141S0–01

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

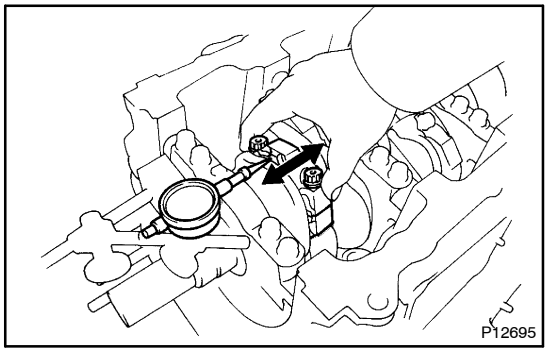
(a) Using a socket hexagon wrench 10, remove the screw plug.

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

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

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

(a) Using a socket hexagon wrench 10, 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 to 0.30 mm (0.0059 to 0.0118 in.)
Maximum thrust clearance: 0.35 mm (0.0138 in.)

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

Connecting rod thickness:
20.80 to 20.85 mm (0.8189 to 0.8209 in.)

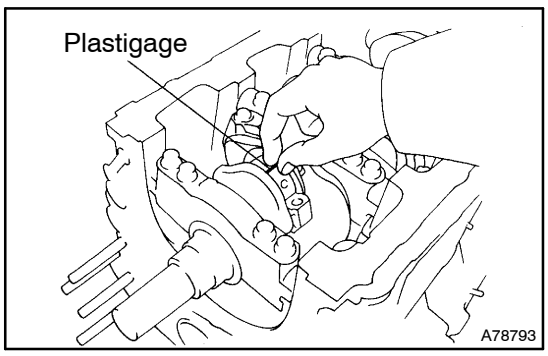
7. INSPECT CONNECTING ROD OIL CLEARANCE

(a) Check that the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.

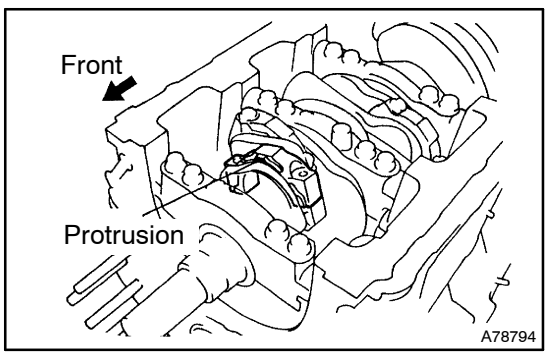
(b) Remove the 2 connecting rod cap bolts.

(c) Clean the crank pin, the bearing and the connecting rod.

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

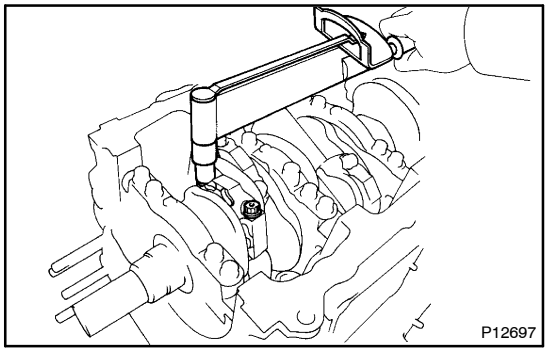


(e) Lay a strip of plastigage across the crank pin.

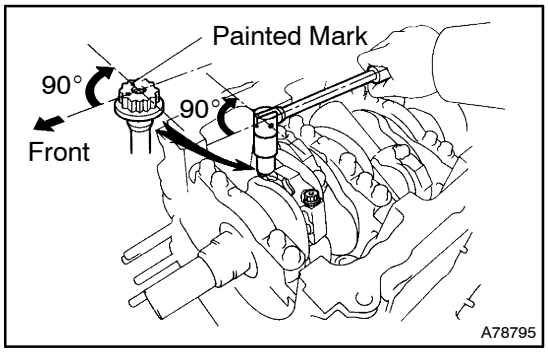


(f) Check that the protrusion of the connecting rod cap is facing the correct direction.

(g) Apply a light coat of engine oil to the threads of the connecting rod cap bolts.



(h) Tighten the bolts in several steps by the specified torque.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

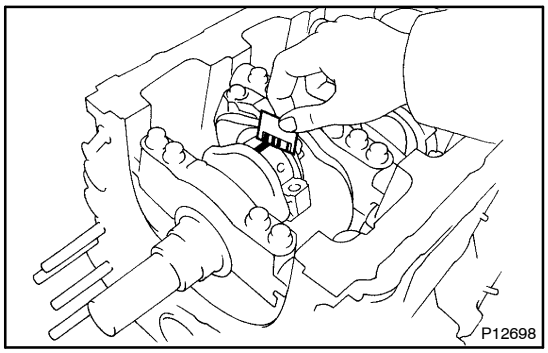


(i) Mark the front side of each connecting cap bolt with paint.
(j) Retighten the cap bolts by 90° as shown in the illustration.

NOTICE:

Do not turn the crankshaft.

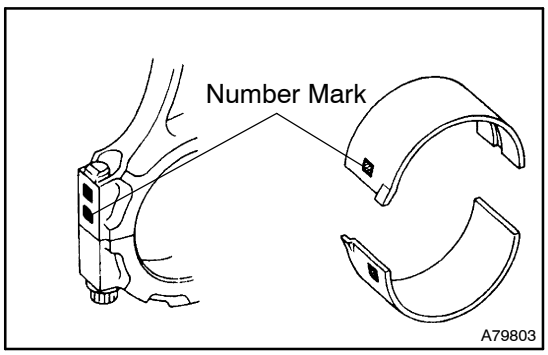
(k) Remove the 2 bolts, the connecting rod cap and the lower bearing.



(l) Measure the plastigage at its widest point.
Standard oil clearance:
0.038 to 0.066 mm (0.0015 to 0.0026 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)

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

(m) Completely remove the plastigage.

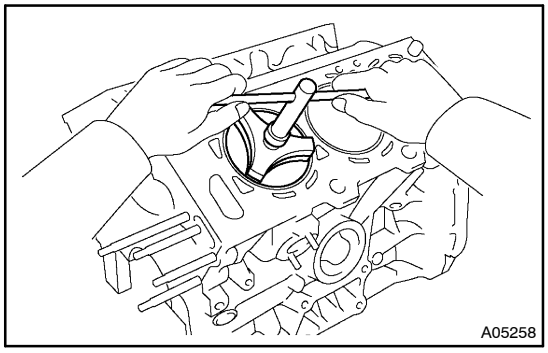


HINT:

If replacing the bearing, replace it with a bearing that has the same number as the connecting rod. There are 4 sizes of standard bearings: 1, 2, 3 and 4.

Standard bearing center wall thickness:

Mark	Center Wall Thickness mm (in.)
1	1.484 to 1.486 (0.05843 to 0.05850)
2	1.487 to 1.489 (0.05854 to 0.05862)
3	1.490 to 1.492 (0.05866 to 0.05874)
4	1.493 to 1.495 (0.05878 to 0.05886)



8. REMOVE PISTON SUB–ASSY W/CONNECTING ROD

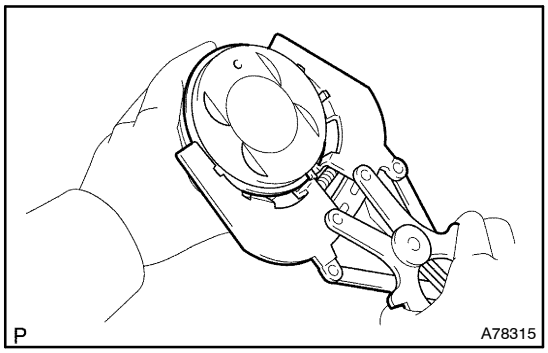
(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

(b) Push out the piston and the connecting rod assembly from the top of the cylinder block.

HINT:

- Keep the bearings, the connecting rod and the cap together.
- Arrange the piston and the connecting rod assemblies in the correct order so they can be returned to their original locations when reassembled.

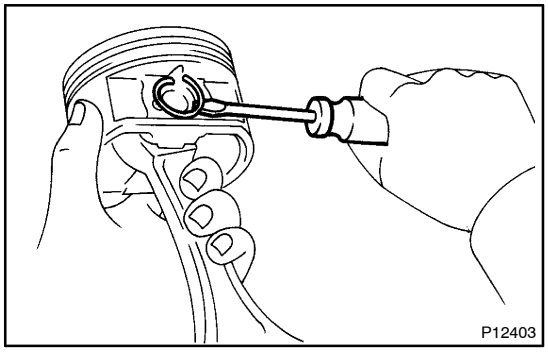
9. REMOVE CONNECTING ROD BEARING



10. REMOVE PISTON RING SET

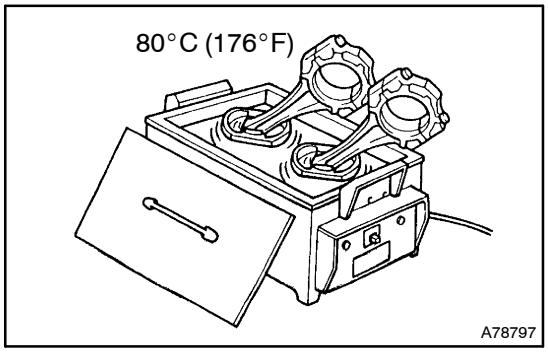
(a) Using a piston ring expander, remove the 2 compression rings.

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



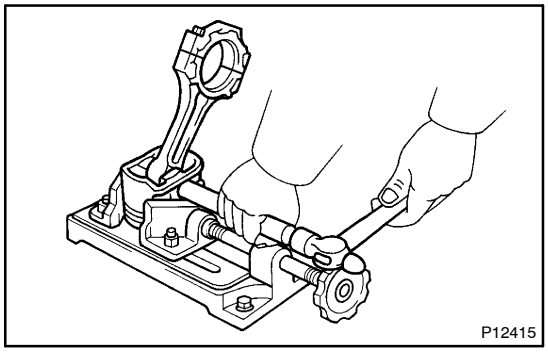
11. REMOVE PISTON PIN HOLE SNAP RING

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



12. REMOVE W/PIN PISTON SUB–ASSY

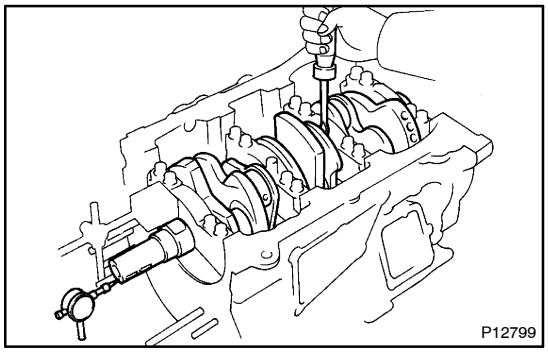
(a) Gradually heat the piston to approximately 80°C (176°F).



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

HINT:

- The piston and pin are a matched set.
- Store the pistons, the pins, the rings, the connecting rods and the bearings in the correct order so that they can be returned to their original locations when reassembled.



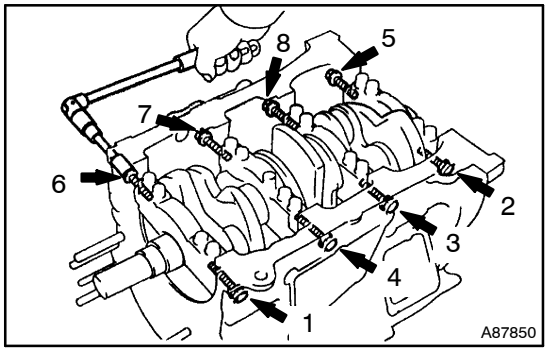
13. INSPECT CRANKSHAFT THRUST CLEARANCE

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

Standard thrust clearance:
0.04 to 0.24 mm (0.0016 to 0.0094 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

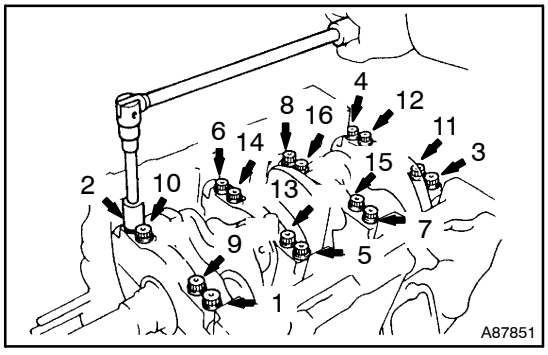
If the thrust clearance is greater than the maximum, replace the thrust washers as a set. Check the crankshaft for wear, and repair or replace if necessary.

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

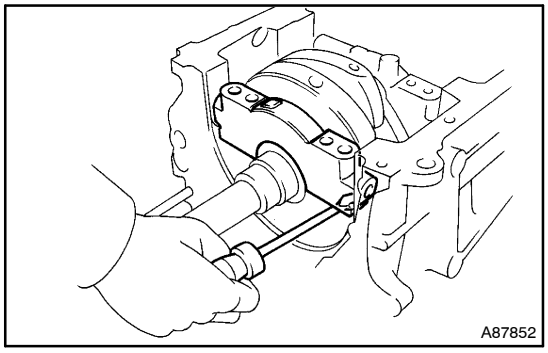


14. INSPECT CRANKSHAFT OIL CLEARANCE

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



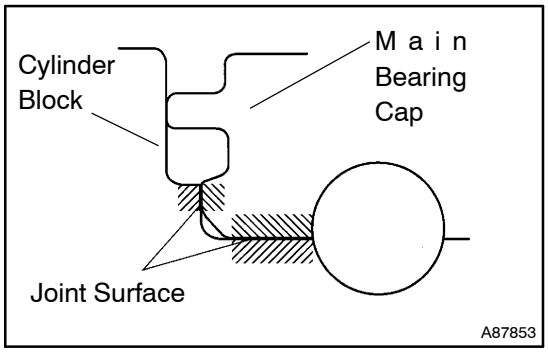
(b) Uniformly loosen and remove the 16 main bearing cap bolts in the sequence shown in the illustration.



(c) Remove the 4 main bearing caps and 4 lower bearings. Also remove the 2 lower thrust washers, located under the No. 2 main bearing cap.

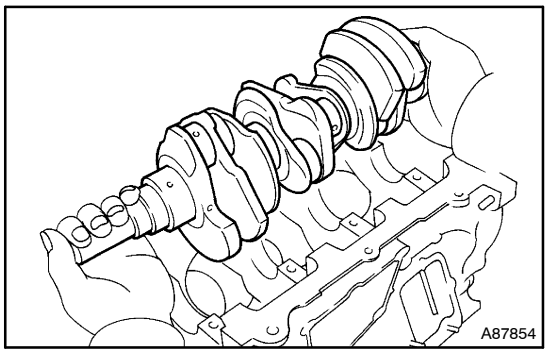
HINT:

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



NOTICE:

Using a screwdriver, push up on the cap little by little, alternating from the right and left side until the cap is free. Take care not to damage the contact surfaces of the cap and cylinder block.



(d) Lift out the crankshaft.

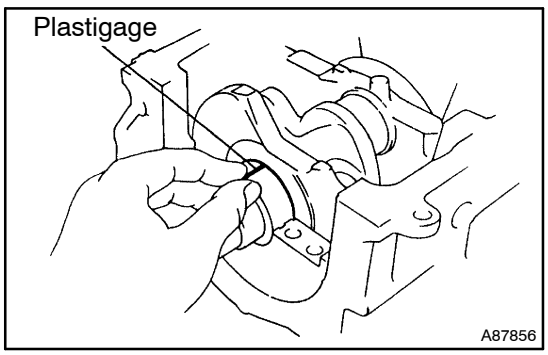
HINT:

Keep the upper bearings together with the cylinder block.

(e) Clean each main journal and bearing.

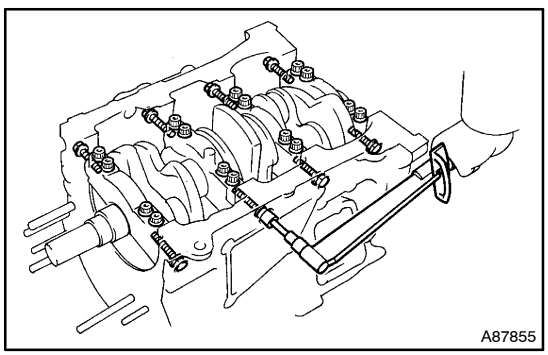
(f) Check each main journal and bearing for pitting and scratches.

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



(g) Place the crankshaft on the cylinder block.

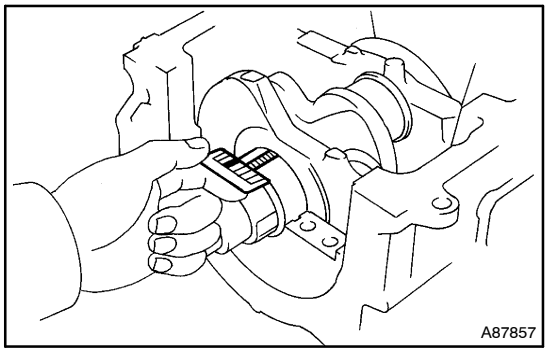
(h) Lay a strip of plastigage across each journal.



(i) Install the 4 main bearing caps.

NOTICE:
Do not turn the crankshaft.

(j) Remove the main bearing caps (see steps (a) to (c)).



(k) Measure the plastigage at its widest point.

Standard oil clearance:

No. 1 and No. 2 journals	0.014 to 0.034 mm (0.0006 to 0.0013 in.)
No. 3 and No. 4 journals	0.026 to 0.046 mm (0.0010 to 0.0018 in.)

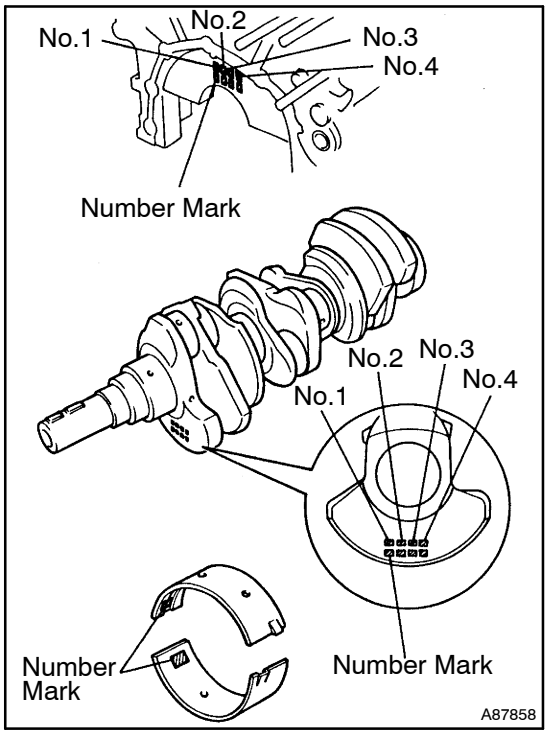
Maximum oil clearance:

No. 1 and No. 4 journals	0.05 mm (0.0020 in.)
No. 3 and No. 4 journals	0.06 mm (0.0024 in.)

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

HINT:

If using a bearing, replace it with a bearing that has 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 on the next page for the appropriate bearing number. The No. 1 and No. 4 journal bearings have 5 standard bearing sizes, marked 3, 4, 5, 6 and 7. The No. 2 and No. 3 journal bearings have 5 standard bearing sizes, marked 1, 2, 3, 4 and 5.



No. 1 and No. 4 journal bearings

Cylinder block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replace-ment Bearing	3	4	5	6	7

HINT:
EXAMPLE
Cylinder block imprinted number mark is 06
Crankshaft imprinted number mark is 08
6 + 8 = 14
Select the bearing marked ”5”

No. 1 and No. 4 journal standard bearings selection chart

Crankshaft number mark	Cylinder block number mark																
	00	01	02	03	04	05	**06**	07	08	09	10	11	12	13	14	15	16
00	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5
01	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5
02	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6
03	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6
04	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6
05	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6
06	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6
07	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6
08	4	4	4	4	5	5	**5**	5	5	5	6	6	6	6	6	6	7
09	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7
10	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7
11	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7
12	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7

EXAMPLE:
Cylinder block ”**06**”, Crankshaft ”**08**” = Use bearing ”**5**”

No. 2 and No. 3 journal bearings

Cylinder block + Crankshaft =	0 to 5	6 to 11	12 to 17	18 to 23	24 to 28
Replace-ment Bearing	3	4	5	6	7

HINT:
EXAMPLE
Cylinder block imprinted number mark is 06
Crankshaft imprinted number mark is 08
6 + 8 = 14
Select the bearing marked ”3”

No.2 and No.3 journal standard bearings selection chart

Crankshaft number mark	Cylinder block number mark																
	00	01	02	03	04	05	**06**	07	08	09	10	11	12	13	14	15	16
00	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3
01	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3
02	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4
03	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4
04	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4
05	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4
06	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4
07	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
08	2	2	2	2	3	3	**3**	3	3	3	4	4	4	4	4	4	5
09	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5
10	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5
11	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5
12	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5

EXAMPLE:
Cylinder block ”**06**”, Crankshaft ”**08**” = Use bearing ”**3**”

Reference

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

(l) Completely remove the plastigage.
(m) Lift the crankshaft.
(n) Remove the 4 upper main bearings and 2 upper thrust washers from the cylinder block.

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

15. REMOVE CRANKSHAFT

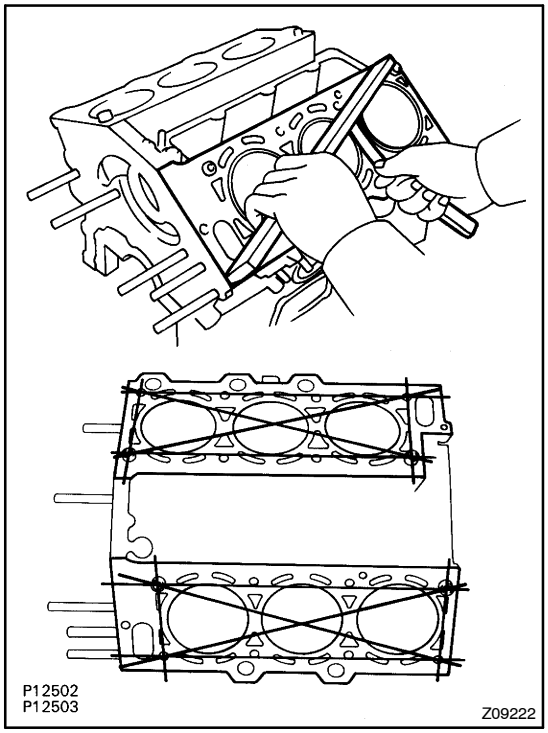
16. REMOVE CRANKSHAFT THRUST WASHER SET

17. REMOVE CRANKSHAFT BEARING

18. CLEAN CYLINDER BLOCK

NOTICE:

If the cylinder is washed at high temperatures, the cylinder liner sticks out beyond the cylinder block. Always wash the cylinder block at a temperature of 45°C (113°F) or less.

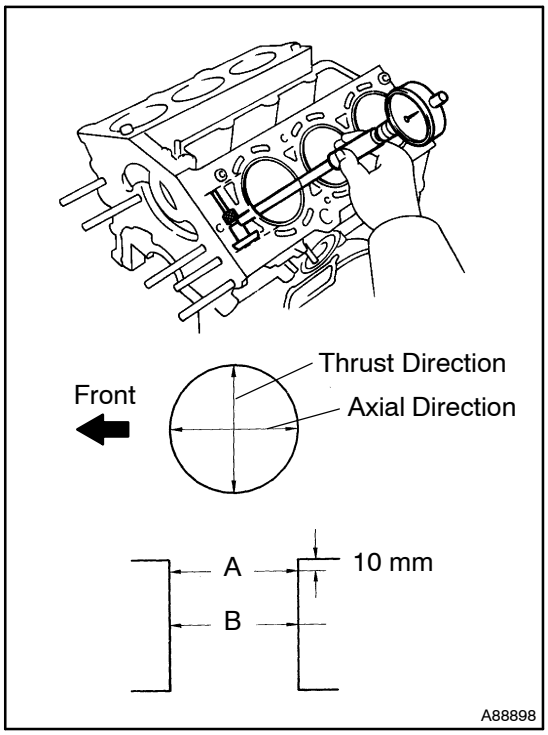


19. INSPECT CYLINDER BLOCK FOR FLATNESS

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



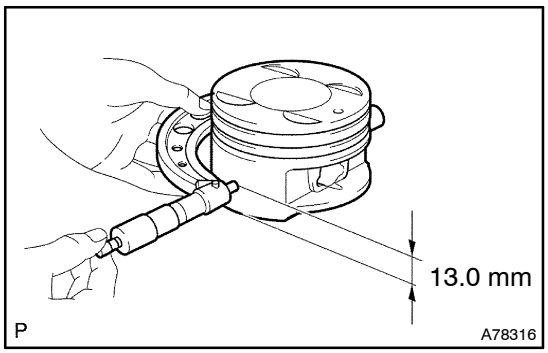
20. INSPECT CYLINDER BORE

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

Standard diameter:

92.000 to 92.132 mm (3.6220 to 3.6272 in.)

If the average of the measured diameters is greater than the standard, replace the cylinder block.



21. INSPECT W/PIN PISTON SUB–ASSY

(a) Using a micrometer, measure the diameter of the piston. When measuring the diameter, attach the micrometer 13.0 mm (0.512 in.) above the piston bottom and at a right angle to the piston pin hole.

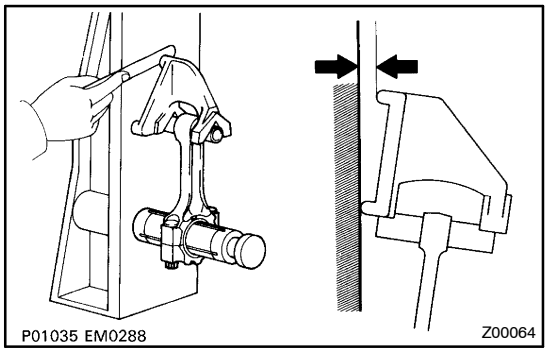
Piston diameter:

91.953 to 91.967 mm (3.6202 to 3.6207 in.)

22. INSPECT PISTON OIL CLEARANCE

(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.
Standard oil clearance: 0.033 to 0.059 mm (0.0013 to 0.0023 in.)
Maximum oil clearance: 0.13 mm (0.0051 in.)

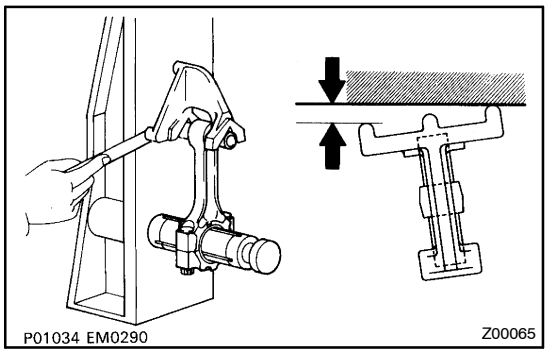
If the oil clearance is greater than the maximum, replace all the 6 pistons. If necessary, replace the cylinder block.



23. INSPECT CONNECTING ROD SUB–ASSY

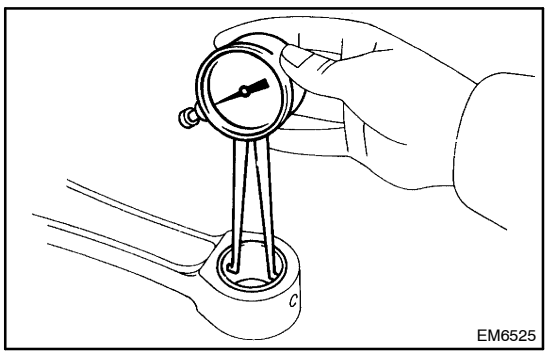
(a) Using a rod aligner and feeler gauge, check the connecting rod alignment.
(1) Check for misalignment.
Maximum misalignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If misalignment is greater than the maximum, replace the connecting rod assembly.



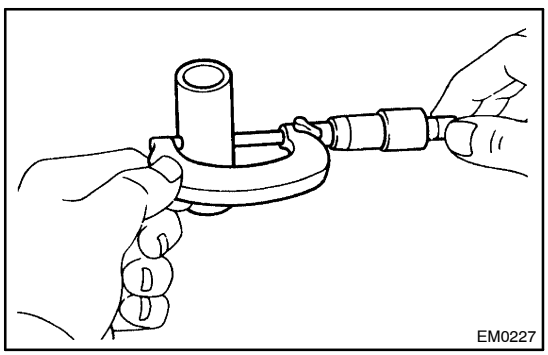
(2) Check if twisted.
Maximum twist:
0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twisted more than the maximum, replace the connecting rod assembly.



24. INSPECT PISTON PIN OIL CLEARANCE

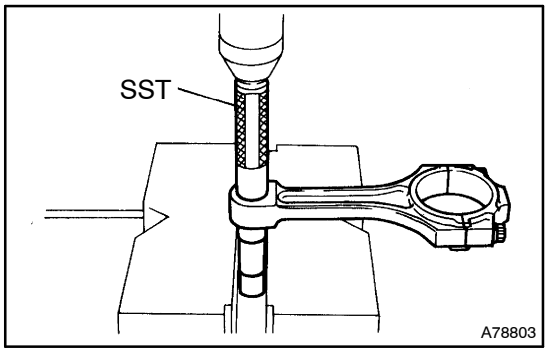
(a) Using a caliper gauge, measure the inside diameter of the connecting rod bush.
Bush inside diameter:
22.005 to 22.014 mm (0.8663 to 0.8667 in.)



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

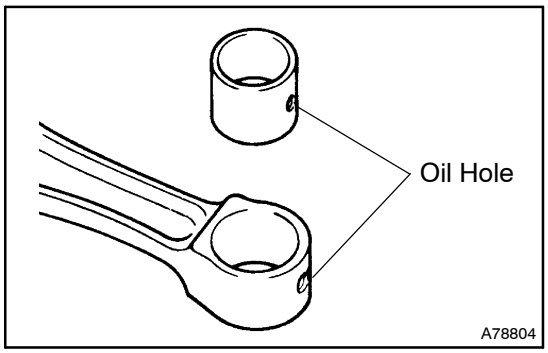
(c) Subtract the piston pin diameter measurement from the bush inside diameter measurement.
Standard oil clearance:
0.005 to 0.011 mm (0.0002 to 0.0004 in.)
Maximum oil clearance: 0.05 mm (0.0020 in.)

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



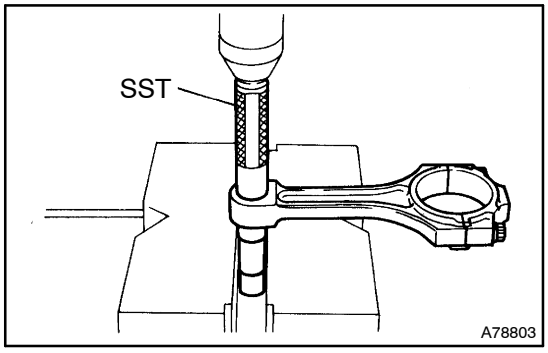
25. REMOVE CONNECTING ROD SMALL END BUSH

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

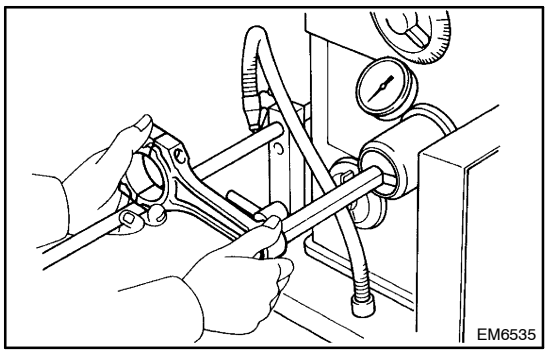


26. INSTALL CONNECTING ROD SMALL END BUSH

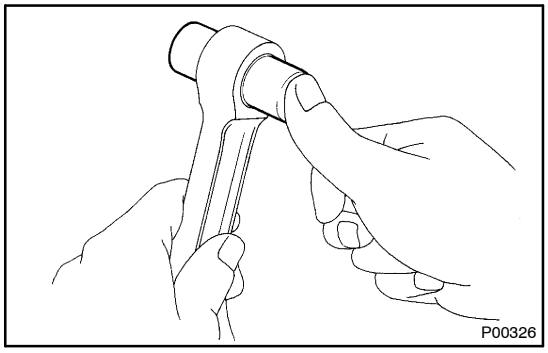
(a) Align the oil holes of a new bush and the connecting rod.



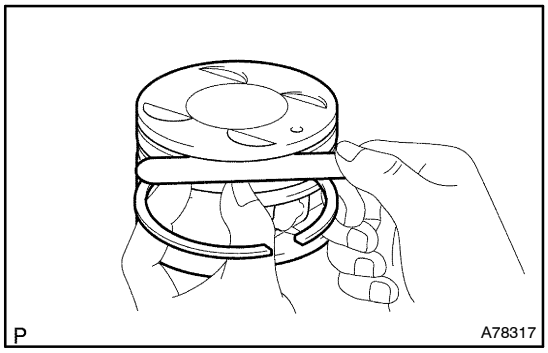
(b) Using SST and a press, press in the bush.
SST 09222–30010



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



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



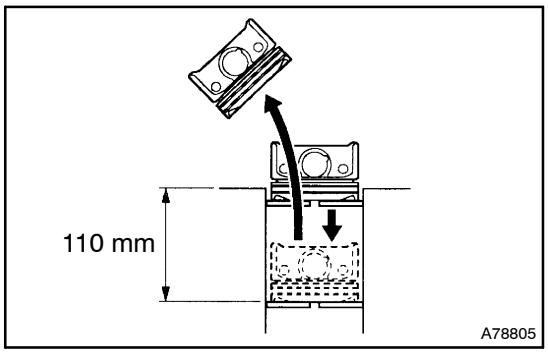
27. INSPECT RING GROOVE CLEARANCE

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

Ring groove clearance:

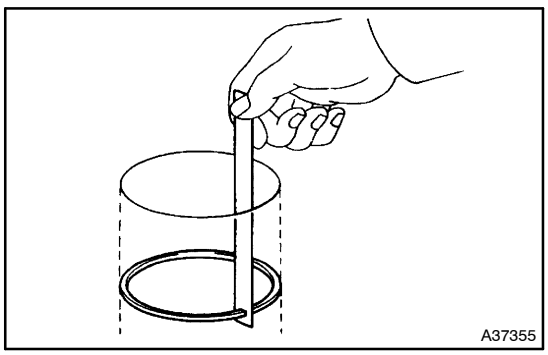
Item	Specified Condition
No. 1	0.03 to 0.08 mm (0.0012 to 0.0031 in.)
No. 2	0.02 to 0.06 mm (0.0008 to 0.0024 in.)
Oil	0.03 to 0.11 mm (0.0012 to 0.0043 in.)

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



28. 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:

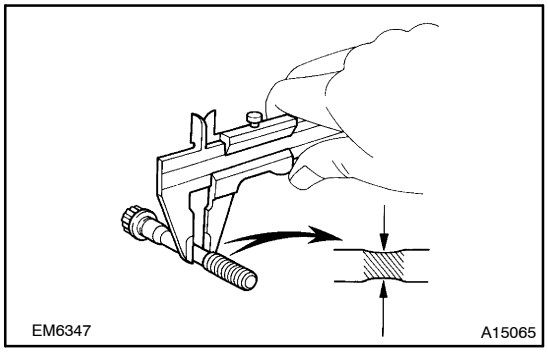
Item	Specified Condition
No. 1	0.30 to 0.40 mm (0.0118 to 0.0157 in.)
No. 2	0.50 to 0.60 mm (0.0197 to 0.0236 in.)
Oil (Side rail)	0.15 to 0.40 mm (0.0059 to 0.0157 in.)

Maximum end gap:

Item	Specified Condition
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.)

If the end gap is greater than the maximum, replace the piston ring.

If the end gap is greater than the maximum even with a new piston ring, replace the cylinder block.

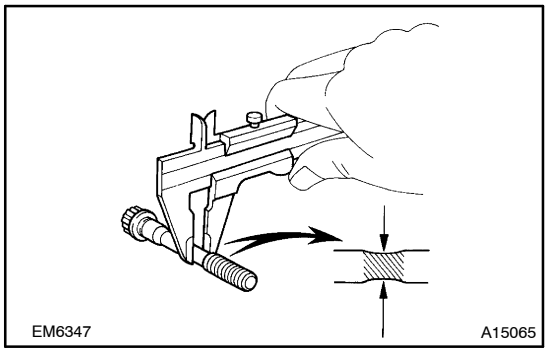


29. INSPECT CONNECTING ROD BOLT

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

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

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

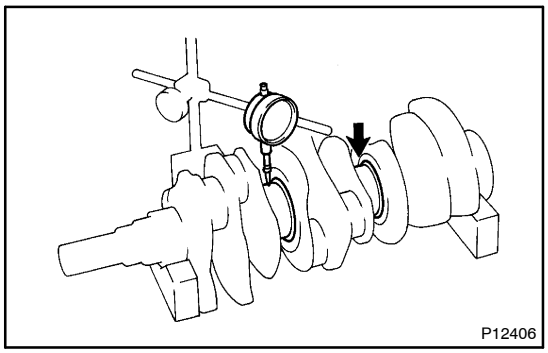


30. INSPECT CRANKSHAFT BEARING CAP SET BOLT

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

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

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

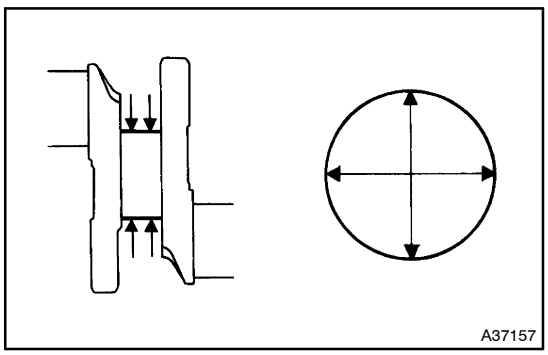


31. INSPECT CRANKSHAFT

(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.)

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



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

Diameter: 60.988 to 61.000 mm (2.4011 to 2.4016 in.)

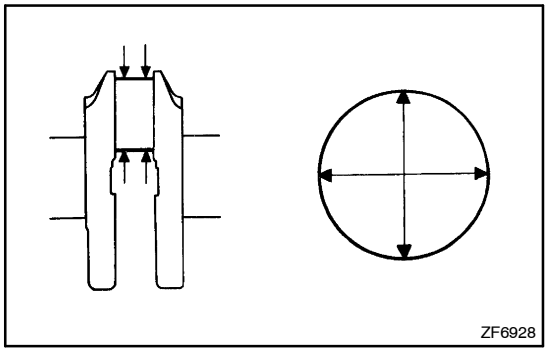
If the diameter is not as specified, check the oil clearance (see step 7).

If necessary, replace the crankshaft.

(c) Check each main journal for taper and out–of–round as shown in the illustration.

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

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



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

Diameter: 52.992 to 53.000 mm (2.0863 to 2.0866 in.)

If the diameter is not as specified, check the oil clearance (see step 7).

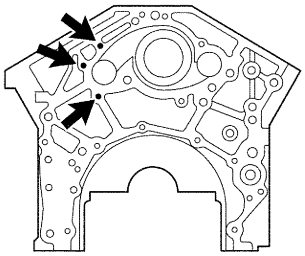
(e) Check each crank pin for taper and out–of–round as shown in the illustration.

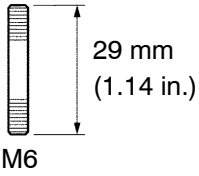
Maximum taper and out–of–round:
0.02 mm (0.0008 in.)

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

32. INSTALL STUD BOLT

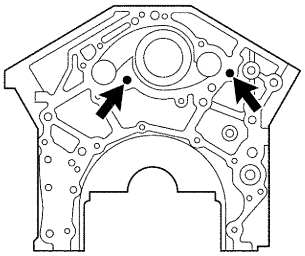
Front Side

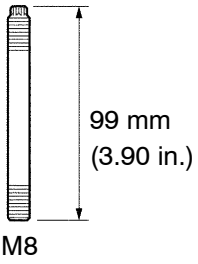




Torque: 6.0 N·m (60 kgf·cm, 53 in.·lbf)

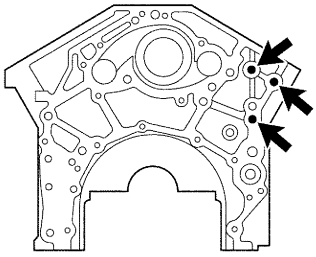
Front Side

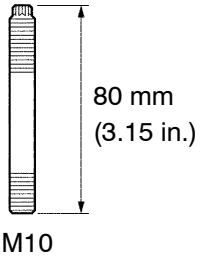




Torque: 15 N·m (145 kgf·cm, 11 ft·lbf)

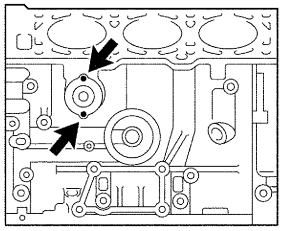
Front Side

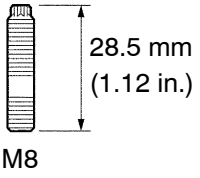




Torque: 21 N·m (220 kgf·cm, 15 ft·lbf)

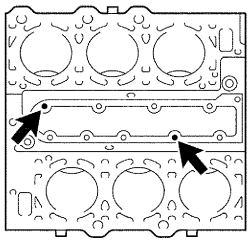
Left Side

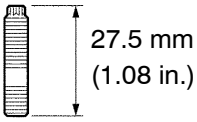




Torque: 7.0 N·m (70 kgf·cm, 62 in.·lbf)

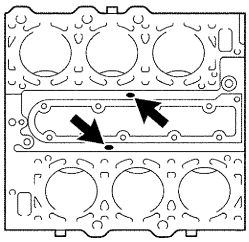
Top Side

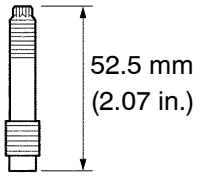




Torque: 4.0 N·m (40 kgf·cm, 35 in.·lbf)

Top Side





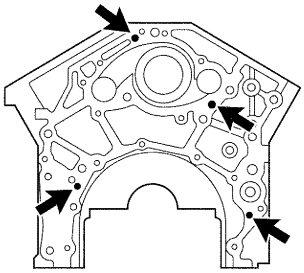
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

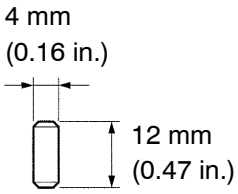
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33. INSTALL STRAIGHT PIN

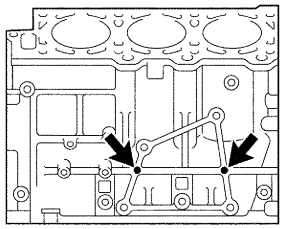
Front Side

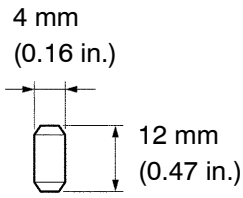




Protrusion Height:
6 mm (0.24 in.)

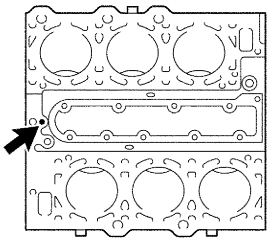
Right Side (FF)

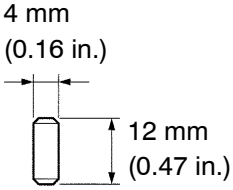




Protrusion Height:
6 mm (0.24 in.)

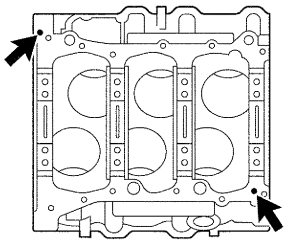
Top Side

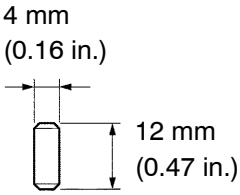




Protrusion Height:
6 mm (0.24 in.)

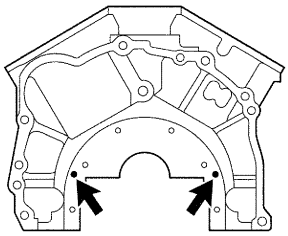
Bottom Side

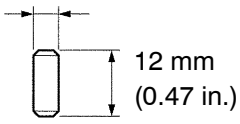




Protrusion Height:
6 mm (0.24 in.)

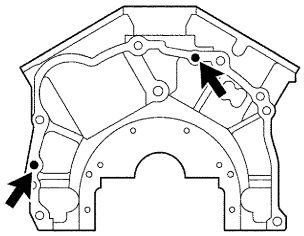
Backside

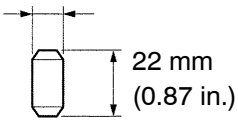




Protrusion Height:
6 mm (0.24 in.)

Backside

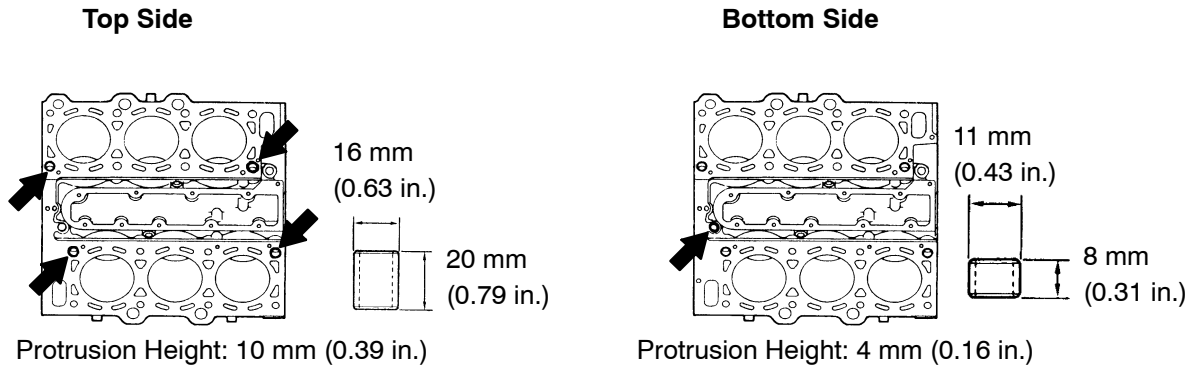


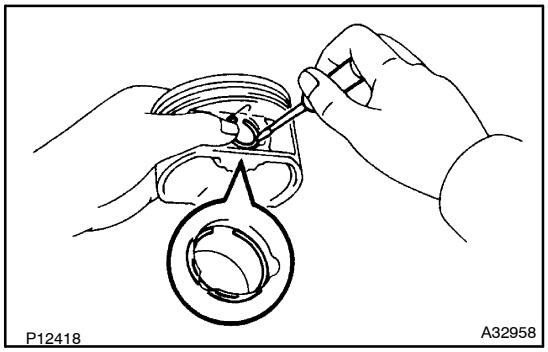


Protrusion Height:
11 mm (0.43 in.)

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34. INSTALL RING PIN



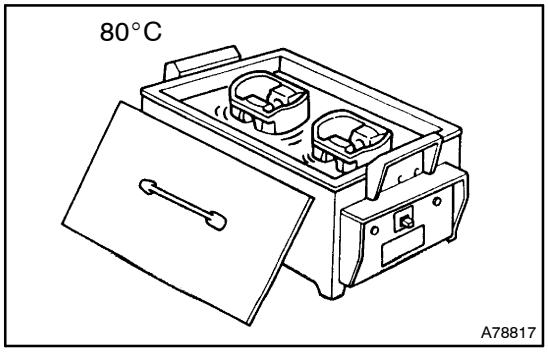


35. INSTALL PISTON PIN HOLE SNAP RING

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

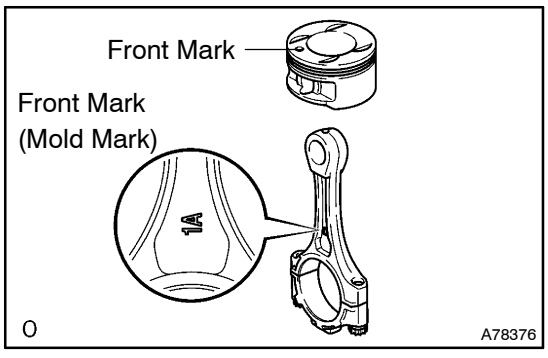
HINT:

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



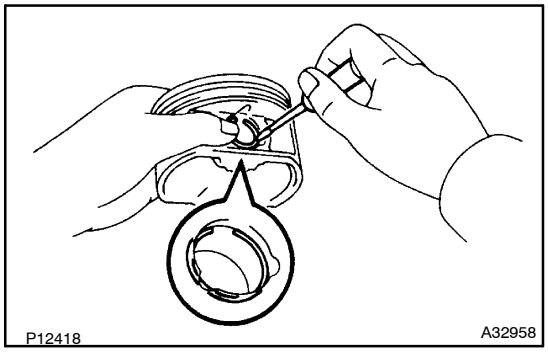
36. INSTALL W/PIN PISTON SUB–ASSY

(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 your thumb until the pin contacts the snap ring.

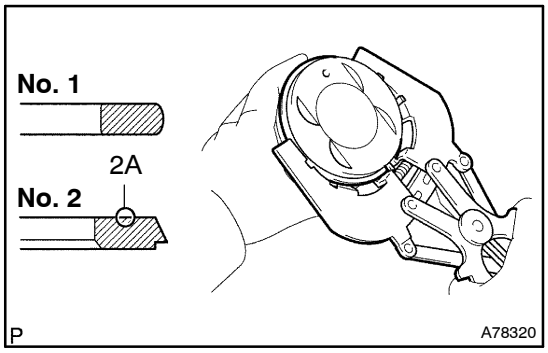


37. INSTALL PISTON PIN HOLE SNAP RING

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

HINT:

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



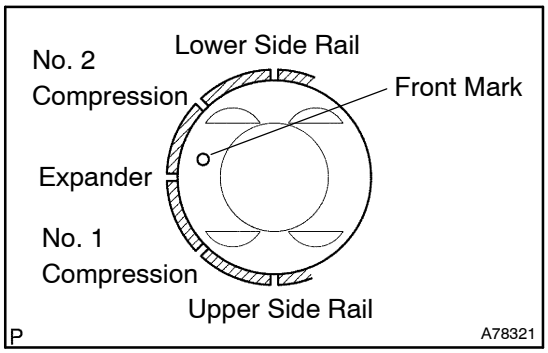
38. INSTALL PISTON RING SET

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

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

HINT:

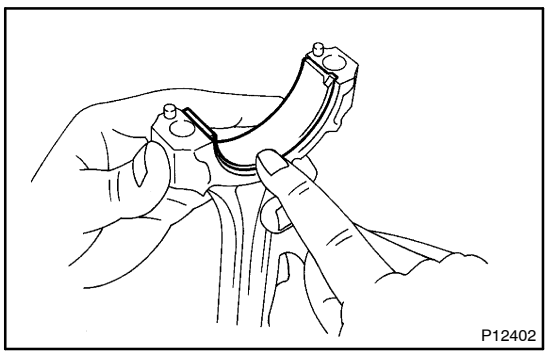
The compression ring No. 2 is installed with code mark ”2A” faced upward, as shown in the illustration.



(c) Position the piston rings so that the ring ends are arranged, as shown in the illustration.

NOTICE:

Do not align the ring ends.

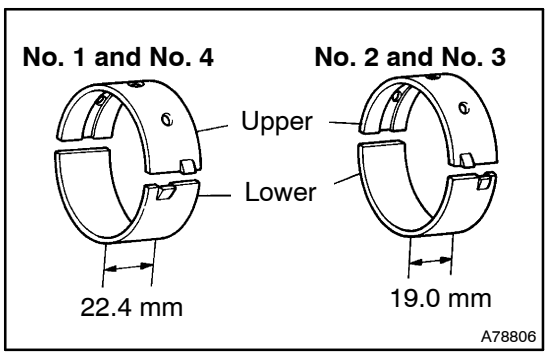


39. INSTALL CONNECTING ROD BEARING

(a) Align the key of the bearing with the keyway of the connecting rod or connecting cap.

NOTICE:

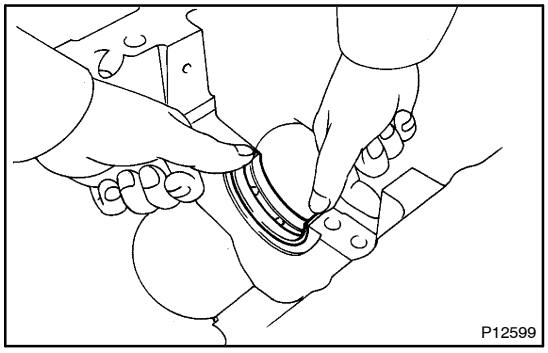
Clean the backside of the bearing and the bearing surface of the connecting rod. The surface should be free of dust and oils.



40. INSTALL CRANKSHAFT BEARING

HINT:

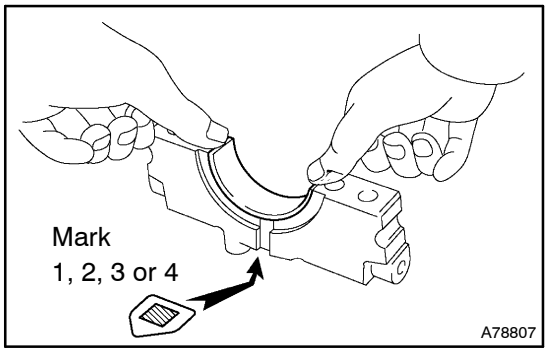
Main bearings come in widths of 22.4 mm (0.882 in.) and 19.0 mm (0.748 in.). Install the 22.4mm (0.882 in.) bearings in the No. 1 and No. 4 cylinder block journal positions with the main bearing cap. Install the 19.0 mm (0.748 in.) bearings in the No. 2 and No. 3 positions.



(a) Align the key of the bearing with the keyway of the cylinder block, and push in the 4 upper bearings.

NOTICE:

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



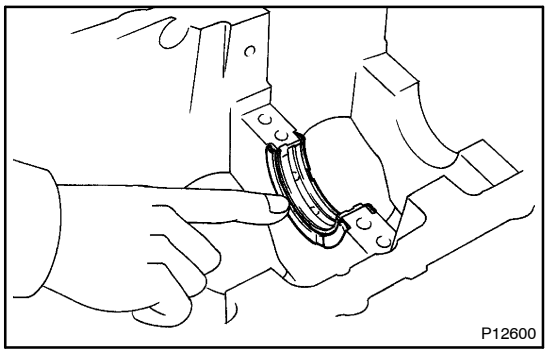
(b) Align the key of the bearing with the keyway of the main bearing cap, and push in the 4 lower bearings.

HINT:

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

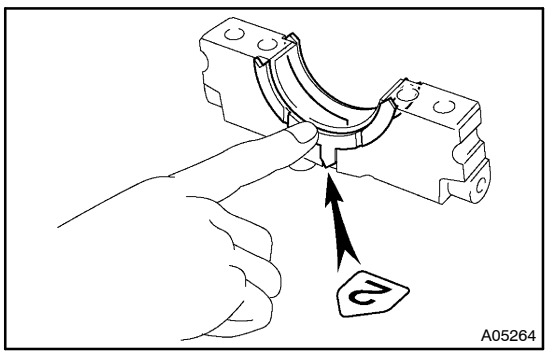
NOTICE:

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



41. INSTALL CRANKSHAFT THRUST WASHER SET

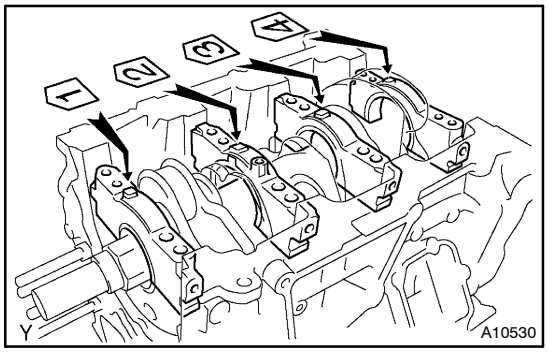
(a) Install the 2 thrust washers under the No. 2 journal position of the cylinder block with the oil grooves facing outward.



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

42. INSTALL CRANKSHAFT

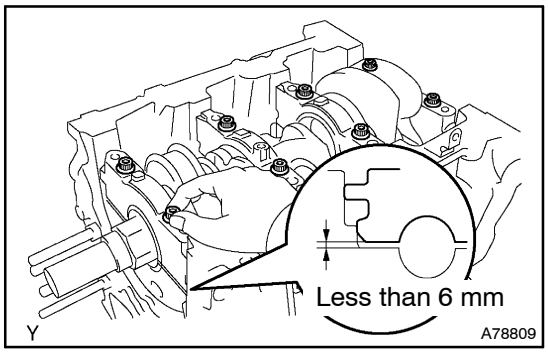
(a) Apply engine oil to the upper bearing and install the crankshaft on the cylinder block.



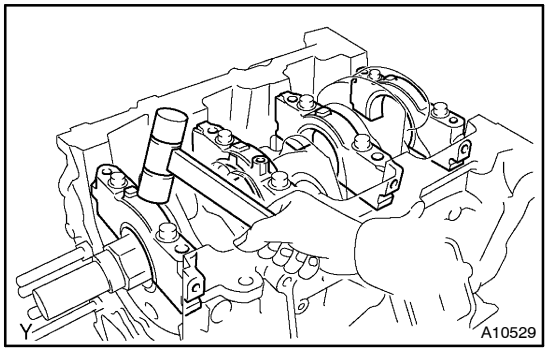
(b) Examine the front marks and numbers. Install the bearing caps on the cylinder block.

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

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

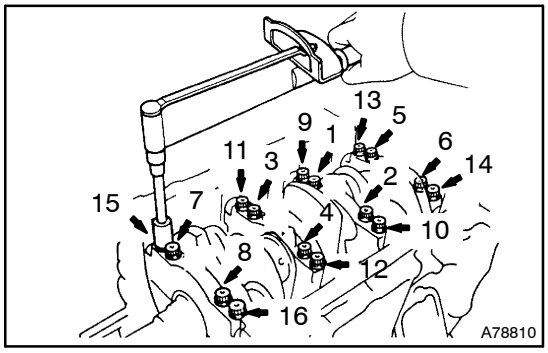


(e) Install the main bearing cap by hand using the inner bolt as a guide. Stop the main bearing cap about 6 mm (0.23 in.) form the surface of the block.

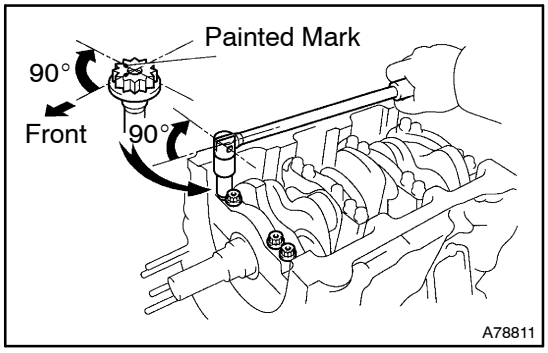


(f) Using a plastic–faced hammer, lightly tap the bearing cap to ensure a proper fit.

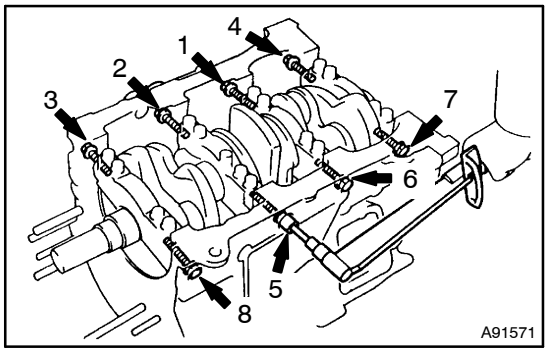
(g) Apply a light coat of engine oil on the threads of the main bearing cap bolts.



(h) Uniformly install and tighten the 16 main bearing cap bolts in the sequence shown in the illustration.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

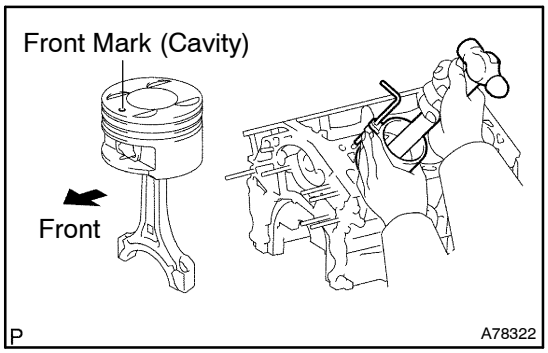


(i) Mark the front side of the bearing cap bolts with paint.
(j) Retighten the bearing cap bolts by 90° in the same sequence as step (h).
(k) Check that each painted mark is now at a 90° angle to the front.
(l) Check that the crankshaft turns smoothly.



(m) Uniformly install and tighten the 8 main bearing cap bolts in the sequence shown in the illustration.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

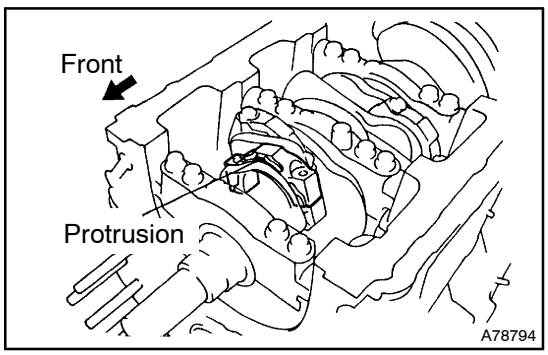
HINT:
Use short bolts for the marked positions (arrow).



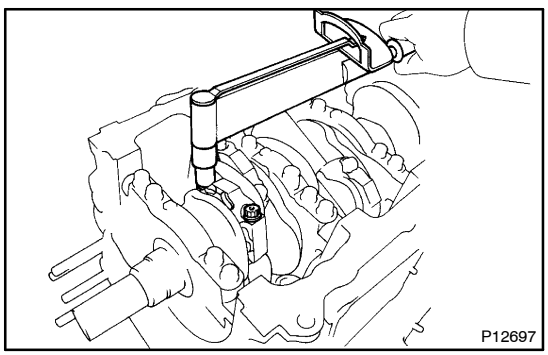
43. INSTALL PISTON SUB–ASSY W/CONNECTING ROD

(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 piston with the correct number and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.

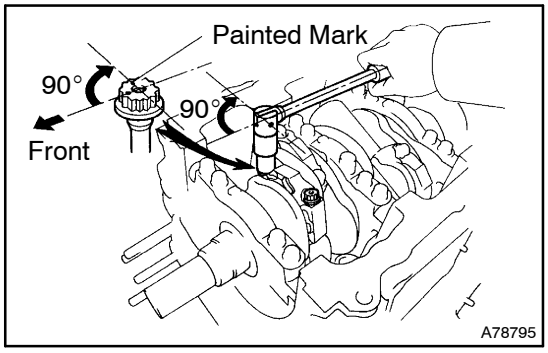
NOTICE:
Match the numbered connecting rod caps with the numbered connecting rods.



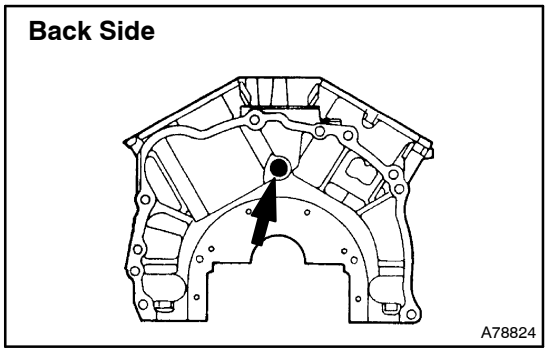
(d) Check that the protrusion of the connecting rod cap is facing the correct direction.
(e) Apply a light coat of engine oil on the threads of the connecting rod cap bolts.



(f) Tighten the bolts in several steps by the specified torque.
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

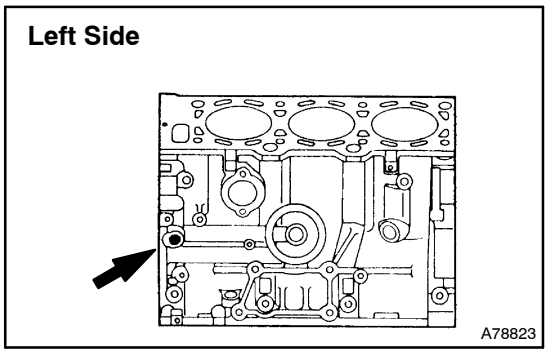


(g) Mark the front side of each connecting cap bolt with paint.
(h) Retighten the cap bolts by 90° as shown in the illustration.
(i) Check that the crankshaft turns smoothly.



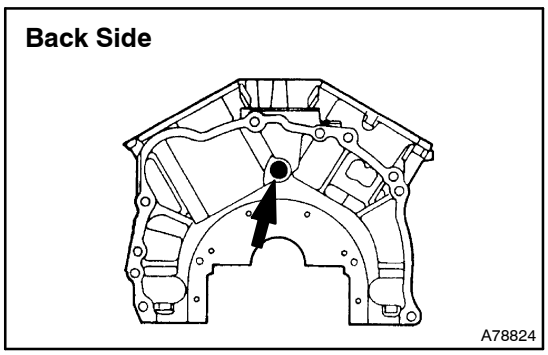
44. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.1 PLUG

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



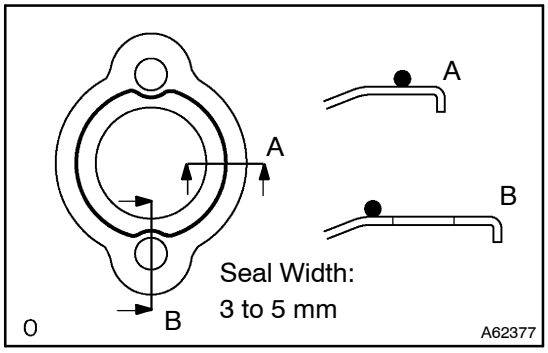
45. INSTALL CYLINDER BLOCK W/HEAD STRAIGHT SCREW NO.2 PLUG

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



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

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



47. INSTALL WATER SEAL PLATE

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

(b) Apply a continuous bead of seal packing (seal width: 3 to 5 mm (0.12 to 0.20 in.)), as shown in the illustration.
Seal packing: Part No. 08826–00100 or equivalent

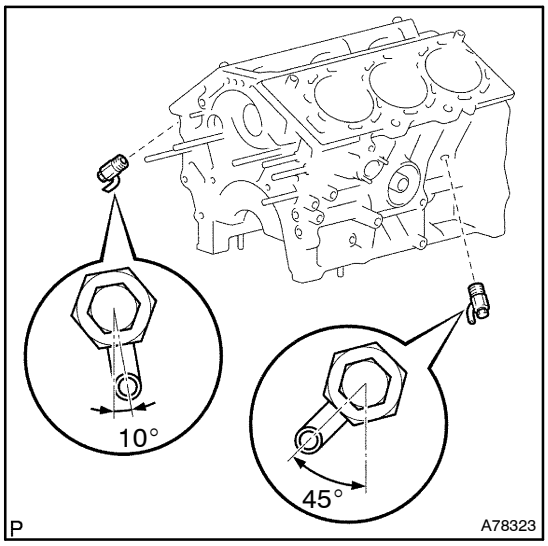
NOTICE:

- **Remove any oil from the contact surface.**
- **Install the seal plate within 3 minutes after applying seal packing.**
- **Do not expose the seal to engine oil for at least 2 hours after installing.**

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

48. 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 expose the seal to coolant for at least 1 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.**