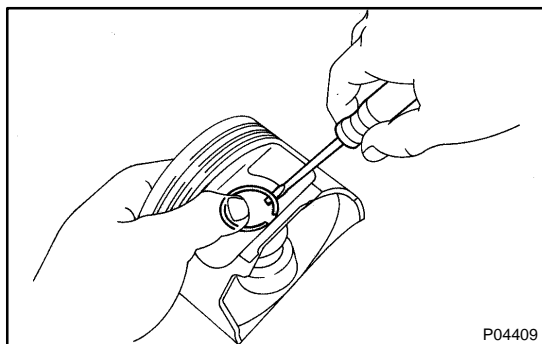


REASSEMBLY

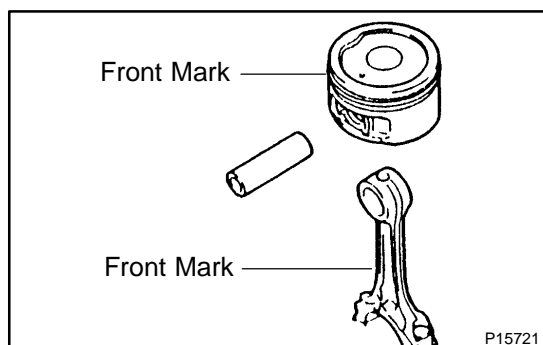
HINT:

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

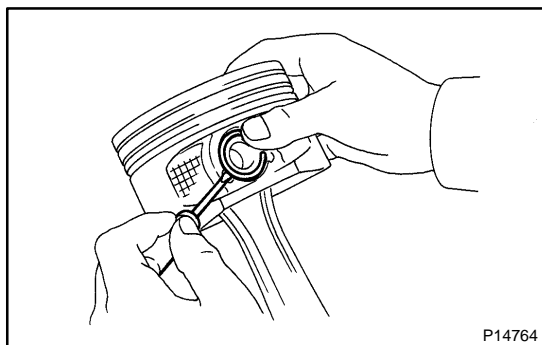


1. ASSEMBLE PISTON AND CONNECTING ROD

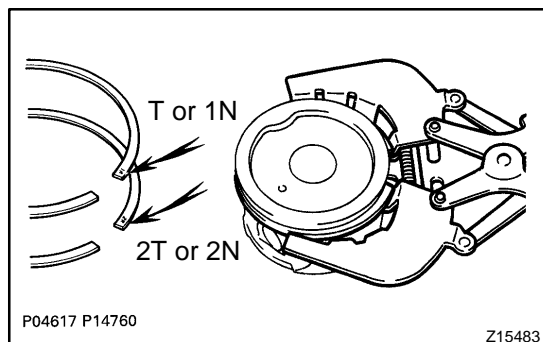
- Install a new snap ring on one side of the piston pin hole.
- Gradually heat the piston to 80 – 90°C (176 – 194°F).
- Coat the piston pin with engine oil.



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



- Install a new snap ring on the other side of the piston pin hole.

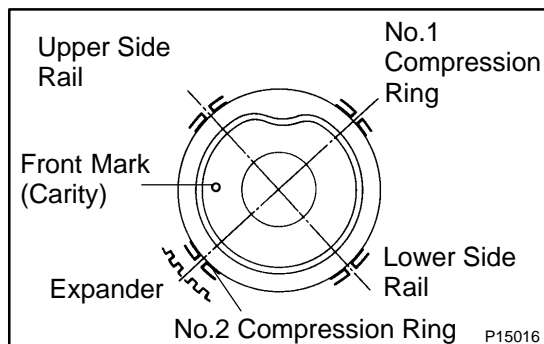


2. INSTALL PISTON RINGS

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

Code mark:

No.1	T or 1N
No.3	2T or 2N



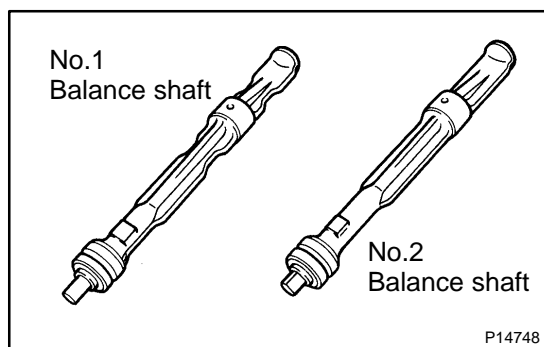
- (c) Position the piston rings so that the ring ends are as shown.

NOTICE:

Do not align the ring ends.

3. INSTALL BEARINGS

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

**4. ASSEMBLY NO.1 (RH) BALANCE SHAFT****HINT:**

- No.1 balance shaft has indentations.
 - No.3 balance shaft has no indentations.
- (a) Mount the hexagon wrench head portion of the No.1 balance shaft in a vise.

NOTICE:

Be careful not to damage the balance shaft.

- (b) Install the No.1 balance shaft thrust plate.
(c) Install the balance shaft thrust spacer.
(d) Install the key.
(e) Install the balance shaft timing gear with the bolt.

Torque: 36 N·m (365 kgf-cm, 26 ft-lbf)

5. ASSEMBLY NO.2 (LH) BALANCE SHAFT**HINT:**

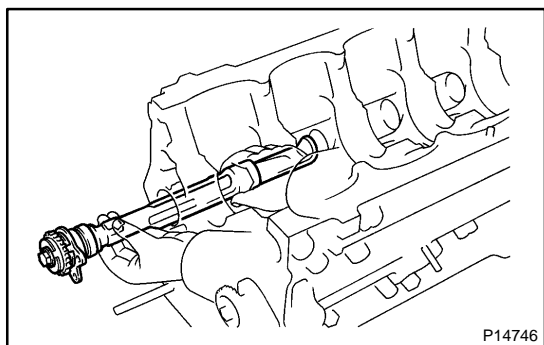
- No.1 balance shaft has indentations.
 - No.2 balance shaft has no indentations.
- (a) Mount the hexagon wrench head portion of the No.2 balance shaft in a vise.

NOTICE:

Be careful not to damage the balance shaft.

- (b) Install the No.2 balance shaft thrust plate.
(c) Install the balance shaft timing sprocket with the bolt.

Torque: 36 N·m (365 kgf-cm, 26 ft-lbf)

**6. INSTALL BALANCE SHAFTS**

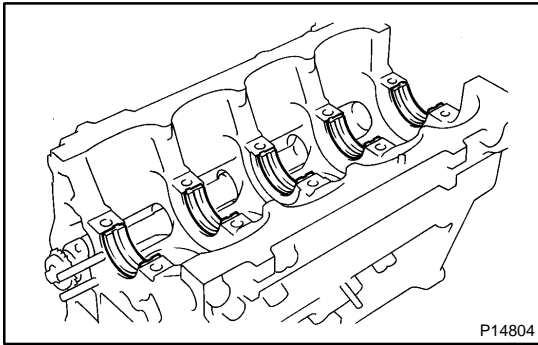
- (a) Install the balance shafts.

NOTICE:

When installing the balance shaft make sure you support the balance shaft with both hands and avoid scratching the balance shaft bearing on the cylinder block side.

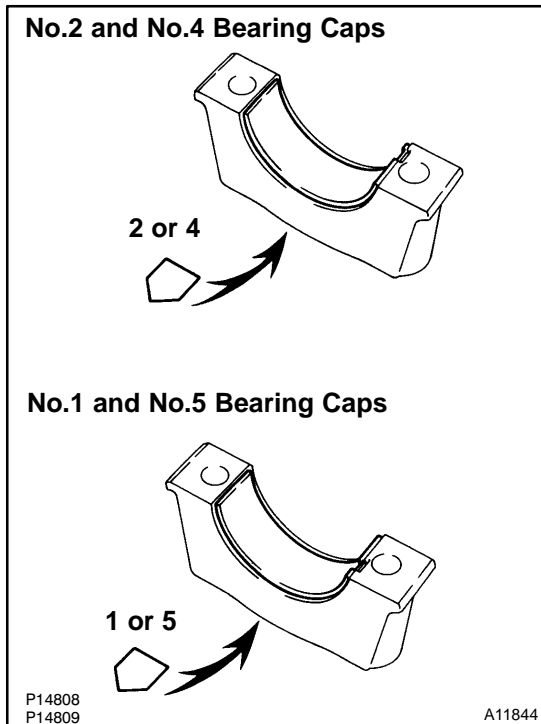
- (b) Install the No.1 balance shaft with the bolt.
(c) Install the No.2 balance shaft with the 2 bolts.

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



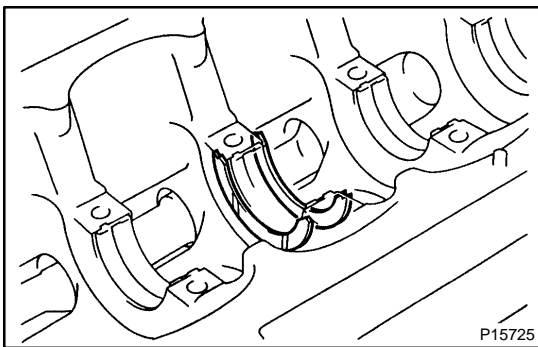
7. INSTALL MAIN BEARINGS

- (a) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.
- (b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 5 lower bearings.



HINT:

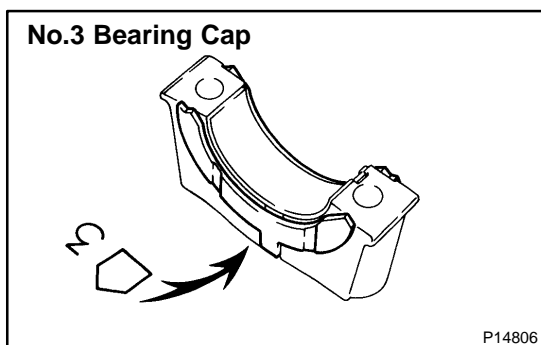
A number is marked on each main bearing cap to indicate the installation position.



8. INSTALL UPPER THRUST WASHERS

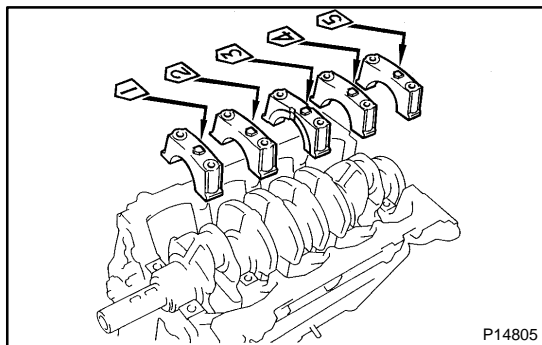
Install the 2 thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.

9. PLACE CRANKSHAFT ON CYLINDER BLOCK



10. PLACE MAIN BEARING CAPS AND LOWER THRUST WASHERS ON CYLINDER BLOCK

- (a) Install the 2 thrust washers on the No.3 bearing cap with the grooves facing outward.



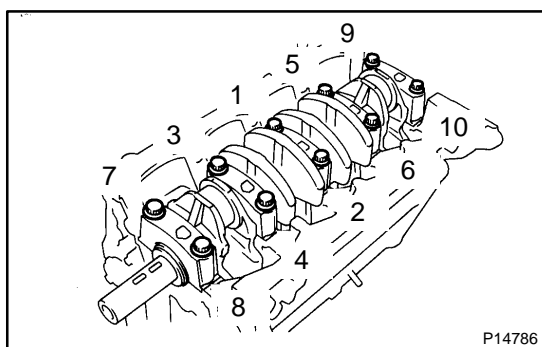
(b) Install the 5 main bearing caps in their proper locations.
HINT:

Each bearing cap has a number and front mark.

11. INSTALL MAIN BEARING CAP BOLTS

HINT:

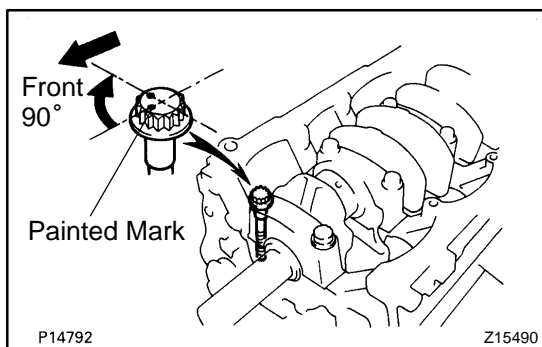
- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any of the main bearing cap bolts is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.



(b) Install and uniformly tighten the 10 bolts of the main bearing caps in several passes, in the sequence shown.

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

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



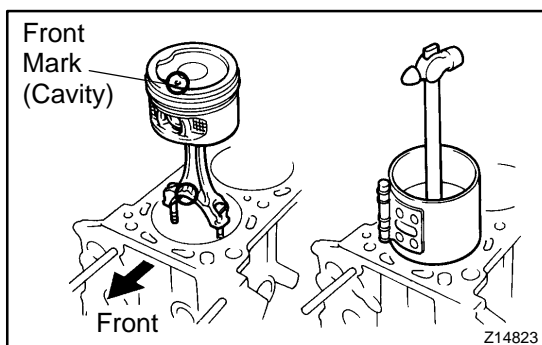
(c) Mark the front of the main bearing cap bolt with paint.

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

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

(f) Check that the crankshaft turns smoothly.

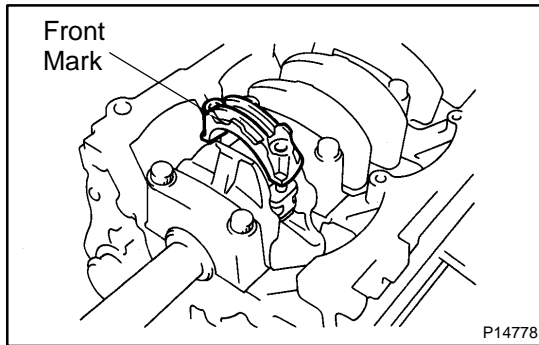
(g) Check the crankshaft thrust clearance (See page [EM-84](#)).



12. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

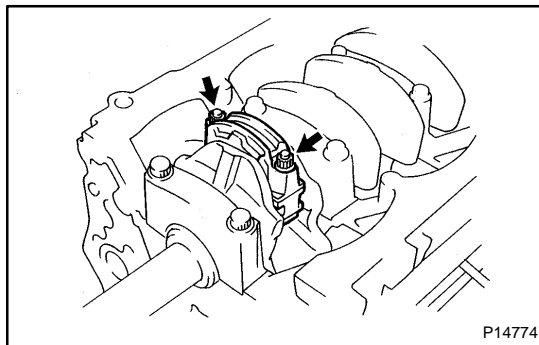
(a) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(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.



13. PLACE CONNECTING ROD CAP ON CONNECTING ROD

- Match the numbered connecting rod cap with the connecting rod.
- Install the connecting rod cap with the front mark facing forward.



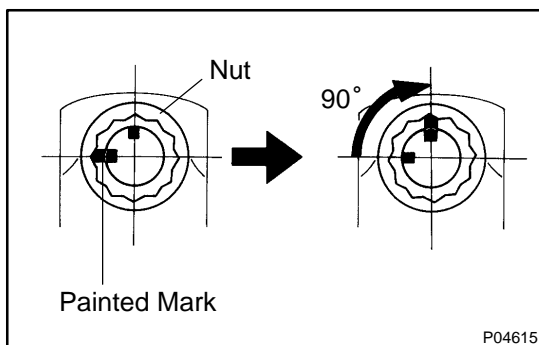
14. INSTALL CONNECTING ROD CAP NUTS

HINT:

- The connecting rod cap nuts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any connecting rod bolt is broken or deformed, replace it.
- Apply a light coat of engine oil on the threads and under the nuts of the connecting rod cap.
 - Install and alternately tighten the nuts of the connecting rod cap in several passes.

Torque: 45 N·m (460 kgf·cm, 33 ft·lbf)

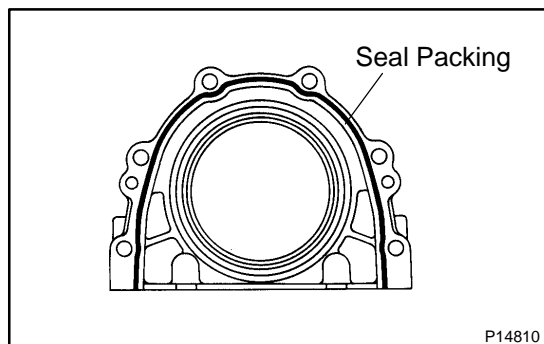
If any one of the connecting rod cap nuts does not meet the torque specification, replace the connecting rod bolt and cap nut as a set.



- Mark the front of the connecting rod cap nut and bolt with paint.
- Retighten the connecting rod cap nuts 90° as shown.
- Check that the painted mark on the nut is at a 90° angle in relation to the mark on the bolt.
- Check that the crankshaft turns smoothly.
- Check the connecting rod thrust clearance (See page [EM-84](#)).

15. INSTALL REAR OIL SEAL RETAINER

- 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 seal 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 cap.

- (c) Install the retainer with the 6 bolts.

Torque: 13.5 N·m (135 kgf·cm, 9.7 ft·lbf)

16. INSTALL CRANKSHAFT POSITION SENSOR CONNECTOR BRACKET

17. INSTALL ENGINE WIRE BRACKET

18. INSTALL RH AND LH ENGINE MOUNTING ASSEMBLIES

Torque: 52 N·m (520 kgf·cm, 38 ft·lbf)

19. INSTALL OIL PRESSURE SWITCH

- (a) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

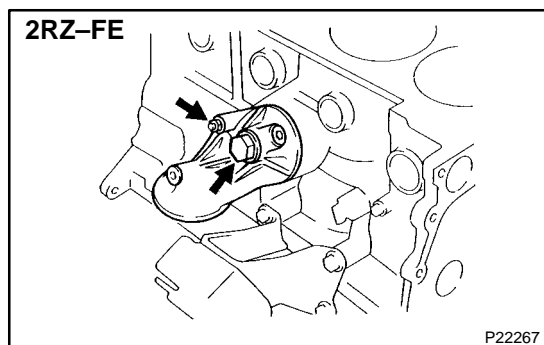
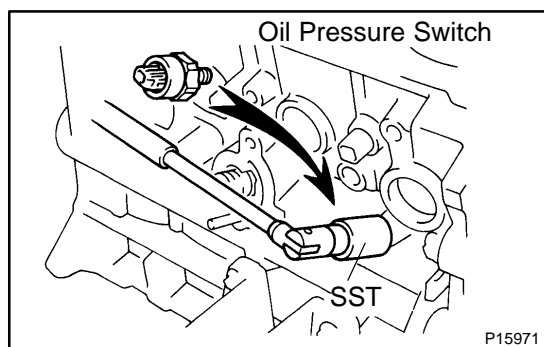
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Using SST, install the oil pressure switch.

SST 09816-30010

20. INSTALL ENGINE COOLANT DRAIN COCK

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



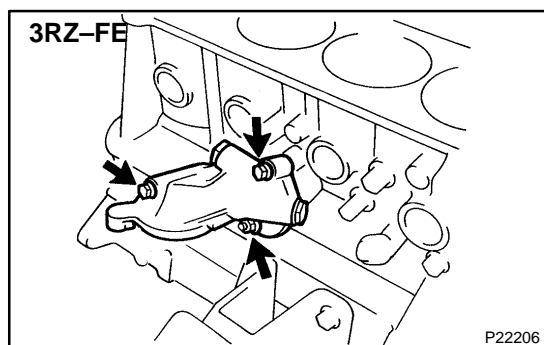
**21. 2RZ-FE:
INSTALL OIL FILTER BRACKET**

- (a) Install a new O-ring to the union bolt.
(b) Install a new gasket.
(c) Install the oil filter bracket with the union bolt and a nut.

Torque:

68.5 N·m (700 kgf·cm, 51 ft·lbf) for union bolt

12 N·m (120 kgf·cm, 9 ft·lbf) for nut



**22. 3RZ-FE:
INSTALL OIL FILTER BRACKET**

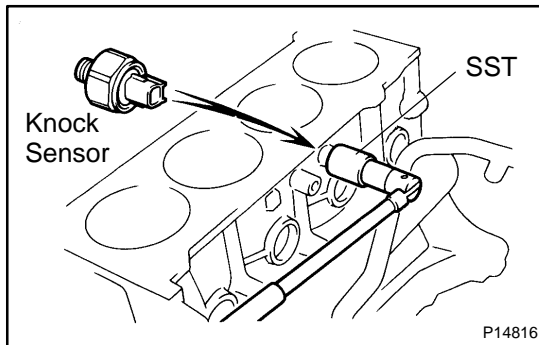
- (a) Install a new O-ring to the union.
(b) Using a 14 mm hexagon wrench, install the union.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)
(c) Install a new O-ring and the oil filter bracket with the 2 bolts and nut.

Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)

23. INSTALL OIL FILTER (See page LU-2)

24. INSTALL WATER BYPASS PIPE

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

**25. INSTALL KNOCK SENSOR**

Using SST, install the knock sensor.

SST 09816-30010

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

26. INSTALL FUEL FILTER

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

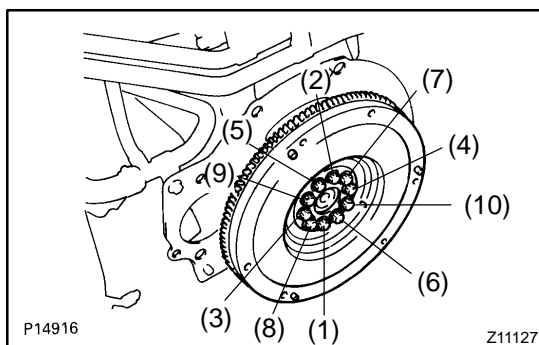
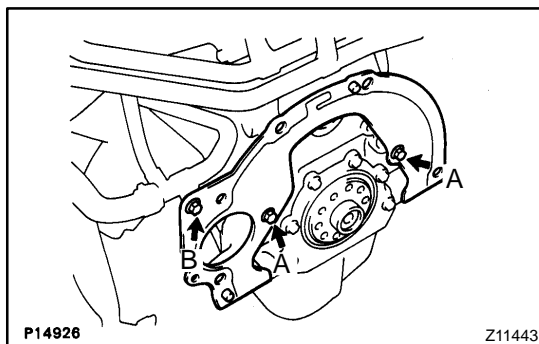
27. INSTALL TIMING CHAINS, GEAR AND SPROCKETS
(See page [EM-25](#))**28. INSTALL CYLINDER HEAD** (See page [EM-57](#))**29. REMOVE ENGINE STAND****30. INSTALL REAR END PLATE**

Install the rear end plate with the 3 bolts.

Torque:

18 N·m (185 kgf·cm, 13 ft·lbf) for bolt A

20 N·m (200 kgf·cm, 14 ft·lbf) for bolt B

**31. M/T for 2RZ-FE:****INSTALL FLYWHEEL**

Install and uniformly tighten 10 new bolts to the flywheel in several passes, in the sequence shown.

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

32. M/T for 3RZ-FE:**INSTALL FLYWHEEL**

(a) Install and uniformly tighten 10 new bolts to the flywheel in several passes, in the sequence shown.

Torque: 26.5 N·m (270 kgf·cm, 19 ft·lbf)

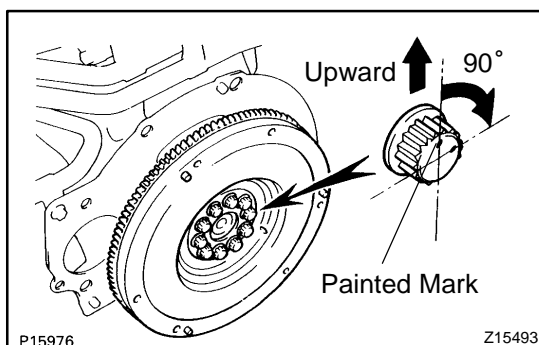
(b) Mark the top of the flywheel bolt with paint.

(c) Retighten the flywheel bolts by 90° in the numerical order shown above.

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

33. A/T:**INSTALL DRIVE PLATE**

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



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

- (b) Install the front spacer, drive plate and rear plate with the 10 bolts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)