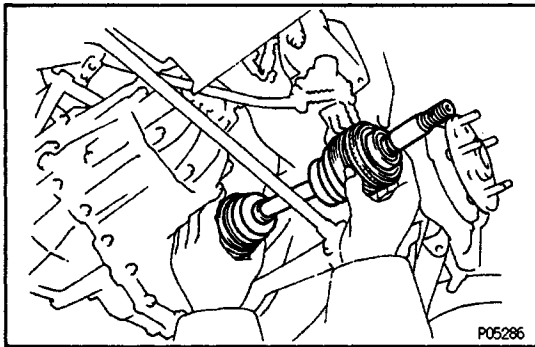




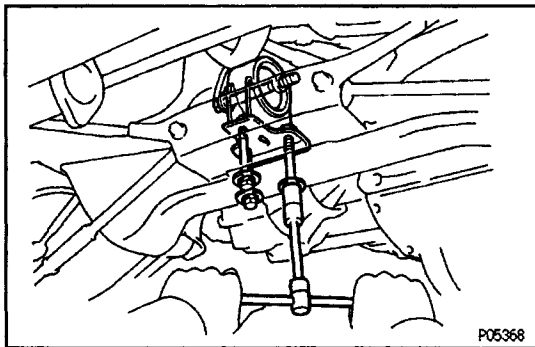
- (h) Remove the two bolts, and disconnect the A/C compressor from the engine.



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

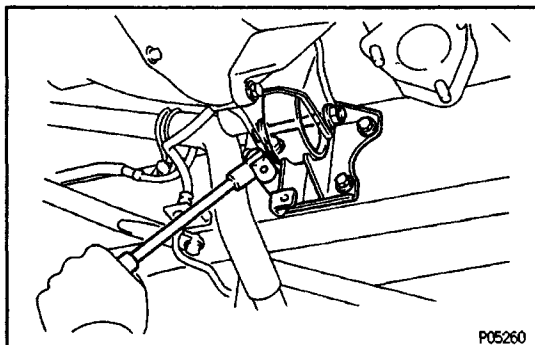


**26. REMOVE DRIVE SHAFTS**  
(See Drive Shaft Removal in SA section)



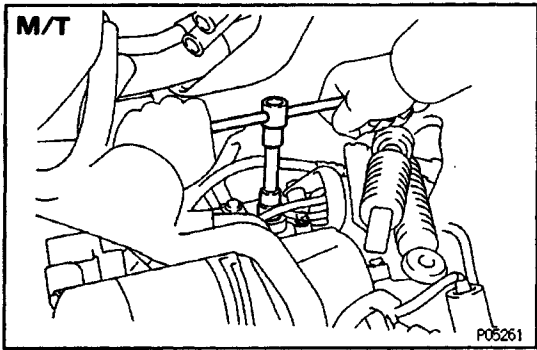
**27. REMOVE REAR ENGINE MOUNTING INSULATOR**

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

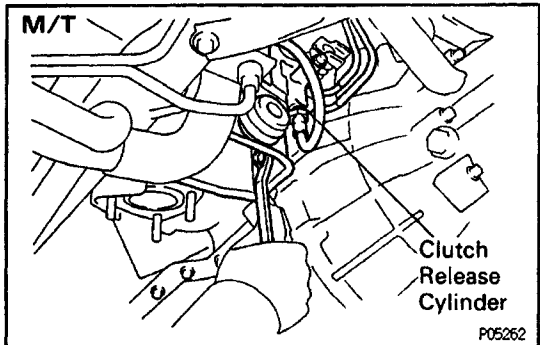


**28. REMOVE FRONT ENGINE MOUNTING INSULATOR**

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

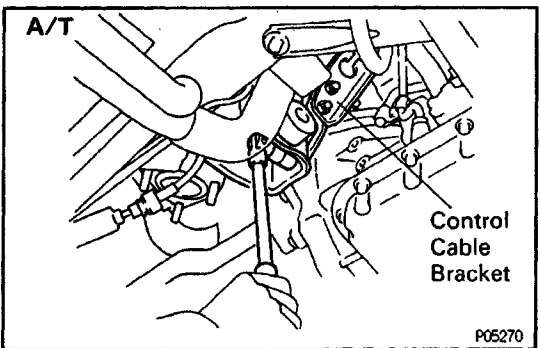
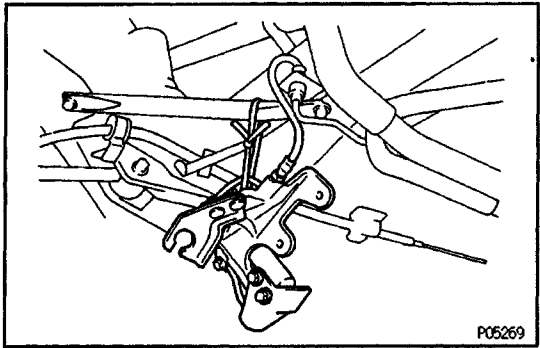
**29. REMOVE FRONT ENGINE MOUNTING BRACKET****(M/T)**

- (a) Remove the bolt and nut holding the clutch release cylinder to the transaxle.

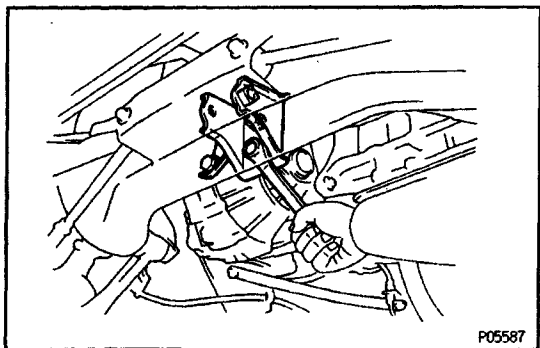


- (b) Remove the two bolts and mounting bracket, and disconnect the clutch release cylinder from the transaxle.

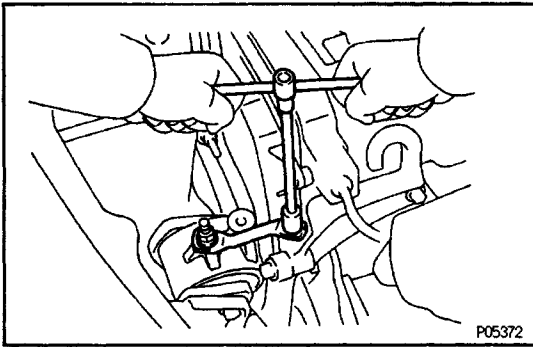
HINT: Suspend the clutch release cylinder to the suspension brace with a string.

**(A/T)**

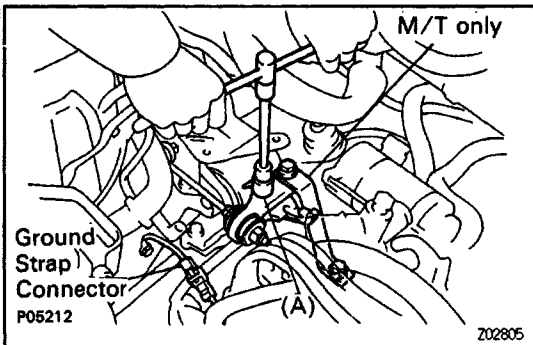
- Remove the two bolts, mounting bracket and control cable bracket.

**30. REMOVE REAR ENGINE MOUNTING BRACKET**

- Remove the three bolts and mounting bracket.

**31. REMOVE RH ENGINE MOUNTING STAY**

Remove the bolt, nut and mounting stay.

**32. (M/T only)****REMOVE LH ENGINE MOUNTING STAY**

Remove the two bolts and mounting stay.

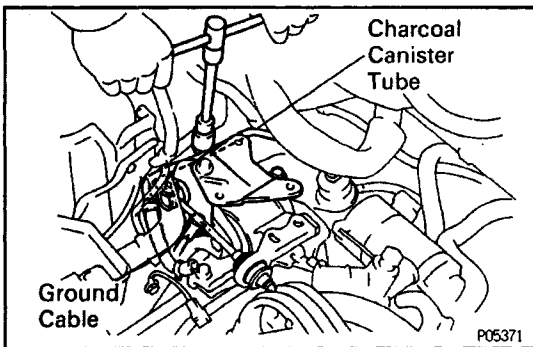
**33. DISCONNECT LATERAL CONTROL ROD FROM LH ENGINE MOUNTING INSULATOR**

(M/T)

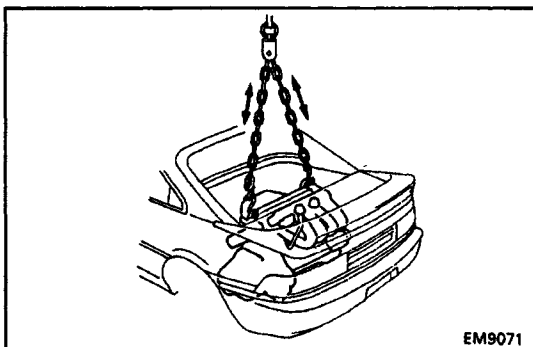
Remove the bolt (A), and disconnect the lateral control rod from the mounting insulator.

(A/T)

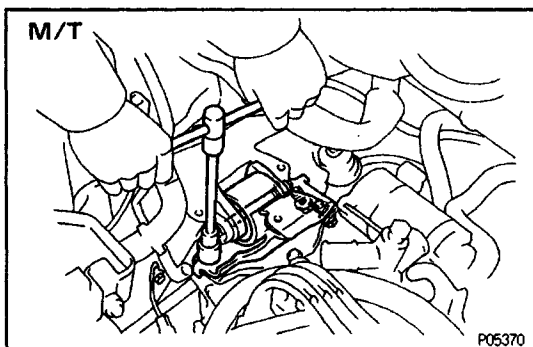
Remove the two bolts and disconnect the lateral control rod from the mounting insulator.

**34. DISCONNECT GROUND STRAP CONNECTOR****35. REMOVE LATERAL CONTROL ROD**

Remove the four bolts and lateral control rod. Disconnect the ground strap connector.

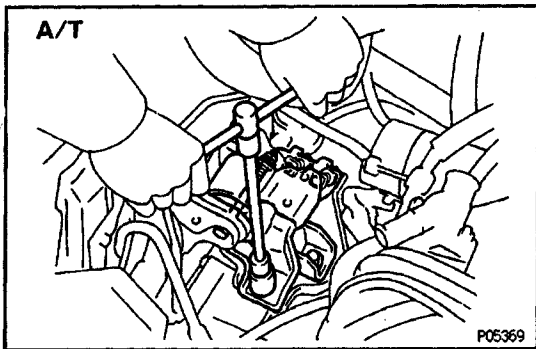
**36. REMOVE ENGINE AND TRANSAXLE ASSEMBLY FROM VEHICLE**

(a) Attach the engine chain hoist to the engine hangers.



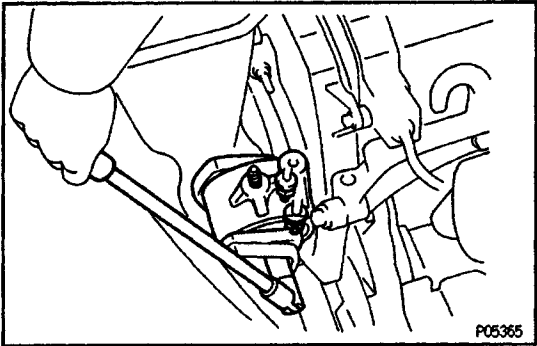
(b) (M/T)

Remove the three bolts, through bolt, nut and LH mounting insulator.

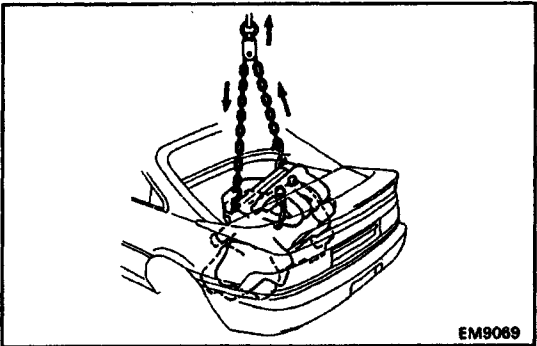


(c) (A/T)

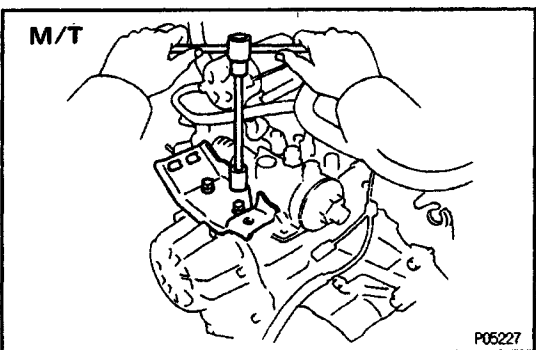
Remove the four bolts, through bolt, nut and LH mounting insulator.



(d) Remove the through bolt, two nuts and RH mounting insulator.

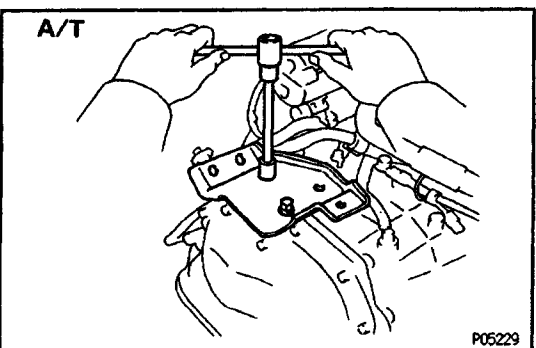
(e) Lift the engine out of the vehicle slowly and carefully.  
HINT: Make sure the engine is clear of all wiring, hoses and cables.

(f) Place the engine and transaxle assembly onto the stand.

**37. REMOVE LH ENGINE MOUNTING BRACKET**

(M/T)

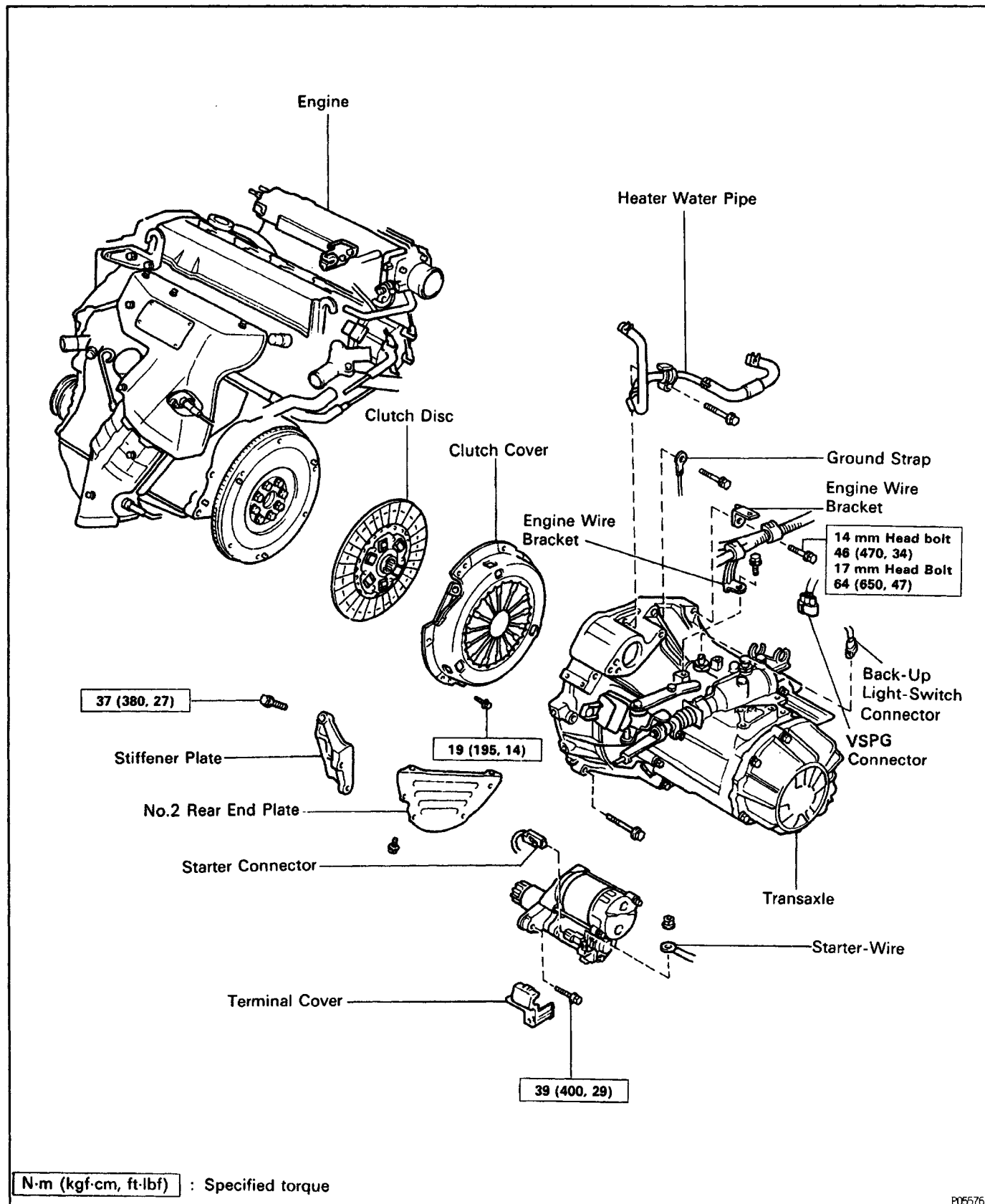
Remove the three bolts and mounting bracket.



(A/T)

Remove the two bolts and mounting bracket.

# COMPONENTS FOR ENGINE & TRANSAXLE SEPARATION AND ASSEMBLY (M/T)

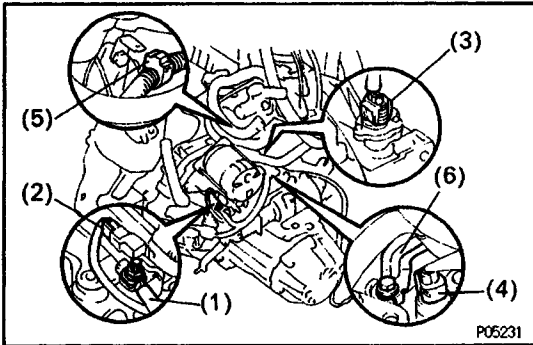


# ENGINE & TRANSAXLE SEPARATION<sup>0011H-01</sup> (M/T)

(Components for Engine & Transaxle Separation and Assembly)

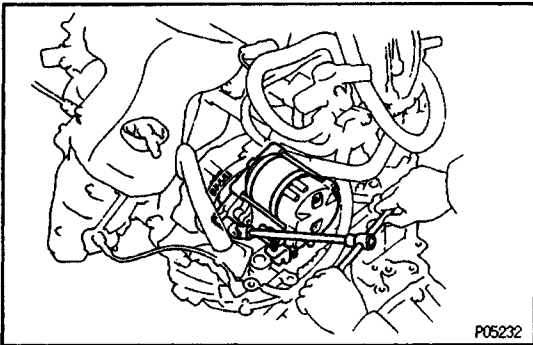
## 1. DISCONNECT ENGINE WIRE

(a) Remove the terminal cover from the starter.



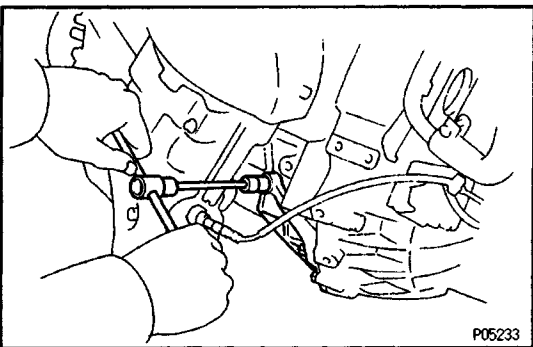
(b) Disconnect the following parts:

- (1) Starter wire
- (2) Starter connector
- (3) Vehicle speed pulse generator connector
- (4) Back-up light switch connector
- (5) Engine wire clamp
- (6) Engine wire bracket



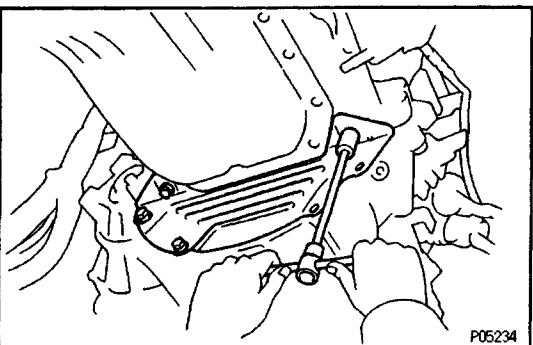
## 2. REMOVE STARTER

Remove the two bolts and starter.



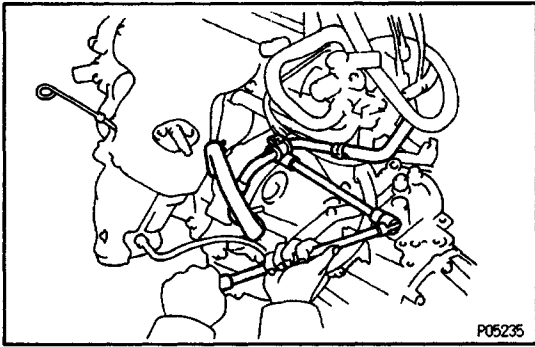
## 3. REMOVE STIFFENER PLATE

Remove the three bolts and stiffener plate.



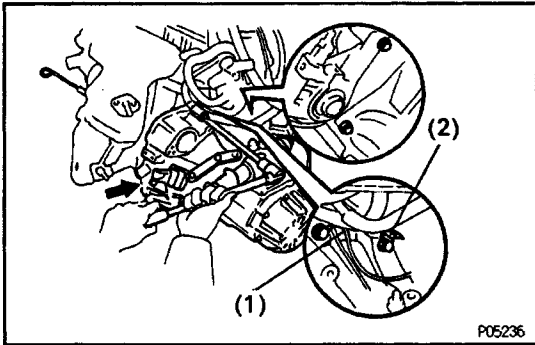
## 4. REMOVE NO.2 REAR END PLATE

Remove the four bolts and rear end plate.



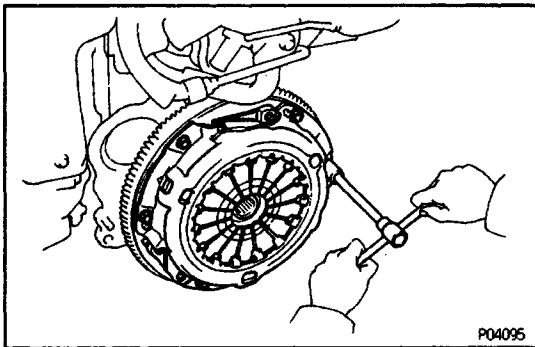
### 5. REMOVE HEATER WATER PIPE

- (a) Disconnect the water hose from the water by-pass pipe.
- (b) Remove the two bolts and heater water pipe.



### 6. REMOVE TRANSAXLE

- (a) Remove the five bolts and following parts:
  - (1) Ground strap
  - (2) Engine wire bracket
- (b) Separate the transaxle and engine.

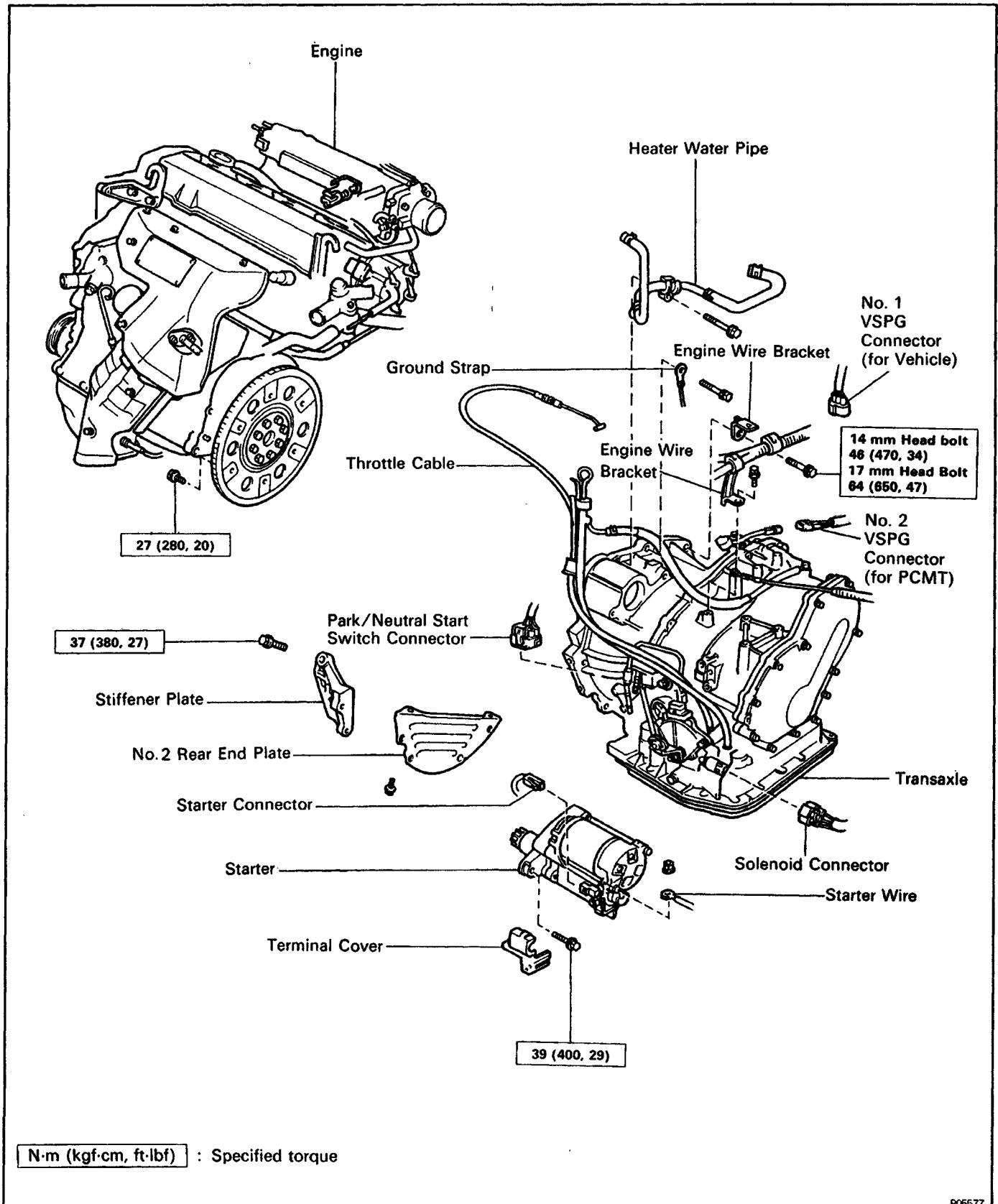


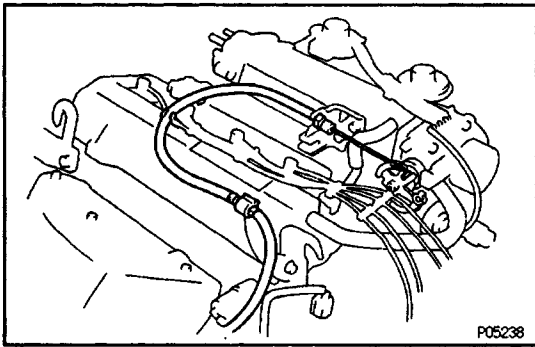
### 7. REMOVE CLUTCH COVER AND DISC

Remove the six bolts, clutch cover and disc.



# COMPONENTS FOR ENGINE & TRANSAXLE SEPARATION AND ASSEMBLY (A/T)





## ENGINE & TRANSAXLE SEPARATION. (A/T)

(Components for Engine & Transaxle Separation and Assembly (A/T))

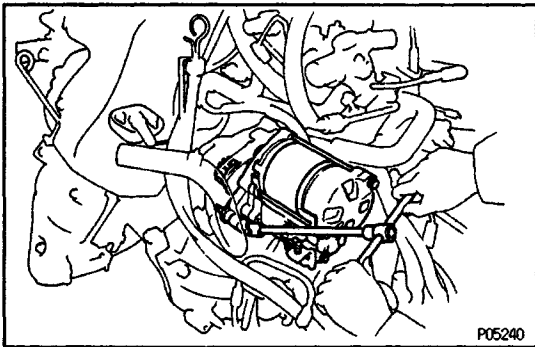
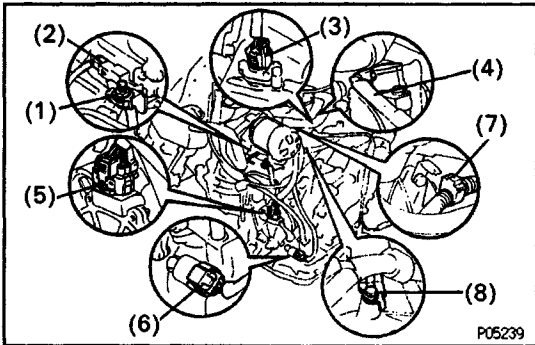
### 1. DISCONNECT THROTTLE CABLE FROM THROTTLE BODY

### 2. DISCONNECT ENGINE WIRE

(a) Remove the terminal cover from the starter.

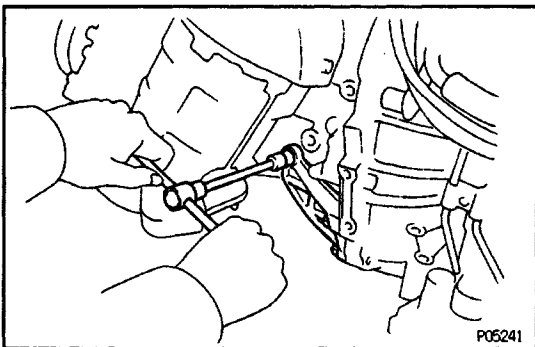
(b) Disconnect the following parts:

- (1) Starter wire
- (2) Starter connector
- (3) No.1 vehicle speed pulse generator
- (4) No.2 vehicle speed pulse generator
- (5) Park/neutral switch connector
- (6) Solenoid connector
- (7) Engine wire clamp
- (8) Engine wire bracket



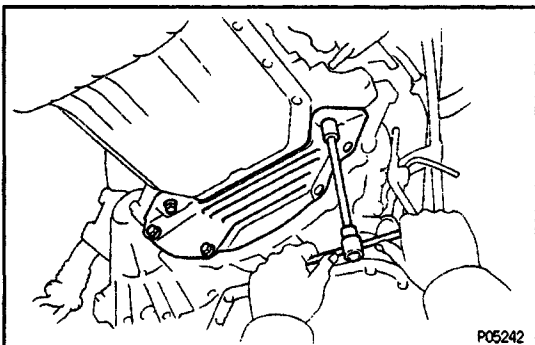
### 3. REMOVE STARTER

Remove the two bolts and starter.



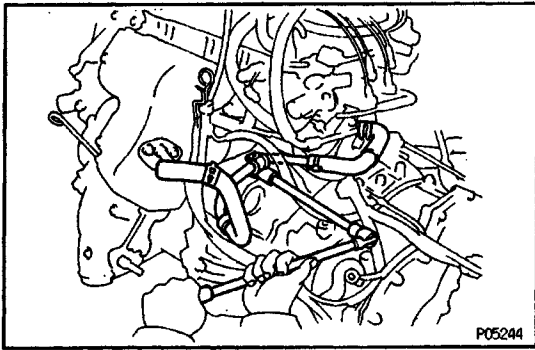
### 4. REMOVE STIFFENER PLATE

Remove the three bolts and stiffener plate.



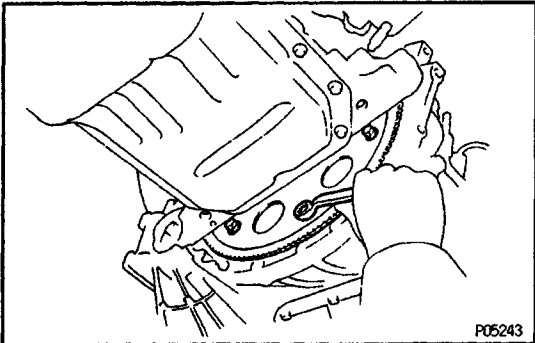
### 5. REMOVE NO-2 REAR END PLATE

Remove the four bolts and rear end plate.



## 6. REMOVE HEATER WATER PIPE

- (a) Disconnect the water hose from the water by-pass pipe.
- (b) Remove the two bolts and heater water pipe.

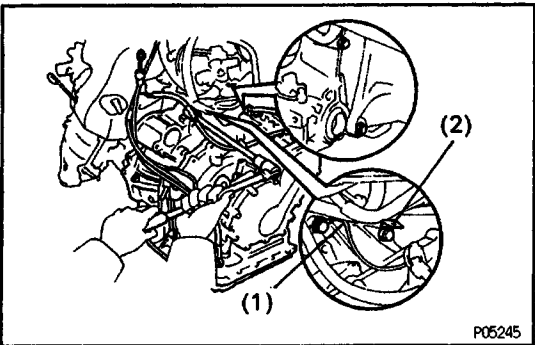


## 7. REMOVE TRANSAXLE

### A. Remove torque converter mounting bolts

- (a) Turn the crankshaft the to gain access to each bolts.
- (b) Hold the crankshaft pulley bolt with a wrench, and remove the six bolts.

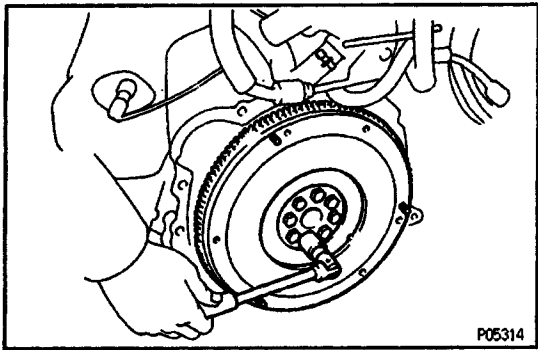
HINT: First remove the dark green colored bolt, and remove the other bolts.



### B. Remove transaxle

- (a) Remove the five bolts and following parts:
  - (1) Ground strap
  - (2) Engine wire bracket
- (b) Remove the transaxle together with the torque converter from the engine.



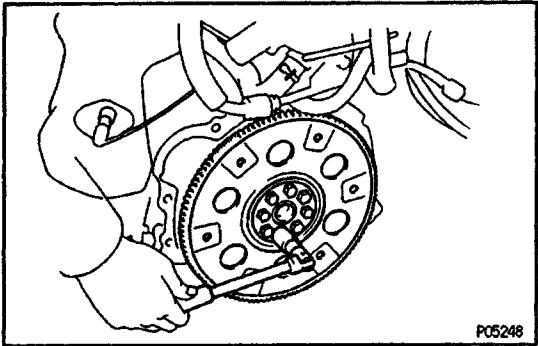


## PREPARATION FOR DISASSEMBLY <sup>8011K-01</sup>

### 1. (M/T)

#### REMOVE FLYWHEEL

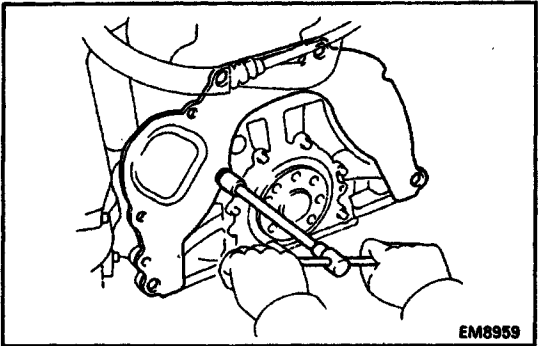
Remove the eight bolts and flywheel.



### 2. (A/T)

#### REMOVE DRIVE PLATE

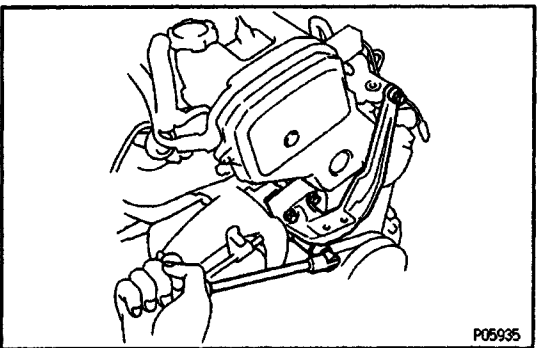
Remove the eight bolts, front spacer, drive plate and rear spacer.



### 3. REMOVE REAR END PLATE

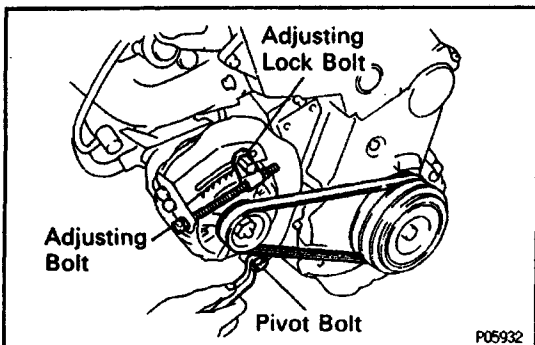
Remove the bolt and end plate.

### 4. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY



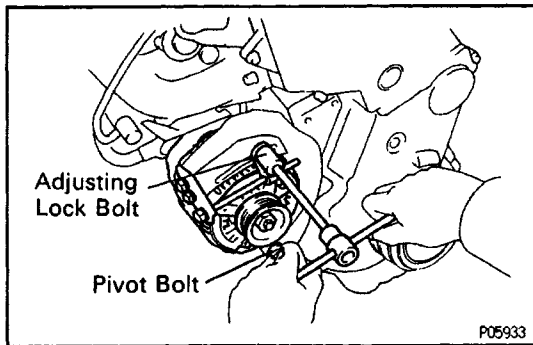
### 5. REMOVE RH ENGINE MOUNTING BRACKET

Remove the four bolts and mounting bracket.

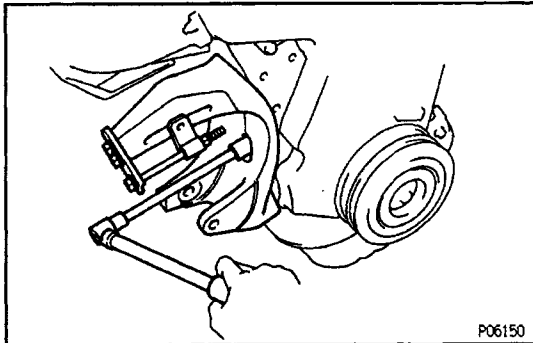


### 6. REMOVE ALTERNATOR

- (a) Loosen the pivot bolt and adjusting lock bolt.
- (b) Loosen the adjusting bolt, and disconnect the drive belt from the alternator.



- (c) Remove the pivot bolt and adjusting lock bolt, and disconnect the alternator from the bracket.



## 7. REMOVE ALTERNATOR BRACKET

- Remove the three bolts, two nuts and alternator bracket.

## 8. REMOVE TIMING BELT AND PULLEYS

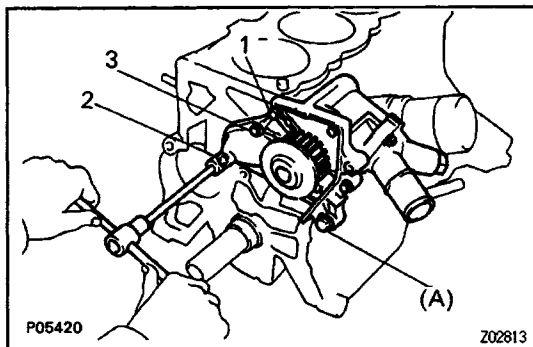
(See Timing Belt Removal)

## 9. REMOVE CYLINDER HEAD

(See Cylinder Head Removal)

## 10. REMOVE OIL PAN AND OIL PUMP

(See Oil pump Removal)

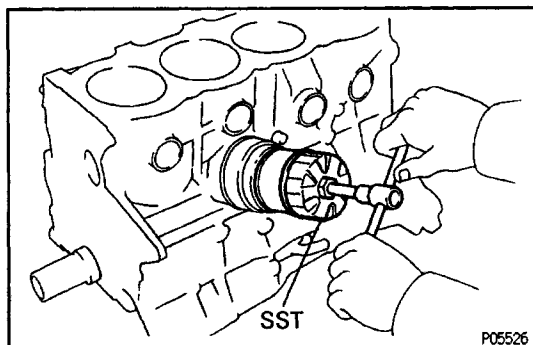


## 11. REMOVE WATER PUMP

(a) (w/o A/C)

Remove the bolt (A).

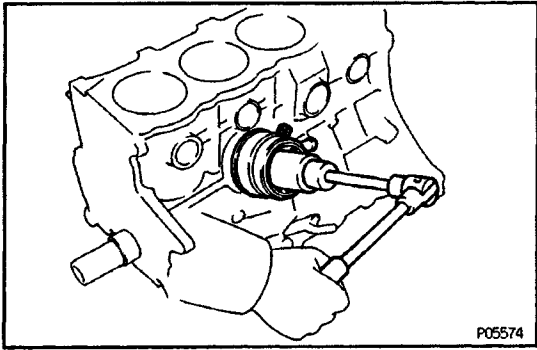
(b) Remove the three bolts in the sequence shown.



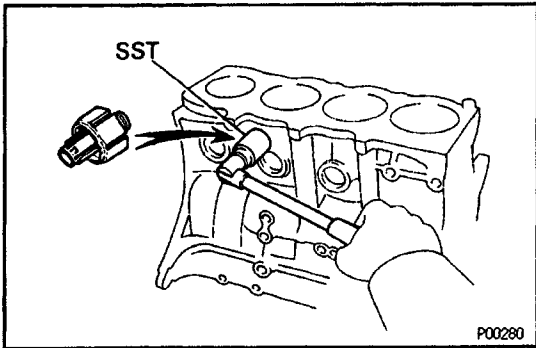
## 12. REMOVE OIL COOLER

(a) Using SST, remove the oil filter.

SST 09228-06500



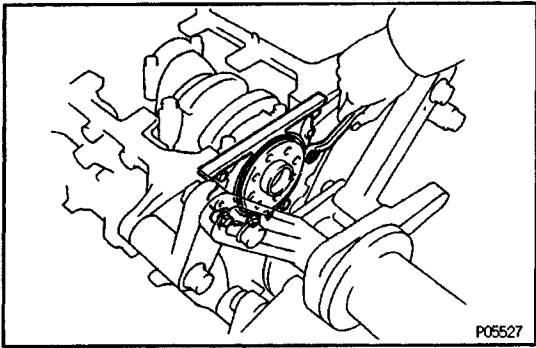
- (b) Remove the relief valve and plate washer.
- (c) Remove the nut and oil cooler.
- (d) Remove the O-ring and gasket from the oil cooler.



### 13. REMOVE KNOCK SENSOR

Using SST, remove the knock sensor.

SST 09816 - 30010

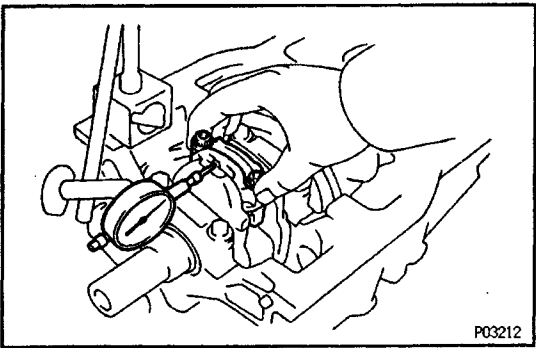


## CYLINDER BLOCK DISASSEMBLY <sup>8011L-01</sup>

(See Components for Cylinder Block Disassembly and Installation)

### 1. REMOVE REAR OIL SEAL RETAINER

Remove the six bolts, retainer and gasket.



### 2. CHECK CONNECTING ROD OIL CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

**Standard thrust clearance:**

**0.160 - 0.312 mm (0.0063 - 0.0123 in.)**

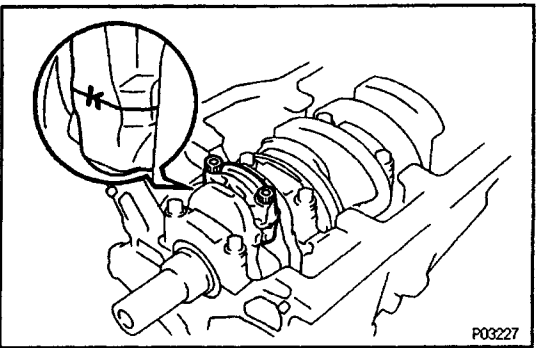
**Maximum thrust clearance:**

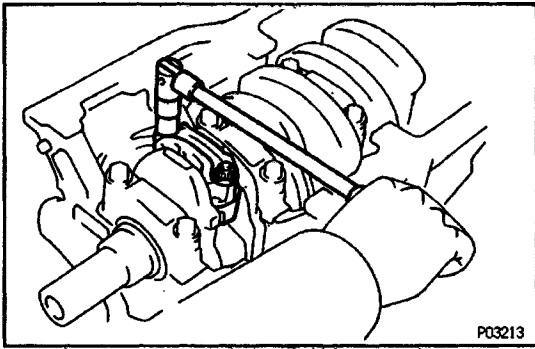
**0.35 mm (0.0138 in.)**

If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.

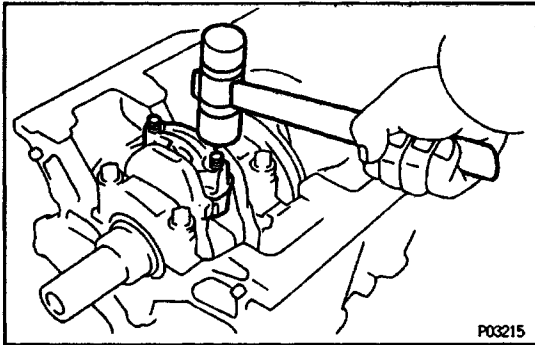
### 3. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

- (a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.

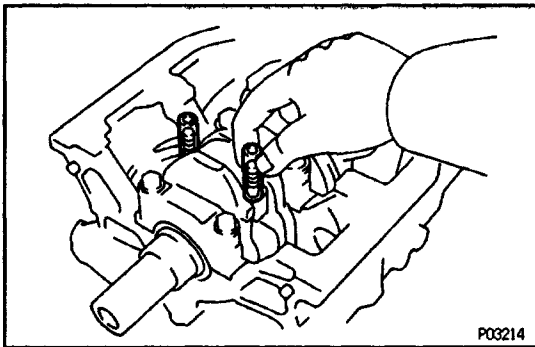




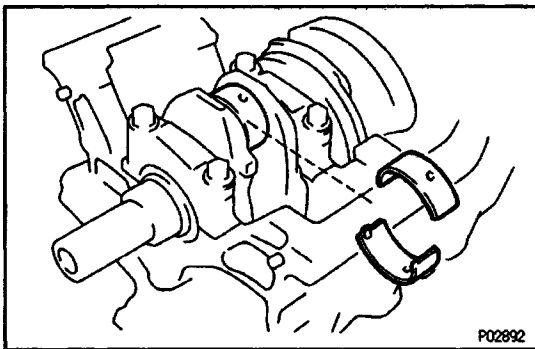
(b) Remove the connecting rod cap nuts.



(c) Using a plastic-faced hammer, lightly tap the connecting rod bolts and lift off the connecting rod cap.  
 HINT: Keep the lower bearing inserted with the connecting rod cap.



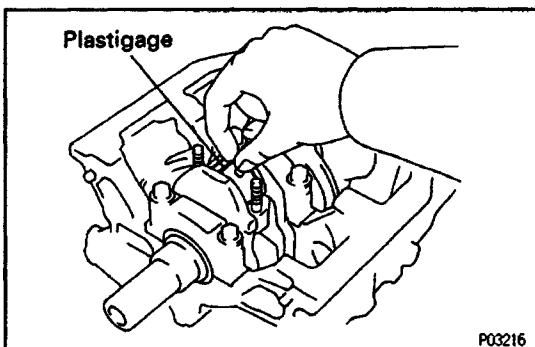
(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



(e) Clean the crank pin and bearing.

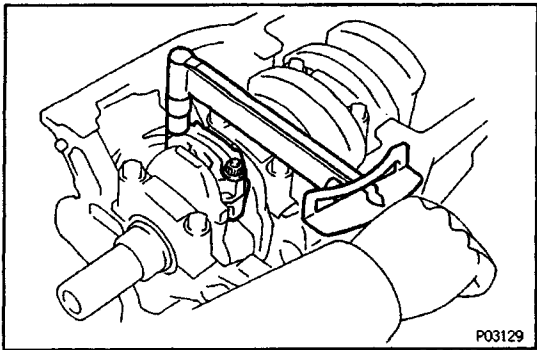
(f) Check the crank pin and bearing for pitting and scratches.

If the crank pin or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.



(g) Lay a strip of Plastigage across the crank pin.





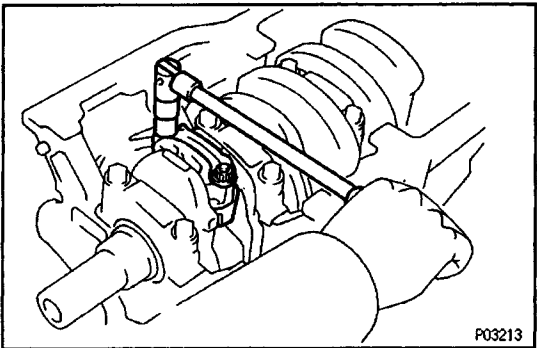
- (h) Install the connecting rod cap.  
(See step 6 in Cylinder Block Assembly)

**1st**

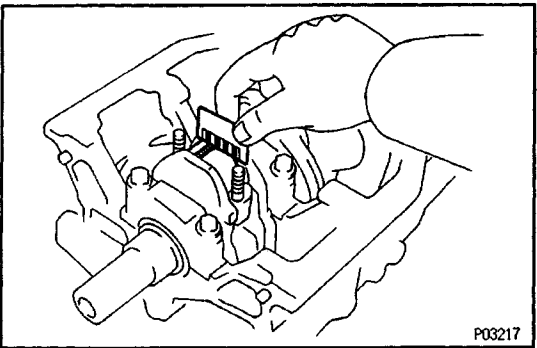
**Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)**

**2nd Turn 90°**

**NOTICE: Do not turn the crankshaft.**



- (i) Remove the connecting rod cap.  
(See procedure (b) and (c) above)



- (j) Measure the Plastigage at its widest point.

**Standard oil clearance:**

**STD**

**0.024 – 0.055 mm (0.0009 – 0.0022 in.)**

**U/S 0.25**

**0.023 – 0.069 mm (0.0009 – 0.0027 in.)**

**Maximum oil clearance:**

**0.08 mm (0.0031 in.)**

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

HINT: If using a standard bearing, replace it with one having the same number marked on the connecting rod cap. There are three sizes of standard bearings, marked "1", "2" and "3" accordingly.

**Standard sized bearing center wall thickness:**

**Mark "1"**

**1.484 – 1.488 mm (0.0584 – 0.0586 in.)**

**Mark "2"**

**1.488 – 1.492 mm (0.0586 – 0.0587 in.)**

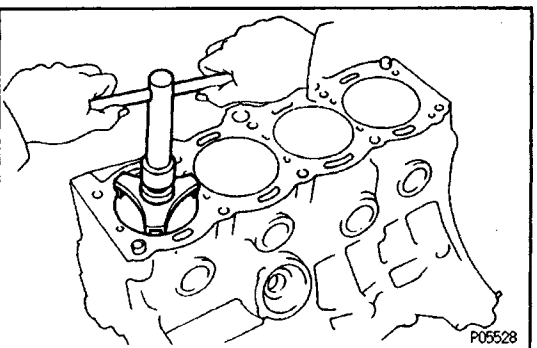
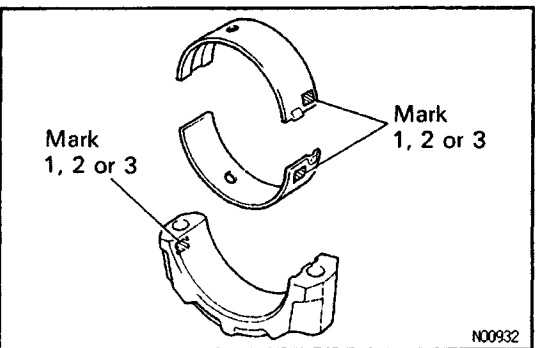
**Mark "3"**

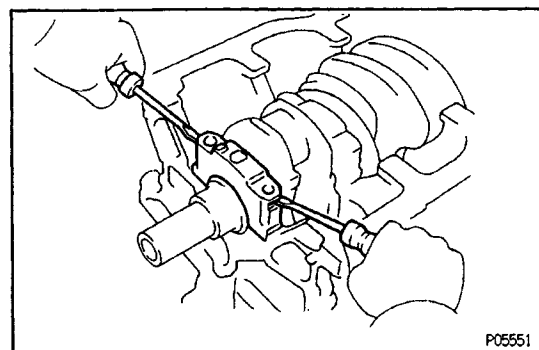
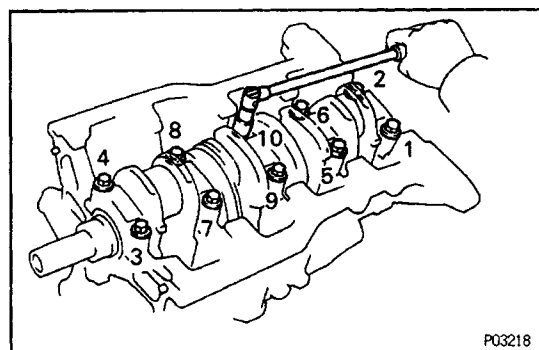
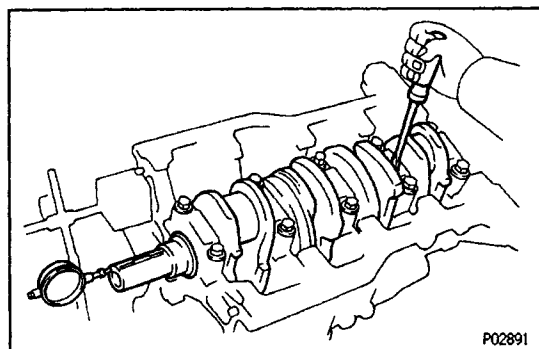
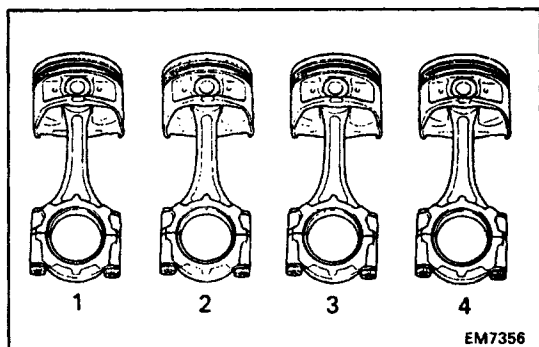
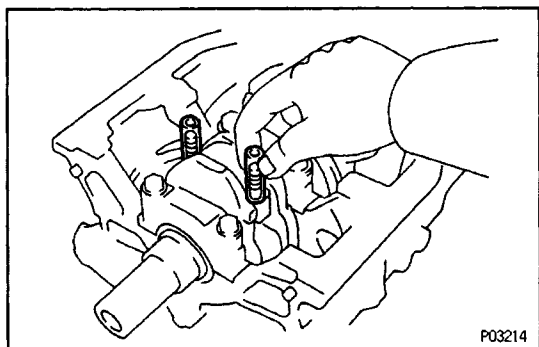
**1.492 – 1.496 mm (0.0587 – 0.0589 in.)**

- (k) Completely remove the Plastigage.

#### **4. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES**

- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.





- (b) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.
- (e) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

#### HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in correct order.

### 5. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

#### Standard thrust clearance:

**0.020 – 0.220 mm (0.0008 – 0.0087 in.)**

#### Maximum thrust clearance:

**0.30 mm (0.0118 in.)**

If the thrust clearance is greater than maximum, replace the thrust washers as a set.

#### Thrust washer thickness:

**2.440 – 2.490 mm (0.0961 – 0.0980 in.)**

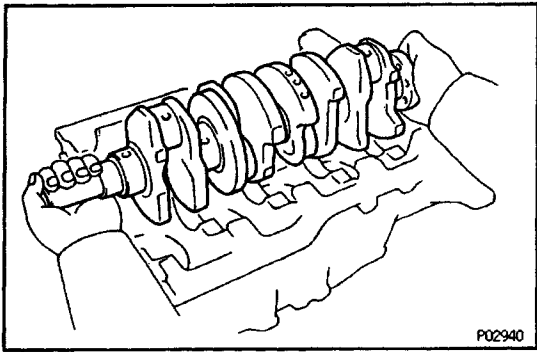
### 6. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

- (a) Uniformly loosen and remove the main bearing cap bolts in several passes, in the sequence shown.

- (b) Using two screwdrivers, pry out the main bearing cap, and remove the main bearing caps, lower bearings and lower thrust washers (No.3 main bearing cap only).

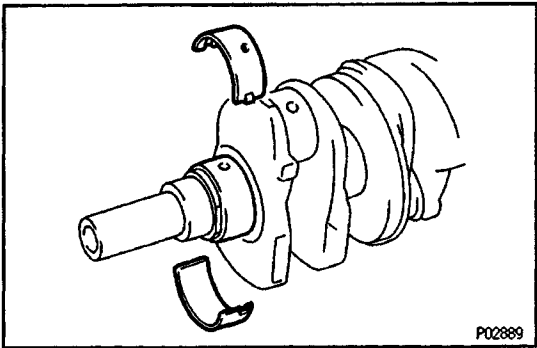
#### HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.



(c) Lift out the crankshaft.

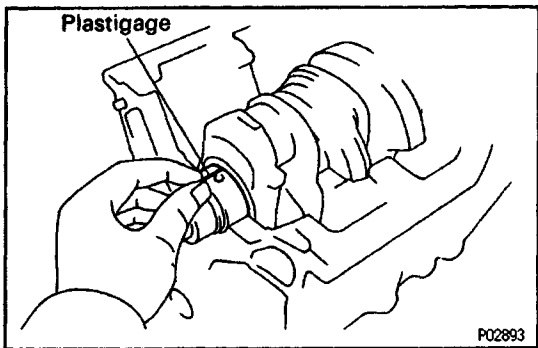
HINT: Keep the upper bearing and upper thrust washers together with the cylinder block.



(d) Clean each main journal and bearing.

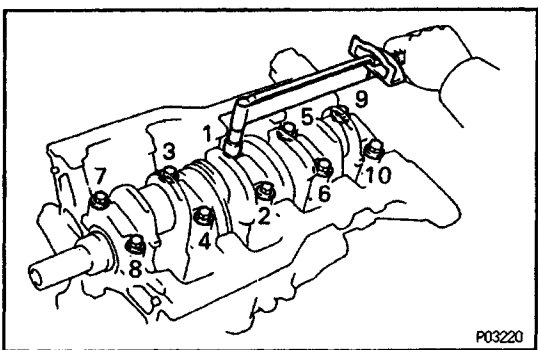
(e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.



(f) Place the crankshaft on the cylinder block.

(g) Lay a strip of Plastigage across each journal.

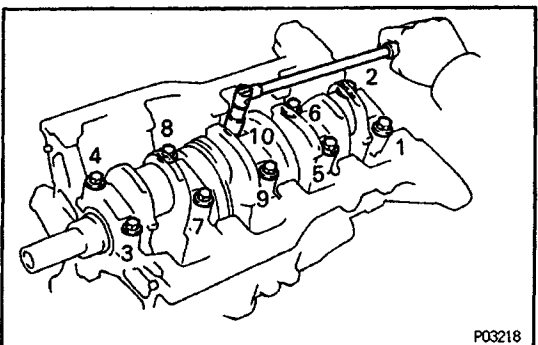


(h) Install the main bearing caps.

(See step 4 in Cylinder Block Assembly)

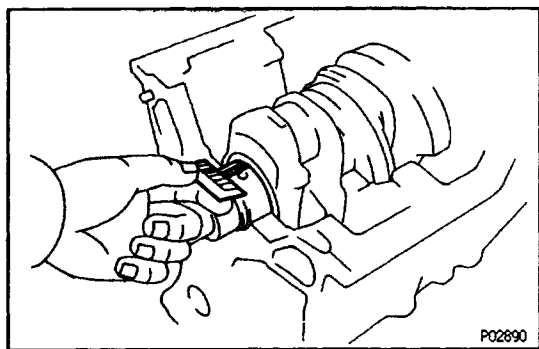
**Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)**

**NOTICE: Do not turn the crankshaft.**



(i) Remove the main bearing caps.

(See procedure (a) and (b) above)



(j) Measure the Plastigage at its widest point.

**Standard clearance:**

**No-3**

**STD**

0.025 – 0.044 mm (0.0010 – 0.0017 in.)

**U/S 0.25**

0.027 – 0.067 mm (0.0011 – 0.0026 in.)

**Others**

**STD**

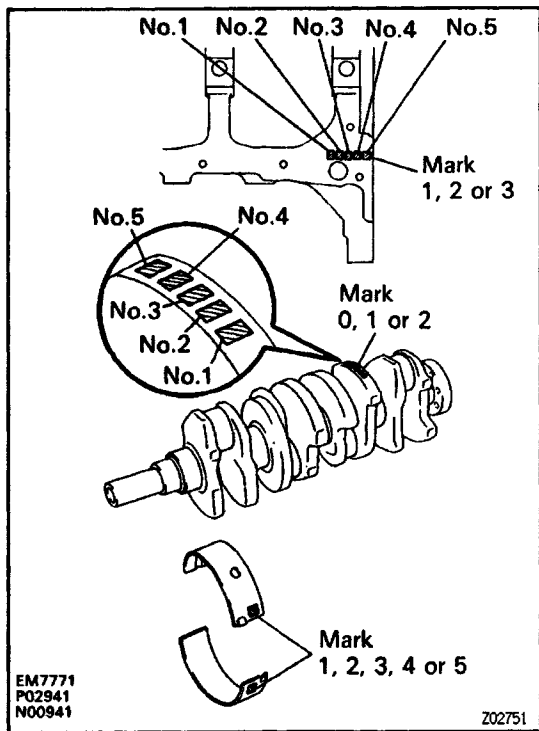
0.015 – 0.034 mm (0.0006 – 0.0013 in.)

**U/S 0.25**

0.019 – 0.059 mm (0.0007 – 0.0023 in.)

**Maximum clearance:**

0.08 mm (0.0031 in.)



HINT: If replacing the cylinder block subassembly, the bearing standard clearance will be:

**No.3**

0.027 – 0.054 mm (0.0011 – 0.0021 in.)

**Others**

0.017 – 0.044 mm (0.0007 – 0.0017 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

HINT: If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then selecting the bearing with the same number as the total. There are five sizes of standard bearings, marked '1', '2', '3', '4' and '5' accordingly.

	Number marked								
	1			2			3		
Cylinder block									
Crankshaft	0	1	2	0	1	2	0	1	2
Use bearing	1	2	3	2	3	4	3	4	5

EXAMPLE: Cylinder block "2" + Crankshaft "1"  
= Total number 3 (Use bearing "3")

**(Reference)****Cylinder block main journal bore diameter:****Mark "1"**

59.020– 59.026 mm (2.3236 – 2.3239 in.)

**Mark "2"**

59.026 – 59.032 mm (2.3239 – 2.3241 in.)

**Mark "3"**

59.032 – 59.038 mm (2.3241 – 2.3243 in.)

**Crankshaft journal diameter:****Mark "0"**

54.998 – 55.003 mm (2.1653 – 2.1655 in.)

**Mark '1'**

54.993 – 54.998 mm (2.1651 – 2.1653 in.)

**Mark "2"**

54.988 – 54.993 mm (2.1649 – 2.1651 in.)

**Standard sized bearing center wall thickness:****No.3****Mark "1"**

1.992 – 1.995 mm (0.0784 – 0.0785 in.)

**Mark "2"**

1.995 – 1.998 mm (0.0785 – 0.0787 in.)

**Mark "3"**

1.998 – 2.001 mm (0.0787 – 0.0788 in.)

**Mark "4"**

2.001 – 2.004 mm (0.0788 – 0.0789 in.)

**Mark "5"**

2.004 – 2.007 mm (0.0789 – 0.0790 in.)

**Others****Mark "1"**

1.997 – 2.000 mm (0.0786 – 0.0787 in.)

**Mark "2"**

2.000 – 2.003 mm (0.0787 – 0.0789 in.)

**Mark "3"**

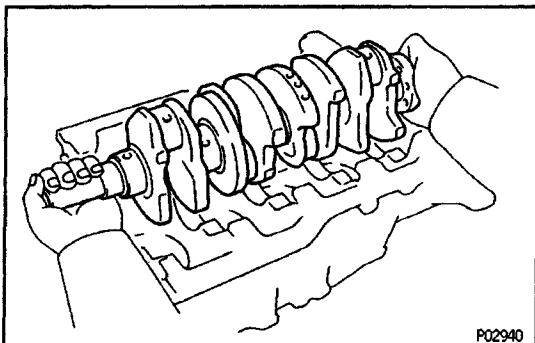
2.003 – 2.006 mm (0.0789 – 0.0790 in.)

**Mark "4"**

2.006 – 2.009 mm (0.0790 – 0.0791 in.)

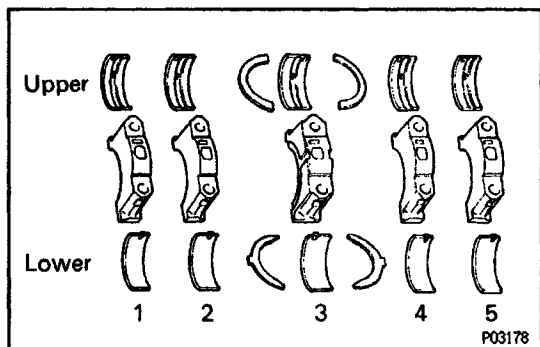
**Mark "5"**

2.009 – 2.012 mm (0.0791 – 0.0792 in.)

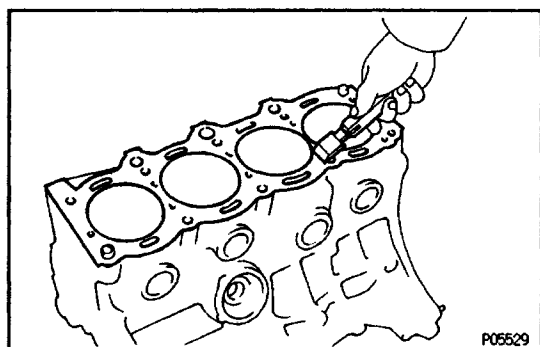
**(k) Completely remove the Plastigage.****7. REMOVE CRANKSHAFT**

(a) Lift out the crankshaft.

(b) Remove the upper bearings and upper thrust washers from the cylinder block.



HINT: Arrange the main bearing caps, bearings and thrust washers in correct order.



## CYLINDER BLOCK INSPECTION

E208U-03

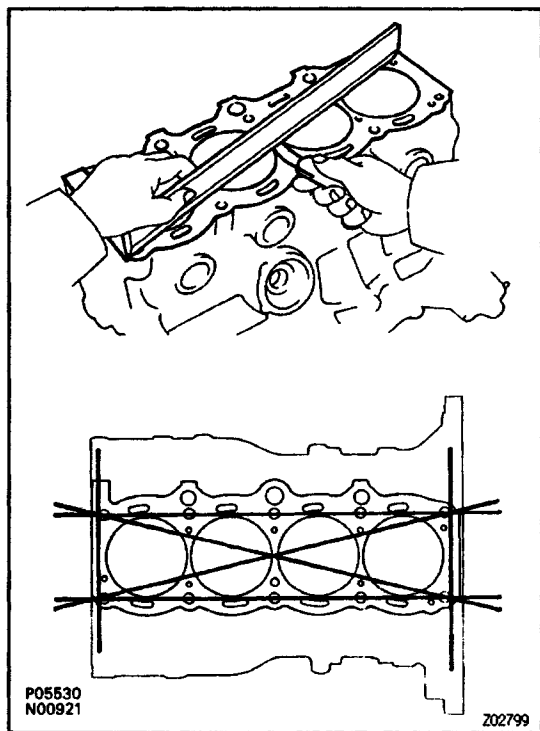
### 1. CLEAN CYLINDER BLOCK

#### A. Remove gasket material

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

#### B. Clean cylinder block

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



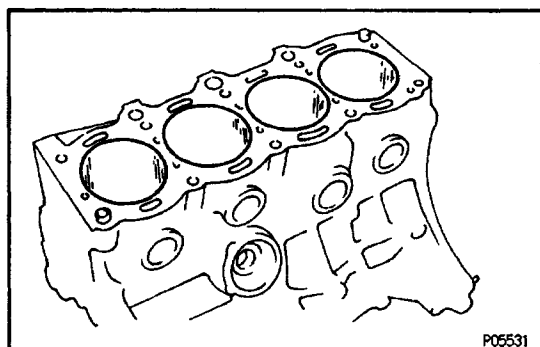
### 2. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS

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

#### Maximum warpage:

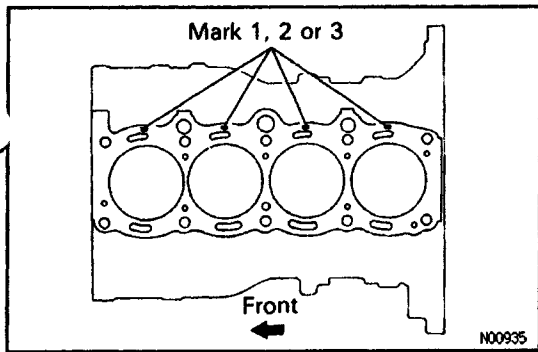
**0.05 mm (0.0020 in.)**

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



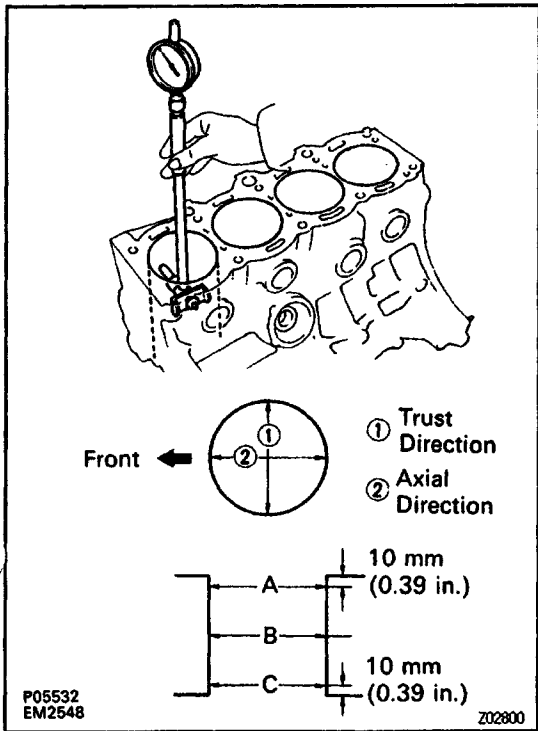
### 3. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches. If deep scratches are present, rebore all the four cylinders. If necessary, replace the cylinder block.



#### 4. INSPECT CYLINDER BORE DIAMETER

**HINT:** There are three sizes of the standard cylinder bore diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the top of the cylinder block.



Using a cylinder-gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

**Standard diameter:**

**STD**

**Mark "1"**

87.000 – 87.010 mm (3.4252 – 3.4256 in.)

**Mark "2"**

87.010 – 87.020 mm (3.4256 – 3.4260 in.)

**Mark "3"**

87.020 – 87.030 mm (3.4260 – 3.4264 in.)

**Maximum diameter:**

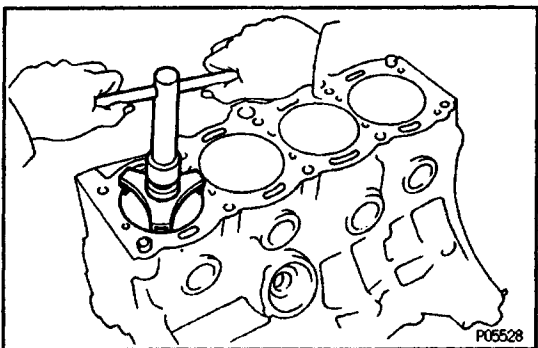
**STD**

87.23 mm (3.4342 in.)

**O/S 0.50**

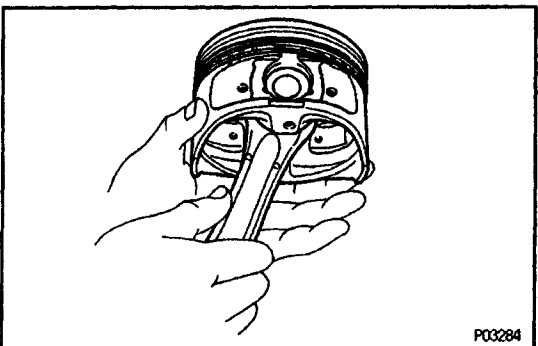
87.73 mm (3.4350 in.)

If the diameter is greater than maximum, rebore all the four cylinders. If necessary, replace the cylinder block.



#### 5. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

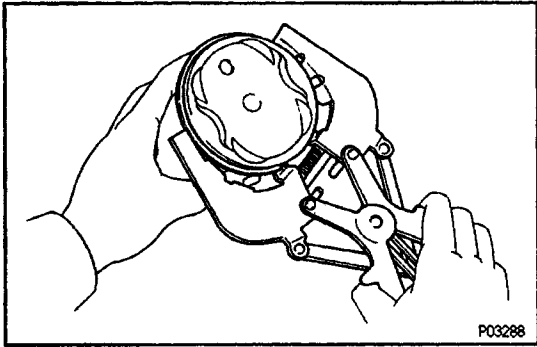


### PISTON AND CONNECTING ROD ASSY DISASSEMBLY

#### 1. CHECK FIT BETWEEN PISTON AND PISTON PIN

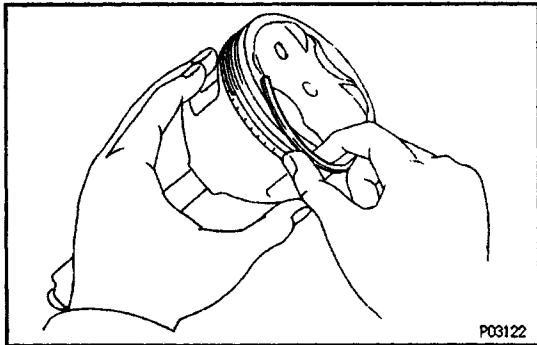
Try to move the piston back and forth on the piston pin.

If any movement is felt, replace the piston and pin as a set.

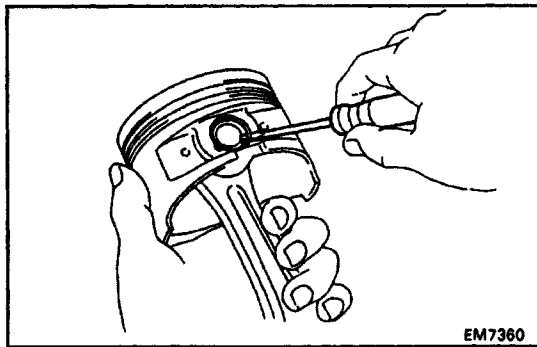


## 2. REMOVE PISTON RINGS

- (a) Using a piston ring expander, remove the two compression rings.

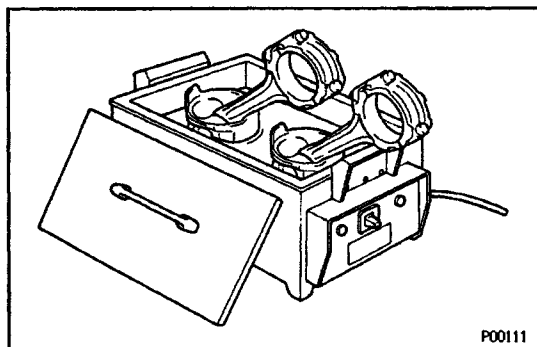


- (b) Remove the two side rails and oil ring by hand.  
HINT: Arrange the piston rings in correct order only.

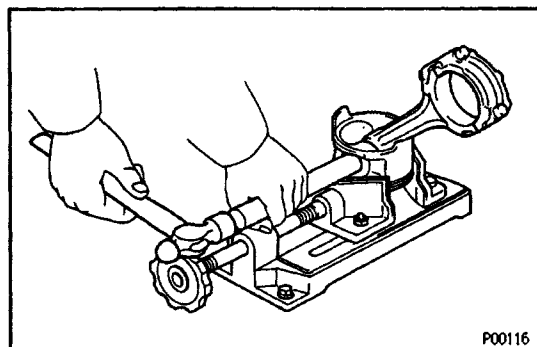


## 3. DISCONNECT CONNECTING ROD FROM PISTON

- (a) Using a small screwdriver, pry out the two snap rings.

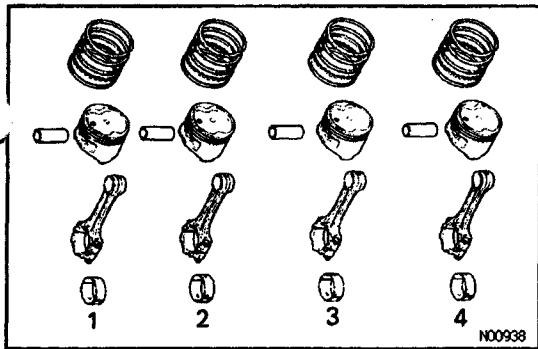


- (b) Gradually heat the piston to 80 – 90°C (1176 – 194°F).



- (c) Using plastic-faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.



**HINT:**

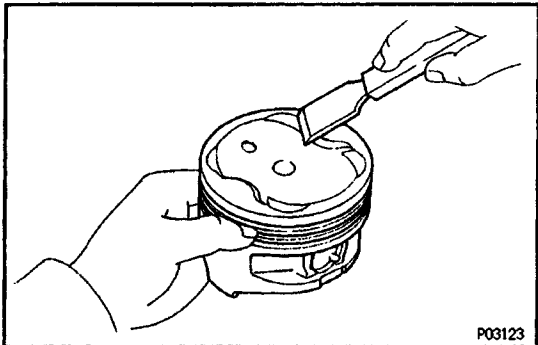
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in correct order.

## PISTON AND CONNECTING ROD INSPECTION

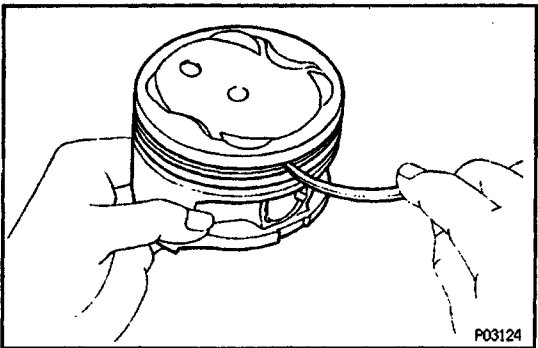
5008W-02

### 1. CLEAN PISTON

- (a) Using a gasket scraper, remove the carbon from the piston top.

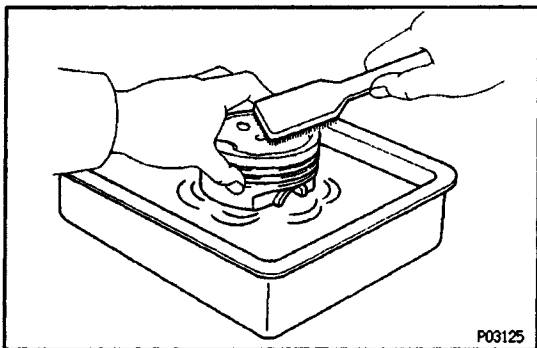


- (b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



- (c) Using solvent and a brush, thoroughly clean the piston.

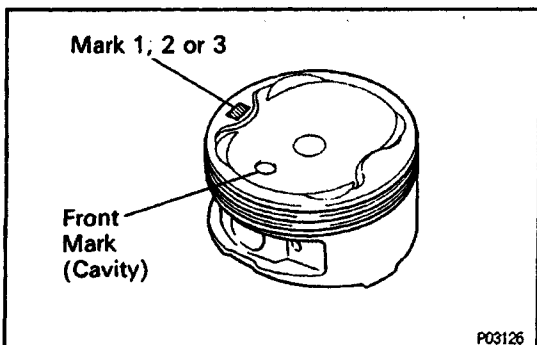
**NOTICE:** Do not use a wire brush.

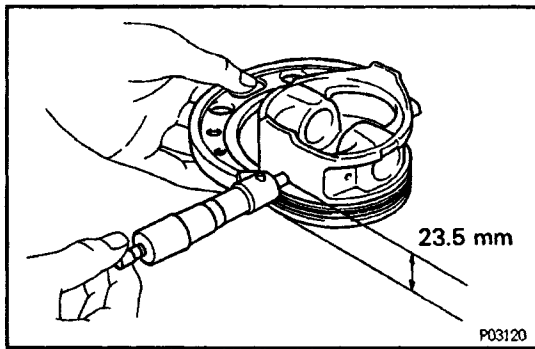


### 2. INSPECT PISTON

#### A. Inspect piston oil clearance

- HINT:** There are three sizes of the standard piston diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the piston top.





- (a) Using a micrometer, measure the piston diameter at ring angles to the piston pin center line, 23.5 mm (0.925 in.) from the piston head.

**Piston diameter:**

**STD**

**Mark "1"**

**86.850 – 86.860 mm (3.4193 – 3.4197 in.)**

**Mark '2'**

**86.860 – 86.870 mm (3.4197 – 3.4201 in.)**

**Mark '3'**

**86.870 – 86.880 mm (3.4201 – 3.4205 in.)**

**O/S 0.50**

**87.350 – 87.380 mm (3.4390 – 3.4402 in.)**

- (b) Measure the cylinder bore diameter in the thrust directions. (See step 4 in Cylinder Block Inspection)

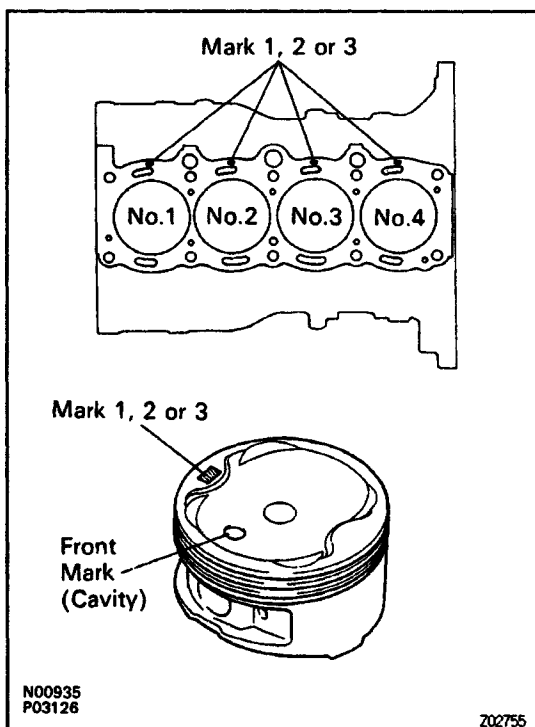
- (c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

**Standard oil clearance:**

**0.14 – 0.16 mm (0.0055 – 0.0063 in.)**

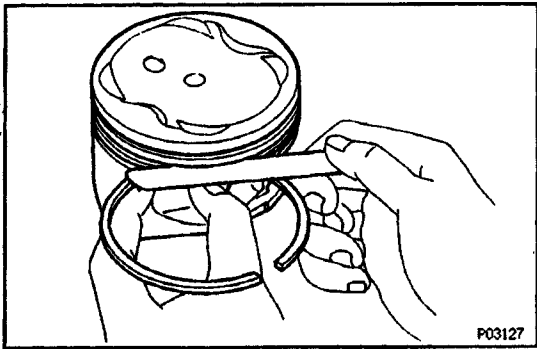
**Maximum oil clearance:**

**0.18 mm (0.0071 in.)**



If the oil clearance is greater than maximum, replace all the four pistons and rebore all the four cylinders. If necessary, replace the cylinder block.

**HINT (Use new cylinder block):** Use a piston with the same number mark as the cylinder bore diameter marked on the cylinder block.



### B. Inspect piston ring groove clearance

Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

#### Ring groove clearance:

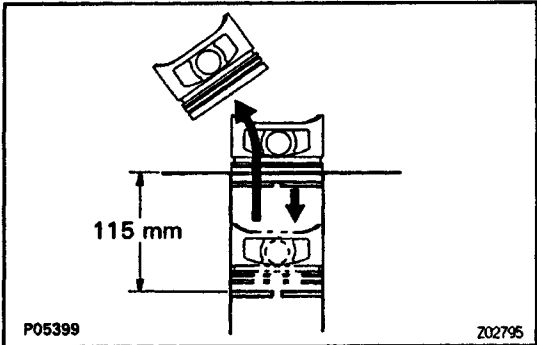
##### No.1

0.040 – 0.080 mm (0.0016 – 0.0031 in.)

##### No.2

0.030 – 0.070 mm (0.0012 – 0.0028 in.)

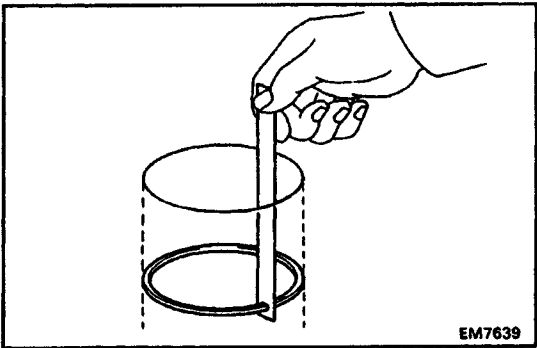
If the clearance is greater than maximum, replace the piston.



### C. Inspect piston ring end gap

(a) Insert the piston ring into the cylinder bore.

(b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 115 mm (4.53 in.) from the top of the cylinder block.



(c) Using a feeler gauge, measure the end gap.

#### Standard end gap:

##### No.1

0.270 – 0.500 mm (0.0106 – 0.0197 in.)

##### No.2

0.350 – 0.600 mm (0.0138 – 0.0234 in.)

#### Oil (Side rail)

0.200 – 0.550 mm (0.0079 – 0.0217 in.)

#### Maximum end gap:

##### No.1

1.10 mm (0.0433 in.)

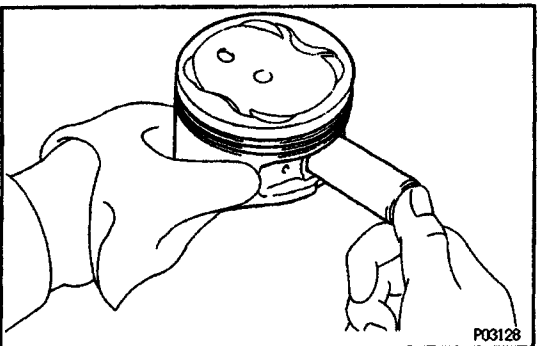
##### No-2

1.20 mm (0.0472 in.)

#### Oil (Side rail)

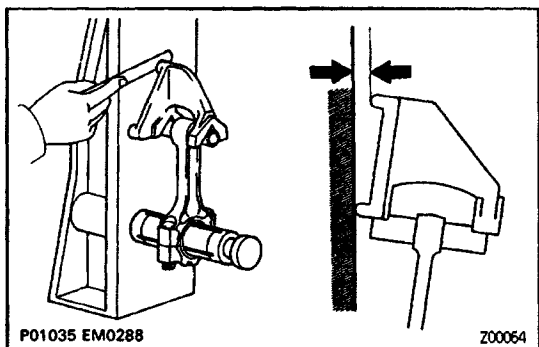
1.15 mm (0.0453 in.)

If the end gap is greater than maximum, replace the piston ring. If the end gap is greater than maximum, even with a new piston ring, rebore all the four cylinders or replace the cylinder block.



### D. Inspect piston pin fit

At 60°C (140°F), you should be able to push the piston pin into the piston pin hole with your thumb.



### 3. INSPECT CONNECTING ROD

#### A. Inspect connecting rod alignment

Using a rod aligner and feeler gauge, check the connecting rod alignment.

- Check for bend.

##### Maximum bend:

**0.05 mm (0.0020 in.) per 100 mm (3.94 in.)**

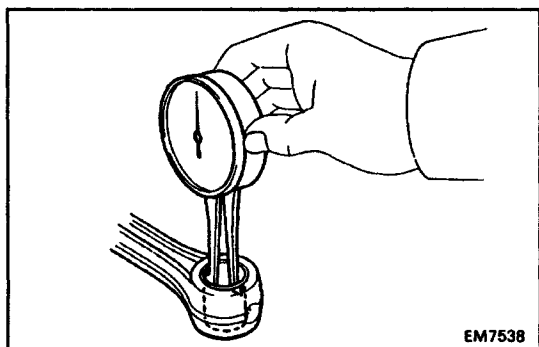
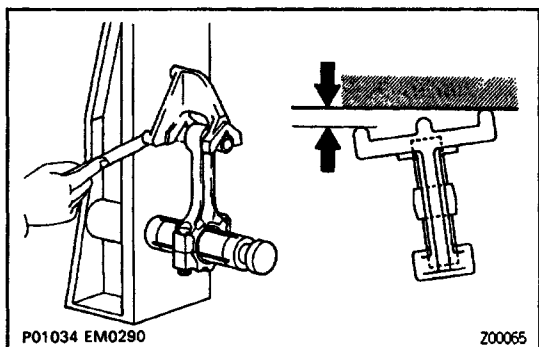
If bend is greater than maximum, replace the connecting rod assembly.

##### Check for twist

##### Maximum twist:

**0.15 mm (0.0059 in.) per 100 mm (3.94 in.)**

If twist is greater than maximum, replace the connecting rod assembly.

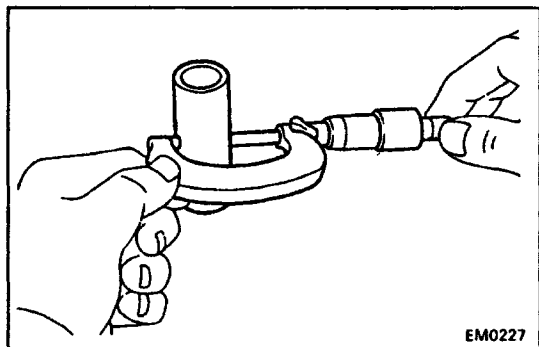


#### B. Inspect piston pin oil clearance

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

##### Bushing inside diameter:

**22.005 – 22.017 mm (0.8663 – 0.8668 in.)**



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

##### Piston pin diameter:

**21.997 – 22.009 mm (0.8660 – 0.8665 in.)**

- (c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

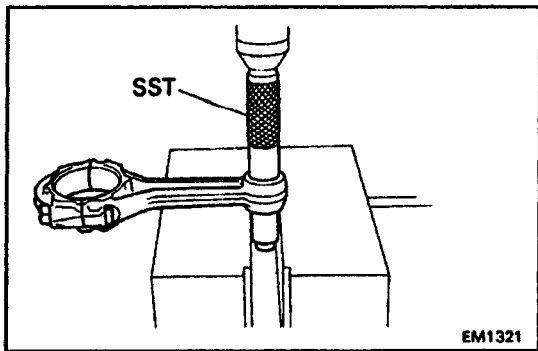
##### Standard oil clearance:

**0.005 – 0.011 mm (0.0002 – 0.0004 in.)**

##### Maximum oil clearance:

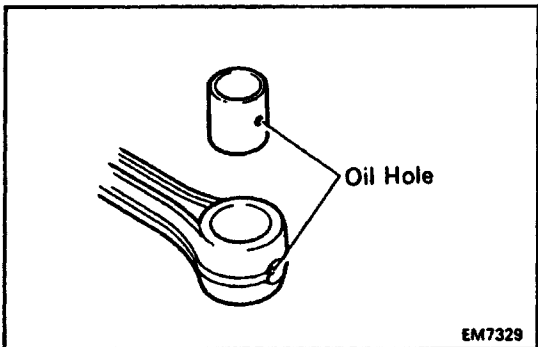
**0.05 mm (0.0020 in.)**

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.



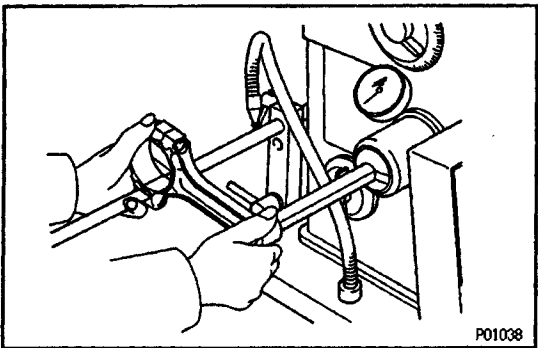
### C. If necessary, replace connecting rod bushing

- (a) Using SST and a press, press out the bushing.  
SST 09222-30010

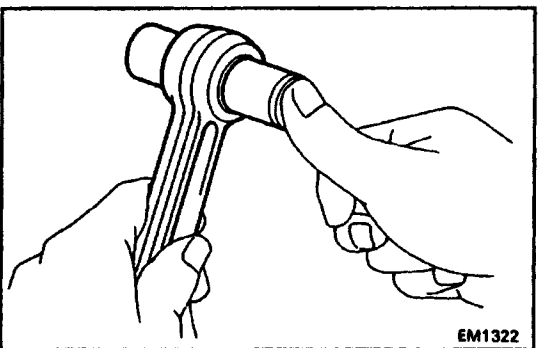


- (b) Align the oil holes of a new bushing and the connecting rod.

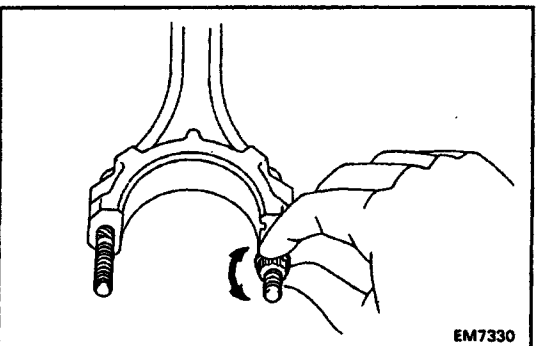
- (c) Using SST and a press, press in the bushing.  
SST 09222-30010



- (d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (see step B above) between the bushing and piston pin.

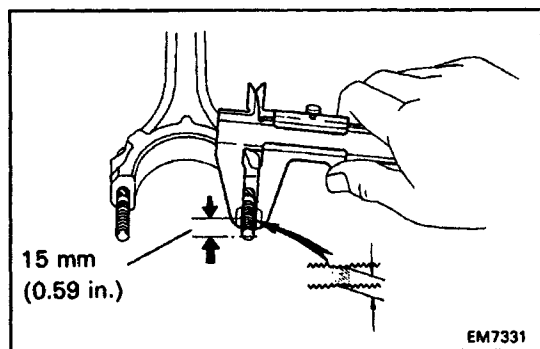


- (e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.



### D. Inspect connecting rod bolts

- (a) Install the cap nut to the connecting rod bolt. Check that the cap nut can be turned easily by hand to the end of the thread.



- (b) If the cap nut cannot be turned easily, measure the outside diameter— of the connecting rod bolt with a vernier caliper.

**Standard diameter:**

**7.860 – 8.000 mm (0.3094 – 0.3150 in.)**

**Maximum diameter:**

**7.60 mm (0.2992 in.)**

**HINT:** If the location of this area cannot be judged by visual inspection, measure the outer diameter at the location shown in the illustration.

If the outside diameter is less than minimum, replace the connecting rod bolt and nut as a set.

## CYLINDER BORING

6011M-01

**HINT:**

- Bore all the four cylinders for the oversized piston outside diameter.
- Replace all the piston rings with ones to match the oversized pistons.

### 1. KEEP OVERSIZED PISTONS

**Oversized piston diameter:**

**O/S 0.50**

**87.350 – 87.380 mm (3.4390 – 3.4402 in.)**

### 2. CALCULATE AMOUNT TO BORE CYLINDERS

- (a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 23.5 mm (0.925 in.) from the piston head.
- (b) Calculate the amount of each cylinder is to be rebored as follows:

**Size to be rebored = P + C – H**

**P = Piston diameter**

**C = Piston oil clearance**

**0.140 – 0.160 mm (0.0055 – 0.0063 in.)**

**H = Allowance for honing**

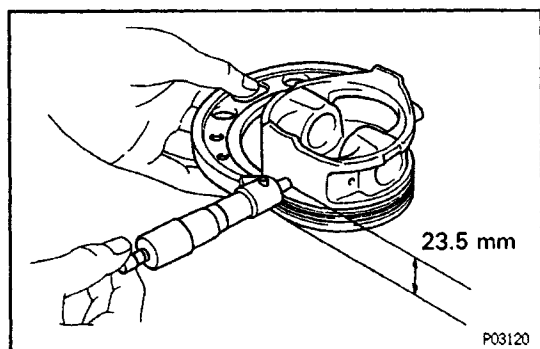
**0.20 mm (0.0008 in.) or less**

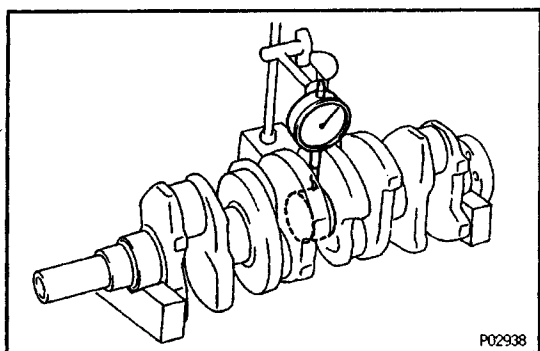
### 3. BORE AND HONE CYLINDER TO CALCULATED DIMENSIONS

**Maximum honing:**

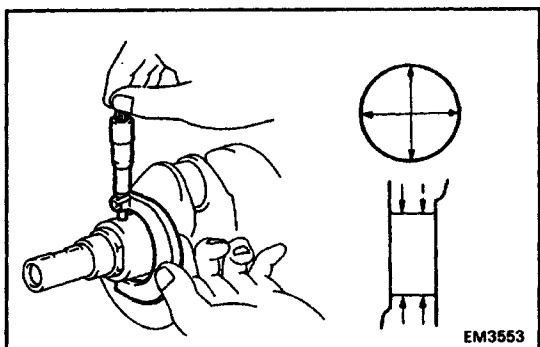
**0.02 mm (0.0008 in.)**

**NOTICE:** Excess honing will destroy the finished roundness.





P02938



EM3553

## CRANKSHAFT INSPECTION AND REPAIR

### 1. INSPECT CRANKSHAFT FOR CIRCLE RUNOUT

- (a) Place the crankshaft on V-blocks.
- (b) Using a dial indicator, measure the circle runout at the center journal.

**Maximum circle runout**  
**0.06 mm (0.0024 in.)**

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

### 2. INSPECT MAIN JOURNALS AND CRANK PINS

- (a) Using a micrometer, measure the diameter of each main journal and crank pin.

**Main journal diameter:**  
**STD**

**54.988 – 55.003 mm (2.1653 – 2.1655 in.)**

**U/S 0.25**

**54.745 – 54.755 mm (2.1553 – 2.1557 in.)**

**Crank pin diameter:**

**STD**

**51.985 – 52.000 mm (2.0466 – 2.0472 in.)**

**U/S 0.25**

**51.745 – 51.755 mm (2.0372 – 2.0376 in.)**

If the diameter is not as specified, check the oil clearance (See steps 3 and 6 in Cylinder Block Disassembly). If necessary, grind or replace the crankshaft.

- (b) Check each main journal and crank pin for taper and out-of-round as shown.

**Maximum taper and out-of-round:**  
**0.02 mm (0.0008 in.)**

If the taper and out-of-round is greater than maximum, replace the crankshaft.

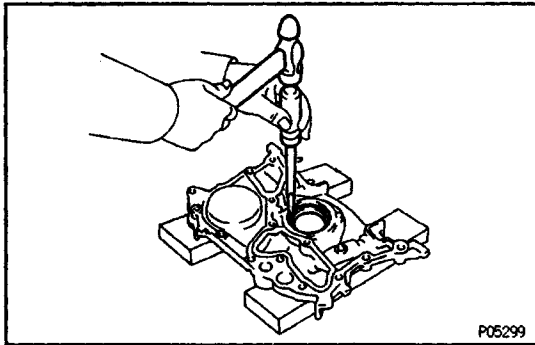
### 3. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

Grind and hone the main journals and/or crank pins to the finished undersized diameter (See procedure in step 2).

Install new main journal and/or crankshaft pin undersized bearings.

# CRANKSHAFT OIL SEALS REPLACEMENT

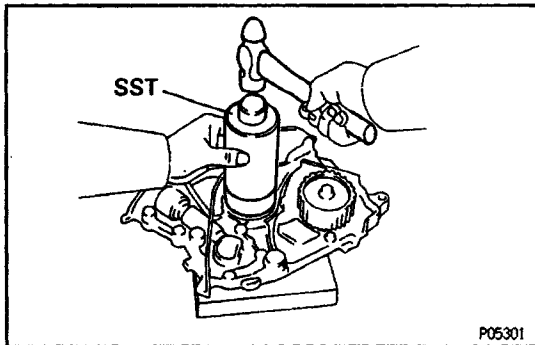
HINT: There are two methods (A and B) to replace the oil seal which are as follows:



## 1. REPLACE CRANKSHAFT FRONT OIL SEAL

### A. If oil pump is removed from cylinder block:

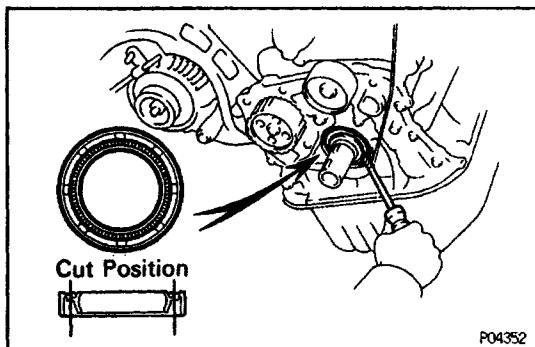
(a) Using a screwdriver and hammer, tap out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump case edge.

SST 09226-10010

(c) Apply MP grease to the oil seal lip.

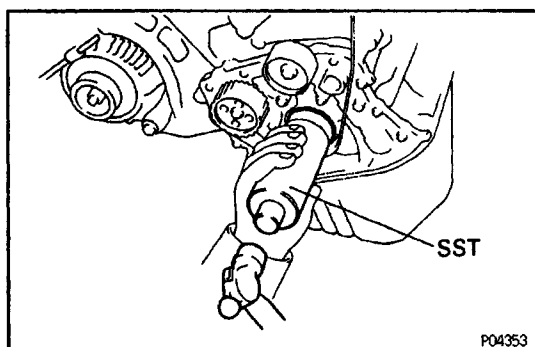


### B. If oil pump is installed to the cylinder block:

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.

**NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.**

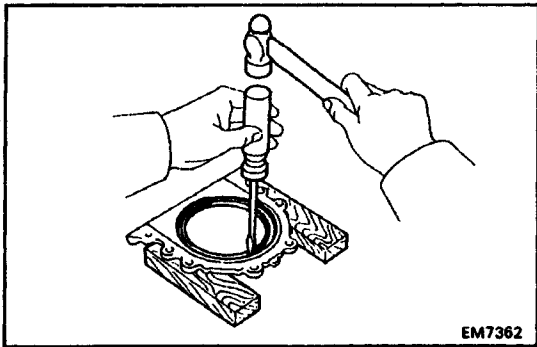


(c) Apply MP grease to a new oil seal lip.

(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump case edge.

SST 09226-10010

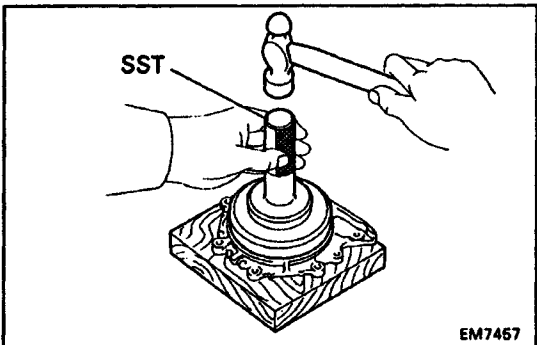




## 2. REPLACE CRANKSHAFT REAR OIL SEAL

### A. If rear oil seal retainer is removed from cylinder block:

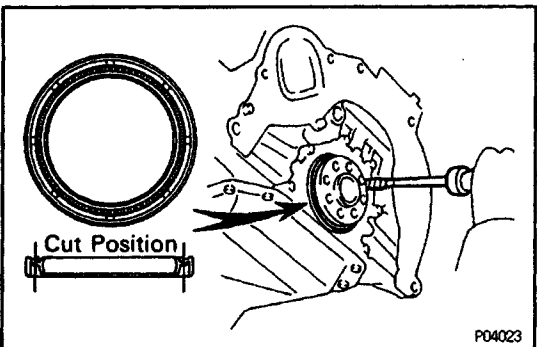
(a) Using a screwdriver and hammer, tap out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal edge.

SST 09223-63010

(c) Apply MP grease to the oil seal lip.

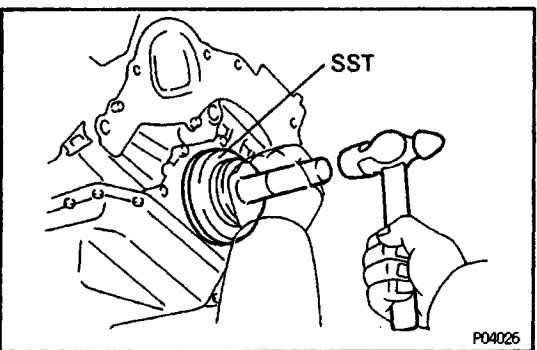


### B. If rear oil seal retainer is installed to cylinder block:

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.

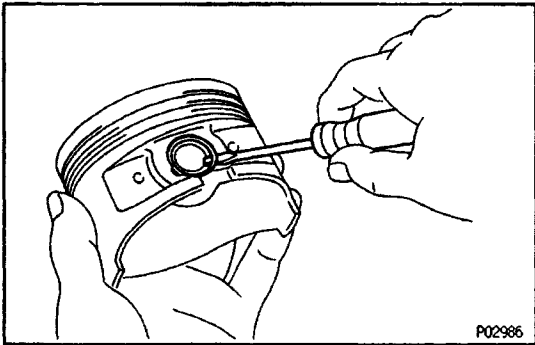
**NOTICE:** Be careful not to damage the crankshaft. Tape the screwdriver tip.



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

(d) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223-63010

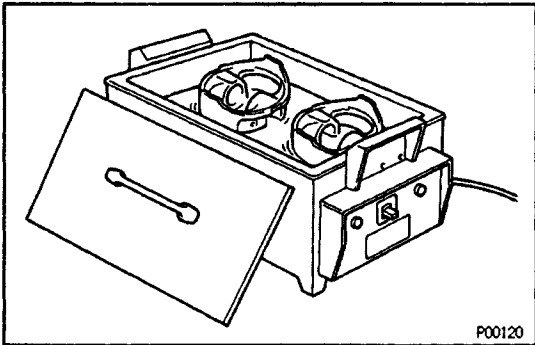


P02906

## PISTON AND CONNECTING ROD ASSEMBLY

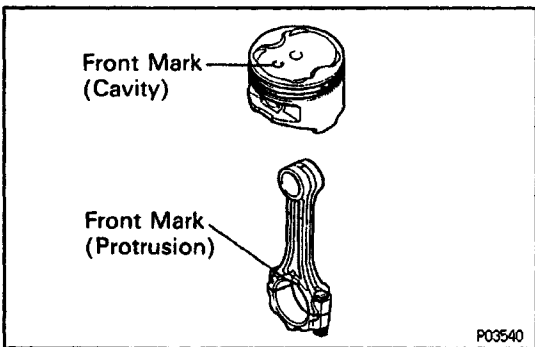
### 1. ASSEMBLE PISTON AND CONNECTING ROD

- (a) Using a small screwdriver, install a new snap ring on one side of the piston pin hole.



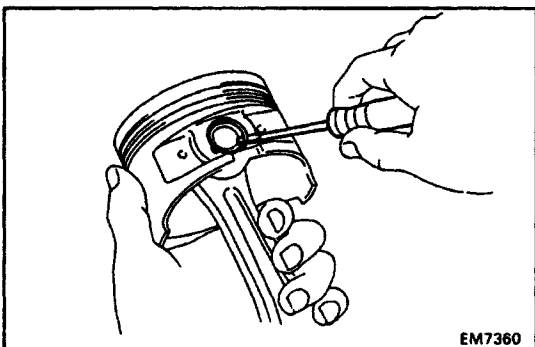
P00120

- (b) Gradually heat the piston to 80 – 90°C (176 – 194°F).



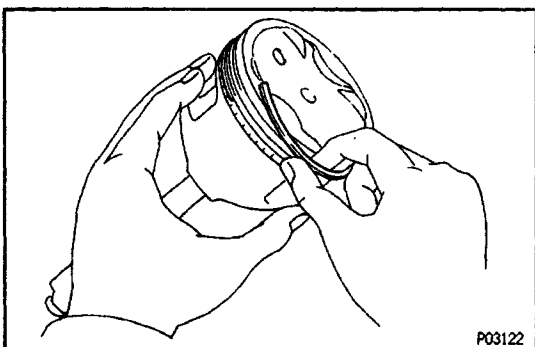
P03540

- (c) Coat the piston pin with engine oil.  
 (d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.



EM7360

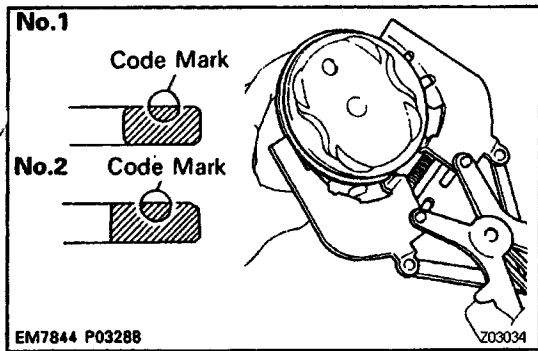
- (e) Using a small screwdriver, install a new snap ring on the other side of the piston pin hole.



P03122

### 2. INSTALL PISTON RINGS

- (a) Install the oil ring expander and two side rails by hand.



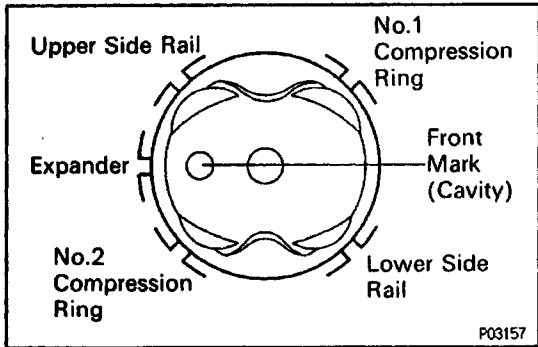
- (b) Using a piston ring expander, install the two compression rings with the code mark facing upward.  
Code mark:

**No.1**

1 Nor T

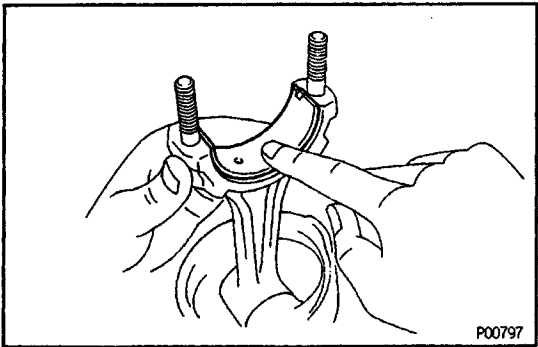
**No.2**

2N or 2T



- (c) Position the piston rings so that the ring ends are as shown.

**NOTICE: Do not align the ring ends.**



### 3. INSTALL BEARINGS

- (a) Align the bearing claw with the groove of the connecting rod or connecting cap.
- (b) Install the bearings in the connecting rod and connecting rod cap.

## CYLINDER BLOCK ASSEMBLY

(See Components for Cylinder block Disassembly and Installation)

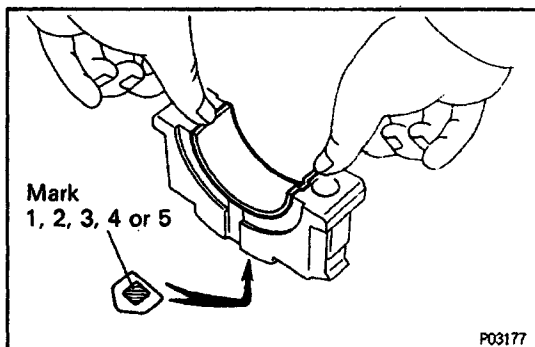
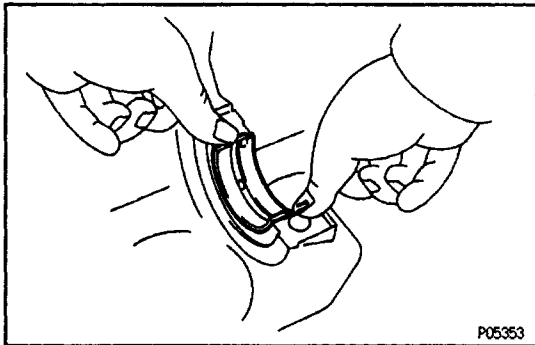
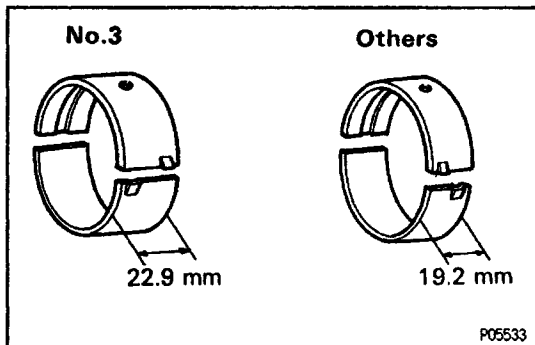
HINT:

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

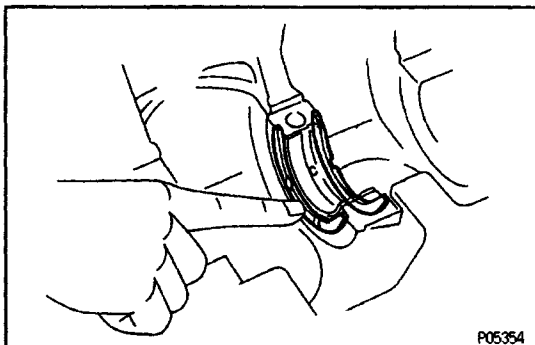
### 1. INSTALL MAIN BEARINGS

HINT:

- Main bearings come in widths of 19.2 mm (0.756 in.) and 22.9 mm (0.902 in.). Install the 22.9 mm (0.902 in.) bearings in the No.3 cylinder block journal position with the main bearing cap. Install the 19.2 mm (0.756 in.) bearings in the other positions.
  - Upper bearings have an oil groove and oil holes; lower bearings do not.
- (a) Align the bearing claw with the claw groove of the cylinder block, and push in the five upper bearings.

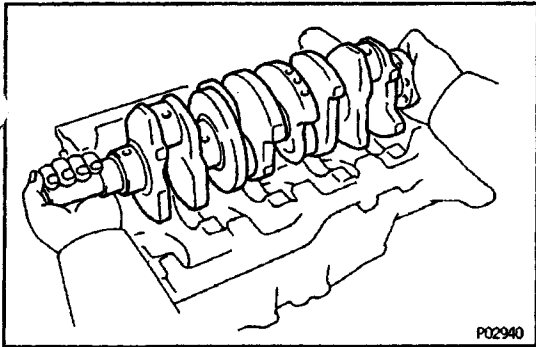


- (b) Align the bearing claw with the claw groove of the main bearing cap, and push in the five lower bearings.
- HINT: A number is marked on each main bearing cap to indicate the installation position.

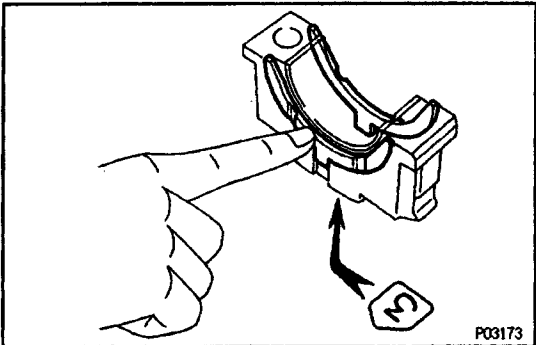


### 2. INSTALL UPPER THRUST WASHERS

Install the two thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.

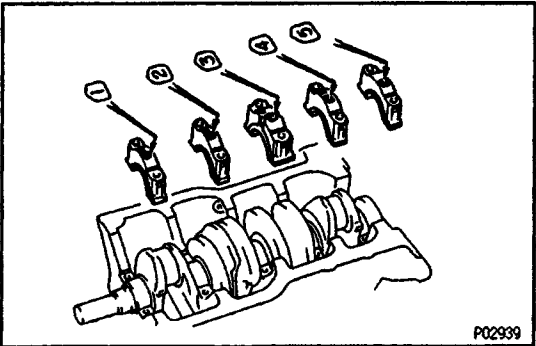


### 3. PLACE CRANKSHAFT ON CYLINDER BLOCK



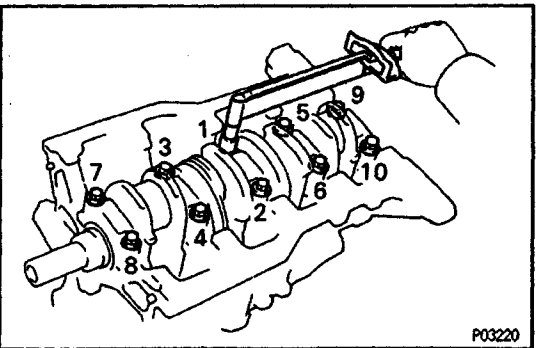
### 4. INSTALL MAIN BEARING CAPS AND LOWER THRUST WASHERS

- (a) Install the two thrust washers on the No.3 bearing cap with the grooves facing outward.



- (b) Install the five main bearing caps in their proper locations.

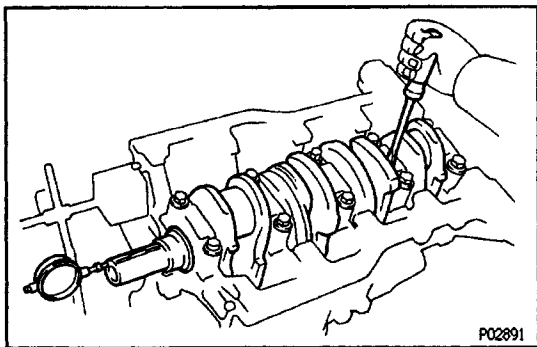
HINT: Each bearing cap has a number and front mark.



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

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

- (e) Check that the crankshaft turns smoothly.



- (f) Check the crankshaft thrust clearance.  
Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

**Standard thrust clearance:**

**0.020 – 0.220 mm (0.0008 – 0.0087 in.)**

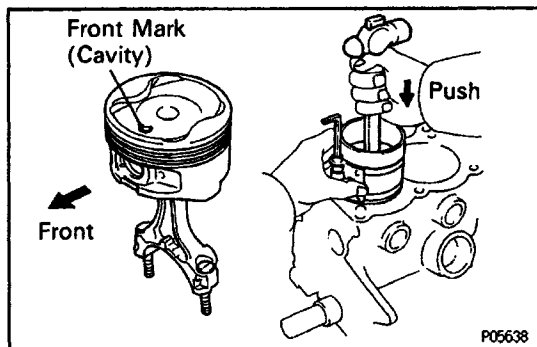
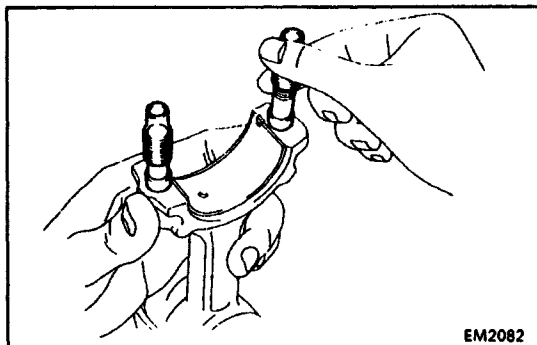
**Maximum thrust clearance:**

**0.30 mm (0.0118 in.)**

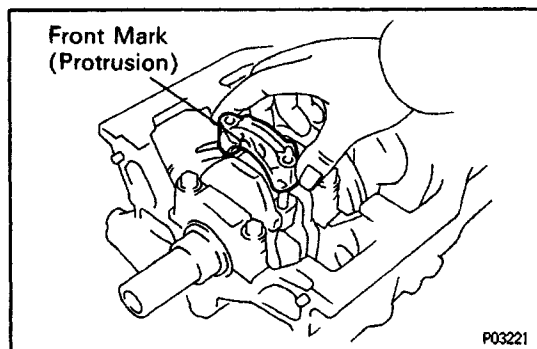
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

**5. INSTALL PISTON AND CONNECTING ROD ASSEMBLES**

- (a) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



- (b) Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



**6. INSTALL CONNECTING ROD CAPS**

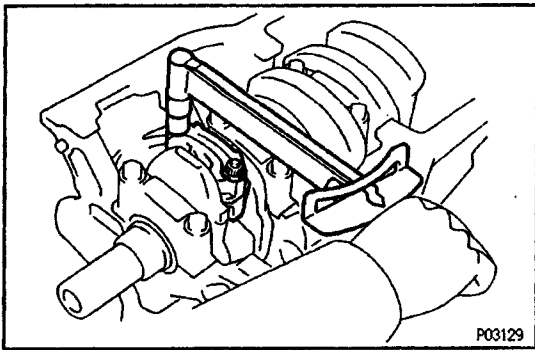
**A. Place connecting rod cap on connecting rod**

- (a) Match the numbered connecting rod cap with the connecting rod.  
(b) Install the connecting rod cap with the front mark facing forward.

**B. Install connecting rod cap nuts**

**HINT:**

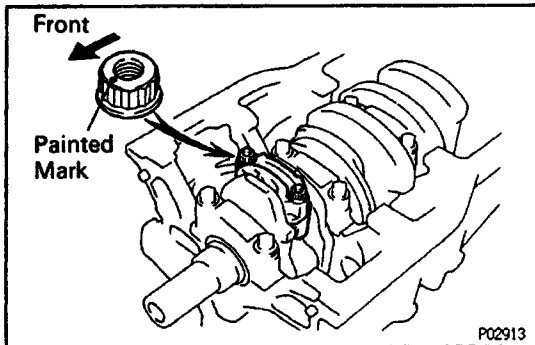
- The cap nuts are tightened in two progressive steps (steps (b) and (d)).
- If any one of the connecting rod bolts is broken or deformed, replace it.



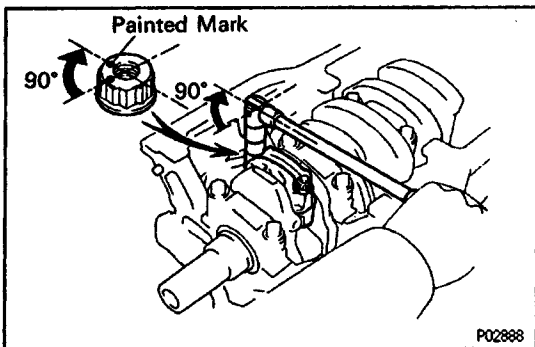
- (a) Apply a light of engine oil on the threads and under the nuts of the connecting rod cap.
- (b) Using SST, install and alternately tighten the cap nuts in several passes.  
SST 09011-38121

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

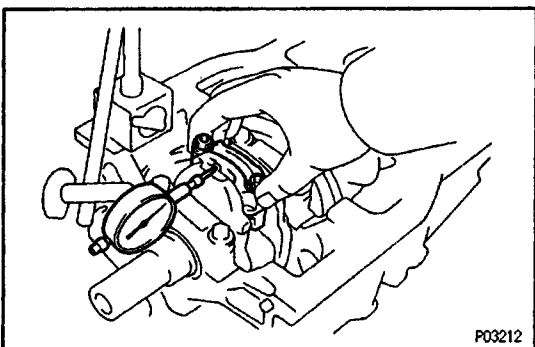
If any one of the cap nuts does not meet the torque specification, replace the connecting rod bolt and cap nut as a set.



- (c) Mark the front of the cap nut with the paint.



- (d) Retighten the cap nuts 90° as shown.
- (e) Check that the painted mark is now at a 90° angle to the front.
- (f) Check that the crankshaft turns smoothly.



- (g) Check the connecting rod thrust clearance.
  - Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

**Standard thrust clearance:**

**0.160 – 0.312 mm (0.0063 – 0.0123 in.)**

**Maximum thrust clearance:**

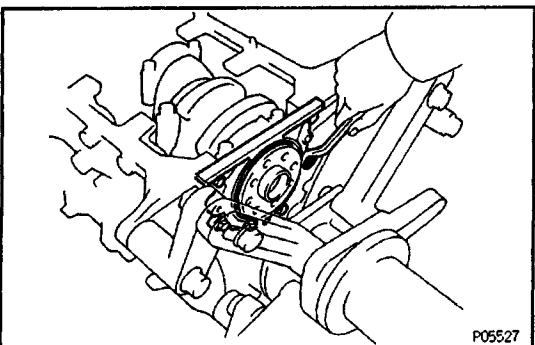
**0.35 mm (0.0138 in.)**

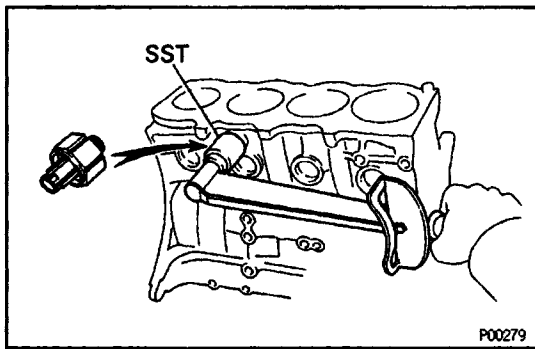
If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.

## 7. INSTALL REAR OIL SEAL RETAINER

Install a new gasket and the retainer with the six bolts.

**Torque: 9.3 N-m (95 kgf-cm, 82 in.-lbf)**





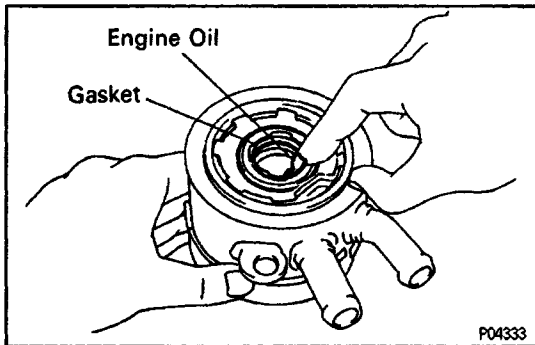
## POST ASSEMBLY

### 1. INSTALL KNOCK SENSOR

Using SST, install the knock sensor.

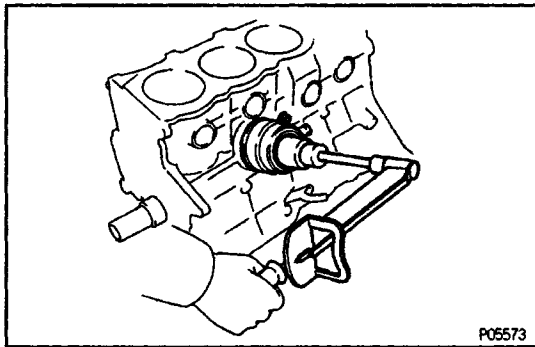
SST 09816-30010

**Torque: 37 N-m (380 kgf-cm, 27 ft-lbf)**



### 2. INSTALL OIL COOLER

(a) Install new O-ring and gasket to the oil cooler.



(b) Apply a light coat of engine oil on the threads and under the head of the relief valve.

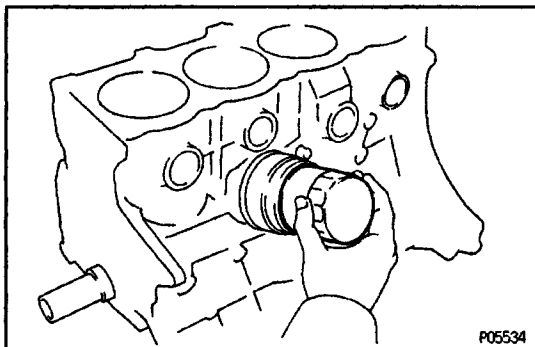
(c) Temporarily install the oil cooler with the nut.

(d) Install the plate washer and relief valve.

**Torque: 78 N-m (800 kgf-cm, 58 ft-lbf)**

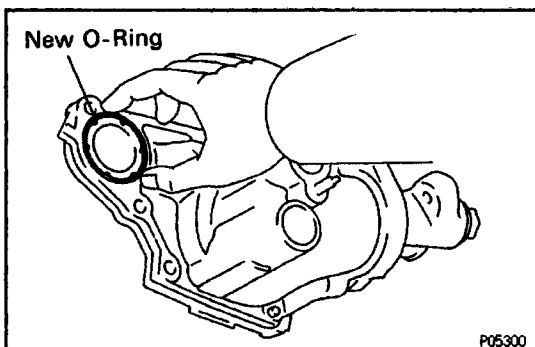
(e) Tighten the nut.

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



(f) Install the oil filter.

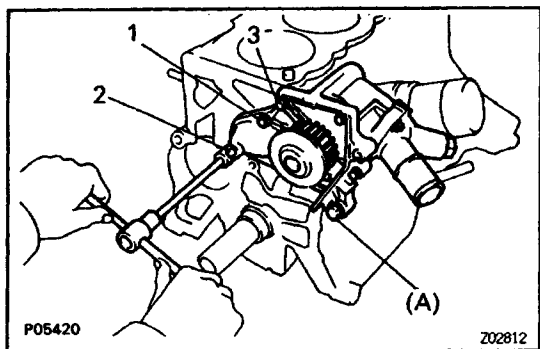
(See Replacement of Oil and Oil Filter)



### 3. INSTALL WATER PUMP AND WATER PUMP COVER ASSEMBLY

(a) Install a new O-ring to the water pump cover.





(b) Install the water pump with the three bolts. Tighten the bolts in the sequence shown.

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

(c) (w/o A/C)

Install the bolt (A).

Torque: 27 N-m (275 kgf-cm, 20 ft-lbf)

#### 4. INSTALL OIL PUMP AND OIL PAN

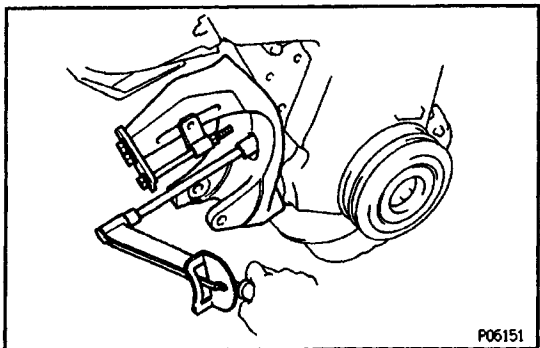
(See Oil pump Installation)

#### 5. INSTALL CYLINDER HEAD

(See Cylinder Head Installation)

#### 6. INSTALL TIMING BELT AND PULLEYS

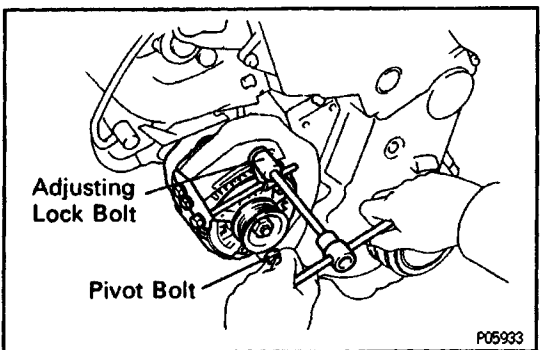
(See Timing Belt Installation)



#### 7. INSTALL ALTERNATOR BRACKET

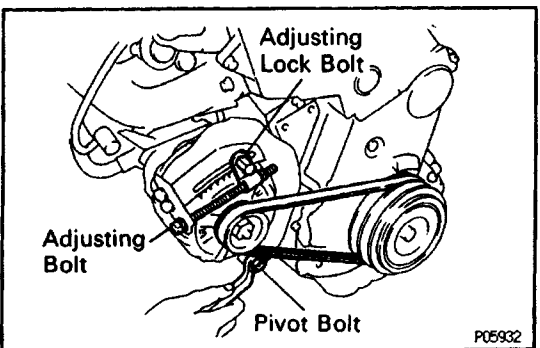
Install the alternator bracket with the three bolts and two nuts.

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



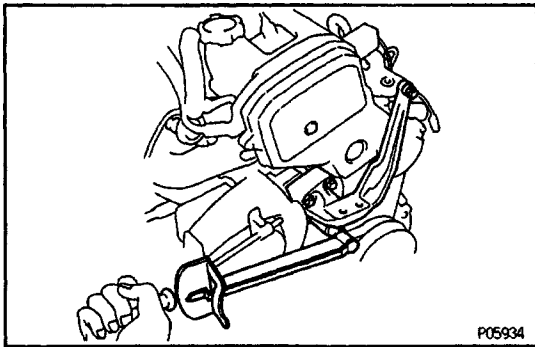
#### 8. INSTALL ALTERNATOR

(a) Mount the alternator on the alternator bracket with the pivot bolt and adjusting lock bolt. Do not tighten the bolts yet.



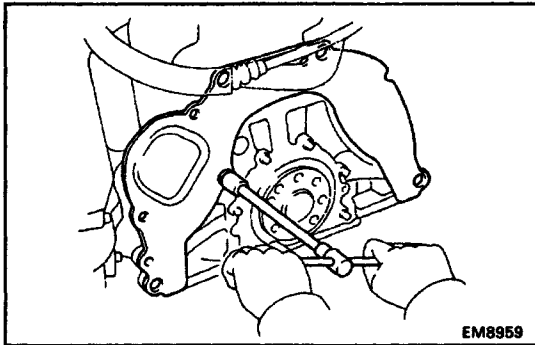
(b) Install the drive belt with the adjusting bolt.

(c) Adjust the drive belt with the adjusting bolt.

**9. INSTALL RH ENGINE MOUNTING BRACKET**

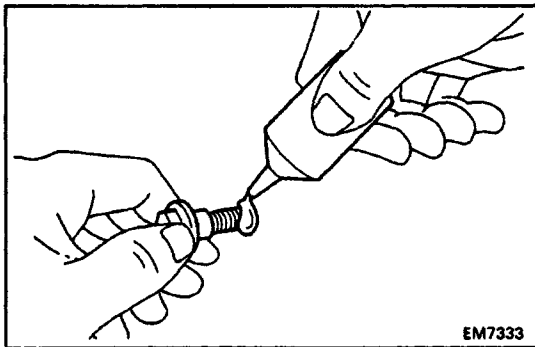
Install the mounting bracket with the four bolts.

**Torque: 61 N-m (620 kgf-cm, 45 ft-lbf)**

**10. DISCONNECT ENGINE FROM ENGINE STAND****11. INSTALL REAR END PLATE**

Install the rear end plate with the bolt.

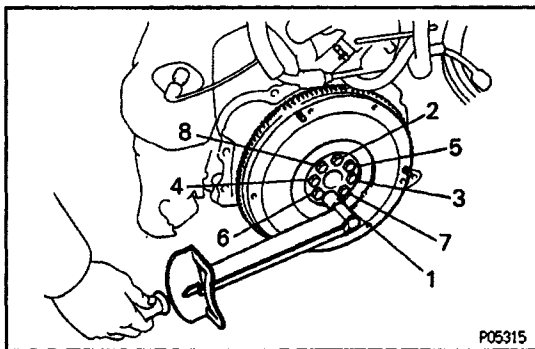
**Torque: 9.3 N-m (95 kgf-cm, 82in-lbf)**

**12. (M/T)****INSTALL FLYWHEEL**

(a) Apply adhesive to two or three threads of the mounting bolt end.

**Adhesive:**

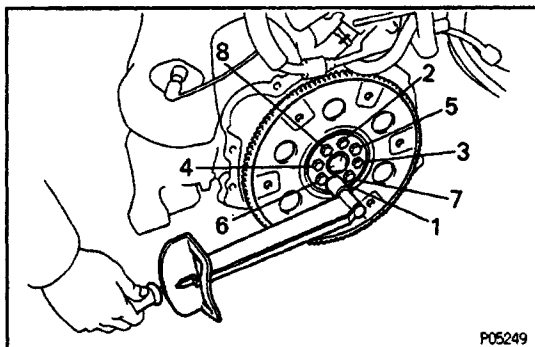
**Part No. 08833-00070, THREE BOND 1324 or equivalent**



(b) Install the flywheel on the crankshaft.

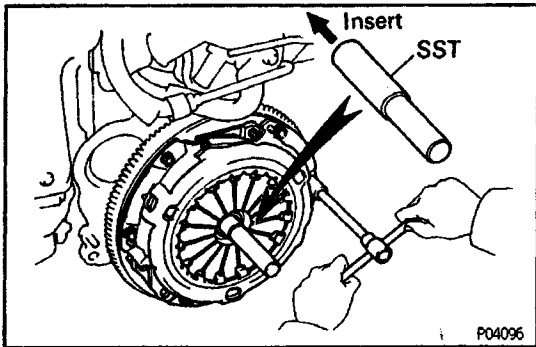
(c) Install and uniformly tighten the mounting bolts in several passes, in the sequence shown.

**Torque: 88 N-m (900 kgf-cm, 65 ft-lbf)**

**13. (A/T)**

**INSTALL DRIVE PLATE (See procedure in step 12)**

**Torque: 83 N-m (850 kgf-cm, 61 ft-lbf)**

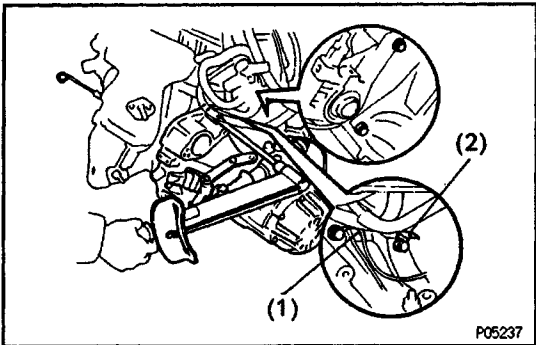


### 1. INSTALL CLUTCH DISC AND COVER

Using SST, install the disc and cover with the six bolts. Uniformly tighten the bolts in several passes.

SST 09301-32010

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



### 2. INSTALL TRANSAXLE TO ENGINE

(a) Attach the transaxle to the engine.

(b) Install the five bolts together with the following parts

(1) Ground strap

(2) Engine wire bracket

**Torque:**

**46 N-m (470 kgf-cm, 34 ft-lbf) for 14 mm head**

**64 N-m (650 kgf-cm, 47 ft-lbf) for 17 mm head**

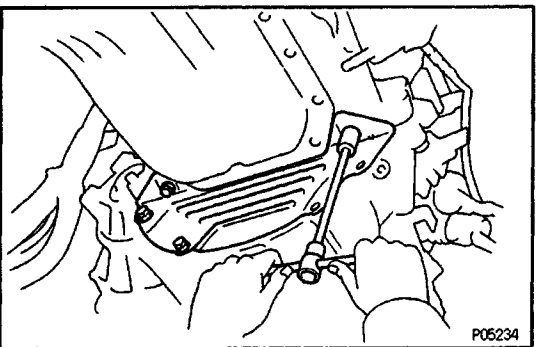


### 3. INSTALL HEATER WATER PIPE

(a) Install the water pipe with the two bolts.

(b) Connect the water hose to the water by-pass pipe.

**Torque: 46 N-m (470 kgf-cm, 34 ft-lbf)**



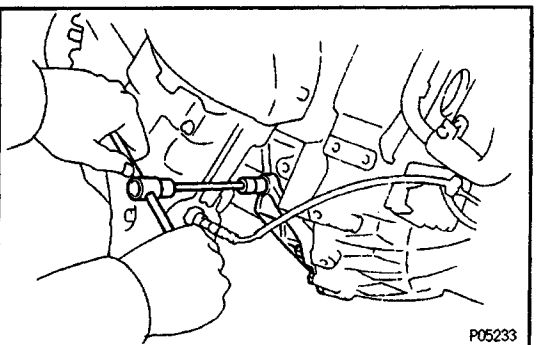
### 4. INSTALL NO.2 REAR END PLATE

Install the rear end plate with the four bolts.

**Torque:**

**9.3 N-m (95 kgf-cm, 82 in.-lbf) for 10 mm head**

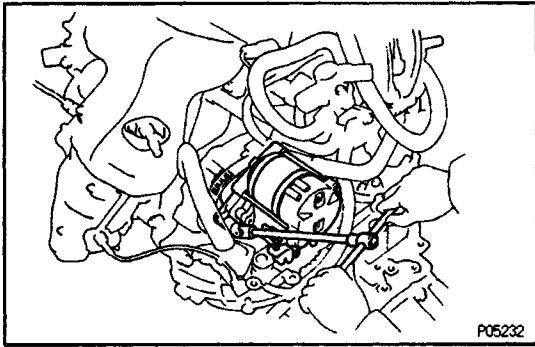
**19 N-m (195 kgf-cm, 14 ft-lbf) for 12 mm head**



### 5. INSTALL STIFFENER PLATE

Install the stiffener plate with the three bolts.

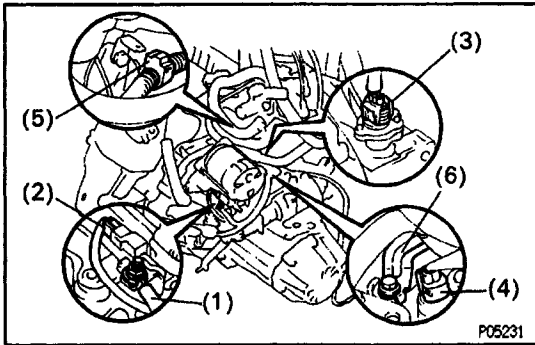
**Torque: 37N-m (380 kgf-cm, 27 ft-lbf)**



## 6. INSTALL STARTER

Install the starter with the two bolts.

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

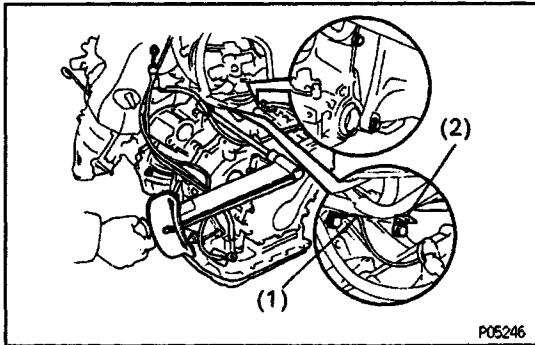


## 7. CONNECT ENGINE WIRE

(a) Connect the following parts:

- (1) Starter wire
- (2) Starter connector
- (3) Vehicle speed pulse generator connector
- (4) Back-up light switch connector
- (5) Engine wire clamp
- (6) Engine wire bracket

(b) Install the terminal cover to the starter.



## ENGINE & TRANSAXLE ASSEMBLY (A/T)

(See Components for Engine & Transaxle Separation and Assembly (A/T))

### 1. INSTALL TRANSAXLE TO ENGINE

#### A. Install transaxle

- (a) Attach the transaxle to the engine.
- (b) Install the five bolts together with the following parts
  - (1) Ground strap
  - (2) Engine wire bracket

**Torque:**

**46 N-m (470 kgf-cm, 34 ft-lbf) for 14 mm head**

**64 N-m (650 kgf-cm, 47 ft-lbf) for 17 mm head**

#### B. Install torque converter mounting bolts

- (a) Apply adhesive to two or three threads of the mounting bolt end.

**Adhesive:**

**Part No. 08833-00070, THREE BOND 1324 or equivalent**

- (b) Hold the crankshaft pulley bolt with a wrench, and install the six bolts evenly.

**Torque: 27 N-m (280 kgf-cm, 20 ft-lbf)**

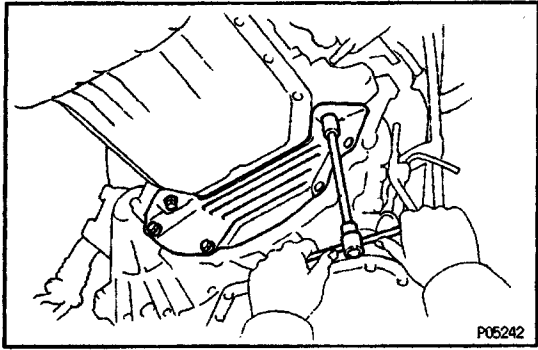
**HINT:** First install the dark green colored bolt, install the other bolts.

### 2. INSTALL HEATER WATER PIPE

- (a) Install the water pipe with the two bolts.
- (b) Connect the water hose to the water by-pass pipe.

**Torque: 46 N-m (470 kgf-cm, 34 ft-lbf)**





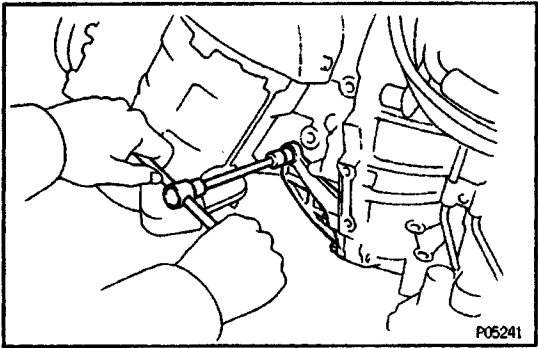
### 3. INSTALL No.2 REAR END PLATE

Install the rear end plate with the four bolts.

**Torque:**

**9.3 N-m (95 kgf-cm, 82 in-lbf) for 10 mm head**

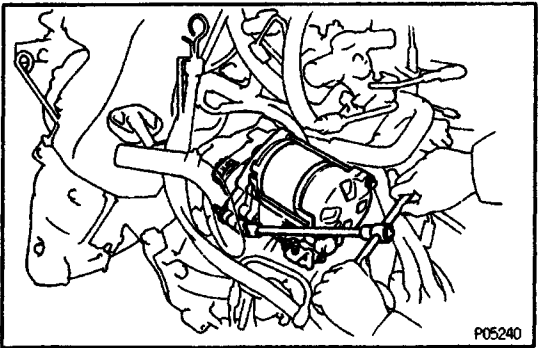
**19 N-m (195 kgf-cm, 14 ft-lbf) for 12 mm head**



### 4. INSTALL STIFFENER PLATE

Install the stiffener plate with the three bolts.

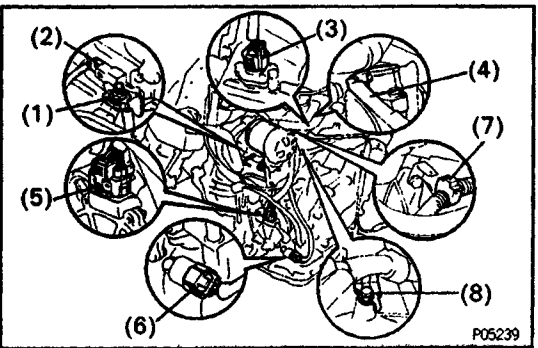
**Torque: 37 N-m (380 kgf-cm, 27 ft-lbf)**



### 5. INSTALL STARTER

Install the starter with the two bolts.

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



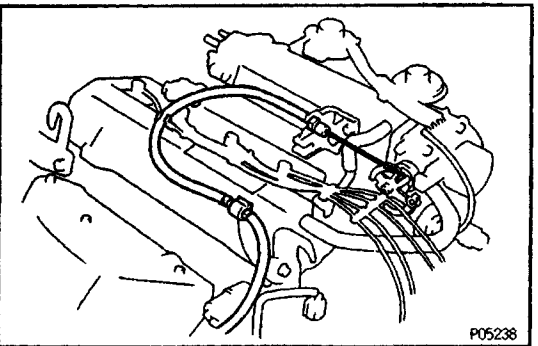
### 6. CONNECT ENGINE WIRE

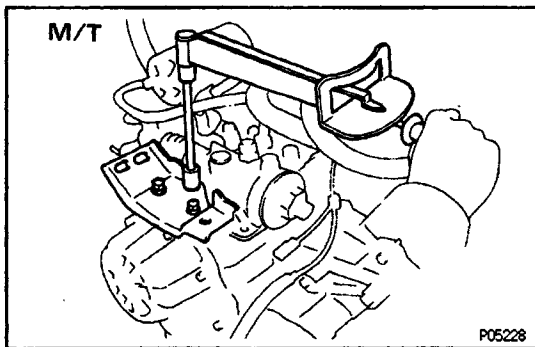
(a) Connect the following parts:

- (1) Starter wire
- (2) Starter connector
- (3) No.1 vehicle speed pulse generator
- (4) No.2 vehicle speed pulse generator
- (5) Park/neutral switch connector
- (6) Solenoid connector
- (7) Engine wire clamp
- (8) Engine wire bracket

(b) Install the terminal cover to the starter.

### 7. CONNECT THROTTLE CABLE FROM THROTTLE BODY





## ENGINE INSTALLATION

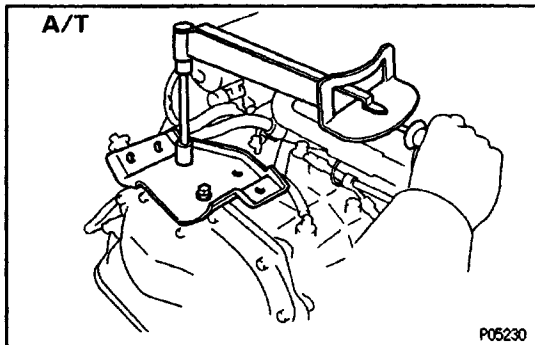
(See Components for Engine Removal and Installation)

### 1. INSTALL LH ENGINE MOUNTING BRACKET TO TRANSAXLE

(M/T)

install the mounting bracket with the three bolts.

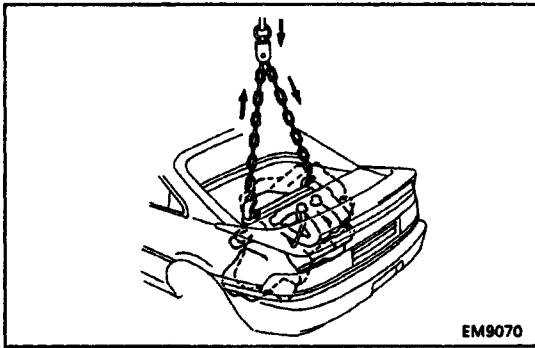
**Torque 52 N-m (530 kgf-cm, 38 ft-lbf)**



(A/T)

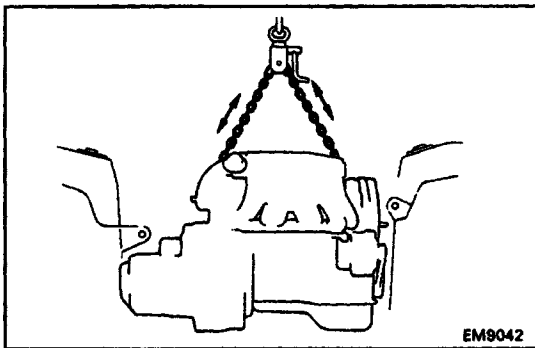
Install the mounting bracket with the two bolts.

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

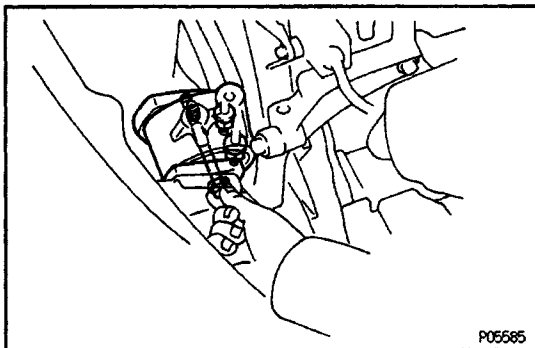


### 2. INSTALL ENGINE AND TRANSAXLE ASSEMBLY IN VEHICLE

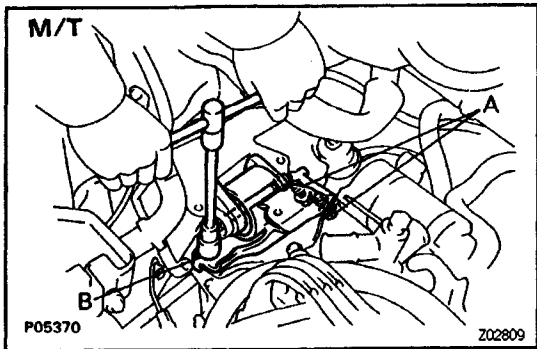
- (a) Attach the engine chain hoist to engine hangers.
- (b) Slowly lower the engine into the engine compartment.  
Tilt the transaxle downward, lower the engine and clear the LH body mounting.



- (c) Keep the engine level, and align RH and LH mountings with the body mountings.



- (d) Attach the RH mounting insulator to the body, and temporarily install the through bolt.
- (e) Attach the RH mounting insulator to the mounting bracket, and temporarily the two nuts.



(f) Attach the LH mounting insulator to the body, and temporarily install the through bolt.

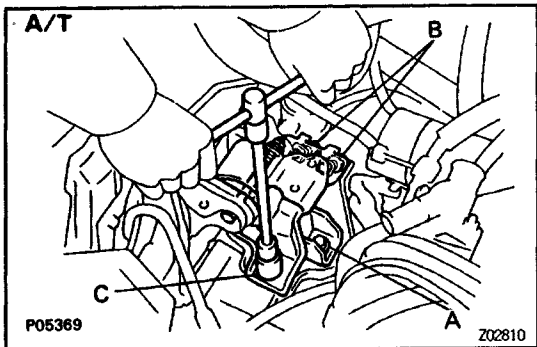
(g) (M/T)

Attach the LH mounting insulator to the mounting bracket, and install the three bolts.

**Torque:**

**63 N-m (650 kgf-cm, 47 ft-lbf) for A**

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



(h) (A/T)

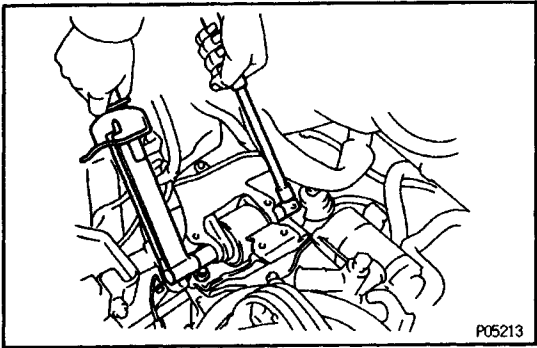
Attach the LH mounting insulator to the mounting bracket, and install the four bolts.

**Torque:**

**52 N-m (530 kgf-cm, 38 ft-lbf) for A**

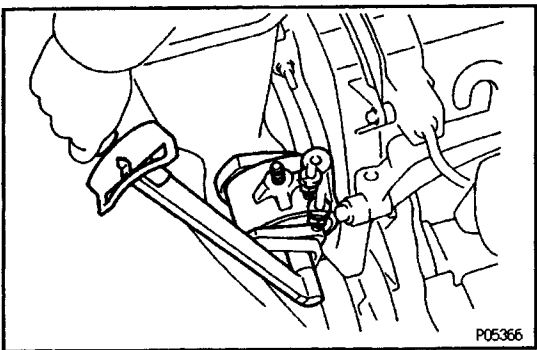
**63 N-m (650 kgf-cm, 47 ft-lbf) for B**

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



(i) Tighten the through bolt holding the LH mounting insulator to the body.

**Torque: 78 N-m (800 kgf-cm, 58 ft-lbf)**



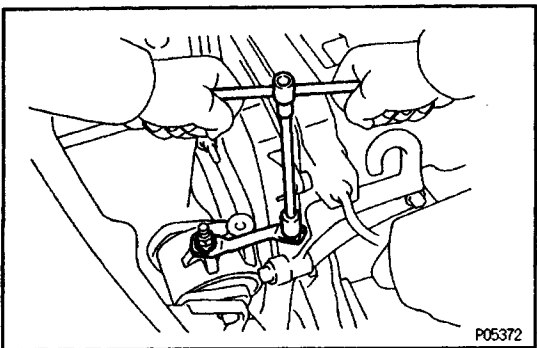
(j) Tighten the two nuts holding the RH mounting insulator to the mounting bracket.

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

(k) Tighten the through bolt holding the RH mounting insulator to the body.

**Torque: 78 N-m (800 kgf-cm, 58 ft-lbf)**

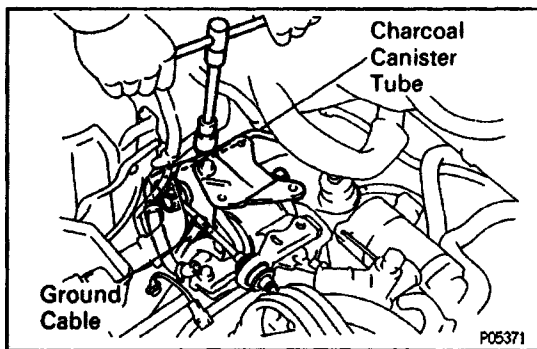
(l) Remove the engine chain hoist from the engine.



### 3. INSTALL RH ENGINE MOUNTING STAY

Install the mounting stay with the bolt and nut.

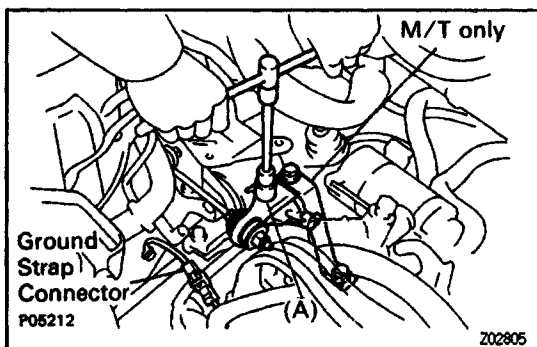
**Torque: 73 N-m (740 kgf-cm, 54 ft-lbf)**



#### 4. INSTALL LATERAL CONTROL ROD TO BODY

Install the control rod and charcoal canister tube with the four bolts. Connect the ground cable.

**Torque: 35 N-m (360 kgf-cm, 26 ft-lbf)**



#### 5. INSTALL LATERAL CONTROL ROD (TO LH ENGINE MOUNTING INSULATOR) AND LH ENGINE MOUNTING STAY (M/T only)

(M/T)

(a) Temporarily install the lateral control rod Temporarily install the lateral control rod with bolt (A).

(b) install the LH mounting stay with the two bolts.

**Torque:**

**25 N-m (250 kgf-cm, 18 ft-lbf) for transaxle side**

**73 N-m (740 kgf-cm, 54 ft-lbf) for insulator side**

(c) Tighten the bolt (A).

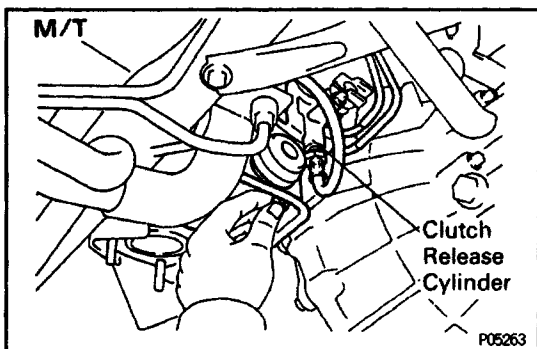
**Torque: 37 N-m (380 kgf-cm, 27 ft-lbf)**

(A/T)

Install the lateral control rod with two bolts.

**Torque: 37 N-m (380 kgf-cm, 27 ft-lbf)**

#### 6. CONNECT GROUND STRAP CONNECTOR

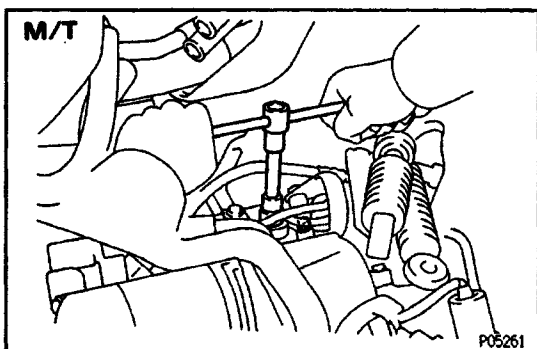


#### 7. INSTALL FRONT ENGINE MOUNTING BRACKET (M/T)

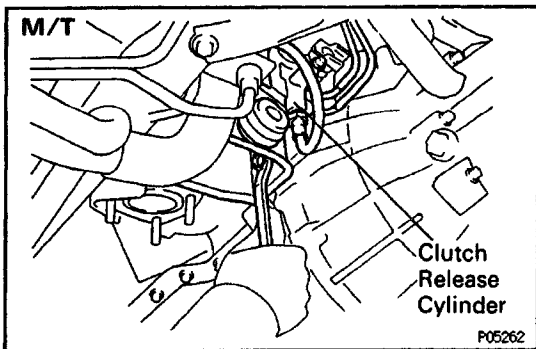
(a) Temporarily install the clutch release cylinder and mounting bracket with the two bolts.

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

**Torque: 12 N-m (120 kgf-cm, 9 ft-lbf)**

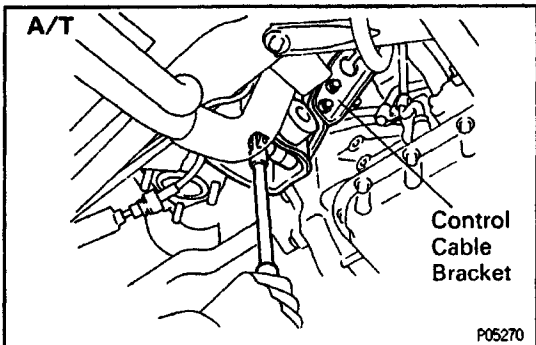






(c) Tighten the two bolts holding the mounting bracket to the transaxle.

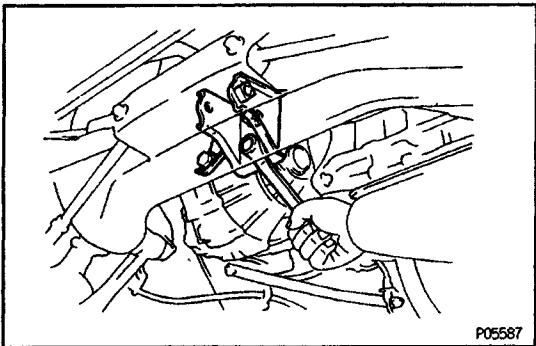
**Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)**



(A/T)

Install the control cable bracket and mounting bracket with the two bolts.

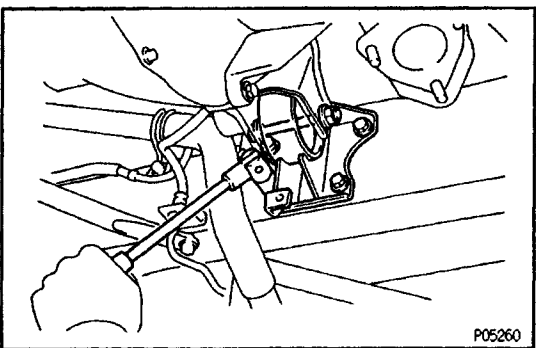
**Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)**



## 8. INSTALL REAR ENGINE MOUNTING BRACKET

Install the mounting bracket with the three bolts.

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

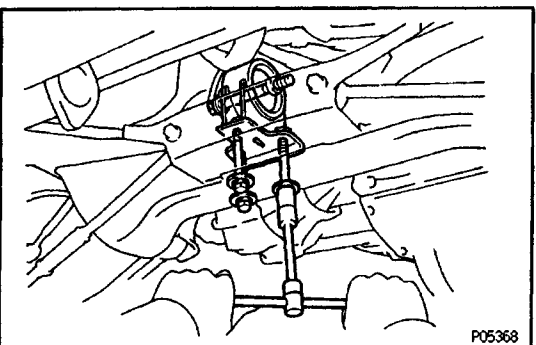


## 9. INSTALL FRONT ENGINE MOUNTING INSULATOR

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

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

(b) Temporarily install the through bolt and nut holding the mounting insulator to the mounting bracket.



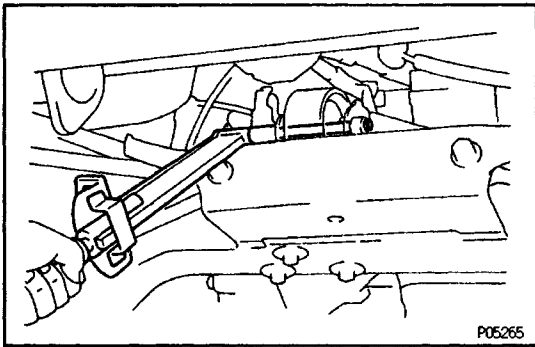
## 10. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Temporarily install the mounting bracket to the body with the three bolts.

(b) Temporarily install the through bolt holding the mounting insulator to the mounting bracket.

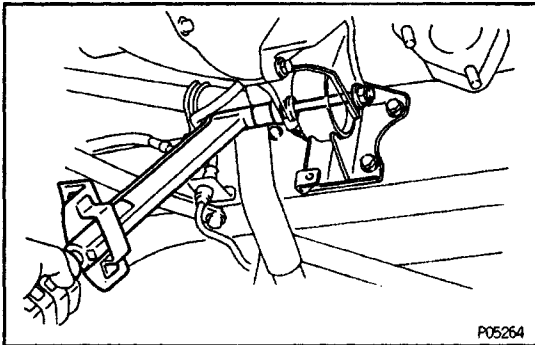
(c) Tighten the three bolts holding the mounting bracket to the body.

**Torque: 64 N-m (650 kgf-cm, 47 ft-lbf)**



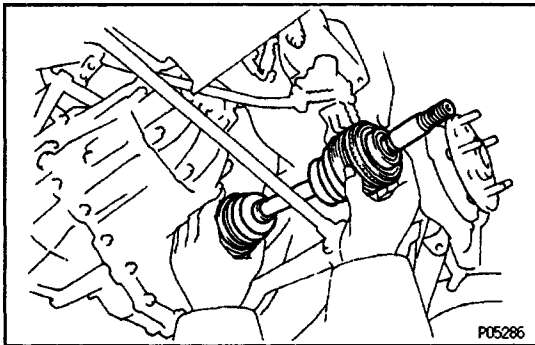
(d) Tighten the through bolt holding the mounting insulator to the mounting bracket.

**Torque: 87 N-m (890 kgf-cm, 64 ft-lbf)**



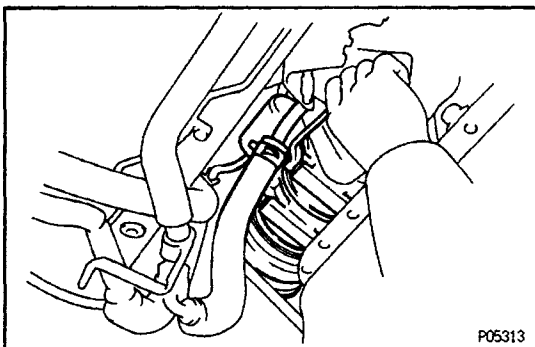
### 11. TIGHTEN FRONT ENGINE MOUNTING THROUGH BOLT

**Torque: 96 N-m (980 kgf-cm, 70 ft-lbf)**



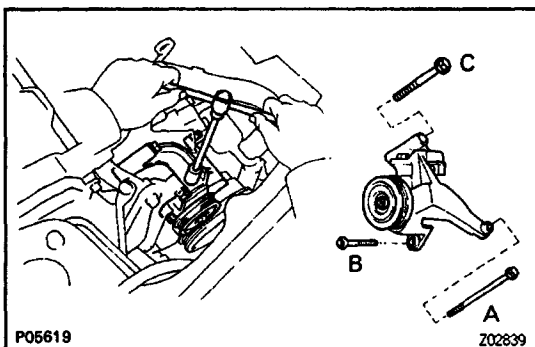
### 12. INSTALL DRIVE SHAFTS

(See Drive Shaft Installation in SA section)



### 13. INSTALL A/C COMPRESSOR

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



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

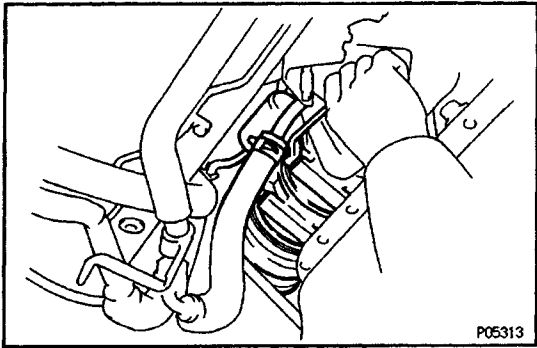
**Torque:**

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

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

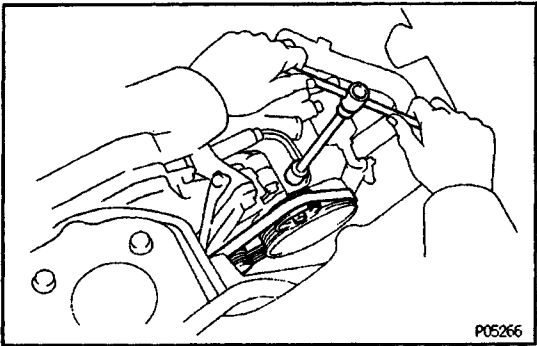
**37 N-m (375 kgf-cm, 27 ft-lbf) for C**

(c) Connect the A/C compressor connector.



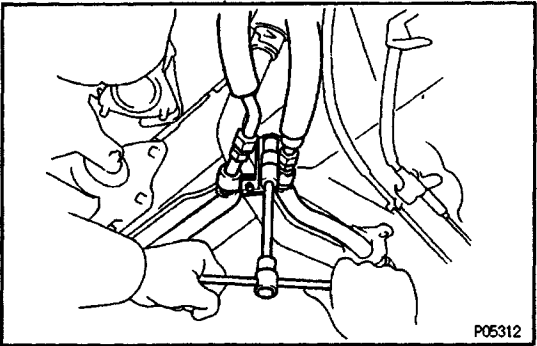
(d) Tighten the two bolts of the lower side of the A/C compressor.

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

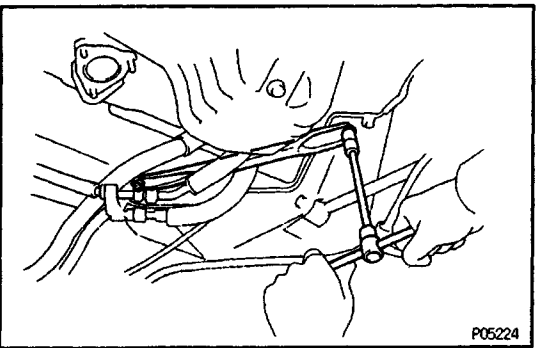


(e) Install the drive belt with the adjusting bolt.

(f) Tighten the idler pulley nut.

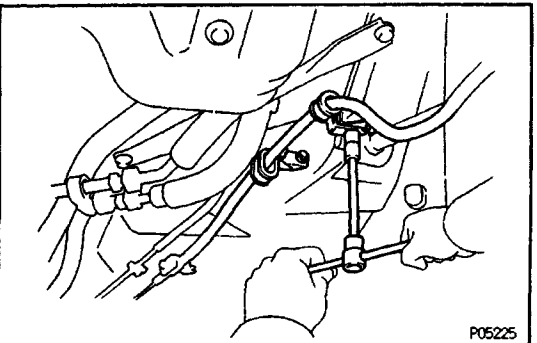


(g) Install the A/C pipes with the two clamps and nut.

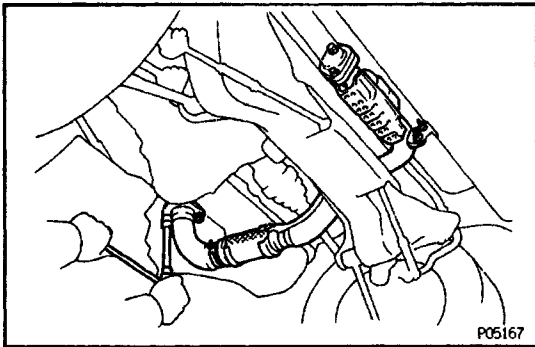


(h) Install the lower suspension brace with the two bolts.

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



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



#### 14. INSTALL FRONT EXHAUST PIPE

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

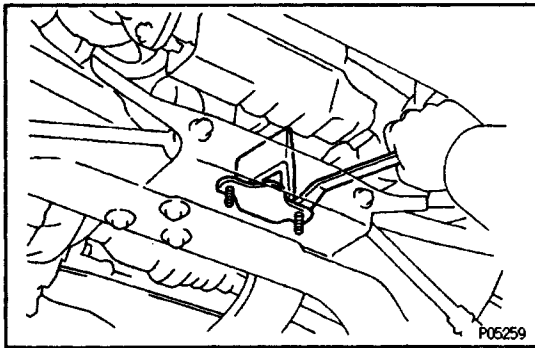
**Torque: 62 N-m (630 kgf-cm, 46 ft-lbf)**

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

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

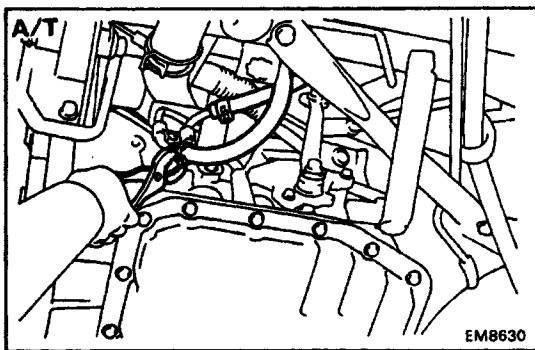
- (d) Install the two bolts holding the front exhaust pipe bracket to the tailpipe bracket.

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



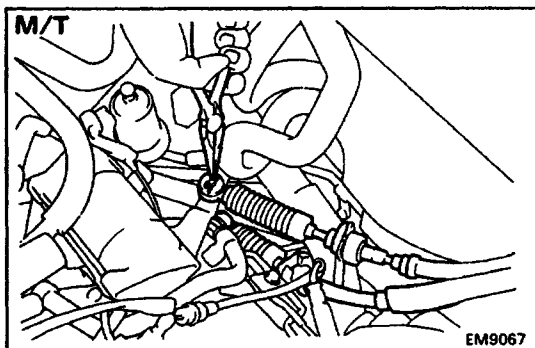
- (e) Install the damper with the two bolts.

**Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)**

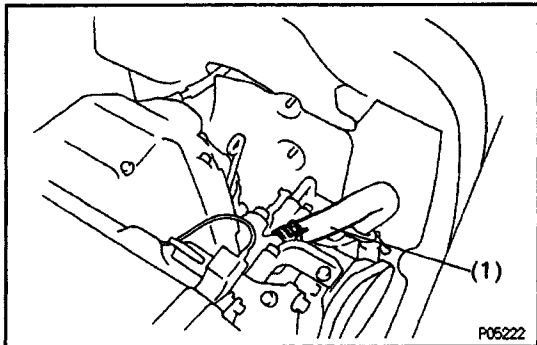
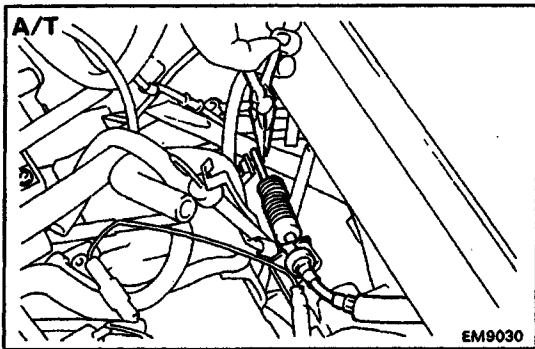


#### 15. (A/T)

#### CONNECT TRANSAXLE OIL COOLER HOSES



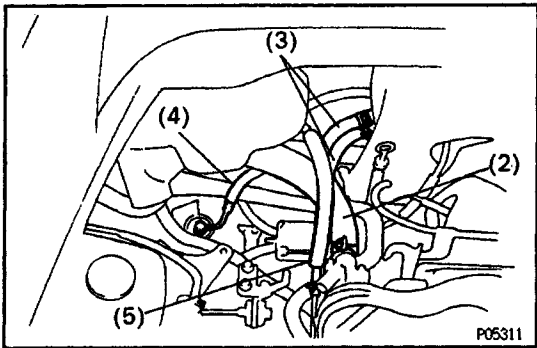
#### 16. CONNECT TRANSAXLE CONTROL CABLE(S)



### 17. CONNECT HOSES

Connect the following connectors:

(1) Radiator hose to water inlet

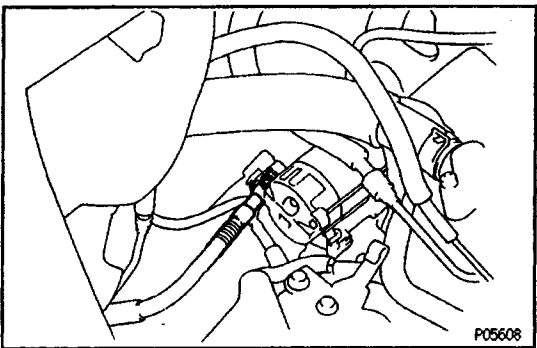


(2) Radiator hose to water outlet

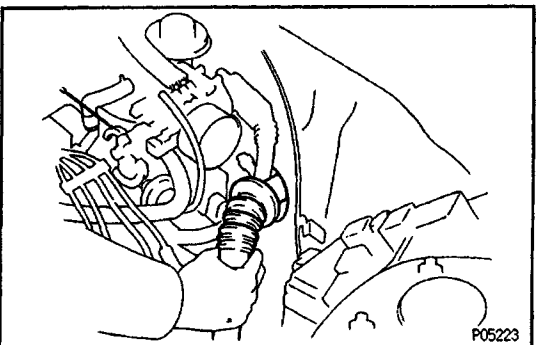
(3) Two heater water hoses

(4) Fuel inlet hose to fuel filter

(5) Fuel return hose

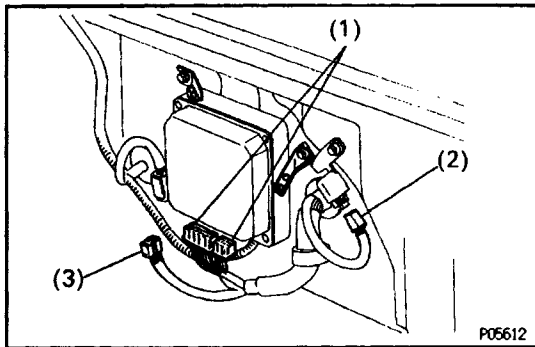


### 18. CONNECT STARTER CABLE

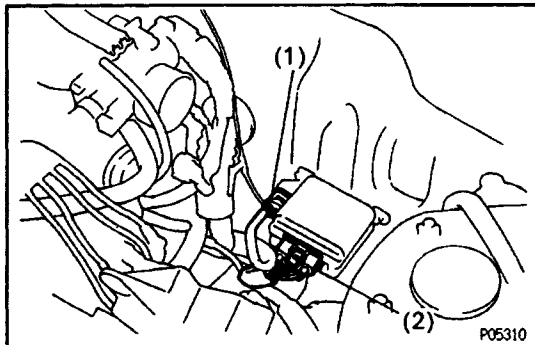


### 19. CONNECT ENGINE WIRE TO LUGGAGE COMPARTMENT

(a) Push in the engine wire through the luggage compartment.

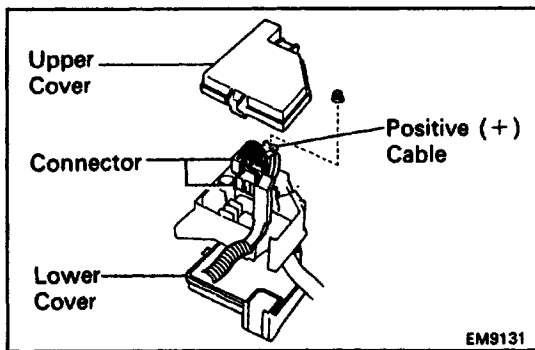


- (b) Connect the following connectors:
- (1) Two PCME (& T) connectors
  - (2) Starter relay connector
  - (3) Engine compartment wire connector



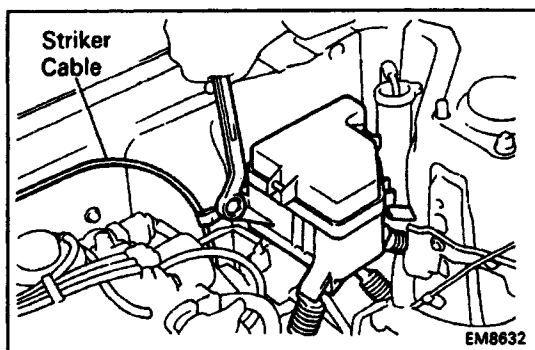
## 20. CONNECT CONNECTORS

- Connect the following connectors:
- (1) Noise filter connector
  - (2) Igniter connector

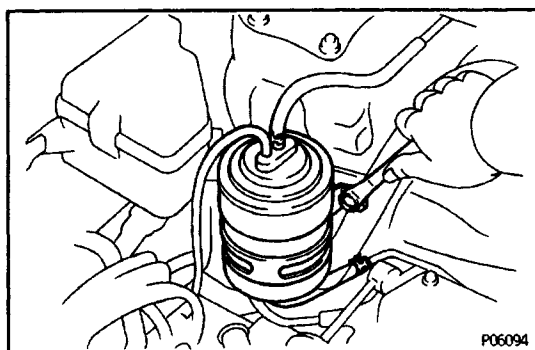


## 21. CONNECT ENGINE WIRE, AND INSTALL ENGINE RELAY BOX

- (a) Connect the two connectors and positive (+) cable of the engine wire to relay box.
- (b) Install the upper and lower covers to the relay box.

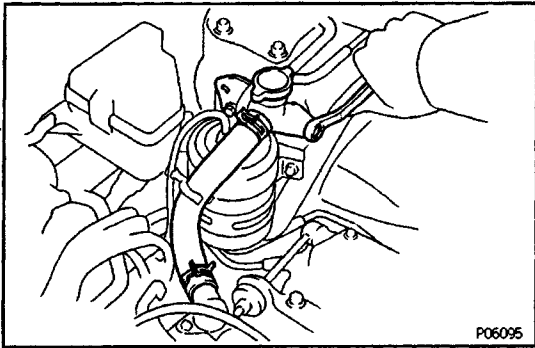


- (c) Install the relay box with the two bolts. Install the luggage compartment striker cable.

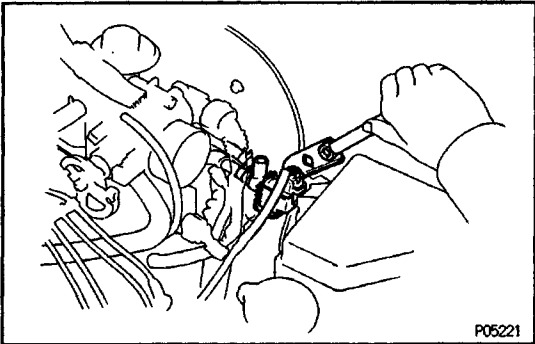


## 22. INSTALL CHARCOAL CANISTER

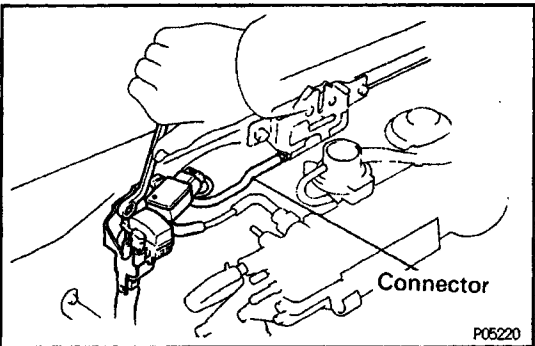
- (a) Install the charcoal with the two bolts.
- (b) Connect the three hoses.

**23. INSTALL WATER FILTER**

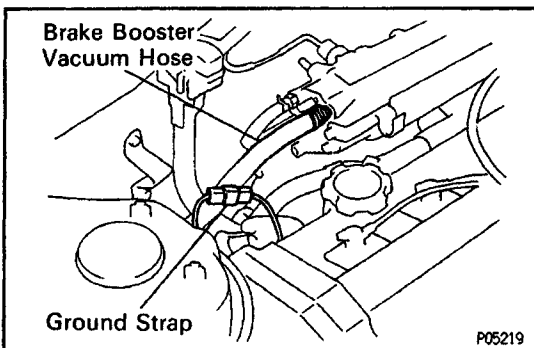
- (a) Install the water filter with the two bolts.
- (b) Connect the following hoses:
  - (1) Water filler hose
  - (2) Coolant reservoir hose

**24. INSTALL A/C IDLE-UP VALVE**

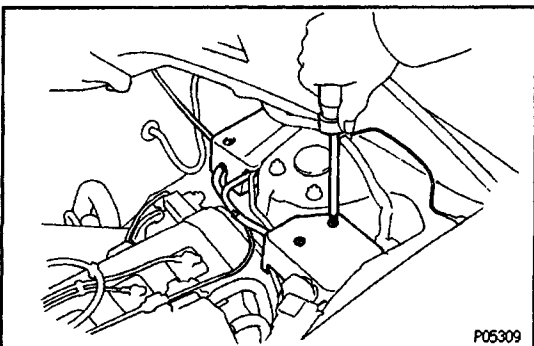
Install the A/C idle-up valve with the bolt.

**25. INSTALL DATA LINK CONNECTOR 1 AND MAP**

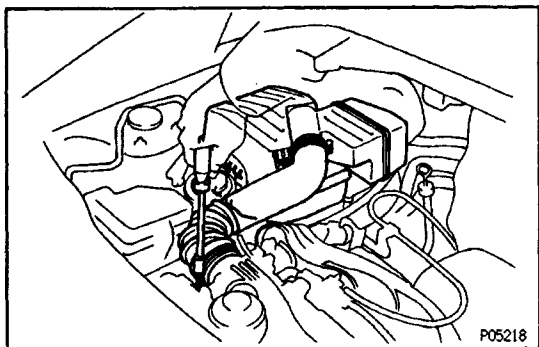
- (a) Install the data link connector 1 and MAP to the body with the bolt.
- (b) Connect the engine hood curtesy switch connector.



**26. CONNECT BRAKE BOOSTER VACUUM HOSE**  
**27. CONNECT GROUND STRAP CONNECTOR**



- 28. (w/ CRUISE CONTROL SYSTEM)**  
**INSTALL CRUISE CONTROL ACTUATOR AND**  
**ACCELERATOR LINKAGE**  
**29. CONNECT ACCELERATOR LINKAGE TO**  
**THROTTLE BODY**

**30. 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 with the four clamps.
- (d) Connect the air cleaner hose to the throttle body.
- (e) Connect the IATS connector.

**31. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY****32. FILL WITH ENGINE COOLANT****33. FILL WITH ENGINE OIL****34. START ENGINE AND CHECK FOR LEAKS****35. PERFORM ENGINE ADJUSTMENT**

(See Tune-Up)

**36. INSTALL ENGINE UNDER COVERS****37. INSTALL ENGINE HOOD****38. INSTALL ENGINE HOOD SIDE PANELS****39. PERFORM ROAD TEST**

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

**40. RECHECK ENGINE COOLANT AND OIL LEVELS**