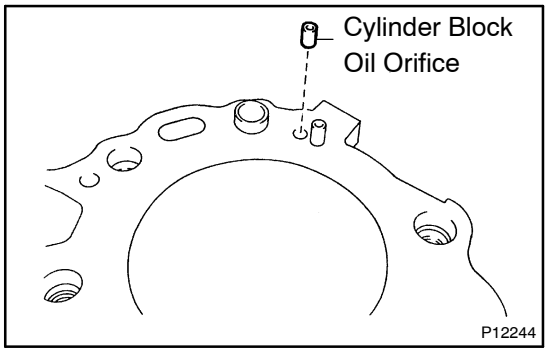
1410J–01

OVERHAUL

HINT:

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

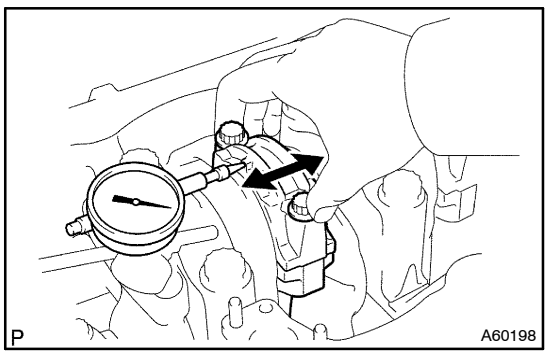


1. REMOVE CYLINDER BLOCK OIL ORIFICE

2. INSPECT CYLINDER BLOCK OIL ORIFICE

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

If necessary, replace the oil orifice.

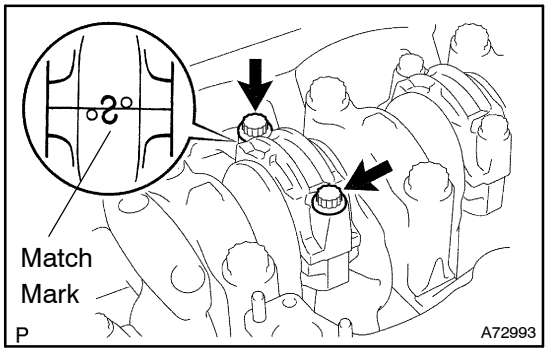


3. INSPECT CONNECTING ROD THRUST CLEARANCE

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

Standard thrust clearance:
0.100 – 0.300 mm (0.0039 – 0.0118 in.)
Maximum thrust clearance: 0.40 mm (0.0157 in.)

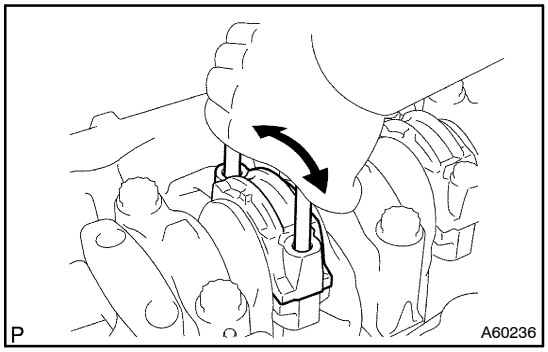
If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.



4. 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 road cap bolts.



(c) Using the 2 removed connecting rod bolts, pry the connecting rod cap back and forth, and remove the connecting cap.

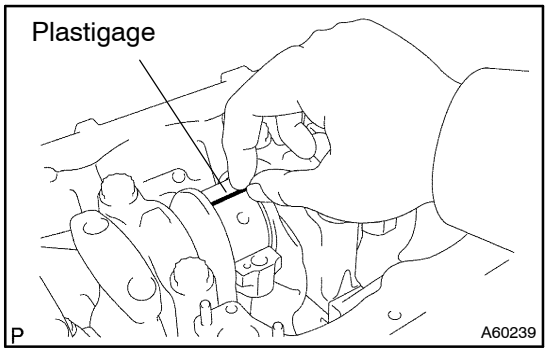
HINT:

Keep the lower bearing inserted with the connecting rod cap.

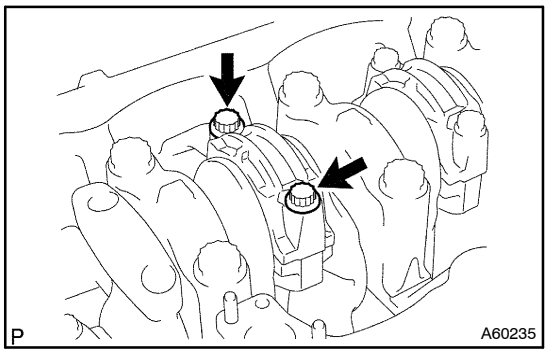
(d) Clean the crank pin and bearing.

(e) Check the crank pin and bearing for pitting and scratches.

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



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

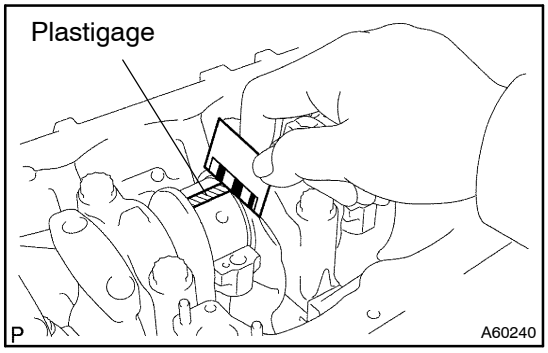


(g) Install the connecting rod cap with the 2 bolts (See step 39).

NOTICE:

Do not turn the crankshaft.

(h) Remove the 2 bolts, connecting rod cap and lower bearing (See procedure (b) and (c) above).



(i) Measure the Plastigage at its widest point.

Standard oil clearance:

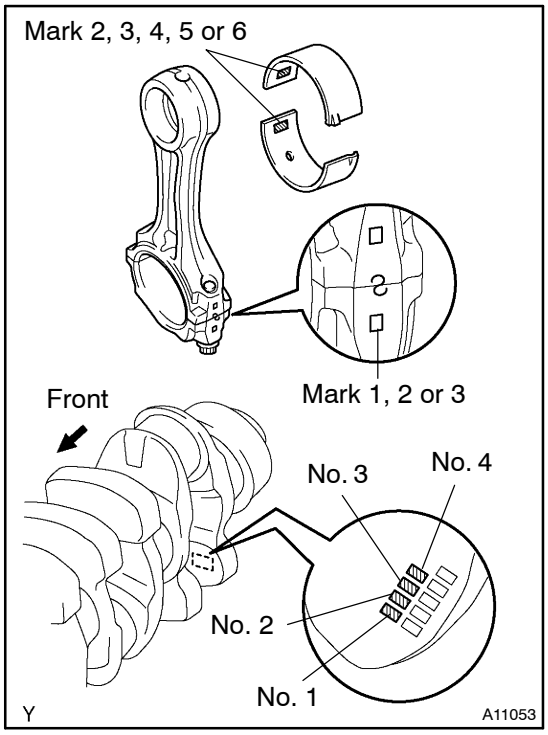
STD	0.036 – 0.054 mm (0.0014 – 0.0021 in.)
U/S 0.25, U/S 0.50	0.037 – 0.077 mm (0.0015 – 0.0030 in.)

Maximum oil clearance: 0.10 mm (0.0039 in.)

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

HINT:

If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers inprinted on the crankshaft and connecting rod, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked 2, 3, 4, 5 and 6 accordingly.



Item	Number Mark								
Connecting rod cap	1			2			3		
Crankshaft	1	2	3	1	2	3	1	2	3
Use bearing	2	3	4	3	4	5	4	5	6

EXAMPLE:

Connecting rod cap ”3” + Crankshaft ”1” =

Total number 4 (Use bearing ”4”)

Reference

Connecting rod big end inner diameter:

Mark 1	62.014 – 62.020 mm (2.4415 – 2.4417 in.)
Mark 2	62.020 – 62.026 mm (2.4417 – 2.4420 in.)
Mark 3	62.026 – 62.032 mm (2.4420 – 2.4422 in.)

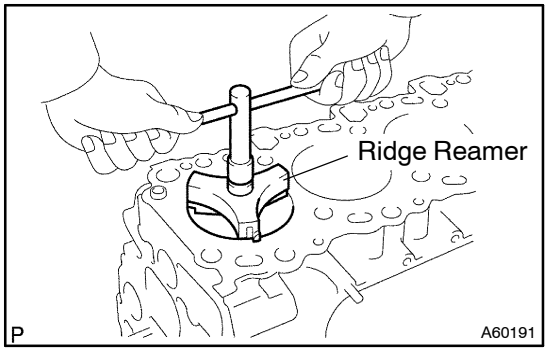
Crankshaft pin diameter:

Mark 1	58.994 – 59.000 mm (2.3226 – 2.3228 in.)
Mark 2	58.988 – 58.994 mm (2.3224 – 2.3226 in.)
Mark 3	58.982 – 58.988 mm (2.3221 – 2.3224 in.)

Standard sized bearing center wall thickness:

Mark 2	1.486 – 1.489 mm (0.0585 – 0.0586 in.)
Mark 3	1.489 – 1.492 mm (0.0586 – 0.0587 in.)
Mark 4	1.492 – 1.495 mm (0.0587 – 0.0589 in.)
Mark 5	1.495 – 1.498 mm (0.0589 – 0.0590 in.)
Mark 6	1.498 – 1.501 mm (0.0590 – 0.0591 in.)

(j) Completely remove the Plastigage.



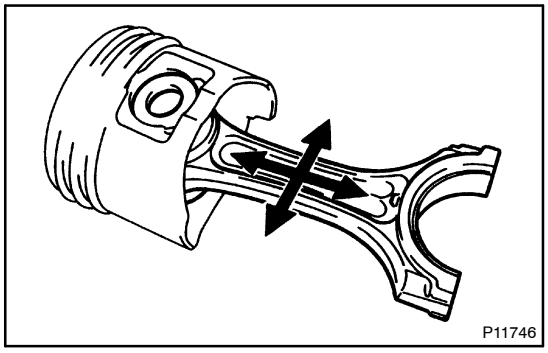
5. REMOVE PISTON AND CONNECTING ROD

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

(b) Push 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 correct order.

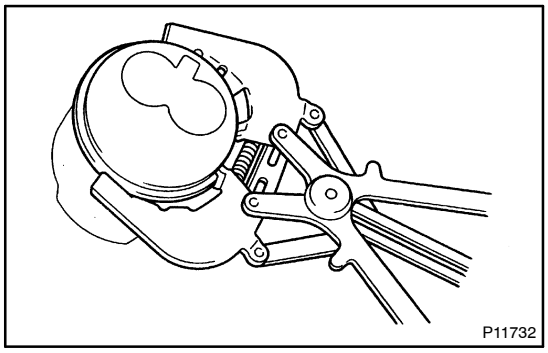


6. REMOVE W/PIN PISTON SUB–ASSY

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

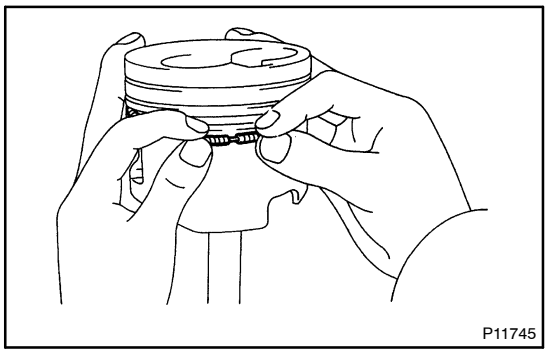
(1) Try to move the piston back and forth on the piston pin.

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



(b) Remove the piston rings.

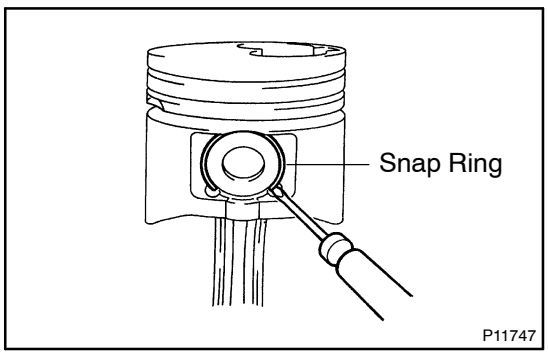
(1) Using a piston ring expander, remove the 2 compression rings and oil ling.



(2) Remove the coil by hand.

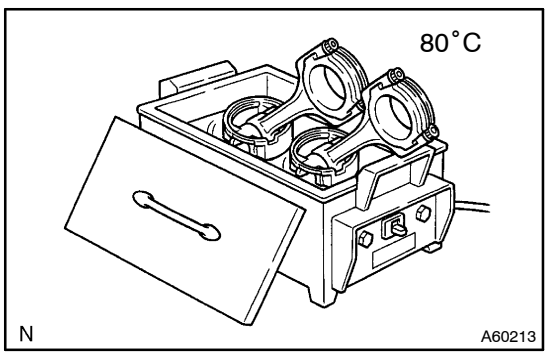
HINT:

Arrange the piston rings in correct order only.

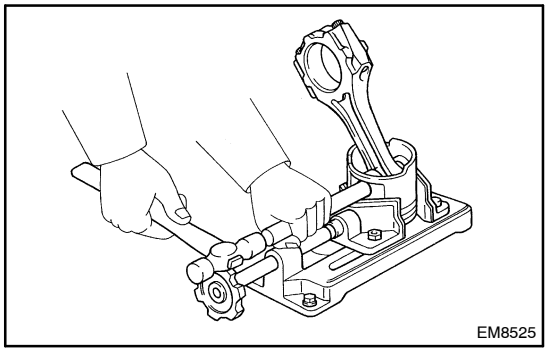


(c) Disconnect the connecting rod from the piston.

(1) Using a small screwdriver, pry off the snap ring form the piston.



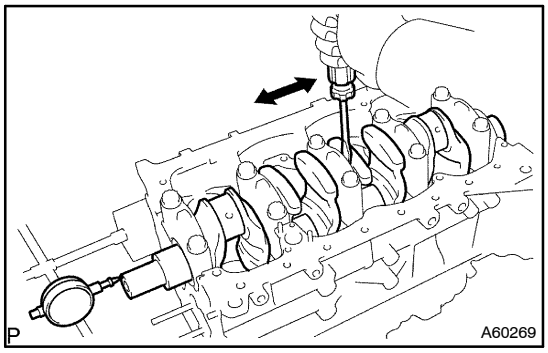
(2) Gradually heat the piston to approx. 80˚C (176˚F).



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

HINT:

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



7. INSPECT CRANKSHAFT THRUST CLEARANCE

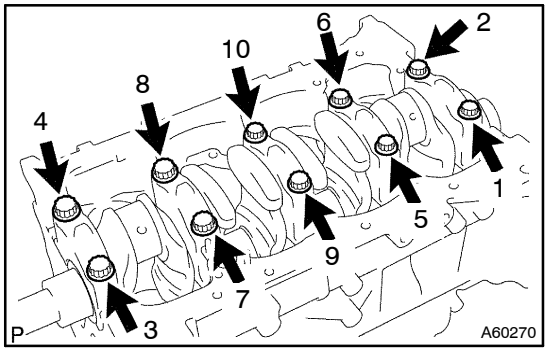
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.040 – 0.240 mm (0.0016 – 0.0094 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

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

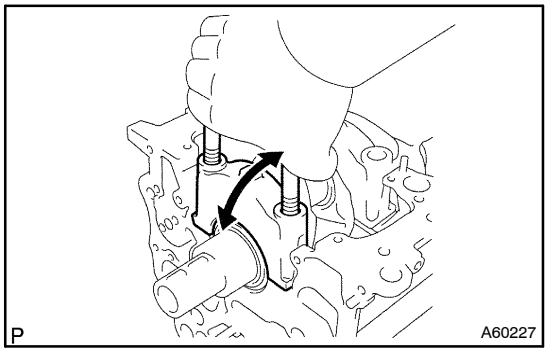
Thrust washer thickness:

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



8. INSPECT CRANKSHAFT OIL CLEARANCE

(a) Uniformly loosen and remove the 10 main bearing cap bolts in several passes, in the sequence shown.



(b) Using the removed crankshaft bearing cap bolts, pry the cap back and forth, and remove the crankshaft bearing caps, lower crankshaft bearings and lower thrust washers (No. 5 crankshaft bearing cap only).

HINT:

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

(c) Lift out the crankshaft.

HINT:

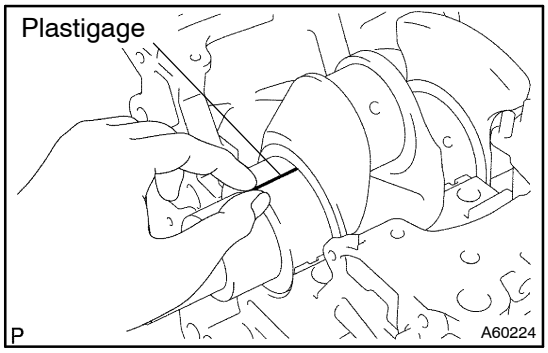
Keep the upper crankshaft bearings and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

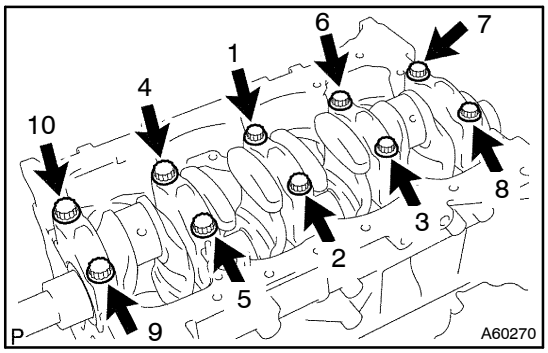
(e) Check each main journal and bearing for pitting and scratches.

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.

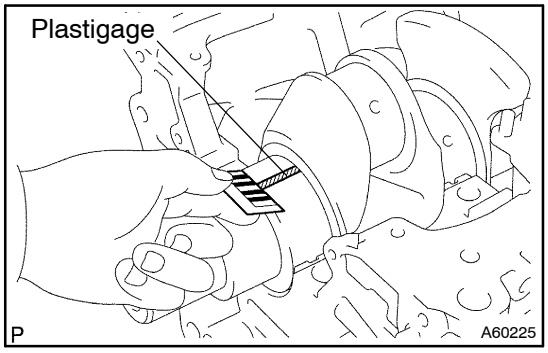


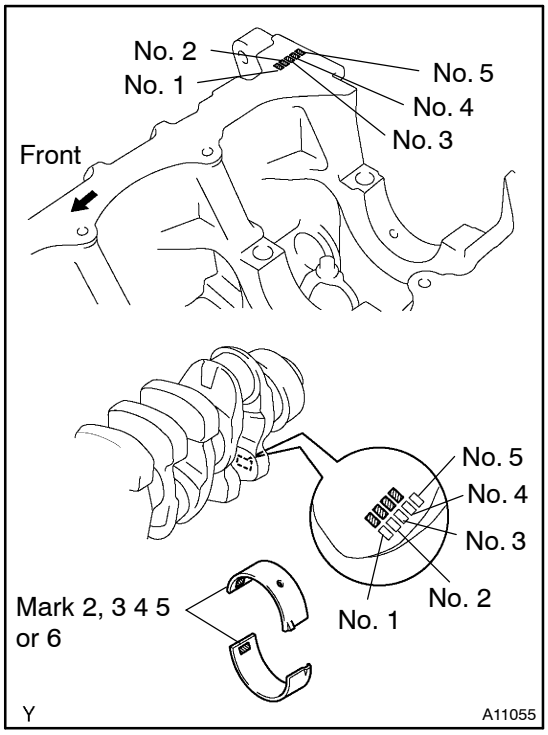
(h) Install the 5 crankshaft bearing caps with the 10 bolts (See step 38).

NOTICE:

Do not turn the crankshaft.

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





(j) Measure the Plastigage at its widest point.

Standard oil clearance:

0.030 – 0.048 mm (0.00118 – 0.00189 in.)

Maximum clearance: 0.10 mm (0.0039 in.)

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

HINT:

If replacing the cylinder block subassembly, the bearing standard clearance will be:

0.030 – 0.048 mm (0.00118 – 0.00189 in.)

HINT:

If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked 2, 3, 4, 5 and 6 accordingly.

Item	Number Mark								
Cylinder block	1			2			3		
Crankshaft	1	2	3	1	2	3	1	2	3
Use bearing	2	3	4	3	4	5	4	5	6

HINT:

EXAMPLE: Cylinder block ”2” + crankshaft ”1”

= Total number 3 (Use bearing ”3”)

Reference

Cylinder block main journal bore diameter:

Mark 1	75.000 – 75.006 mm (2.9528 – 2.9530 in.)
Mark 2	75.006 – 75.012 mm (2.9530 – 2.9532 in.)
Mark 3	75.012 – 75. 018 mm (2.9532 – 2.9535 in.)

Crankshaft journal diameter:

Mark 1	69.994 – 70.000 mm (2.7557 – 2.7559 in.)
Mark 2	69.988 – 69.994 mm (2.7554 – 2.7557 in.)
Mark 3	69.982 – 69.988 mm (2.7552 – 2.7554 in.)

Standard sized bearing center wall thickness:

Mark 2	2.482 – 2.485 mm (0.0977 – 0.0978 in.)
Mark 3	2.485 – 2.488 mm (0.0978 – 0.0980 in.)
Mark 4	2.488 – 2.491 mm (0.0980 – 0.0981 in.)
Mark 5	2.491 – 2.494 mm (0.0981 – 0.0982 in.)
Mark 6	2.494 – 2.497 mm (0.0982 – 0.0983 in.)

(k) Completely remove the Plastigage.

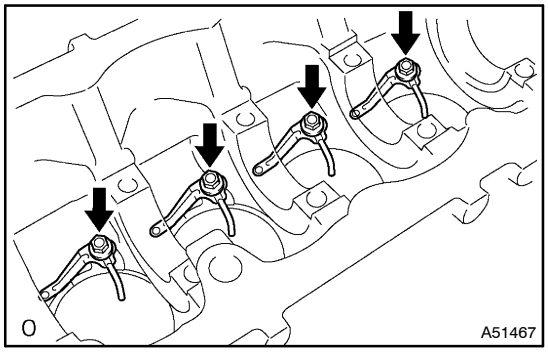
9. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

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

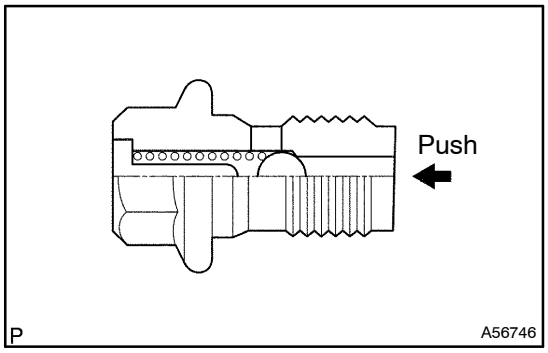
HINT:

Arrange the main bearing caps, bearings and thrust washers in correct order.



10. REMOVE SUB–ASSY OIL NOZZLE NO.1

(a) Remove the 4 check valves and oil nozzles.



11. INSPECT OIL CHECK VALVE SUB–ASSY

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

If stuck, replace the check valve.

12. INSPECT SUB–ASSY OIL NOZZLE NO.1

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

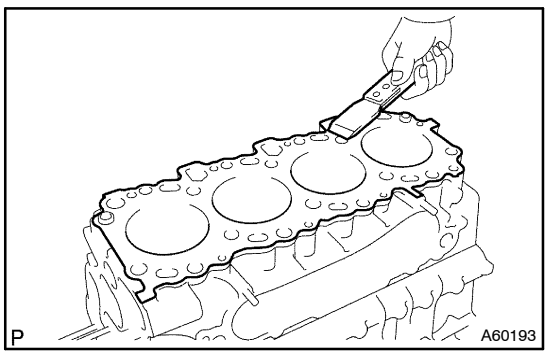
If necessary, replace the oil nozzle.

13. REMOVE STUD BOLT

14. REMOVE STRAIGHT PIN

15. REMOVE RING PIN

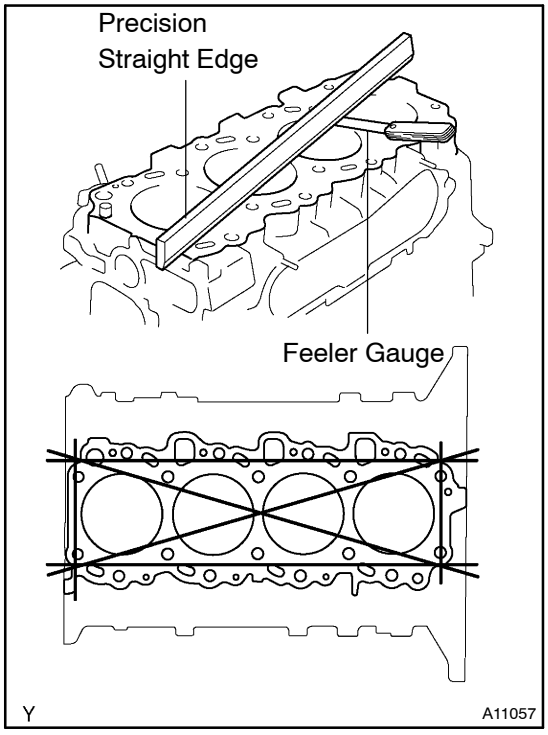
16. REMOVE TIGHT PLUG



17. CLEAN CYLINDER BLOCK 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.



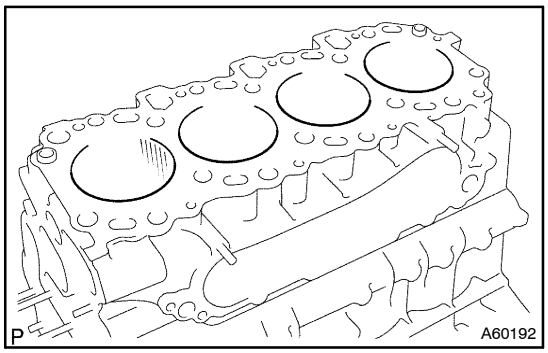
18. INSPECT CYLINDER BLOCK ASSY

(a) Inspect for flatness.

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

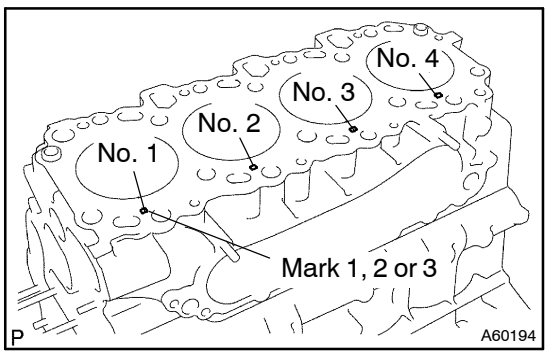
Maximum warpage: 0.10 mm (0.0039 in.)

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



(b) Visually check the cylinder for vertical scratches.

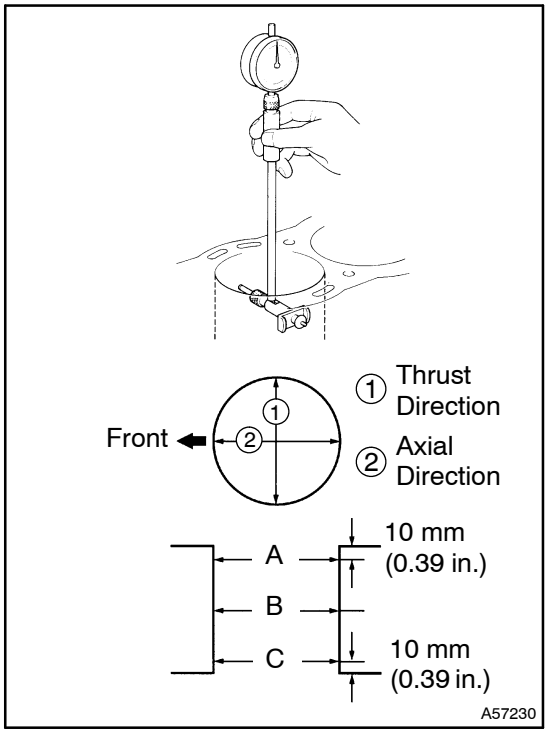
If deep scratches are present, rebore all the 4 cylinders. If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.

HINT:

There are 3 sizes of the standard cylinder bore diameter, marked 1, 2 and 3 accordingly. The mark is stamped on the lower left rear 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.

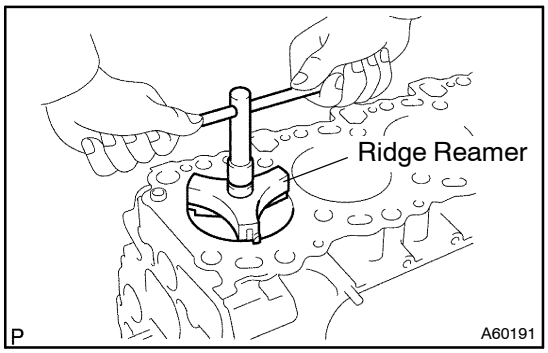
Standard diameter:

Mark 1	96.000 – 96.010 mm (3.7795 – 3.7799 in.)
Mark 2	96.010 – 96.020 mm (3.7799 – 3.7803 in.)
Mark 3	96.020 – 96.030 mm (3.7803 – 3.7807 in.)

Maximum diameter:

STD	92.23 mm (3.6311 in.)
O/S 0.50	92.73 mm (3.6508 in.)
O/S 0.75	96.96 mm (3.8137 in.)
O/S 1.00	97.23 mm (3.8279 in.)

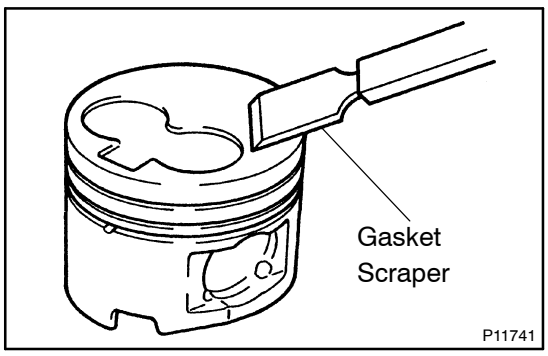
If the diameter is greater than maximum, rebore all the 4 cylinders. If necessary, replace the cylinder block.



(d) Remove the cylinder ridge.

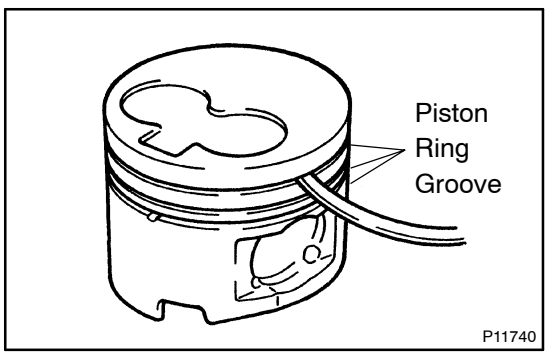
If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

SST 23801

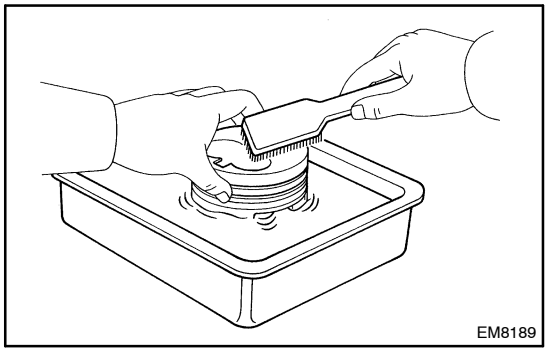


19. CLEAN W/PIN PISTON SUB–ASSY

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



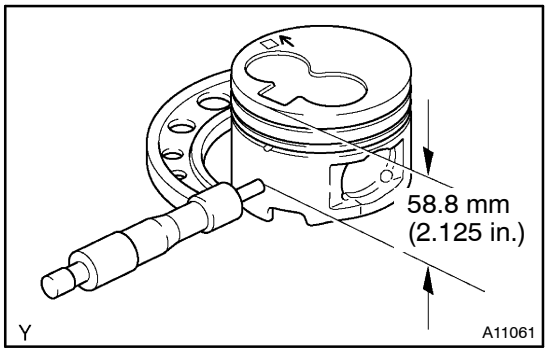
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



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

NOTICE:

Do not use a wire brush.



20. INSPECT W/PIN PISTON SUB–ASSY

(a) Inspect the piston oil clearance.

HINT:

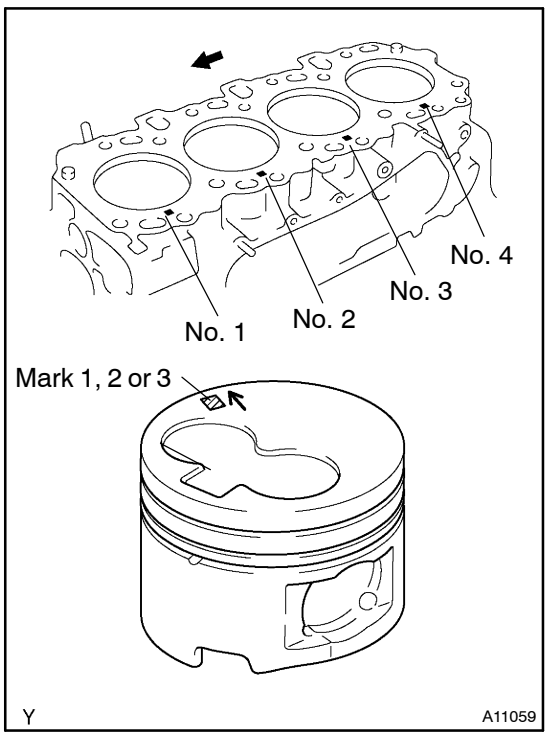
There are 3 sizes of the standard piston diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the piston top.

(1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 58.8 mm (2.125 in.) from the piston head.

Piston diameter:

STD	Mark 1	95.940 – 95.950 mm (3.7772 – 3.7776 in.)
	Mark 2	95.950 – 95.960 mm (3.7776 – 3.7779 in.)
	Mark 3	95.960 – 95.970 mm (3.7779 – 3.7783 in.)
O/S 0.50		96.440 – 96.470 mm (3.7968 – 3.7980 in.)
O/S 0.75		96.690 – 96.720 mm (3.8067 – 3.8079 in.)
O/S 1.00		96.940 – 96.970 mm (3.8165 – 3.8177 in.)

(2) Measure the cylinder bore diameter in the thrust directions (See step 18).



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

Standard oil clearance:

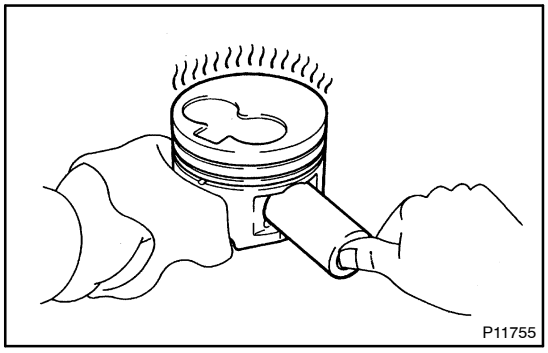
0.050 – 0.070 mm (0.0020 – 0.0028 in.)

Maximum oil clearance: 0.14 mm (0.0055 in.)

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

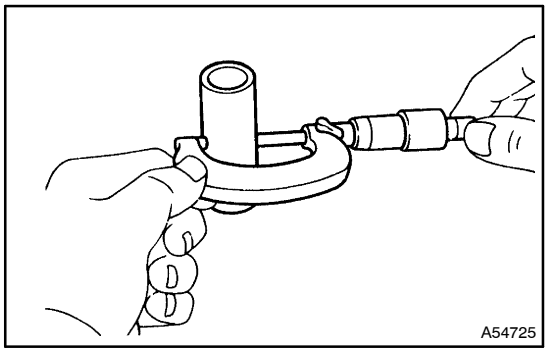
HINT:

Use a piston with the same number mark as the cylinder bore diameter marked on the cylinder block.

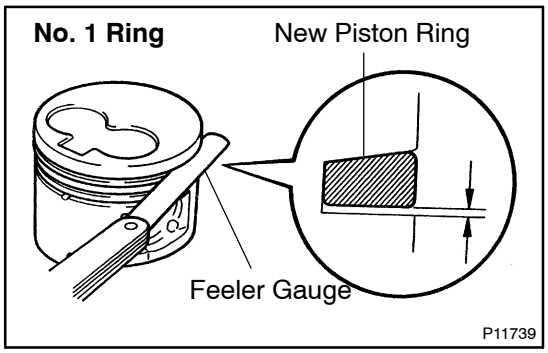


(b) Inspect the piston pin fit.
(1) At 80°C (176°F), you should be able to push the piston pin into the piston pin hole with your thumb.

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

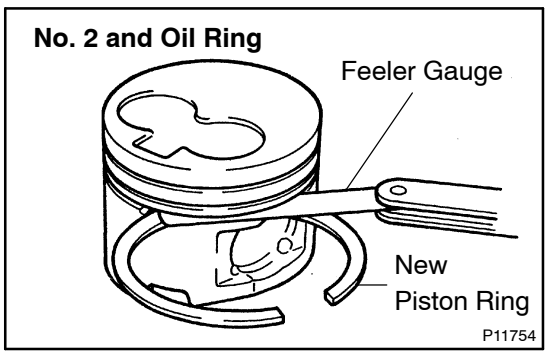


(c) Using a micrometer, measure the piston pin diameter.
Piston pin diameter:
34.000 – 34.012 mm (1.3386 – 1.3391 in.)



21. INSPECT PISTON RING SET

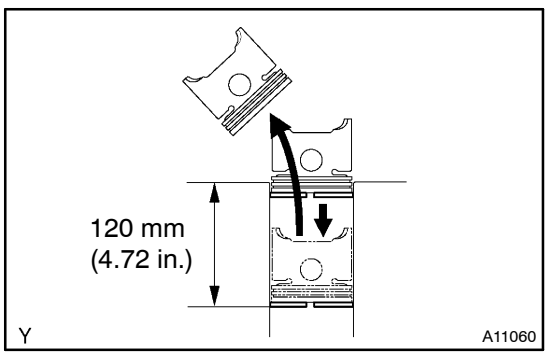
(a) Inspect the piston ring groove clearance.
(1) No. 1 ring:
Install a new No. 1 piston ring to the piston. Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.
Ring groove clearance (No. 1):
0.060 – 0.110 mm (0.0024 – 0.0043 in.)



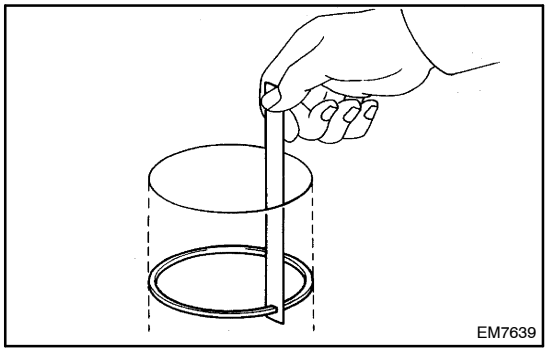
(2) No. 2 and oil ring:
Using a feeler gauge, measure the clearance between the new piston ring and the wall of the ring groove.
Ring groove clearance (No. 2 and oil ring):

No. 2	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
Oil	0.020 – 0.060 mm (0.0004 – 0.0024 in.)

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



(b) Inspect the piston ring end gap.
(1) Insert the piston ring into the cylinder bore.
(2) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 120 mm (4.72 in.) from the top of the cylinder block.



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

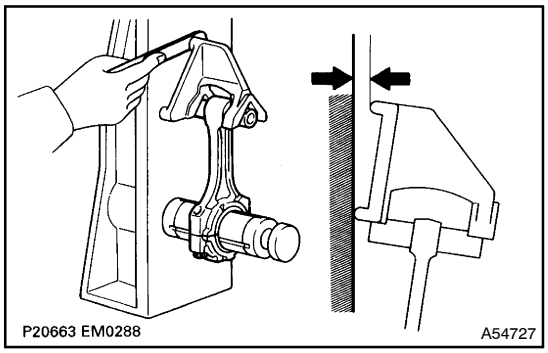
Standard end gap:

No. 1	0.350 – 0.470 mm (0.0138 – 0.0185 in.)
No. 2	0.400 – 0.500 mm (0.0157 – 0.0197 in.)
Oil	0.200 – 0.400 mm (0.0079 – 0.0157 in.)

Maximum end gap:

No. 1	1.03 mm (0.0406 in.)
No. 2	1.10 mm (0.0433 in.)
Oil	0.87 mm (0.0343 in.)

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



22. INSPECT CONNECTING ROD SUB–ASSY

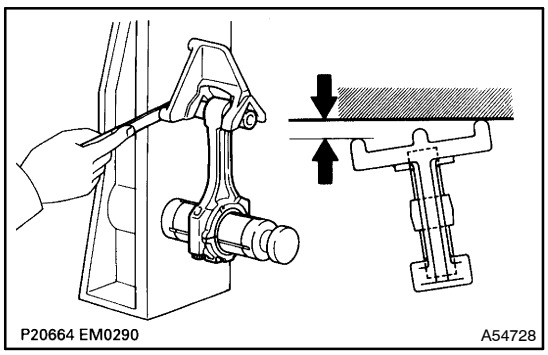
(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.

(1) Check for bend.

Maximum bend:

0.03 mm (0.0012 in.) per 100 mm (3.94 in.)

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

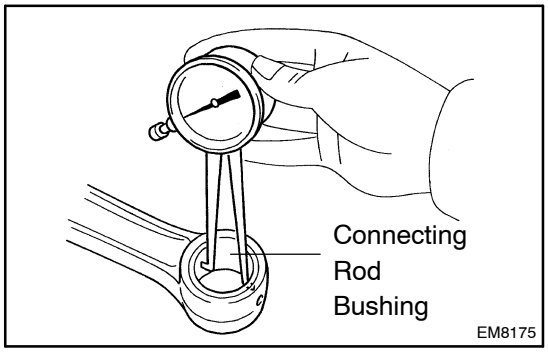


(2) Check for twist

Maximum twist:

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

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



(b) Inspect the piston pin oil clearance.

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

Bush inside diameter:

34.012 – 34.024 mm (1.3391 – 1.3395 in.)

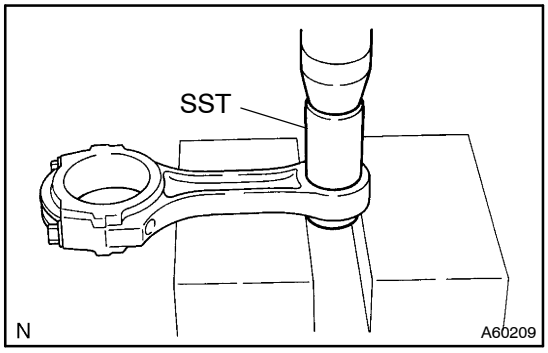
(2) Subtract the piston pin diameter measurement (See step 20) from the bush inside diameter measurement.

Standard oil clearance:

0.008 – 0.016 mm (0.0003 – 0.0006 in.)

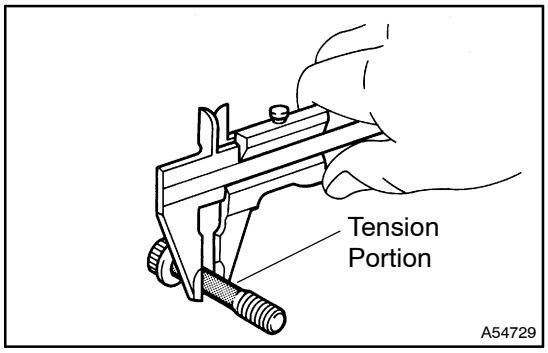
Maximum oil clearance: 0.03 mm (0.0012 in.)

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



23. REMOVE CONNECTING ROD SMALL END BUSH

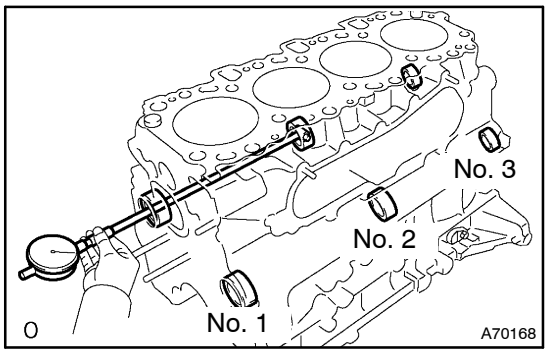
(a) Using SST and a press, press out the bush.
SST 09222–06010 (09222–06031)



24. INSPECT CONNECTING ROD BOLT

(a) Using vernier calipers, measure the tension portion of the connecting rod bolt.
Standard diameter:
8.500 – 8.600 mm (0.3347 – 0.3385 in.)
Minimum diameter: 8.30 mm (0.3268 in.)

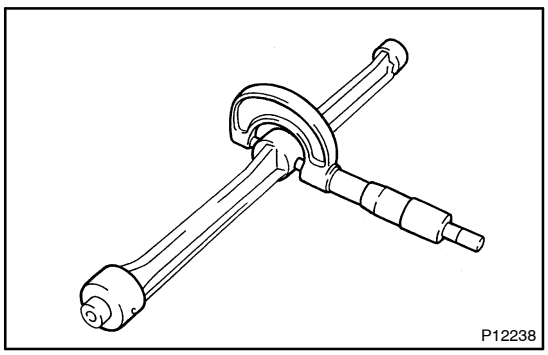
If the diameter is less than minimum, replace the bolt.



25. INSPECT NO.1 BALANCESHAFT SUB–ASSY

(a) Using cylinder gauge, measure the inside diameter of the balance shaft bearing.
Bearing inside diameter (from front side):

No. 1	42.000 – 42.020 mm (1.6535 – 1.6543 in.)
No. 2	41.000 – 41.020 mm (1.6142 – 1.6150 in.)
No. 3	32.000 – 32.020 mm (1.2598 – 1.2606 in.)



(b) Using a micrometer, measure the diameter of the balance shaft main journals.
Main journal diameter (from front side):

No. 1	41.941 – 41.960 mm (1.6512 – 1.6520 in.)
No. 2	40.931 – 40.950 mm (1.6115 – 1.6122 in.)
No. 3	31.941 – 31.960 mm (1.2575 – 12583 in.)

(c) Subtract the balance shaft main journal diameter measurement from the balance shaft bearing inside diameter measurement.

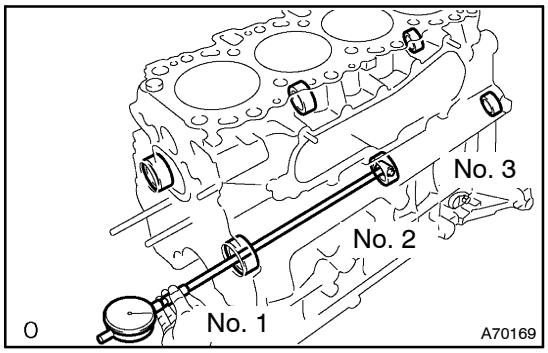
Standard oil clearance:

No. 1	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
No. 2	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
No. 3	0.050 – 0.089 mm (0.0020 – 0.0035 in.)

Maximum oil clearance:

No. 1	0.18 mm (0.0071 in.)
No. 2	0.19 mm (0.0075 in.)
No. 3	0.18 mm (0.0071 in.)

If the clearance is greater than maximum, replace the cylinder block and balance shaft.

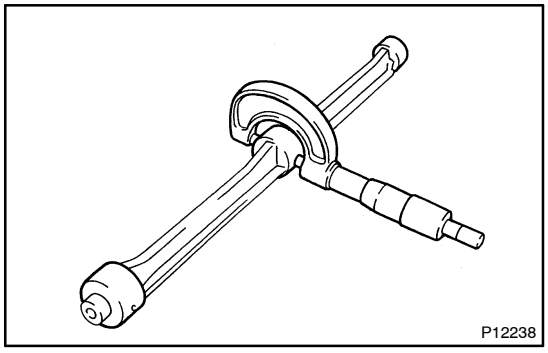


26. INSPECT NO.2 BALANCESHAFT SUB–ASSY

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

Bearing inside diameter (from front side):

No. 1	42.000 – 42.020 mm (1.6535 – 1.6543 in.)
No. 2	41.000 – 41.020 mm (1.6142 – 1.6150 in.)
No. 3	32.000 – 32.020 mm (1.2598 – 1.2606 in.)



(b) Using a micrometer, measure the diameter of the balance shaft main journals.

Main journal diameter (from front side):

No. 1	41.941 – 41.960 mm (1.6512 – 1.6520 in.)
No. 2	40.931 – 40.950 mm (1.6115 – 1.6122 in.)
No. 3	31.941 – 31.960 mm (1.2575 – 12583 in.)

(c) Subtract the balance shaft main journal diameter measurement from the balance shaft bearing inside diameter measurement.

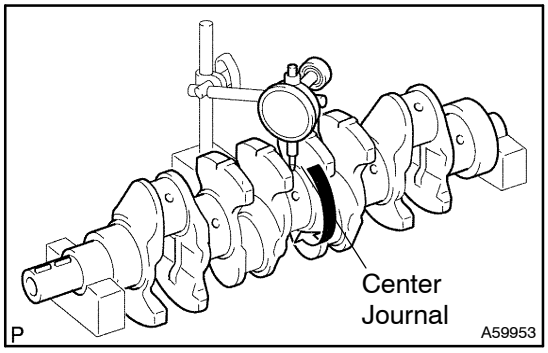
Standard oil clearance:

No. 1	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
No. 2	0.040 – 0.079 mm (0.0016 – 0.0031 in.)
No. 3	0.050 – 0.089 mm (0.0020 – 0.0035 in.)

Maximum oil clearance:

No. 1	0.18 mm (0.0071 in.)
No. 2	0.19 mm (0.0075 in.)
No. 3	0.18 mm (0.0071 in.)

If the clearance is greater than maximum, replace the cylinder block and balance shaft.



27. INSPECT CRANKSHAFT

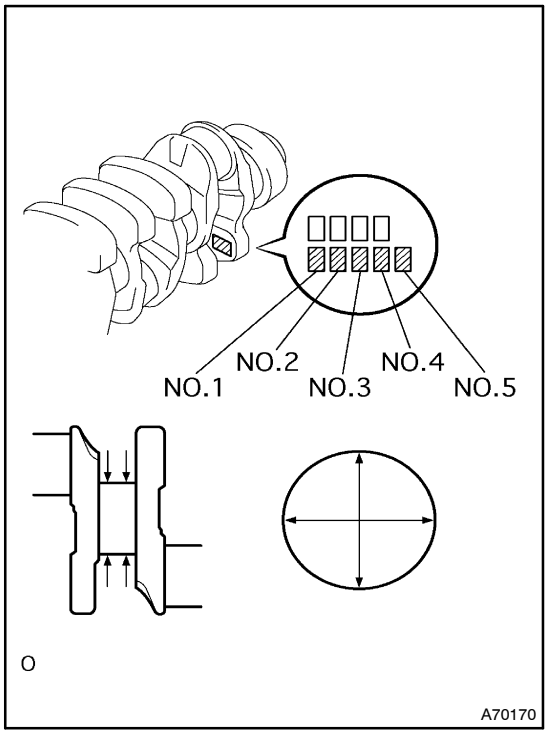
(a) Inspect for circle runout.

(1) Place the crankshaft on V–blocks.

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

Maximum circle runout: 0.06 mm (0.0024 in.)

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



(b) Inspect the main journals.

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

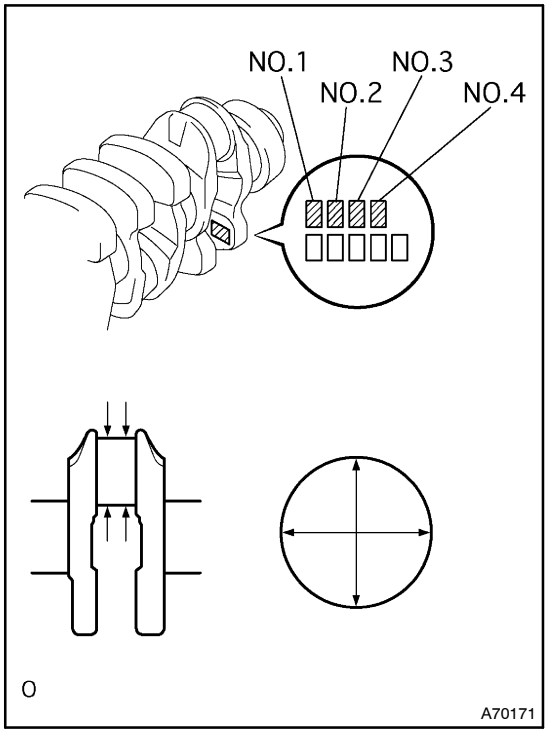
Main journal diameter:

STD	69.994 – 70.000 mm (2.75566 – 2.75590 in.)
U/S 0.25	69.988 – 69.994 mm (2.75543 – 2.75566 in.)
U/S 0.50	69.982 – 69.988 mm (2.75519 – 2.75543 in.)

(2) Check each main journal for taper and out–of–round as shown.

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

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



(c) Inspect the crank pins.

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

Crank pin diameter:

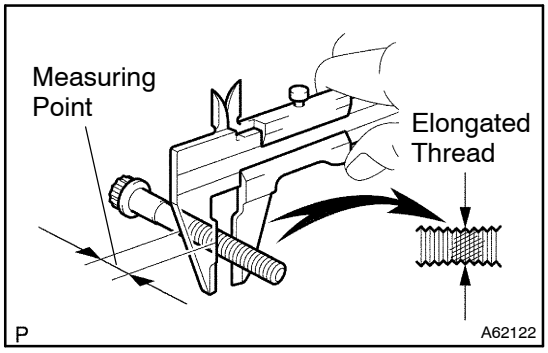
Mark 1	58.994 – 59.000 mm (2.32259 – 2.32283 in.)
Mark 2	58.988 – 59.994 mm (2.32236 – 2.32259 in.)
Mark 3	58.982 – 58.988 mm (2.32212 – 2.32239 in.)

If the diameter is not as specified, check the oil clearance (See step 4). If necessary, grid or replace the crankshaft.

(2) Check each crank pin for taper and out–of–round as shown.

maximum taper and out–of–round:
0.020 mm (0.0008 in.)

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

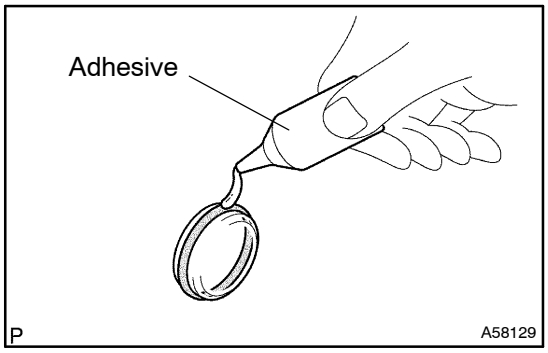


28. INSPECT CRANKSHAFT BEARING CAP BOLT

(a) Using vernier calipers, measure the minimum diameter of the compressed thread at the measuring point.

Standard diameter:
13.500 – 14.000 mm (0.5315 – 0.5512 in.)
Minimum diameter: 12.60 mm (0.4961 in.)

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



29. INSTALL TIGHT PLUG

(a) Apply adhesive around tight plugs.

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

(1) Using SST, tap in the tight plug No. 1 as shown in the illustration.

SST 09950–60010 (09951–00450), 09950–70010 (09951–07100)

(2) Using SST, tap in the tight plug No. 2 as shown in the illustration.

SST 09950–60010 (09951–00350), 09950–70010 (09951–07100)

(3) Using SST, tap in the tight plug No. 3 as shown in the illustration.

SST 09950–60010 (09951–00400), 09950–70010 (09951–07100)

(4) Using SST, tap in the tight plug No. 4 as shown in the illustration.

SST 09950–60010 (09951–00350), 09950–70010 (09951–07100)

(5) Using SST, tap in the tight plug No. 5 as shown in the illustration.

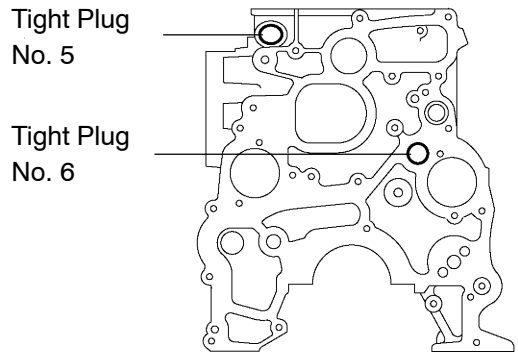
SST 09950–60010 (09951–00200), 09950–70010 (09951–07100)

(6) Using SST, tap in the tight plug No. 6 as shown in the illustration.

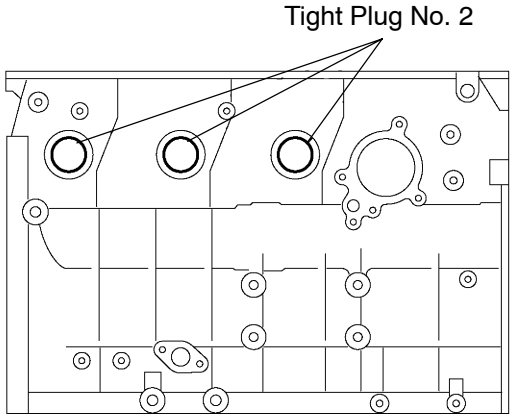
SST 09950–60010 (09951–00180), 09950–70010 (09951–07100)

(7) Using a 8mm socket wrench, tap in the tight plug No. 7 as shown in the illustration.

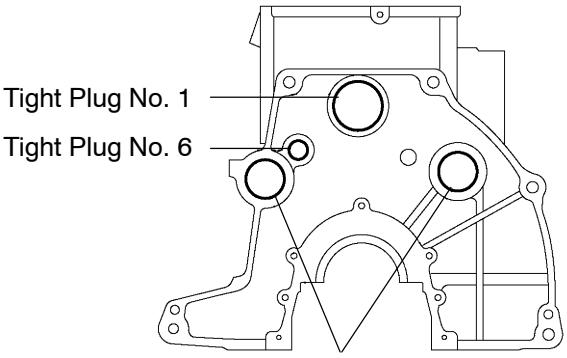
Front Side:



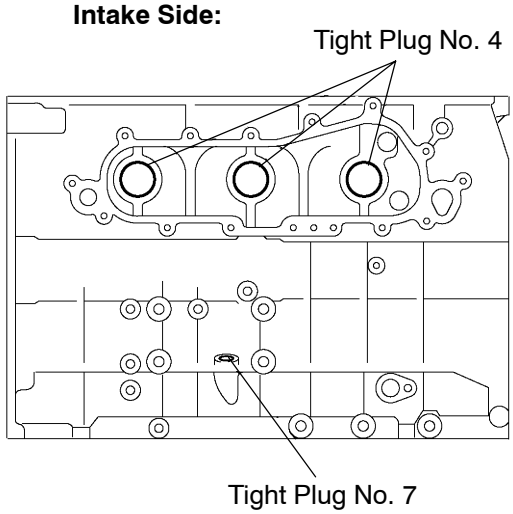
Exhaust Side:

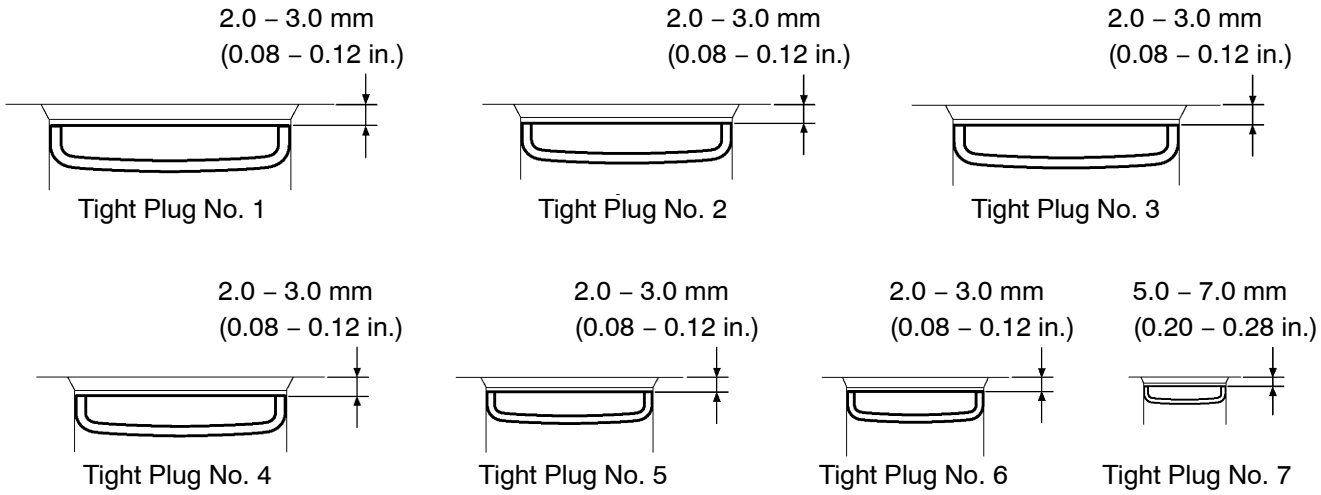


Rear Side:



Intake Side:





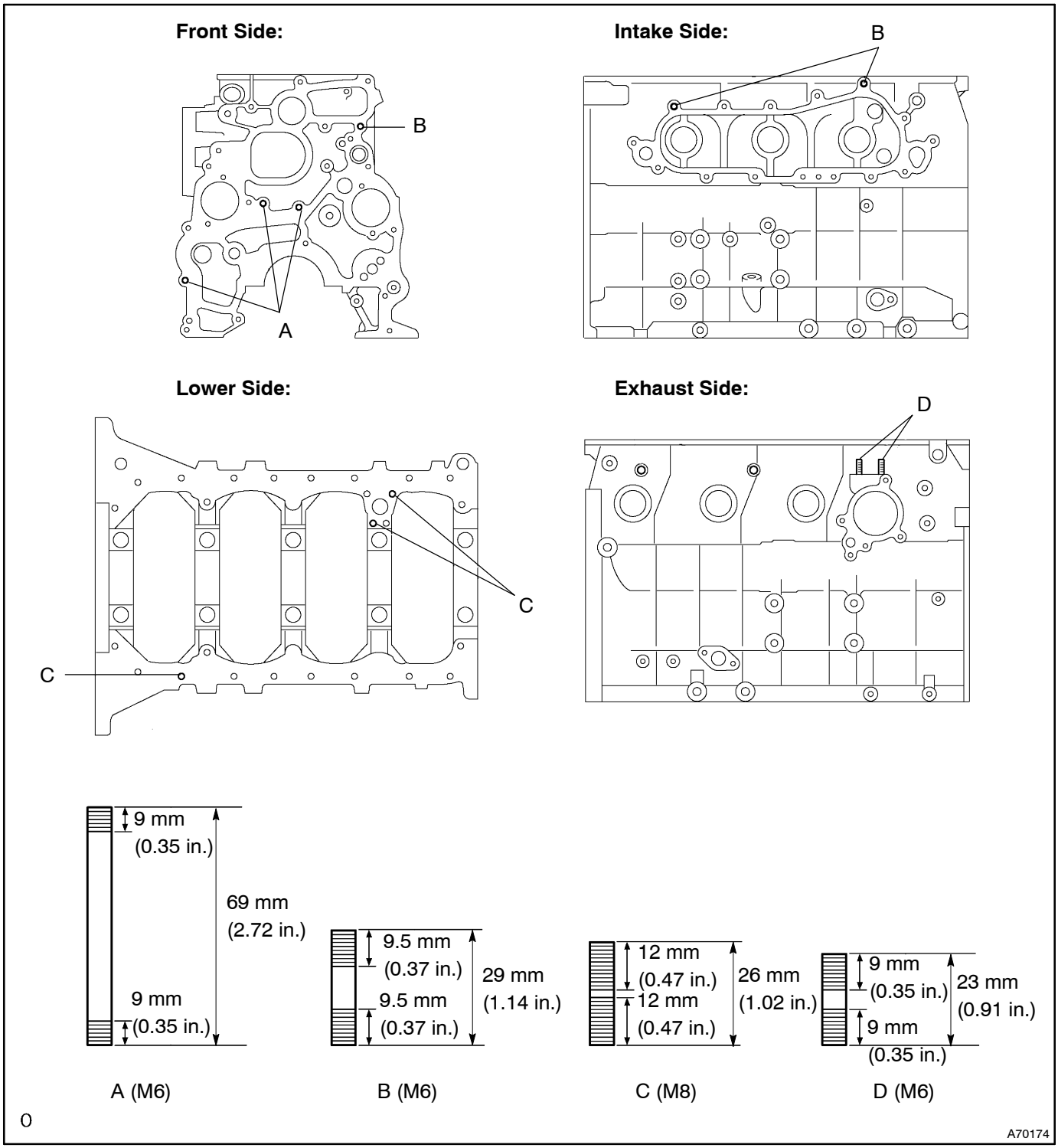
O

A70165

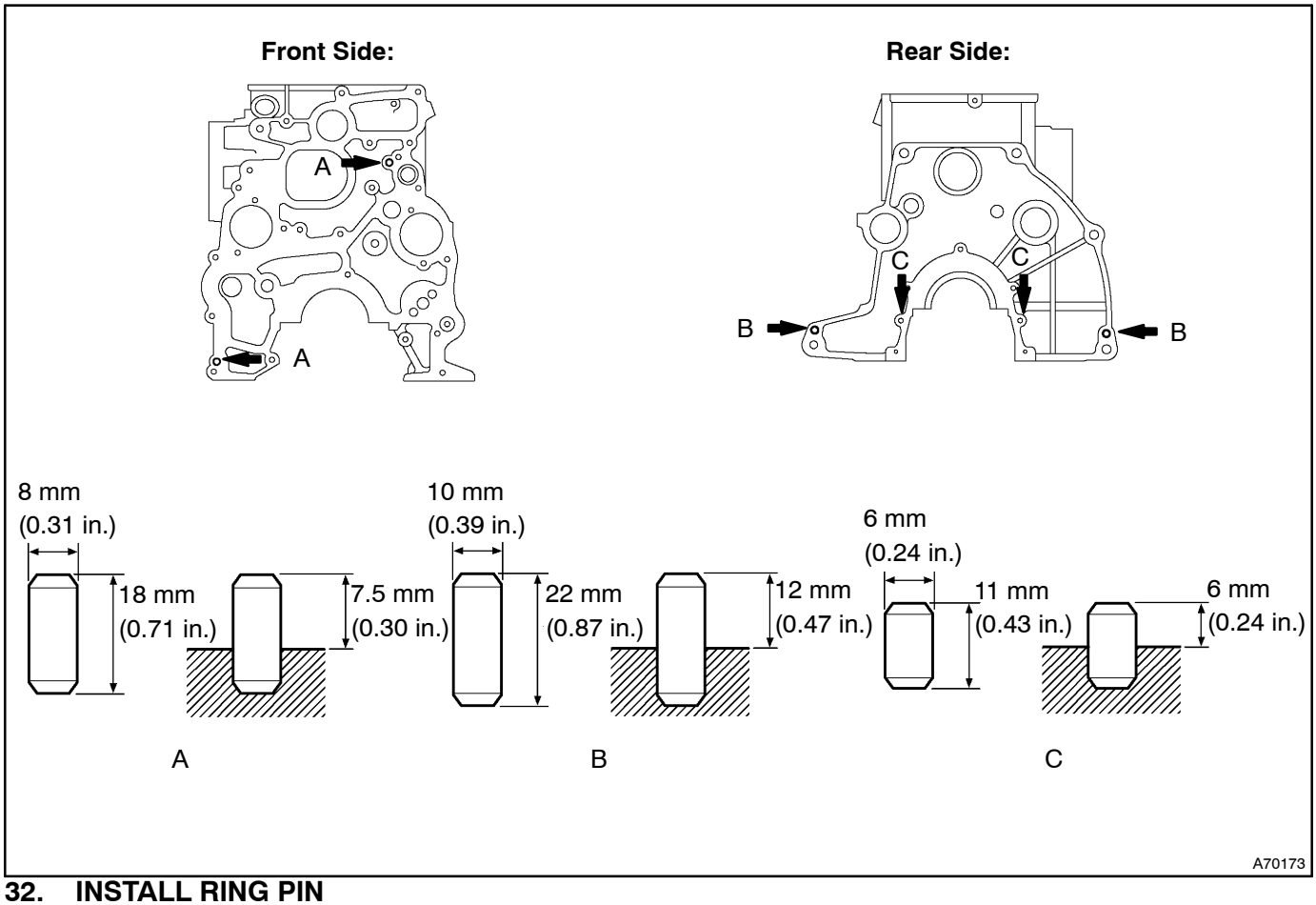
30. INSTALL STUD BOLT

(a) Install the stud bolts as shown in the illustration.

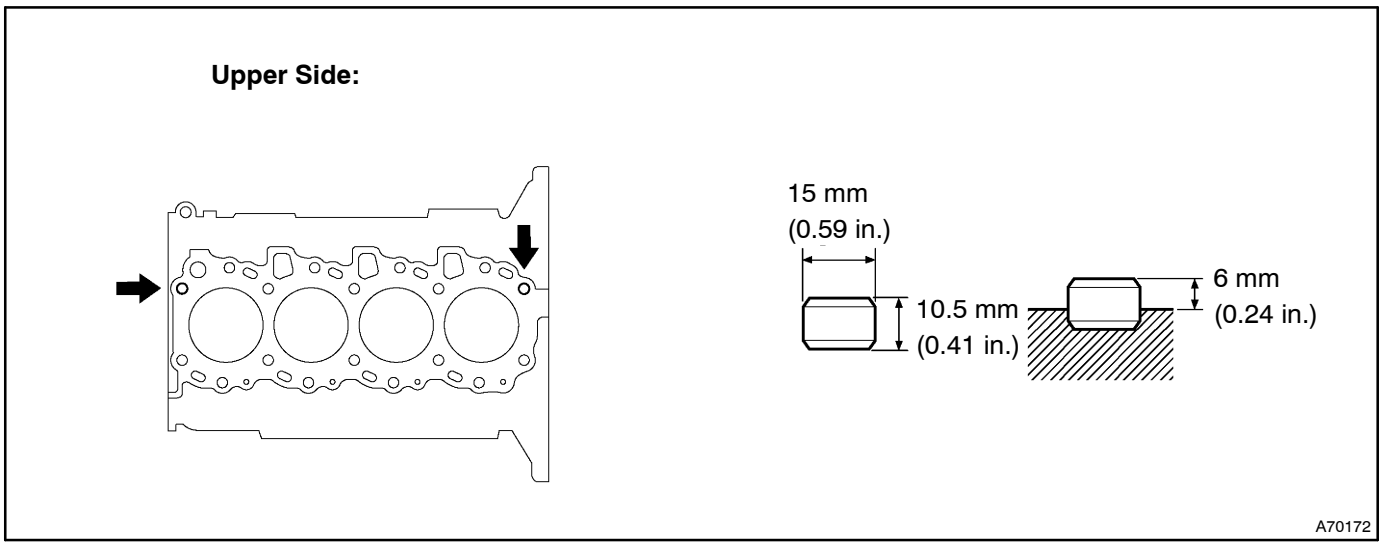
Torque:
Bolt A, B 7 N·m (71 kgf·cm, 62 ft·lbf)
Bolt C 8 N·m (82 kgf·cm, 71 ft·lbf)
Bolt D, E 4 N·m (41 kgf·cm, 35 ft·lbf)

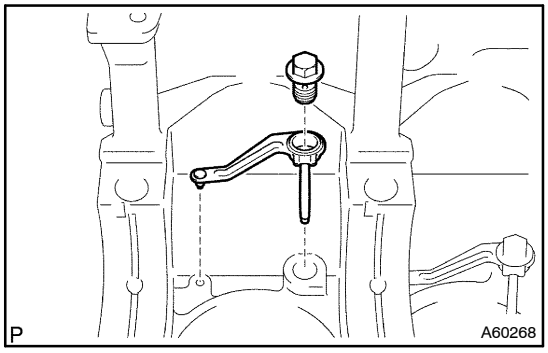


31. INSTALL STRAIGHT PIN



32. INSTALL RING PIN

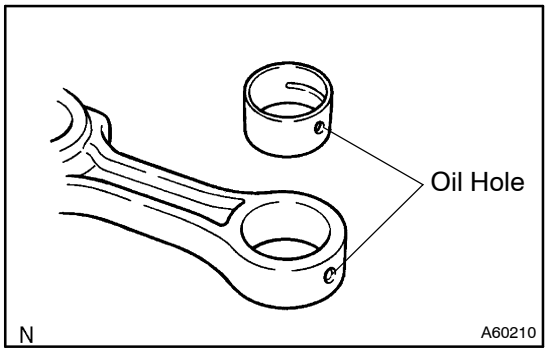




33. INSTALL SUB–ASSY OIL NOZZLE NO.1

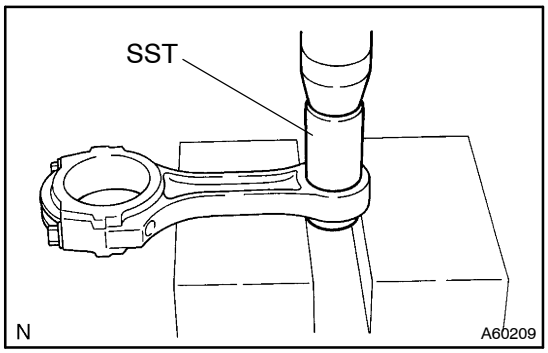
(a) Align the pin of the oil nozzle with the pin hole of the cylinder block.

(b) Install the oil nozzle with the check valve. Install the 4 oil nozzles and check valves.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

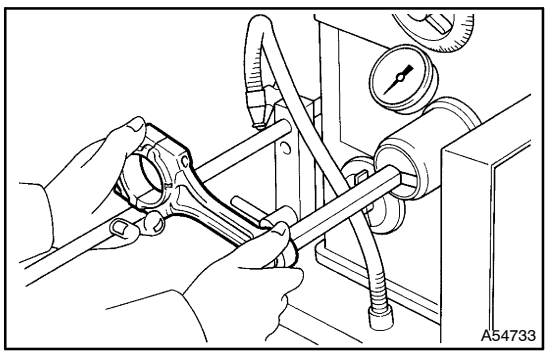


34. INSTALL CONNECTING ROD SMALL END BUSH

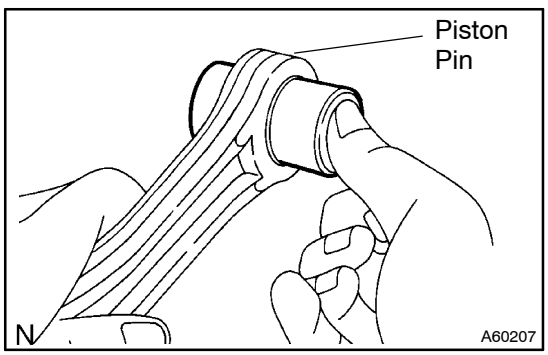
(a) Align the oil holes of a new bush and the connecting rod.



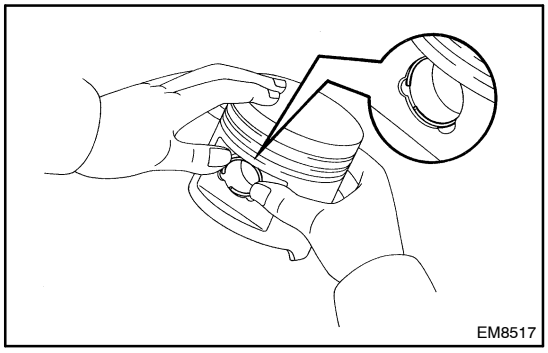
(b) Using SST and a press, press in the bush.
SST 09222–06010 (09222–06031)



(1) Using a pin hole grinder, hone the bush to obtain the standard specified clearance (See step 22) between the bush and piston pin.



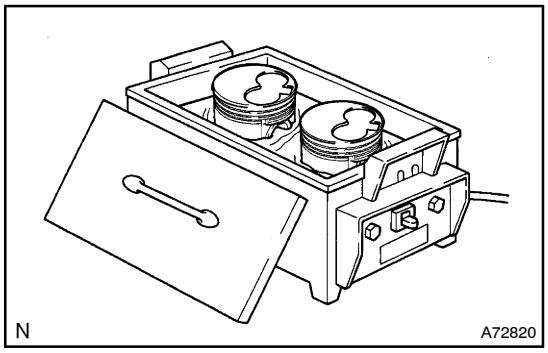
(2) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.



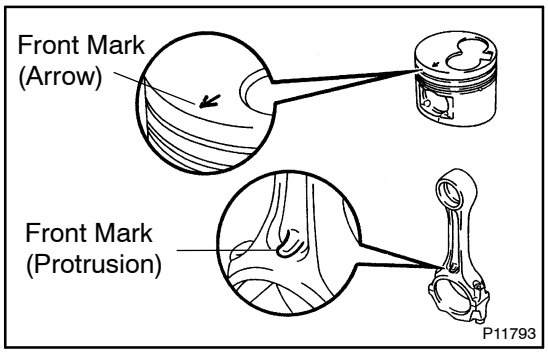
35. INSTALL W/PIN PISTON SUB–ASSY

(a) Assemble the piston and connecting rod.

(1) Using a small screwdriver, install a new snap ring on one side of the piston pin hole.

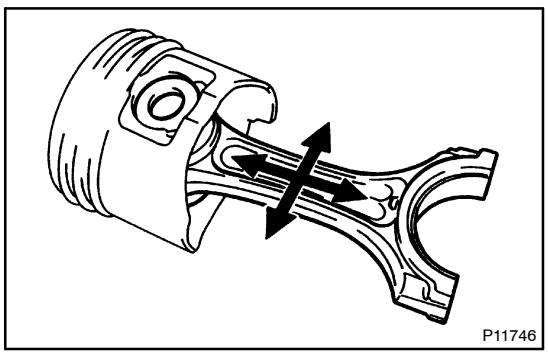


(2) Gradually heat the piston to about 80˚C (176˚F).



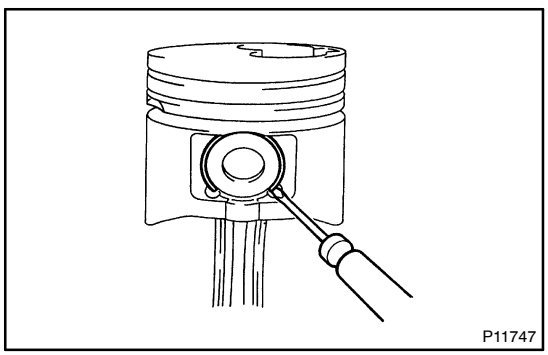
(3) Coat the piston pin with engine oil.

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

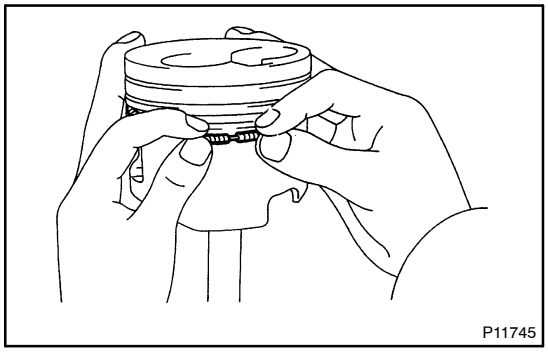


(5) Check fit between the piston and piston pin.

- Try to move the piston back and forth on the piston pin.



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

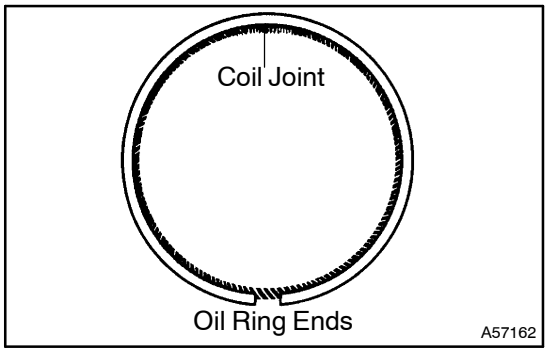

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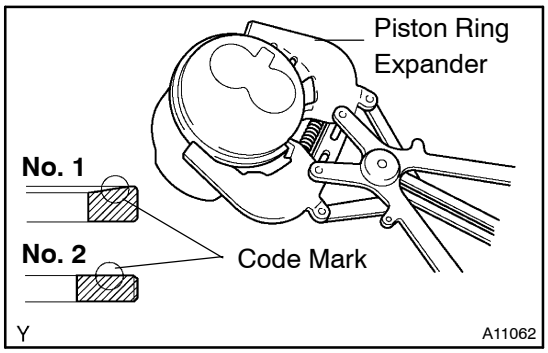
(b) Install the piston rings.

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

HINT:

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

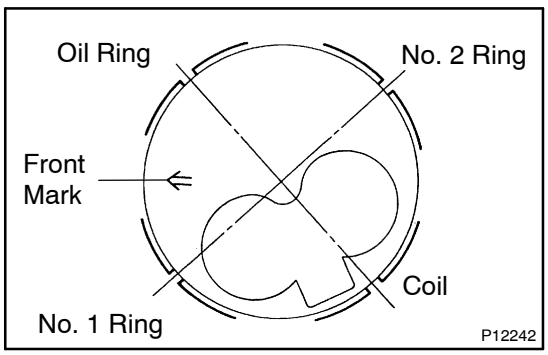




(2) Using a piston ring expander, install the No. 1 and No. 2 piston rings with the code mark facing upward.

Code mark:

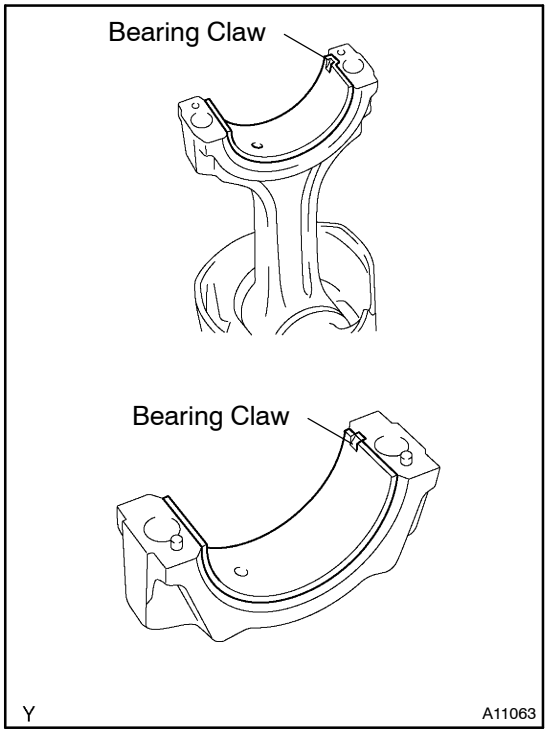
No. 1	1N
No. 2	2N



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

NOTICE:

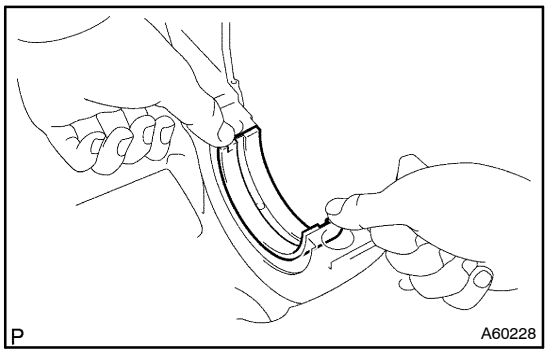
Do not align the ring ends.



36. INSTALL CONNECTING ROD BEARING

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

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

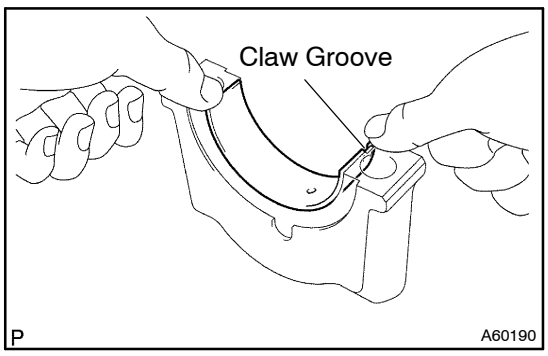


37. INSTALL CRANKSHAFT BEARING

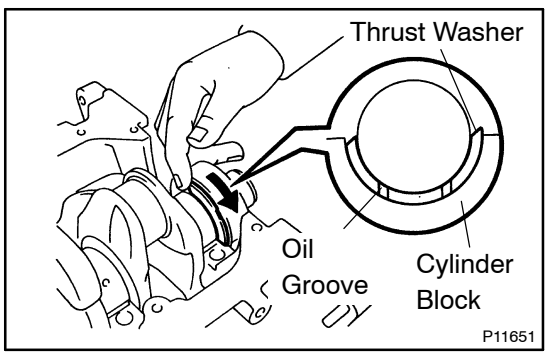
HINT:

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

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



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



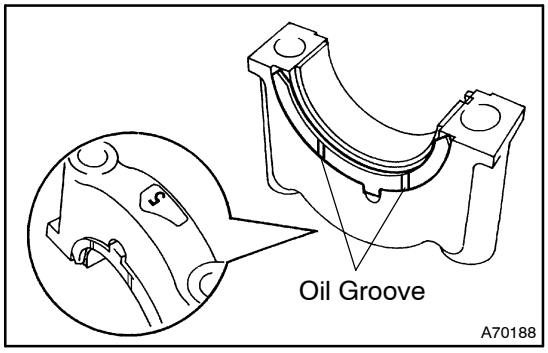
38. INSTALL CRANKSHAFT

(a) Place the crankshaft on the cylinder block.

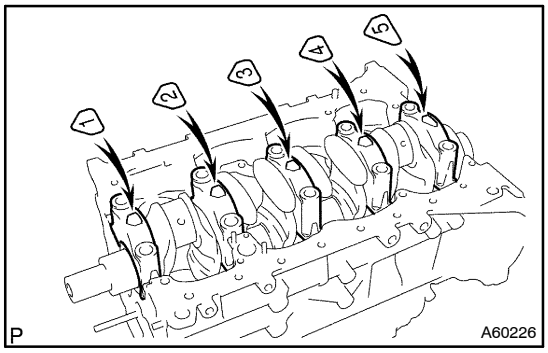
(b) Install the 2 upper thrust washers to the No. 5 journal position of the cylinder block.

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

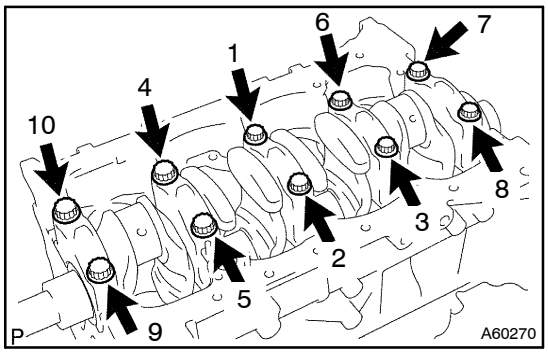
(2) Install the 2 thrust washers with the oil grooves facing outward.



(c) Install the 2 thrust washers on the No. 5 bearing cap with the grooves facing outward.



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



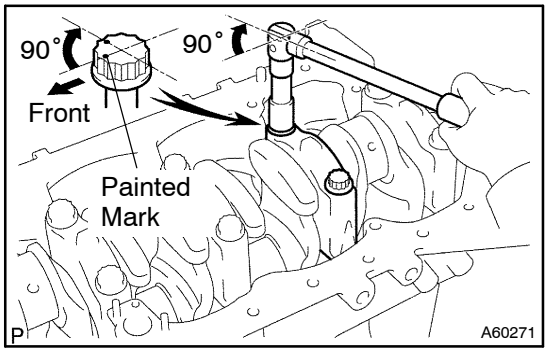
(e) Install the crankshaft bearing cap bolts.

HINT:

- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any one of the main bearing cap bolt is broken or deformed, replace it.
  (1) Apply a light coat of the engine oil on the threads and under the bolt heads of the main bearing caps.
  (2) Install and uniformly tighten the 10 bolts of the main bearing caps, in several passes, in the sequence shown.

  Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

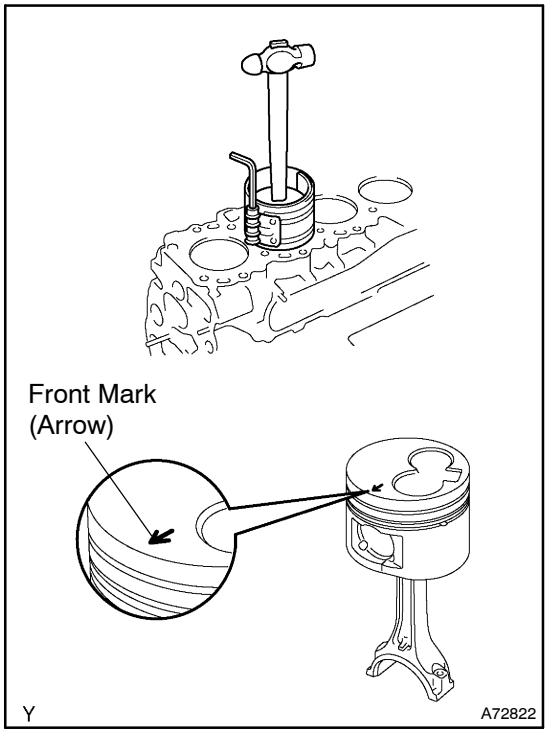
If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



(3) Mark the front of the main bearing cap bolt with paint.
(4) Retighten the main bearing cap bolts 90 ° in the numerical order shown above.
(5) Check that the painted mark is now at a 90 ° angle to the front.

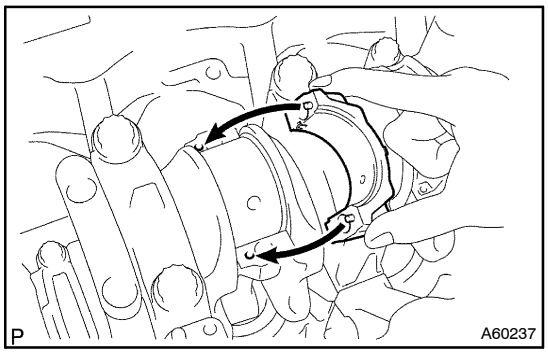
(f) Check that the crankshaft turns smoothly.

(g) Check the crankshaft thrust clearance (See step 7).

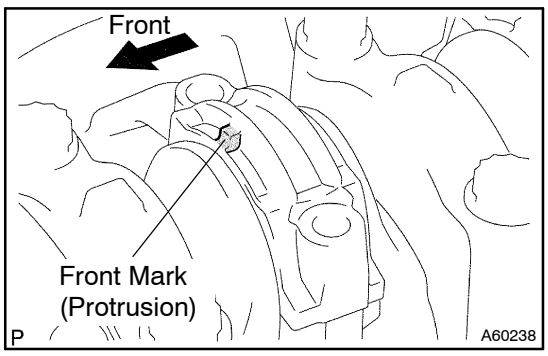


39. INSTALL PISTON AND CONNECTING ROD

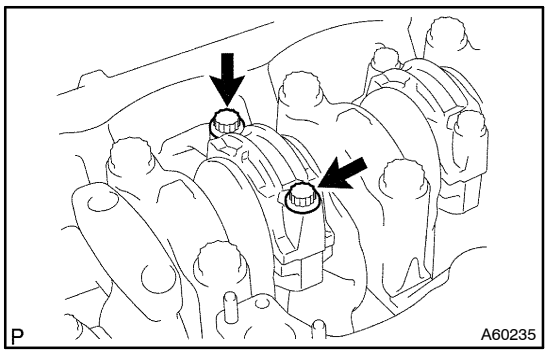
(a) Using a piston ring compressor, push the correctly numbered piston and connecting rod assembly into the cylinder with the front mark of the piston facing forward.



(b) Place the connecting rod cap on the connecting rod.
   (1) Match the numbered connecting rod cap with the connecting rod.
   (2) Align the pins of the connecting rod cap with the pin holes 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.

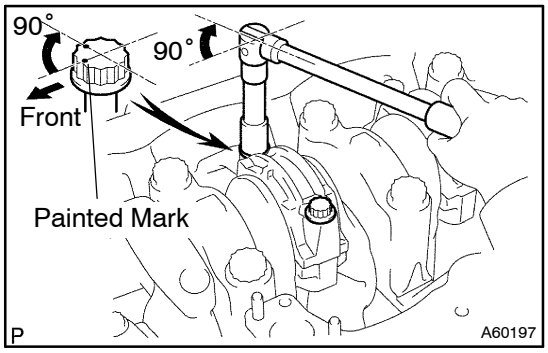
HINT:

- 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 of engine oil on the threads and under the heads of the connecting rod cap bolts.

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

Torque: 35 N·m (357 kgf·cm, 26 ft·lbf)

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



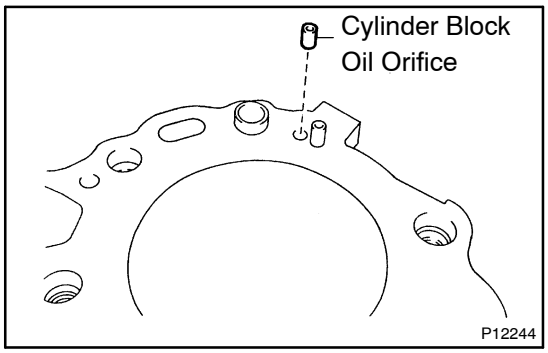
(3) Mark the front of the connecting rod cap bolts with paint.

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

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

(d) Check that the crankshaft turns smoothly.

(e) Check the connecting rod thrust clearance (See step 3).



40. INSTALL CYLINDER BLOCK OIL ORIFICE