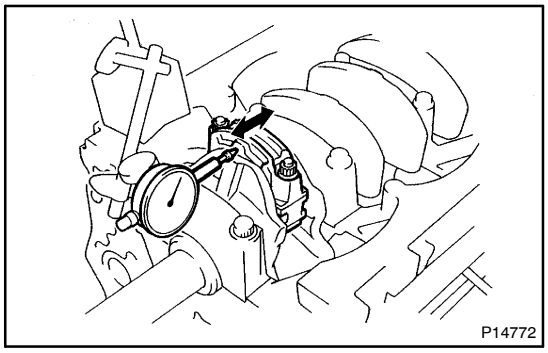
1412L–02

OVERHAUL

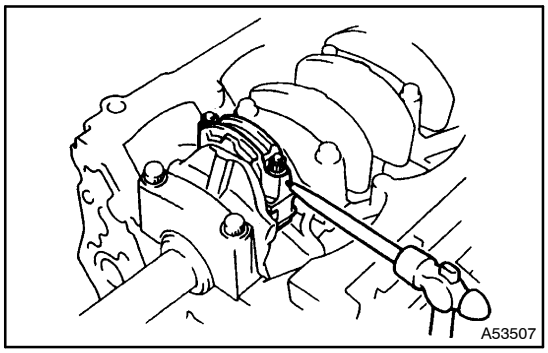

P14772

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:
0.160 – 0.312 mm (0.0063 – 0.0123 in.)
Maximum thrust clearance: 0.350 mm (0.0138 in.)

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


A53507

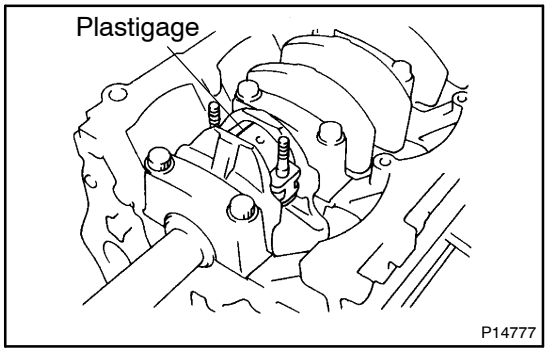
2. INSPECT CONNECTING ROD OIL CLEARANCE

(a) Using a center punch, mark the cylinder number on each connecting rod and connecting rod cap.

HINT:
The match marks on the connecting rods and connecting rod caps are for ensuring correct reassembly.

(b) Using a socket wrench (12 mm) (double hexagon), remove the 2 connecting rod cap nuts.
(c) Remove the connecting rod cap together with the connecting rod bearing (lower).
(d) Clean the crank pin and connecting rod bearing (lower).
(e) Check the crank pin and connecting rod bearing (lower) for pitting and scratches.

If the crank pin or connecting rod bearing (lower) is damaged, replace the connecting rod bearings. If necessary, grind or replace the crankshaft.

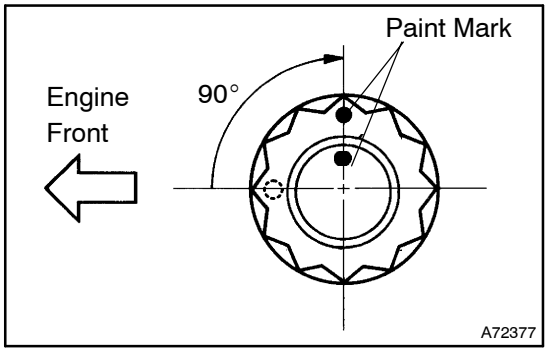


P14777

(f) Lay a strip of Plastigage across the crank pin.
(g) Apply a light coat of the engine oil on the threads and under the connecting rod cap nuts.
(h) Using a socket wrench (12 mm) (double hexagon), install and alternately tighten the connecting rod cap nuts in several passes.

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

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

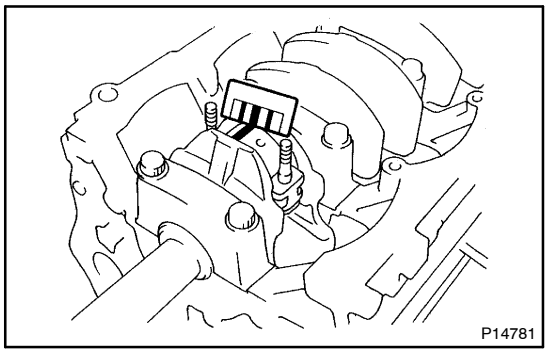


(i) Mark the front of the connecting rod cap nuts and bolt with paint.
(j) Retighten the connecting rod cap nuts 90° as shown in the illustration.
(k) Check that the painted mark on the nut is at a 90° angle in relation to the mark on the bolt.

NOTICE:

Do not turn the crankshaft.

(l) Using a socket wrench (12 mm) (double hexagon), remove the 2 connecting rod cap nuts.
(m) Remove the connecting rod cap together with the connecting rod bearing (lower).



(n) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	0.030 – 0.055 mm (0.0012 – 0.0022 in.)
U/S 0.25	0.030 – 0.071 mm (0.0012 – 0.0026 in.)

Maximum oil clearance: 0.10 mm (0.0039 in.)

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

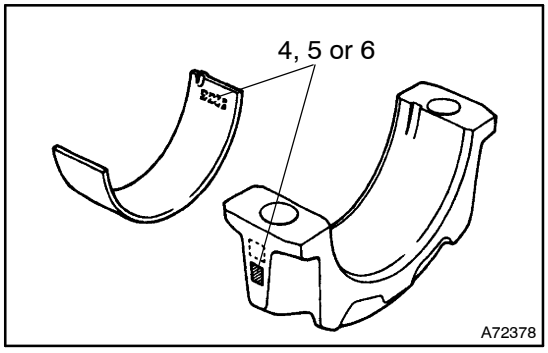
HINT:

If using a standard connecting rod bearing, replace with one having same number as marked on the connecting rod bearing cap. There are 3 sizes of standard connecting rod bearings, marked "4", "5" and "6" accordingly.

Reference:

Bearing center wall thickness

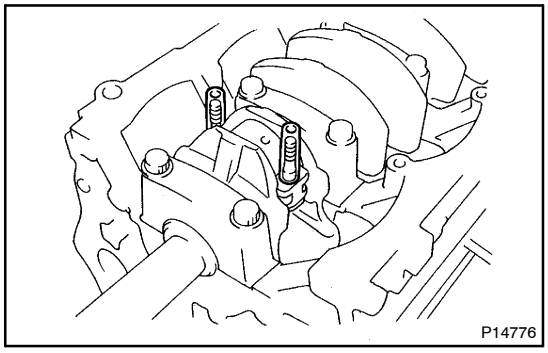
STD "4"	1.482 – 1.485 mm (0.0583 – 0.0585 in.)
STD "5"	1.485 – 1.488 mm (0.0585 – 0.0586 in.)
STD "6"	1.488 – 1.491 mm (0.0586 – 0.0587 in.)
U/S 0.25	1.601 – 1.607 mm (0.0630 – 0.0633 in.)

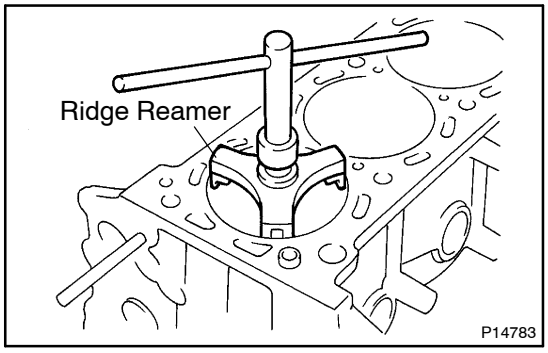


(o) Completely remove the Plastigage.

3. REMOVE CONNECTING ROD SUB–ASSY

(a) Cover the 2 connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

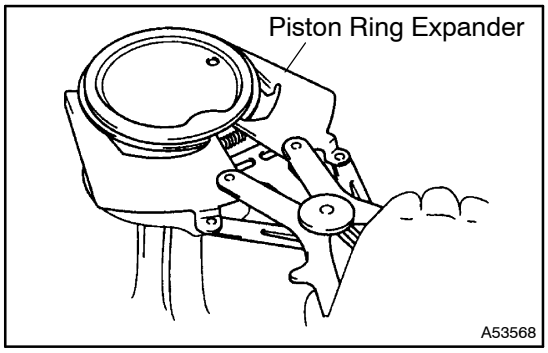




(b) Using a ridge reamer, remove the all carbon from the top of the cylinder.
(c) Push the piston, connecting rod and connecting rod bearing (upper) through the top of the cylinder block.

HINT:

- Keep the connecting rod bearing (upper) and connecting rod together.
- Arrange the piston and connecting rod assemblies in correct order.

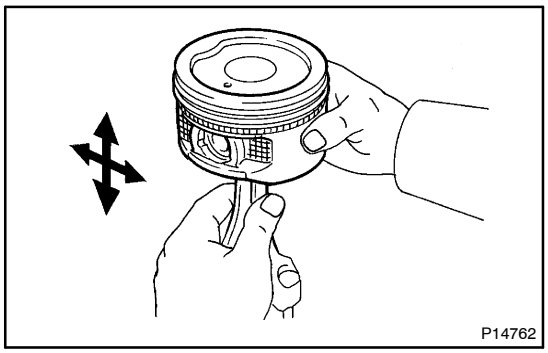


4. REMOVE PISTON RING SET

(a) Using a piston ring expander, remove the 2 compression springs.
(b) Remove the 2 side rails and oil ring by hand.

HINT:

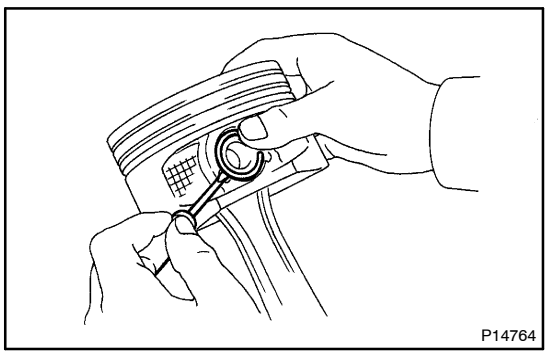
Arrange the piston rings in correct order only.



5. INSPECT W/PIN PISTON SUB–ASSY

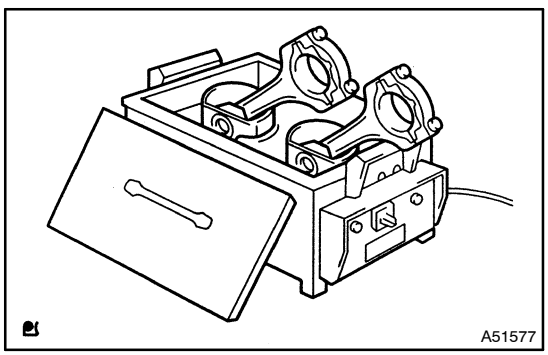
(a) Try to move the piston back and forth on the piston pin.

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

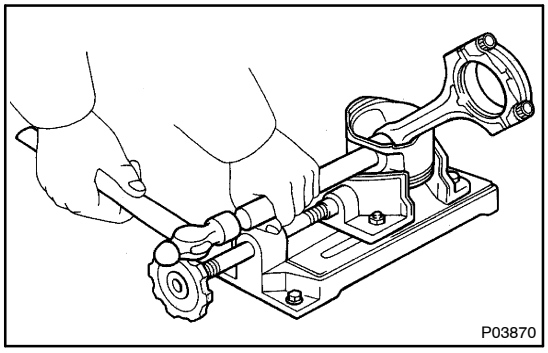


6. REMOVE W/PIN PISTON SUB–ASSY

(a) Using a small screwdriver, pry out the 2 hole snap rings.



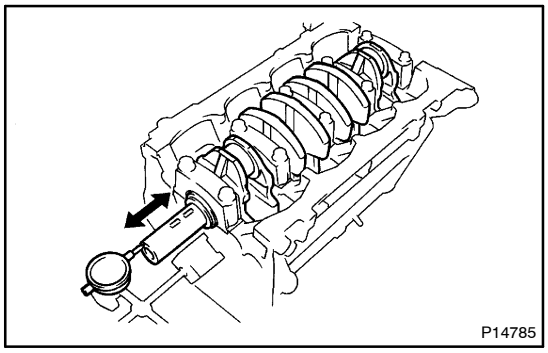
(b) Gradually heat the piston to 80 – 90°C (176 – 194°F).



(c) Using a brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

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



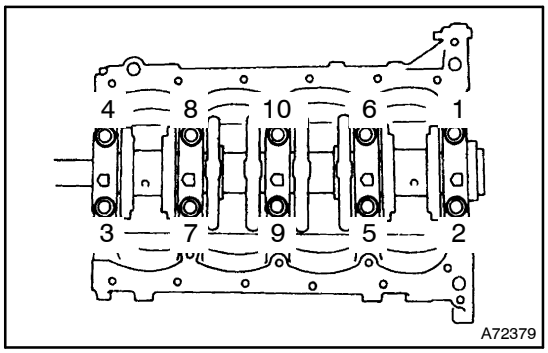
7. INSPECT CRANKSHAFT THRUST CLEARANCE

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

Standard thrust clearance:
0.020 – 0.220 mm (0.0008 – 0.0087 in.)
Maximum thrust clearance: 0.300 mm (0.0118 in.)

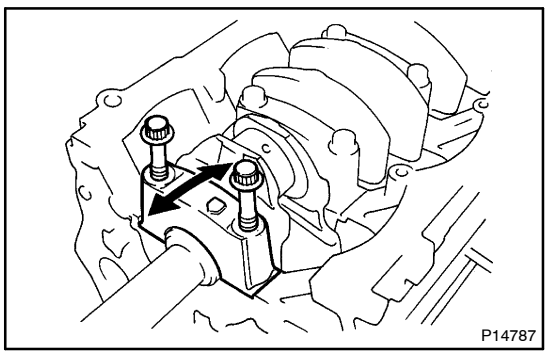
If the thrust clearance is greater than maximum, replace the crankshaft thrust washer as a set.

Crankshaft thrust washer thickness:
2.440 – 2.490 mm (0.0961 – 0.0980 in.)



8. INSPECT CRANKSHAFT OIL CLEARANCE

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



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

HINT:

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

(c) Lift out the crankshaft.

HINT:

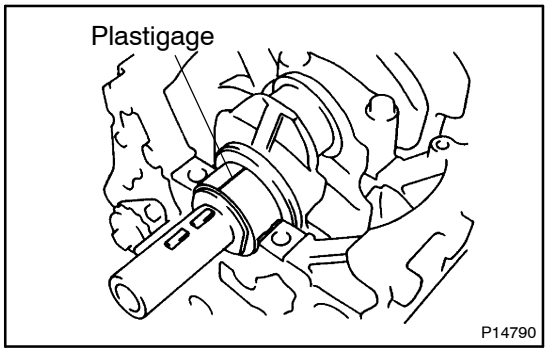
Keep the upper crankshaft bearings and upper crankshaft thrust washers together with the cylinder block.

(d) Clean each main journal and crankshaft bearings.

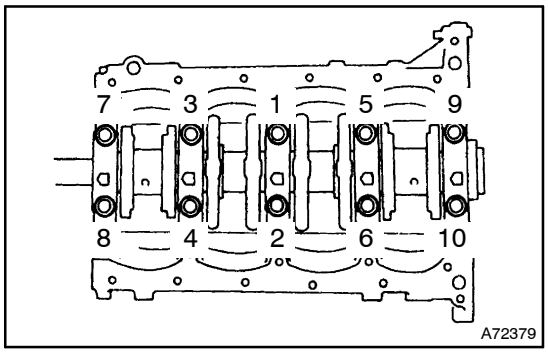
(e) Check each main journal and crankshaft bearing for pitting and scratches.

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

(f) Place the crankshaft on the cylinder block.



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

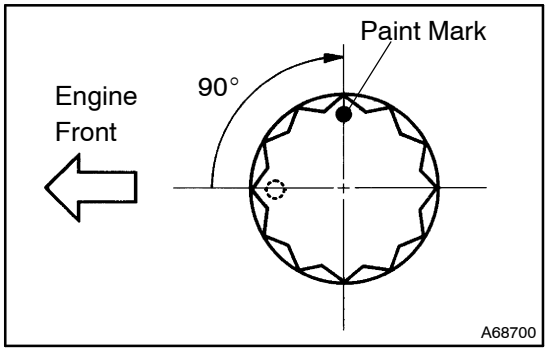


(h) Apply a light coat of the engine oil on the threads and under the heads of the crankshaft bearing cap bolts.

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

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

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



(j) Mark the front of the crankshaft bearing cap bolt with paint.

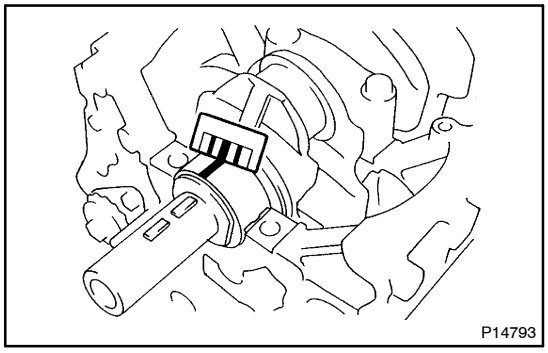
(k) Retighten the crankshaft bearing cap bolts by 90° in the numerical order shown above.

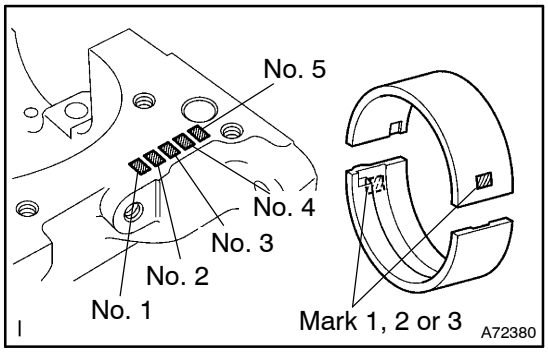
(l) Check that the painted mark is now at a 90° angle to the front.

NOTICE:

Do not turn the crankshaft.

(m) Remove the bearing caps.





(n) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	No. 3	0.030 – 0.055 mm (0.0012 – 0.0022 in.)
	Others	0.024 – 0.049 mm (0.0009 – 0.0019 in.)
U/S 0.25	No. 3	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
	Others	0.025 – 0.065 mm (0.0010 – 0.0026 in.)

Maximum oil clearance: 0.10 mm (0.0039 in.)

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

HINT:

If using a standard crankshaft bearing, replace with one having the same number as marked on the cylinder block. There are 3 sizes of standard crankshaft bearings, marked "1", "2" and "3" accordingly.

Standard bearing center wall thickness:

STD "1"	1.987 – 1.990 mm (0.0782 – 0.0783 in.)
STD "2"	1.991 – 1.993 mm (0.0784 – 0.0785 in.)
STD "3"	1.994 – 1.996 mm (0.0785 – 0.0786 in.)
U/S 0.25	2.106 – 2.112 mm (0.0829 – 0.0831 in.)

(o) Completely remove the Plastigage.

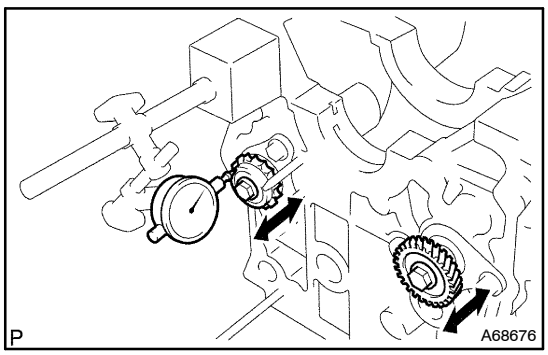
9. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

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

HINT:

Arrange the crankshaft bearings and crankshaft thrust washers in correct order.



10. INSPECT BALANCESHAFT THRUST CLEARANCE

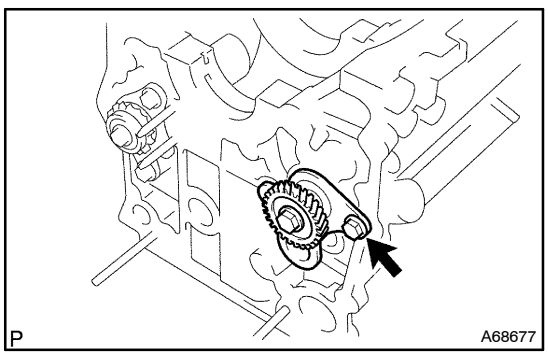
(a) Using a dial indicator, measure the thrust clearance while moving the balanceshaft back and forth.

Standard thrust clearance:

0.07 – 0.13 mm (0.0027 – 0.0051 in.)

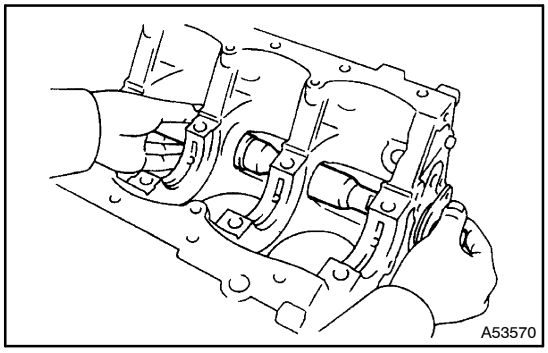
Maximum thrust clearance: 0.20 mm (0.0079 in.)

If the thrust clearance is greater than maximum, replace the balanceshaft thrust washer. If necessary, replace the balanceshaft.



11. REMOVE NO.1 BALANCESHAFT

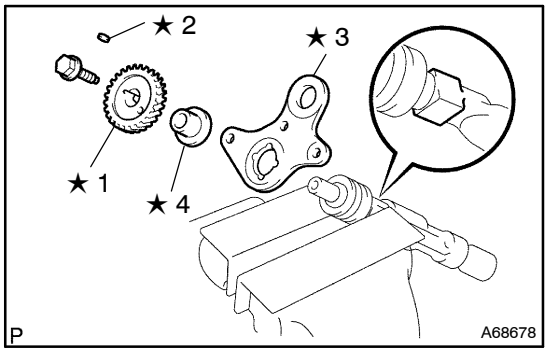
(a) Remove the bolt.



(b) Remove the balanceshaft from the cylinder block.

NOTICE:

When removing the balanceshaft make sure you support the balanceshaft with both hands and avoid scratching the balanceshaft bearing on the cylinder block side.



12. REMOVE BALANCESHAFT DRIVEN GEAR NO.1

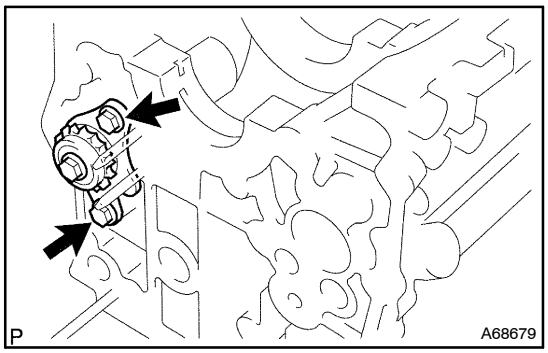
(a) Mount the hexagon wrench head portion of the balanceshaft in a vise.

NOTICE:

Be careful not to damage the balanceshaft.

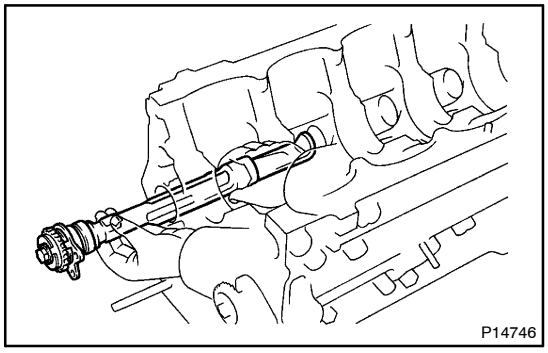
(b) Remove the bolt.

(c) Remove the balanceshaft driven gear (★ 1), sliding key (★ 2), balanceshaft thrust washer (★ 3) and balanceshaft thrust spacer (★ 4).



13. REMOVE NO.2 BALANCESHAFT

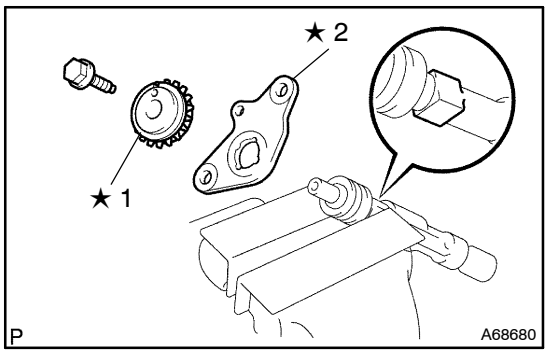
(a) Remove the 2 bolts.



(b) Remove the balanceshaft from the cylinder block.

NOTICE:

When removing the balanceshaft make sure you support the balanceshaft with both hands and avoid scratching the balanceshaft bearing on the cylinder block side.



14. REMOVE BALANCESHAFT DRIVEN GEAR NO.2

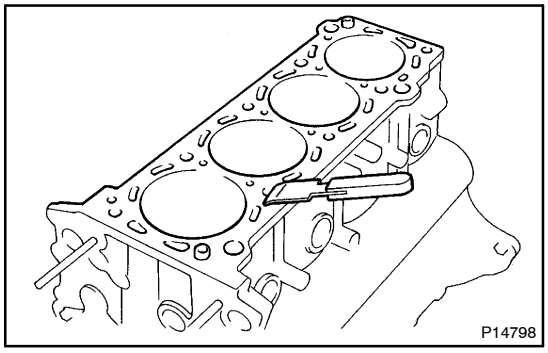
(a) Mount the hexagon wrench head portion of the balanceshaft in a vise.

NOTICE:

Be careful not to damage the balanceshaft.

(b) Remove the bolt.

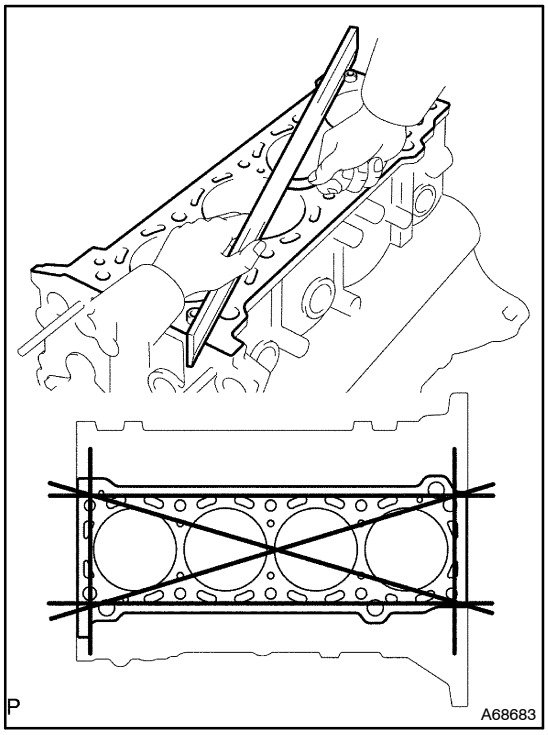
(c) Remove the balanceshaft driven (★ 1) and balanceshaft thrust washer (★ 2).



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.



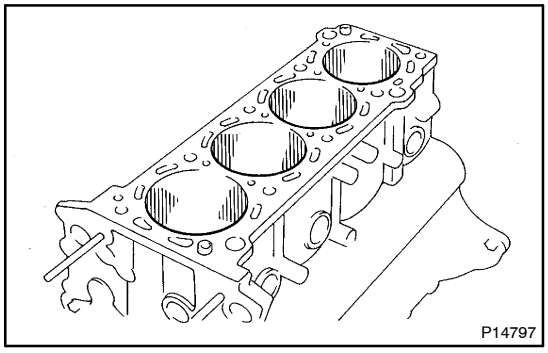
16. INSPECT CYLINDER BLOCK SUB–ASSY

(a) Inspect for flatness.

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

Maximum warpage: 0.05 mm (0.0020 in.)

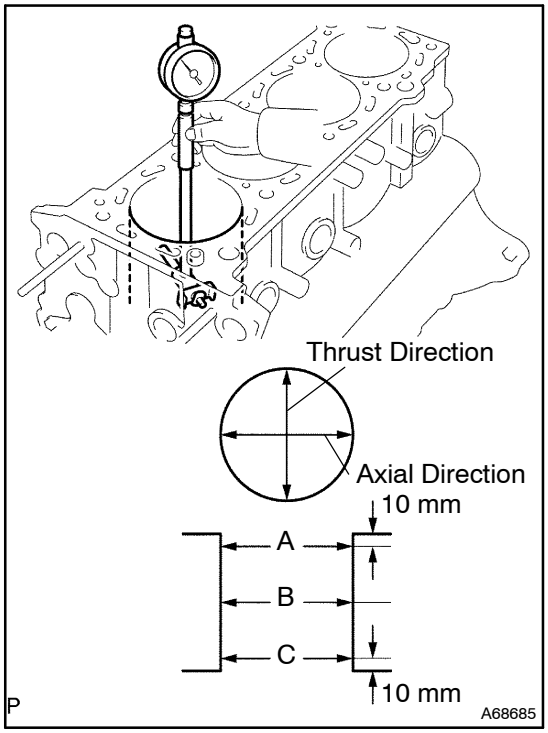
If the warpage is greater than maximum, replace the cylinder block.



(b) Inspect for vertical scratches.

(1) Visually check the cylinder for vertical scratches.

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

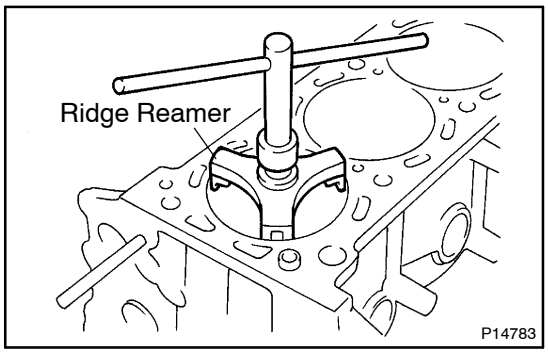


(c) Inspect cylinder bore diameter.

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

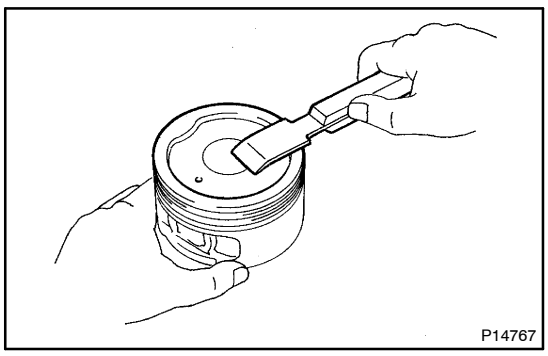
Standard diameter:
94.990 – 95.003 mm (3.7400 – 3.7403 in.)
Maximum diameter: 95.060 mm (3.7425 in.)

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



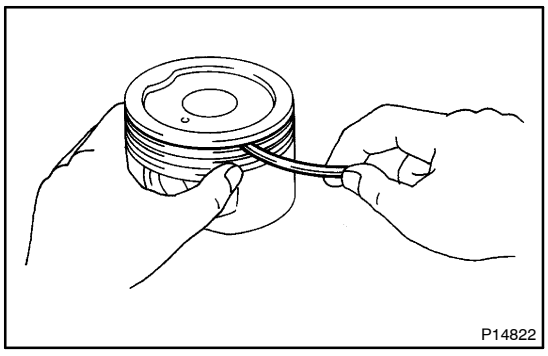
(d) Remove cylinder ridge.

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



17. CLEAN W/PIN PISTON SUB–ASSY

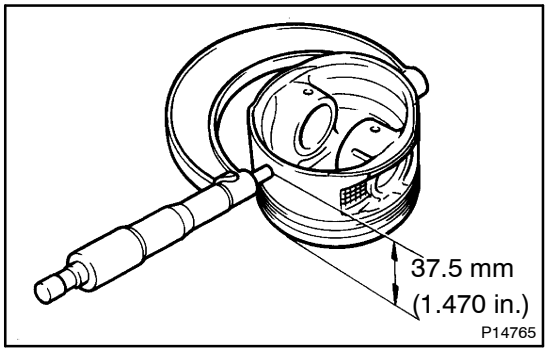
(a) Using a gasket scraper, remove the carbon from the piston top.



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

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

NOTICE:
Do not use a wire brush.



18. INSPECT W/PIN PISTON SUB–ASSY

(a) Inspect for diameter.

(1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 37.5 mm (1.470 in.) from the piston head.

Piston diameter:

STD	94.933 – 94.943 mm (3.7375 – 3.7379 in.)
O/S 0.50	95.433 – 95.443 mm (3.7572 – 3.7576 in.)

(b) Inspect for oil clearance.

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

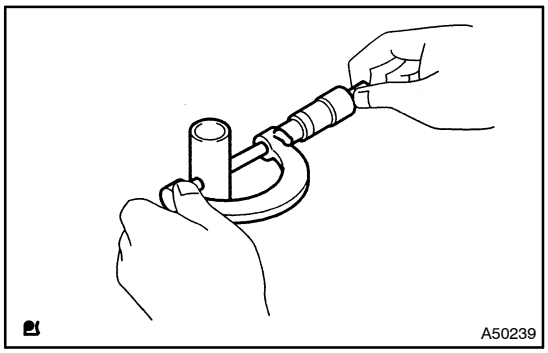
Standard oil clearance:

0.047 – 0.070 mm (0.0019 – 0.0028 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.

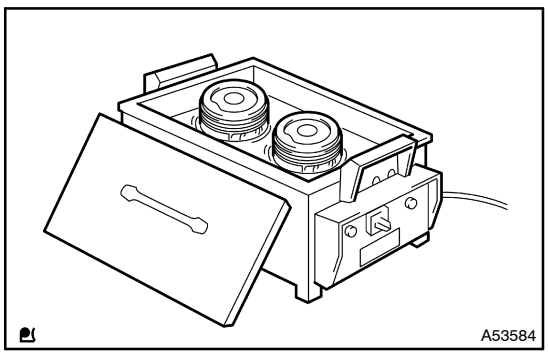


(c) Inspect for piston pin.

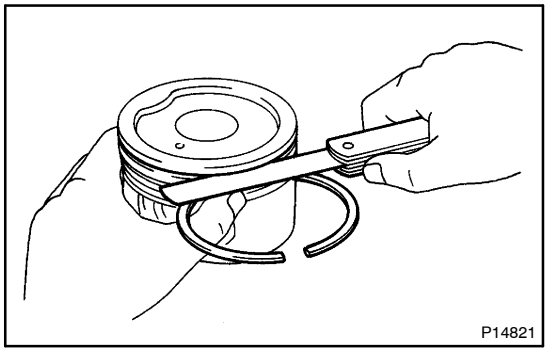
(1) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

24.000 – 24.009 mm (0.9449 – 0.9452 in.)



(2) At 80 – 90°C (176 – 194°F), you should be able to push the piston pin into the piston pin hole with your thumb.



19. INSPECT PISTON RING SET

(a) Inspect piston ring groove clearance.

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

Ring groove clearance:

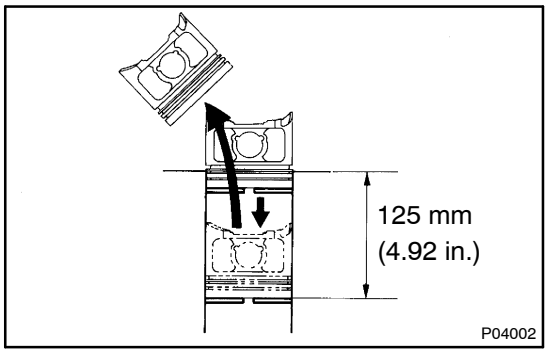
No. 1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
No. 2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
Oil	0.055 – 0.135 mm (0.0022 – 0.0053 in.)

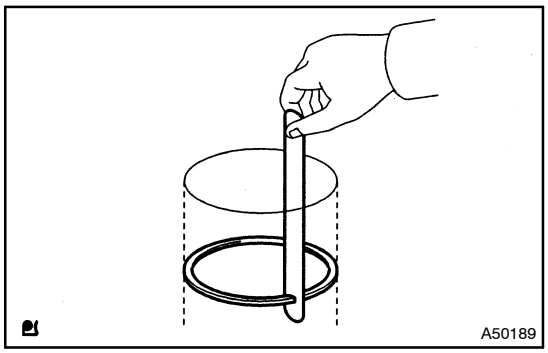
If the clearance is not as specified, replace the piston.

(b) Inspect 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, 125 mm (4.92 in.) from the top of the cylinder.





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

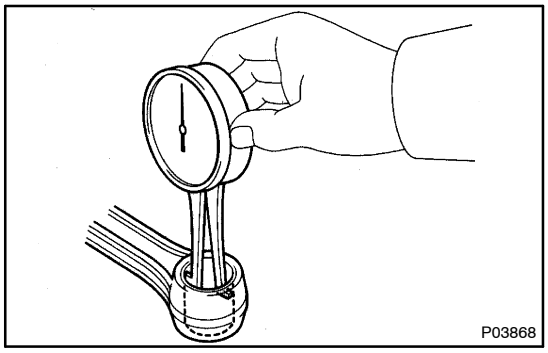
Standard ring end gap:

No. 1	0.300 – 0.400 mm (0.0118 – 0.0157 in.)
No. 2	0.400 – 0.500 mm (0.0157 – 0.0197 in.)
Oil	0.130 – 0.380 mm (0.005 – 0.015 in.)

Maximum ring end gap:

No. 1	1.00 mm (0.039 in.)
No. 2	1.10 mm (0.043 in.)
Oil	0.98 mm (0.039 in.)

If the end gap is not as specified, replace the piston ring. If the end gap is not as specified, even with a new piston ring, rebore all the 4 cylinders or replace the cylinder block.



20. INSPECT PISTON PIN OIL CLEARANCE

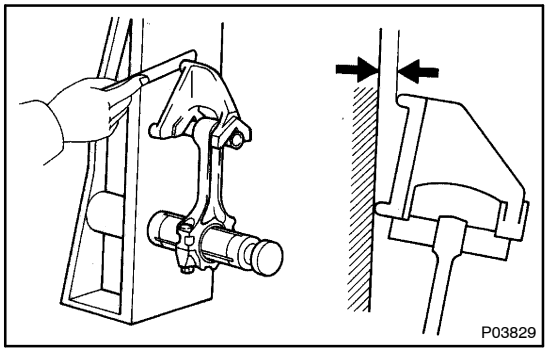
(a) Using a caliper gauge, measure the inside diameter of the bush.

Bush inside diameter:
24.008 –24.017 mm (0.9452 – 0.9455 in.)

(b) Subtract the piston pin diameter measurement from the bush inside diameter measurement.

Standard oil clearance:
0.005 – 0.011 mm (0.0002 – 0.0004 in.)
Maximum oil clearance: 0.015 mm (0.0006 in.)

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



21. INSPECT CONNECTING ROD SUB–ASSY

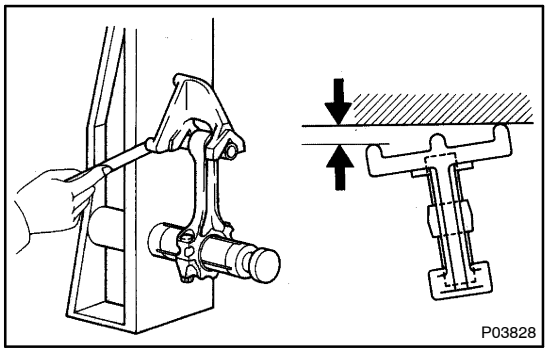
(a) Using a rod aligner and thickness gauge, check the connecting rod alignment.

(1) Check for out–of–alignment.

Maximum out–of alignment:

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

If the out–of–alignment is greater than maximum, replace connecting rod.

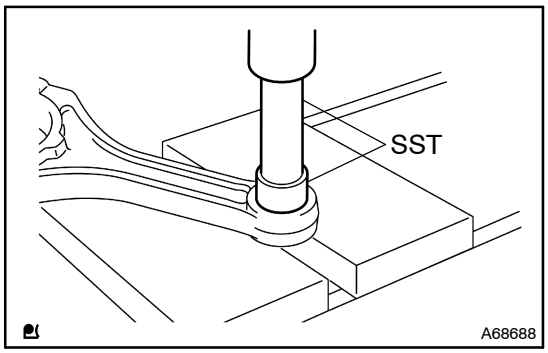


(2) Check for twist.

Maximum twist:

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

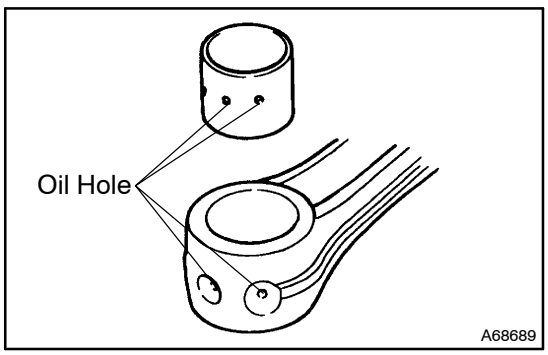
If the twist is greater than maximum, replace the connecting rod.



22. REMOVE CONNECTING ROD SMALL END BUSH

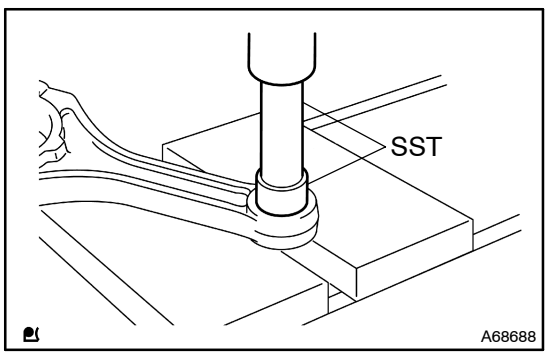
(a) Using SST and a press, press out the connecting rod small end bush.

SST 09950–60010 (09951–00250, 09951–00260, 09952–06010), 09950–70010 (09951–07100)



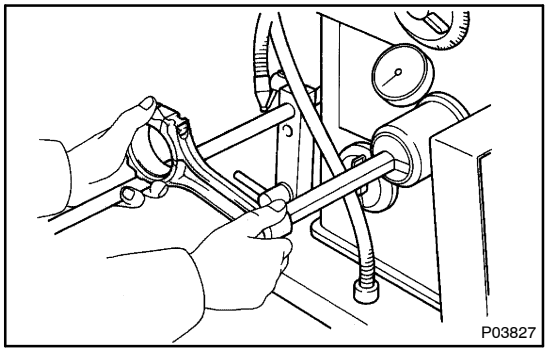
23. INSTALL CONNECTING ROD SMALL END BUSH

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

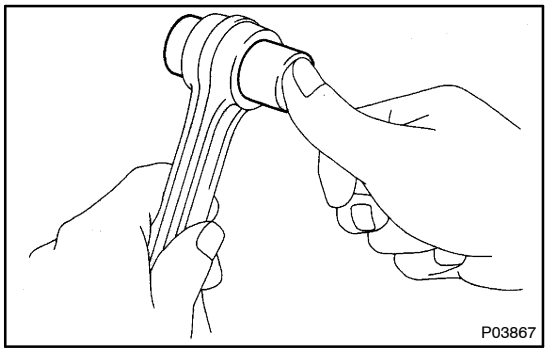


(b) Using SST and a press, press in the connecting rod small end bush.

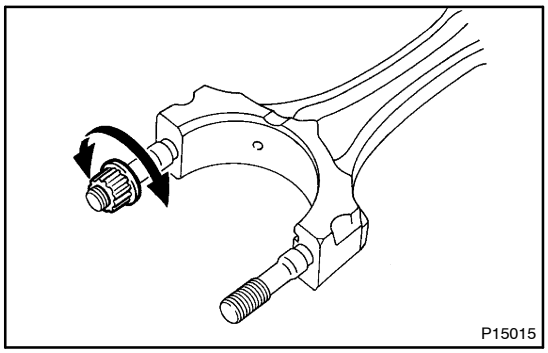
SST 09950–60010 (09951–00250, 09951–00260, 09952–06010), 09950–70010 (09951–07100)



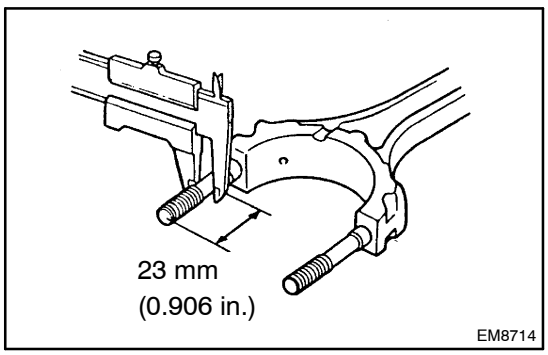
(c) Using a pin hole grinder, hone the connecting rod small end bush to obtain the standard specified oil clearance between the connecting rod small end bush and piston pin.
Standard oil clearance:
0.005 – 0.011 mm (0.0002 – 0.0004 in.)



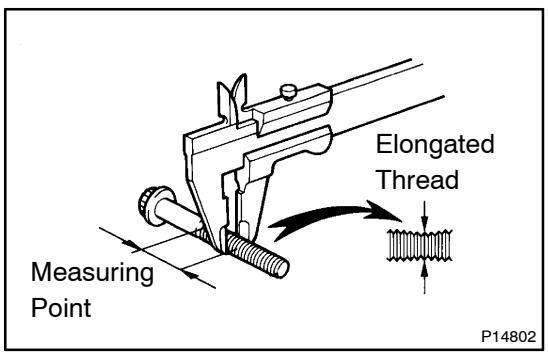
(d) Check the piston pin fit at normal room temperature.
(1) Coat the piston pin with the engine oil, and push it into the connecting rod with your thumb.



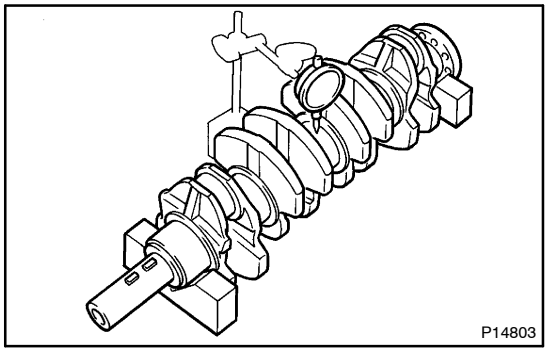
24. INSPECT CONNECTING ROD BOLT
(a) Install the connecting rod cap nut to the connecting rod bolt.
(b) Check that the connecting rod cap nut can be turned easily by hand to the end of the thread.
If the connecting rod cap nut cannot be turned easily, measure the minimum outside diameter of connecting rod bolt.



(c) Using vernier calipers, measure the outside diameter.
Standard outside diameter:
7.80 – 7.90 mm (0.3071 – 0.3110 in.)
Minimum outside diameter: 7.60 mm (0.2992 in.)
If the outside diameter is less than limit, replace the connecting rod bolt and connecting rod cap nut as a set.
HINT:
If the location of minimum diameter cannot be judged by visual inspection, measure the outer diameter at the location shown in the illustration.



25. INSPECT CRANKSHAFT BEARING CAP SET BOLT
(a) Using vernier calipers, measure the minimum diameter of the elongated thread at the measuring point.
Standard outside diameter:
10.76 – 10.97 mm (0.4236 – 0.4319 in.)
Minimum outside diameter: 10.40 mm (0.4094 in.)
If the diameter is less than minimum, replace the crankshaft bearing cap bolt.

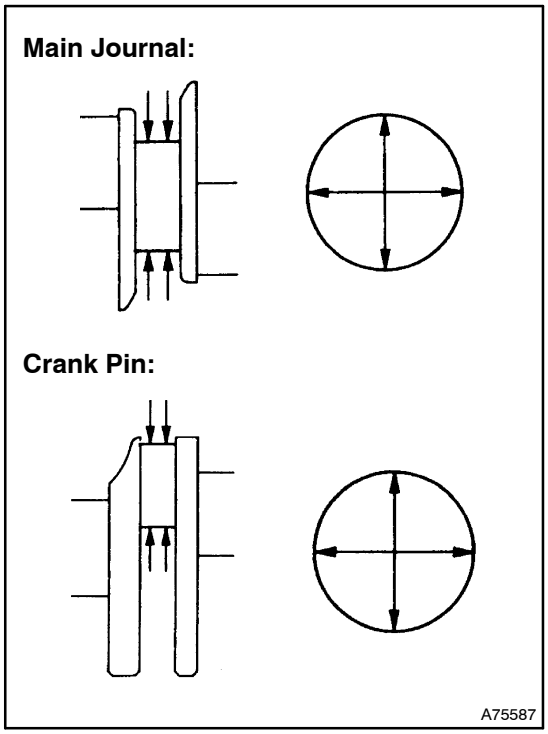


26. INSPECT CRANKSHAFT

(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: 0.03 mm (0.0012 in.)

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



(b) Inspect for 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	59.981 – 59.994 mm (2.2615 – 2.3620 in.)
	Others	59.987 – 60.000 mm (2.3617 – 2.3622 in.)
U/S 0.25	No. 3	59.740 – 59.750 mm (2.3520 – 2.3524 in.)
	Others	59.745 – 59.755 mm (2.3522 – 2.3526 in.)

Crank pin diameter:

STD	52.987 – 53.000 mm (2.0861 – 2.0866 in.)
U/S 0.25	52.745 – 52.755 mm (2.0766 – 2.0770 in.)

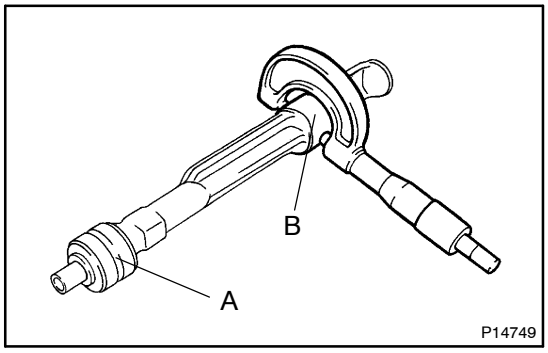
If the diameter is not as specified, check the oil clearance. If necessary, grind or replace the crankshaft.
  (2) Check each main journal for taper and out–of–round as shown.

Maximum taper and out–of–round:
0.005 mm (0.0002 in.)

If the taper and out–of–round is greater than maximum, replace the crankshaft. If necessary, grind and hone the main journals and/or crank pins.

(c) Grind and hone the main journals and/or crank pins to the finished undersized diameter.

(d) Install new main journal and/or crank pin undersized bearings.

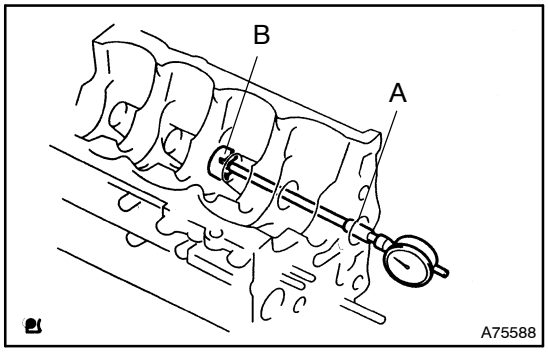


27. INSPECT NO.1 BALANCESHAFT

(a) Inspect for diameter of the journal.
  (1) Using a micrometer, measure the diameter of the balanceshaft main journals.

Main journal diameter:

A	37.969 – 37.985 mm (1.4948 – 1.4955 in.)
B	37.449 – 37.465 mm (1.4744 – 1.4750 in.)



(b) Inspect for diameter of bearing.
(1) Using a cylinder gauge, measure the inside diameter of the balanceshaft bearing.

Bearing inside diameter:

A	38.025 – 38.045 mm (1.4970 – 1.4978 in.)
B	37.525 – 37.545 mm (1.4774 – 1.4781 in.)

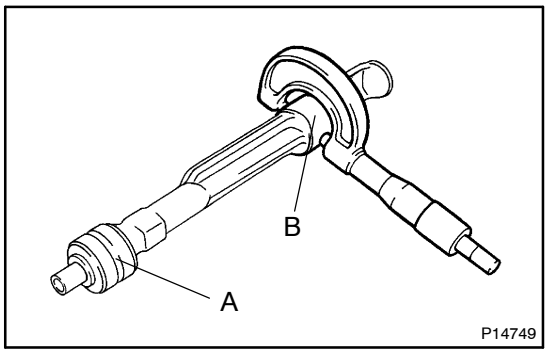
(c) Inspect for oil clearance.
(1) Subtract the balanceshaft main journal diameter measurement from the balanceshaft bearing inside diameter measurement.

Standard oil clearance:

A	0.040 – 0.076 mm (0.0016 – 0.0031 in.)
B	0.060 – 0.096 mm (0.0024 – 0.0038 in.)

Maximum oil clearance: 0.15 mm (0.0059 in.)

If the oil clearance is greater than maximum, replace the cylinder block and balanceshaft.

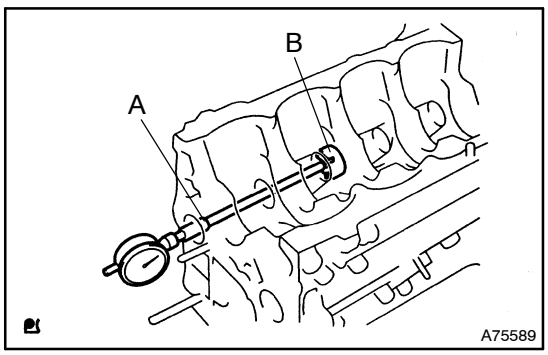


28. INSPECT NO.2 BALANCESHAFT

(a) Inspect for diameter of the journal.
(1) Using a micrometer, measure the diameter of the balanceshaft main journals.

Main journal diameter:

A	37.969 – 37.985 mm (1.4948 – 1.4955 in.)
B	37.449 – 37.465 mm (1.4744 – 1.4750 in.)



(b) Inspect for diameter of bearing.
(1) Using a cylinder gauge, measure the inside diameter of the balanceshaft bearing.

Bearing inside diameter:

A	38.025 – 38.045 mm (1.4970 – 1.4978 in.)
B	37.525 – 37.545 mm (1.4774 – 1.4781 in.)

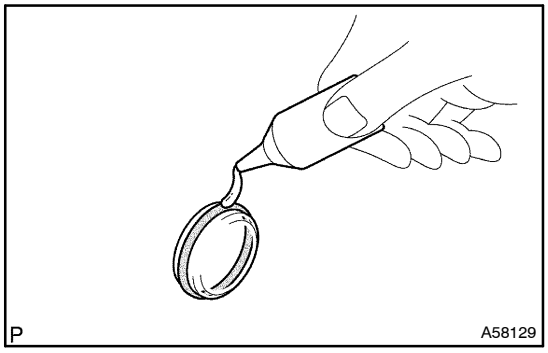
(c) Inspect for oil clearance.

Standard oil clearance:

A	0.040 – 0.076 mm (0.0016 – 0.0031 in.)
B	0.060 – 0.096 mm (0.0024 – 0.0038 in.)

Maximum oil clearance: 0.15 mm (0.0059 in.)

If the oil clearance is greater than maximum, replace the cylinder block and balanceshaft.



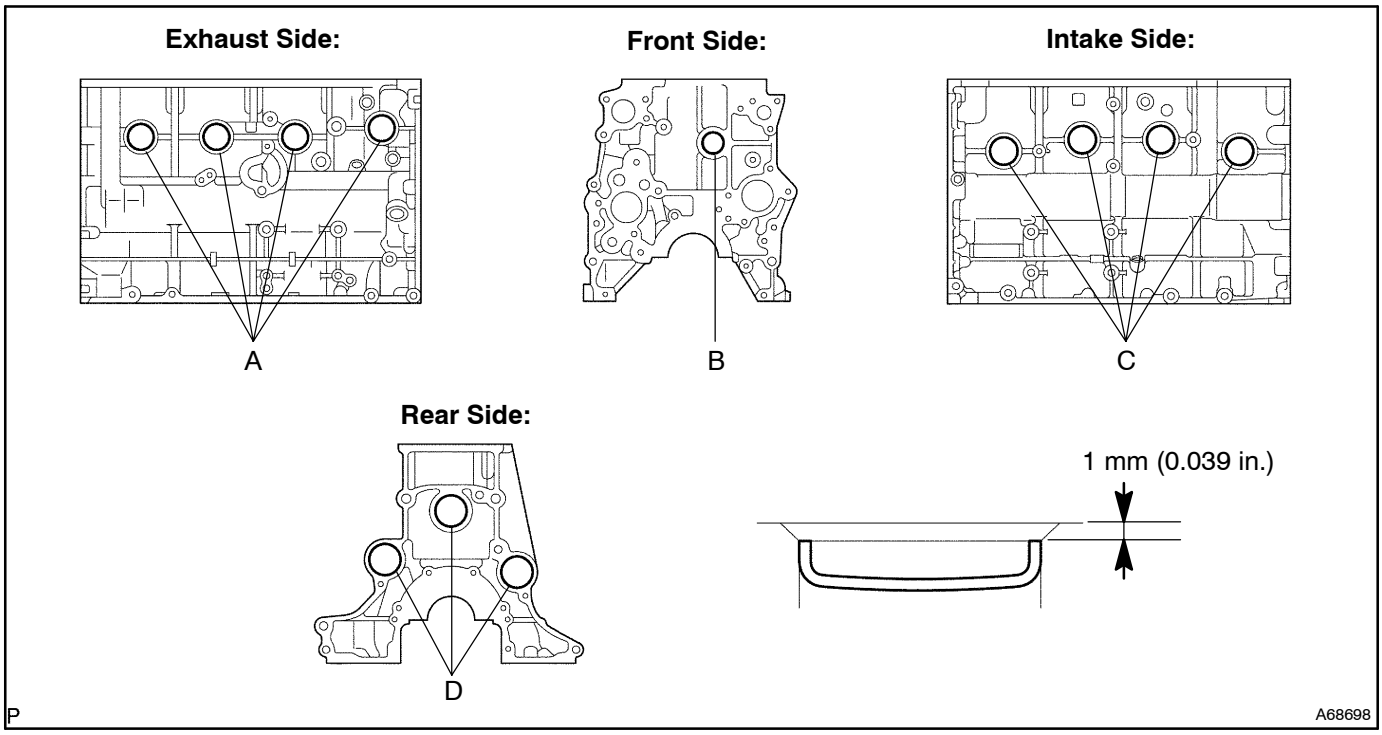
29. INSTALL TIGHT PLUG

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

(b) Using SST, tap in the 8 tight plugs A and C.
SST 09950–60010 (09951–00350), 09950–70010 (09951–07100)

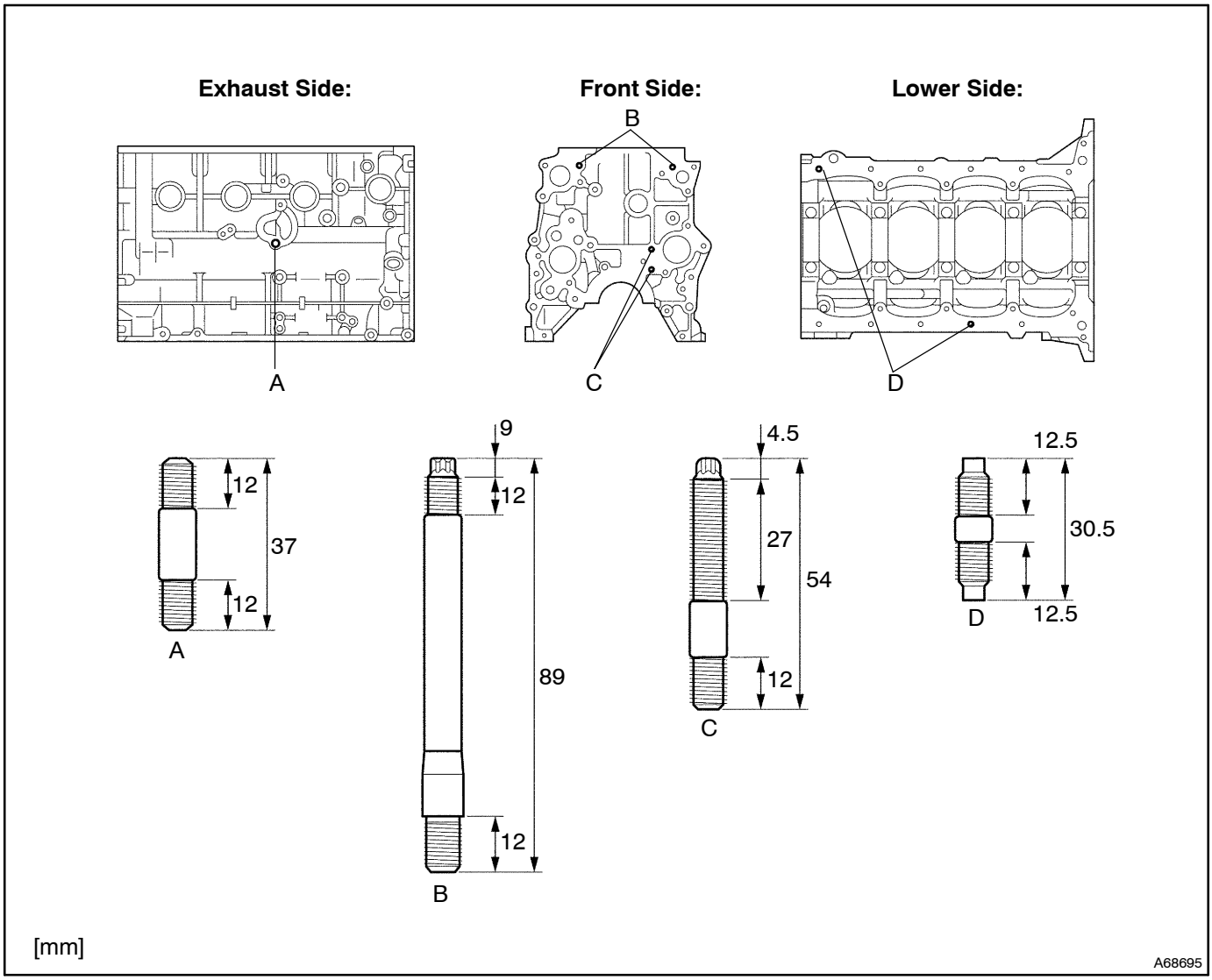
(c) Using SST, tap in the tight plug B.
SST 09950–60010 (09951–00300), 09950–70010 (09951–07100)

(d) Using SST, tap in the 3 tight plugs D
SST 09950–60010 (09951–00400), 09950–70010 (09951–07100)



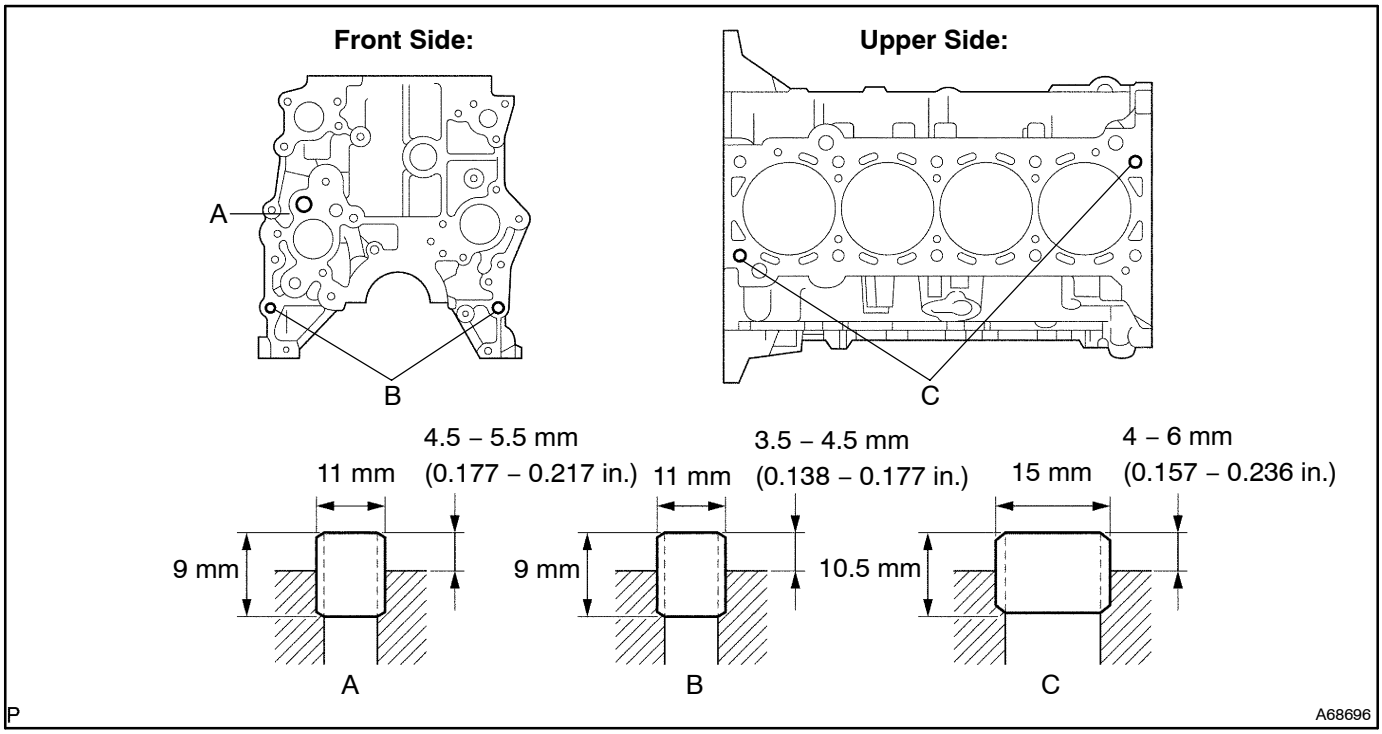
30. INSTALL STUD BOLT

(a) Using the torx socket E8 and E7, Install the stud bolts
Torque: 7.5 N·m (75 kgf·cm, 65 in.·lbf)



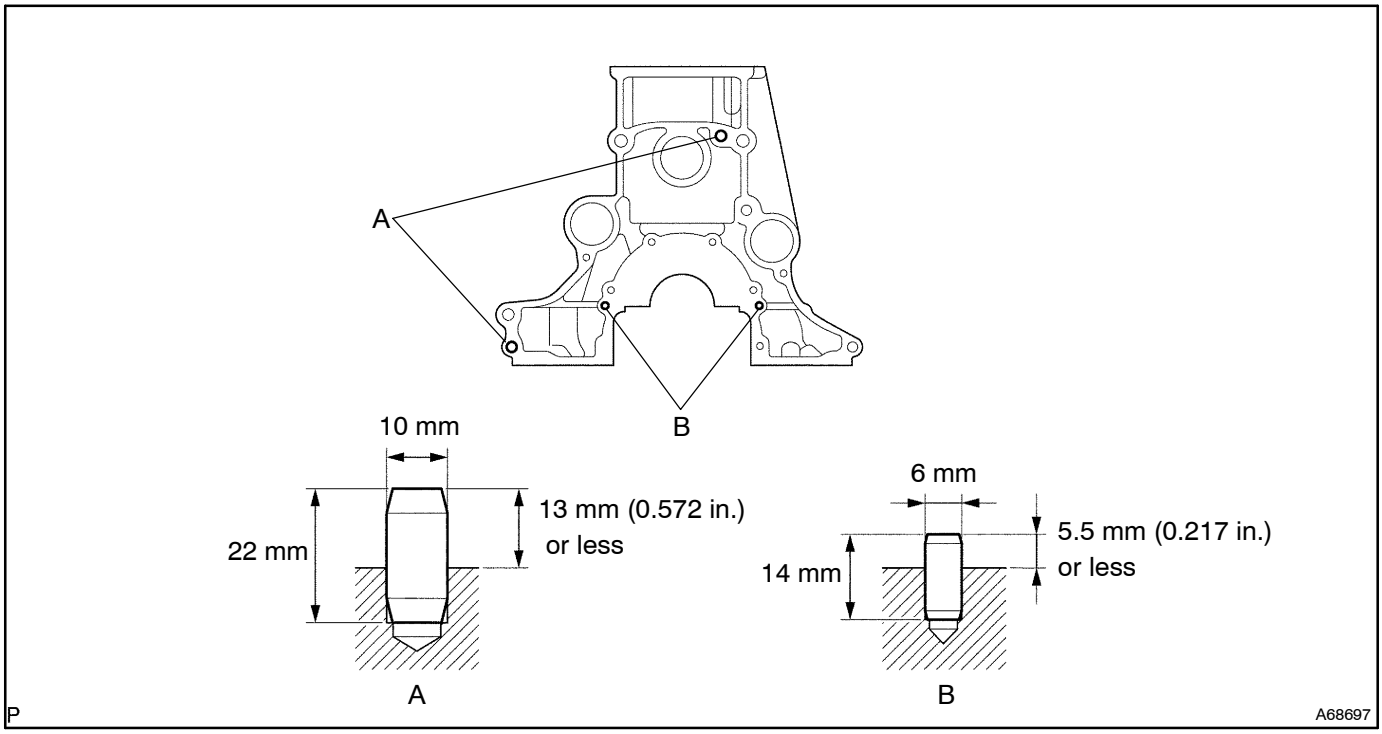
31. INSTALL RING PIN

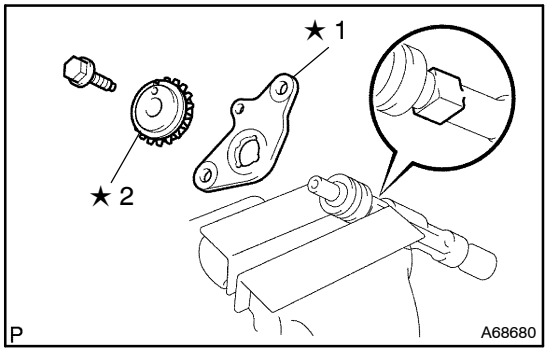
(a) Using a plastic–faced hammer, tap in the ring pins.



32. INSTALL STRAIGHT PIN

(a) Using a plastic–faced hammer, tap in the straight pins.





33. INSTALL BALANCESHAFT DRIVEN GEAR NO.2

(a) Mount the hexagon wrench head portion of the balanceshaft in a vise.

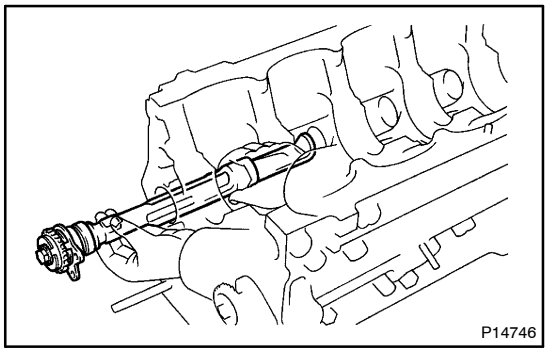
NOTICE:

Be careful not to damage the balanceshaft.

(b) Install the balanceshaft thrust washer (★ 1) and balanceshaft driven gear (★ 2).

(c) Install and torque the bolt.

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



34. INSTALL NO.2 BALANCESHAFT

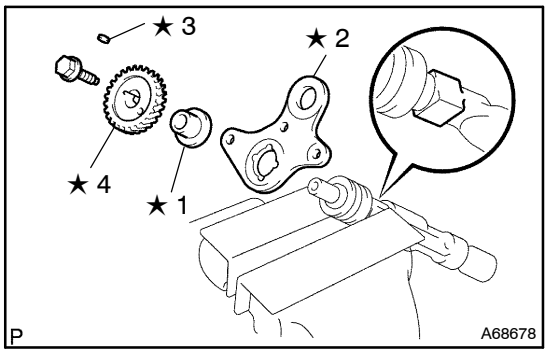
(a) Install the balanceshaft to the cylinder block.

NOTICE:

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

(b) Install and torque the 2 bolts.

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



35. INSTALL BALANCESHAFT DRIVEN GEAR NO.1

(a) Mount the hexagon wrench head portion of the balanceshaft in a vise.

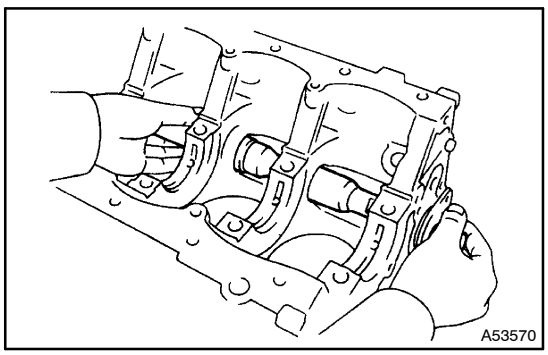
NOTICE:

Be careful not to damage the balanceshaft.

(b) Install the balanceshaft thrust spacer (★ 1), balanceshaft thrust washer (★ 2), sliding key (★ 3) and balanceshaft driven gear (★ 4).

(c) Install and torque the bolt.

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



36. INSTALL NO.1 BALANCESHAFT

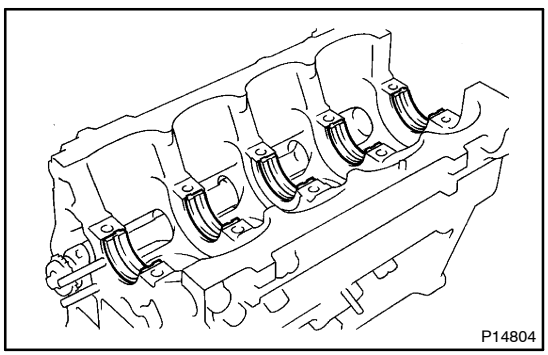
(a) Install the balanceshaft to the cylinder block.

NOTICE:

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

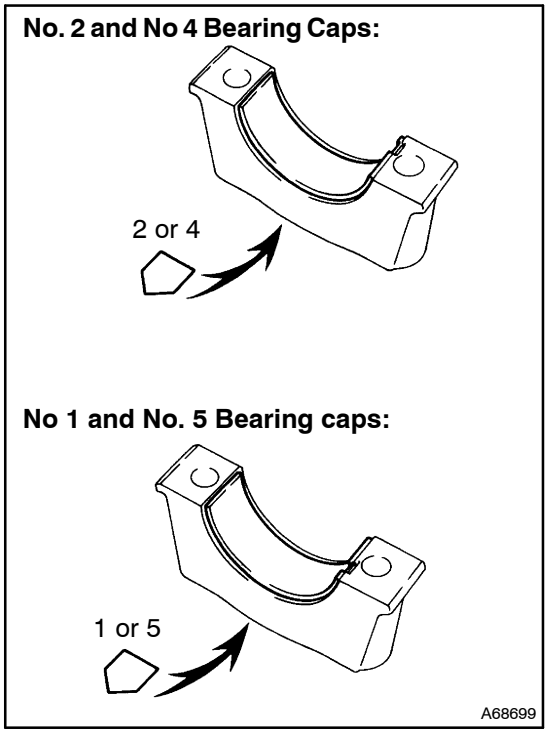
(b) Install and torque the bolt.

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



37. INSTALL CRANKSHAFT

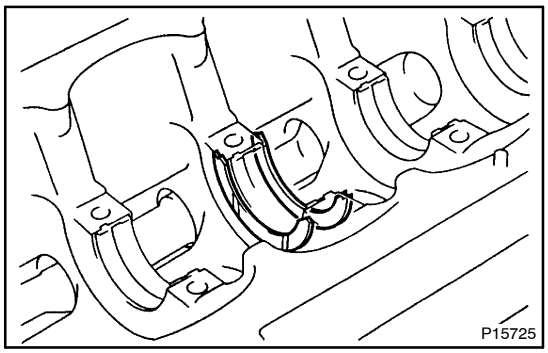
(a) Align the crankshaft bearing claw with the claw groove of the cylinder block, and push in the 5 upper crankshaft bearings.



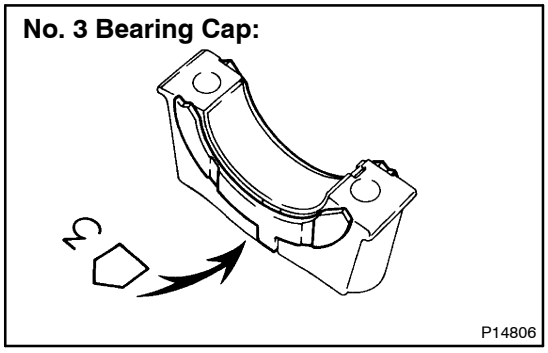
(b) Align the crankshaft bearing claw with the claw groove of the crankshaft bearing cap, and push in the 5 lower crankshaft bearings.

HINT:

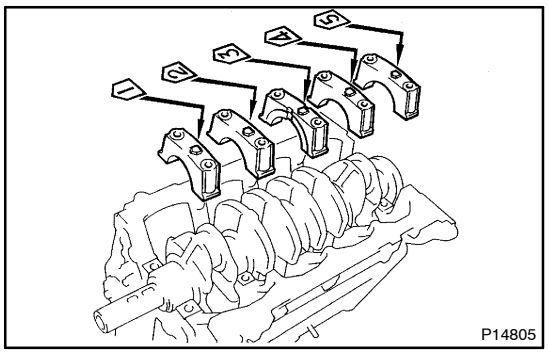
A number is marked on each crankshaft bearing cap to indicate the installation position.



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

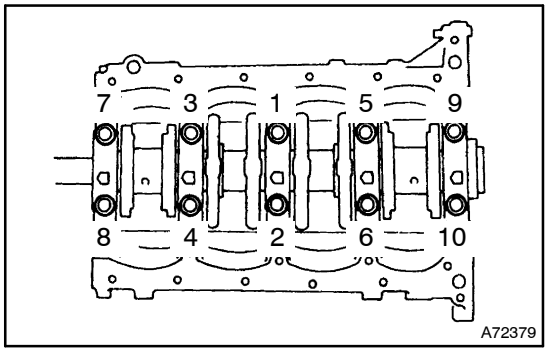


(d) Install the 2 crankshaft thrust washers on the No. 3 crankshaft bearing cap with the grooves facing outward.



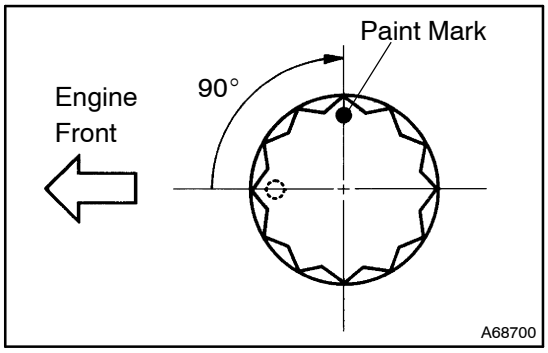
(e) Place the crankshaft on the cylinder block.

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



(g) Apply a light coat of the engine oil on the threads and under the heads of the crankshaft bearing cap bolts.
(h) Install and uniformly tighten the 10 bolts of the crankshaft bearing caps, in several passes, in the sequence shown.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

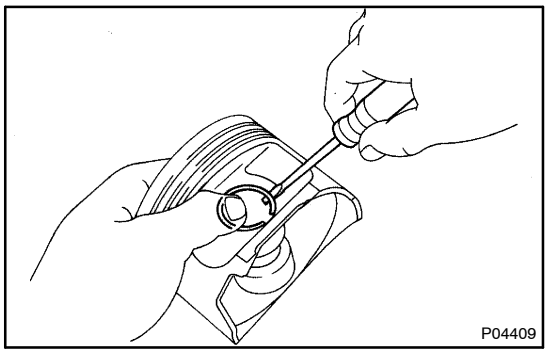
If any one of the crankshaft bearing cap bolts does not meet the torque specification, replace the crankshaft bearing cap bolt.



(i) Mark the front of the crankshaft bearing cap bolt with paint.
(j) Retighten the crankshaft bearing cap bolts by 90° in the numerical order shown above.
(k) Check that the painted mark is now at a 90° angle to the front.

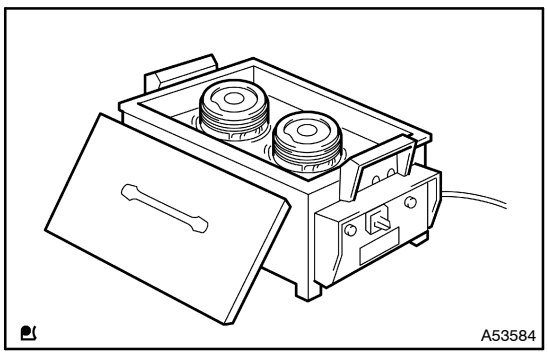
HINT:
Each crankshaft bearing cap has a number and front mark.

(l) Check that the crankshaft turns smoothly.

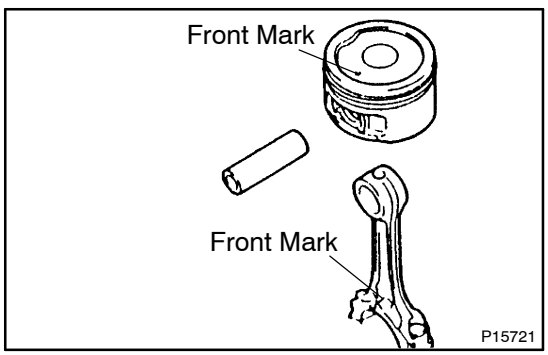


38. INSTALL W/PIN PISTON SUB–ASSY

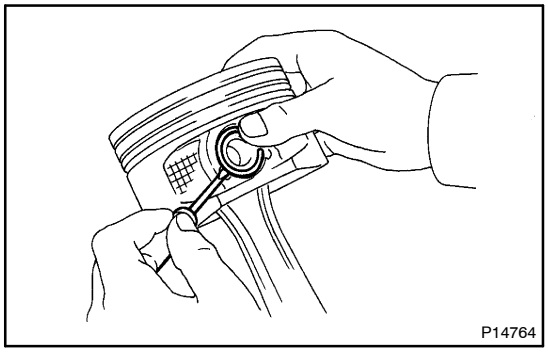
(a) Install a new hole snap ring on one side of the piston pin hole.



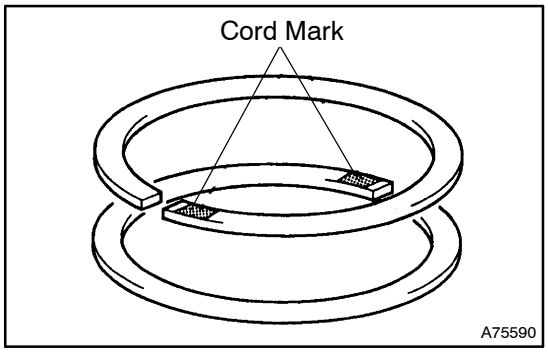
(b) Gradually heat the piston to 80 – 90°C (176 – 194°F).



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



(e) Install a new hole snap ring on the other side of the piston pin hole.



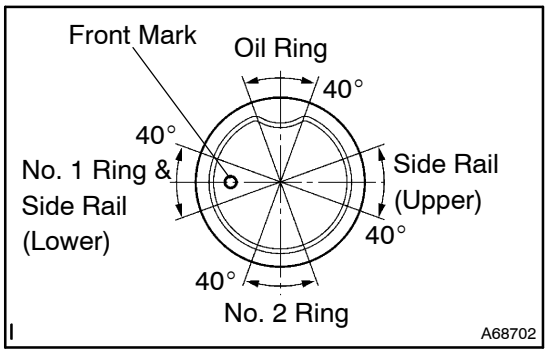
39. INSTALL PISTON RING SET

(a) Install the oil ring and 2 side rails by hand.

(b) Using a piston ring expander, install the 2 compression rings with the cord mark facing upward.

Cord mark:

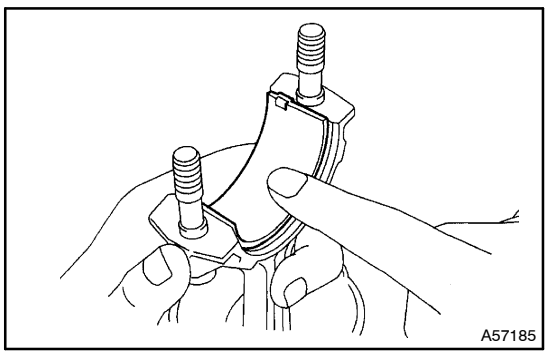
No. 1	”T” or ”1N”
No. 2	”2T” or ”2N”



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

NOTICE:

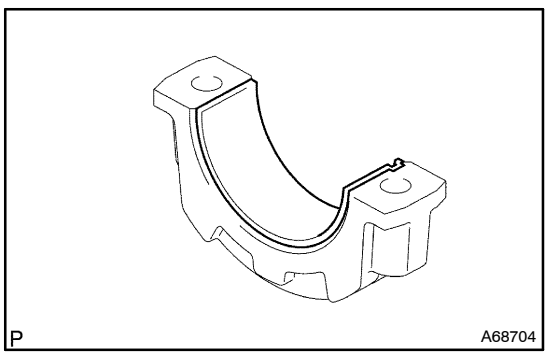
Do not align the ring ends.



40. INSTALL CONNECTING ROD SUB–ASSY

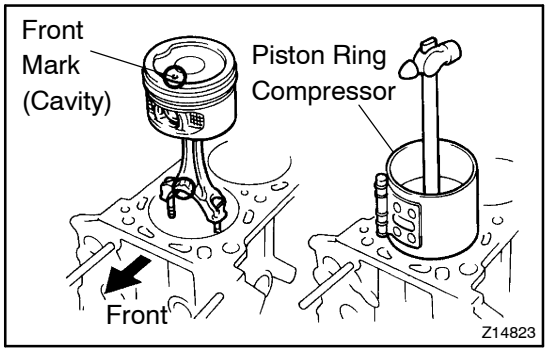
(a) Align the connecting rod bearing claw with the groove of the connecting rod.

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



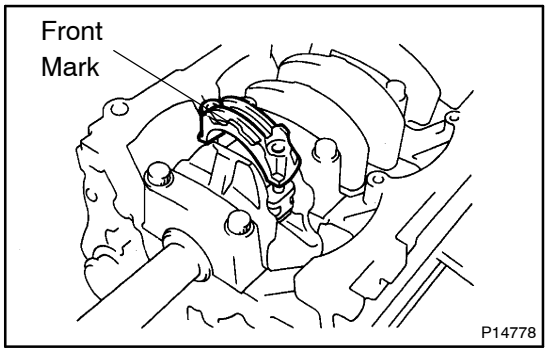
(c) Align the connecting rod bearing claw with the groove of the connecting rod cap.

(d) Install the connecting rod bearings in the connecting rod cap.



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

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



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

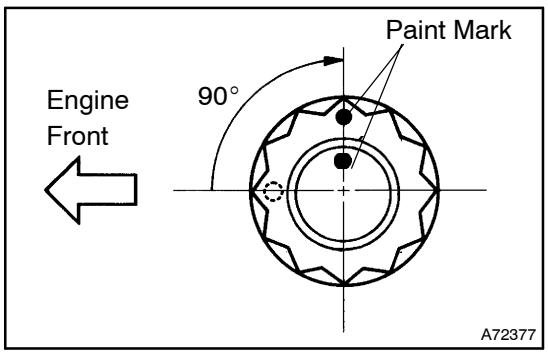
(h) Install the connecting rod cap with the front mark facing forward.

(i) Apply a light coat of the engine oil on the threads and under the nuts of the connecting rod cap.

(j) Install and alternately tighten the nuts of the connecting rod cap in several passes.

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

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



(k) Mark the front of the connecting rod cap nut and bolt with paint.

(l) Retighten the connecting rod cap nuts 90° as shown.

(m) Check that the painted mark on the nut is at a 90° angle in relation to the mark on the bolt.

(n) Check that the crankshaft turns smoothly.