CYLINDER BLOCK (1MZ–FE)

140HQ–01

OVERHAUL

1. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

2. REMOVE WATER SEAL PLATE

3. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

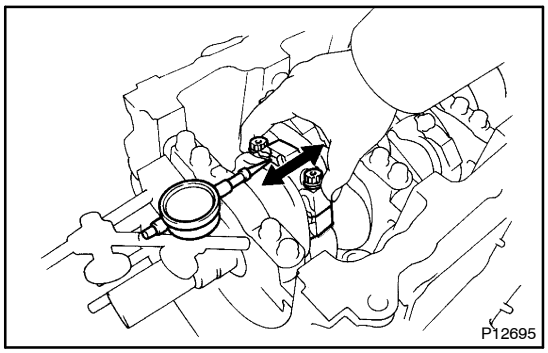
(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

4. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

5. REMOVE CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a 10 mm socket hexagon wrench, remove the screw plug.

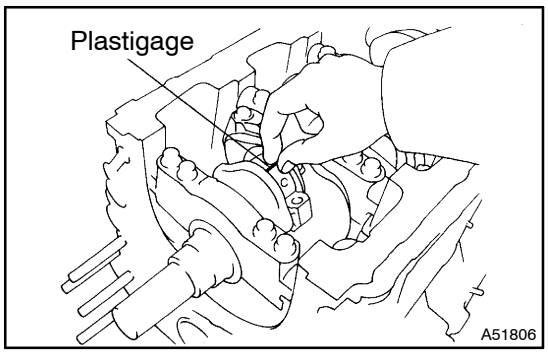


6. INSPECT CONNECTING ROD THRUST CLEARANCE

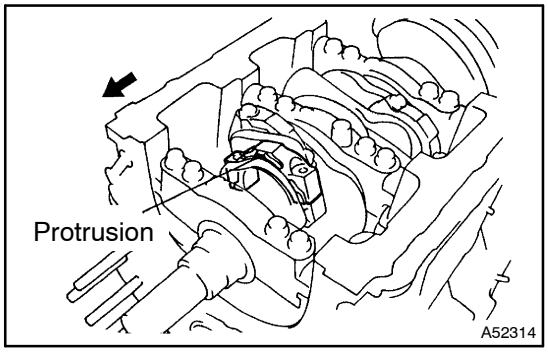
(a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.
Standard thrust clearance:
0.15 – 0.30 mm (0.0059 – 0.0118 in.)
Maximum thrust clearance: 0.35 mm (0.0138 in.)

7. INSPECT CONNECTING ROD OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.
(b) Remove the 2 connecting rod cap bolts.
(c) Clean the crank pin, bearing and connecting rod.
(d) Check the crank pin and bearing for pitting and scratches.

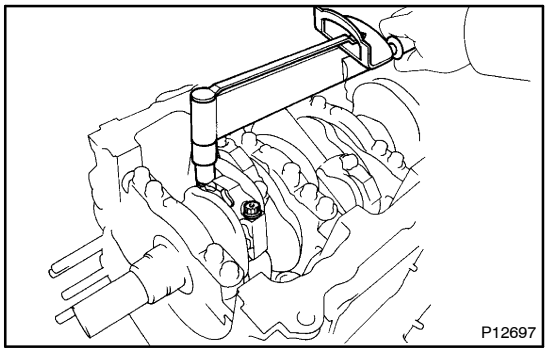


(e) Lay a strip of plastigage across the crank pin.



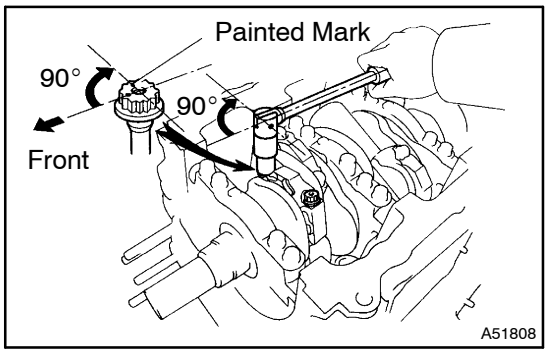
(f) Check that the protrusion of the connecting rod cap is facing in the correct direction.

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



(h) Tighten the bolts in several passes by the specified torque.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



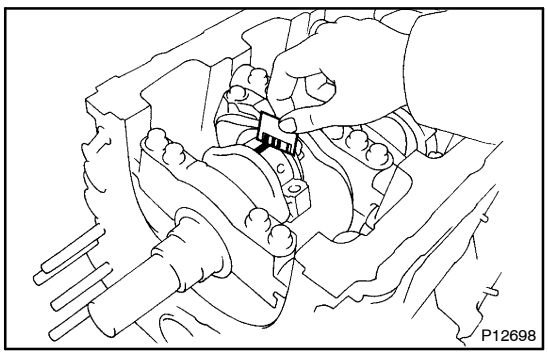
(i) Mark the front side of the each connecting cap bolt with paint.

(j) Retighten the cap bolts by 90° as shown in the illustration.

NOTICE:

Do not turn the crankshaft.

(k) Remove the 2 bolts, connecting rod cap and lower bearing.

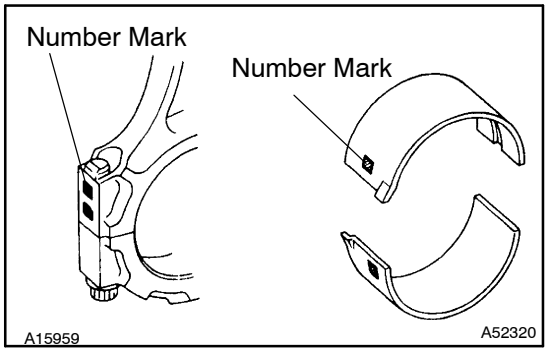


(l) Measure the plastigage at its widest point.

Standard oil clearance:
0.038 – 0.066 mm (0.0015 – 0.0026 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)

NOTICE:

Completely remove the plastigage.

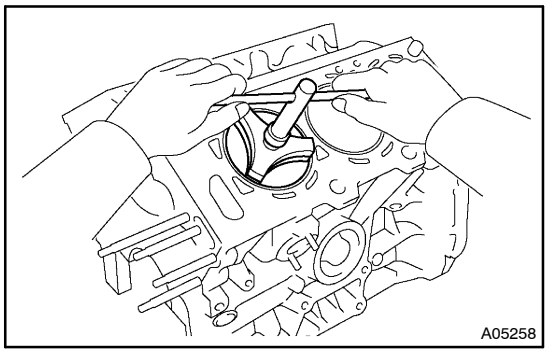


(m) If replace the bearing, replace it with one having the same number as marked on the connecting rod. There are 4 sizes of standard bearings, marked "1 ", "2", "3" and "4" accordingly.

HINT:

Standard bearing center wall thickness

Mark	mm (in.)
"1"	1.484 – 1.487 (0.0584 – 0.0585)
"2"	1.487 – 1.490 (0.0585 – 0.0587)
"3"	1.490 – 1.493 (0.0587 – 0.0588)
"4"	1.493 – 1.496 (0.0588 – 0.0589)



8. REMOVE PISTON SUB–ASSY W/CONNECTING ROD

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

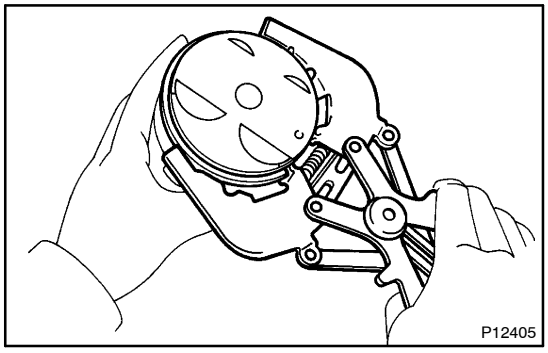
(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

HINT:

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

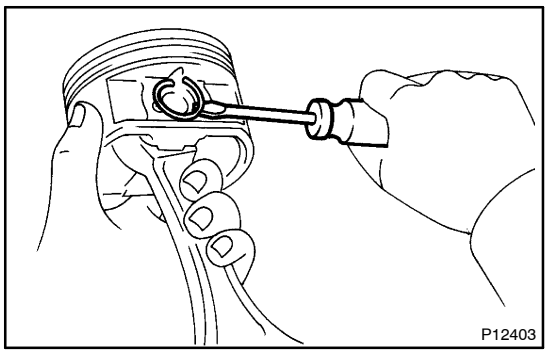
9. REMOVE CONNECTING ROD BEARING

10. REMOVE PISTON RING SET



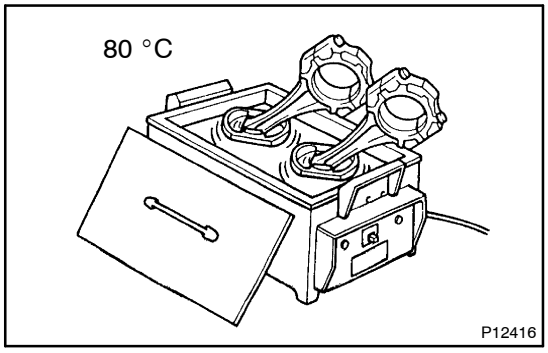
(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and oil ring by hand.



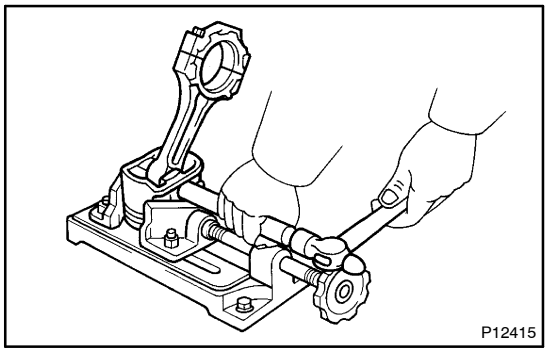
11. REMOVE PISTON PIN HOLE SNAP RING

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



12. REMOVE W/PIN PISTON SUB–ASSY

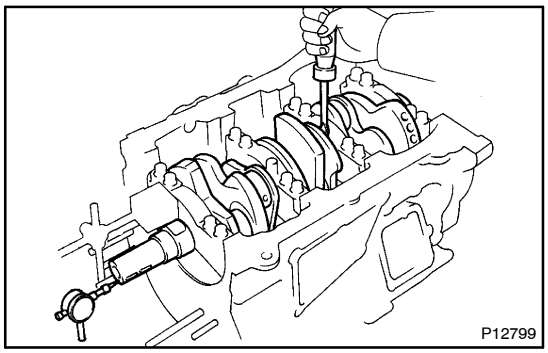
(a) Gradually heat the piston to approx. 80°C (176°F).



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

HINT:

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



13. INSPECT CRANKSHAFT THRUST CLEARANCE

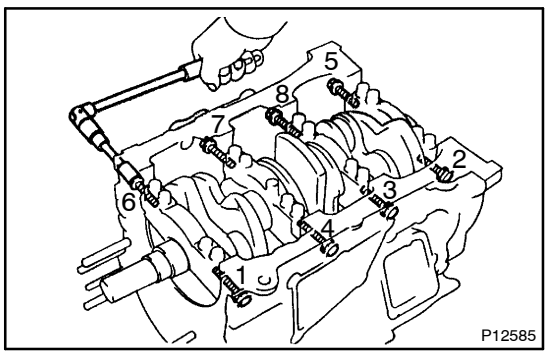
(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.04 – 0.24 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 or a crankshaft.

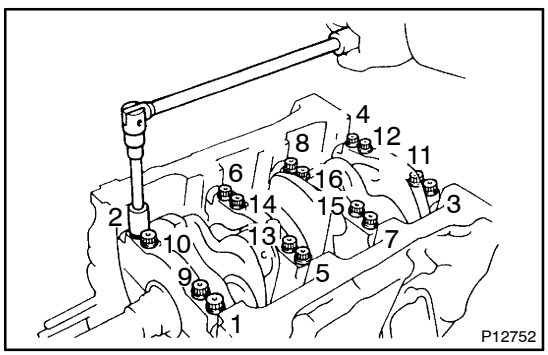
HINT:

Thrust washer thickness 1.93 – 1.98 mm (0.0760 – 0.0780 in.)

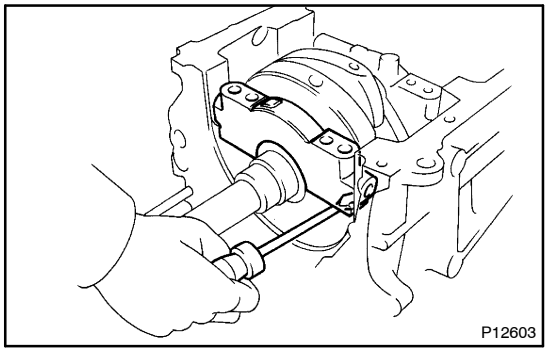


14. REMOVE CRANKSHAFT

(a) Uniformly loosen and remove the 8 main bearing cap bolts and seal washers in the several passes, in the sequence shown.



(b) Uniformly loosen and remove the 16 main bearing cap bolts in several passes, in the sequence shown.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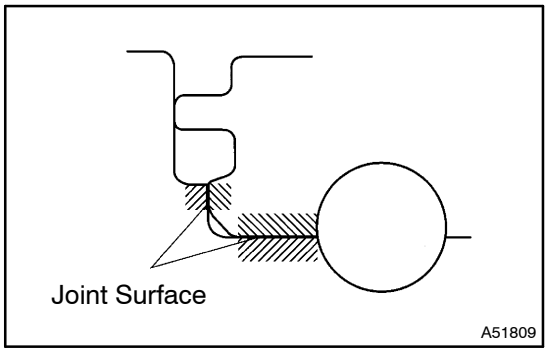
(c) Using a screwdriver, pry out main bearing caps. Remove the 4 main bearing caps and lower bearings.

NOTICE:

- **Pull up the main bearing cap little by little to the right and the left by turns.**
- **Be careful not to damage the joint surface of the cylinder block and the main bearing cap.**



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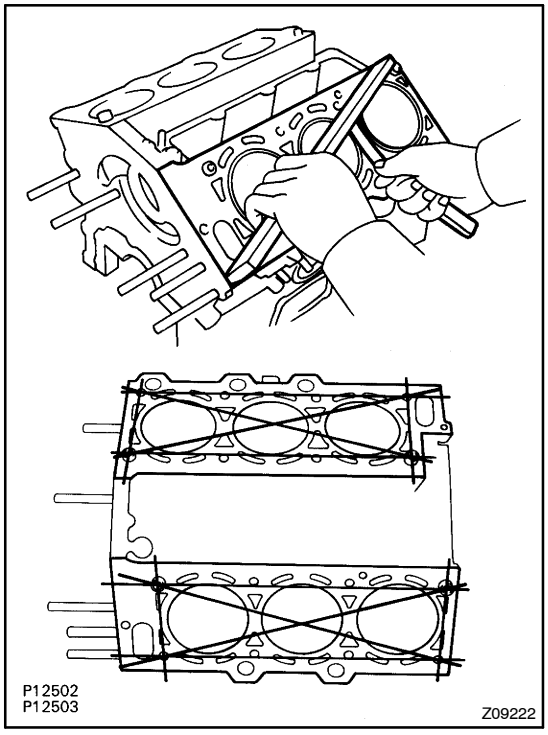
15. REMOVE CRANKSHAFT THRUST WASHER SET

16. REMOVE CRANKSHAFT BEARING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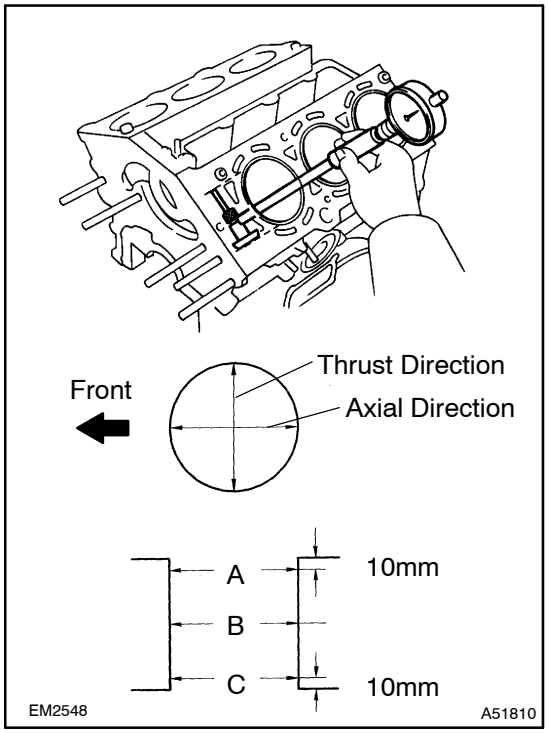
17. INSPECT CYLINDER BLOCK FOR FLATNESS

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

Maximum warpage: 0.05 mm (0.0020 in.)

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

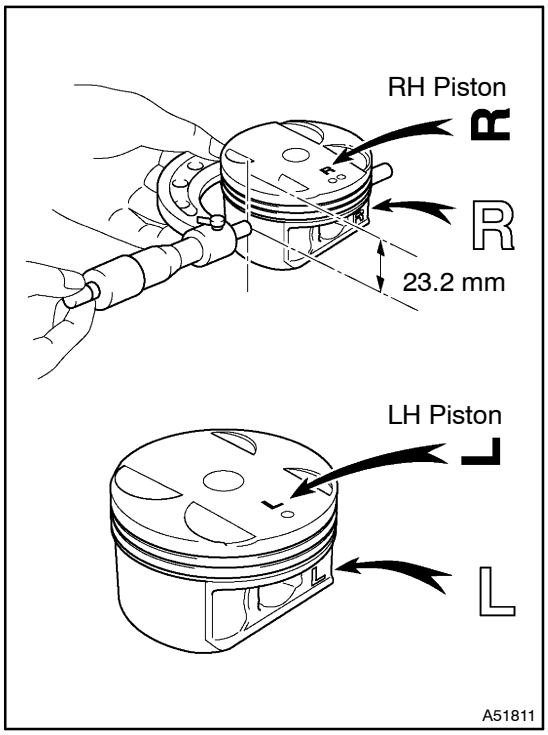


18. INSPECT CYLINDER BORE

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

Standard diameter:
87.500 – 87.512 mm (3.4449 – 3.4453 in.)
Maximum diameter: 87.52 mm (3.4457 in.)

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



19. INSPECT W/PIN PISTON SUB–ASSY

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 23.2 mm (0.913 in.) from the piston head.

Piston diameter:
87.406 – 87.416 mm (3.4412 – 3.4416 in.)

HINT:
The shape of the piston varies for the RH and LH banks. The RH piston is marked with ”R”, the LH piston with ”L”.

20. INSPECT PISTON OIL CLEARANCE

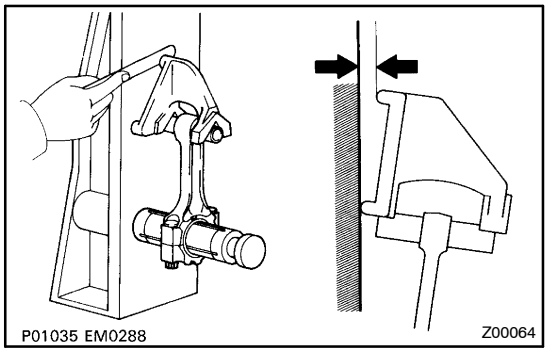
(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance: 0.084 – 0.106 mm (0.0033 – 0.0042 in.)
Maximum oil clearance: 0.13 mm (0.0051 in.)

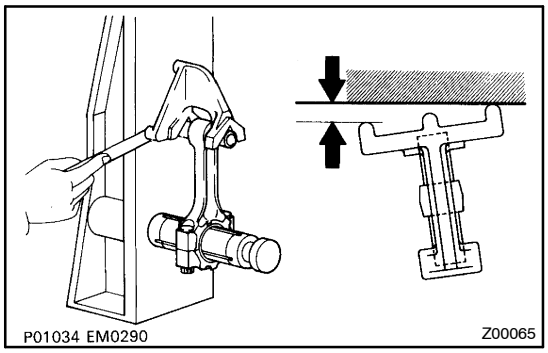
If the oil clearance is greater than maximum, replace all the 6 pistons. If necessary, replace the cylinder block.

21. INSPECT CONNECTING ROD SUB–ASSY

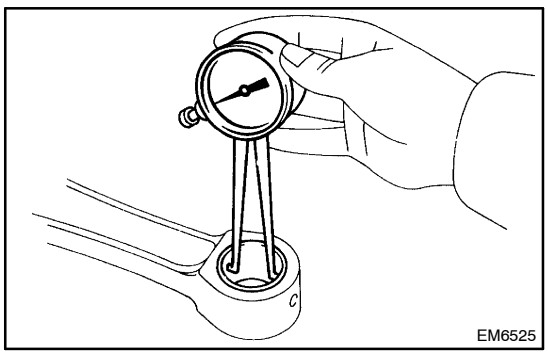
(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.



(1) Check for out–of–alignment.
Maximum out–of alignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
If out–of alignment is greater than maximum, replace the connecting rod assembly.

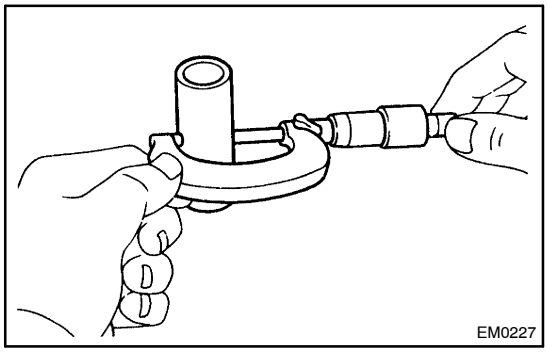


(2) Check of twist.
Maximum twist:
0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
If twist is greater than maximum, replace the connecting rod assembly.



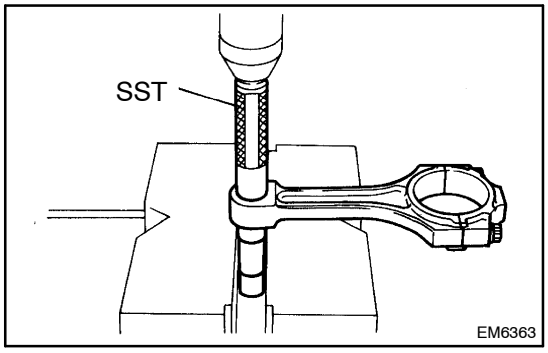
22. INSPECT PISTON PIN OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the connecting rob bushing.
Bushing inside diameter:
22.005 – 22.014 mm (0.8663 – 0.8667 in.)



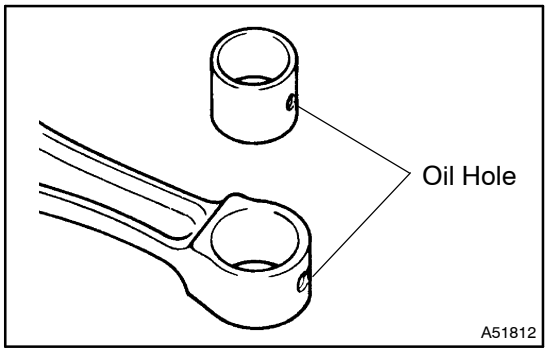
(b) Using a micrometer, measure the piston pin diameter.
Piston pin diameter:
21.997 – 22.006 mm (0.8660 – 0.8664 in.)

(c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.
Standard oil clearance:
0.005 – 0.011 mm (0.0002 – 0.0004 in.)
Maximum oil clearance: 0.05 mm (0.0020 in.)
If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.



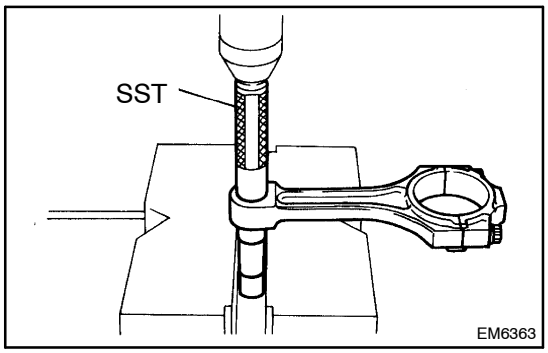
23. REMOVE CONNECTING ROD SMALL END BUSH

(a) Using SST and a press, press out the bushing.
SST 09222–30010

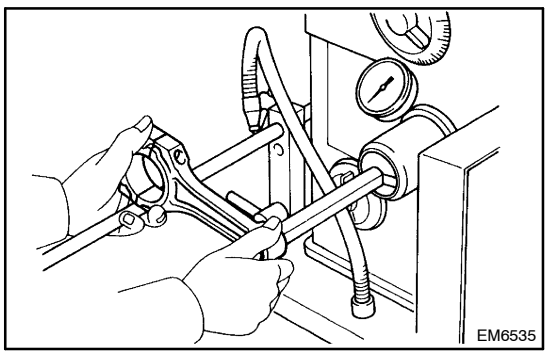


24. INSTALL CONNECTING ROD SMALL END BUSH

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

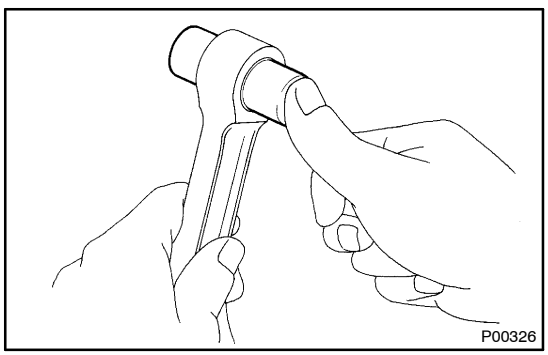


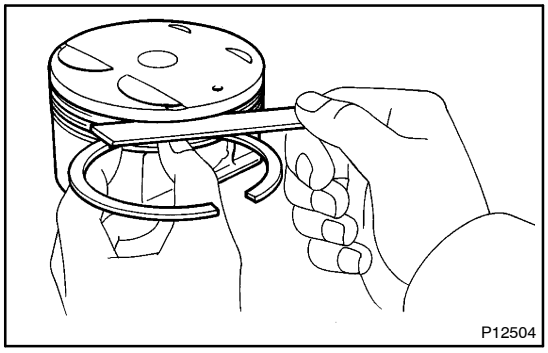
(b) Using SST and a press, press in the bushing.
SST 09222–30010



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

HINT:
Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with thumb.

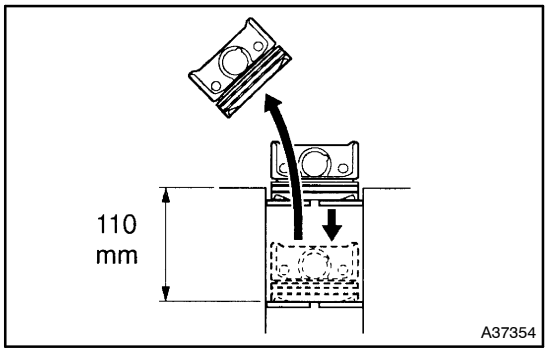




25. INSPECT RING GROOVE CLEARANCE

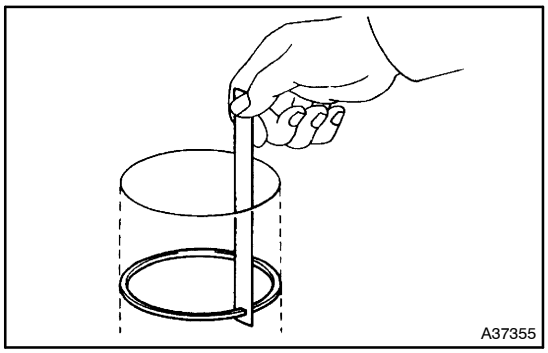
(a) Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

Ring groove clearance:
No.1 0.02 – 0.07 mm (0.0008 – 0.0028 in.)
No.2 0.02 – 0.06 mm (0.0008 – 0.0024 in.)
Oil 0.03 – 0.11 mm (0.0011 – 0.0043 in.)



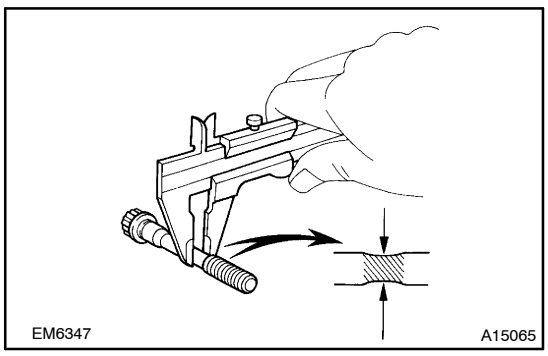
26. INSPECT PISTON RING END GAP

(a) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 110 mm (4.33 in.) from the top of the cylinder block.



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

Standard end gap:
No. 1 0.25 – 0.35 mm (0.0098 – 0.0138 in.)
No. 2 0.35 – 0.45 mm (0.0138 – 0.0177 in.)
Oil (Side rail) 0.15 – 0.40 mm (0.0059 – 0.0157 in.)
Maximum end gap:
No. 1 0.95 mm (0.0374 in.)
No. 2 1.05 mm (0.0413 in.)
Oil (Side rail) 1.00 mm (0.0394 in.)

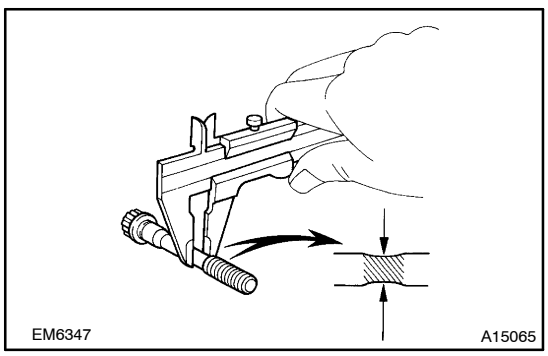


27. INSPECT CONNECTING ROD BOLT

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

Standard diameter: 7.2 – 7.3 mm (0.283 – 0.287 in.)
Minimum diameter: 7.0 mm (0.276 in.)

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

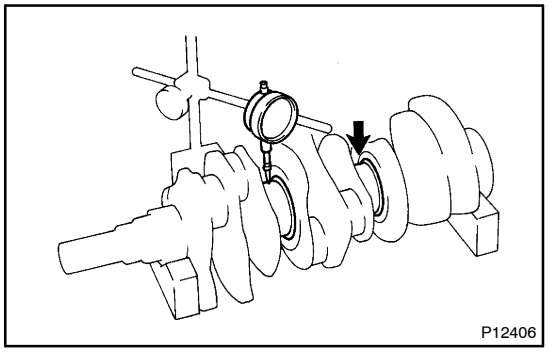


28. INSPECT CRANKSHAFT BEARING CAP SET BOLT

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

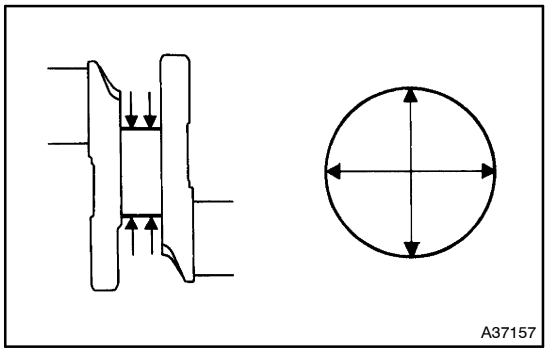
Standard diameter:
7.5 – 7.6 mm (0.295 – 0.299 in.)
Minimum diameter: 7.2 mm (0.283 in.)

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



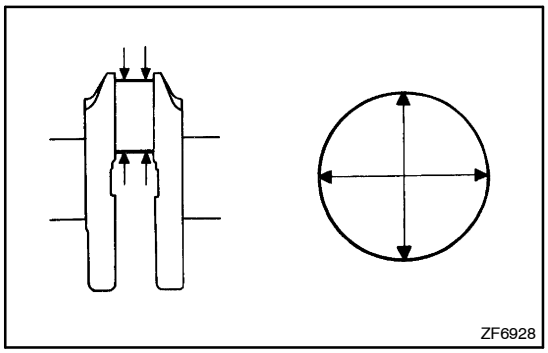
29. INSPECT CRANKSHAFT

(a) Using a dial indicator and V–blocks, measure the circle runout, as shown in the illustration.
Maximum circle runout: 0.06 mm (0.0024 in.)



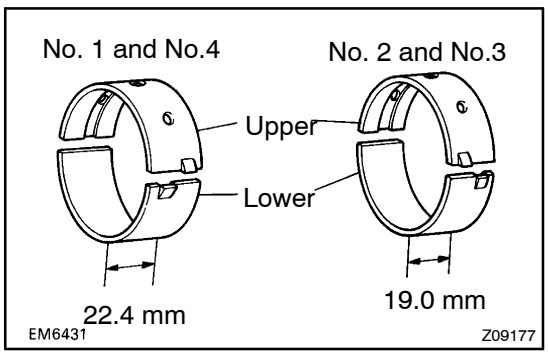
(b) Using a micrometer, measure the diameter of each main journal.
Diameter: 60.988 – 61.000 mm (2.4011 – 2.4016 in.)

(c) Check each main journal for taper and out–of–round as shown.
Maximum taper and out–of–round:
0.02 mm (0.0008 in.)



(d) Using a micrometer, measure the diameter of each crank pin.
Diameter: 52.992 – 53.000 mm (2.0863 – 2.0866 in.)

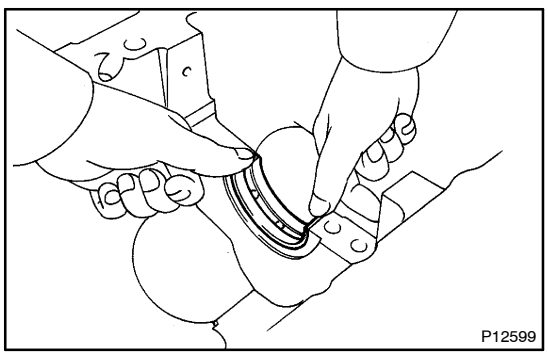
(e) Check each crank pin for taper and out–of–round as shown.
Maximum taper and out–of–round:
0.02 mm (0.0008 in.)



30. INSPECT CRANKSHAFT OIL CLEARANCE

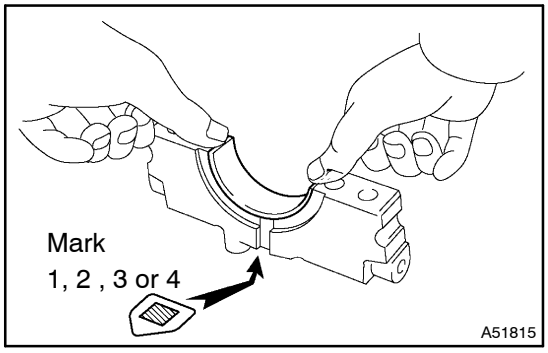
HINT:
Main bearings come in widths of 19.0 mm (0.748 in.) and 22.4 mm (0.882 in.). Install the 22.4mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the main bearing cap. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.

(a) Clean each main journal and bearing.



(b) Align the bearing claw with the claw groove of the cylinder block, and push in the 4 upper bearings.

NOTICE:
Do not apply engine oil to the bearing and its contact surface.



(c) Align the bearing claw with the claw groove of the main bearing cap, and push in the 4 lower bearings.

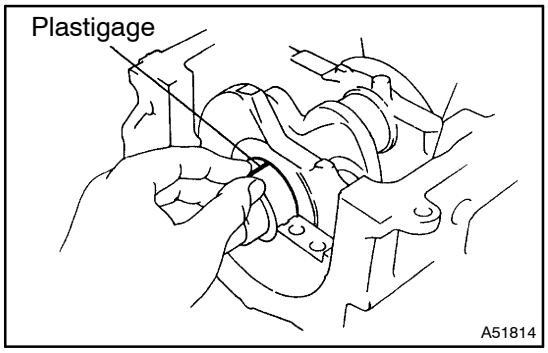
NOTICE:

Do not apply engine oil to the bearing and its contact surface.

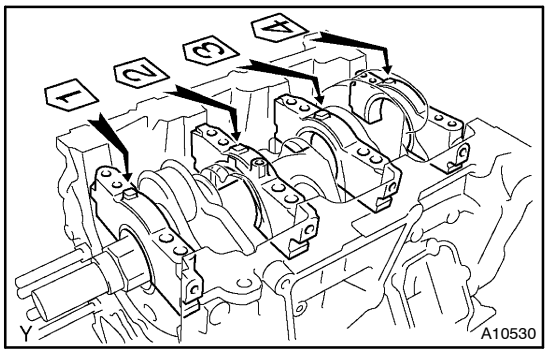
HINT:

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

(d) Place the crankshaft on the cylinder block.



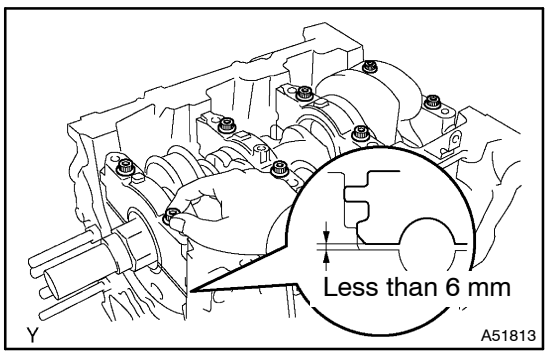
(e) Lay a strip of plastigage across each journal.



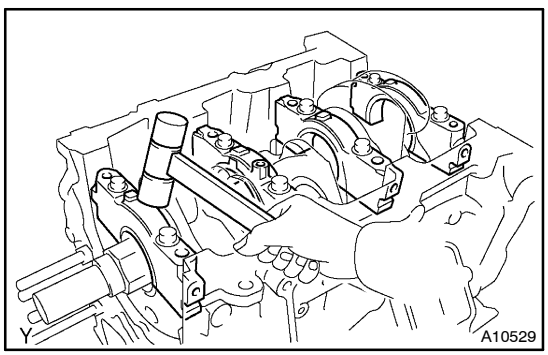
(f) Examine the front marks and numbers and install the bearing caps on the cylinder block.

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

(h) Temporarily install the 8 main bearing cap bolts to the inside positions.

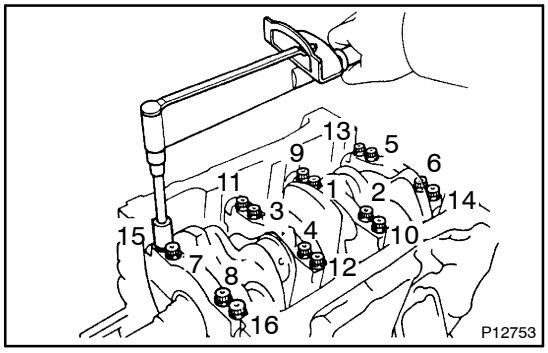


(i) Insert the main bearing cap with hand until the clearance between the main bearing cap and the cylinder block will become less than 6 mm (0.23 in.) by making the 2 internal bearing cap bolts as a guide.

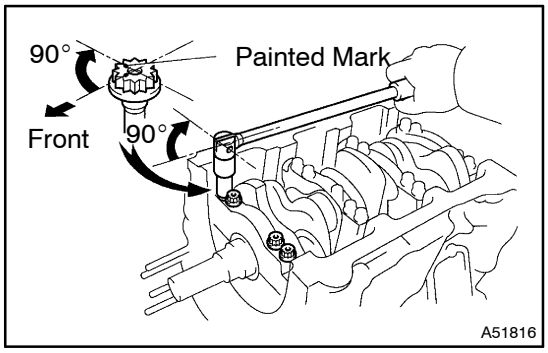


(j) Using a plastic–faced hammer, lightly tap the bearing cap to ensure a proper fit.

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

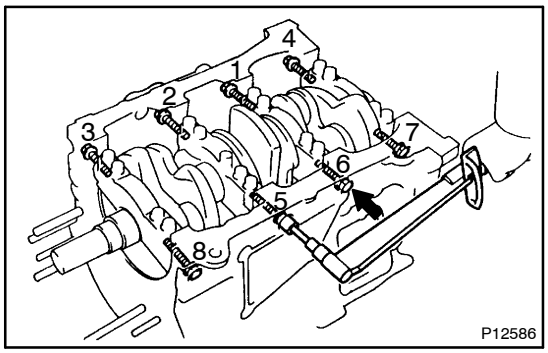


(l) Install and uniformly tighten the 16 main bearing cap bolts in several passes, in the sequence shown.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)



(m) Mark the front side of the bearing cap bolts with paint.
(n) Retighten the bearing cap bolts by 90° in the sequence shown.
(o) Check that the painted mark is now at a 90° angle to the front.

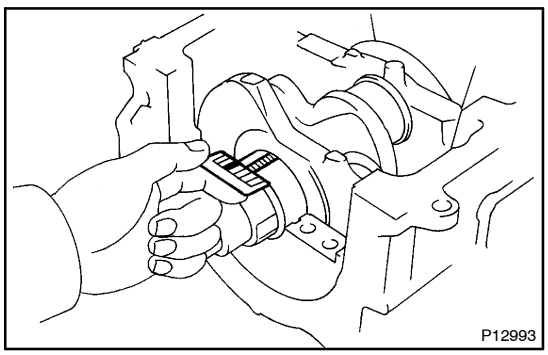
NOTICE:
Do not turn the crankshaft.



(p) Install and uniformly tighten the 8 main bearing cap bolts in several passes, in the sequence shown.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

HINT:
Use a short bolt for the marked position (an arrow)

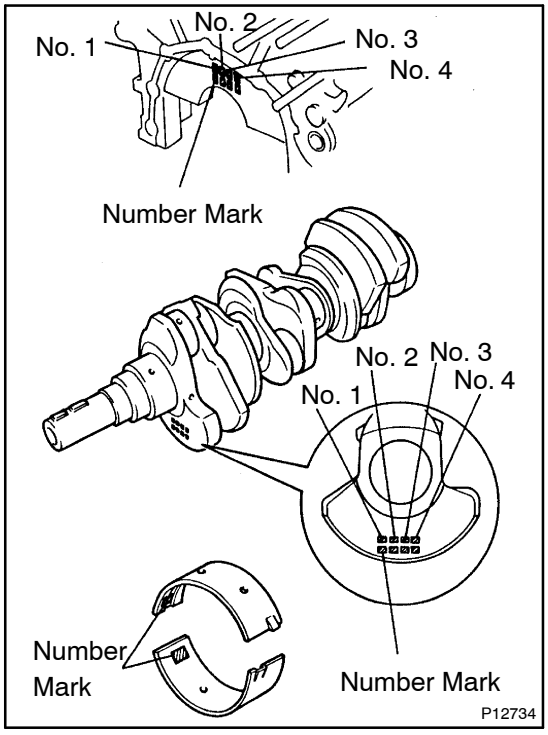
(q) Remove the main bearing caps.



(r) Measure the Plastigage at its widest point.
Standard oil clearance:
No. 1 and No. 4 journals
0.014 – 0.034 mm (0.0006 – 0.0013 in.)
No. 2 and No. 3 journals
0.026 – 0.046 mm (0.0010 – 0.0018 in.)
Maximum clearance:
No. 1 and No. 4 journals 0.05 mm (0.0020 in.)
No. 2 and No. 3 journals 0.06 mm (0.0024 in.)

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

NOTICE:
Completely remove the plastigage.



(s) If using a 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 refer to the table below for the appropriate bearing number. The No. 1 and No. 4 journal bearing sizes, marked ”3”, ”4”, ”5”, ”6” and ”7” accordingly. The No.2 and No. 3 journal bearings have 5 standard bearing sizes, marked ”1”, ”2”, ”3”, ”4” and ”5” accordingly.

No. 1 and No. 4 journal bearings

Cylinder block (A) + Crankshaft	0 – 5	6 – 11	12 – 17	18 – 23	24 – 28
Use Bearing	”3”	”4”	”5”	”6”	”7”

HINT:
EXAMPLE
Cylinder block ”06” (A) + Crankshaft ”08” (B)
=Total number 14 (Use bearing ”5”)

No. 2 and No. 3 journal bearings

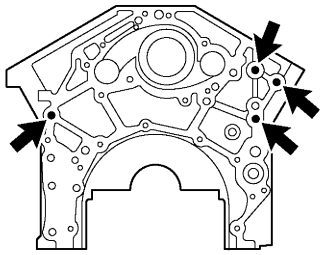
Cylinder block (A) + Crankshaft	0 – 5	6 – 11	12 – 17	18 – 23	24 – 28
Use Bearing	”1”	”2”	”3”	”4”	”5”

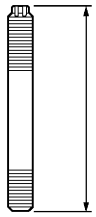
HINT:
EXAMPLE
Cylinder block ”06” (A) + Crankshaft ”08” (B)
=Total number 14 (Use bearing ”3”)

Item	Mark	mm (in.)
Cylinder block main journal bore diameter (A)	”00”	66.000 (2.5984)
	”01”	66.001 (2.5985)
	”02”	66.002 (2.5985)
	”03”	66.003 (2.5985)
	”04”	66.004 (2.5986)
	”05”	66.005 (2.5986)
	”06”	66.006 (2.5987)
	”07”	66.007 (2.5987)
	”08”	66.008 (2.5987)
	”09”	66.009 (2.5988)
	”10”	66.010 (2.5988)
	”11”	66.011 (2.5989)
	”12”	66.012 (2.5989)
	”13”	66.013 (2.5989)
	”14”	66.014 (2.5990)
	”15”	66.015 (2.5990)
	”16”	66.016 (2.5990)
Crankshaft main journal diameter (B)	”00”	61.000 (2.4016)
	”01”	60.999 (2.4015)
	”02”	60.998 (2.4015)
	”03”	60.997 (2.4015)
	”04”	60.996 (2.4014)
	”05”	60.995 (2.4014)
	”06”	60.994 (2.4013)
	”07”	60.993 (2.4012)
	”08”	60.992 (2.4012)
	”09”	60.991 (2.4012)
	”10”	60.990 (2.4012)
	”11”	60.989 (2.4011)
	”12”	60.988 (2.4011)
Standard bearing center wall thickness	”1”	2.486 – 2.489 (0.0979 – 0.0980)
	”2”	2.489 – 2.492 (0.0980 – 0.0981)
	”3”	2.492 – 2.495 (0.0981 – 0.0982)
	”4”	2.495 – 2.498 (0.0982 – 0.0983)
	”5”	2.498 – 2.501 (0.0983 – 0.0985)
	”6”	2.501 – 2.504 (0.0985 – 0.0986)
	”7”	2.504 – 2.507 (0.0986 – 0.0987)

31. INSTALL STUD BOLT

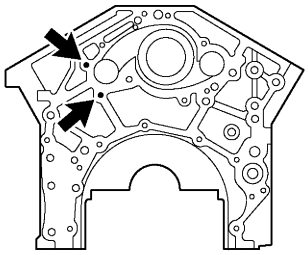
Front Side

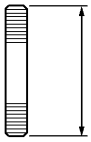




M10

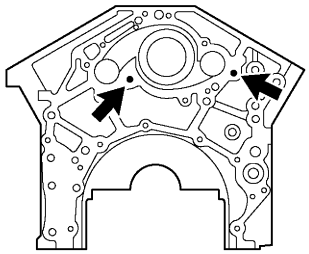
Front Side

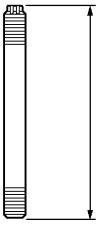




M6

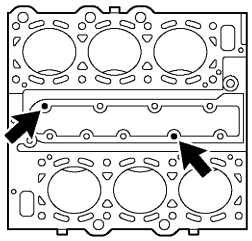
Front Side

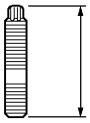




M8

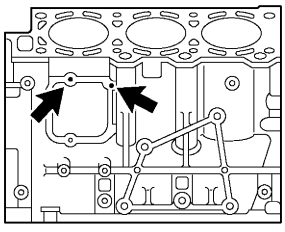
Upper Side

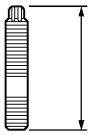




M6

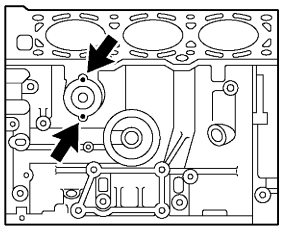
Right Side

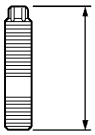




M6

Left Side





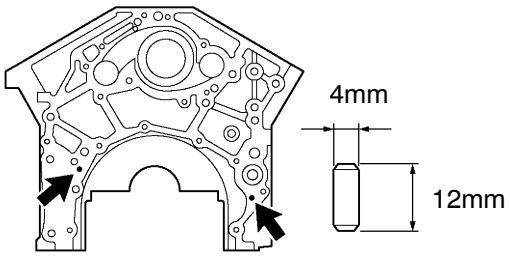
M8

O

A61688

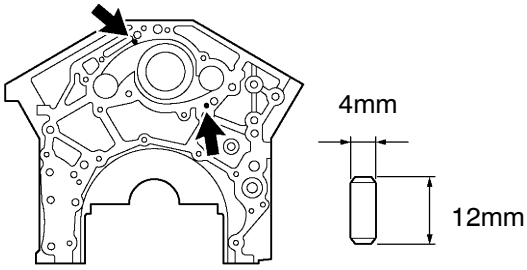
32. INSTALL STRAIGHT PIN

Front Side



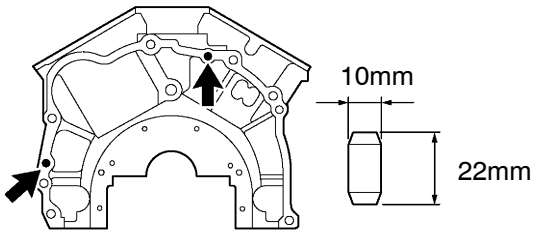
Protrusion Height: 6 mm

Front Side



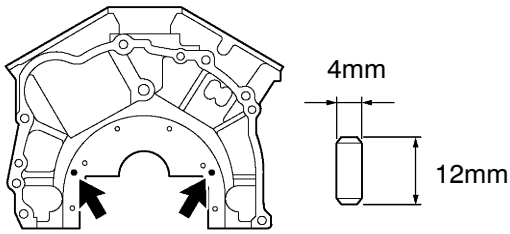
Protrusion Height: 6 mm

Back Side



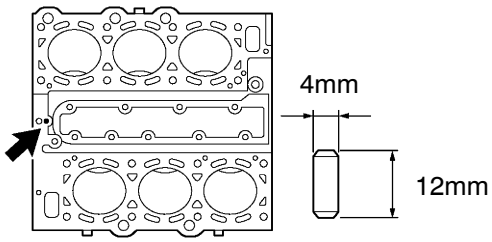
Protrusion Height: 11 mm

Back Side



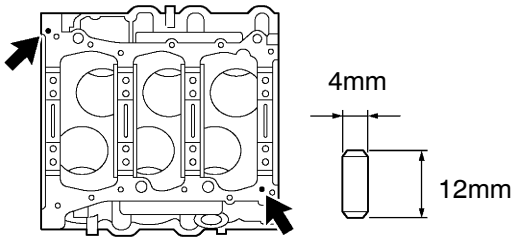
Protrusion Height: 6 mm

Upper Side



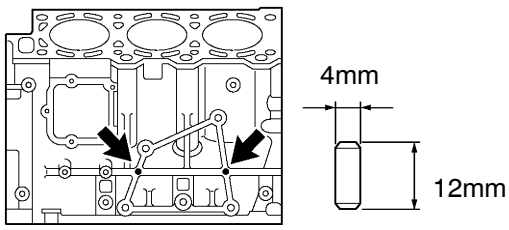
Protrusion Height: 6 mm

Lower Side



Protrusion Height: 6 mm

Right Side

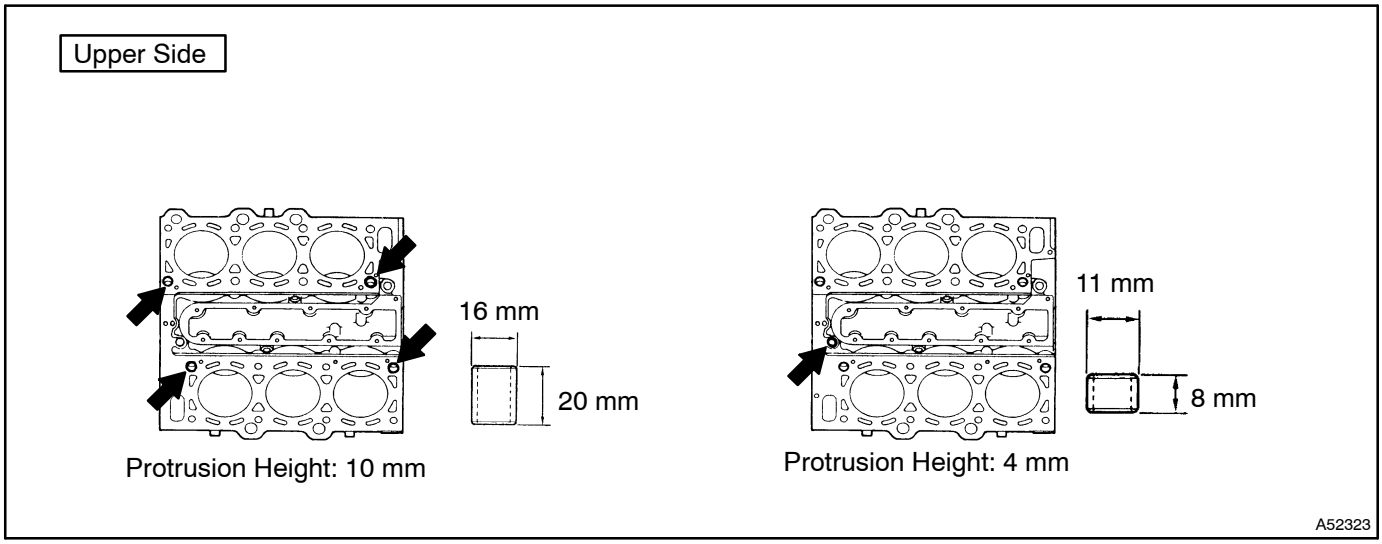


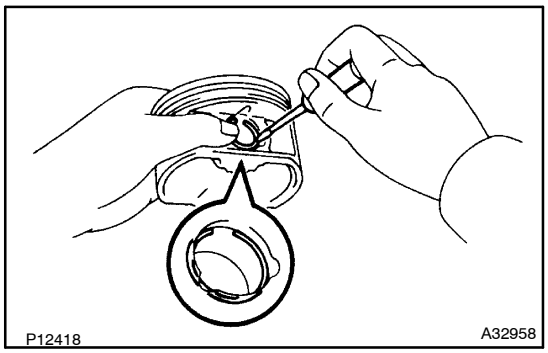
Protrusion Height: 6 mm

O

A61689

33. INSTALL RING PIN

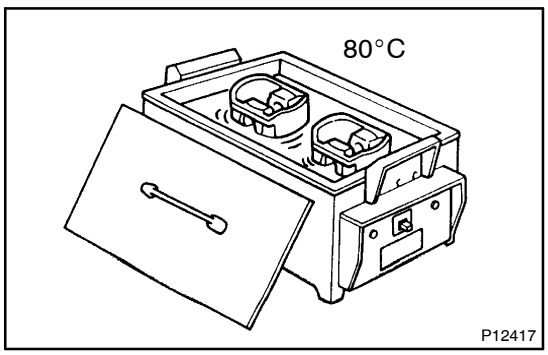




34. INSTALL PISTON PIN HOLE SNAP RING

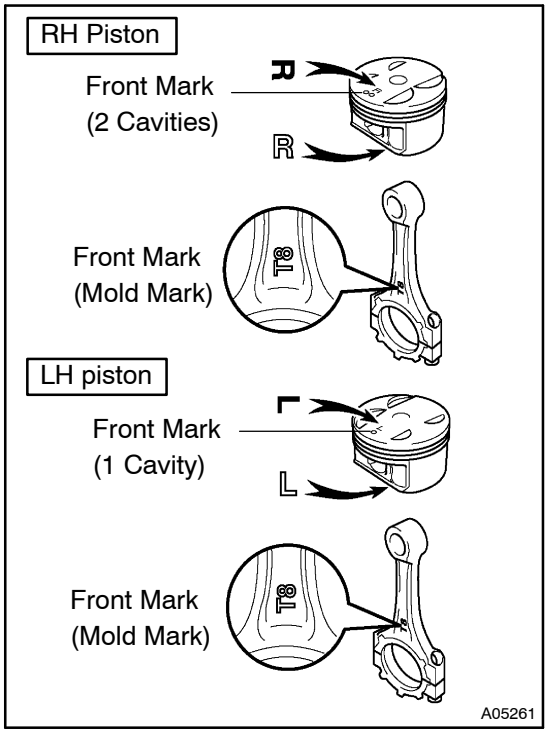
(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.

HINT:
Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

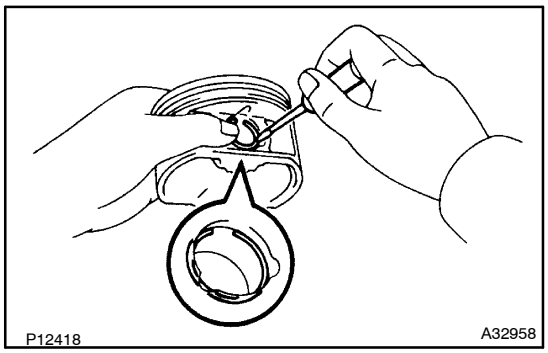


35. INSTALL W/PIN PISTON SUB–ASSY

(a) Gradually heat the piston to about 80°C (176°F).



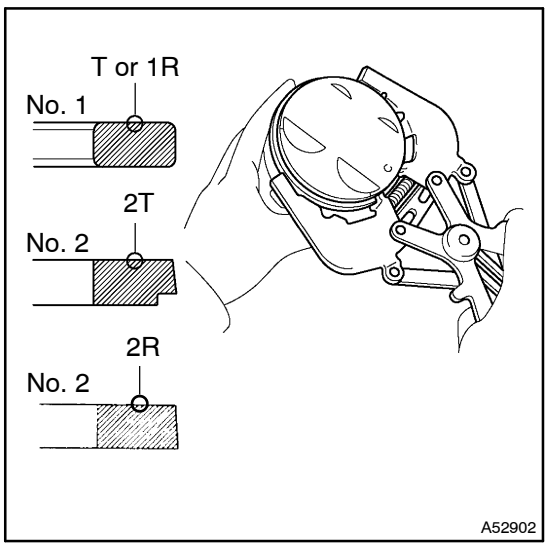
(b) Coat the piston pin with engine oil.
(c) Align the front marks of the piston and connecting rod, and push in the piston pin with thumb.



36. INSTALL PISTON PIN HOLE SNAP RING

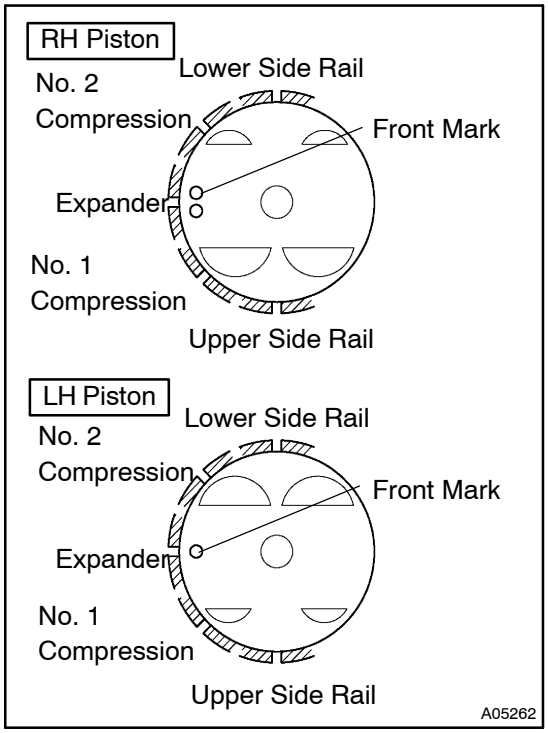
(a) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.

HINT:
Be sure that end of gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

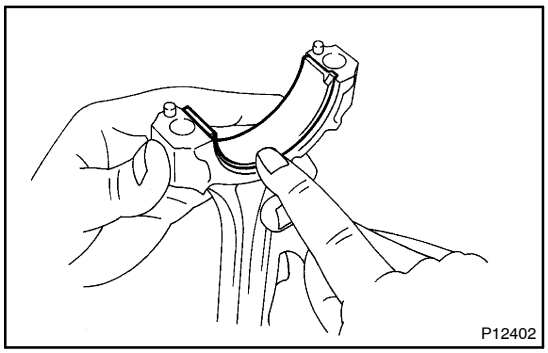


37. INSTALL PISTON RING SET

(a) Install the oil ring expander and 2 side rails by hand.
(b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.
Code mark:
No. 1 piston ring T or 1R
No. 2 piston ring 2T or 2R



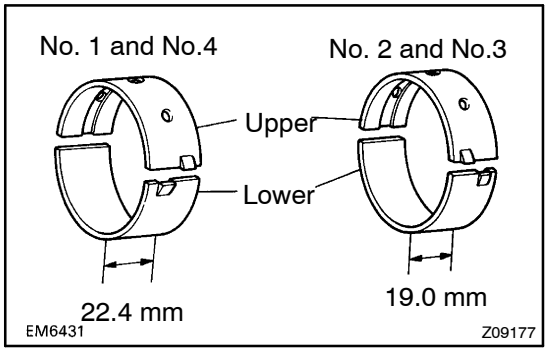
(c) Position the piston rings so that the ring ends are as shown.



38. INSTALL CONNECTING ROD BEARING

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

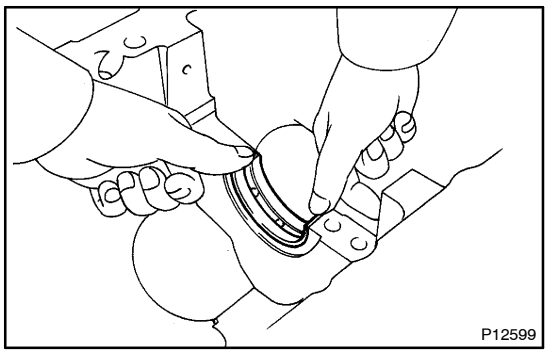
NOTICE:
Clean the backside of the bearing and the bearing surface of the connecting rod and let not stick the oils and fats.



39. INSTALL CRANKSHAFT BEARING

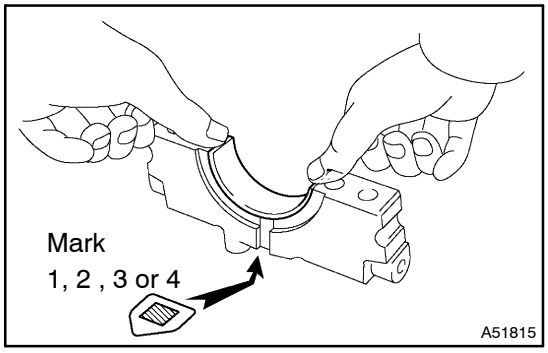
HINT:
Main bearings come in widths of 19.0 mm (0.748 in.) and 22.4 mm (0.882 in.). Install the 22.4mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the main bearing cap. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.

(a) Clean each main journal and bearing.



(b) Align the bearing claw with the claw groove of the cylinder block, and push in the 4 upper bearings.

NOTICE:
Do not apply engine oil to the bearing and its contact surface.



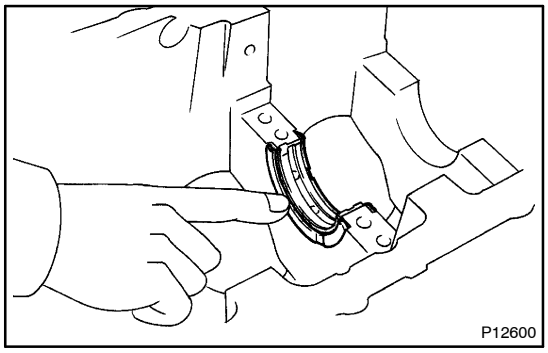
(c) Align the bearing claw with the claw groove of the main bearing cap, and push in the 4 lower bearings.

NOTICE:

Do not apply engine oil to the bearing and its contact surface.

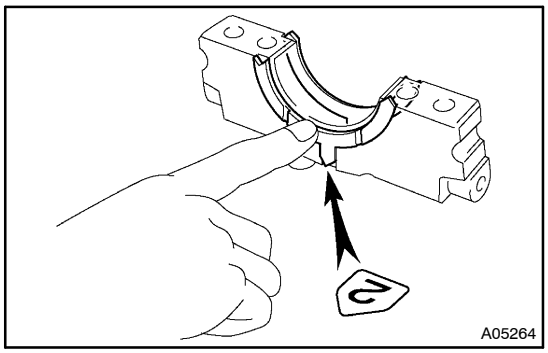
HINT:

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



40. INSTALL CRANKSHAFT THRUST WASHER SET

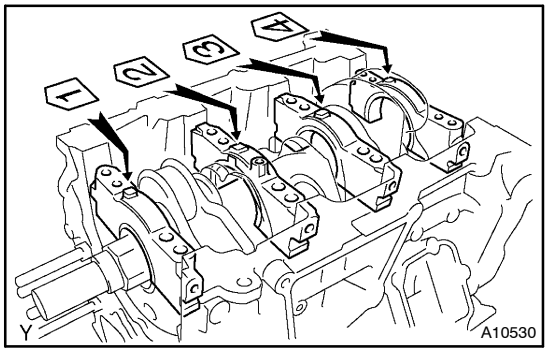
(a) Install the 2 thrust washers under the No. 2 journal position of the cylinder block with the oil grooves facing outward.



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

41. INSTALL CRANKSHAFT

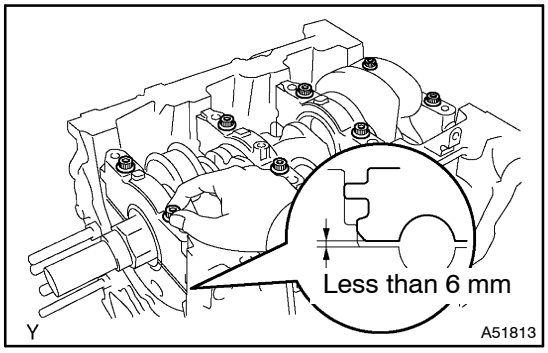
(a) Apply engine oil to upper bearing and install the crankshaft on the cylinder block.



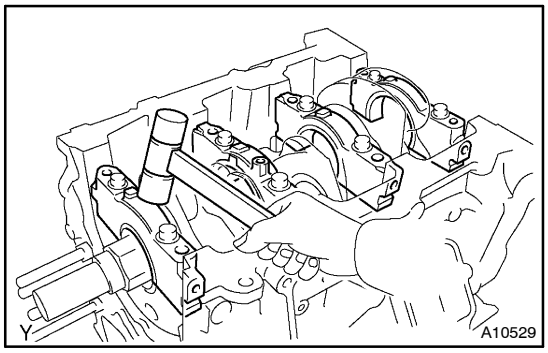
(b) Examine the front marks and numbers and install the bearing caps on the cylinder block.

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

(d) Temporarily install the 8 main bearing cap bolts to the inside positions.

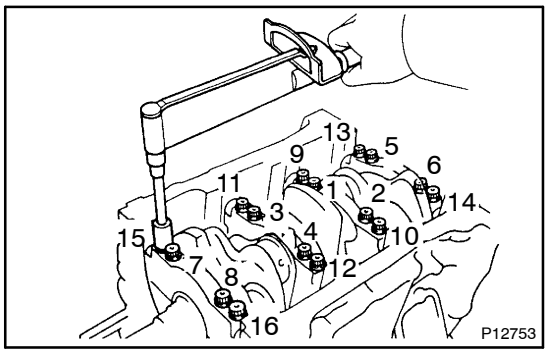


(e) Insert the main bearing cap with hand until the clearance between the main bearing cap and the cylinder block will become less than 6 mm (0.23 in.) by making the 2 internal bearing cap bolts as a guide.

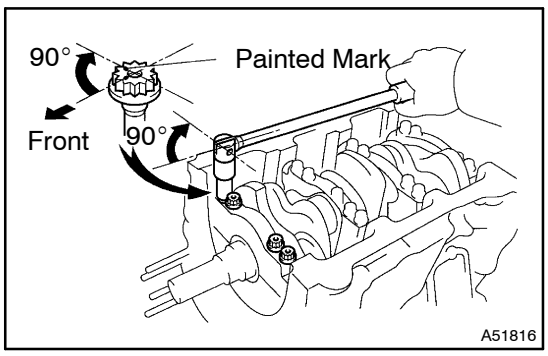


(f) Using a plastic–faced hammer, lightly tap the bearing cap to ensure a proper fit.

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



(h) Install and uniformly tighten the 16 main bearing cap bolts in several passes, in the sequence shown.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

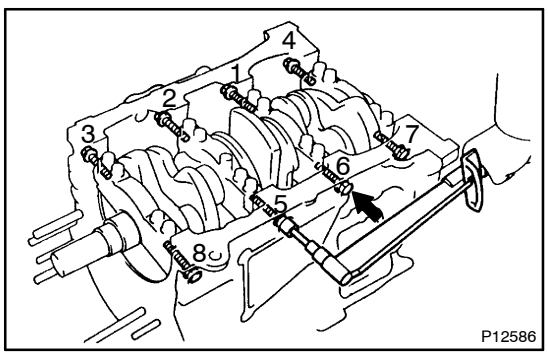


(i) Mark the front side of the bearing cap bolts with paint.

(j) Retighten the bearing cap bolts by 90° in the sequence shown.

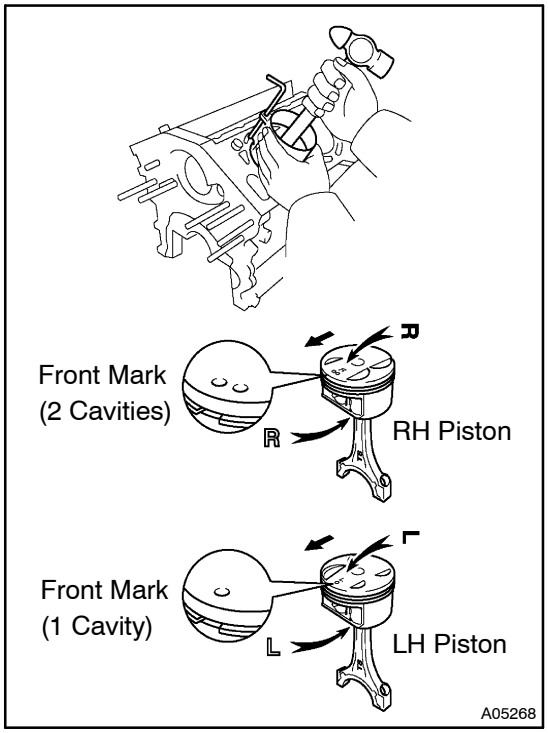
(k) Check that the painted mark is now at a 90° angle to the front.

(l) Check that the crankshaft turns smoothly.



(m) Install and uniformly tighten the 8 main bearing cap bolts in several passes, in the sequence shown.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

HINT:
Use a short bolt for the marked position (an arrow)



42. INSTALL PISTON SUB–ASSY W/CONNECTING ROD

(a) Apply engine oil to the cylinder walls, the pistons, and the surfaces of connecting rod bearings.

(b) Check the position of the piston ring ends.

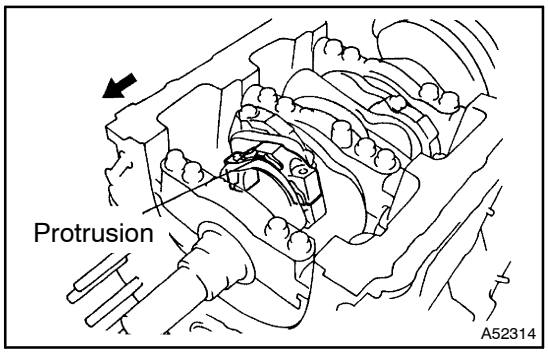
(c) Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.

NOTICE:

- **Clean the backside of the bearing and the bearing surface of the connecting rod cap and let not stick the oils and fats.**
- **Match the numbered connecting rod cap with the connecting rod.**

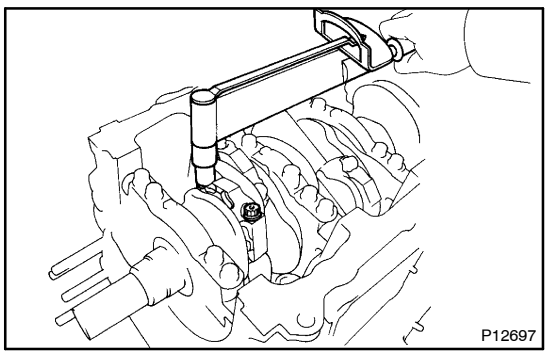
HINT:

The shape of the piston varies for the RH and LH banks. The RH piston is marked with ”R”, the LH piston with ”L”.



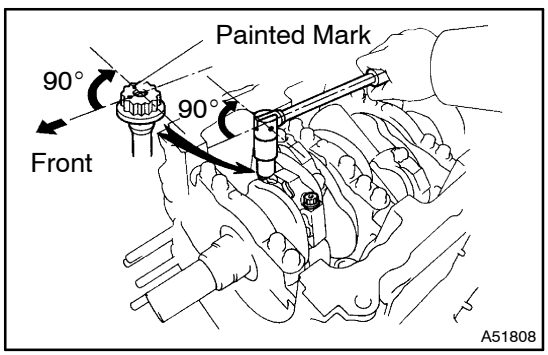
(d) Check that the protrusion of the connecting rod cap is facing in the correct direction.

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



(f) Tighten the bolts in several passes by the specified torque.

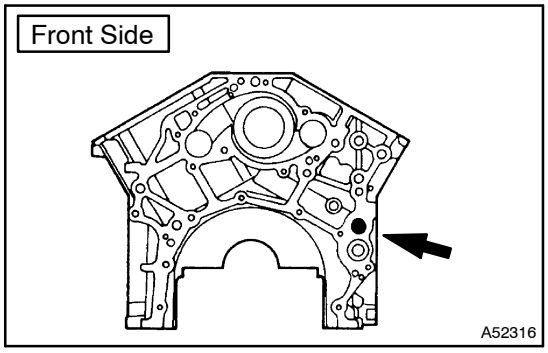
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



(g) Mark the front side of the each connecting cap bolt with paint.

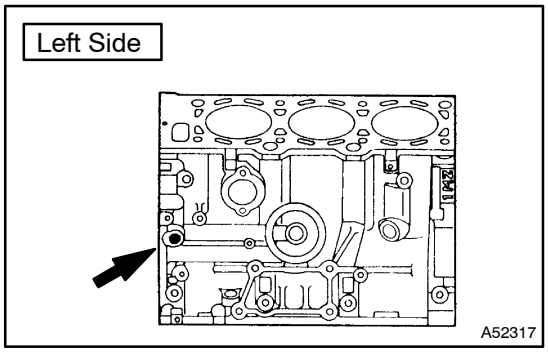
(h) Retighten the cap bolts by 90° as shown.

(i) Check that the crankshaft turns smoothly.



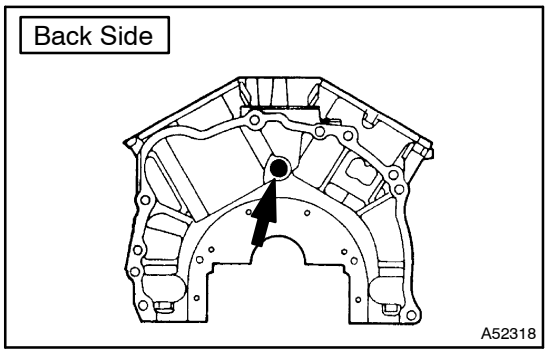
43. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

(a) Using a 10 mm hexagon wrench, install a new gasket and the screw plug.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)



44. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

(a) Using a 10 mm hexagon wrench, install a new gasket and the screw plug.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

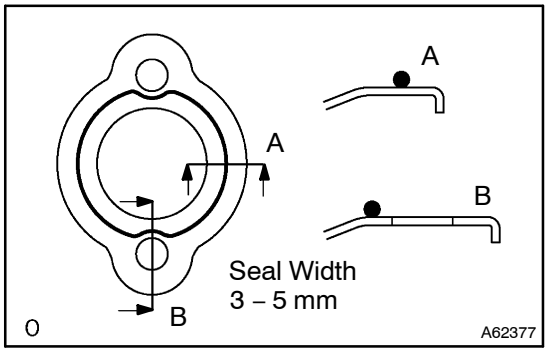


45. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.3 PLUG

(a) Using a 10 mm hexagon wrench, install a new gasket and the screw plug.
Torque: 30 N·m (306 kgf·cm, 22 ft·lbf)

46. INSTALL WATER SEAL PLATE

(a) Remove any old packing material from the contact surface.

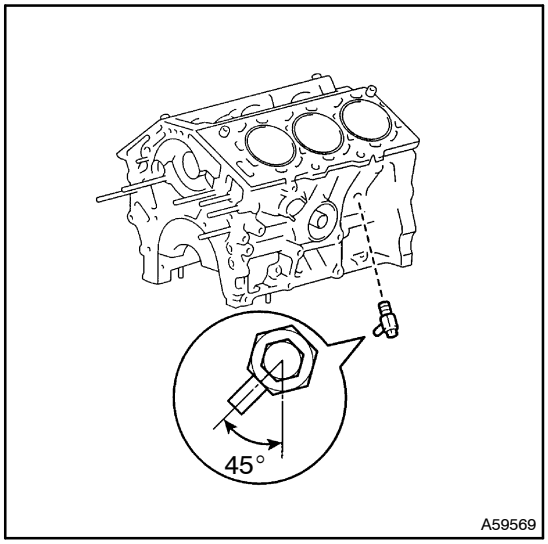


(b) Apply seal packing in the shape of bead (Diameter 3 – 5 mm (0.12 – 0.20 in.) consequently as shown in the illustration.
Seal packing: Part No. 08826–00100 or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the seal plate within 3 minutes after applying seal packing.**
- **Do not put into engine oil within 2 hours after installing.**

(c) Install the seal plate with the 2 nuts.
Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)



47. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB–ASSY

(a) Apply adhesive to 2 or 3 threads of the drain cock end.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent

(b) After applying the specified torque, rotate the drain cock clockwise as shown in the illustration.
Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

NOTICE:

- **Install the drain cock within 3 minutes after applying adhesive.**
- **Do not put into coolant within an hour after installing.**
- **Do not rotate the drain cock more than 1 revolution (360°) after tightening the drain cock with the specified torque.**
- **Do not loosen the drain cock after setting it correctly.**