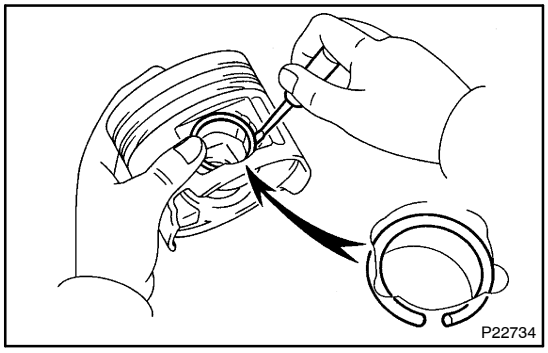
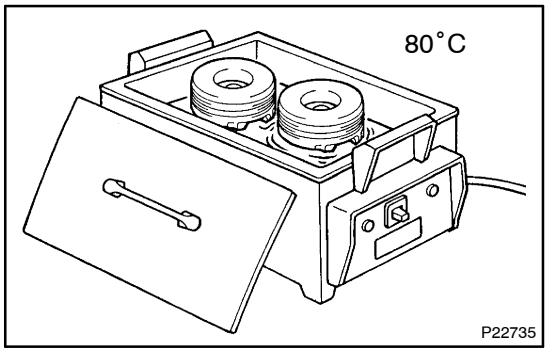
EM0X3–01

REASSEMBLY

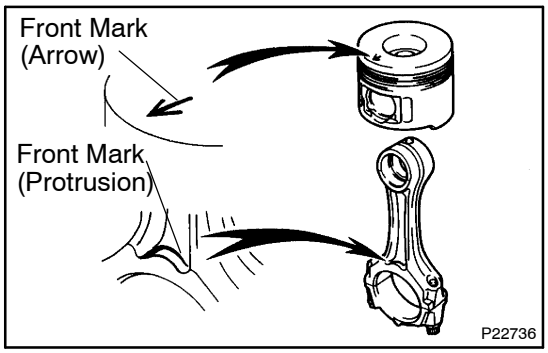
1. ASSEMBLE PISTON AND CONNECTING ROD



(a) Install a new snap ring on one side of the piston pin hole.

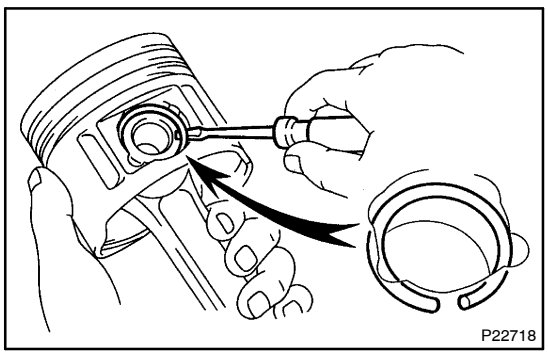


(b) Gradually heat the piston to 80˚C (176˚F).



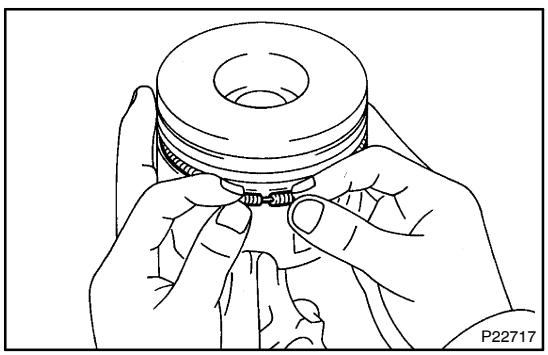
(c) Coat the piston pin with engine oil.

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



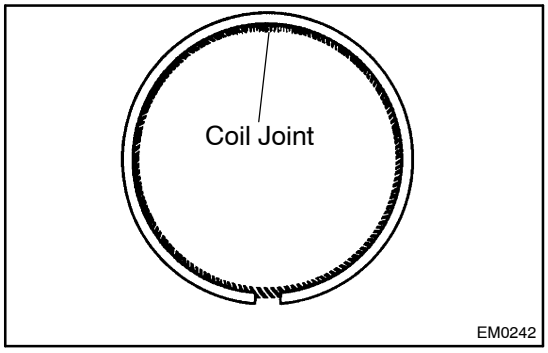
(e) Install a new snap ring on the other side of the piston pin hole.

2. INSTALL PISTON RINGS

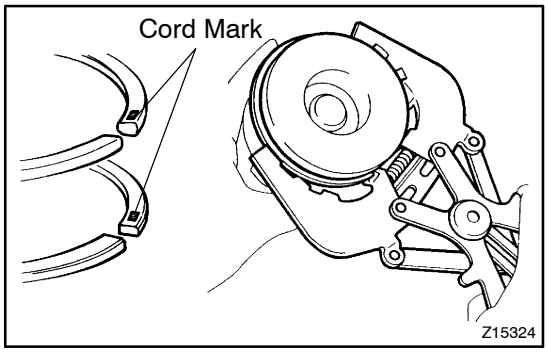


(a) Install the coil by hand.

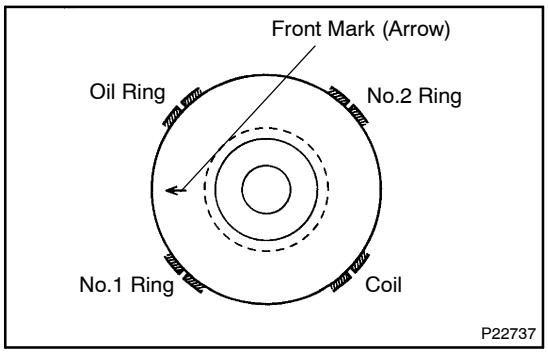
(b) Install a piston ring expander, install the oil ring.



HINT:
Face the end gap of the oil ring in the opposite direction of coil joint.

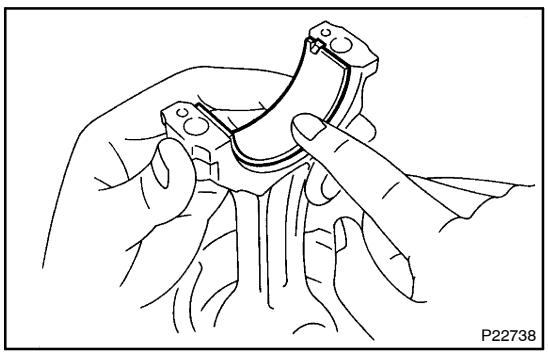


(c) Using a piston ring expander, install the No.1 and No.2 piston rings with the code mark facing upward.
Code mark:
No.1:
1HZ, 1HD–T: T1
1HD–FTE: 1T
No.2: 2T



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

NOTICE:
Do not align the ring ends.



3. INSTALL CONNECTING ROD BEARINGS

(a) Align the bearing claw with the groove of the connecting rod or connecting rod cap.

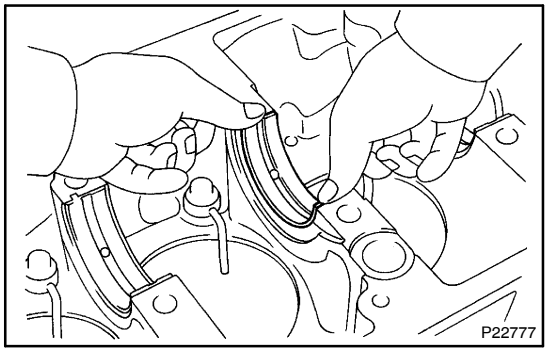
(b) Install the bearings in the connecting rod and connecting rod cap.

4. CYLINDER BLOCK ASSEMBLY

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.

5. INSTALL OIL NOZZLES AND CHECK VALVES
(See page LU–28)



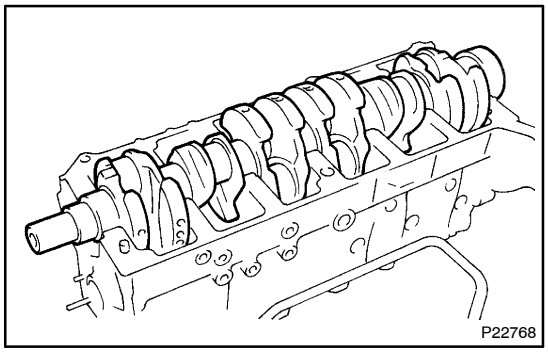
6. INSTALL MAIN BEARINGS

HINT:

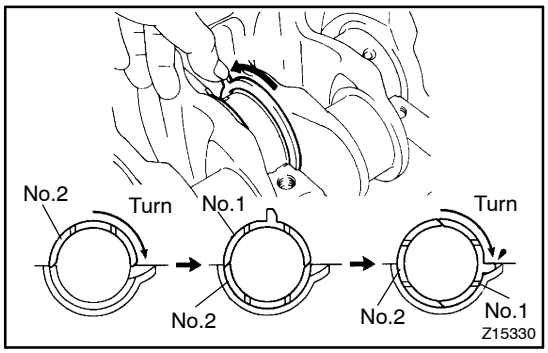
Upper bearings have an oil groove and oil hole; lower bearings do not.

(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.



7. PLACE CRANKSHAFT ON CYLINDER BLOCK



8. INSTALL THRUST WASHERS

(a) Push the crankshaft toward the front (rear) side.

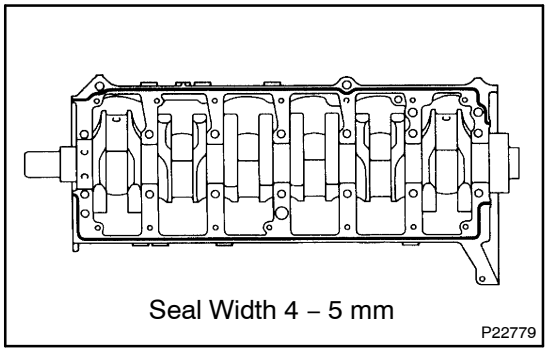
(b) Install the 4 thrust washers to the No.4 journal position of the cylinder block with the oil grooves facing outward.

9. INSTALL MAIN BEARING CAPS

(a) Place main bearing cap on cylinder block

(1) Remove any old packing (FIPG) material and be careful not to drop any oil the contact surfaces of the main bearing cap and cylinder block.

- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(2) Apply seal packing to the cylinder block as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 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.

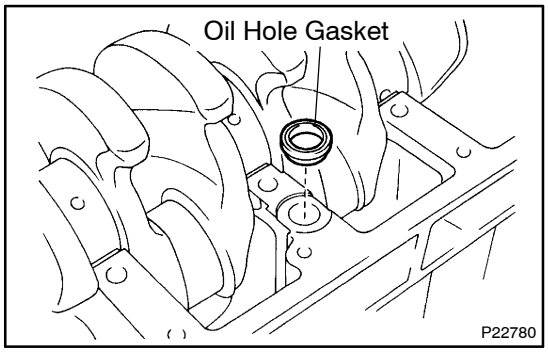
(3) Install a new cylinder block hole gasket.

(4) Place the main bearing cap on the cylinder block.

(b) Install main bearing cap bolts (12 pointed head)

HINT:

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

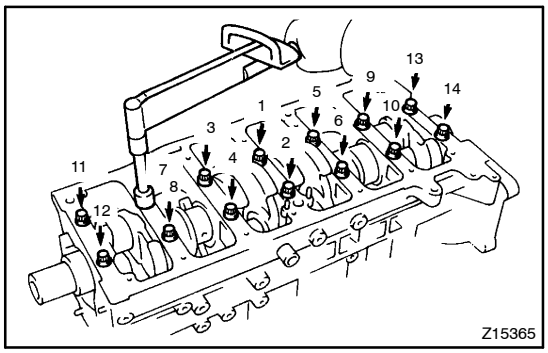


(1) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.

(2) Install and uniformly tighten the 14 main bearing cap bolts in several passes, in the sequence shown.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

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

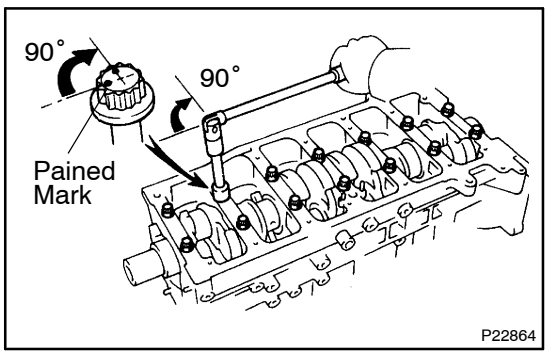


(3) Mark the front of the main bearing cap bolt with paint.

(4) Retighten the main bearing cap bolts 90° in the numerical order shown above.

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

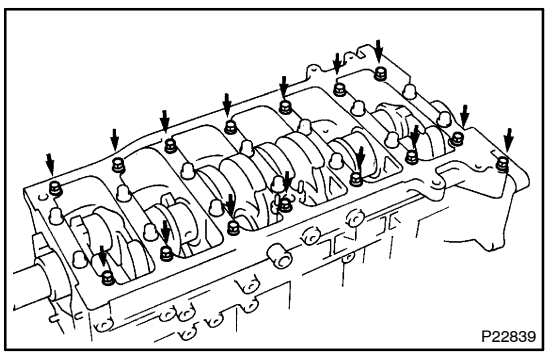
(6) Check that the crankshaft turns smoothly.

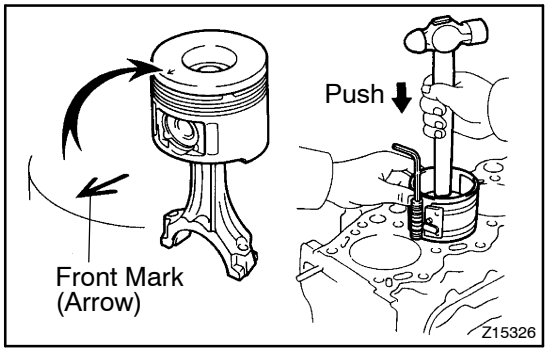


(c) Install main bearing cap bolts (6 pointed head)
Install the 15 main bearing bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

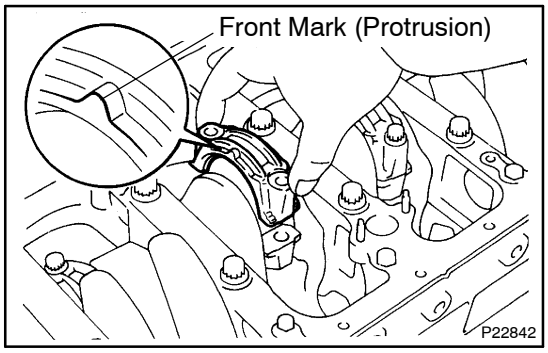
10. CHECK CRANKSHAFT THRUST CLEARANCE
(See page EM–102)





11. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

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.

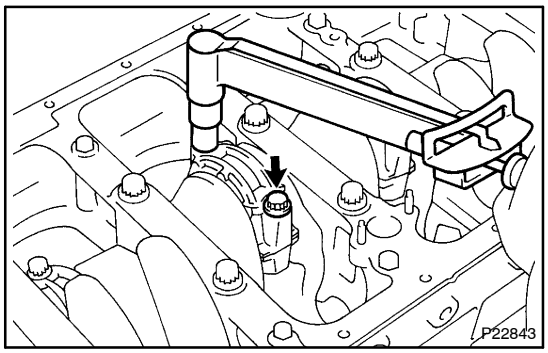


12. INSTALL CONNECTING ROD CAPS

(a) Place connecting rod cap on connecting rod

(1) Match the numbered connecting rod cap with the connecting rod.

(2) Install the connecting rod cap with the front mark facing forward.



(b) Install connecting rod cap bolts

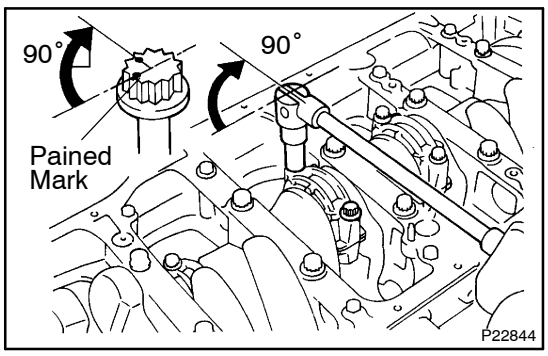
HINT:

- The connecting rod cap nuts are tightened in 2 progessive steps (steps (b) and (d)).
- If any connecting rod bolt is broken or deformed, replace it.

(1) Apply a light of engine oil on the threads and under the heads of the connecting rod cap bolts.

(2) Install and alternately tighten the bolts of the connecting rod cap in several passes.

Torque: 36.8 N·m (375 kgf·cm, 27 ft·lbf)



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

(3) Mark the front of the connecting rod cap bolt with paint.

(4) Retighten the connecting rod cap bolts 90° as shown.

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

(6) Check that the crankshaft turns smoothly.

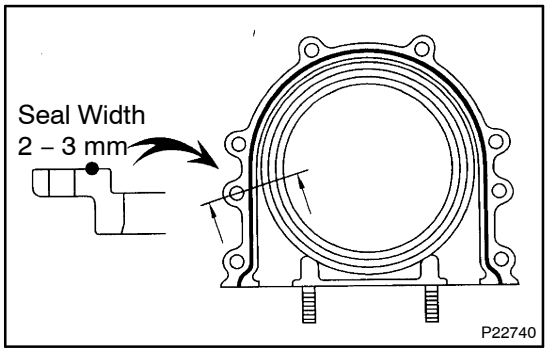
13. CHECK CONNECTING ROD THRUST CLEARANCE (See page EM–102)

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 retainer and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.

- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply sel packing to the retainer as shown in the illustration.

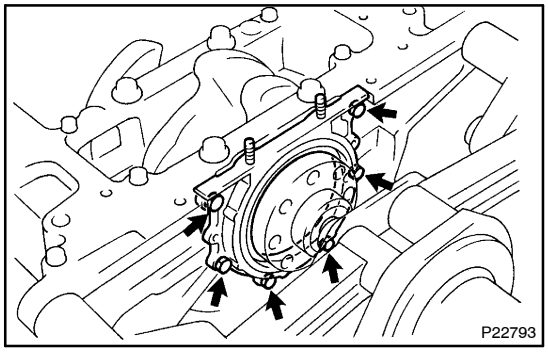
Seal packing: Part No. 08826–00080 or equivalent

- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- 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



(c) Install the retainer with the 6 bolts.

Torque: 6.4 N·m (65 kgf·cm, 57 in.·lbf)

15. INSTALL TURBO WATER PIPE

16. 1HD–FTE:
INSTALL CRANKSHAFT POSITION SENSOR

17. INSTALL DRAIN PLUG

18. INSTALL ENGINE MOUNTING BRACKETS
Torque: 68.6 N·m (700 kgf·cm, 51 ft·lbf)

19. INSTALL TURBO OIL HOSE

20. INSTAL OIL PRESSURE SENDER

21. INSTALL OIL COOLER ASSEMBLY, OIL DIPSTICK, GUIDE AND NO.1 CYLINDER BLOCK INSULATOR (See page LU–23)

22. INSTALL OIL STRAINER, TIMING GEAR CASE (OIL PUMP) AND OIL PAN

23. INSTALL INJECTION PUMP STAY
Torque: 68.6 N·m (700 kgf·cm, 51 ft·lbf)

24. INSTALL 3 INSULATORS

25. INSTALL INJECTION PUMP
1HZ, 1HD–T: (See page FU–111)
1HD–FTE: (See page FU–121)

26. INSTALL ALTERNATOR AND BRACKET
Torque: 68.6 N·m (700 kgf·cm, 51 ft·lbf)

27. INSTALL WATER INLET AND THERMOSTAT
1HZ, 1HD–T: (See page EM–66)
1HD–FTE: (See page EM–94)

28. INSTALL WATER PUMP, TURBO WATER PIPE AND ALTERNATOR ADJUSTING BAR
(See page CO–9)

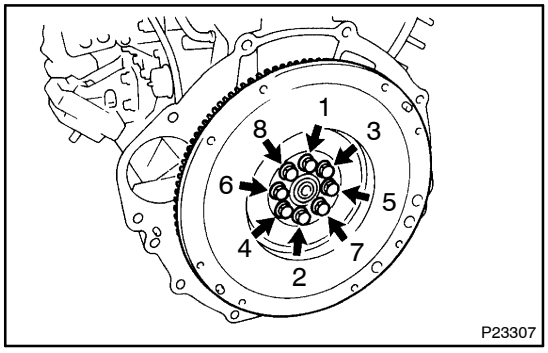
29. INSTALL TIMING GEARS
(See page EM–44)

30. INSTALL CYLINDER HEAD
1HZ, 1HD–T: (See page EM–66)
1HD–FTE: (See page EM–94)

31. INSTALL TIMING BELT AND PULLEYS
(See page EM–31)

32. DISCONNECT ENGINE FROM ENGINE STAND

33. INSTALL REAR END PLATE
Install the rear end plate with the bolt.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



34. M/T:
INSTALL FLYWHEEL
(a) Install the flywheel on the crankshaft.
(b) Install and uniformly tighten the bolt in several passes, in the sequence shown.
Torque:127.4 N·m (1,300 kgf·cm, 94 ft·lbf)

35. A/T:
INSTALL FLYWHEEL, DRIVE PLATE AND REAR PLATE