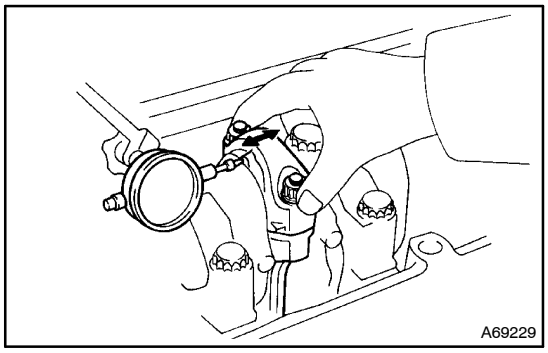
1413Y–01

OVERHAUL

HINT:

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

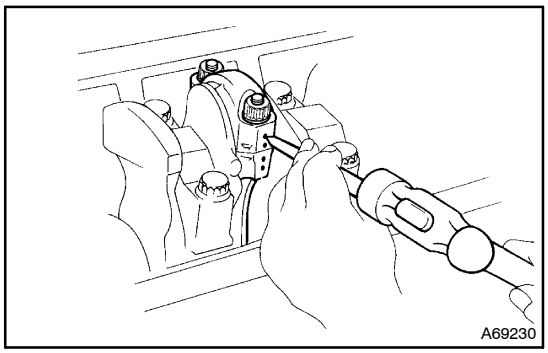


1. INSPECT CONNECTING ROD THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:
0.200 – 0.320 mm (0.0079 – 0.0126 in.)
Maximum thrust clearance: 0.40 mm (0.0157 in.)

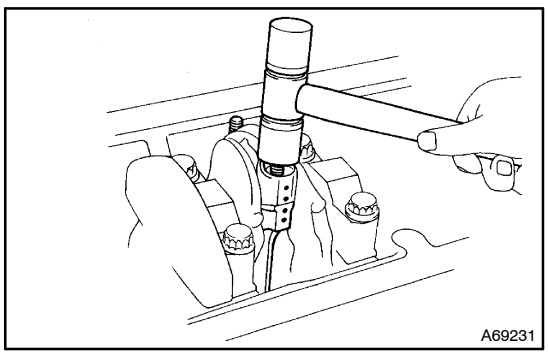
If the thrust clearance is greater than the maximum, replace the connecting rod assy. If necessary, replace the crankshaft.



2. INSPECT CONNECTING ROD OIL CLEARANCE

(a) Using a punch or numbering stamp, place matchmarks on the connecting rod and cap to ensure correct reassembly.

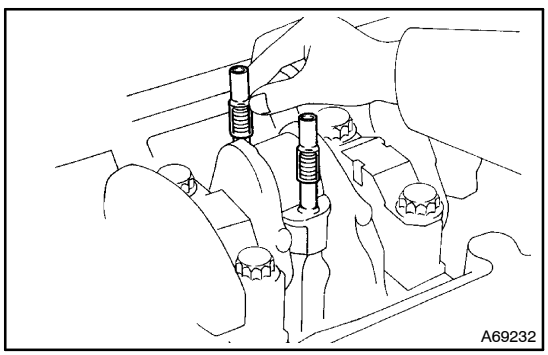
(b) Remove the 2 connecting rod cap nuts.



(c) Using a plastic–faced hammer, lightly tap the connecting road bolts and lift off the connecting rod cap.

HINT:

Keep the lower bearing attached to the connecting rod cap.

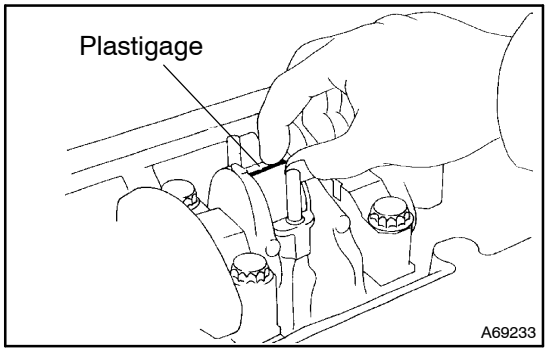


(d) Cover the connecting road bolts with a short piece of hose to protect the crankshaft from damage.

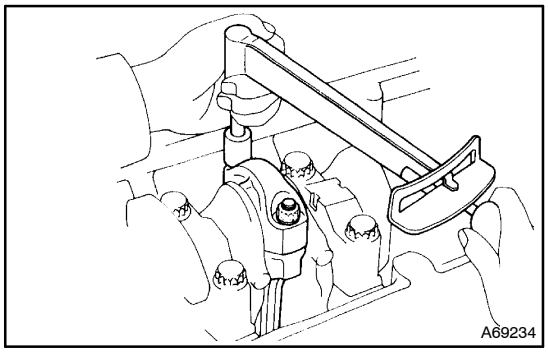
(e) Clean the crank pin and bearing.

(f) Check the crank pin and bearing for pits and scratches.

If the crank pin or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.



(g) Lay a strip of Plastigage across the crank pin.

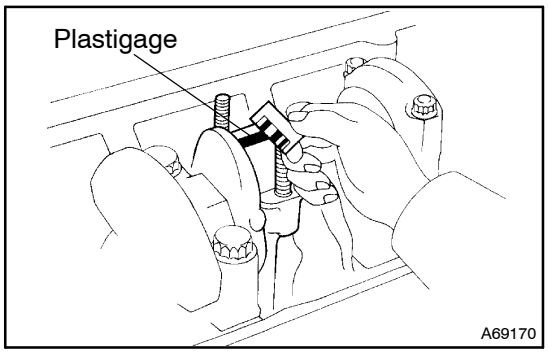


(h) Install the connecting rod cap with the 2 nuts (See step 43).

NOTICE:

Do not turn the crankshaft.

(i) Remove the 2 nuts, connecting rod cap and lower bearing (See steps (b) and (c)).



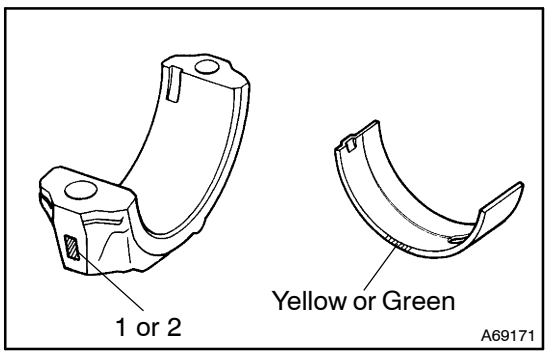
(j) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
U/S 0.25, 0.50, 1.00	0.030 – 0.072 mm (0.0012 – 0.0028 in.)

Maximum oil clearance: 0.10 mm (0.0039 in.)

If the oil clearance is greater than the maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT:

There are 2 sizes of standard bearings, which are identified by color yellow or green. If using a standard bearings, select one having the color corresponding to the number on the bearing cap:

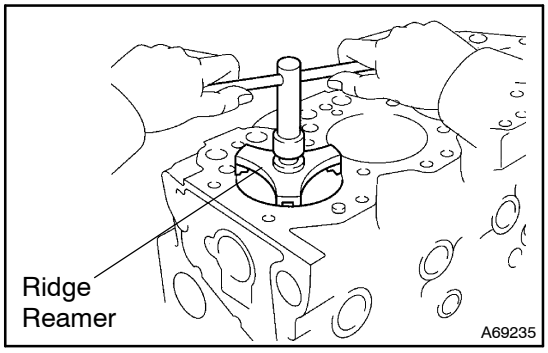
Yellow corresponds to 1

Green corresponds to 2

Standard sized bearing center wall thickness:

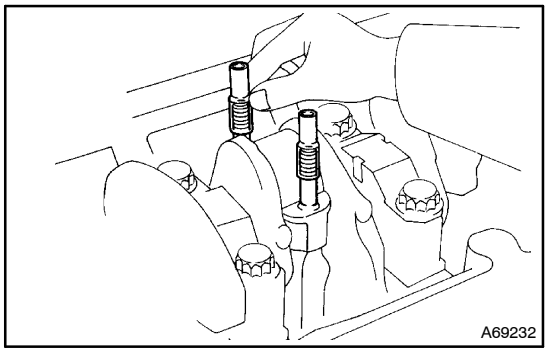
Yellow	1.480 – 1.485 mm (0.0583 – 0.0585 in.)
Green	1.485 – 1.490 mm (0.0585 – 0.0587 in.)

(l) Completely remove the Plastigage.



3. REMOVE PISTON AND CONNECTING ROD

(a) Using a ridge reamer, remove all the carbons from the top of the cylinder.

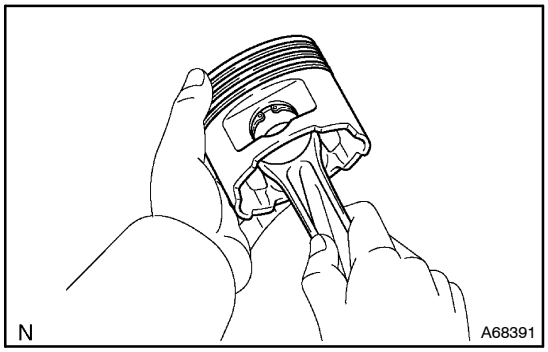


(b) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(c) Push out the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.

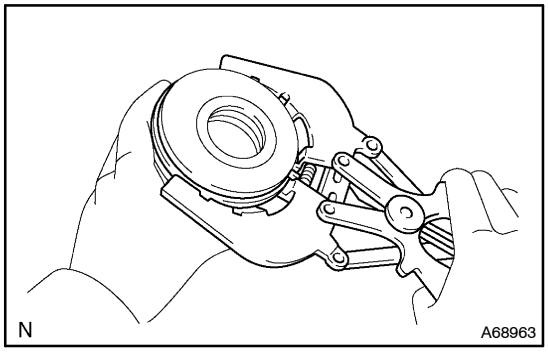


4. REMOVE W/PIN PISTON SUB–ASSY

(a) Check that the piston and piston pin fit.

(1) Try to move the piston back and forth.

If any movement is felt, replace the piston and pin as a set.



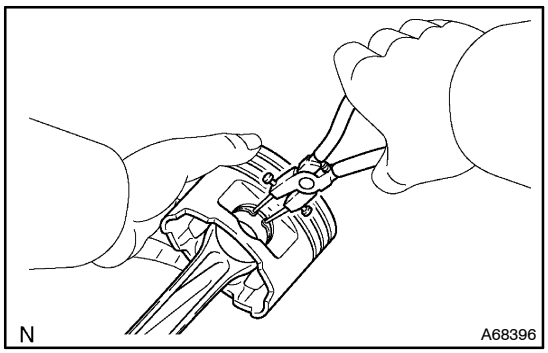
(b) Remove the piston rings.

(1) Using a piston ring expander, remove the No. 1, No. 2 and oil rings.

(2) Remove the coil for the oil ring by hand.

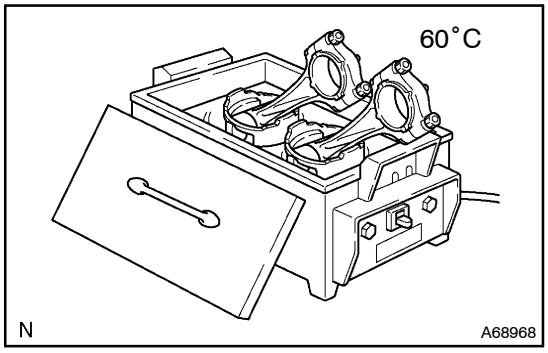
HINT:

Arrange the piston rings in the correct order.

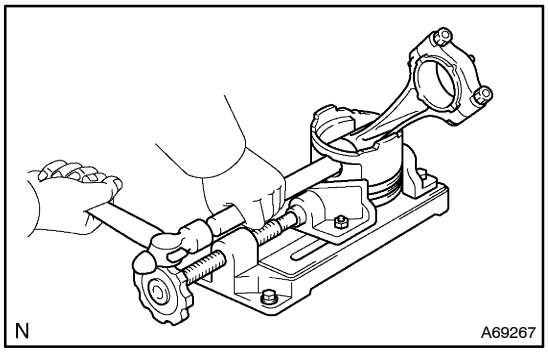


(c) Disconnect the connecting rod from the piston.

(1) Using snap ring pliers, remove the snap rings.



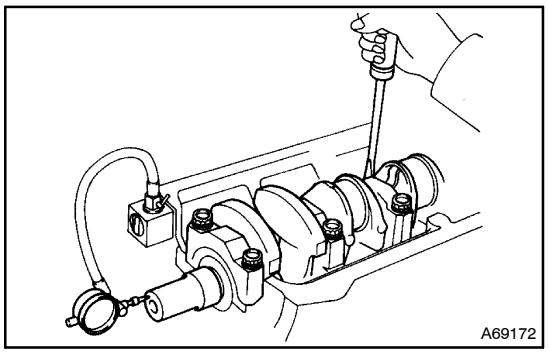
(2) Gradually heat the piston to approx. 60˚C (140˚F).



(3) Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

- The piston and pin are a set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.



5. INSPECT CRANKSHAFT THRUST CLEARANCE

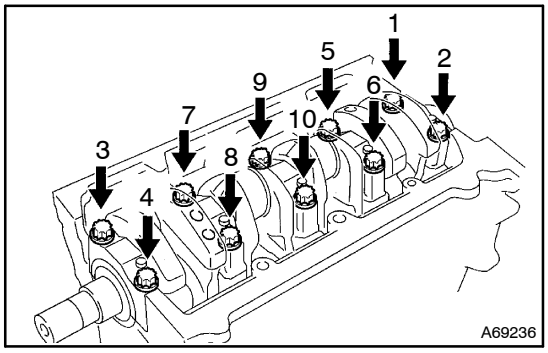
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.040 – 0.250 mm (0.0016 – 0.0098 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

If the thrust clearance is greater than the maximum, replace the thrust washers as a set.

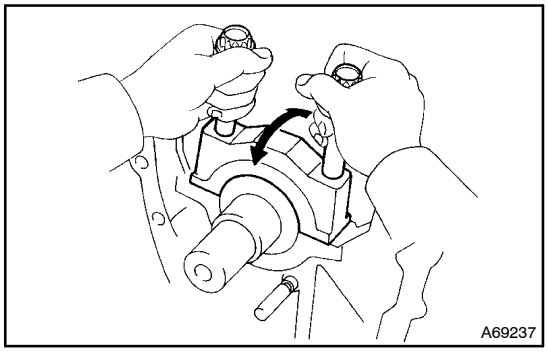
Thrust washer thickness:

STD	2.430 – 2.480 mm (0.0957 – 0.0976 in.)
O/S 0.125	2.493 – 2.543 mm (0.0981 – 0.1001 in.)
O/S 0.250	2.555 – 2.605 mm (0.1006 – 0.1026 in.)



6. INSPECT CRANKSHAFT OIL CLEARANCE

(a) Remove the 10 crankshaft bearing cap bolts.



(b) Using the removed crankshaft bearing cap bolts, pry the crankshaft bearing cap back and forth to remove the crankshaft bearing caps, lower bearings and lower thrust washers (No. 3 crankshaft bearing cap only).

HINT:

- Keep the lower bearing and crankshaft bearing caps together.
- Arrange the thrust washers in the correct order.

(c) Lift out the crankshaft.

HINT:

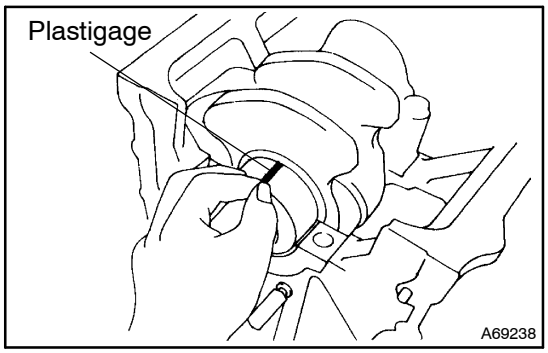
Keep the upper crankshaft bearings and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

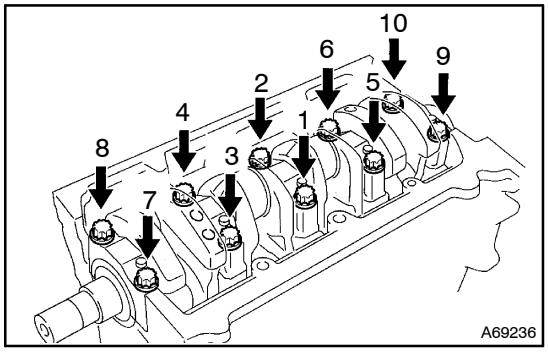
(e) Check each main journal and bearing for pits and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

(f) Place the crankshaft on the cylinder block.



(g) Lay a strip of Plastigage across each journal.

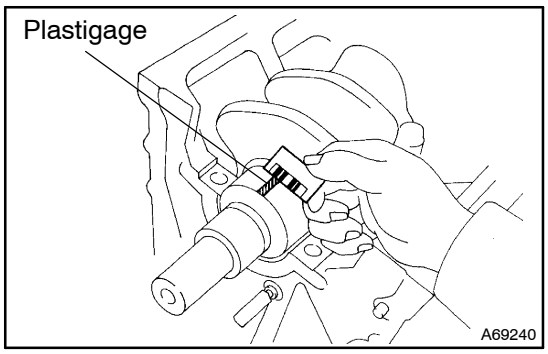


(h) Install the 5 crankshaft bearing caps with the 10 bolts (See step 42).

NOTICE:

Do not turn the crankshaft.

(i) Remove the 10 bolts and 5 crankshaft bearing caps (See steps (a) and (b)).



(j) Measure the Plastigage at its widest point.

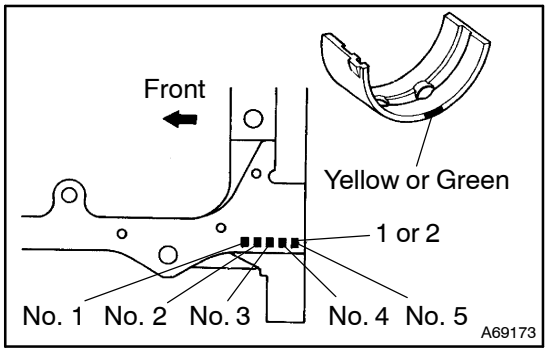
Standard oil clearance:

No. 3 journal	STD	0.060 – 0.104 mm (0.0024 – 0.0041 in.)
	U/S 0.25, 0.50, 1.00	0.060 – 0.106 mm (0.0024 – 0.0042 in.)
Others	STD	0.030 – 0.074 mm (0.0012 – 0.0029 in.)
	U/S 0.25, 0.50, 1.00	0.030 – 0.076 mm (0.0012 – 0.0030 in.)

Maximum clearance: 0.10 mm (0.0039 in.)

No. 3 journal	0.15 mm (0.0059 in.)
Others	0.10 mm (0.0039 in.)

If the oil clearance is greater than the maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT:
There are 2 sizes of standard bearings, which are identified by color yellow or green. If using a standard bearing, select one having the color corresponding to the number on the cylinder block:
Yellow corresponds to 1
Green corresponds to 2

Standard sized bearing center wall thickness:

Yellow	2.480 – 2.485 mm (0.0976 – 0.0978 in.)
Green	2.485 – 2.490 mm (0.0978 – 0.0980 in.)

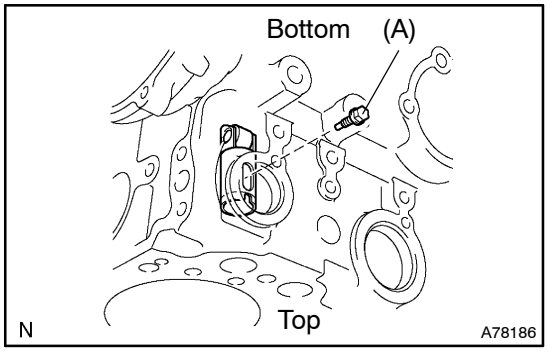
(k) Completely remove the Plastigage.

7. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the upper bearings and upper thrust washers from the cylinder block.

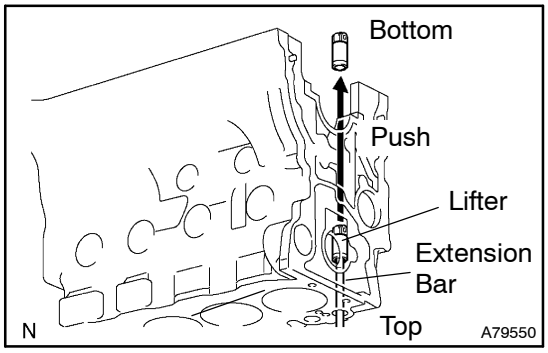
HINT:
Arrange the crankshaft bearing caps, bearings and thrust washers in the correct order.



8. REMOVE VALVE LIFTER

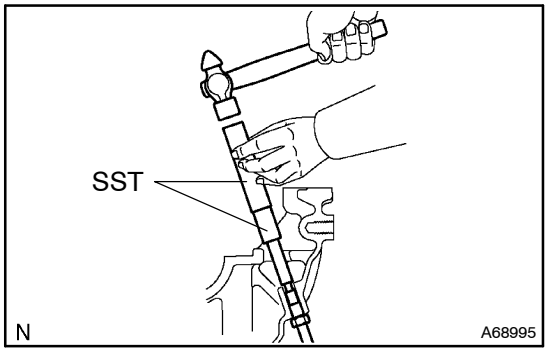
(a) Remove the bolt (A).

NOTICE:
If the bolt (A) is removed with the engine upside down, the lifters will fall in the engine.



(b) Using a extension bar, push out the lifters.

HINT:
Arrange the lifters in the correct order.



9. REMOVE OIL LEVEL GAGE GUIDE

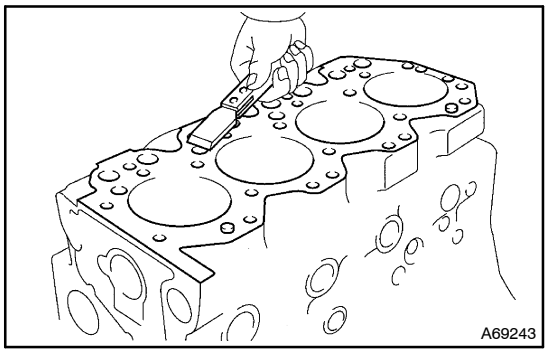
(a) Using SST and a hammer, tap out the level gauge guide.
SST 09201–10000 (09201–01070), 09950–70010 (09951–07100)

10. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

11. REMOVE OIL NOZZLE

(a) Loosen the lock nut, and remove the oil nozzle.

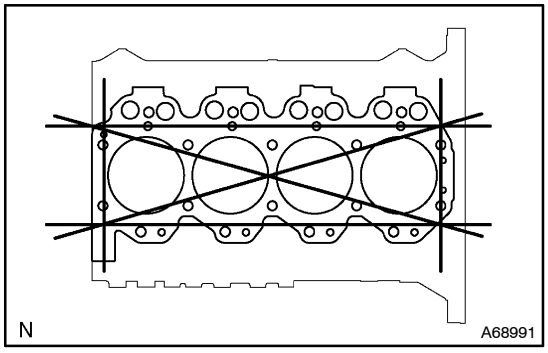
12. REMOVE W/HEAD TAPER SCREW PLUG



13. CLEAN CYLINDER BLOCK SUB–ASSY

(a) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

(b) Using a soft brush and solvent, thoroughly clean the cylinder block.



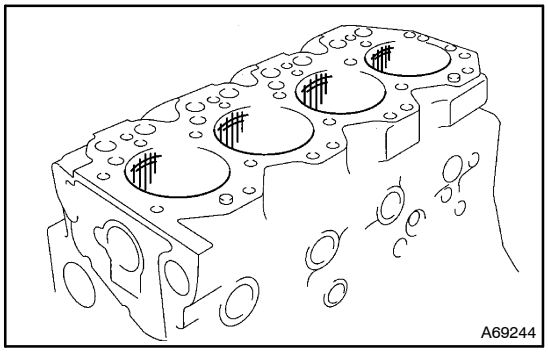
14. INSPECT CYLINDER BLOCK SUB–ASSY

(a) Inspect the flatness.

(1) Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head cap for warpage.

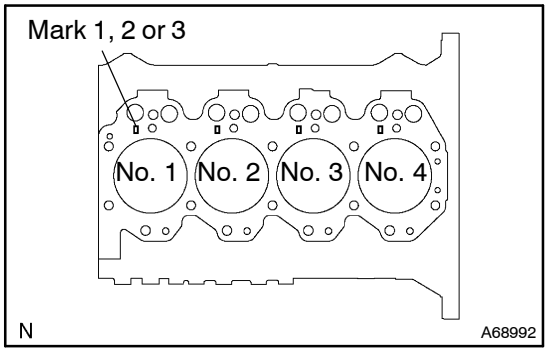
Maximum warpage: 0.20 mm (0.0079 in.)

If the warpage is greater than the maximum, replace the cylinder block.



(b) Visually check the cylinders for vertical scratches.

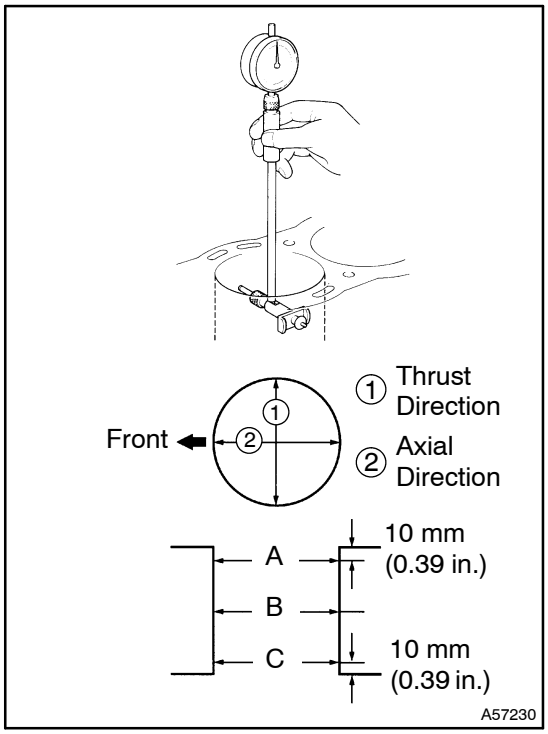
If deep scratches are found, rebore all the 4 cylinders. If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.

HINT:

There are 3 sizes of the standard cylinder bore diameter, which is identified by mark 1, 2 or 3 accordingly. The mark is stamped on the top of the cylinder block.



(1) Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

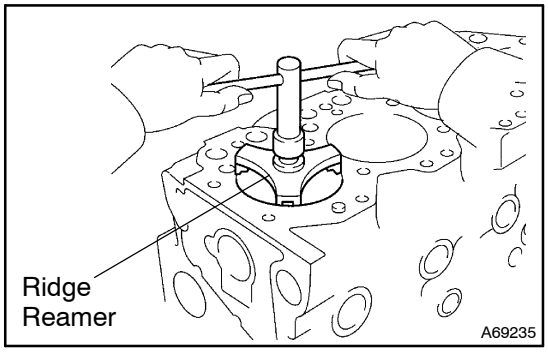
Standard diameter:

Mark 1	102.000 – 102.010 mm (4.0157 – 4.0161 in.)
Mark 2	102.010 – 102.020 mm (4.0161 – 4.0165 in.)
Mark 3	102.020 – 102.030 mm (4.0165 – 4.0169 in.)

Maximum diameter:

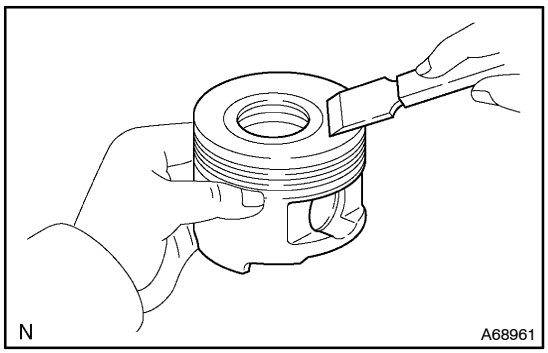
STD	102.23 mm (4.0248 in.)
O/S 0.50	102.73 mm (4.0445 in.)
O/S 0.75	102.98 mm (4.0543 in.)
O/S 1.00	103.23 mm (4.0642 in.)

If the diameter is greater than the maximum, rebore all the 4 cylinders. If necessary, replace the cylinder block.



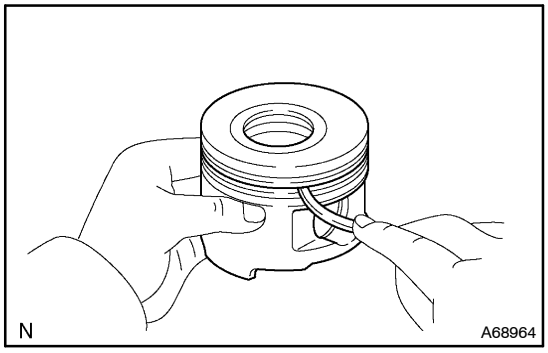
(d) Remove the cylinder ridge.

If the wear is less than 0.2 mm (0.008 in.), grind the top of the cylinder using a ridge reamer.

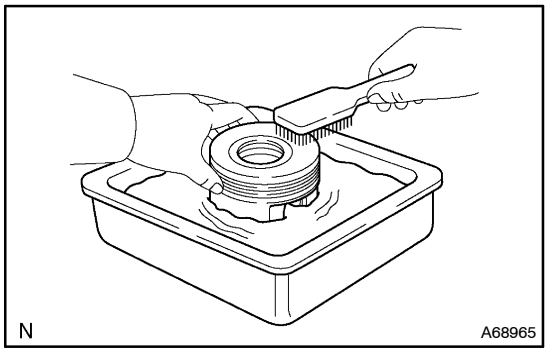


15. CLEAN W/PIN PISTON SUB–ASSY

(a) Using a gasket scraper, remove the carbons from the piston top.



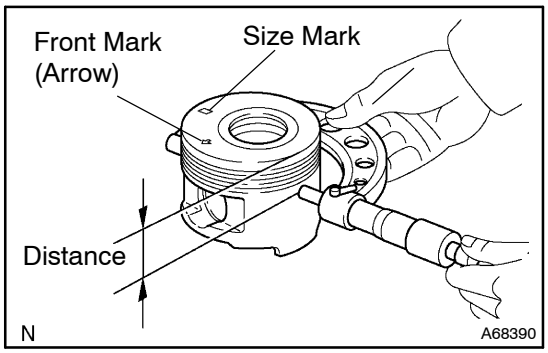
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



16. INSPECT W/PIN PISTON SUB–ASSY

(a) Inspect the piston oil clearance.

HINT:

There are 3 sizes of the standard piston diameter, which is identified by mark 1, 2 or 3 accordingly. The mark is stamped on the piston top.

(1) Using a micrometer, measure the piston diameter at right angles to the piston center line and the distance from the piston head.

Distance: 42.83 mm (1.6862 in.)

Piston diameter:

STD	Mark 1	101.800 – 101.810 mm (4.0079 – 4.0083 in.)
	Mark 2	101.810 – 101.820 mm (4.0083 – 4.0087 in.)
	Mark 3	101.820 – 101.830 mm (4.0087 – 4.0090 in.)
O/S 0.50		102.300 – 102.330 mm (4.0276 – 4.0287 in.)
O/S 0.75		102.550 – 102.580 mm (4.0374 – 4.0386 in.)
O/S 1.00		102.800 – 102.830 mm (4.0472 – 4.0484 in.)

(2) Measure the cylinder bore diameter in the thrust directions (See step 14).

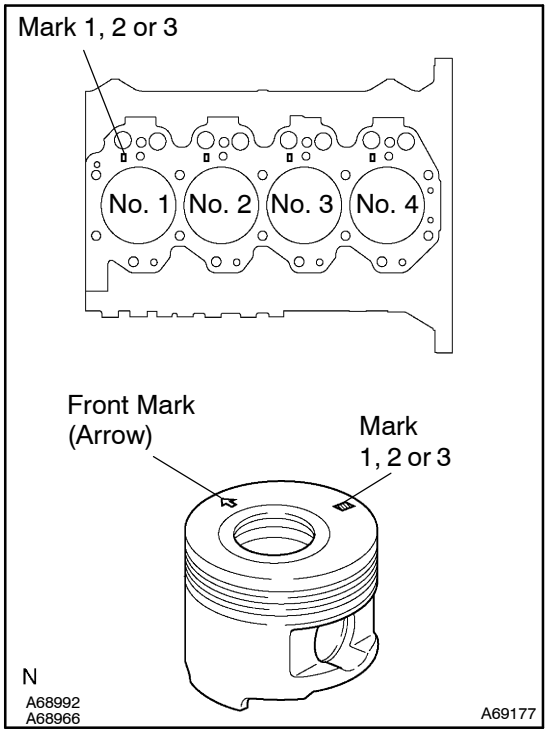
(3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

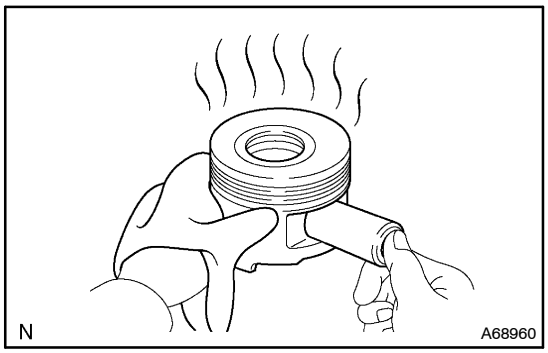
0.190 – 0.210 mm (0.0075 – 0.0083 in.)

Maximum oil clearance: 0.26 mm (0.0102 in.)

If the oil clearance is greater than the maximum, replace all the 4 pistons and rebore all the 4 cylinders. If necessary, replace the cylinder block.

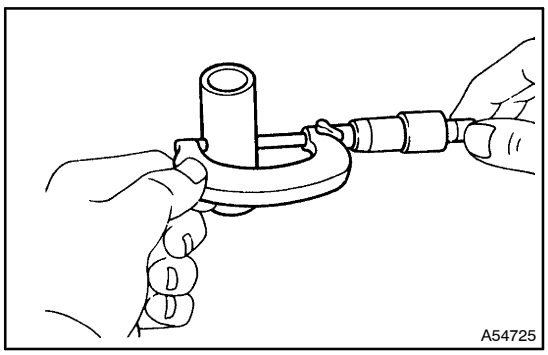


HINT:
Use a piston with the same number mark as that on the cylinder block.

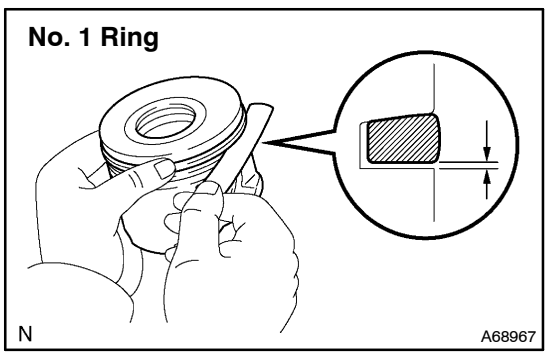


(b) Check that the piston pin fits.
(1) When the piston pin is at 60°C (140°F), you should be able to push the piston pin into the piston pin hole with your thumb.

If the pin can be pushed at a lower temperature, replace the piston and pin as a set.



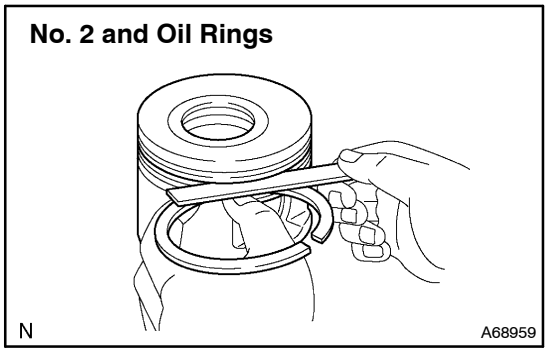
(c) Using a micrometer, measure the piston pin diameter.
Piston pin diameter:
32.000 – 32.010 mm (1.2598 – 1.2602 in.)



17. INSPECT PISTON RING SET

(a) Inspect the piston ring groove clearance.
(1) No. 1 Ring:
Install a new ring to the piston. Using a feeler gauge, measure the clearance between the ring and the wall of the ring groove.
Standard groove clearance:
0.062 – 0.092 mm (0.0024 – 0.0036 in.)
Maximum groove clearance: 0.20 mm (0.0079 in.)

If the clearance is greater than the maximum, replace the piston.



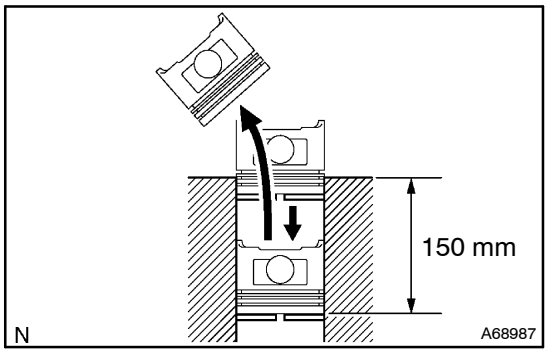
(2) No. 2 and Oil Rings:
Using a feeler gauge, measure the clearance between a new ring and the wall of the ring groove.

Standard groove clearance:

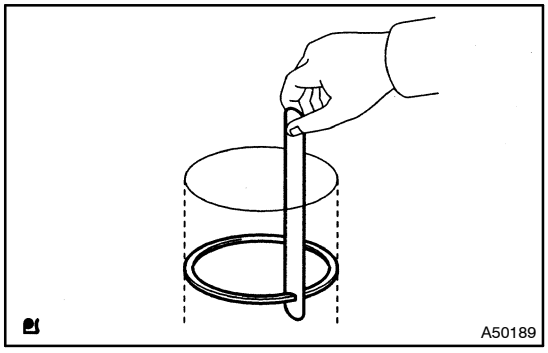
No. 2	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
Oil	0.030 – 0.070 mm (0.0012 – 0.0028 in.)

Maximum groove clearance: 0.20 mm (0.0079 in.)

If the clearance is greater than the maximum, replace the piston.



(b) Inspect the piston ring end gap.
(1) Insert the ring into the cylinder bore.
(2) Using a piston, push the ring a little beyond the bottom of the ring travel, 150 mm (5.91 in.) from the top of the cylinder block.



(3) Using a feeler gauge, measure the end gap.

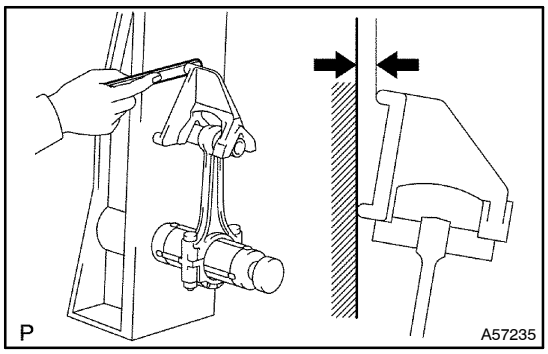
Standard end gap:

No. 1	0.300 – 0.520 mm (0.0118 – 0.0205 in.)
No. 2	0.400 – 0.650 mm (0.0157 – 0.0256 in.)
Oil	0.200 – 0.520 mm (0.0079 – 0.0205 in.)

Maximum end gap:

No. 1	1.32 mm (0.0520 in.)
No. 2	1.45 mm (0.0571 in.)
Oil	1.32 mm (0.0520 in.)

If the end gap is greater than the maximum, replace the piston ring. If the end gap is greater than the maximum even with a new piston ring, rebore all the 4 cylinders or replace the cylinder block.



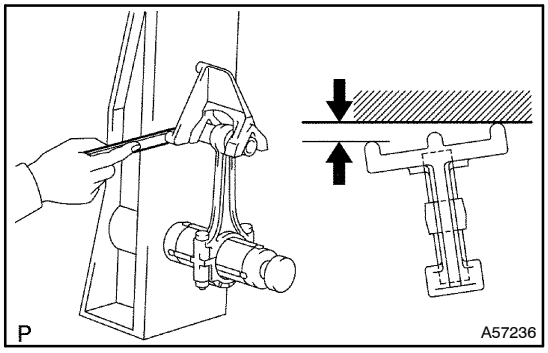
18. INSPECT CONNECTING ROD SUB–ASSY

(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.
(1) Check for bend.

Maximum bend:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If the bend is greater than the maximum, replace the connecting rod sub–assy.

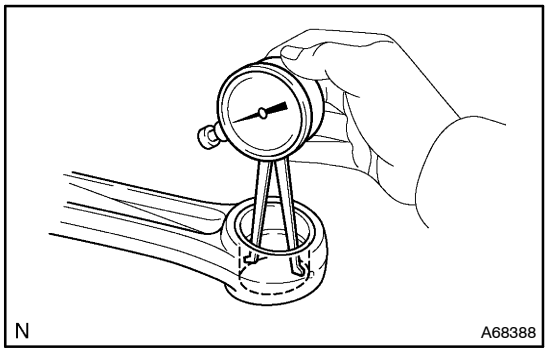


(2) Check for twist.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If the twist is greater than the maximum, replace the connecting rod sub–assy.



19. INSPECT PISTON PIN OIL CLEARANCE

(a) Inspect the piston pin oil clearance.

(1) Using a caliper gauge, measure the inside diameter of the connecting rod bush.

Bush inside diameter:

32.009 – 32.019 mm (1.2602 – 1.2606 in.)

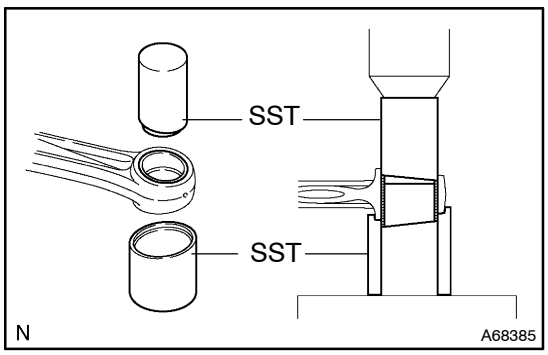
(2) Subtract the piston pin diameter measurement (See step 16) from the bush inside diameter measurement.

Standard oil clearance:

0.004 – 0.014 mm (0.0002 – 0.0006 in.)

Maximum oil clearance: 0.05 mm (0.0020 in.)

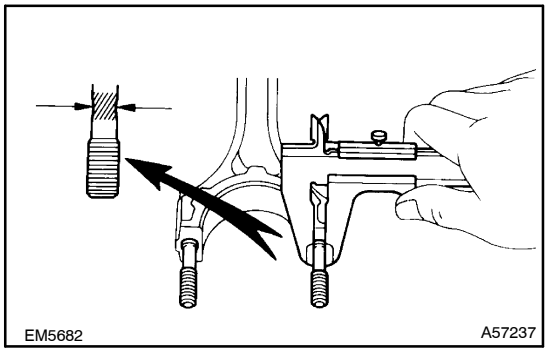
If the oil clearance is greater than the maximum, replace the bush. If necessary, replace the piston and piston pin as a set.



20. REMOVE CONNECTING ROD SMALL END BUSH

(a) Using SST and a press, press out the bush.

SST 09222–58021 (09222–04016, 09222–04026)



21. INSPECT CONNECTING ROD BOLT

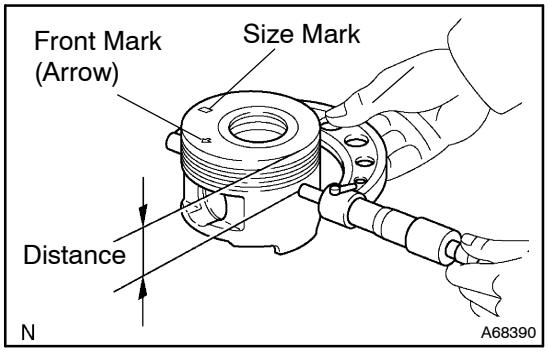
(a) Using vernier calipers, measure the tension portion of the connecting rod bolt.

Standard diameter:

9.900 – 10.100 mm (0.3898 – 0.3976 in.)

Minimum diameter: 9.70 mm (0.3819 in.)

If the diameter is less than the minimum, replace the bolt.



22. BORE CYLINDER

HINT:

- Bore all the 4 cylinders for the O/S piston outside diameter.
- Replace all the piston rings with ones to match the O/S pistons.

(a) Keep 4 new O/S pistons.

O/S piston diameter:

O/S 0.50	102.300 – 102.330 mm (4.0276 – 4.0287 in.)
O/S 0.75	102.550 – 102.580 mm (4.0374 – 4.0386 in.)
O/S 1.00	102.800 – 102.830 mm (4.0472 – 4.0484 in.)

(b) Using a micrometer, measure the piston diameter at right angles to the piston pin center line and the distance from the piston head.

Distance: 42.83 mm (1.6862 in.)

(c) Calculate the amount as follows to rebore each cylinder:

Size to be rebored = P + C – H

P = Piston diameter

C = Piston clearance:

0.190 – 0.210 mm (0.0075 – 0.0083 in.)

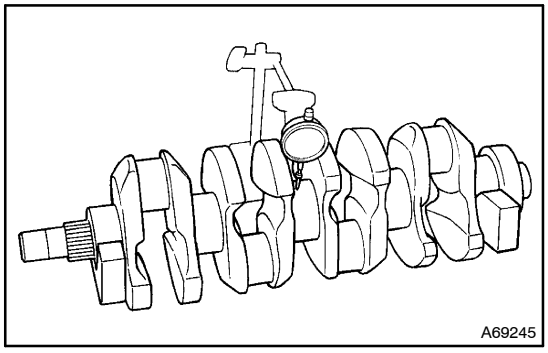
H = Allowance for honing: 0.02 mm (0.0008 in.) or less

(d) Bore and hone the cylinders to the calculated amount.

Maximum honing: 0.02 mm (0.0008 in.)

NOTICE:

Excess honing will destroy the finished roundness.



23. INSPECT CRANKSHAFT

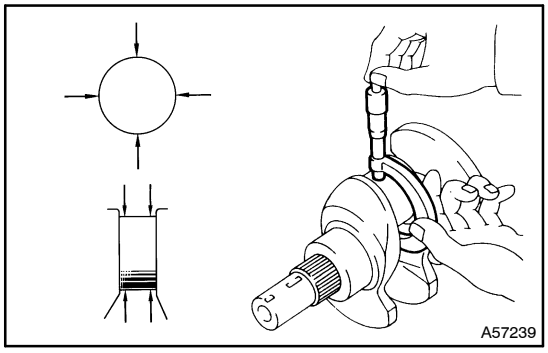
(a) Inspect for circle runout.

(1) Place the crankshaft on V–blocks.

(2) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

If the circle runout is greater than the maximum, replace the crankshaft.



(b) Inspect the main journals and crank pins.

(1) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

STD	No. 3	69.950 – 69.970 mm (2.7539 – 2.7547 in.)
	Others	69.980 – 70.000 mm (2.7551 – 2.7559 in.)
U/S 0.25	No. 3	69.710 – 69.720 mm (2.7445 – 2.7449 in.)
	Others	69.740 – 69.750 mm (2.7457 – 2.7461 in.)
U/S 0.50	No. 3	69.460 – 69.470 mm (2.7346 – 2.7350 in.)
	Others	69.490 – 69.500 mm (2.7358 – 2.7362 in.)
U/S 1.00	No. 3	68.960 – 68.970 mm (2.7150 – 2.7153 in.)
	Others	68.990 – 69.000 mm (2.7161 – 2.7165 in.)

Crank pin diameter:

STD	60.980 – 61.000 mm (2.4008 – 2.4016 in.)
U/S 0.25	60.740 – 60.750 mm (2.3913 – 2.3917 in.)
U/S 0.50	60.490 – 60.500 mm (2.3815 – 2.3819 in.)
U/S 1.00	59.990 – 60.000 mm (2.3618 – 2.3622 in.)

If the diameter is not as specified, check the oil clearance (See steps 2 and 6). If necessary, grind or replace the crankshaft.

(2) Check the main journals and crank pins for taper and out–of–round.

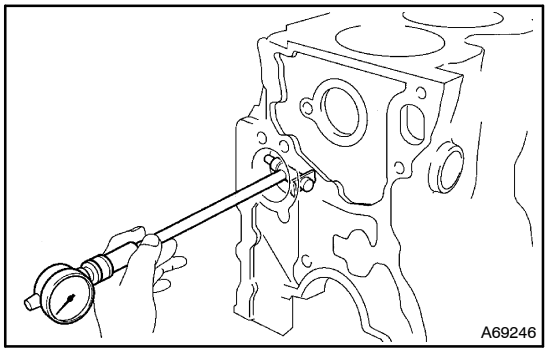
Maximum taper and out–of–round:
0.02 mm (0.0008 in.)

If the taper and out–of–round is greater than the maximum, replace the crankshaft.

(c) If necessary, grind and hone the main journals and/or crank pins.

(1) Grind and hone the main journals and/or crank pins to the U/S diameter (See step (b)).

(2) Install new main journal and/or crank pin U/S bearing.



24. INSPECT CAMSHAFT OIL CLEARANCE

(a) Using a cylinder gauge, measure the inside diameter of the camshaft bearing.

Bearing inside diameter (from front side):

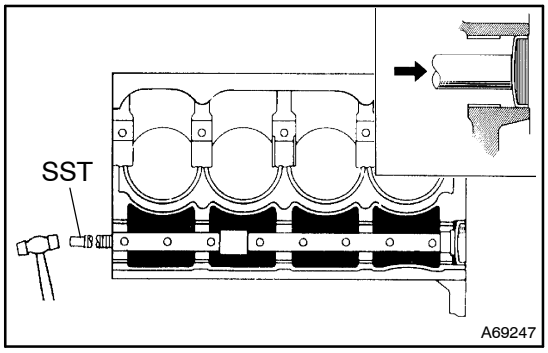
No. 1	53.505 – 53.530 mm (2.1065 – 2.1075 in.)
No. 2	53.255 – 53.280 mm (2.0966 – 2.0976 in.)
No. 3	53.005 – 53.030 mm (2.0868 – 2.0878 in.)
No. 4	52.755 – 52.780 mm (2.0770 – 2.0779 in.)
No. 5	52.505 – 52.530 mm (2.0671 – 2.0681 in.)

(b) Subtract the camshaft journal diameter measurement (See page 14–4) from the bearing inside diameter measurement.

Standard oil clearance:
0.030 – 0.071 mm (0.0012 – 0.0028 in.)

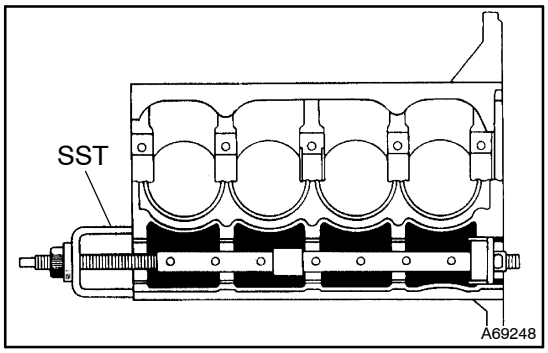
Maximum oil clearance: 0.10 mm (0.0039 in.)

If the clearance is greater than the maximum, replace the camshaft bearings. If necessary, replace the camshaft.

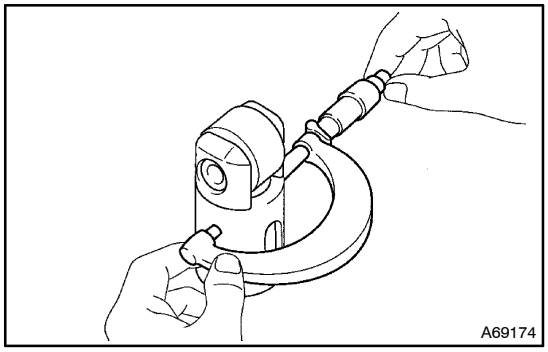


25. REMOVE CAMSHAFT BEARING SET

(a) Using SST and a hammer, tap out the tight plug.
SST 09215–00101 (09215–00130, 09215–00150, 09215–00211)

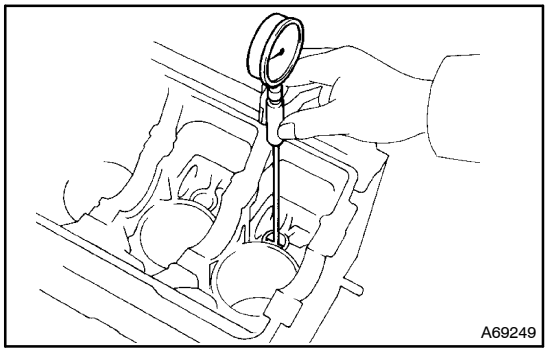


(b) Using SST, remove the camshaft bearings.
SST 09215–00013 (09215–00021, 09215–00471), 09215–00101 (09215–00130, 09215–00141, 09215–00150, 09215–00161)



26. INSPECT VALVE LIFTER

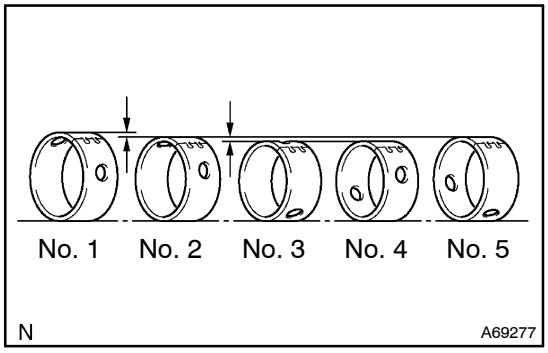
(a) Using a micrometer, measure the lifter diameter.
Lifter diameter:
26.955 – 26.975 mm (1.0612 – 1.0620 in.)



(b) Using a cylinder gauge, measure the lifter bore diameter.
Bore diameter:
27.010 – 27.030 mm (1.0634 – 1.0642 in.)

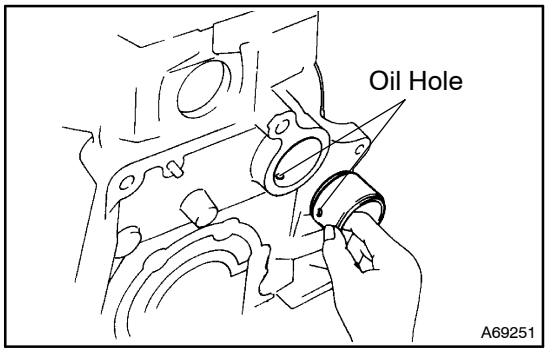
(c) Subtract the valve lifter diameter measurement from the lifter bore diameter measurement.
Standard oil clearance:
0.035 – 0.075 mm (0.0014 – 0.0030 in.)
Maximum oil clearance: 0.10 mm (0.0039 in.)

If the oil clearance is greater than the maximum, replace the lifter.

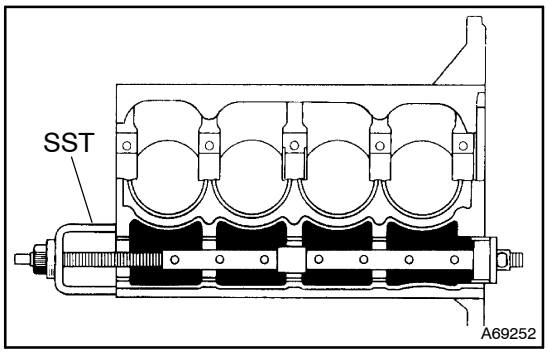


27. INSTALL CAMSHAFT BEARING SET

(a) Install 5 new bearings in their proper location.



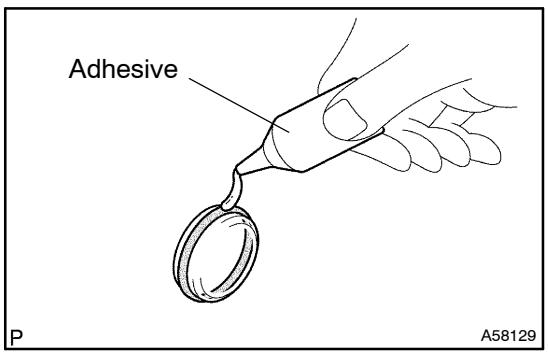
(b) Align the oil holes of the bearing and cylinder block.



(c) Using SST, install the camshaft bearings.
SST 09215–00013 (09215–00021, 09215–00441, 09215–00471), 09215–00101 (09215–00130, 09215–00141, 09215–00150, 09215–00161)

(d) Check the camshaft oil clearance (See step 24).

(e) Install a new tight plug (See step 28).



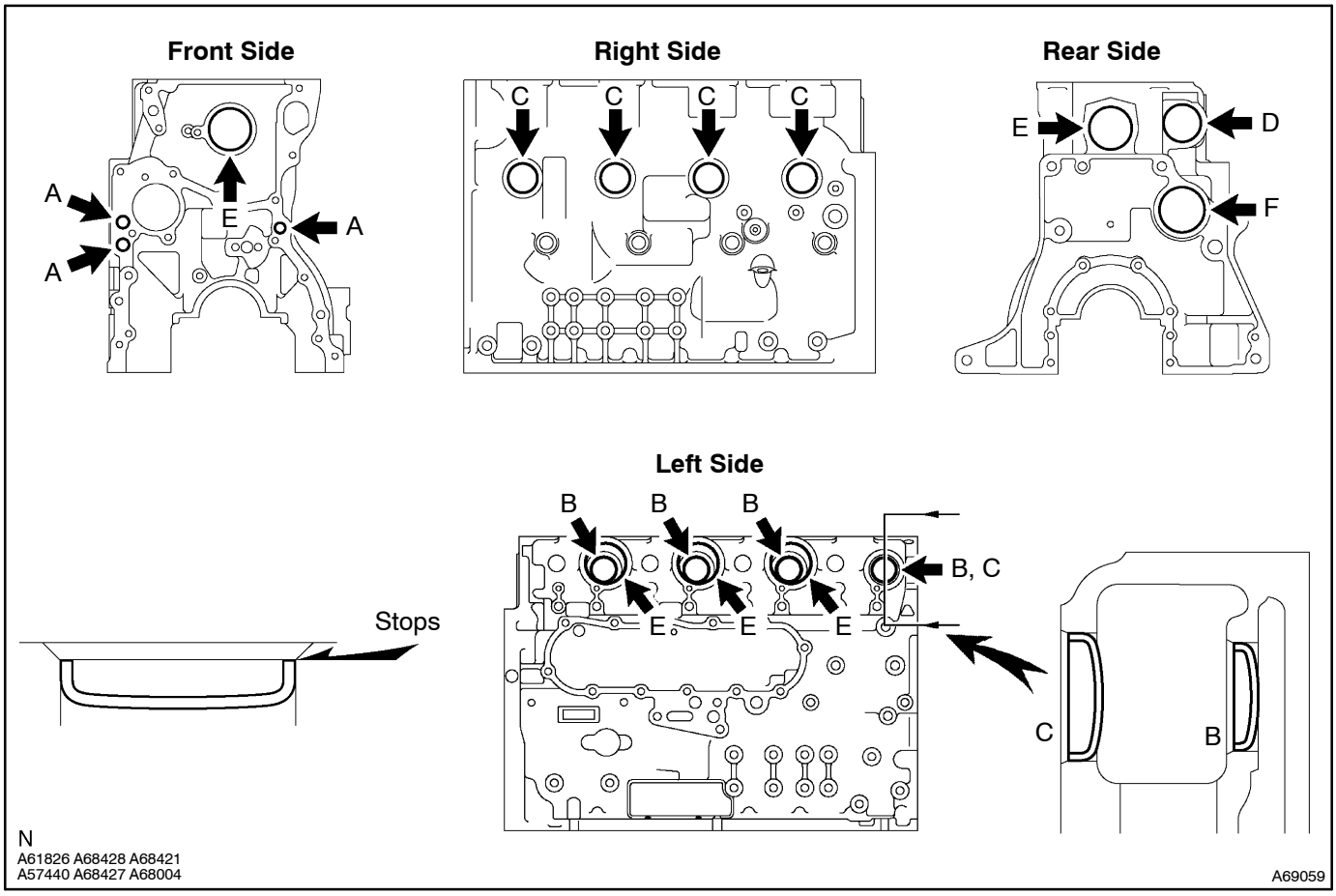
28. INSTALL TIGHT PLUG

(a) Apply adhesive to a new tight plug.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent

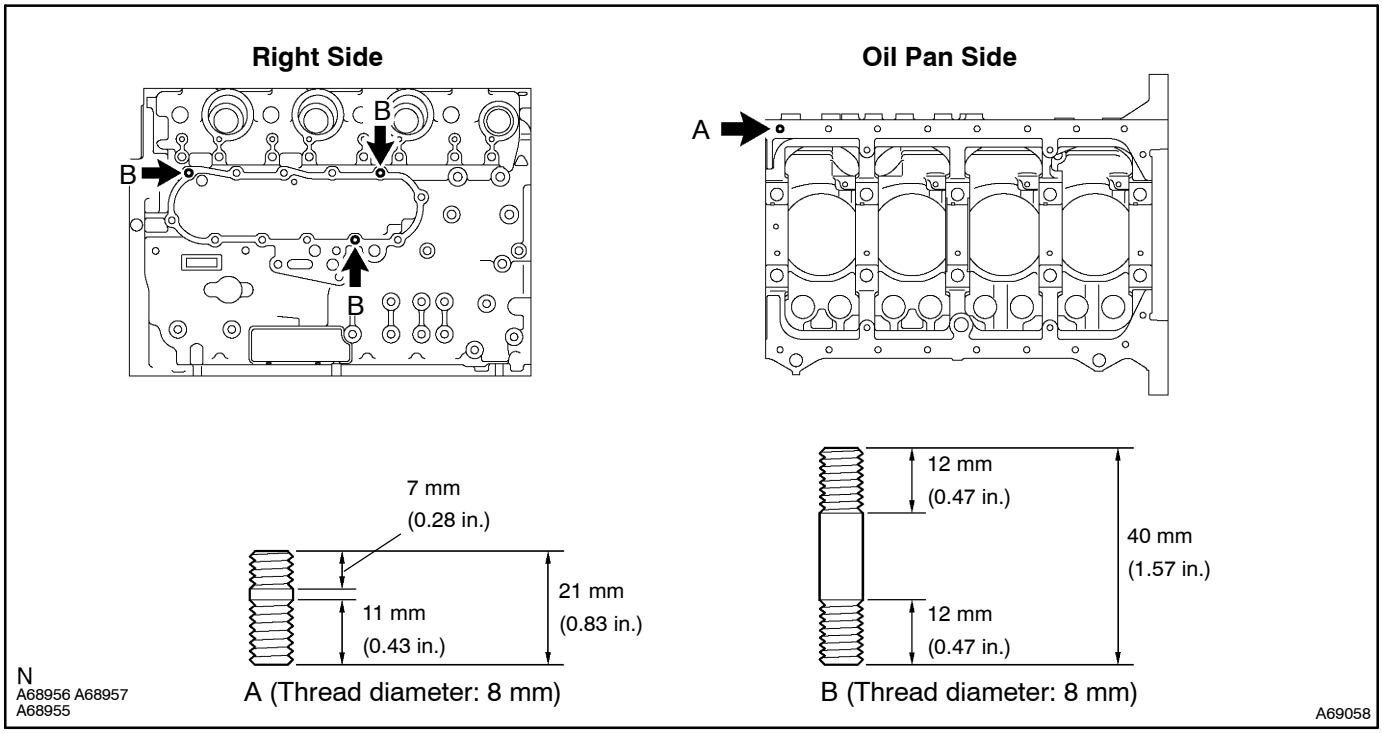
(b) Position A:
Using a 14 mm steel bar and a hammer, tap in the tight plug.

(c) Other postions:
Using SST and a hammer, tap in the tight plug.

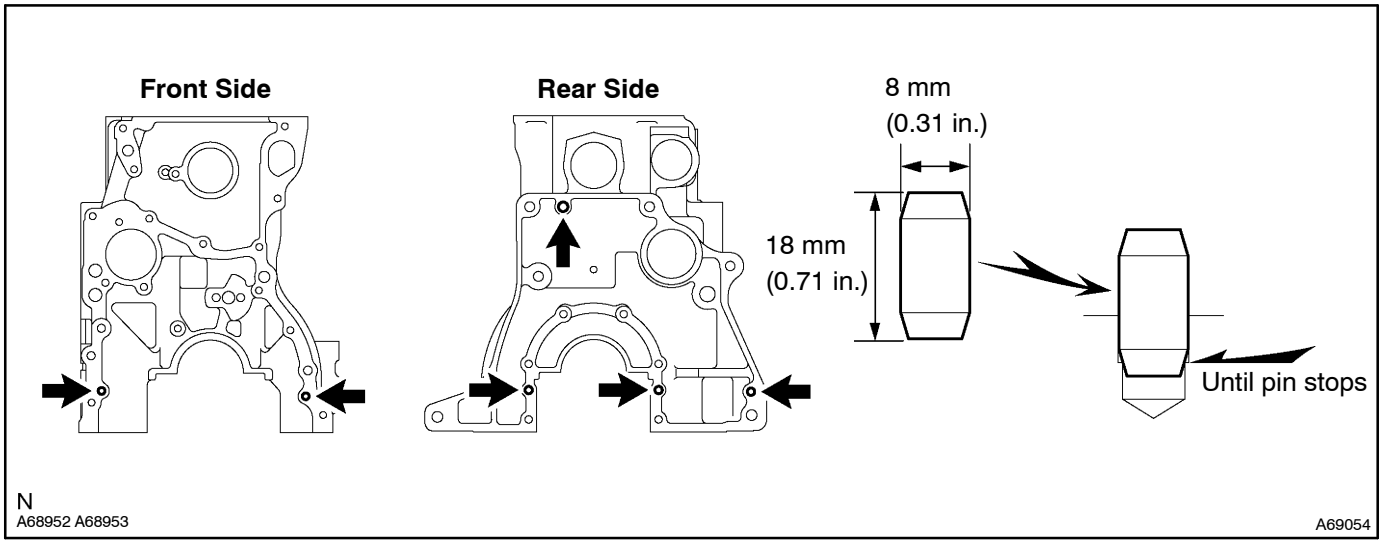
SST Position B:
09950–60010 (09951–00300), 09950–70010 (09951–07100)
Position C:
09950–60010 (09951–00350), 09950–70010 (09951–07100)
Position D:
09950–60010 (09951–00450), 09950–70010 (09951–07100)
Position E:
09950–60010 (09951–00500), 09950–70010 (09951–07100)
Position F:
09950–60010 (09951–00580), 09950–70010 (09951–07100)



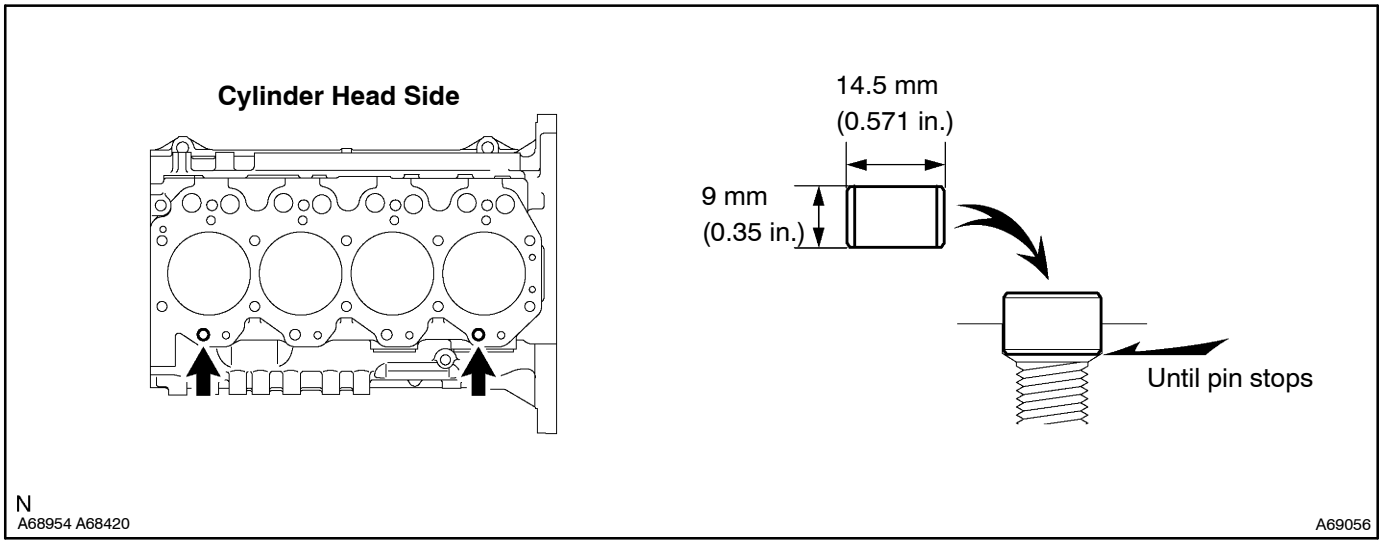
29. INSTALL STUD BOLT

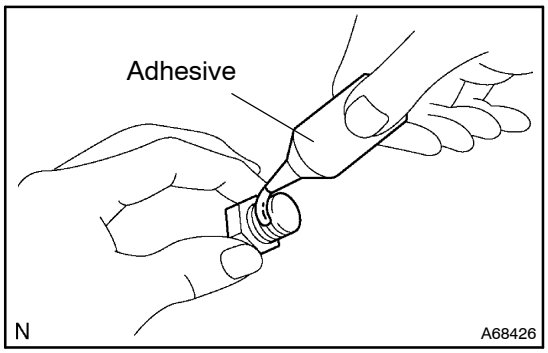


30. INSTALL STRAIGHT PIN



31. INSTALL RING PIN





32. INSTALL W/HEAD TAPER SCREW PLUG

(a) Apply adhesive to the 2 or 3 threads of the screw plug.

Adhesive:

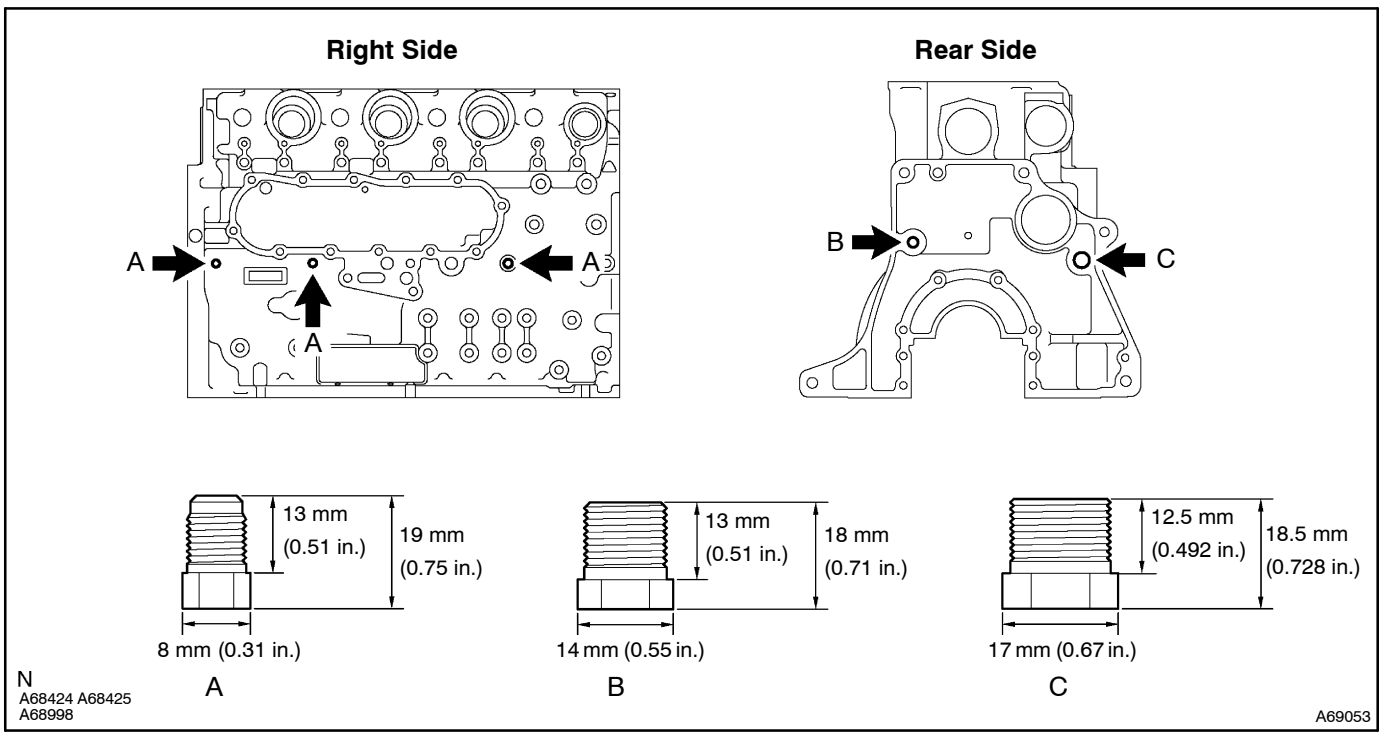
Part No. 08833–00070, THREE BOND 1324 or equivalent

(b) Install the screw plug.

Torque:

34 N·m (350 kgf·cm, 25 ft·lbf) for A, B

69 N·m (700 kgf·cm, 51 ft·lbf) for C



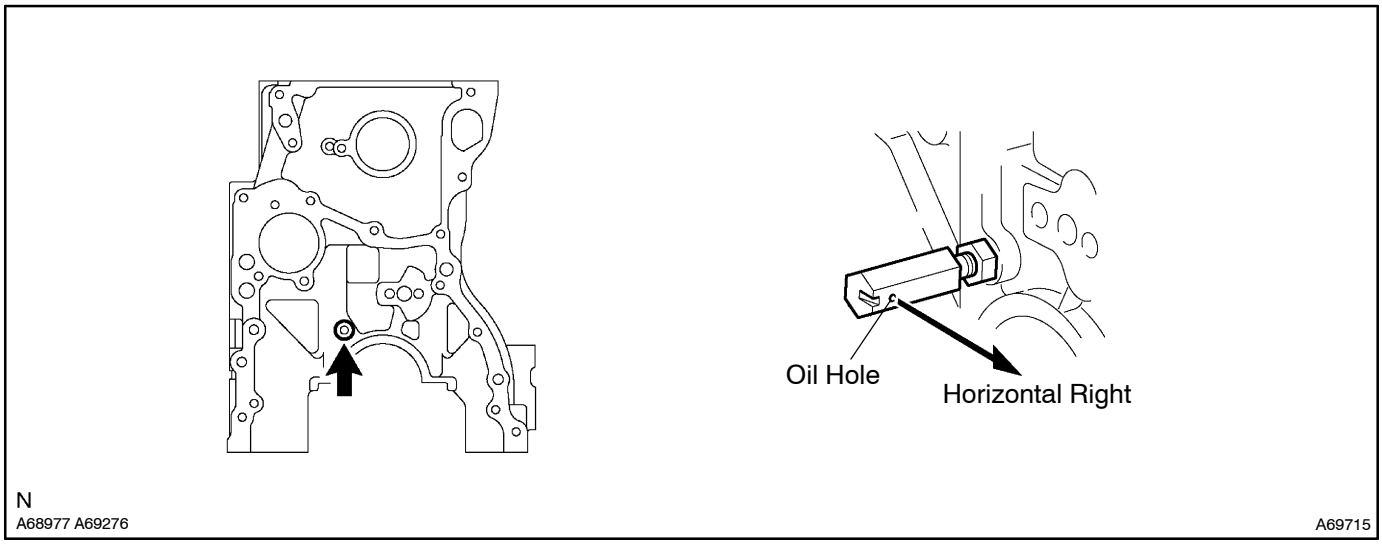
33. INSTALL OIL NOZZLE

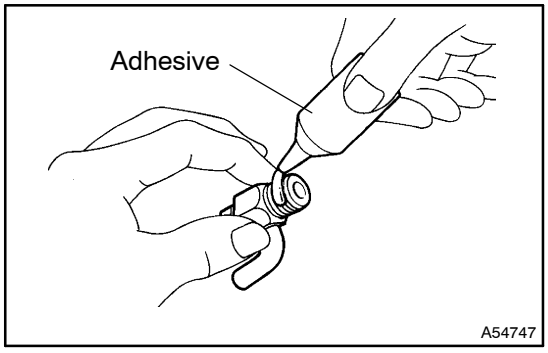
(a) Install the lock nut to the oil nozzle.

(b) Tighten the oil nozzle until it touches the threads bottom, and rotate the oil nozzle counterclockwise until its oil hole is turned to the horizontal right viewed from the engine front side.

(c) Tighten the lock nut.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf)





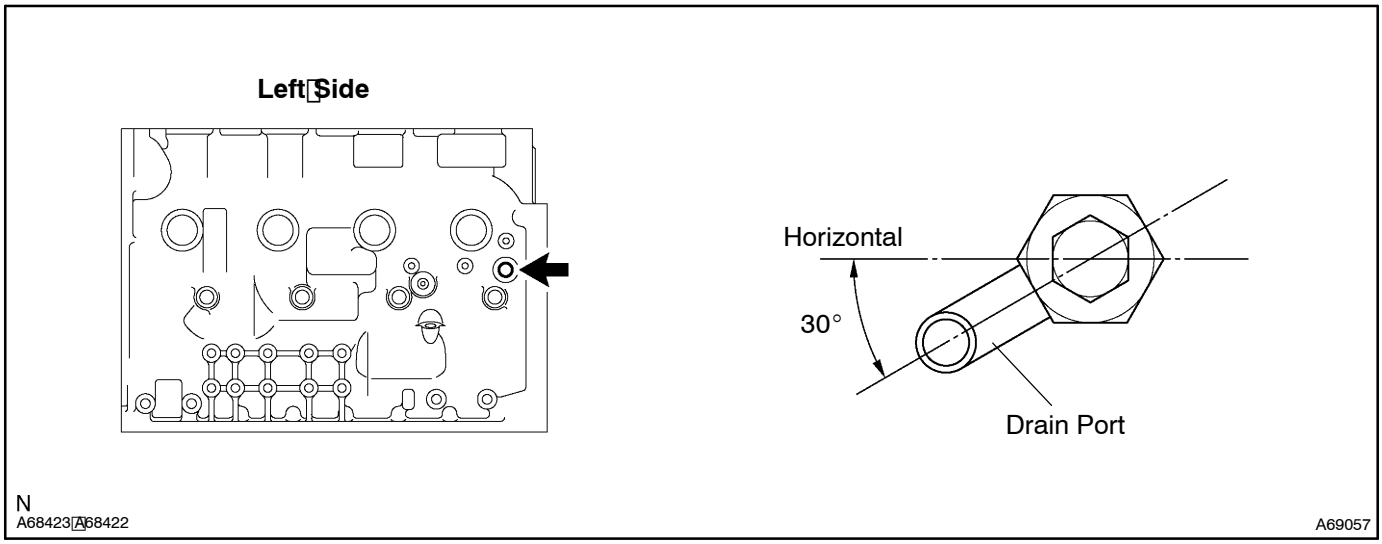
34. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

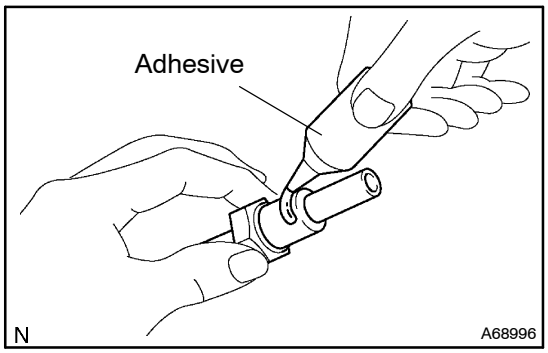
(a) Apply adhesive to 2 or 3 threads.

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

(b) Install the drain union.
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)

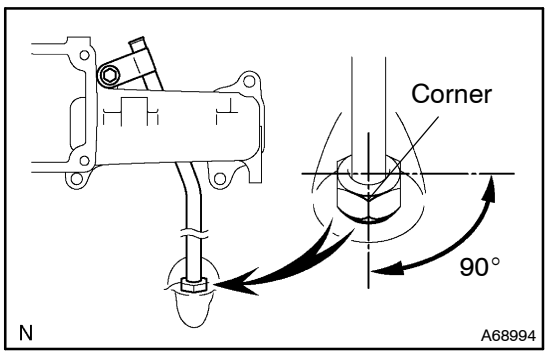
HINT:
After applying the specified torque, rotate the drain union clockwise until its drain port is facing downward by 30°.



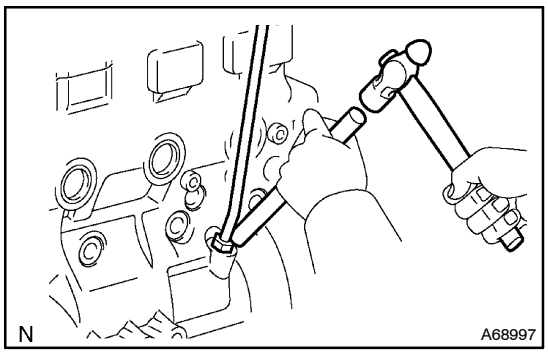


35. INSTALL OIL LEVEL GAGE GUIDE

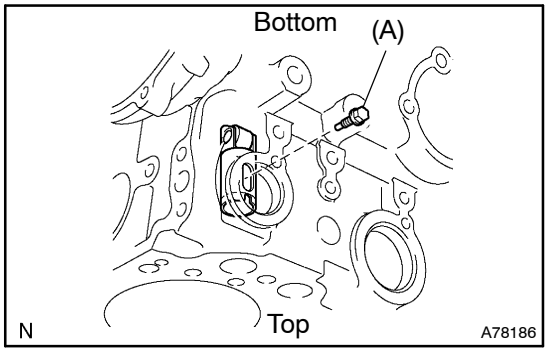
(a) Apply adhesive to the surface of the guide contacting the cylinder block.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Install the cylinder head (See page 14–23).
(c) Install the intake manifold.
(d) Insert the level gauge guide into the cylinder block hole, and set a corner of the hexagon perpendicalar to the cylinder block.
(e) Temporarily install the level gauge guide to the intake manifold with the support and bolt.



(f) Using a brass bar and hammer, tap in the hexagon wrench head portion of the level gauge guide.



36. INSTALL VALVE LIFTER

(a) Insert the lifter into the lifter hole from the bottom of the cylinder block.

(b) Lift up the valve lifter until the long hole of the valve lifter moves up to the position of the installation hole for the bolt (A).

HINT:

If the lifter is lifted up too high, it may miss the position.

(c) Install the bolt (A).

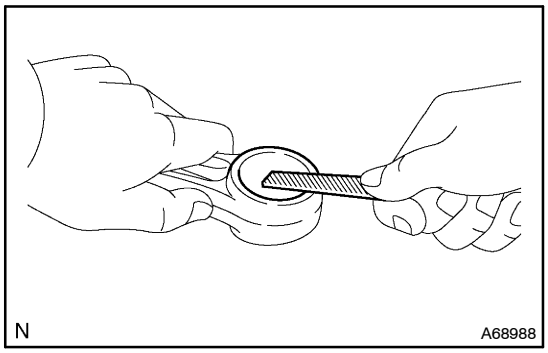
(d) Check that the bolt (A) prevents the valve lifter from falling.

NOTICE:

Be careful not to scratch the valve lifter.

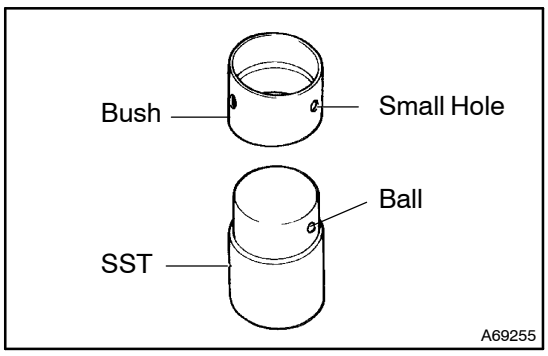
HINT:

Check that the valve lifter moves smoothly up and down.



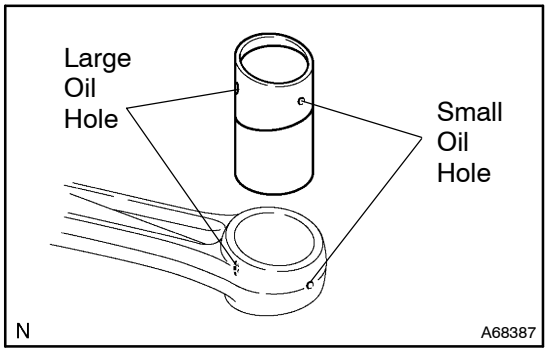
37. INSTALL CONNECTING ROD SMALL END BUSH

(a) Using a round file, lightly file off any roughness from the small end of the connecting rod.

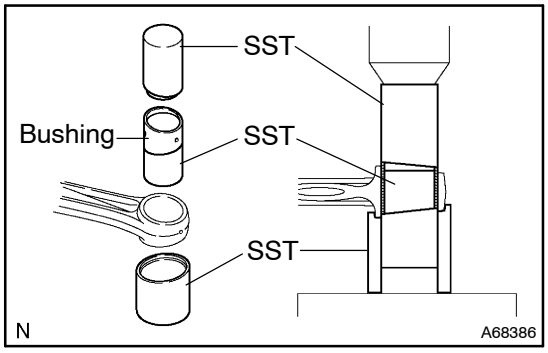


(b) Attach a new bush to SST with the ball of SST inside the oil hole of the bush.

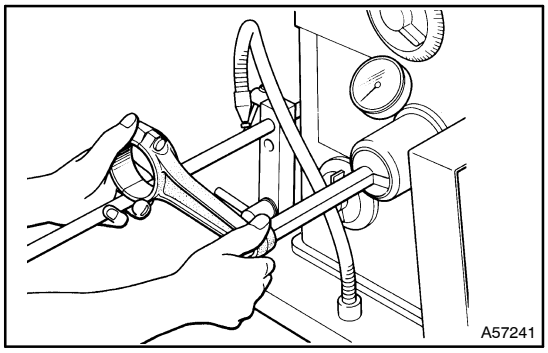
SST 09222–58021 (09222–04021)



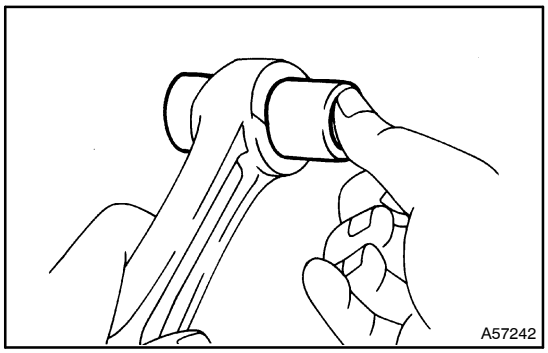
(c) Align the oil holes of the bush and connecting rod.



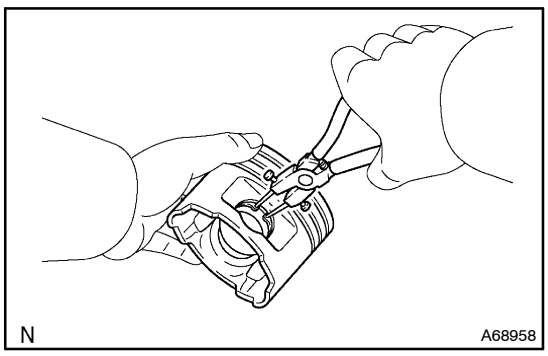
(d) Using SST and a press, press in the bush.
SST 09222–58021 (09222–04016, 09222–04021, 09222–04026)



(e) Using a pin hole grinder, hone the bush to obtain the standard clearance (See step 19) between the bush and piston pin.

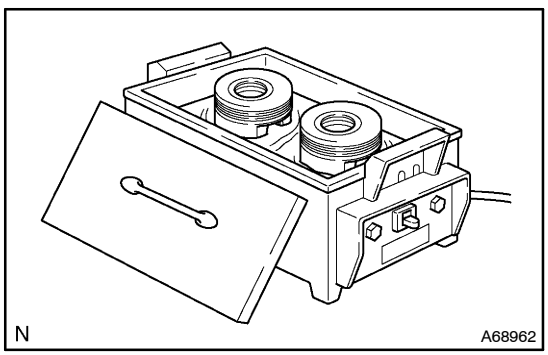


(f) Check that the piston pin fits at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

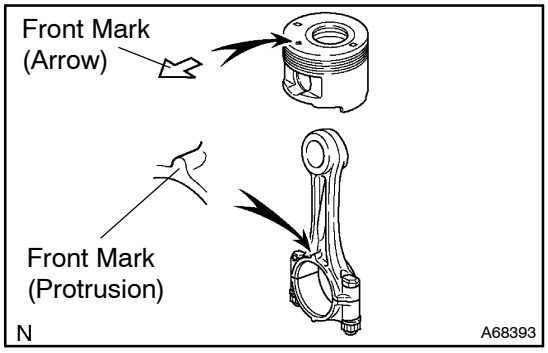


38. INSTALL W/PIN PISTON SUB–ASSY

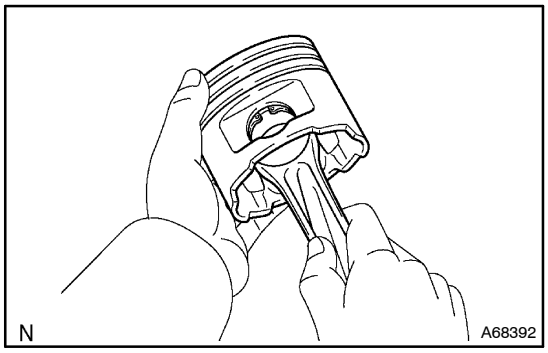
(a) Assemble the piston and connecting rod.
(1) Using snap ring pliers, install a new snap ring on one side of the piston pin hole.



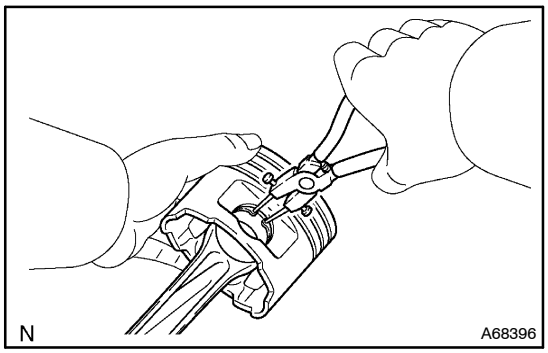
(2) Gradually heat the piston to about 60˚C (140˚F).



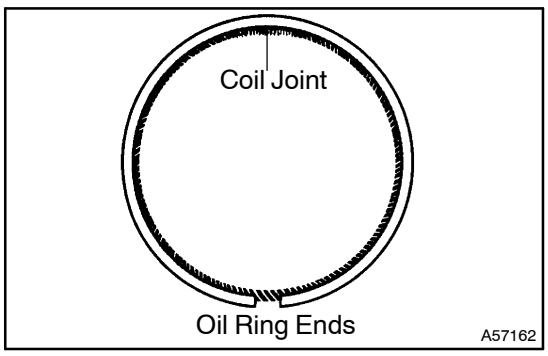
(3) Coat the piston pin with engine oil.
(4) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.



(5) Check that the piston and piston pin fit.
- Try to move the piston back and forth.

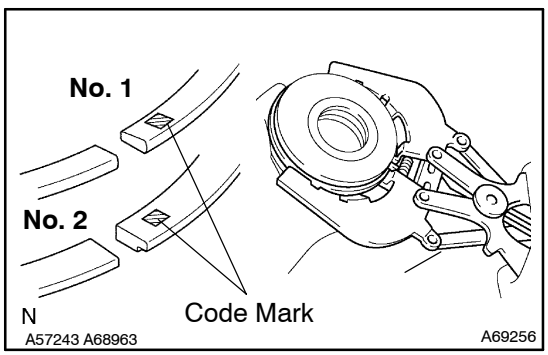


(6) Using snap ring pliers, install a new snap ring on the other side of the piston pin hole.



(b) Install the piston rings.
(1) Install the coil and oil ring by hand.

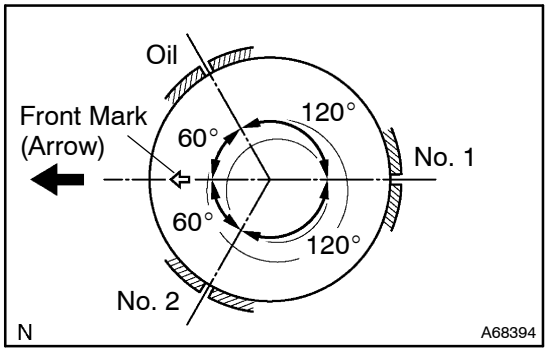
HINT:
Face the end gap of the oil ring in the opposite direction to the coil joint.



(2) Using a piston ring expander, install the No. 1 and No. 2 piston rings with the code mark facing upward.

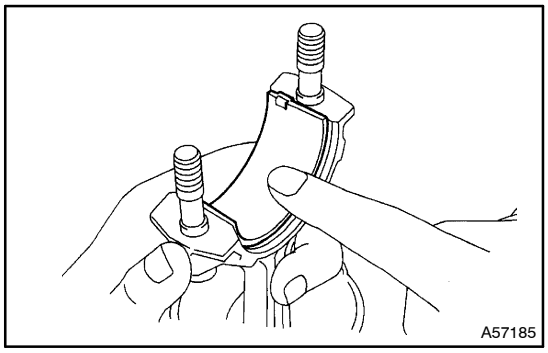
Code mark:

No. 1	T
No. 2	T2



(3) Position the piston rings so that the ring ends become as specified in the illustration.

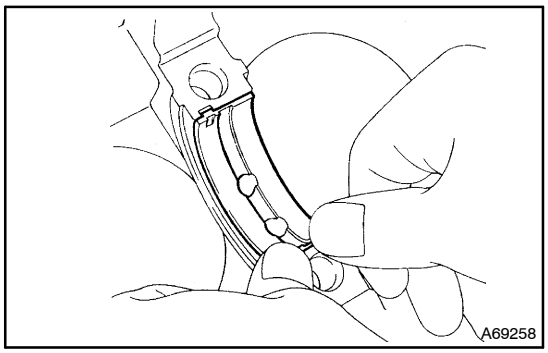
NOTICE:
Do not align the ring ends.



39. INSTALL CONNECTING ROD BEARING

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

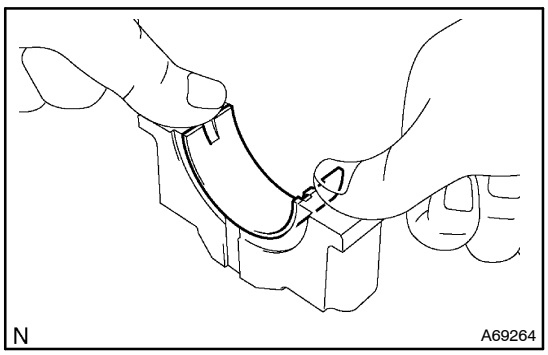
(b) Install the bearings in the connecting rod and connecting rod cap.



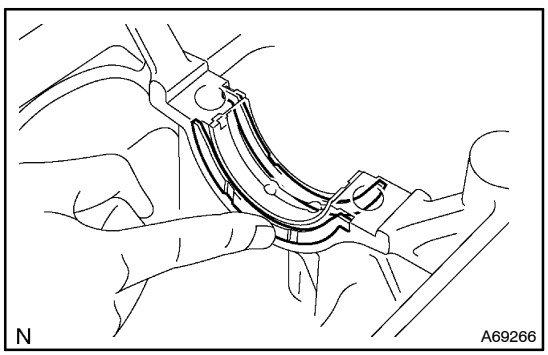
40. INSTALL CRANKSHAFT BEARING

HINT:
The upper bearings have an oil groove and oil hole, however the lower bearings do not.

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

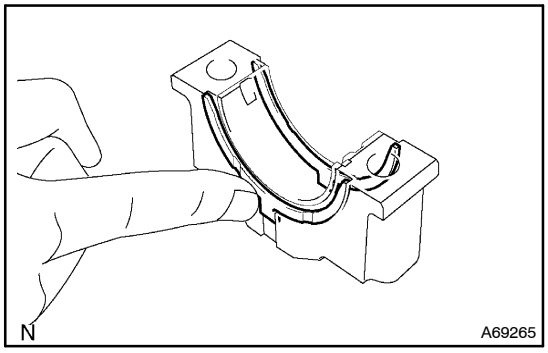


(b) Align the bearing claw with the claw groove of the crankshaft bearing cap, and push in the 5 lower bearings.

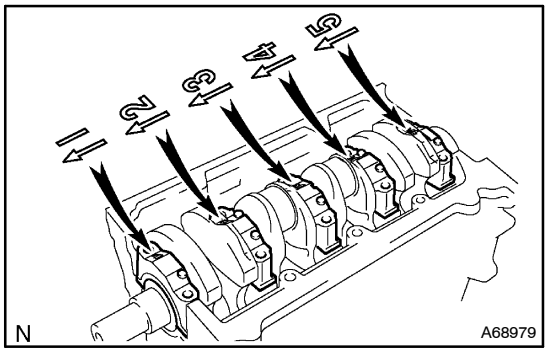


41. INSTALL CRANKSHAFT THRUST WASHER SET

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



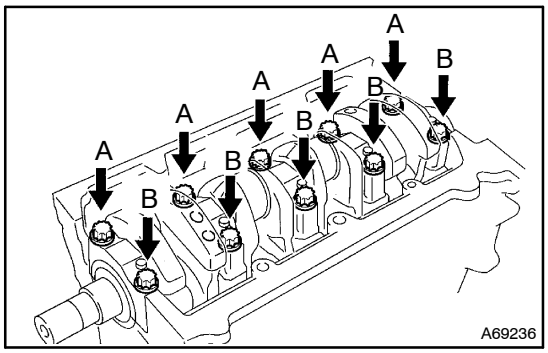
(b) Install the 2 thrust washers on the No. 3 crankshaft bearing cap with the grooves facing outward.



42. INSTALL CRANKSHAFT

(a) Place the crankshaft on the cylinder block.

(b) Install the 5 crankshaft bearing caps in their proper locations.



(c) Install the crankshaft bearing cap bolts.

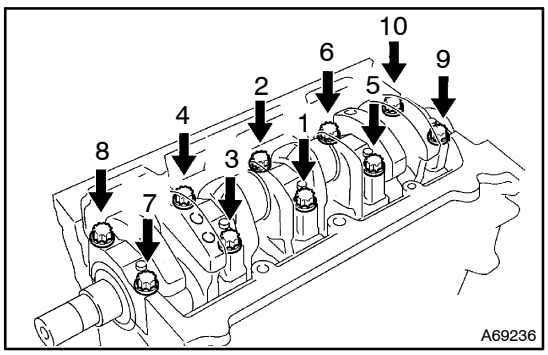
(1) Apply a light coat of the engine oil on the threads and under the bolt heads of the bearing caps.

(2) Install the 10 bolts (A and B).

HINT:

Bolt length:

Item	Length
A	129.5 mm (5.098 in.)
B	93.5 mm (3.681 in.)

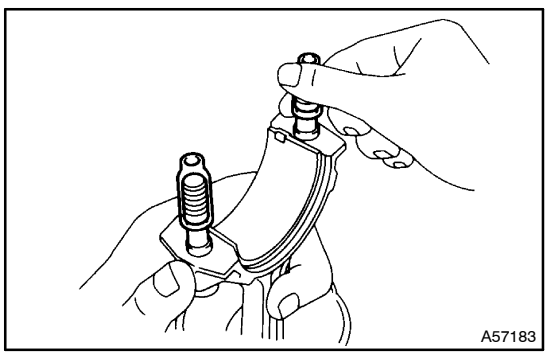


(3) Uniformly tighten the 10 bolts of the bearing caps in several passes in the sequence shown in the illustration.

Torque: 200 N·m (2,039 kgf·cm, 148 ft·lbf)

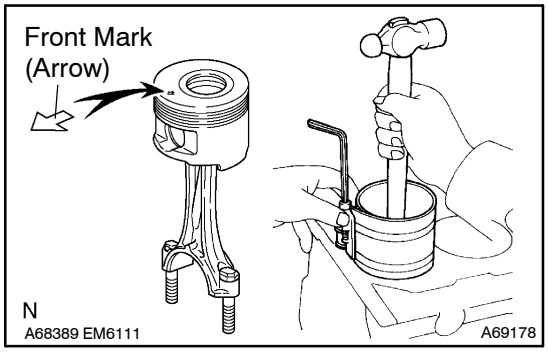
(d) Check that the crankshaft smoothly turns.

(e) Check the crankshaft thrust clearance (See step 5).

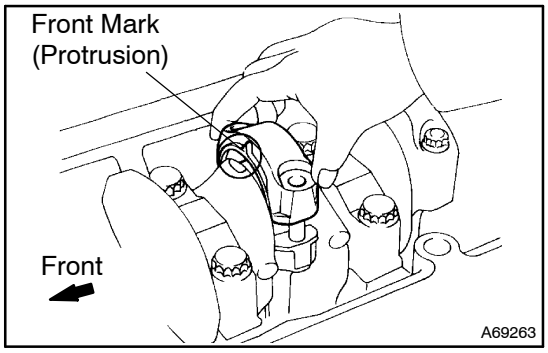


43. INSTALL PISTON AND CONNECTING ROD

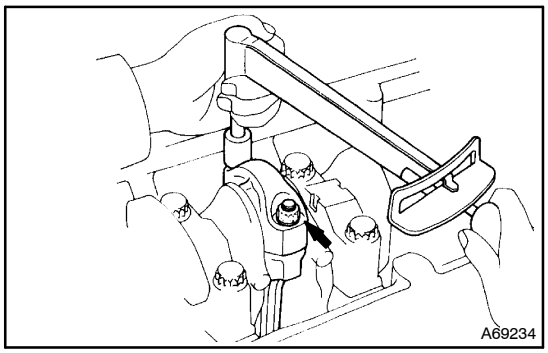
(a) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft and cylinder bore from damage.



(b) Using a piston ring compressor, push the correctly numbered piston and connecting rod assembly into the cylinder with the front mark of the piston facing forward.



(c) Place the connecting rod cap on the 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.



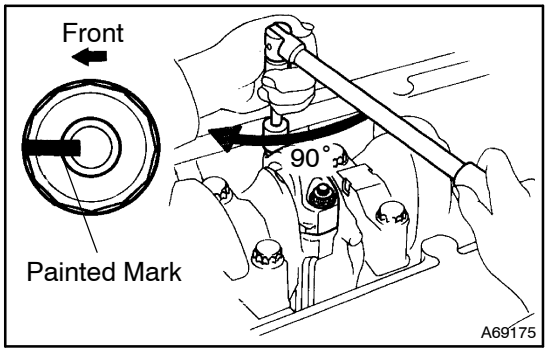
(d) Install the connecting rod cap nuts.

HINT:

- The connecting rod cap nuts are tightened in 2 progressive steps (steps (2) and (4)).
- If any connecting rod bolt is broken or deformed, replace it.
   (1) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap nuts.
   (2) Install the nuts of the connecting rod cap and alternately tighten them in several passes.

Torque: 68.6 N·m (700 kgf·cm, 51 ft·lbf)

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



   (3) Mark the front of the connecting rod cap nuts with paint.
   (4) Retighten the connecting rod cap nuts by 90° as shown in the illustration.
   (5) Check that the painted mark is at a 90° angle to the front at this time.

(e) Check that the crankshaft turns smoothly.

(f) Check the connecting rod thrust clearance (See step 1).