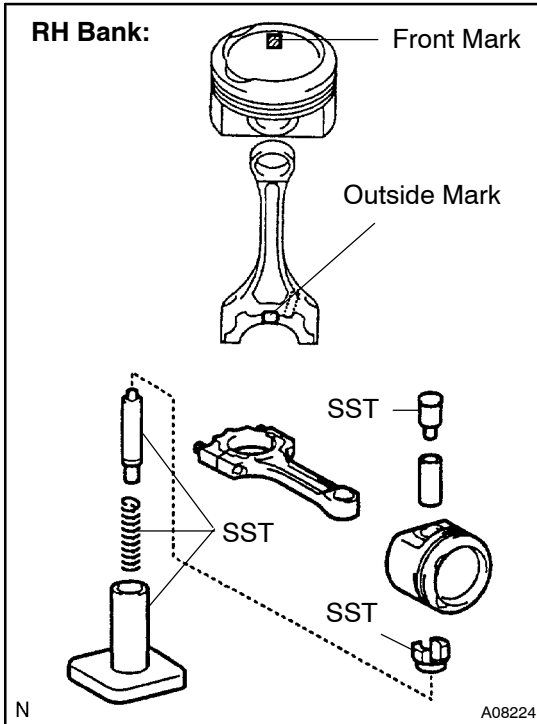


REASSEMBLY

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. ASSEMBLE PISTON AND CONNECTING ROD

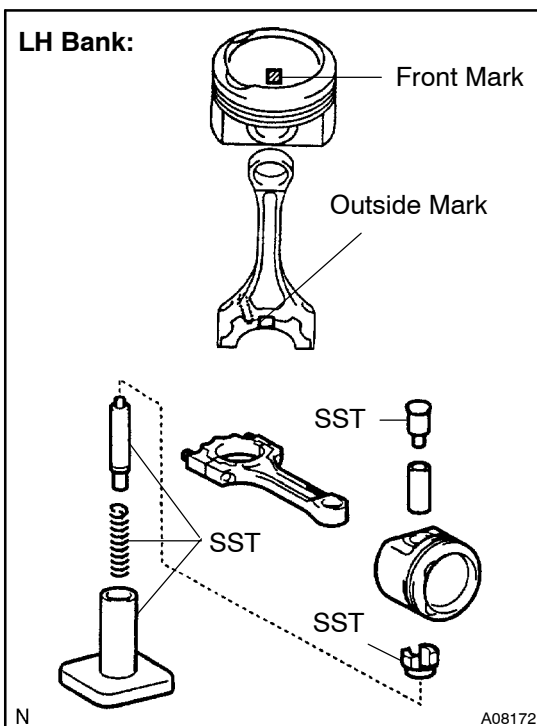
(a) LH side:

Match the front mark of the piston with the outside mark of the connecting rod by using SST and a press as shown in the illustration, and install the piston pin.

SST 09221-25026 (09221-00021, 09221-00030, 09221-00181, 09221-00210, 09221-00220)

NOTICE:

The LH position piston is marked with L.



(b) RH side:

Match the front mark of the piston with the outside mark of the connecting rod by using SST and a press as shown in the illustration, and install the piston pin.

SST 09221-25026 (09221-00021, 09221-00030, 09221-00181, 09221-00210, 09221-00220)

NOTICE:

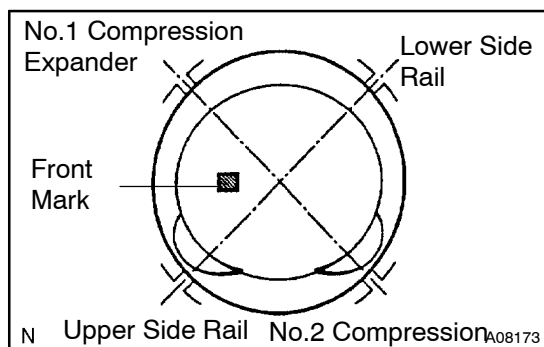
The RH position piston is marked with R.

2. INSTALL PISTON RINGS

- (a) Install the oil ring expander and 2 side rails by hand.
- (b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

HINT:

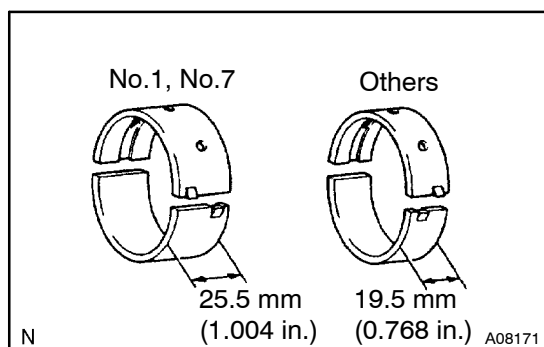
Compression ring	TEIKOKU made
No.1	1T
No.2	2T



- (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.

**4. INSTALL MAIN BEARINGS**

HINT:

- Main bearings come in widths of 19.5 mm (0.768 in.) and 25.5 mm (1.004 in.). Install the 25.5-mm (1.004 in.) bearings in the No.1 and No.7 cylinder block journal positions with the main bearing cap. Install the 19.5-mm (0.768 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 7 upper bearings.
 - (b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 7 lower bearings.

HINT:

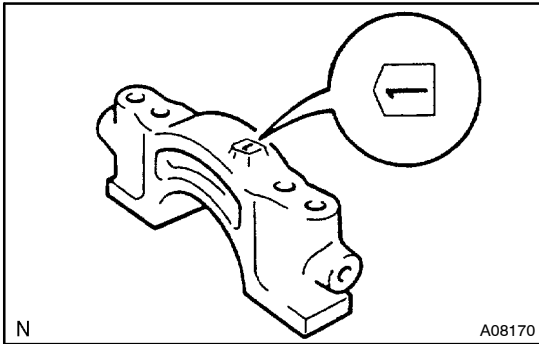
A number is marked on each main bearing cap to indicate the installation position.

5. INSTALL UPPER THRUST WASHERS

Install the 2 thrust washers under the No.4 journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK**7. PLACE MAIN BEARING CAPS AND LOWER THRUST WASHERS ON CYLINDER BLOCK**

- (a) Install the 2 thrust washers on the No.4 bearing cap with the grooves facing outward.

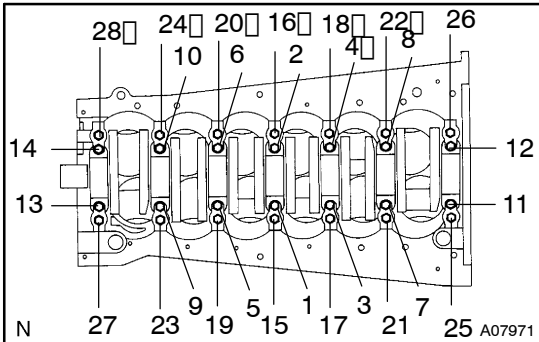


(b) Install the 7 main bearing caps in their proper locations.

8. INSTALL MAIN BEARING CAP BOLTS

HINT:

- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any one of the main bearing cap bolts is broken or deformed, replace it.

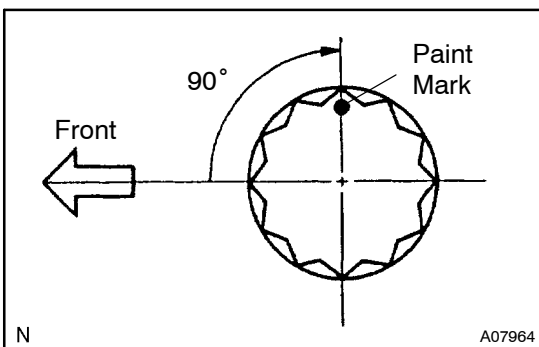


(a) Apply a light coat of engine oil on the threads and under the main bearing cap bolts.

(b) Install and uniformly tighten the 28 main bearing cap bolts in several passes, in the sequence shown.

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

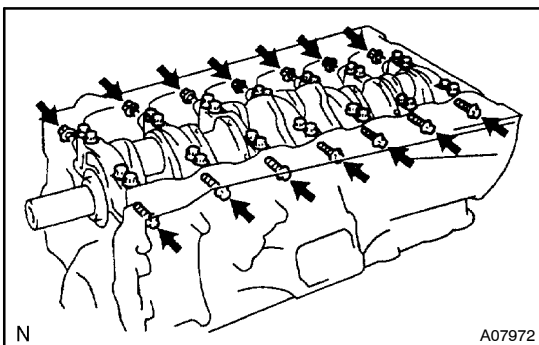
If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



(c) Mark the front of the main bearing cap bolt with paint.

(d) Retighten the main bearing cap bolts by 90° in the numerical order shown.

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



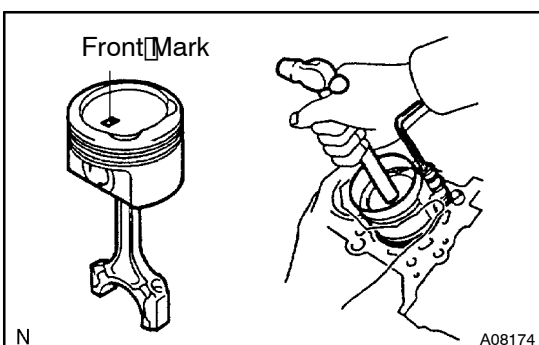
(f) Tighten the 14 bolts indicated by the arrow temporarily through the seal washers 2 or 3 times, and then tighten them to the specified torque value.

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

(g) Check that the crankshaft turns smoothly.

9. CHECK CRANKSHAFT THRUST CLEARANCE

(See page EM-63)



10. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

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.

NOTICE:

The shape of the piston varies for the LH and RH banks. The LH piston is marked with "L", the RH piston with "R".

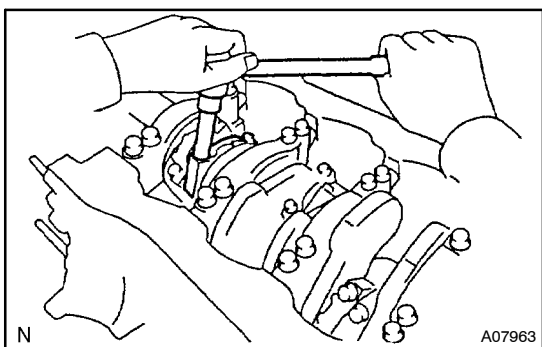
11. PLACE CONNECTING ROD CAP ON CONNECTING ROD

- (a) Match the numbered connecting rod cap with the connecting rod.
- (b) Align the pin groove of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.
- (c) Check that the outside mark of the connecting rod cap is facing in correct direction.

12. INSTALL CONNECTING ROD CAP BOLTS

HINT:

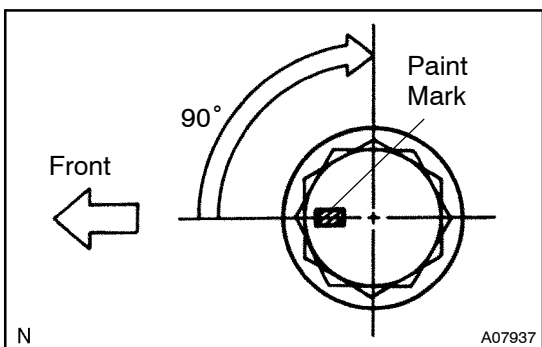
- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any one of the connecting rod cap bolts is broken or deformed, replace it.



- (a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.
- (b) Install and alternately tighten the 2 connecting rod cap bolts in several passes.

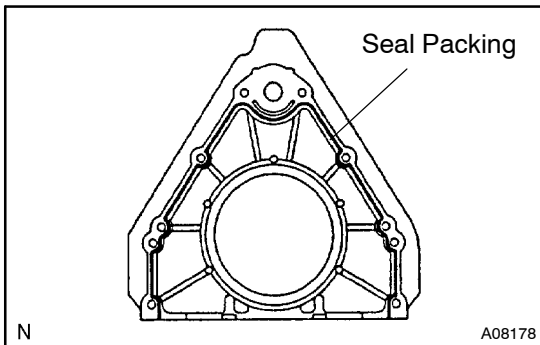
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

If any one of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



- (c) Mark the front of the connecting cap bolt with paint.
- (d) Retighten the cap bolts 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.

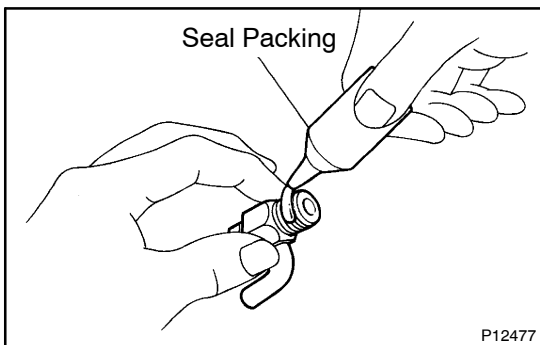
13. CHECK CONNECTING ROD THRUST CLEARANCE (See page EM-63)

**14. INSTALL REAR OIL SEAL RETAINER**

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil seal retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the oil packing (FIPG) material from the gasket surfaces and sealing grooves.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.
- (b) Apply seal packing to the oil seal retainer as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.
 - Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 - Immediately remove nozzle from the tube and reinstall cap.
- (c) Install a new O-ring to the cylinder block.
- (d) Install the oil seal retainer with the 8 bolts.
- Torque: 8.0 N·m (80 kgf·cm, 71 in·lbf)**

**15. INSTALL ENGINE COOLANT DRAIN UNIONS**

- (a) Apply seal packing to 2 or 3 threads.
- Seal packing: Part No. 08826-00100 or equivalent**
- (b) Install the 2 drain unions.
- Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**

HINT:

After applying the specified torque, rotate the drain union clockwise until its drain port is facing forward.

16. INSTALL LEVEL GAUGE GUIDE WITH OIL LEVEL GAUGE

- 17. INSTALL ENGINE MOUNTING BRACKET LH AND RH**
Install the mounting brackets and 8 bolts.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

18. INSTALL OIL FILTER BRACKET WITH OIL FILTER

Install the 2 new O-rings, oil filter bracket with filter and 3 nuts.

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

19. INSTALL ALTERNATOR BRACKET NO.1

Install the bracket and 4 bolts.

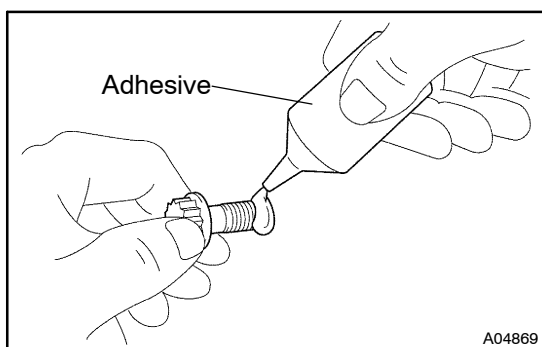
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

20. INSTALL 4 KNOCK SENSORS (See page FI-57)**21. INSTALL WATER BY-PASS PIPE NO.3**

- (a) Install a new gasket and the water by-pass pipe.
- (b) Install the 2 nuts and 2 bolts.

Torque:**Bolt: 19 N·m (195 kgf·cm, 14 ft·lbf)****Nut: 12 N·m (125 kgf·cm, 9 ft·lbf)**

- (c) Connect the wire harness clamp to the water by-pass pipe.

22. INSTALL TIMING CHAIN SPROCKET AND CHAIN (See page EM-22)**23. DISCONNECT ENGINE FROM ENGINE STAND****24. INSTALL DRIVE PLATE**

- (a) Apply adhesive to 2 or 3 threads of the mounting bolt end.

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

- (b) Install the front spacer, drive plate and rear spacer on the crankshaft.
- (c) Install and uniformly tighten the 8 mounting bolts.

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