

**2014 ENGINE****Engine Mechanical (Service Information) (Except Hybrid)- Camry (2AR-FE)****ENGINE****ON-VEHICLE INSPECTION [08/2013 - ]****ON-VEHICLE INSPECTION [08/2013 - ]****1. INSPECT ENGINE COOLANT**

Refer to **ON-VEHICLE INSPECTION [08/2013 - ]**

**2. INSPECT ENGINE OIL**

Refer to **ON-VEHICLE INSPECTION [08/2013 - ]**

**3. INSPECT BATTERY**

Refer to **ON-VEHICLE INSPECTION [08/2013 - ]**

**4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY**

- a. Remove the air cleaner filter element sub-assembly.
- b. Visually check that the air cleaner filter element sub-assembly is not excessively damaged or oily. If necessary, replace the air cleaner filter element sub-assembly.

**HINT:**

- If there is any dirt or a blockage in the air cleaner filter element sub-assembly, clean it with compressed air.
- If any dirt or a blockage remains even after cleaning the air cleaner filter element sub-assembly with compressed air, replace it.

- c. Install the air cleaner filter element sub-assembly.

**5. INSPECT SPARK PLUG**

Refer to **ON-VEHICLE INSPECTION [08/2013 - ]**

**6. INSPECT VALVE LASH ADJUSTER ASSEMBLY NOISE**

- a. Rev up the engine several times. Check that the engine does not emit unusual noises.

If unusual noises occur, warm up the engine and idle it for over 30 minutes. Then perform the inspection above again.

If any defects or problems are found during the inspection above, perform a lash adjuster inspection See step 2.

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1450 kPa (14.8 kgf/cm<sup>2</sup> , 210 psi)

Minimum pressure

980 kPa (10.0 kgf/cm<sup>2</sup> , 142 psi)

Difference between each cylinder

100 kPa (1.0 kgf/cm<sup>2</sup> , 15 psi)

### **HINT:**

Always use a fully charged battery to obtain an engine speed of 250 rpm or more.

- h. If the cylinder compression is low in one or more cylinders, pour a small amount of engine oil into the cylinder with low compression through its spark plug hole. Then inspect the cylinder compression pressure again.

### **HINT:**

- If adding oil helps boost the compression, it is likely that the piston rings and/or cylinder bore is worn or damaged.
  - If the pressure stays low, a valve may be stuck or seated improperly, or there may be leakage in the gasket.
- i. Connect the 4 fuel injector connectors.
  - j. Install the 4 spark plugs. Refer to **INSTALLATION [08/2013 - ] - Step 1** .
  - k. Clear the DTCs. Refer to **DTC CHECK / CLEAR [08/2013 - 12/2013]** .

## 10. INSPECT CO/HC

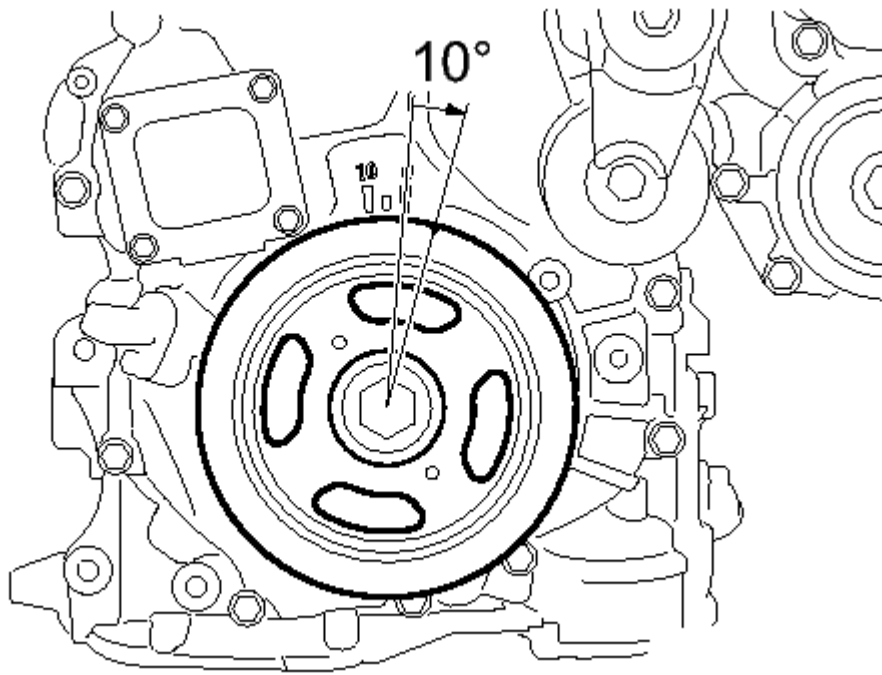
### **HINT:**

This check determines whether or not the idle CO/HC complies with regulations.

- a. Start the engine.
- b. Keep the engine speed at 2500 rpm for approximately 180 seconds.
- c. Insert the CO/HC meter testing probe at least 40 cm (1.31 ft.) into the tailpipe during idling.
- d. Immediately check CO/HC concentration at idle and 2500 rpm.

### **HINT:**

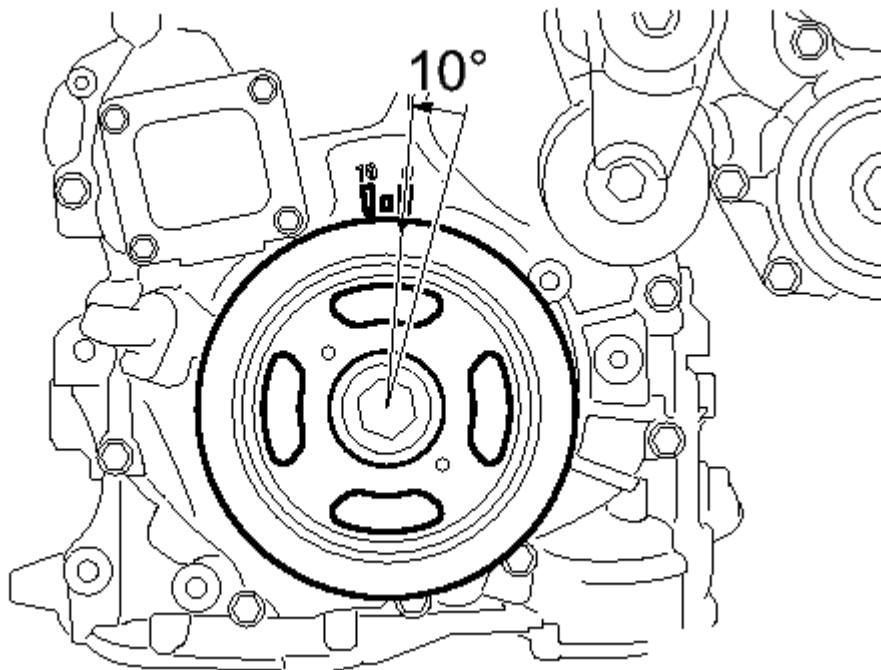
- When performing the 2 mode (2500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.
- If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.



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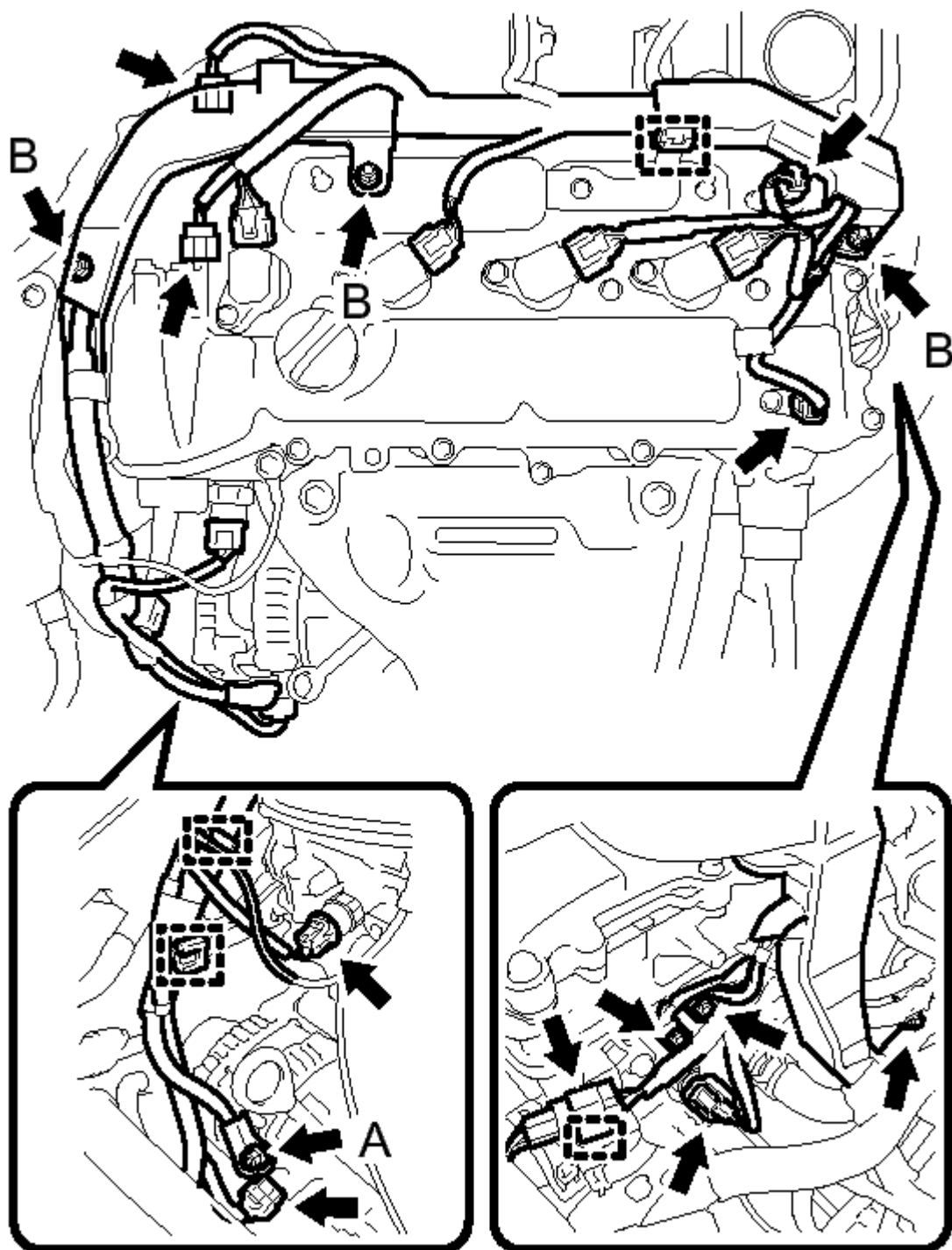
**Fig. 34: View Of Turning Crankshaft 10Degrees Clockwise**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Turn the crankshaft approximately 10° counterclockwise.



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**Fig. 35: Turning Crankshaft 10Degrees Counterclockwise**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

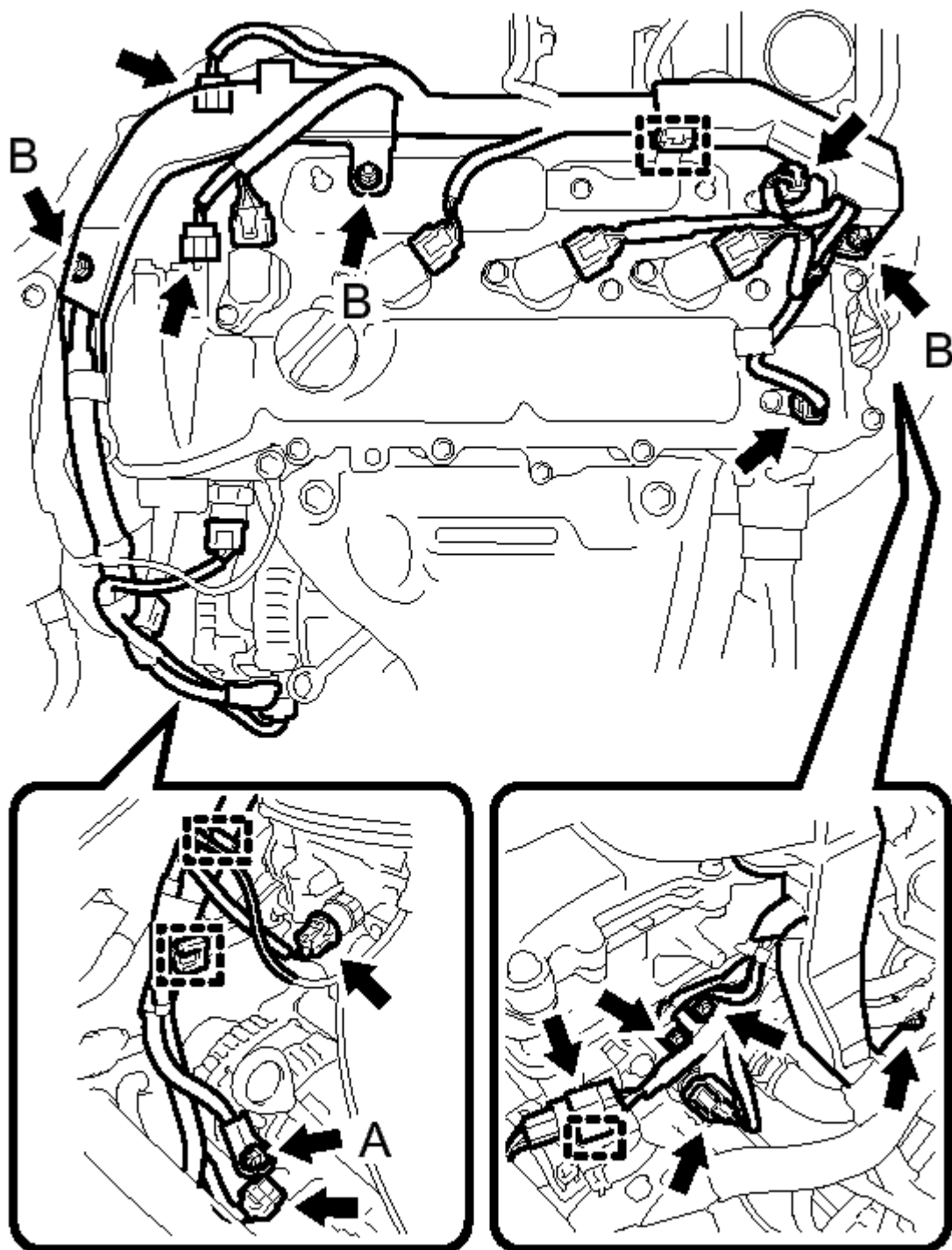


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**Fig. 75: Identifying Bolts And Nuts**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Nut A



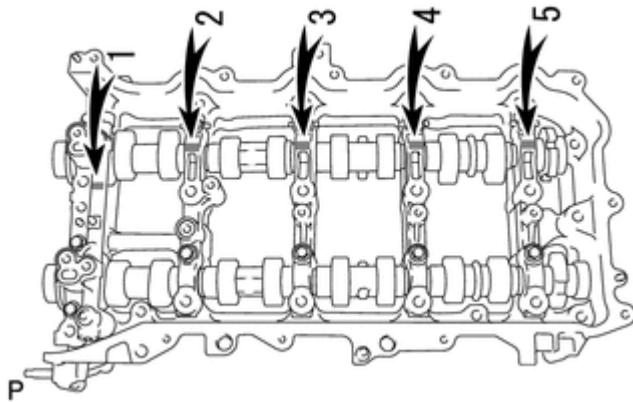
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**Fig. 101: Identifying Bolts And Nuts**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

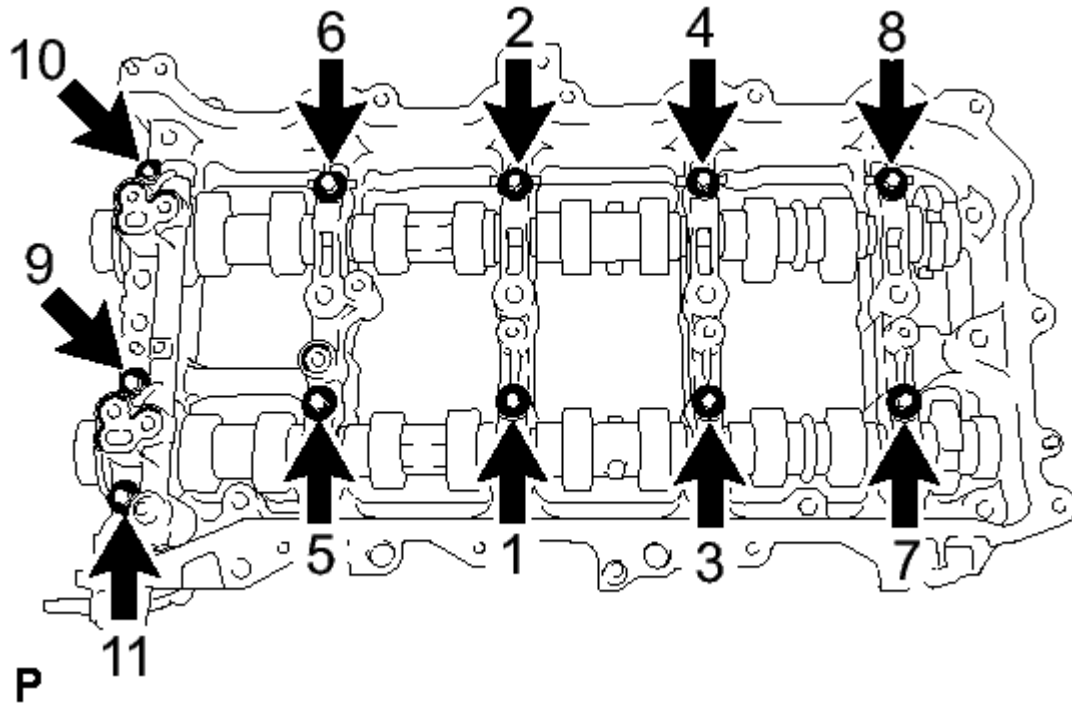
Nut A

and 3 No. 3 camshaft bearing caps and place them in their proper positions and directions.



**Fig. 131: Identifying Camshaft Bearing Caps Positions**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

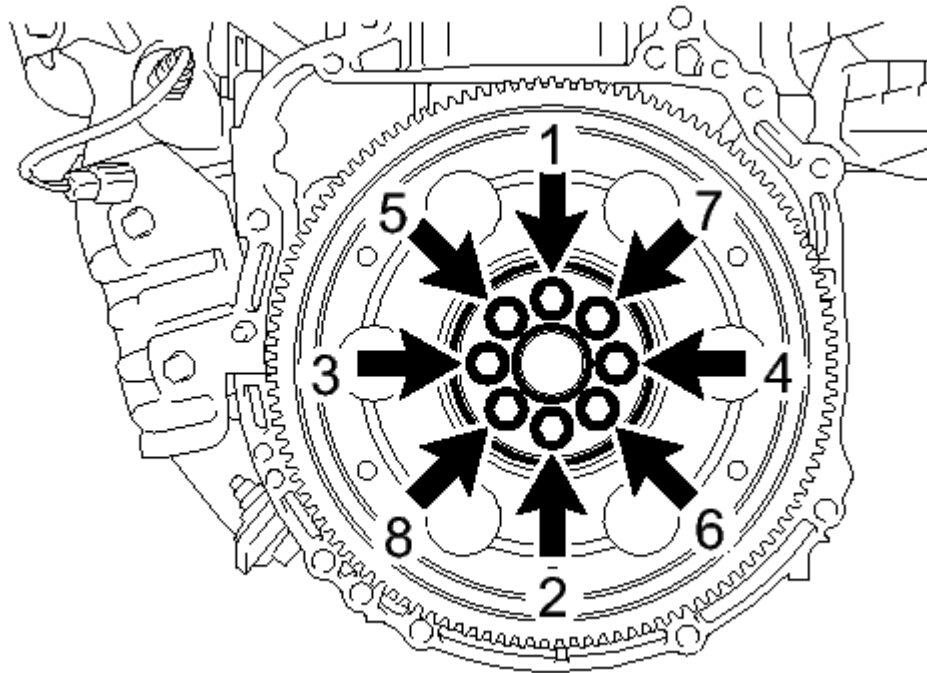
- b. Install the 11 bolts in the order shown in the illustration.



**Fig. 132: Identifying Camshaft Bearing Caps Bolts With Tightening Sequence**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Torque: 16 N\*m (163 kgf\*cm, 12 ft.\*lbf)

**NOTE:** Make sure that the camshaft and No. 2 camshaft rotate smoothly after installing the No. 1 camshaft bearing cap, No. 2 camshaft bearing cap and No. 3 camshaft bearing caps.



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**Fig. 169: Identifying Drive Plate Bolt Tightening Sequence**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Torque: 98 N\*m (999 kgf\*cm, 72 ft.\*lbf)

**NOTE:** Do not start the engine for at least an hour after installing the drive plate.

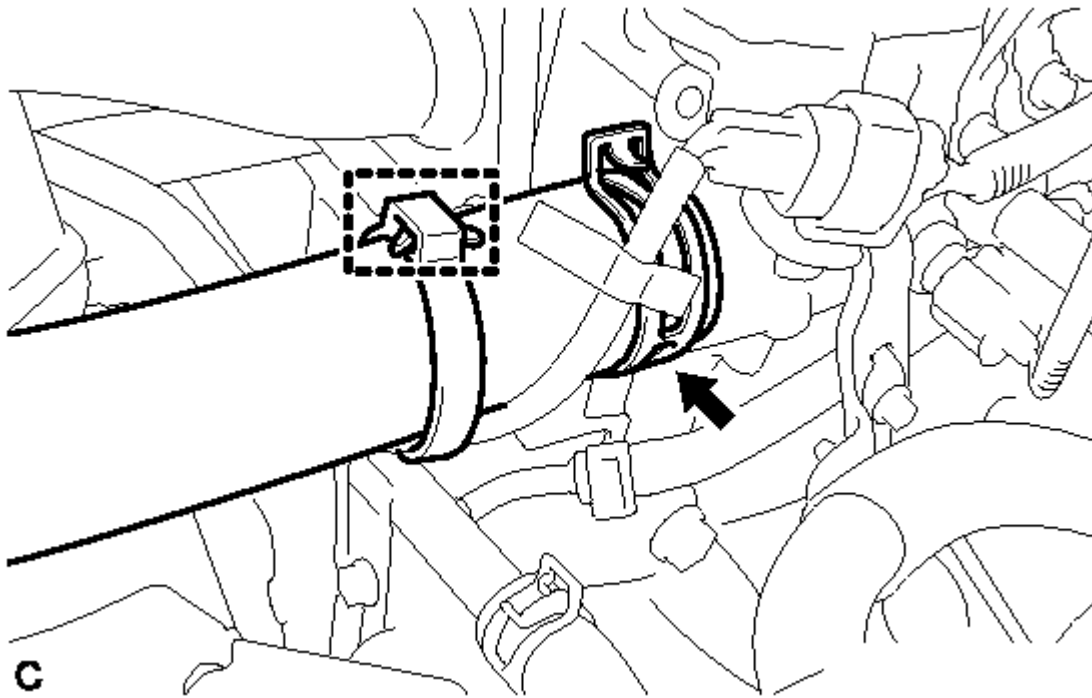
### 3. INSTALL AUTOMATIC TRANSAXLE ASSEMBLY

Refer to INSTALLATION [08/2013 - ]

## ENGINE ASSEMBLY

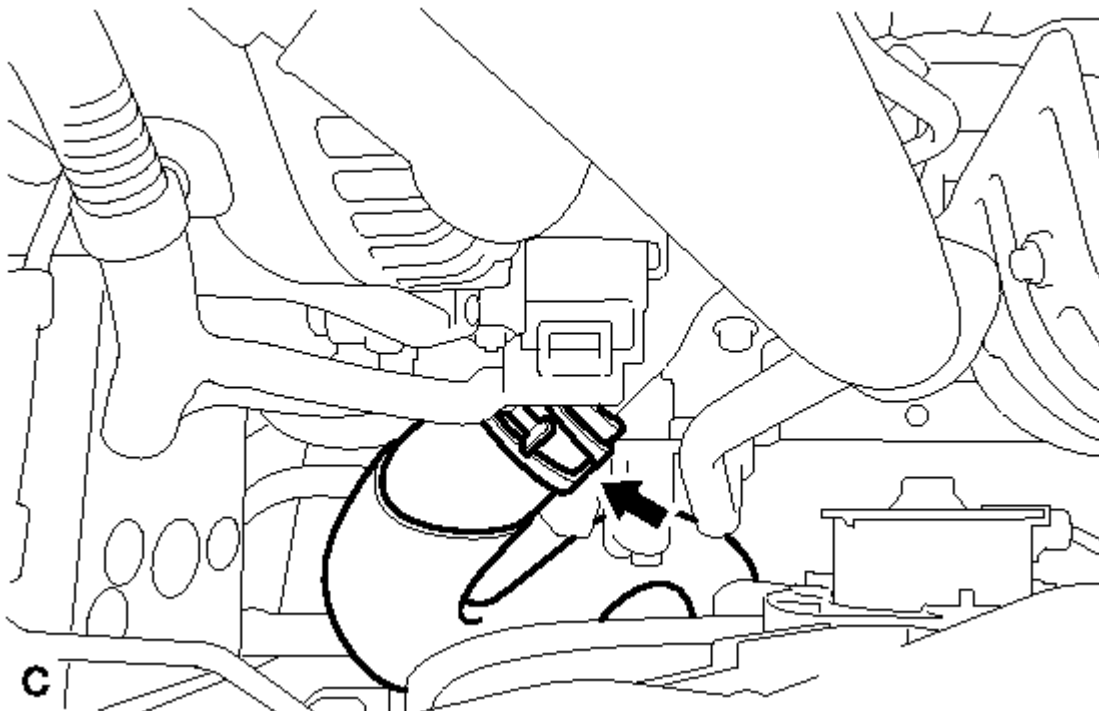
COMPONENTS [08/2013 - ]

ILLUSTRATION



**Fig. 212: Identifying Inlet Radiator Hose & Wire Harness Clamp**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disconnect the No. 1 radiator hose.
- 25. **DISCONNECT NO. 2 RADIATOR HOSE**
  - a. Disconnect the No. 2 radiator hose.



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Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**A**

**Torque: 85 N\*m (867 kgf\*cm, 63 ft.\*lbf)**

**B**

**Torque: 32 N\*m (329 kgf\*cm, 24 ft.\*lbf)**

- e. Install the front suspension member brace rear RH and front suspension member brace rear LH with the 4 bolts and 2 nuts.

**C**

**Torque: 85 N\*m (867 kgf\*cm, 63 ft.\*lbf)**

**D**

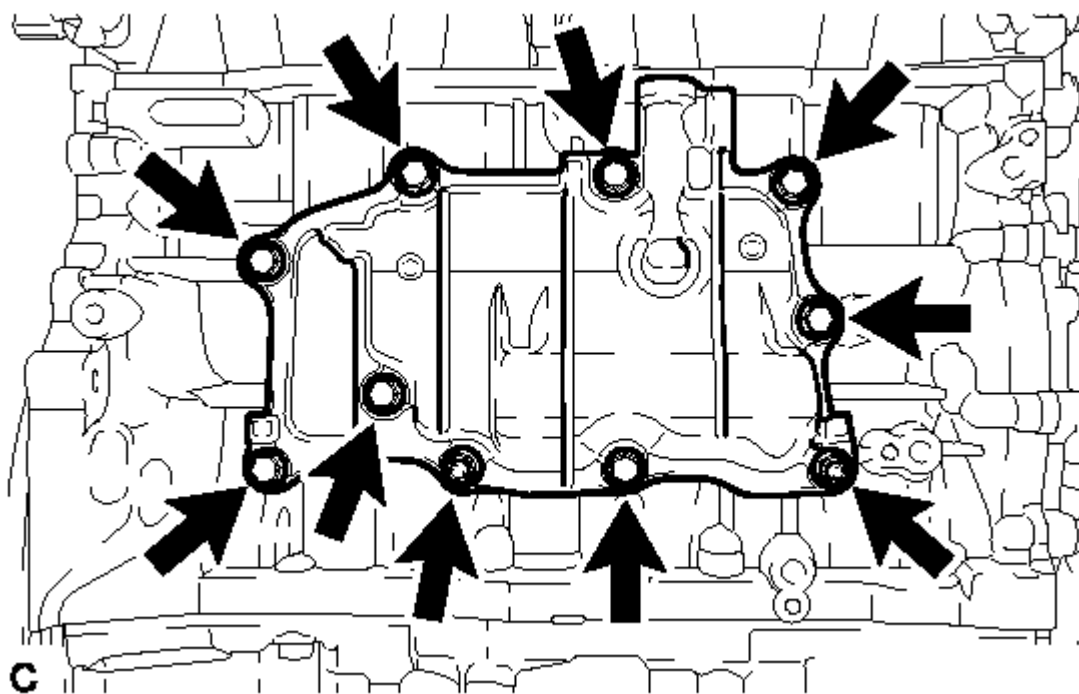
**Torque: 32 N\*m (329 kgf\*cm, 24 ft.\*lbf)**

**HINT:**

Perform "Inspection After Repair" after replacing the engine assembly. Refer to **INITIALIZATION [08/2013 - ]**.

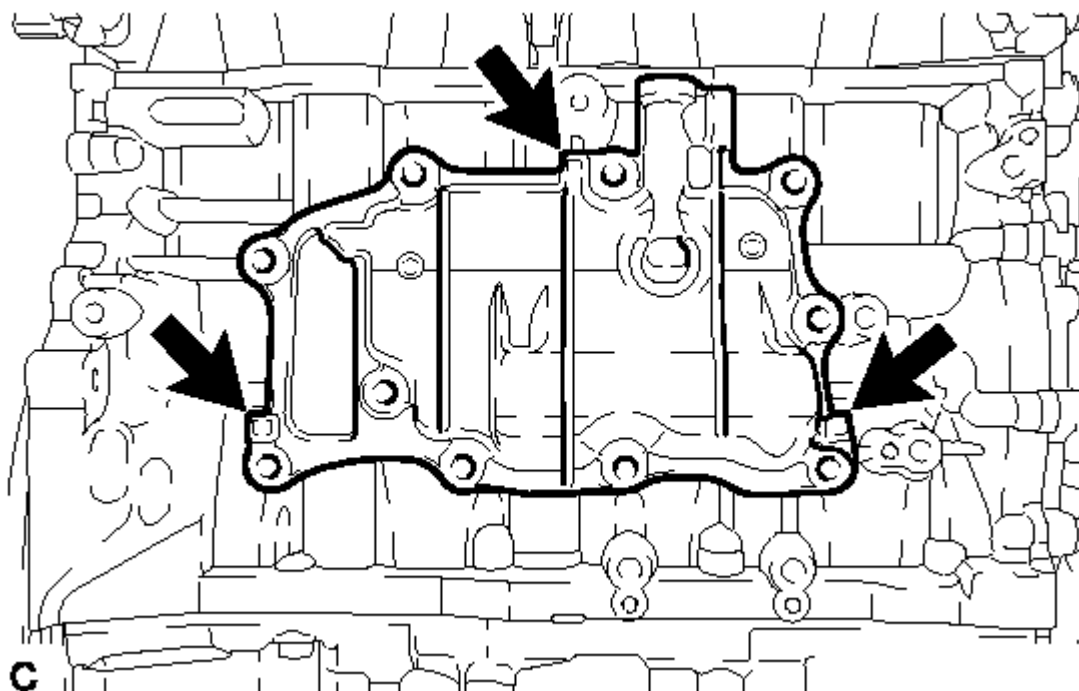
### 18. INSTALL DRIVE PLATE AND TORQUE CONVERTER SETTING BOLT

- a. Apply adhesive to 2 or 3 threads at the tip of each of the 6 drive plate and torque converter setting bolts.



**Fig. 287: Locating Ventilation Case Sub-Assembly Bolts And Nuts**  
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the ventilation case by prying between the ventilation case and cylinder block with a screwdriver.



**Fig. 288: Locating Contact Surfaces Of Cylinder Block And Ventilation Case**

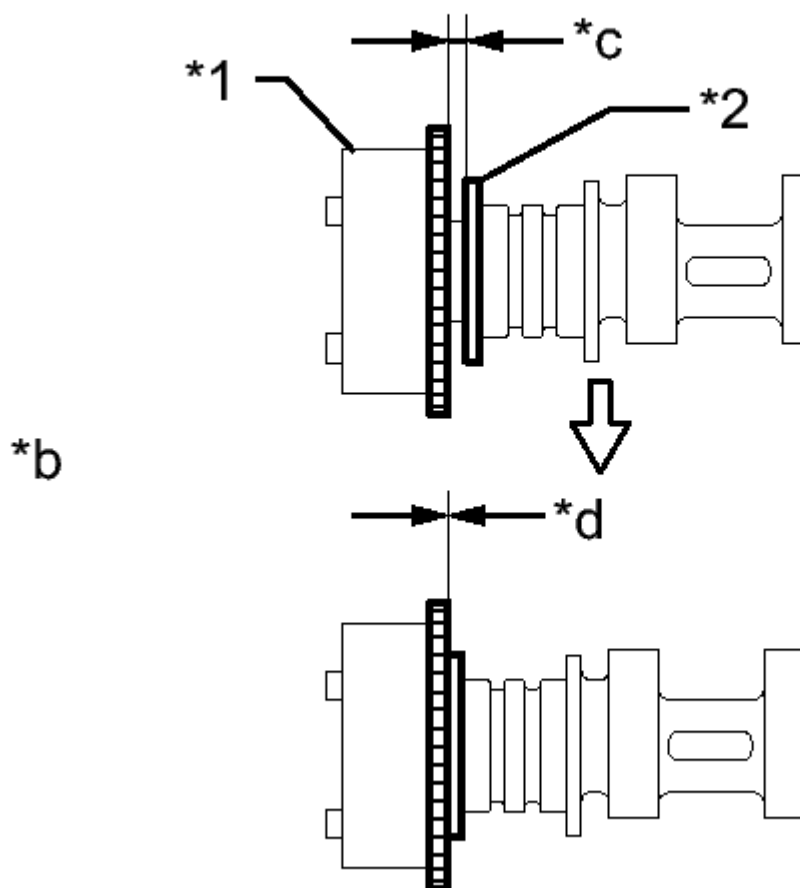
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**TEXT IN ILLUSTRATION**

*1	Pin Hole
*2	Knock Pin

- b. Check that there is no clearance between the camshaft timing exhaust gear assembly and No. 2 camshaft flange.

**\*a**



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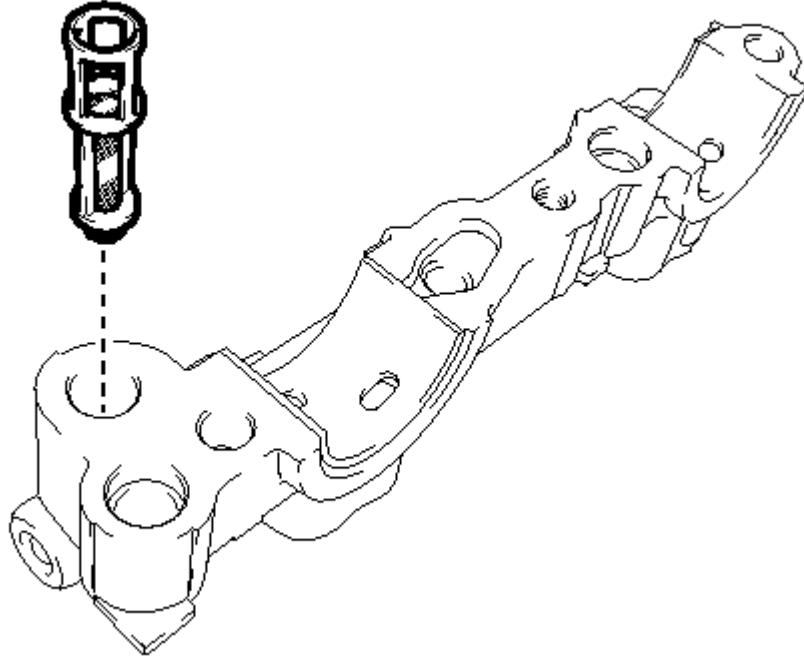
**Fig. 324: Identifying No Clearance Between Camshaft Timing Gear And Camshaft Flange**  
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

**TEXT IN ILLUSTRATION**

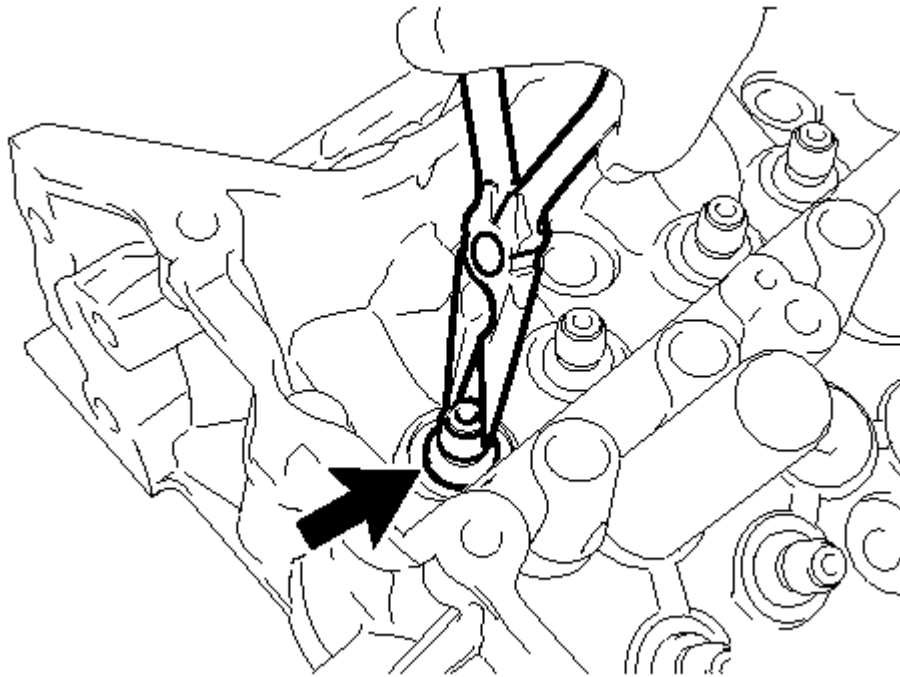
*1	Camshaft Timing Exhaust Gear Assembly
*2	Flange

**19. INSTALL OIL CONTROL VALVE FILTER**

- a. Install the oil control valve filter to the No. 1 camshaft bearing cap.

**P****Fig. 360: Identifying Oil Control Valve Filter****Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.**

20. **INSTALL CAMSHAFT** See step 12
21. **INSTALL CAMSHAFT BEARING CAP** See step 13
22. **INSTALL VALVE STEM CAP** See step 5
23. **INSTALL VALVE LASH ADJUSTER ASSEMBLY** See step 7
24. **INSTALL NO. 1 VALVE ROCKER ARM SUB-ASSEMBLY** See step 8
25. **INSTALL CAMSHAFT HOUSING SUB-ASSEMBLY** See step 14
26. **INSTALL CAMSHAFT TIMING GEAR ASSEMBLY** See step 15
27. **INSTALL CAMSHAFT TIMING EXHAUST GEAR ASSEMBLY** See step 16
28. **INSTALL CRANKSHAFT TIMING SPROCKET**
  - a. Install the crankshaft timing sprocket to the crankshaft.



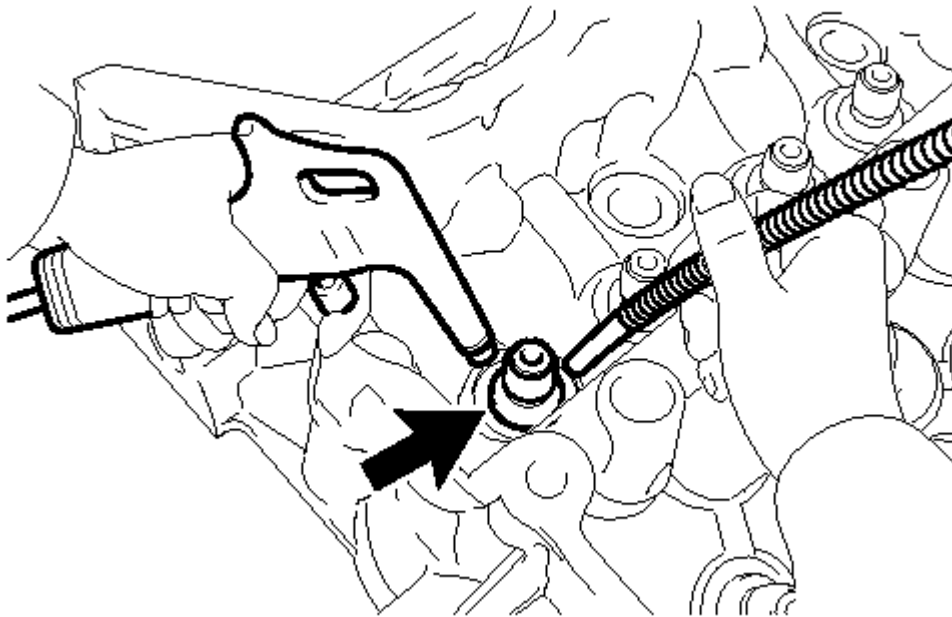
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**Fig. 384: View Of Removing Oil Seals**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

#### **4. REMOVE VALVE SPRING SEAT**

- a. Using compressed air and a Magnet Hand, remove the valve spring seat by blowing air onto it.



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**Fig. 385: View Of Removing Valve Spring Seat**

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Item	Specified Condition
Intake	0.060 to 0.155 mm (0.00236 to 0.00610 in.)
Exhaust	0.060 to 0.155 mm (0.00236 to 0.00610 in.)

Maximum Thrust Clearance

Item	Specified Condition
Intake	0.170 mm (0.00669 in.)
Exhaust	0.170 mm (0.00669 in.)

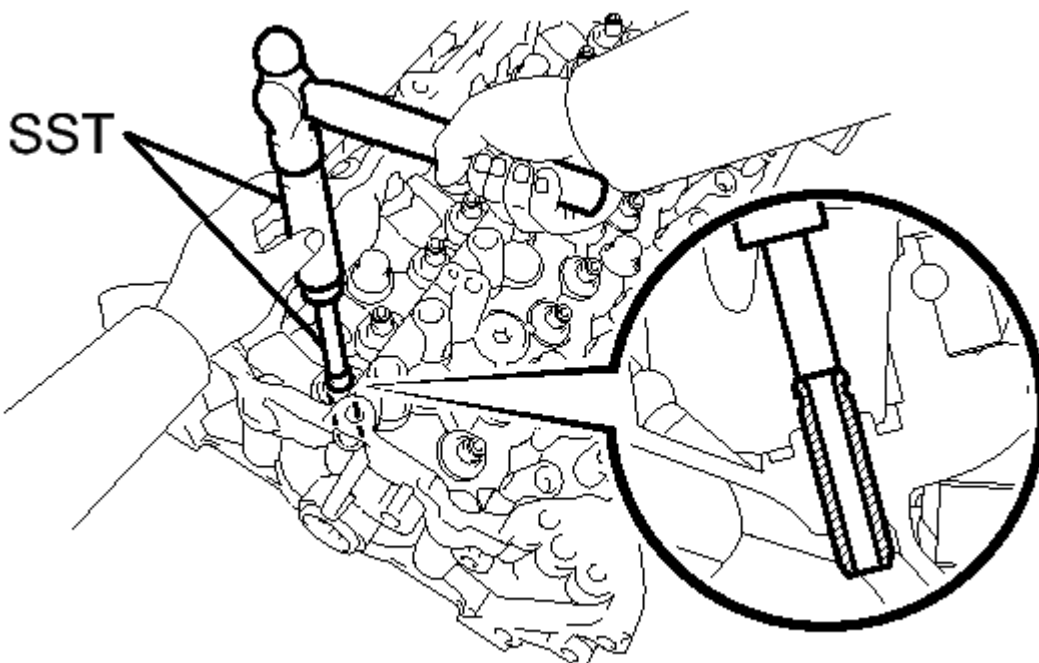
If the thrust clearance is more than the maximum, replace the camshaft housing. If the thrust surface is damaged, replace the camshaft.

### REPLACEMENT [08/2013 - ]

### REPLACEMENT [08/2013 - ]

#### 1. REPLACE INTAKE VALVE GUIDE BUSH

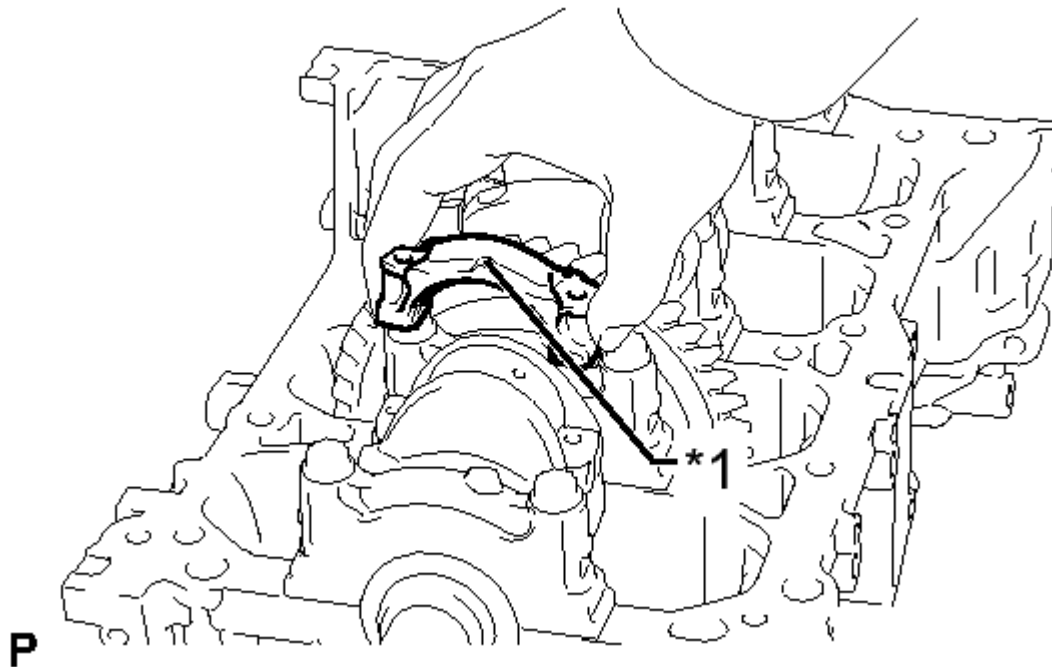
- Heat the cylinder head to approximately 80 to 100°C (176 to 212°F).
- Place the cylinder head on wooden blocks.
- Using SST and a hammer, tap out the valve guide bush.
  - SST: 09201-01055
  - SST: 09950-70010
  - 09951-07100



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**Fig. 435: Identifying Front Mark**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

### TEXT IN ILLUSTRATION

*1	Front Mark
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- g. Apply a light coat of engine oil to the threads and under the heads of the connecting rod bolts.