PROCEDURE

1.INSTALL NO. 1 OIL NOZZLE SUB-ASSEMBLY 15708

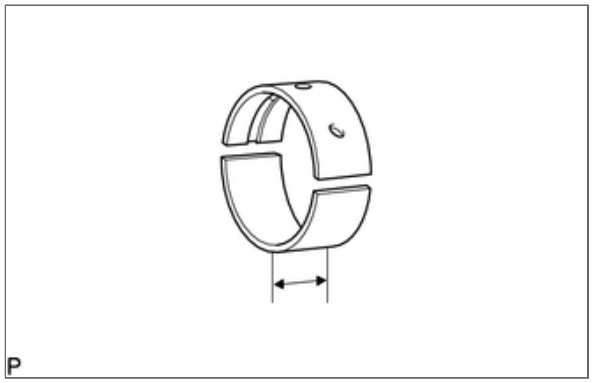
a. Using a 5 mm hexagon socket wrench, install the 3 No. 1 oil nozzle sub-assemblies with the 3 bolts.

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

2.INSTALL CRANKSHAFT BEARING 11711

a. Clean each main journal and bearing.

HINT:

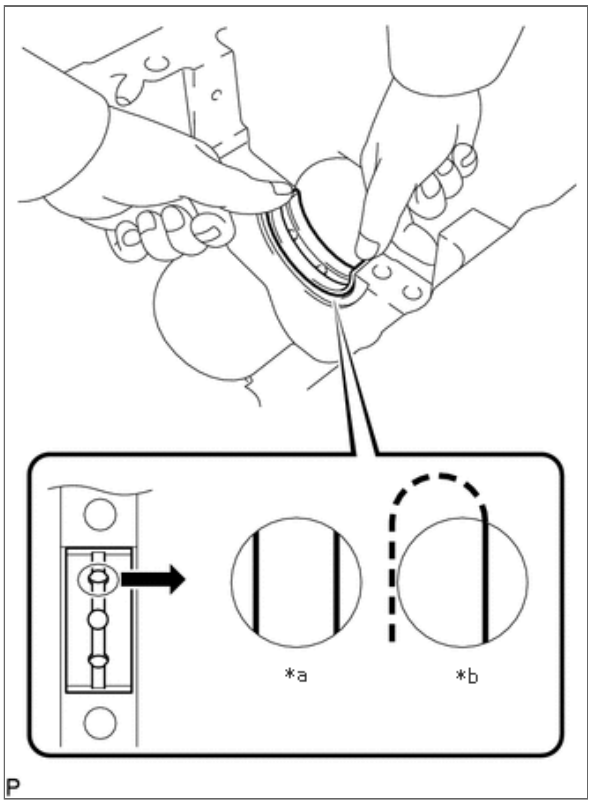


Be sure to check the crankshaft bearings since the width differ according to the installation position.

Item	Width
No. 1 and No. 2 journal bearings	20.0 mm (0.787 in.)
No. 3 and No. 4 journal bearings	17.4 mm (0.685 in.)

b. Install the upper crankshaft bearing.

i.



*a	CORRECT
*b	INCORRECT

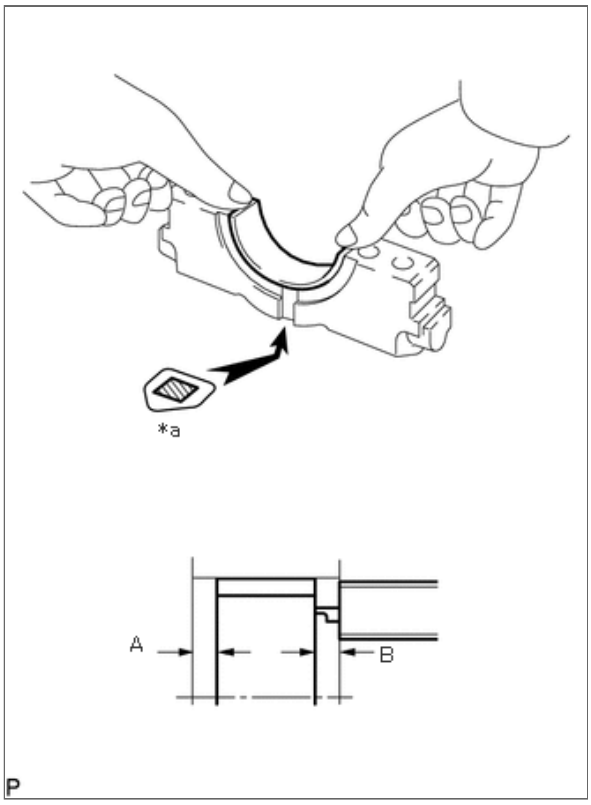
Install the upper crankshaft bearing to the cylinder block sub-assembly as shown in the illustration.

NOTICE:

- Do not apply engine oil to the upper crankshaft bearings or the contact surface.
- Make sure both sides of the oil groove in the cylinder block sub-assembly are visible through the oil feed holes in the upper crankshaft bearing. Make sure the amount visible on each side of the holes is equal.
- Do not allow coolant to come into contact with the upper crankshaft bearing inner surface.
- If any coolant comes into contact with the upper crankshaft bearing inner surface, replace the upper crankshaft bearing with a new one.

c. Install the lower crankshaft bearing.

i.



*a	Journal Number

Install the lower crankshaft bearings to the crankshaft bearing caps.

ii. Using a vernier caliper, measure the distance between the edge of the crankshaft bearing cap and the edge of the lower crankshaft bearing.

Dimension A - B or B - A:
0 to 0.7 mm (0 to 0.0276 in.)

NOTICE:

- Do not apply engine oil to the lower crankshaft bearings or the contact surfaces.
- Do not allow coolant to come into contact with the lower crankshaft bearing inner surface.
- If any coolant comes into contact with the lower crankshaft bearing inner surface, replace the lower crankshaft bearing with a new one.

3.INSTALL CRANKSHAFT 13411

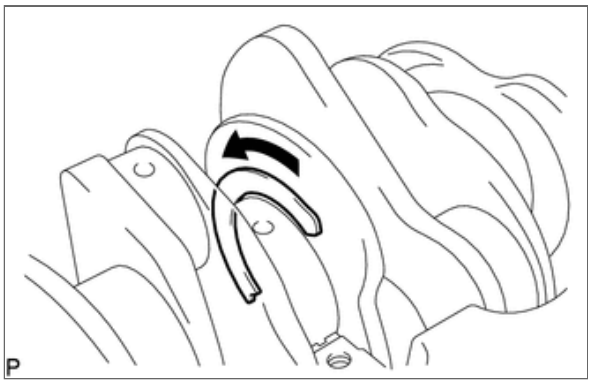
NOTICE:
Clean the contact surface of each main journal and crank pin.

a. Apply new engine oil to the upper crankshaft bearing and install the crankshaft to the cylinder block sub-assembly.

4.INSTALL CRANKSHAFT THRUST WASHER 11011

a. Install the upper crankshaft thrust washer.

i.

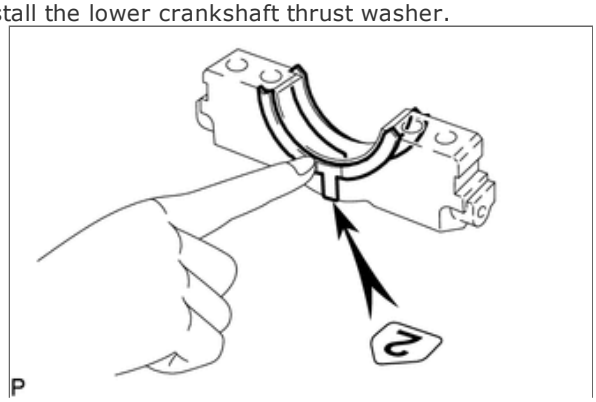


Push the crankshaft in the rear thrust direction to create clearance and install the upper crankshaft thrust washer to the No. 2 journal position with the oil groove facing the front of the engine.

ii. Push the crankshaft in the forward thrust direction to create clearance and install the upper crankshaft thrust washer to the No. 2 journal position with the oil groove facing the rear of the engine.

b. Install the lower crankshaft thrust washer.

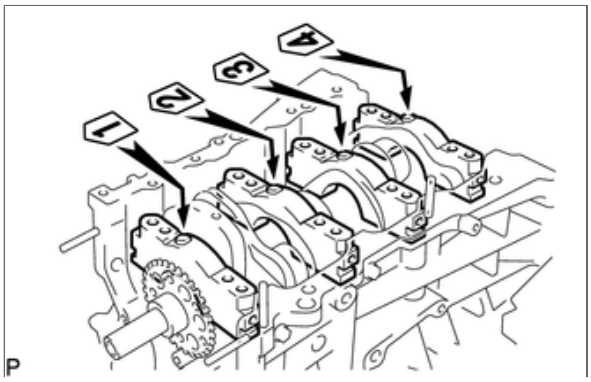
i.



Install the 2 lower crankshaft thrust washers to the No. 2 crankshaft bearing cap with the grooves facing outward.

5.INSTALL CRANKSHAFT BEARING CAP

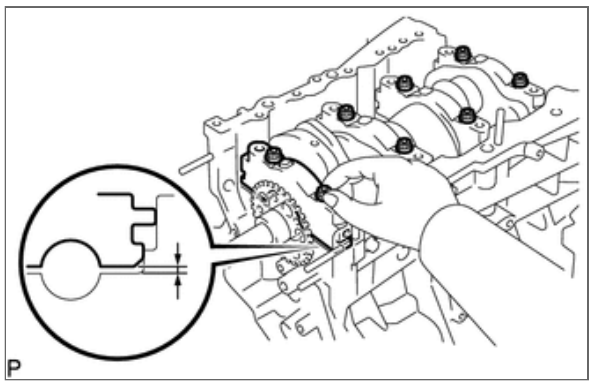
a.



Examine the front marks and numbers and set the crankshaft bearing caps on the cylinder block sub-assembly.

b. Apply a light coat of engine oil to the threads and under the heads of the crankshaft bearing cap set bolts.

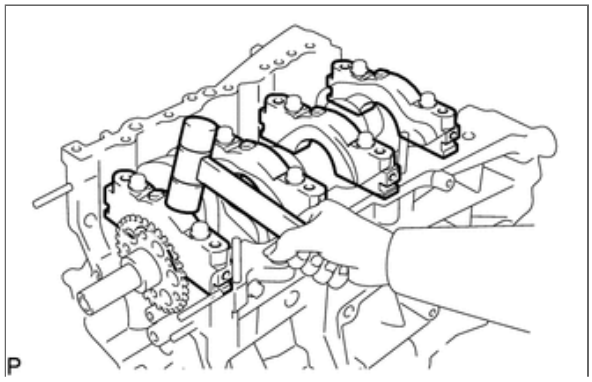
c.



Temporarily install the 8 crankshaft bearing cap set bolts to the inside positions.

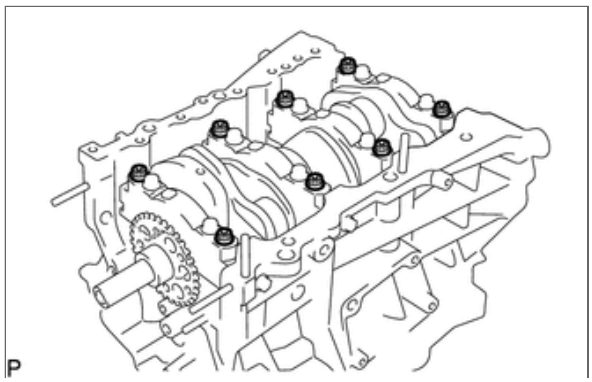
d. Tighten the 2 crankshaft bearing cap set bolts for each crankshaft bearing cap until the clearance between the crankshaft bearing cap and the cylinder block sub-assembly is less than 6 mm (0.236 in.).

e.



Using a plastic-faced hammer, lightly tap the crankshaft bearing cap to ensure a proper fit.

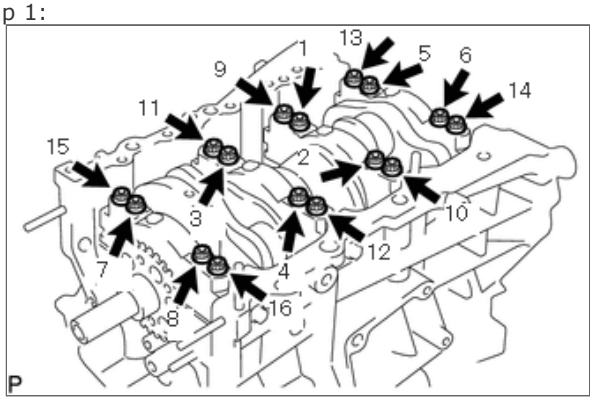
f.



Apply a light coat of engine oil to the threads and under the heads of the crankshaft bearing cap set bolts and temporarily install the 8 crankshaft bearing cap set bolts to the outside positions.

g. Step 1:

i.



Uniformly tighten the 16 crankshaft bearing cap set bolts in several steps in the order shown in the illustration.

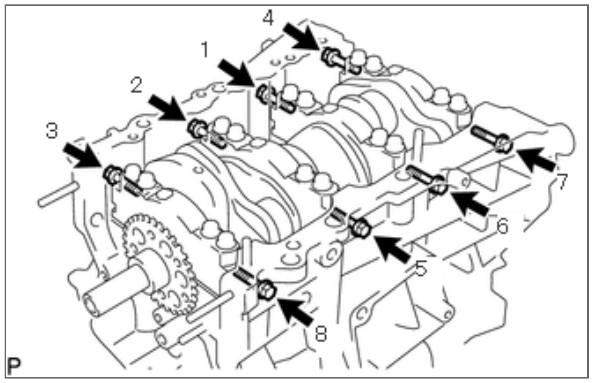
Torque:
61 N*m (622 kgf*cm, 45 ft.*lbf)

h. Step 2:
i. Mark the front side of the crankshaft bearing set cap bolts with paint.

ii. Tighten the crankshaft bearing cap set bolts 90° in the order shown in step 1.

i. Check that the painted marks are now at a 90° angle to the front.

j.



Install and uniformly tighten the 8 new seal washers and 8 bolts in several steps in the sequence shown in the illustration.
Torque:
25.7 N*m (262 kgf*cm, 19 ft.*lbf)

k. Check that the crankshaft turns smoothly.

6.INSPECT CRANKSHAFT THRUST CLEARANCE

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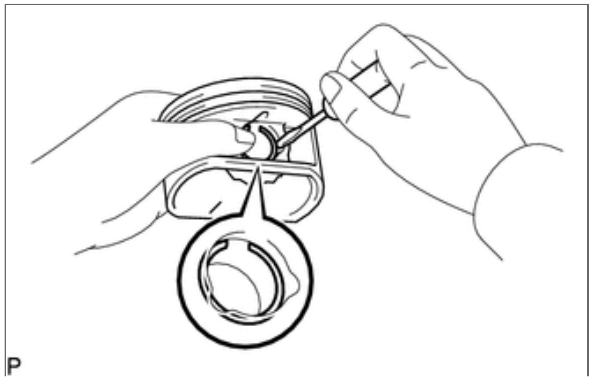
7.INSTALL PISTON PIN HOLE SNAP RING 13101A

a.

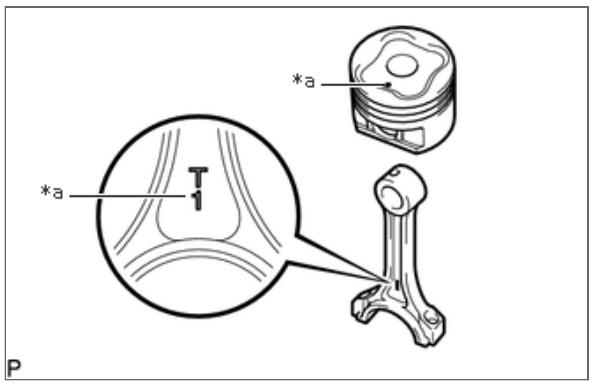


Using a screwdriver, install a new piston pin hole snap ring to one side of the piston pin hole.
NOTICE:
Be sure that the end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

8.INSTALL PISTON WITH PIN SUB-ASSEMBLY 13101

a. Gradually heat the piston to approximately 80°C (176°F).

b.



*a	Front Mark

Coat the piston pin with engine oil.

c. Align the front marks of the piston and connecting rod sub-assembly and push in the piston pin with your thumb.

NOTICE:

The piston and pin are a matched set.

d.

Check the fitting condition between the piston and piston pin by trying to move the piston back and forth on the piston pin.

9.INSTALL PISTON PIN HOLE SNAP RING 13101A

a. Using a screwdriver, install a new piston pin hole snap ring to the other end of the piston pin hole.

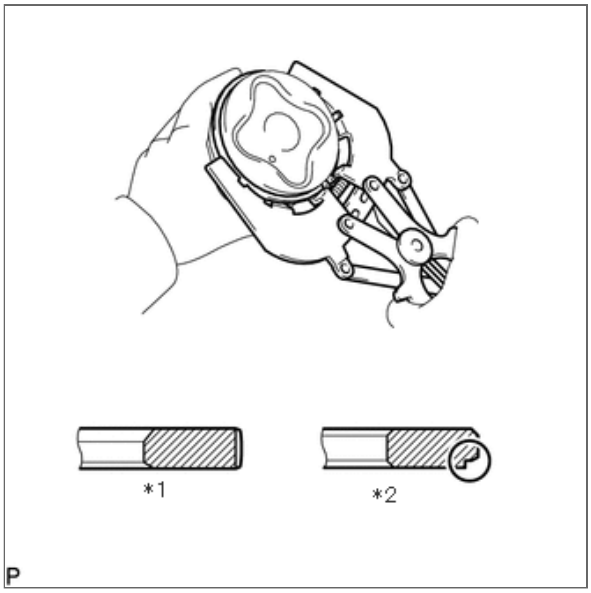
NOTICE:

Be sure that the end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

10.INSTALL PISTON RING SET 13011

a. Install the oil ring (expander) and 2 oil rings (side rails) by hand.

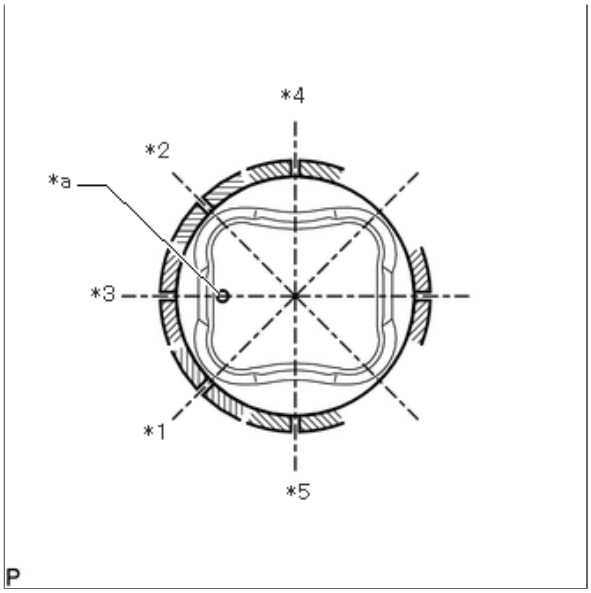
b.



*1	No. 1 Compression Ring
*2	No. 2 Compression Ring

Using a piston ring expander, install the No. 1 compression ring and No. 2 compression ring.

c.

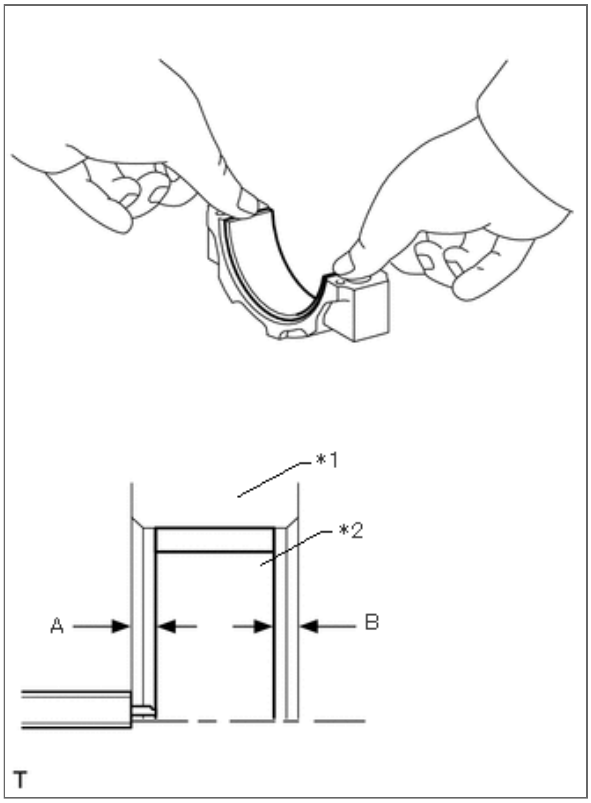


*1	No. 1 Compression Ring
*2	No. 2 Compression Ring
*3	Oil Ring (Expander)
*4	Oil Ring (Lower Side Rail)
*5	Oil Ring (Upper Side Rail)
*a	Front Mark

Position the piston rings so that the ring ends are as shown in the illustration.

11.INSTALL CONNECTING ROD BEARING 13041

a.



*1	Connecting Rod Cap
*2	Connecting Rod Bearing

Install the connecting rod bearing to the connecting rod cap.

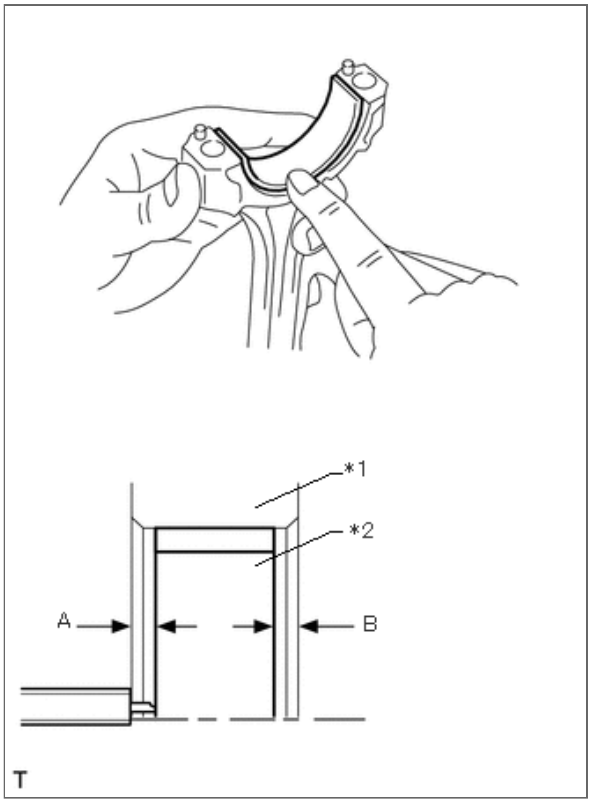
b. Using a vernier caliper, measure the distance between the connecting rod cap edge and connecting rod bearing edge.

Dimension A - B or B - A:
0 to 0.7 mm (0 to 0.0276 in.)

NOTICE:

- Clean the contact surface of the connecting rod bearing and connecting rod cap.
- Do not apply engine oil to the connecting rod bearing or its contact surface.

c.



*1	Connecting Rod Sub-assembly
*2	Connecting Rod Bearing

Install the connecting rod bearing to the connecting rod sub-assembly.

d. Using a vernier caliper, measure the distance between the connecting rod sub-assembly edge and connecting rod bearing edge.

Dimension A - B or B - A:
0 to 0.7 mm (0 to 0.0276 in.)

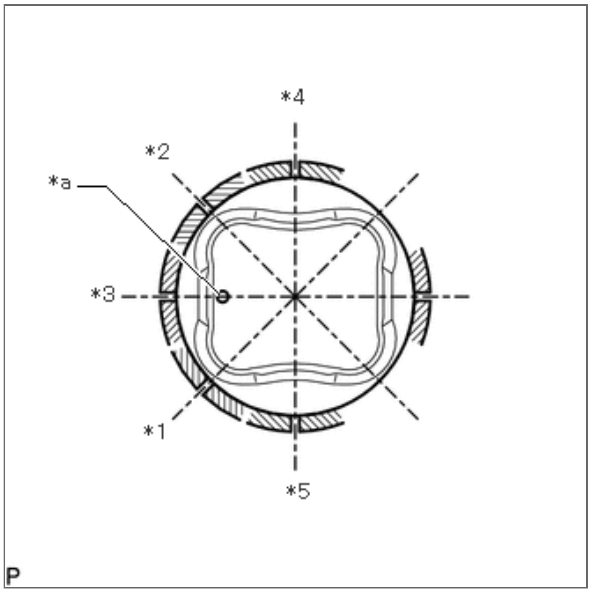
NOTICE:

- Clean the contact surface of the connecting rod bearing and connecting rod sub-assembly.
- Do not apply engine oil to the connecting rod bearing or its contact surface.

12.INSTALL PISTON WITH CONNECTING ROD

a. Apply engine oil to the cylinder walls, pistons and surfaces of the connecting rod bearings.

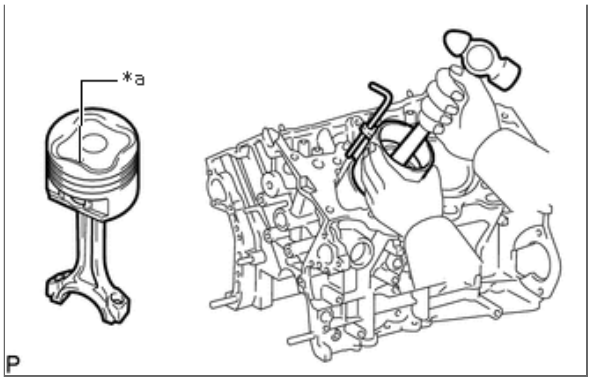
b.



*1	No. 1 Compression Ring
*2	No. 2 Compression Ring
*3	Oil Ring (Expander)
*4	Oil Ring (Lower Side Rail)
*5	Oil Ring (Upper Side Rail)
*a	Front Mark

Check the positions of the piston ring ends.

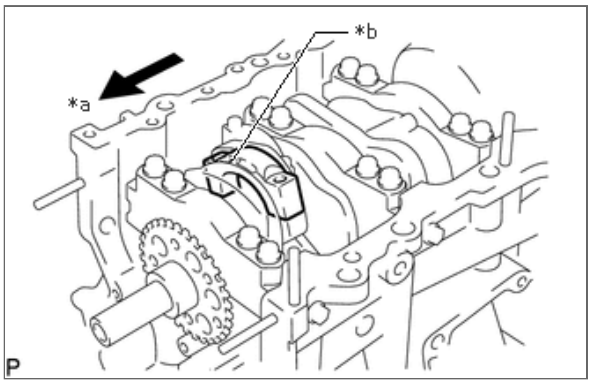
c.



*a	Front Mark

Using a hammer handle and piston ring compressor, press a piston with connecting rod into each cylinder with the front mark of the piston facing forward.

d.



*a	Front
*b	Protrusion

Set the connecting rod cap so that the protrusion is facing the correct direction.

NOTICE:

Match the numbered connecting rod cap with the connecting rod sub-assembly.

e. Apply a light coat of engine oil to the threads and under the heads of the connecting rod bolts.

f. Step 1:
- **i.** Install and alternately tighten the connecting rod bolts of the connecting rod cap in several steps.

Torque:
24.5 N*m (250 kgf*cm, 18 ft.*lbf)

g. Step 2:
- **i.** Mark the front side of each connecting rod cap bolt with paint.
- **ii.** Tighten the cap bolts 90° in the order shown in step 1.

h. Check that the painted marks are now at a 90° angle to the front.

i. Check that the crankshaft turns smoothly.

13.INSPECT CONNECTING ROD THRUST CLEARANCE

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