

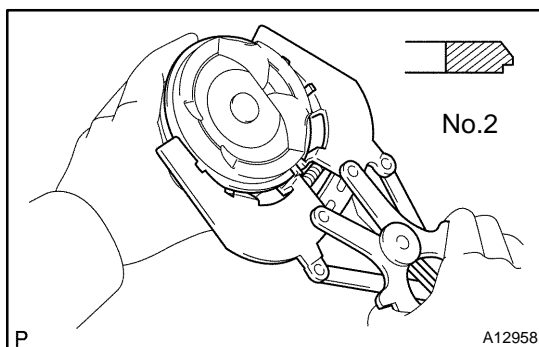
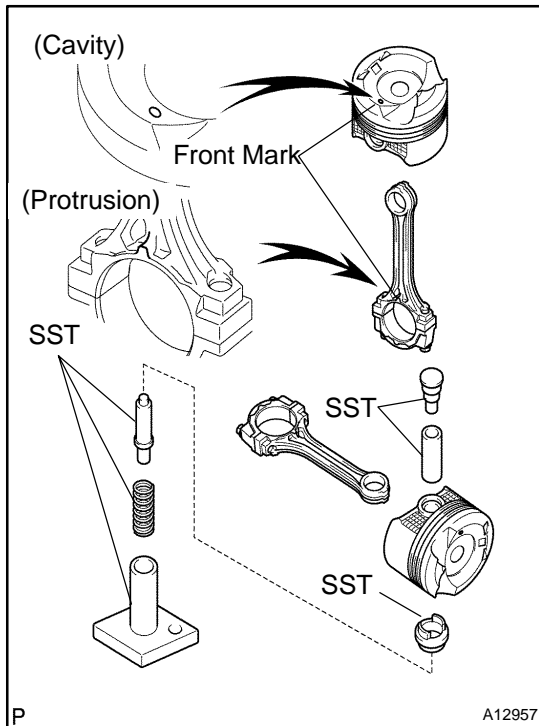
REASSEMBLY

HINT:

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

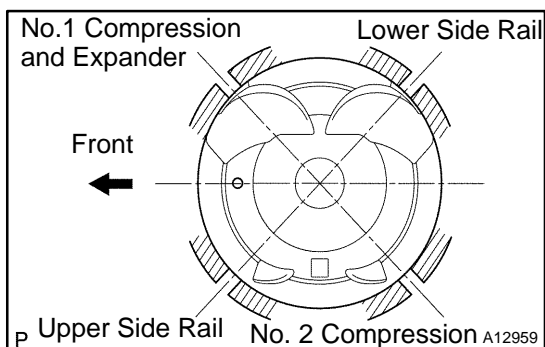
1. ASSEMBLE PISTON AND CONNECTING ROD

- Gradually heat the piston side of connecting rod to 80 - 90°C (176 - 194°F).
- Coat the piston pin and pin holes of the piston with engine oil.
- Align the cavity on the piston with the protrusion on the connecting rod.
- Using SST, press in the piston pin.
SST 09221-25026 (09221-00021, 09221-00030, 09221-00190, 09221-00141, 09221-00150)



2. INSTALL PISTON RINGS

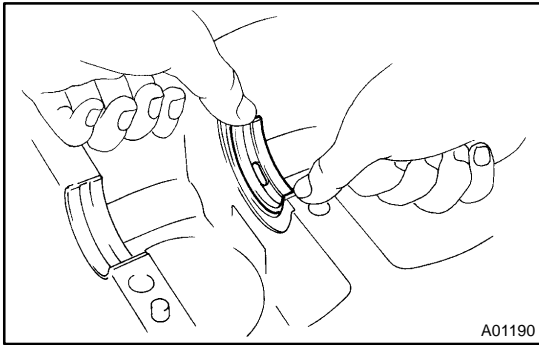
- Install the oil ring expander and 2 side rails by hand.
- Using a piston ring expander, install the 2 compression rings.



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

NOTICE:

Do not align the ring ends.



**3. Supply parts:
INSTALL MAIN BEARINGS**

HINT:

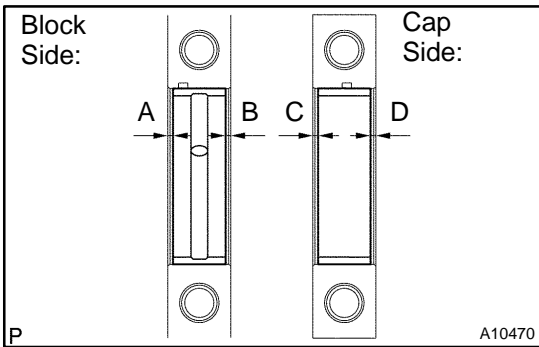
Upper bearings have an oil groove and oil holes; Lower bearings do not.

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

NOTICE:

Install the bearing with the oil hole in the cylinder block.

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



**4. Manufacture parts:
INSTALL MAIN BEARINGS**

HINT:

Upper bearings have an oil groove and oil holes; Lower bearings do not.

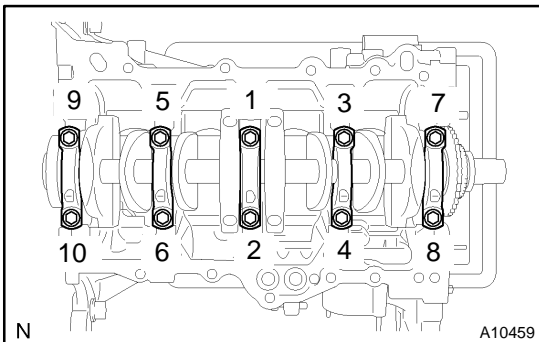
Measure the clearance on both sides of the bearing and install it so that the difference between measured values will be within the specified below.

Specified clearance:

A - B = 0.8 mm (0.032 in.)

C - D = 0.4 mm (0.016 in.)

5. PLACE CRANKSHAFT ON CYLINDER BLOCK



6. INSTALL BEARING CAPS

- (a) Install the 5 bearing caps.

HINT:

Each bearing cap has a number and front mark.

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

- (c) Install and uniformly tighten the 10 bolts of the bearing cap in several passes, in the sequence shown.

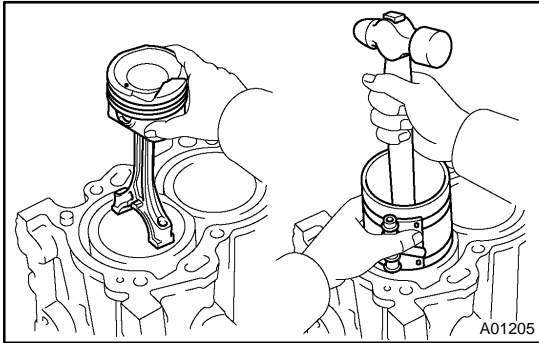
Torque:

1ST 22 N·m (220 kgf·cm, 16 ft·lbf)

2ND Turn 90°

- (d) Check that the crankshaft turns smoothly.

7. CHECK CRANKSHAFT THRUST CLEARANCE (See page EM-63)



8. 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.

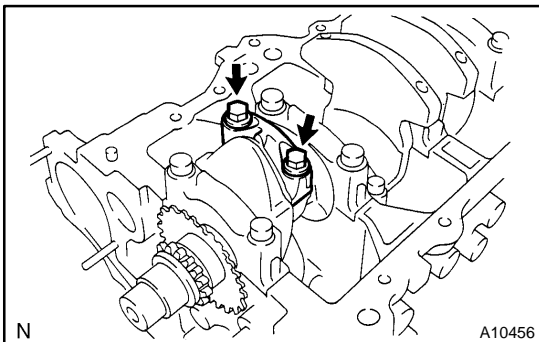
9. PLACE CONNECTING ROD CAP ON CONNECTING ROD

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

10. INSTALL CONNECTING ROD CAP BOLTS

HINT:

- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any 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.

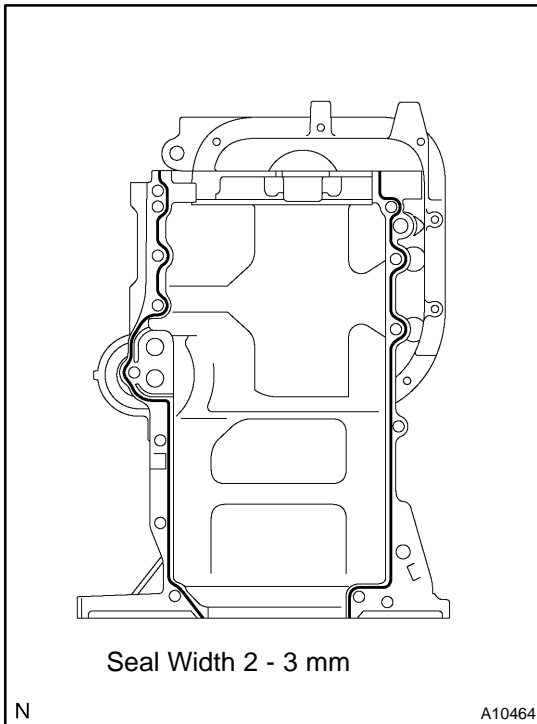
Torque:

1ST 15 N·m (150 kgf·cm, 11 ft·lbf)

2ND Turn 90°

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

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



12. INSTALL OIL PAN NO. 1

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the oil pan No. 1 and cylinder block.
- Using a razor blade and gasket scraper, remove all the old 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 pan No. 1 as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

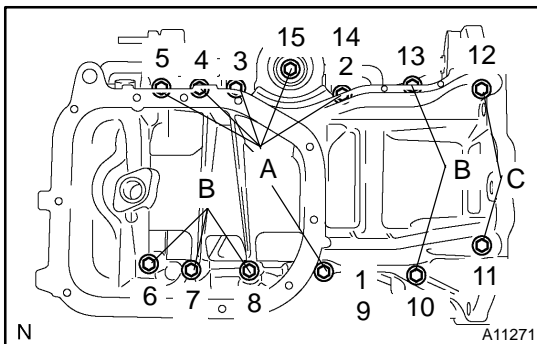
- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

- (c) Install new O-rings to the cylinder block.
 (d) Using a plastic-faced hammer, lightly tap the oil pan No. 1 to ensure a proper fit.



- (e) Install and uniformly tighten the 13 bolts, in several passes, in the sequence shown.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

HINT:

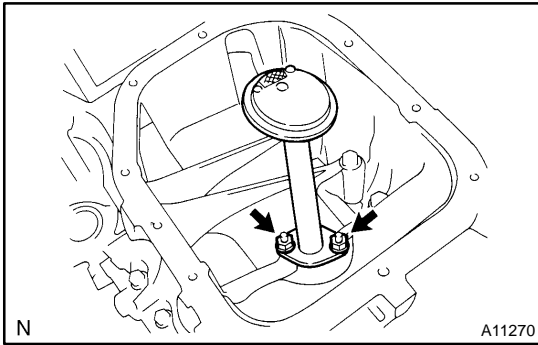
Each bolt length is indicated in the illustration.

- A: 49 mm (1.929 in.)
 B: 88 mm (3.465 in.)
 C: 144 mm (5.669 in.)

13. INSTALL REAR CRANKSHAFT OIL SEAL (See page [EM-76](#))

HINT:

Wipe seal packing away from the contact surface of the cylinder block assembly and oil seal.

**14. INSTALL OIL STRAINER**

Install a new gasket, and oil strainer with the 2 nuts.

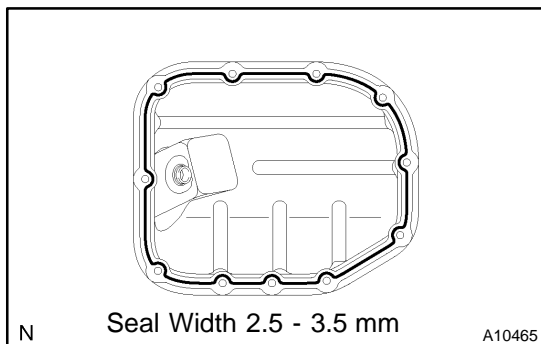
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)

15. INSTALL OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the main bearing cap and oil pan.
- Using a razor blade and gasket scraper, remove all the old 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.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



- (b) Apply seal packing to the oil pan as shown in the illustration.

Seal packing:

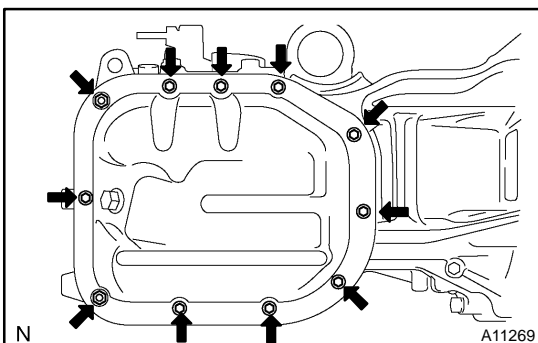
Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2.5 - 3.5 mm (0.098 - 0.138 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



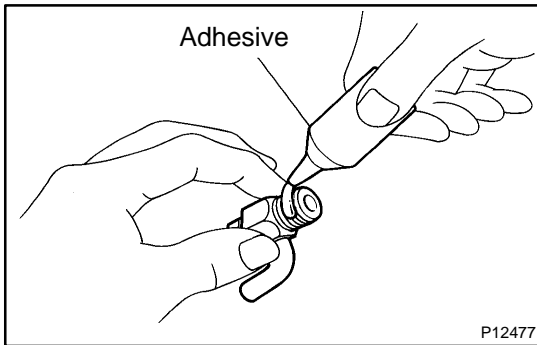
- (c) Install the oil pan with the 9 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

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

16. INSTALL OIL FILTER UNION

Torque: 30 N·m (306 kgf·cm, 21 ft·lbf)

17. INSTALL OIL FILTER (See page [LU-2](#))

**18. INSTALL ENGINE COOLANT DRAIN UNION**

- (a) Apply adhesive to 2 or 3 threads.

Adhesive:

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

- (b) Install the drain union.

Torque: 35 N·m (350 kgf-cm, 25 ft-lbf)

HINT:

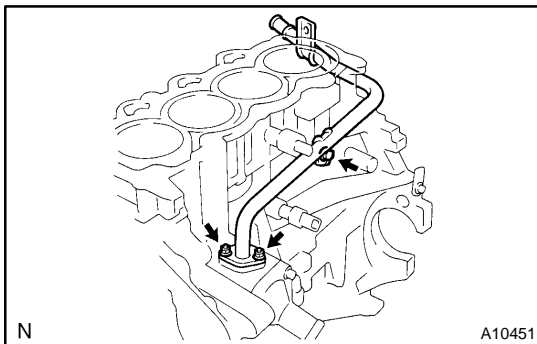
After applying the specified torque, rotate the drain union clockwise until its drain port is facing downward.

19. INSTALL KNOCK SENSOR

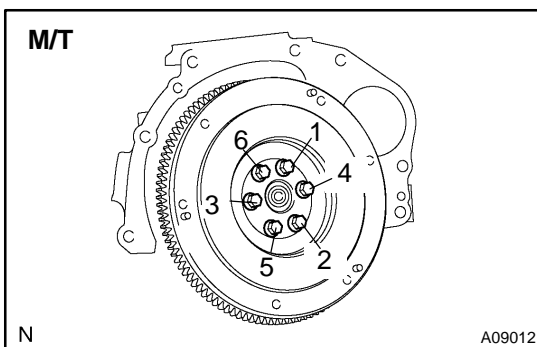
Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

20. INSTALL OIL PRESSURE SWITCH

(See page [LU-1](#))

21. INSTALL THERMOSTAT (See page [CO-10](#))**22. INSTALL WATER BYPASS PIPE**

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

23. INSTALL ENGINE WIRE**24. INSTALL CYLINDER HEAD (See page [EM-44](#))****25. INSTALL TIMING SPROCKETS AND TIMING CHAIN (See page [EM-20](#))****26. REMOVE ENGINE STAND****27. M/T:
INSTALL FLYWHEEL**

HINT:

The flywheel bolts are tightened in 2 progressive steps, (a) and

(c).

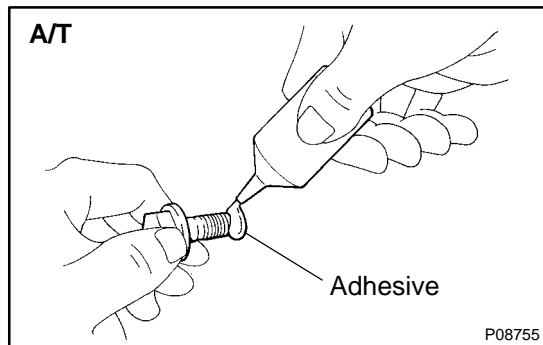
- (a) Install and uniformly tighten the 6 mounting bolts, in several passes, in the sequence shown.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

- (b) Mark the flywheel bolt with paint.

(c) Retighten the flywheel bolts by an additional 90°.

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

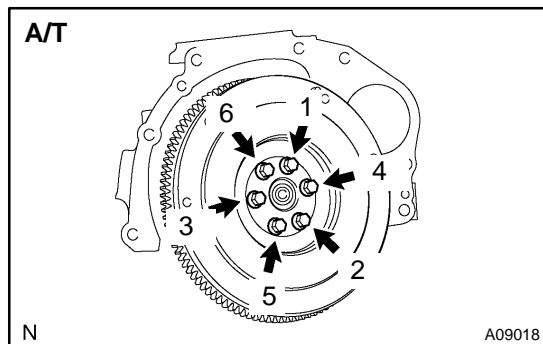


28. **A/T:**
INSTALL DRIVE PLATE

- (a) Install the front spacer, drive plate and rear plate on the crankshaft.
- (b) Apply adhesive to 2 or 3 threads of the mounting bolt end,

Adhesive:

Part No. 08833-00070, THREE BOND or equivalent



- (c) Install and uniformly tighten the 6 mounting bolts, in several passes, in the sequence shown.

Torque: 88 N·m (890 kgf·cm, 65 ft·lbf)