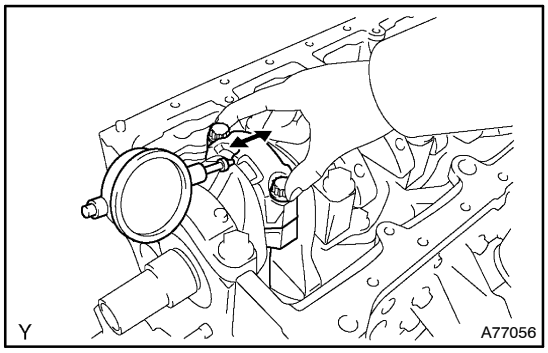
1416O–01

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.

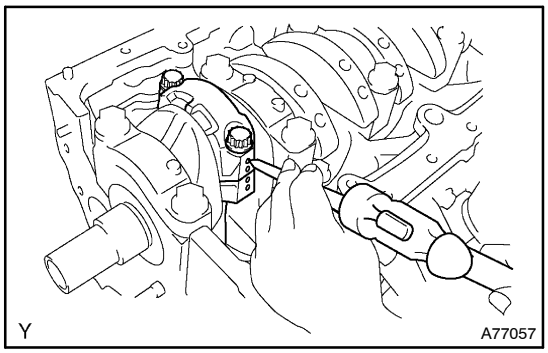


1. INSPECT CONNECTING ROD THRUST CLEARANCE

(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.)

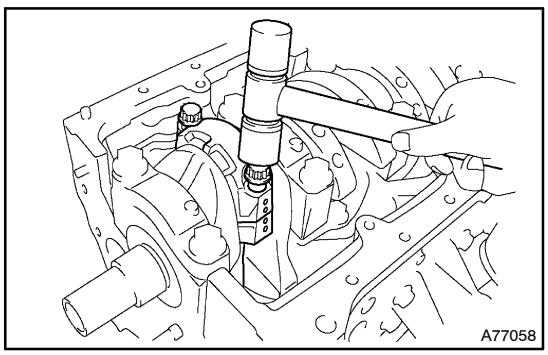
If the thrust clearance is greater than the maximum, replace the connecting rod assy. If necessary, replace the crankshaft.



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) Loosen the 2 connecting rod cap bolts.



(c) Using a plastic–faced hammer, lightly tap the connecting road bolts.

(d) Remove the 2 connecting road bolts and lift off the connecting rod cap.

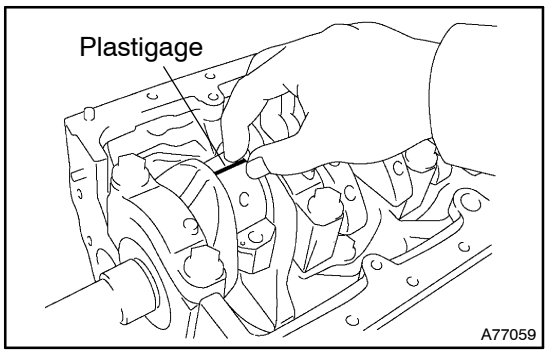
HINT:

Keep the lower bearing attached to the connecting rod cap.

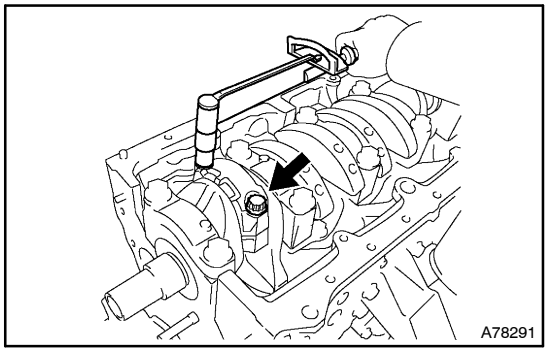
(e) Clean the crank pin and bearing.

(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.

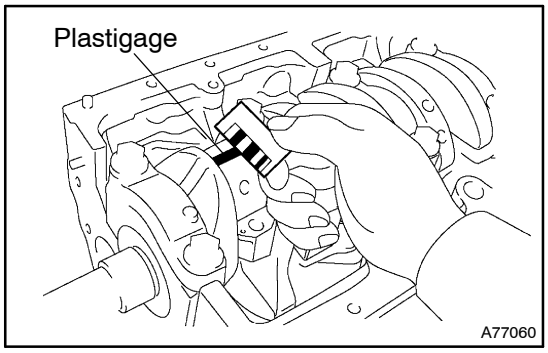


(h) Install the connecting rod cap with the 2 bolts (See step 45).

NOTICE:

Do not turn the crankshaft.

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



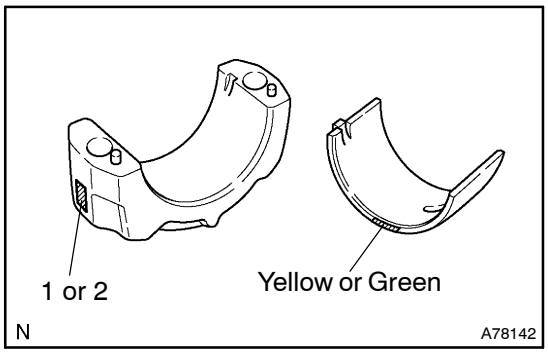
(j) Measure the Plastigage at its widest point.

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:

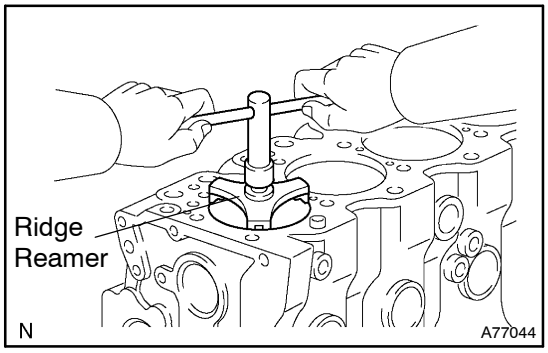
Yellow corresponds to 1

Green corresponds to 2

Standard sized bearing center wall thickness:

Yellow	1.980 – 1.985 mm (0.0780 – 0.0781 in.)
Green	1.985 – 1.990 mm (0.0781 – 0.0783 in.)

(1) Completely remove the Plastigage.



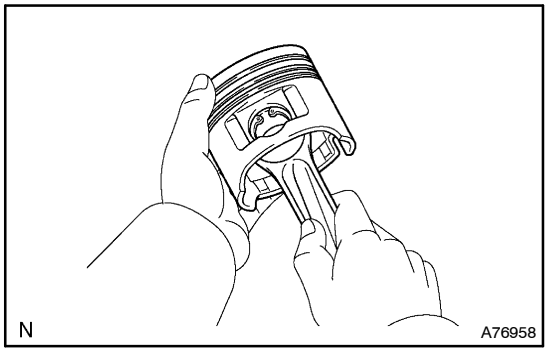
3. REMOVE PISTON AND CONNECTING ROD

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

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

HINT:

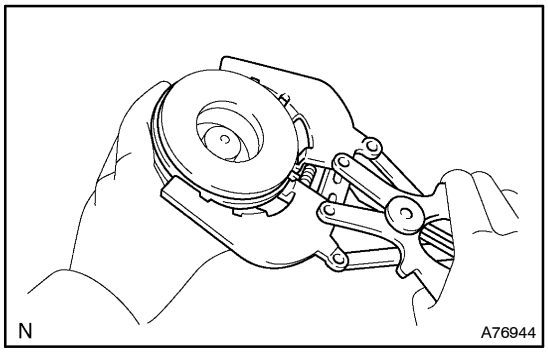
- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.



4. REMOVE W/PIN PISTON SUB–ASSY

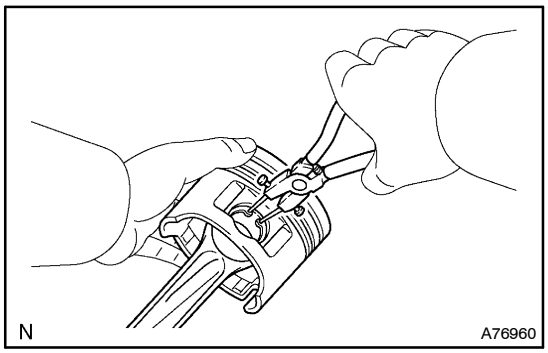
(a) Check that the piston and piston pin fit.
  (1) Try to move the piston back and forth.

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

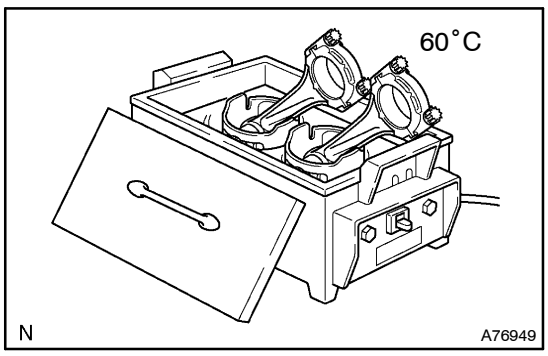


(b) Remove the piston rings.
  (1) Using a piston ring expander, remove the No. 1, No. 2 and oil rings.
  (2) Remove the coil for the oil ring by hand.

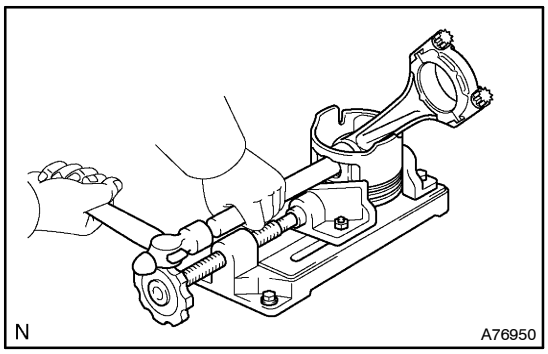
HINT:
Arrange the piston rings in the correct order.



(c) Disconnect the connecting rod from the piston.
  (1) Using snap ring pliers, remove the snap rings.

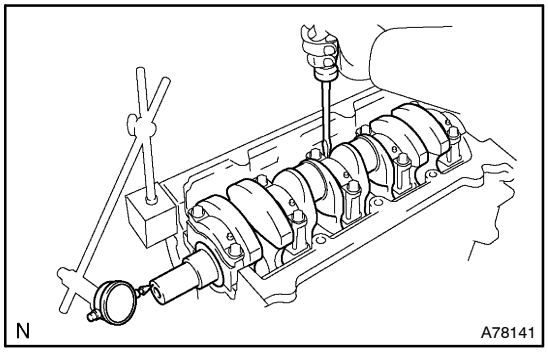


  (2) Gradually heat the piston to approx. 60˚C (140˚F).



  (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

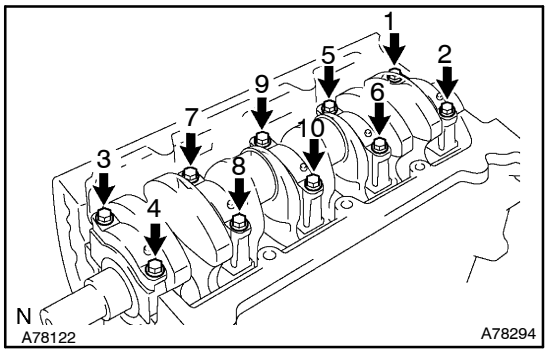
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

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.

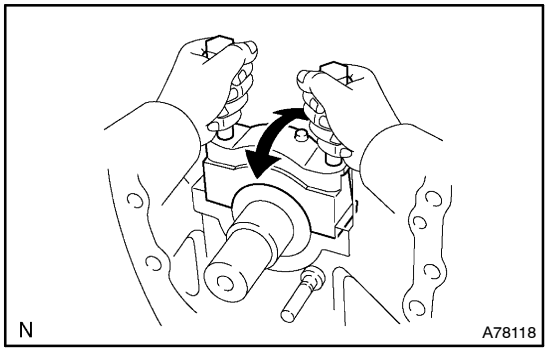
Thrust washer thickness:

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:

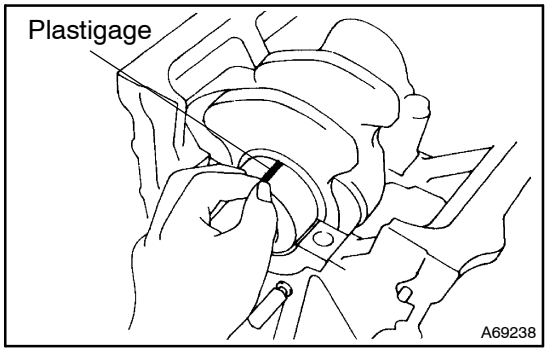
Keep the upper crankshaft bearings and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

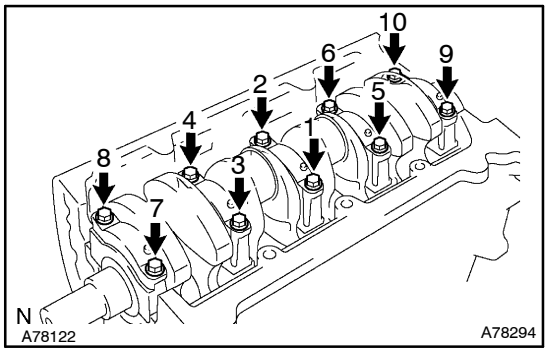
(e) Check each main journal and bearing for pits and scratches.

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.

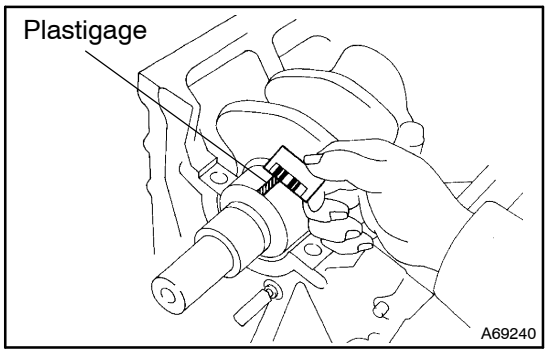


(h) Install the 5 crankshaft bearing caps with the 10 bolts (See step 44).

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.

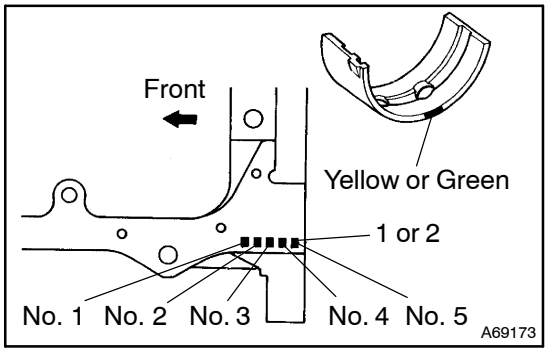
Standard oil clearance:

No. 3 journal	STD	0.059 – 0.099 mm (0.0023 – 0.0039 in.)
	U/S 0.25, 0.50, 1.00	0.059 – 0.101 mm (0.0023 – 0.0040 in.)
Others	STD	0.029 – 0.069 mm (0.0011 – 0.0027 in.)
	U/S 0.25, 0.50, 1.00	0.029 – 0.071 mm (0.0011 – 0.0028 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.)

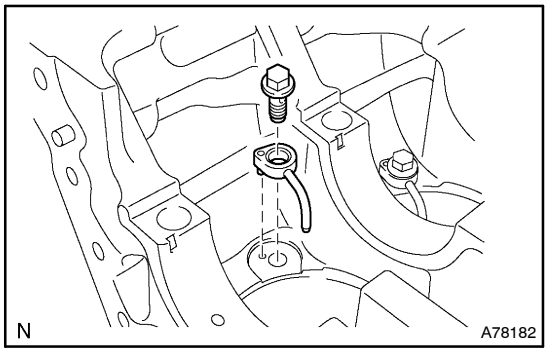
(k) Completely remove the Plastigage.

7. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

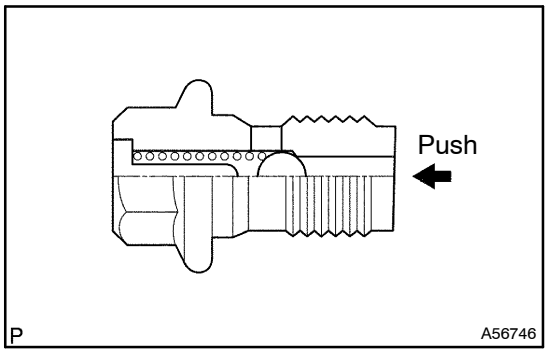
(b) Remove the upper bearings and upper thrust washers from the cylinder block.

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



8. REMOVE SUB–ASSY OIL NOZZLE NO.1

(a) Remove the check valve and oil nozzle.



9. INSPECT OIL CHECK VALVE SUB–ASSY

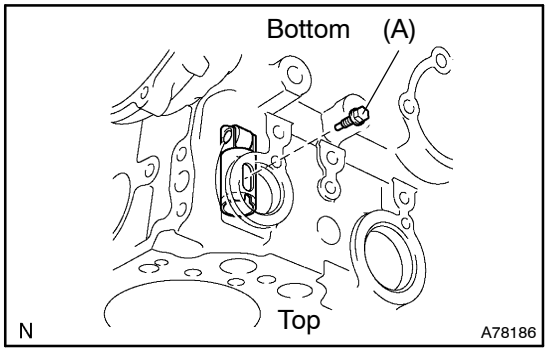
(a) Push the valve with a wooden stick to check if it is stuck.

If stuck, replace the check valve.

10. INSPECT SUB–ASSY OIL NOZZLE NO.1

(a) Check the oil nozzles for damage or clogging.

If necessary, replace the oil nozzle.

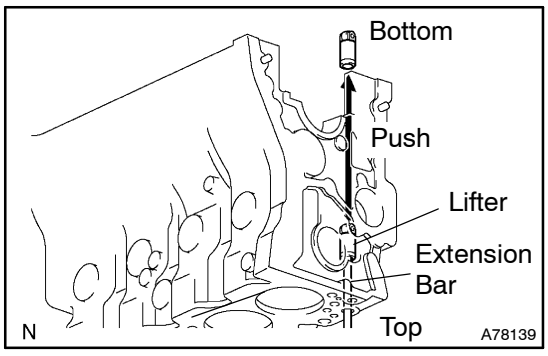


11. REMOVE VALVE LIFTER

(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 lifter.

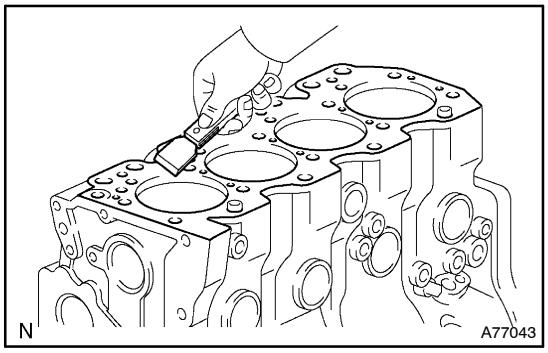
HINT:
Arrange the lifters in the correct order.

12. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

13. REMOVE OIL NOZZLE

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

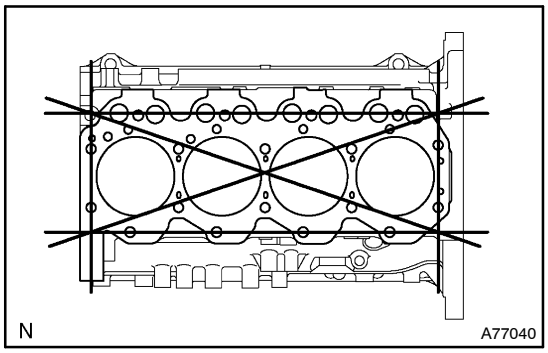
14. REMOVE W/HEAD TAPER SCREW PLUG



15. 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.



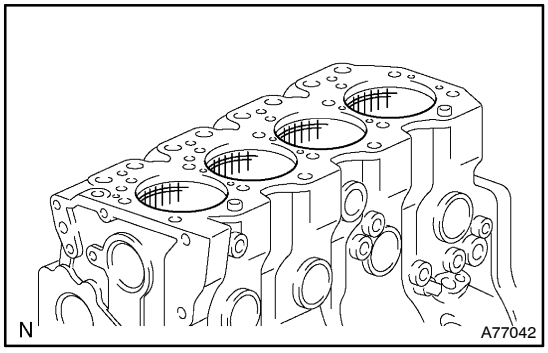
16. INSPECT CYLINDER BLOCK SUB–ASSY

(a) Inspect the flatness.

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

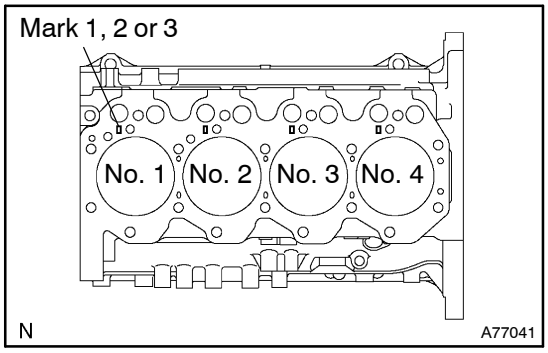
Maximum warpage: 0.20 mm (0.0079 in.)

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



(b) Visually check the cylinders for vertical scratches.

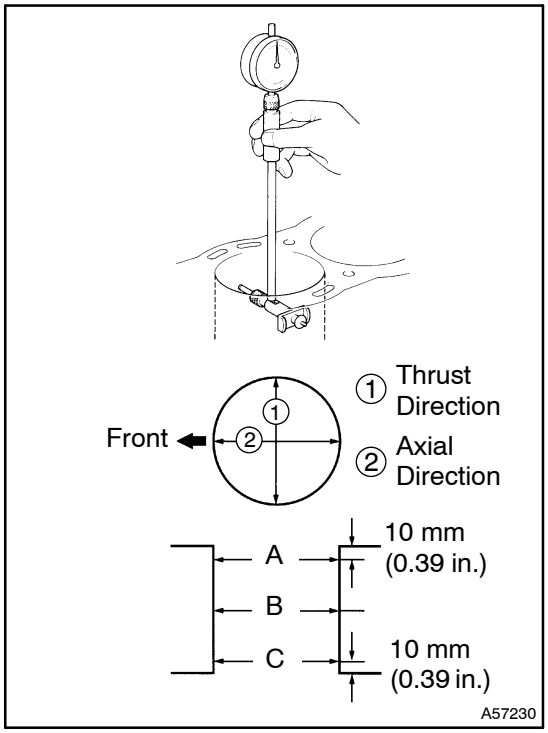
If deep scratches are found, rebore all the 4 cylinders. If necessary, replace the cylinder block.



(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.

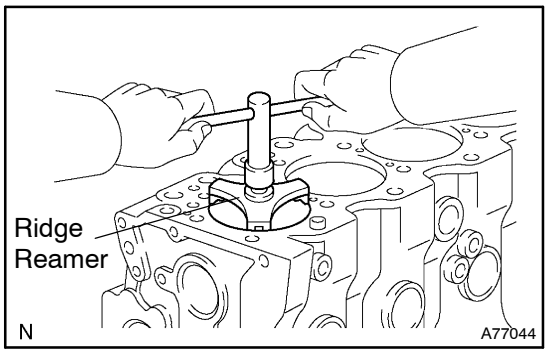
Standard diameter:

Mark 1	108.000 – 108.010 mm (4.2520 – 4.2524 in.)
Mark 2	108.010 – 108.020 mm (4.2524 – 4.2527 in.)
Mark 3	108.020 – 108.030 mm (4.2527 – 4.2531 in.)

Maximum diameter:

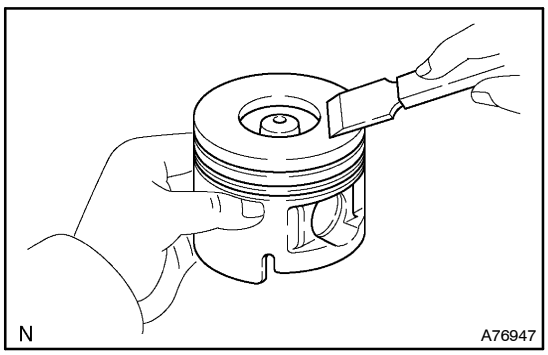
STD	108.03 mm (4.2531 in.)
O/S 0.50	108.53 mm (4.2728 in.)
O/S 0.75	108.78 mm (4.2827 in.)
O/S 1.00	109.03 mm (4.2925 in.)

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



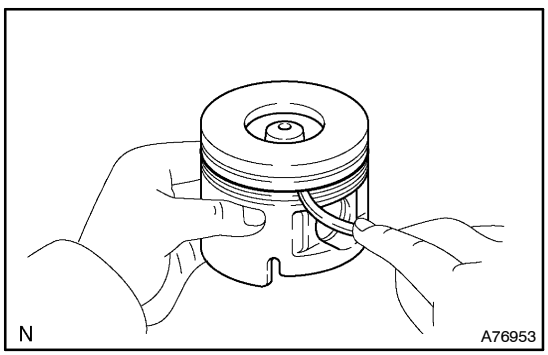
(d) Remove the cylinder ridge.

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

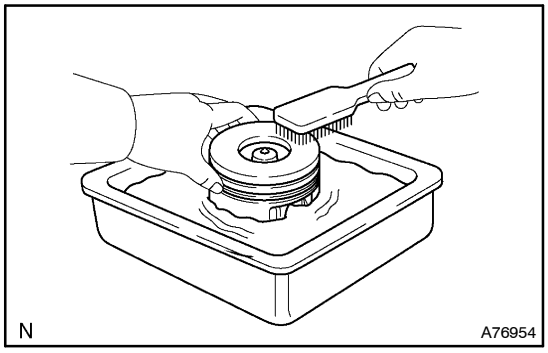


17. CLEAN W/PIN PISTON SUB–ASSY

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



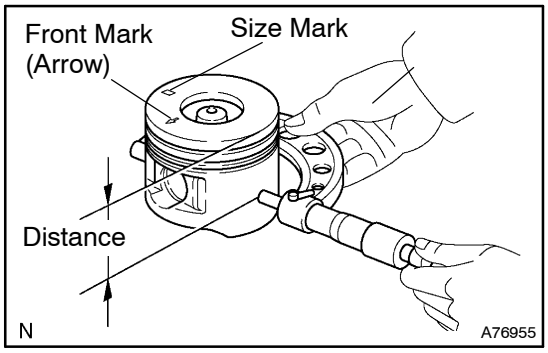
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



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

NOTICE:

Do not use a wire brush.



18. 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: 76.55 mm (3.0138 in.)

Piston diameter:

STD	Mark 1	107.880 – 107.890 mm (4.2472 – 4.2476 in.)
	Mark 2	107.890 – 107.900 mm (4.2476 – 4.2480 in.)
	Mark 3	107.900 – 107.910 mm (4.2480 – 4.2484 in.)
O/S 0.50		108.380 – 108.410 mm (4.2669 – 4.2681 in.)
O/S 0.75		108.630 – 108.660 mm (4.2768 – 4.2779 in.)
O/S 1.00		108.880 – 108.910 mm (4.2866 – 4.2878 in.)

(2) Measure the cylinder bore diameter in the thrust directions (See step 16).

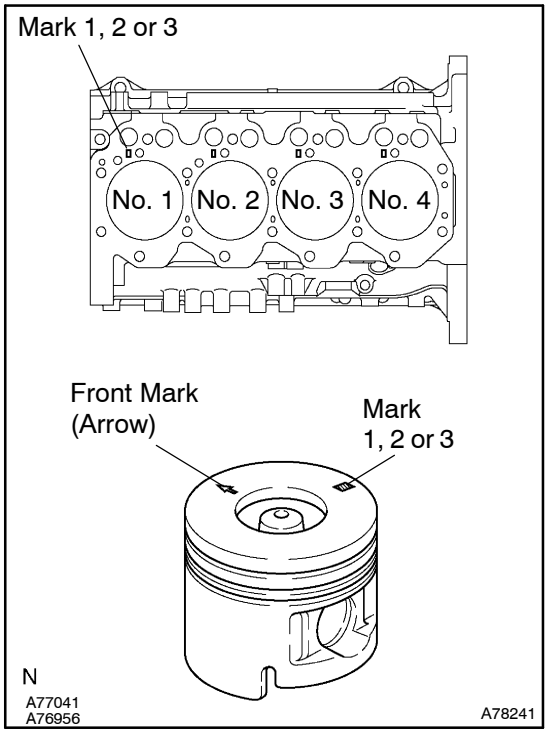
(3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

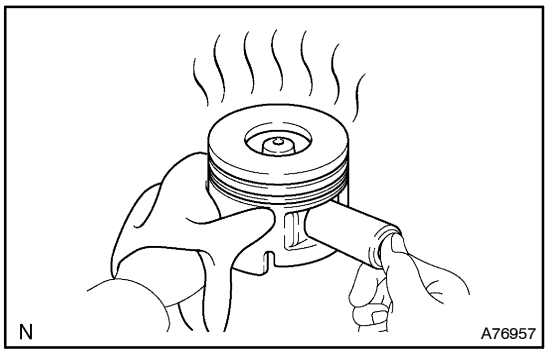
0.110 – 0.130 mm (0.0043 – 0.0051 in.)

Maximum oil clearance: 0.18 mm (0.0071 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.

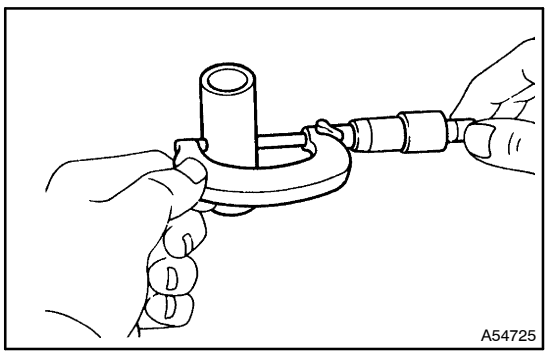


HINT:
Use a piston with the same number mark as that on the cylinder block.

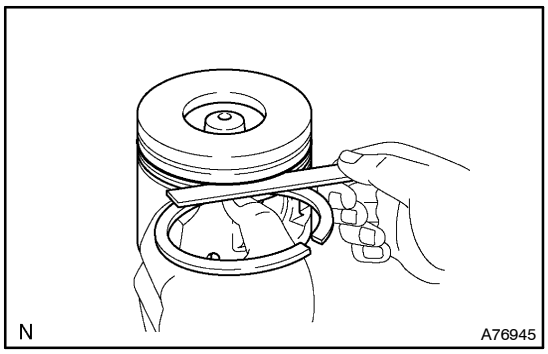


(b) Check that the piston pin fits.
(1) When the piston pin is at 60°C (140°F), you should be able to push the piston pin into the piston pin hole with your thumb.

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:
37.000 – 37.008 mm (1.4567 – 1.4570 in.)



19. INSPECT PISTON RING SET

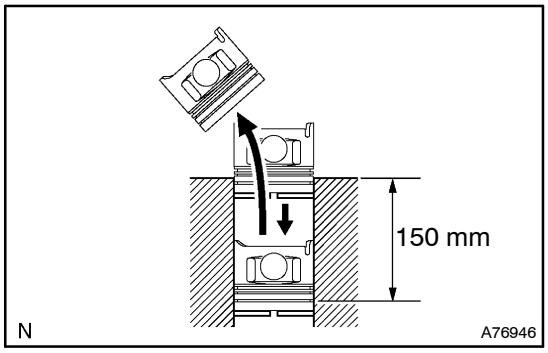
(1) Using a feeler gauge, measure the clearance between a new ring and the wall of the ring groove.

Standard groove clearance:

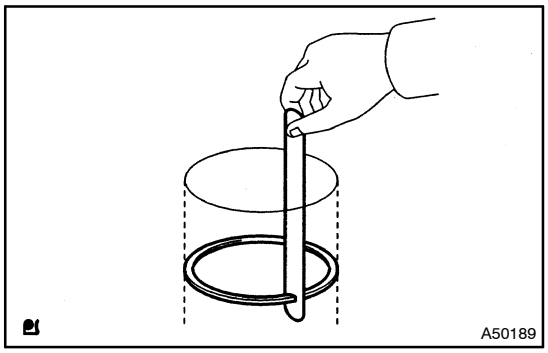
No. 1	0.070 – 0.110 mm (0.0028 – 0.0043 in.)
No. 2	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
Oil	0.030 – 0.070 mm (0.0012 – 0.0028 in.)

Maximum groove clearance: 0.20 mm (0.0079 in.)

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



(a) 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.

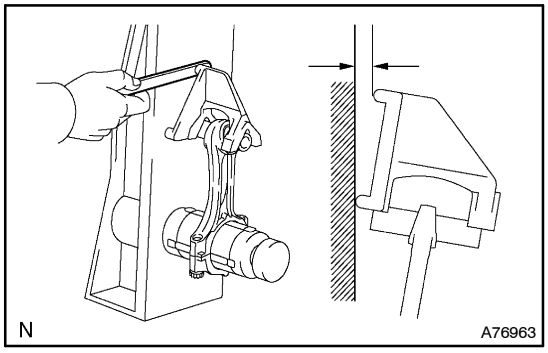
Standard end gap:

No. 1	0.350 – 0.450 mm (0.0138 – 0.0177 in.)
No. 2	0.470 – 0.600 mm (0.0185 – 0.0236 in.)
Oil	0.200 – 0.400 mm (0.0079 – 0.0157 in.)

Maximum end gap:

No. 1	1.41 mm (0.0555 in.)
No. 2	1.61 mm (0.0634 in.)
Oil	1.61 mm (0.0634 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.



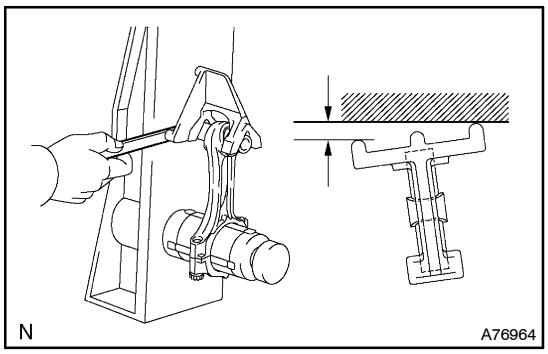
20. INSPECT CONNECTING ROD SUB–ASSY

(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.

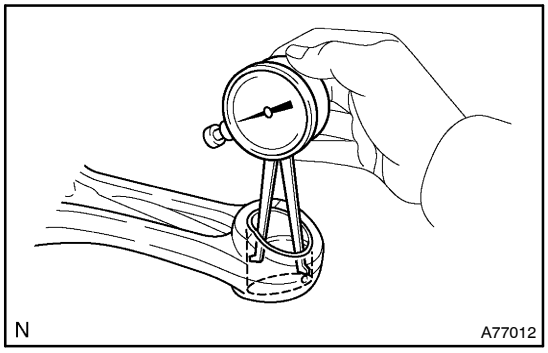


(2) Check for twist.

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.



21. INSPECT PISTON PIN OIL CLEARANCE

(a) Inspect the piston pin oil clearance.

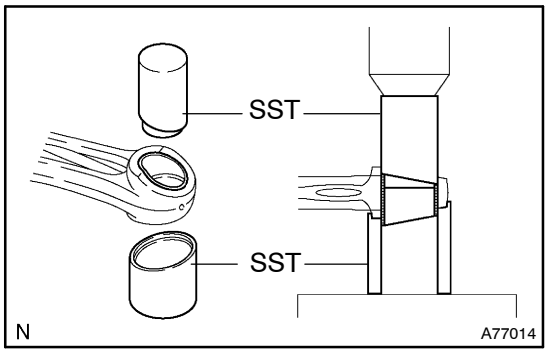
(1) Using a caliper gauge, measure the inside diameter of the connecting rod bush.

Bush inside diameter:
37.009 – 37.019 mm (1.4570 – 1.4574 in.)

(2) Subtract the piston pin diameter measurement (See step 18) from the bush inside diameter measurement.

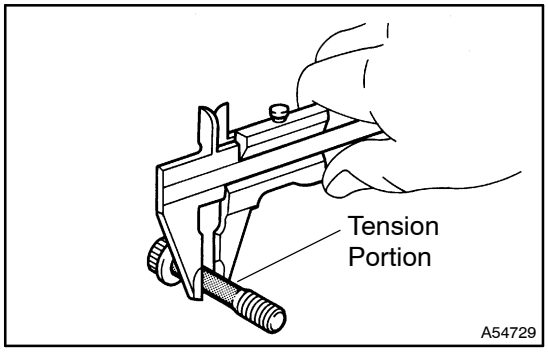
Standard oil clearance:
0.005 – 0.015 mm (0.0002 – 0.0006 in.)
Maximum oil clearance: 0.05 mm (0.0020 in.)

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



22. REMOVE CONNECTING ROD SMALL END BUSH

(a) Using SST and a press, press out the bush.
SST 09222–58030 (09222–07010, 09222–07030)

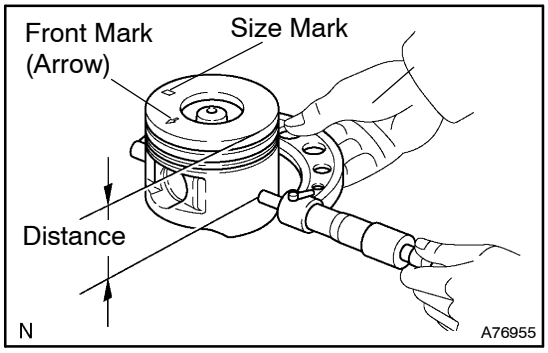


23. INSPECT CONNECTING ROD BOLT

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

Standard diameter:
10.80 – 11.10 mm (0.4252 – 0.4370 in.)
Minimum diameter: 10.50 mm (0.4134 in.)

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



24. 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	108.380 – 108.410 mm (4.2669 – 4.2681 in.)
O/S 0.75	108.630 – 108.660 mm (4.2768 – 4.2779 in.)
O/S 1.00	108.880 – 108.910 mm (4.2866 – 4.2878 in.)

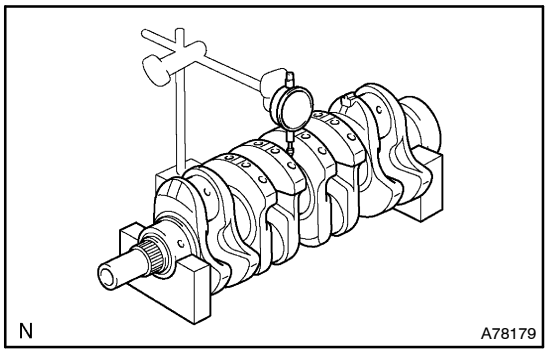
(b) Using a micrometer, measure the piston diameter at right angles to the piston pin center line and the distance from the piston head.

Distance: 76.55 mm (3.0138 in.)

(c) Calculate the amount as follows to rebore each cylinder:
Size to be rebored = P + C – H
P = Piston diameter
C = Piston clearance:
0.110 – 0.130 mm (0.0043 – 0.0051 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.)

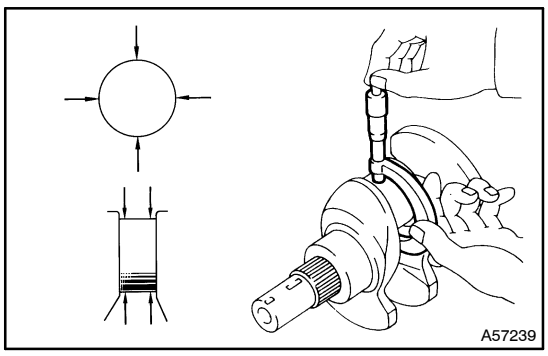
NOTICE:
Excess honing will destroy the finished roundness.



25. 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	76.950 – 76.970 mm (3.0295 – 3.0303 in.)
	Others	76.980 – 77.000 mm (3.0307 – 3.0315 in.)
U/S 0.25	No. 3	76.700 – 76.720 mm (3.0197 – 3.0205 in.)
	Others	76.730 – 76.750 mm (3.0209 – 3.0216 in.)
U/S 0.50	No. 3	76.450 – 76.470 mm (3.0098 – 3.0106 in.)
	Others	76.480 – 76.500 mm (3.0110 – 3.0118 in.)
U/S 1.00	No. 3	75.950 – 75.970 mm (2.9902 – 2.9909 in.)
	Others	75.980 – 76.000 mm (2.9913 – 2.9921 in.)

Crank pin diameter:

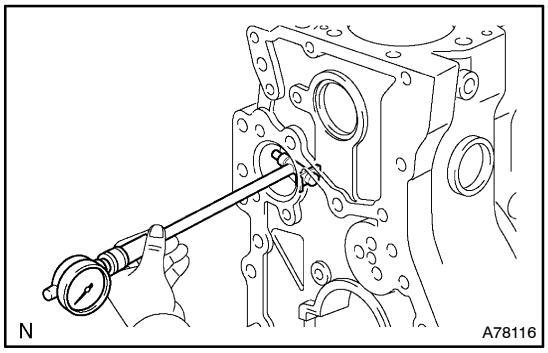
STD	65.980 – 66.000 mm (2.5976 – 2.5984 in.)
U/S 0.25	65.730 – 65.750 mm (2.5878 – 2.5886 in.)
U/S 0.50	65.480 – 65.500 mm (2.5779 – 2.5787 in.)
U/S 1.00	64.980 – 65.000 mm (2.5583 – 2.5591 in.)

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.



26. INSPECT CAMSHAFT OIL CLEARANCE

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

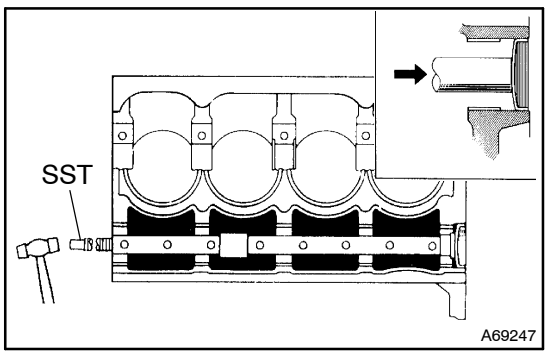
Bearing inside diameter (from front side):

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.

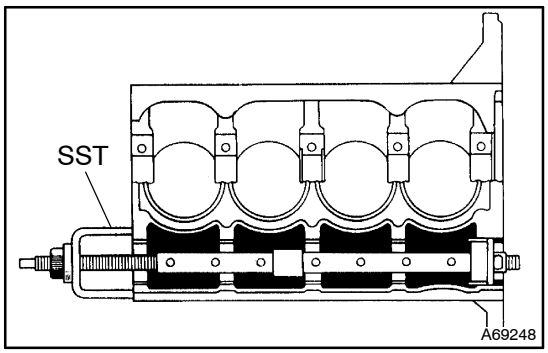
Standard oil clearance:
0.030 – 0.071 mm (0.0012 – 0.0028 in.)
Maximum oil clearance: 0.10 mm (0.0039 in.)

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

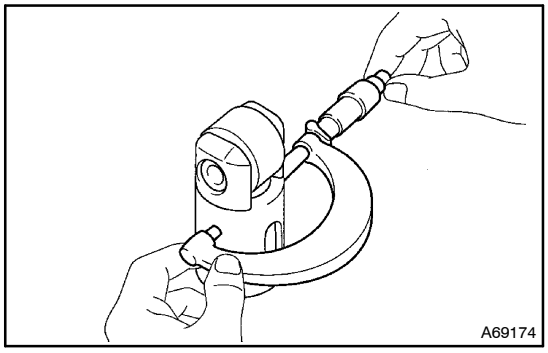


27. REMOVE CAMSHAFT BEARING SET

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

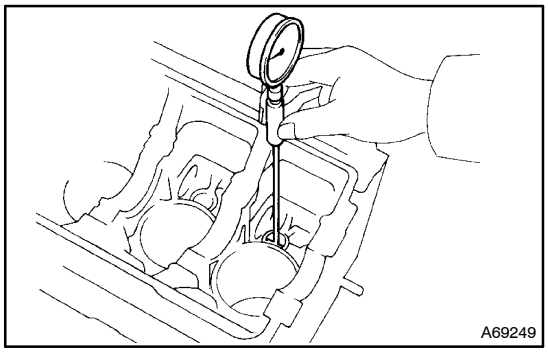


(b) Using SST, remove the camshaft bearings.
SST 09215–00013 (09215–00021, 09215–00471), 09215–00101 (09215–00130, 09215–00141, 09215–00150, 09215–00161)



28. INSPECT VALVE LIFTER

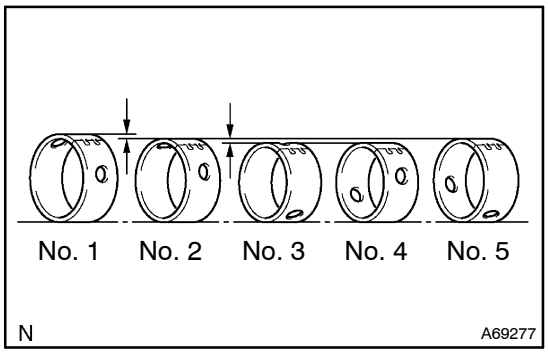
(a) Using a micrometer, measure the lifter diameter.
Lifter diameter:
26.955 – 26.975 mm (1.0612 – 1.0620 in.)



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

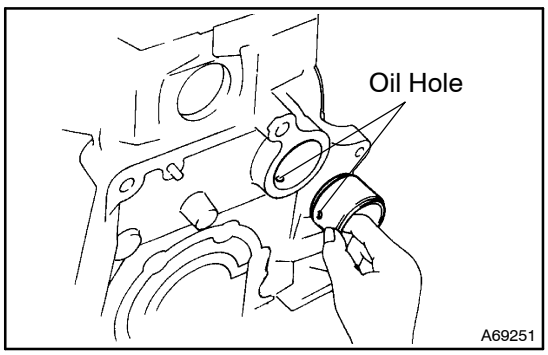
(c) Subtract the valve lifter diameter measurement from the lifter bore diameter measurement.
Standard oil clearance:
0.035 – 0.075 mm (0.0014 – 0.0030 in.)
Maximum oil clearance: 0.10 mm (0.0039 in.)

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

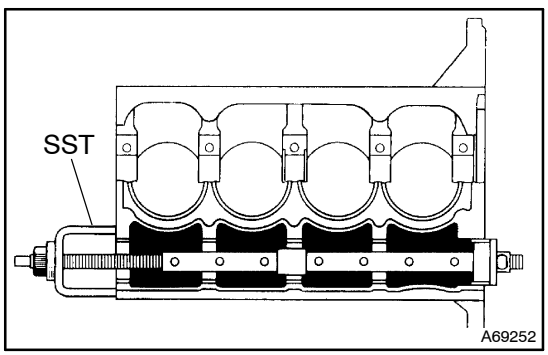


29. INSTALL CAMSHAFT BEARING SET

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



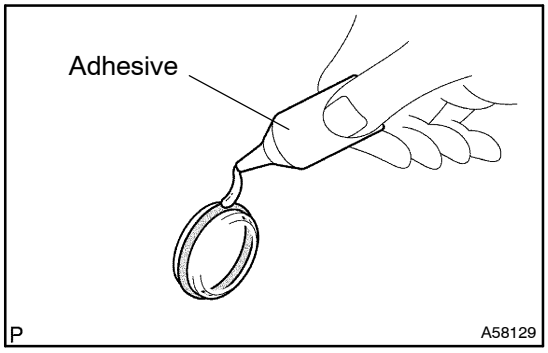
(b) Align the oil holes of the bearing and cylinder block.



(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 26).

(e) Install a new tight plug (See step 30).

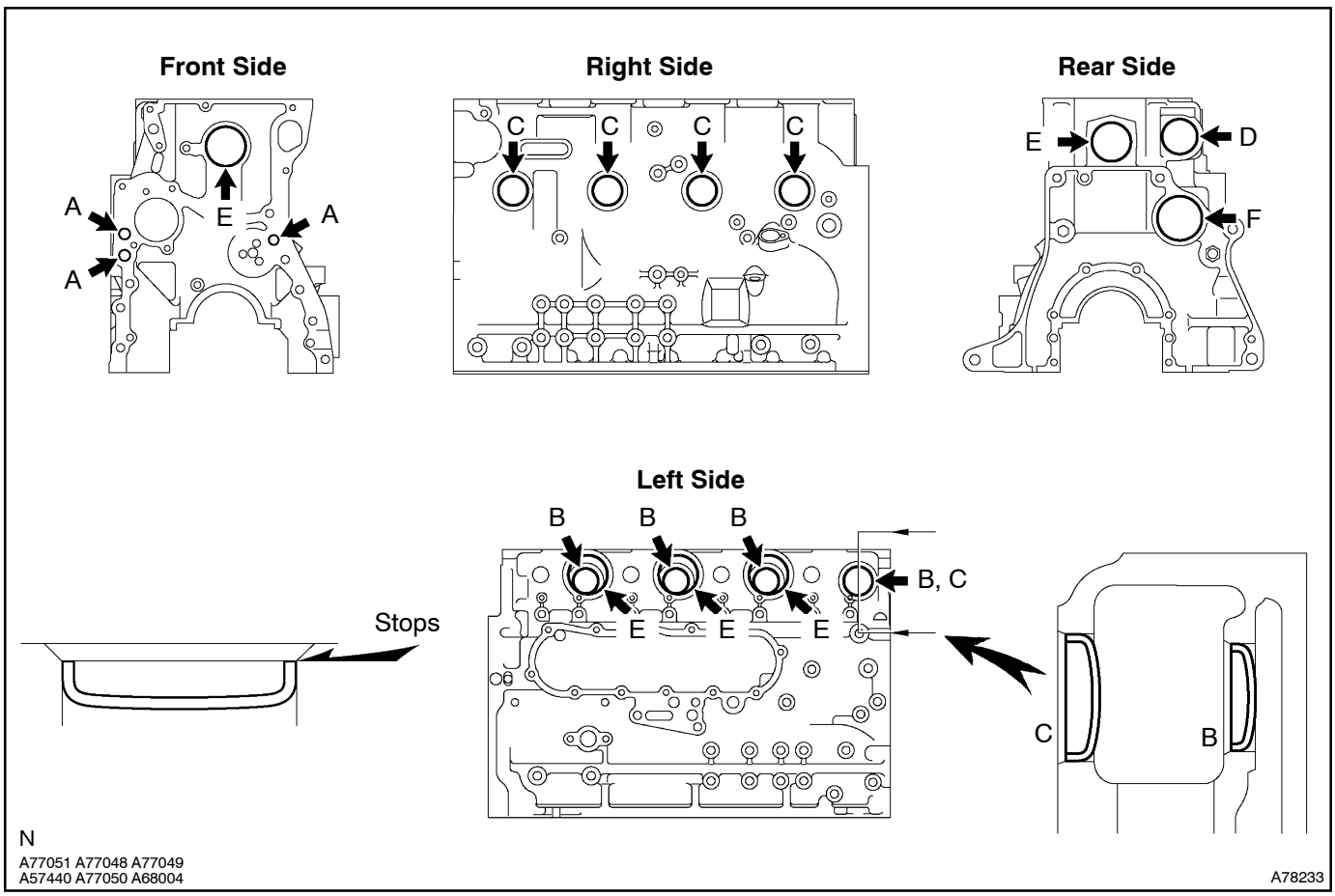


30. INSTALL TIGHT PLUG

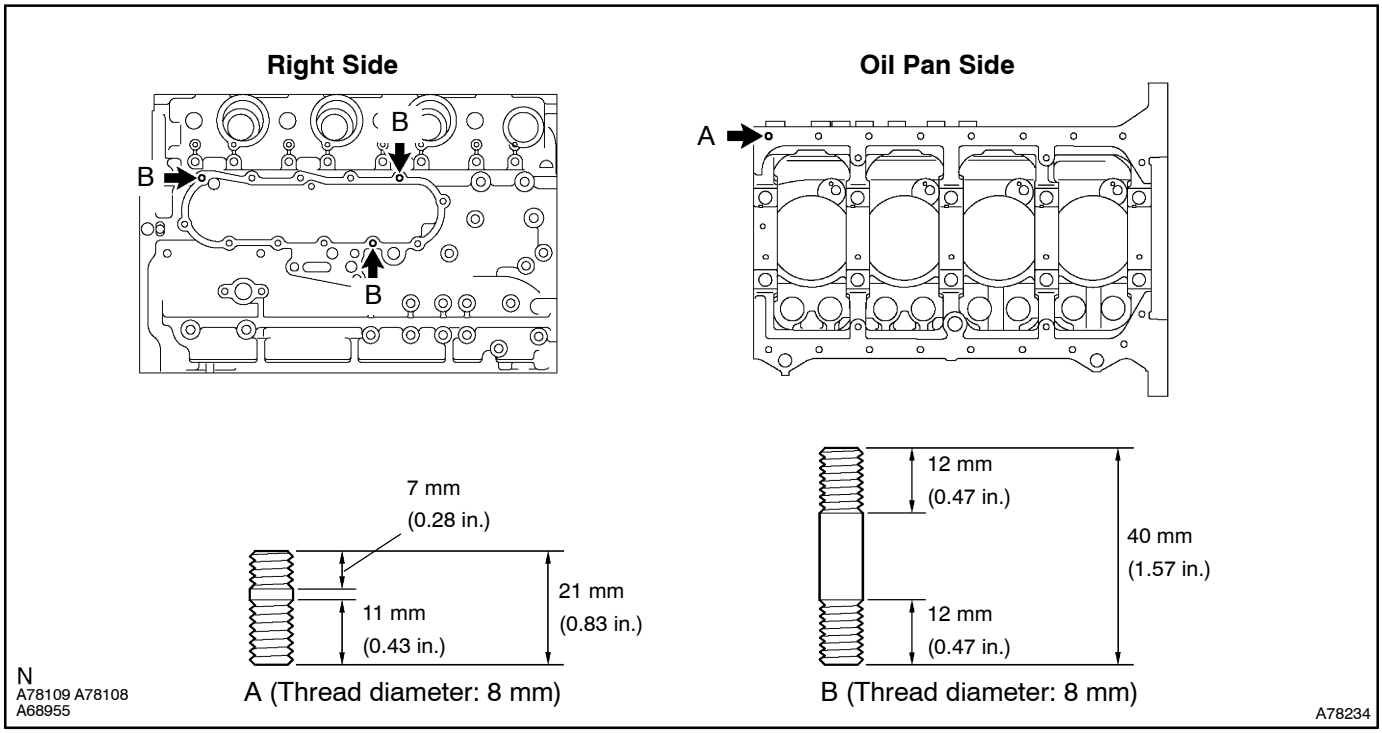
(a) Apply adhesive to a new tight plug.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent

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

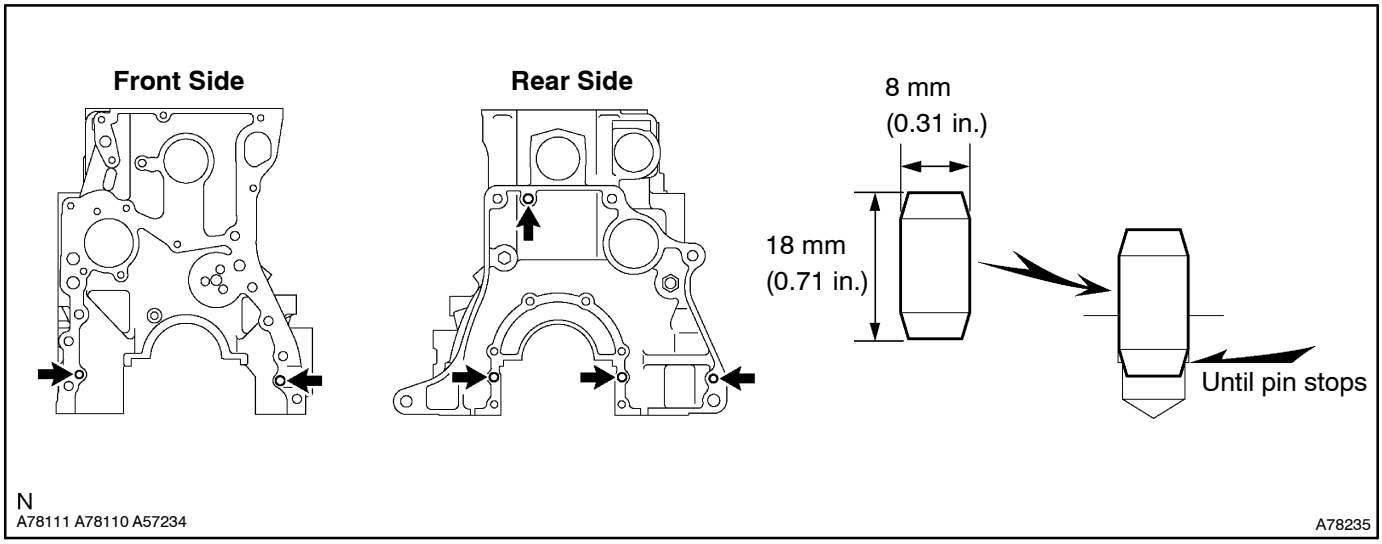
(c) Other postions:
Using SST and a hammer, tap in the tight plug.
SST Position B:
09950–60010 (09951–00300), 09950–70010 (09951–07100)
Position C:
09950–60010 (09951–00350), 09950–70010 (09951–07100)
Position D:
09950–60010 (09951–00450), 09950–70010 (09951–07100)
Position E:
09950–60010 (09951–00500), 09950–70010 (09951–07100)
Position F:
09950–60010 (09951–00580), 09950–70010 (09951–07100)

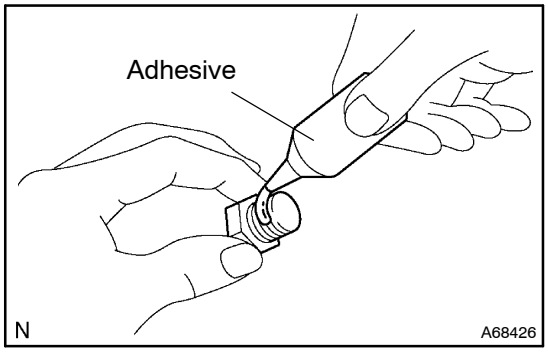


31. INSTALL STUD BOLT



32. INSTALL STRAIGHT PIN

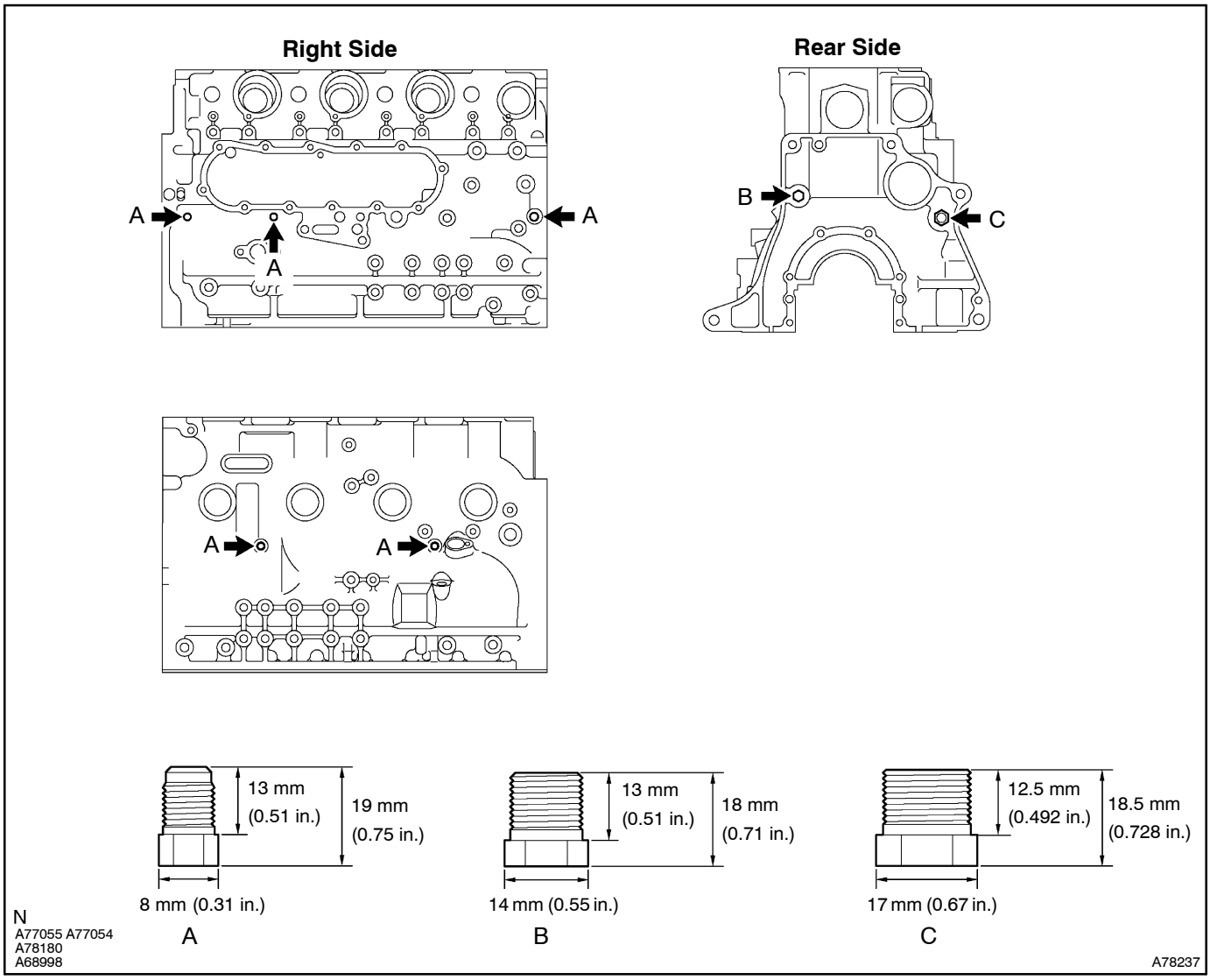




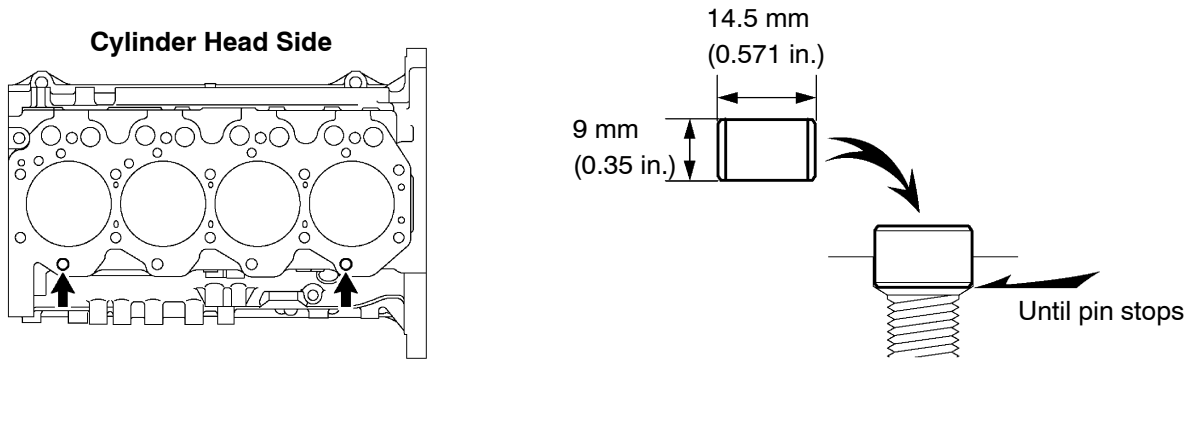
33. INSTALL W/HEAD TAPER SCREW PLUG

(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



34. INSTALL RING PIN



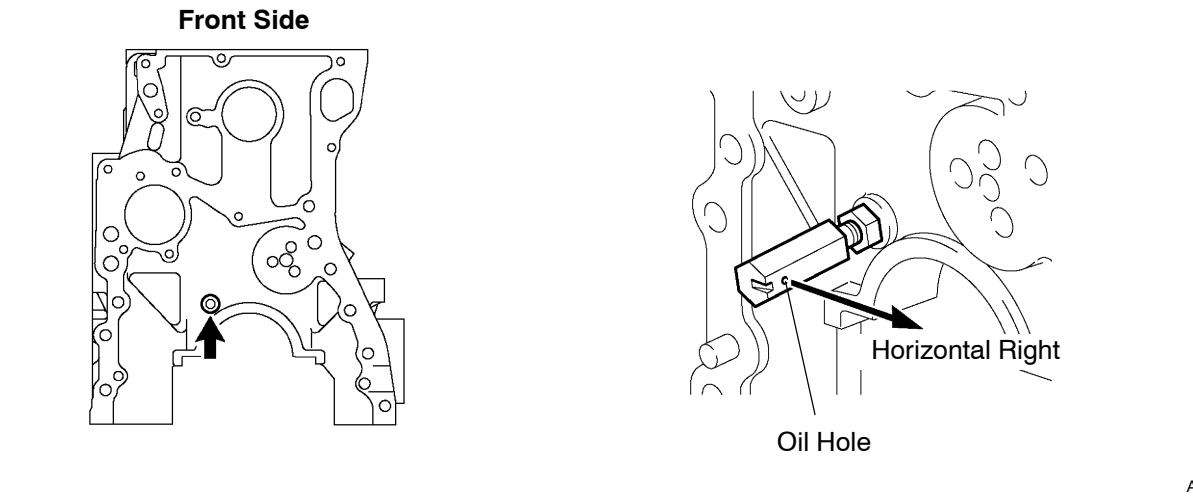
35. INSTALL OIL NOZZLE

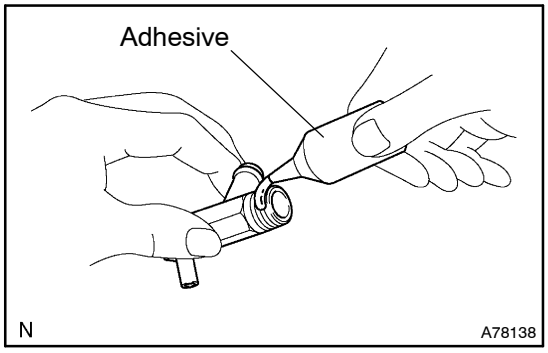
(a) Install the lock nut to the oil nozzle.

(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)



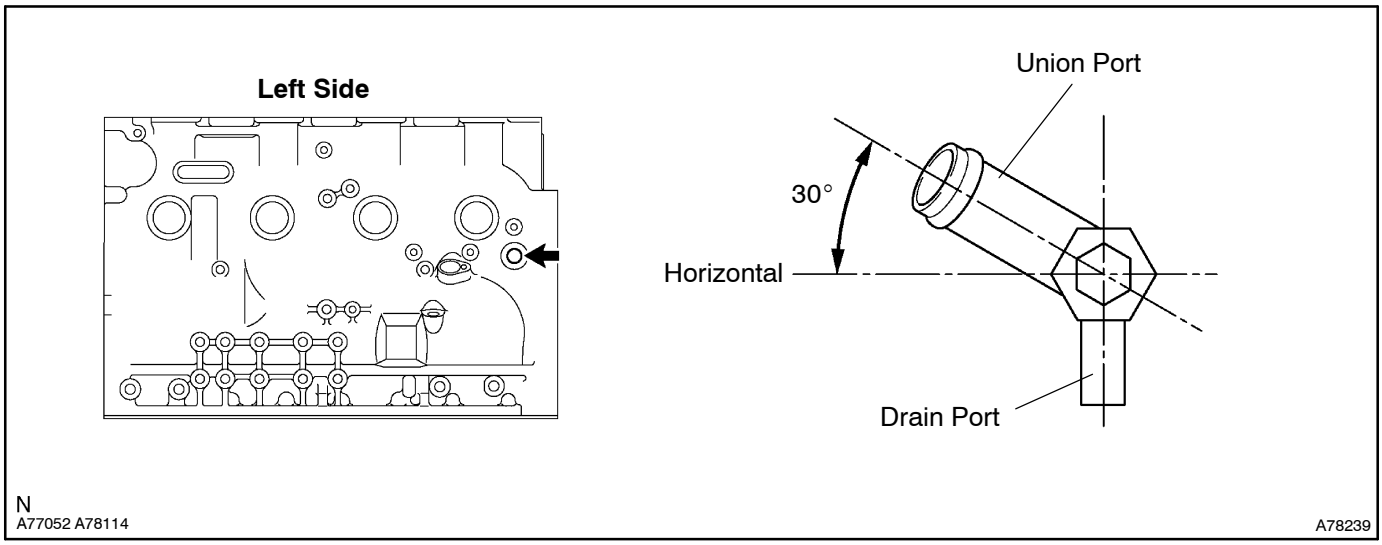


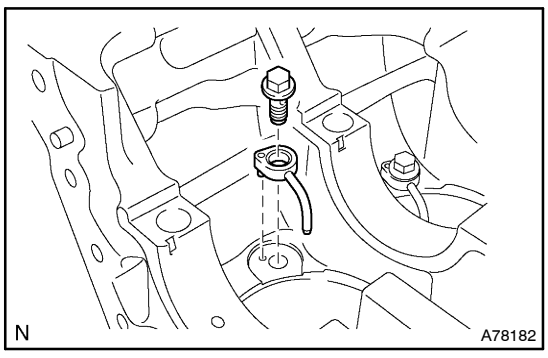
36. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

(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 union port is facing upward by 30°.

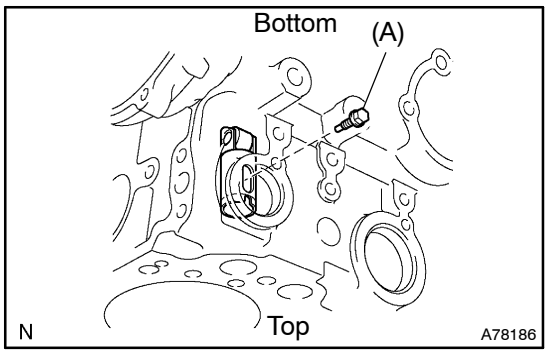




37. INSTALL SUB–ASSY OIL NOZZLE NO.1

(a) Align the pin of the oil nozzle with the pin hole of the cylinder block.

(b) Install the oil nozzle with the check valve.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



38. 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).

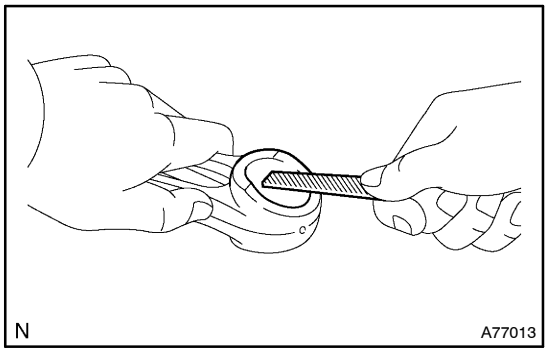
(d) Check that the bolt (A) prevents the valve lifter from falling.

NOTICE:

Be careful not to scratch the valve lifter.

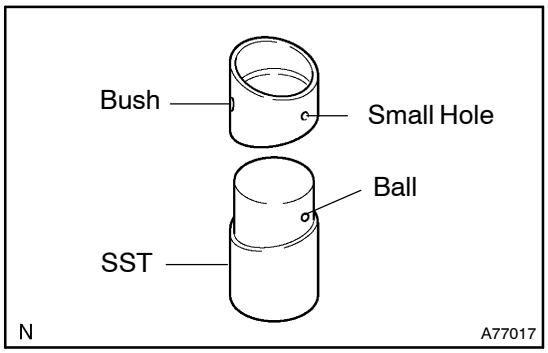
HINT:

Check that the valve lifter moves smoothly up and down.



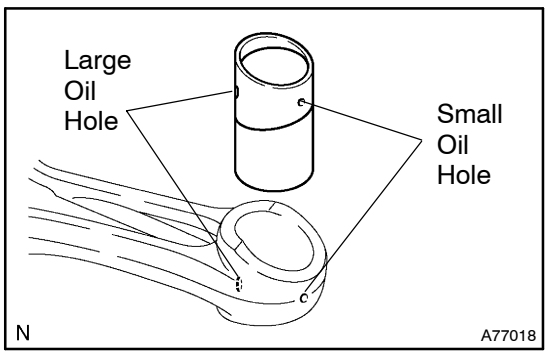
39. INSTALL CONNECTING ROD SMALL END BUSH

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

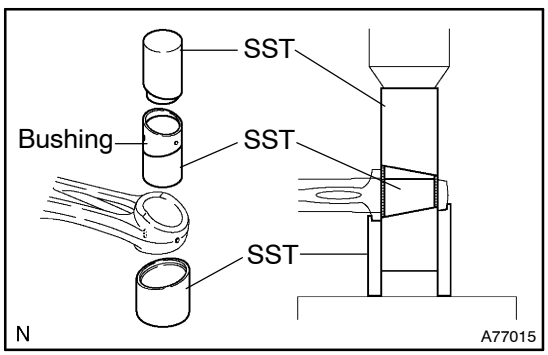


(b) Attach a new bush to SST with the ball of SST inside the oil hole of the bush.

SST 09222–58030 (09222–07020)

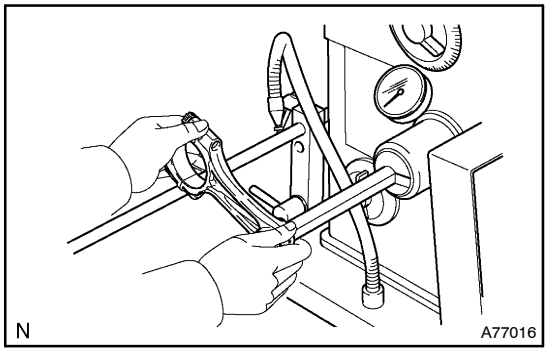


(c) Align the oil holes of the bush and connecting rod.

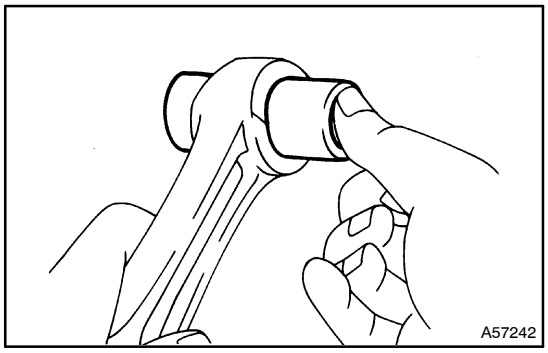


(d) Using SST and a press, press in the bush.

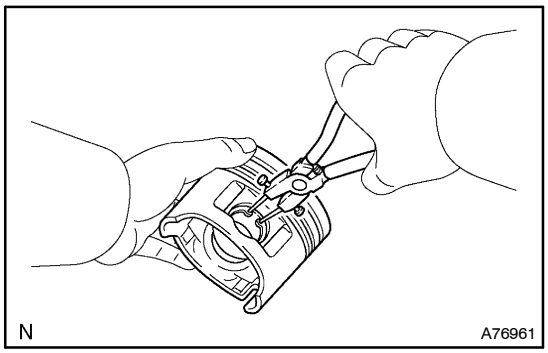
SST 09222–58030 (09222–07010, 09222–07020, 09222–07030)



(e) Using a pin hole grinder, hone the bush to obtain the standard clearance (See step 21) between the bush and piston pin.



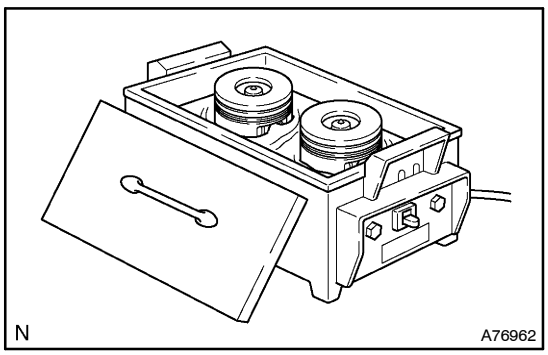
(f) Check that the piston pin fits at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.



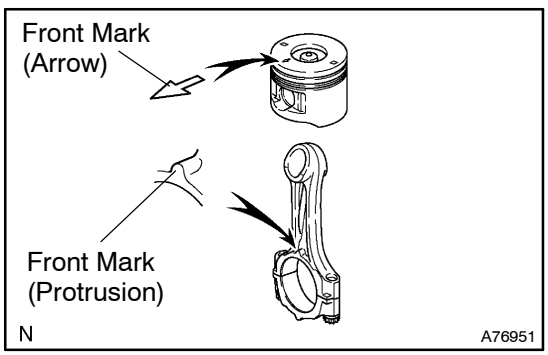
40. INSTALL W/PIN PISTON SUB–ASSY

(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.

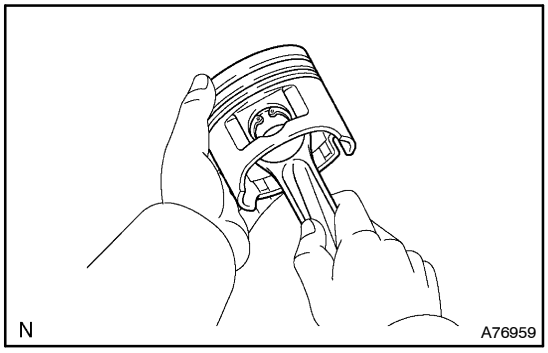


(2) Gradually heat the piston to about 60°C (140°F).

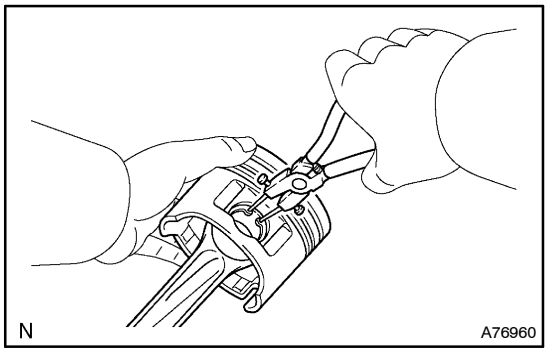


(3) Coat the piston pin with engine oil.

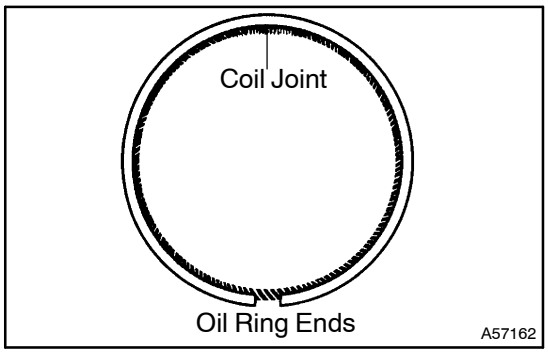
(4) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.



(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.

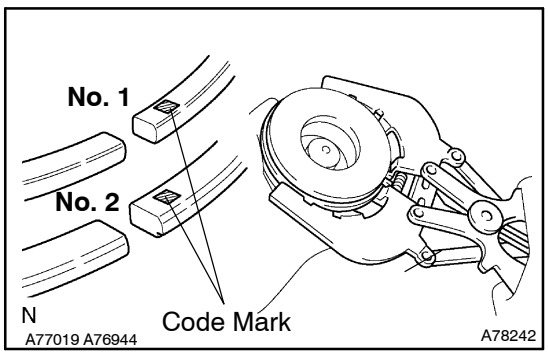


(b) Install the piston rings.

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

HINT:

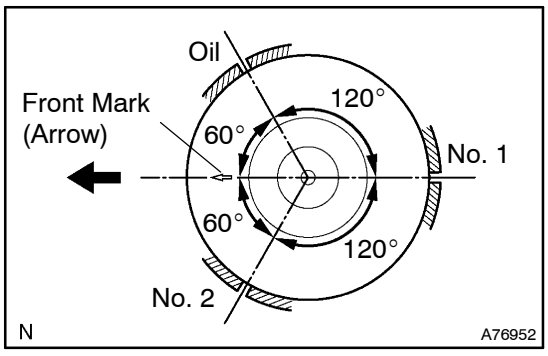
Face the end gap of the oil ring in the opposite direction to the coil joint.



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

Code mark:

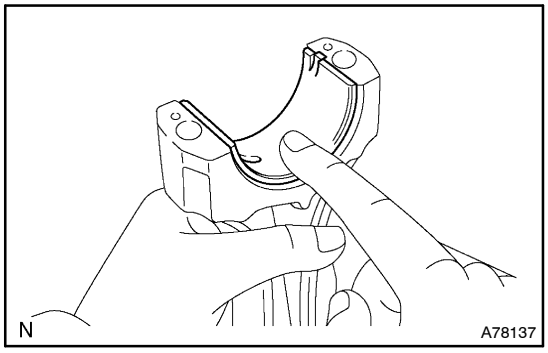
No. 1	1T
No. 2	T2



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

NOTICE:

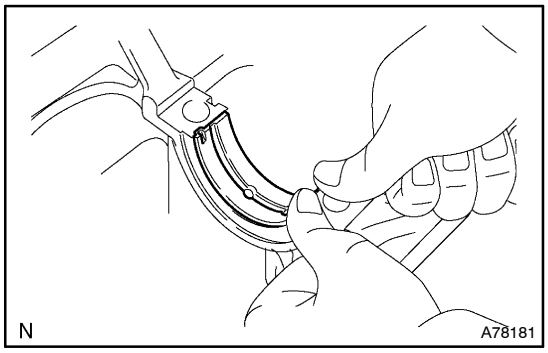
Do not align the ring ends.



41. 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.

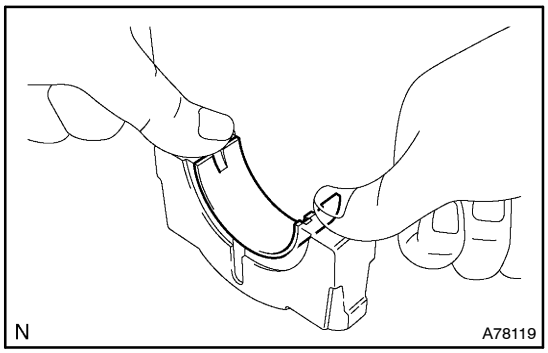


42. INSTALL CRANKSHAFT BEARING

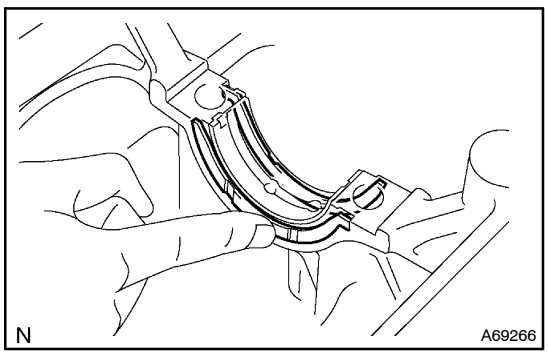
HINT:

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.

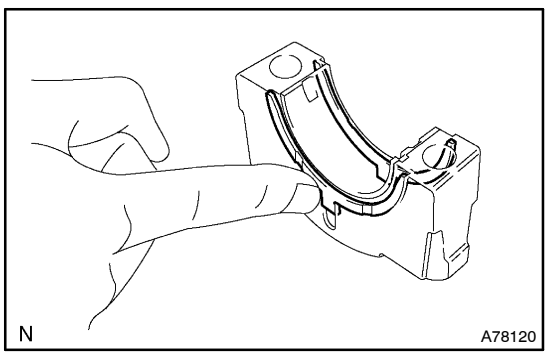


(b) Align the bearing claw with the claw groove of the crankshaft bearing cap, and push in the 5 lower bearings.

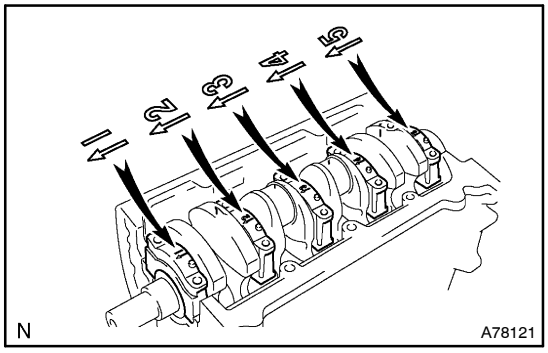


43. INSTALL CRANKSHAFT THRUST WASHER SET

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



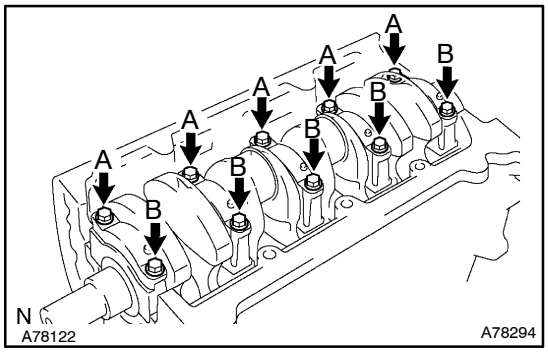
(b) Install the 2 thrust washers on the No. 3 crankshaft bearing cap with the grooves facing outward.



44. 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.

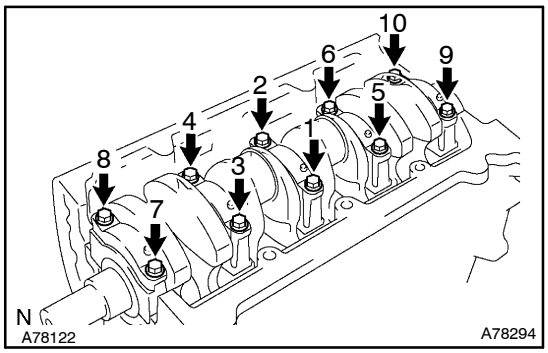
(1) Apply a light coat of the engine oil on the threads and under the bolt heads of the bearing caps.

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

HINT:

Bolt length:

Item	Length
A	126.0 mm (4.961 in.)
B	109.0 mm (4.291 in.)

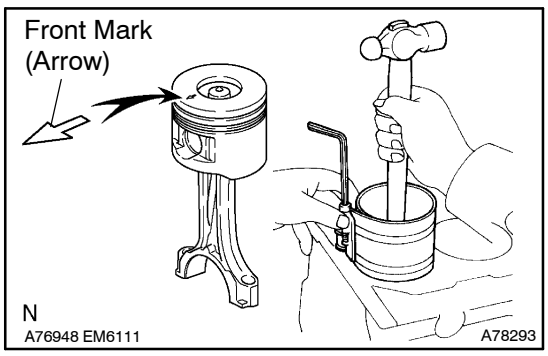


(3) Uniformly tighten the 10 bolts of the bearing caps in several passes in the sequence shown in the illustration.

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

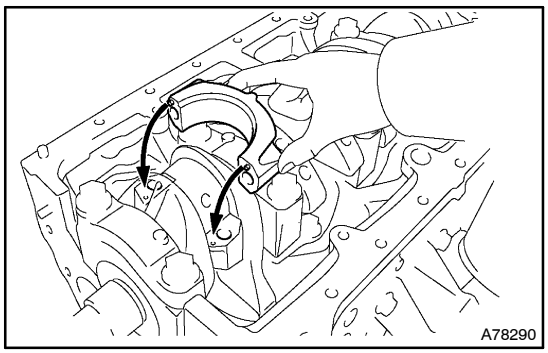
(d) Check that the crankshaft smoothly turns.

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



45. INSTALL PISTON AND CONNECTING ROD

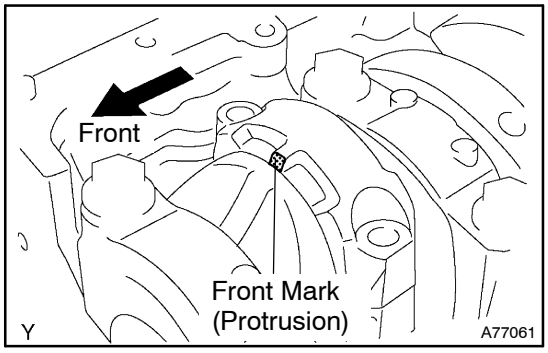
(a) Using a piston ring compressor, push the correctly numbered piston and connecting rod assembly into the cylinder with the front mark of the piston facing forward.



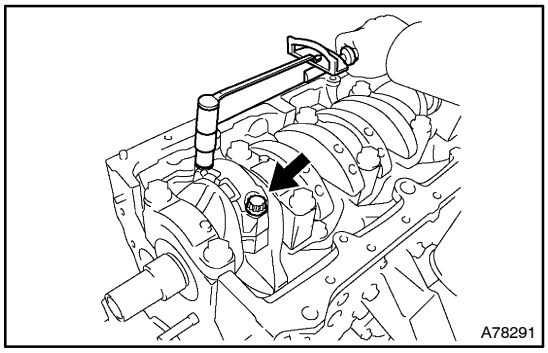
(b) Place the connecting rod cap on the connecting rod.

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

(2) Align the pin grooves of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.



(3) Check that the front mark of the connecting rod cap is facing forward.



(c) Install the connecting rod cap bolts.

HINT:

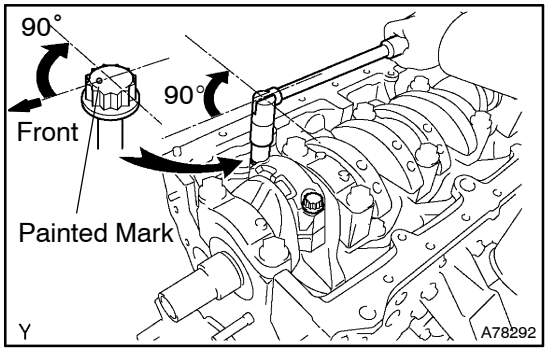
- The connecting rod cap bolts are tightened in 2 progressive steps (steps (2) and (4)).
- If any connecting rod bolt is broken or deformed, replace it.

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

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

Torque: 85 N·m (867 kgf·cm, 63 ft·lbf)

If any 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 bolts with paint.

(4) Retighten the connecting rod cap bolts by 90°, as shown in the illustration.

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

(d) Check that the crankshaft smoothly turns.

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