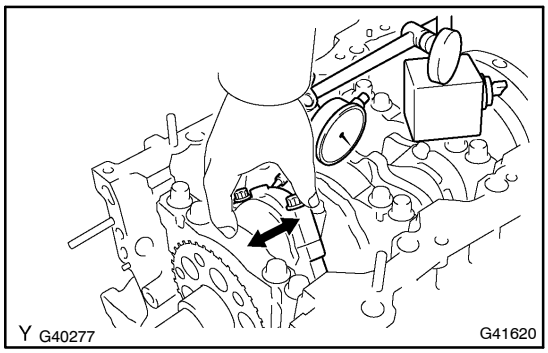
1424G–03

OVERHAUL



1. INSPECT CONNECTING ROD THRUST CLEARANCE

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

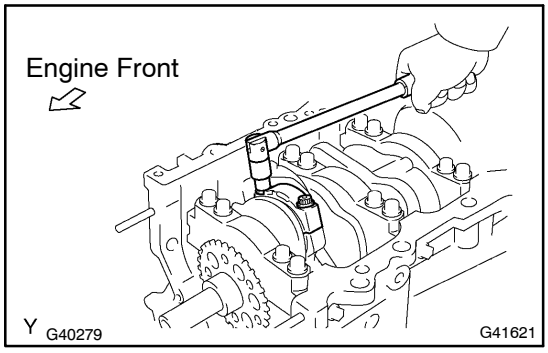
Standard thrust clearance:
0.15 to 0.40 mm (0.0059 to 0.0157 in.)
Maximum thrust clearance: 0.50 mm (0.020 in.)

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

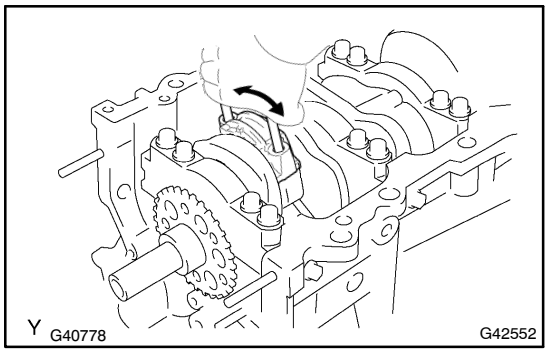
2. INSPECT CONNECTING ROD OIL CLEARANCE

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

HINT:
The matchmarks on the connecting rods and caps are provided to ensure correct reassembly.



(b) Using SST, remove the 2 connecting rod cap bolts.
SST 09011–38121

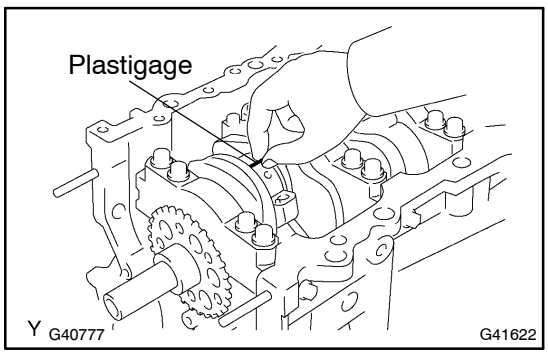


(c) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

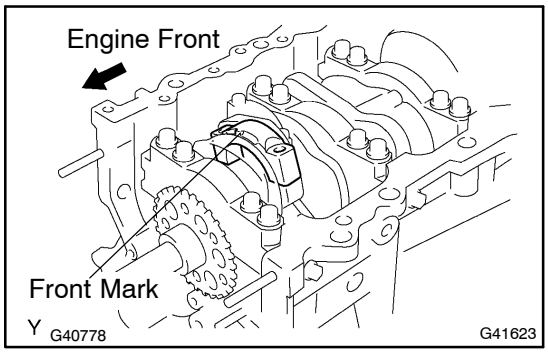
HINT:
Keep the lower bearing inserted to the connecting rod cap.

(d) Clean the crank pin and bearing.

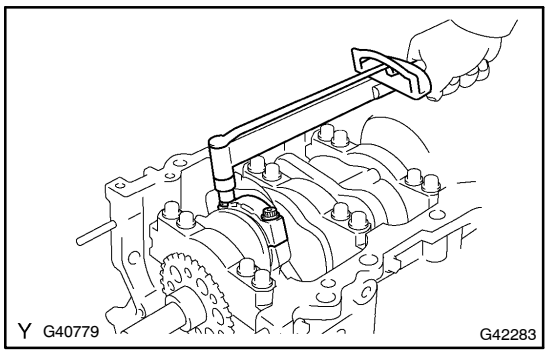
(e) Check the crank pin and bearing for pits and scratches.



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



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

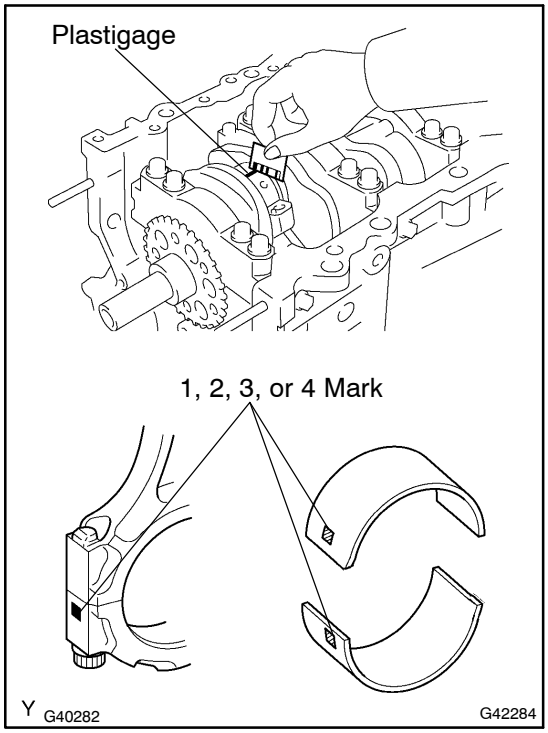


(h) Using SST, install the connecting rod cap. (see step 34)
SST 09011–38121

NOTICE:

Do not turn the crankshaft.

(i) Remove the 2 bolts and connecting rod cap (see steps (b) and (c) above).



(j) Measure the Plastigage at its widest point.

Standard oil clearance:

0.045 to 0.067 mm (0.0018 to 0.0026 in.)

Maximum oil clearance: 0.070 mm (0.0028 in.)

If the oil clearance is greater than the maximum, replace the connecting rod bearings. If necessary, replace the crankshaft.
HINT:
If replacing a bearing, replace it with one that has the same number as its respective connecting rod cap. Each bearing's standard thickness is indicated by a 1, 2, 3 and 4 mark on its surface.

Reference:

Connectiong rod diameter:

Mark	Diameter
1	56.000 to 56.006 mm (2.2047 to 2.2050 in.)
2	56.007 to 56.012 mm (2.2050 to 2.2052 in.)
3	56.013 to 56.018 mm (2.2052 to 2.2054 in.)
4	56.019 to 56.024 mm (2.2055 to 2.2057 in.)

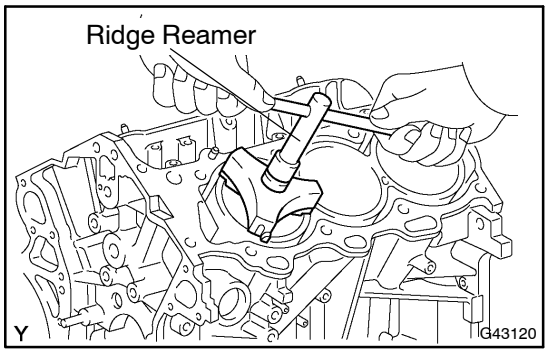
Standard bearing center wall thickness:

Mark	Thickness
1	1.481 to 1.484 mm (0.0583 to 0.0584 in.)
2	1.484 to 1.487 mm (0.0584 to 0.0585 in.)
3	1.487 to 1.490 mm (0.0585 to 0.0587 in.)
4	1.490 to 1.493 mm (0.0587 to 0.0588 in.)

Crankshaft pin diameter:

52.992 to 53.000 mm (2.0863 to 2.0866 in.)

(k) Completely remove the Plastigage.



3. 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.

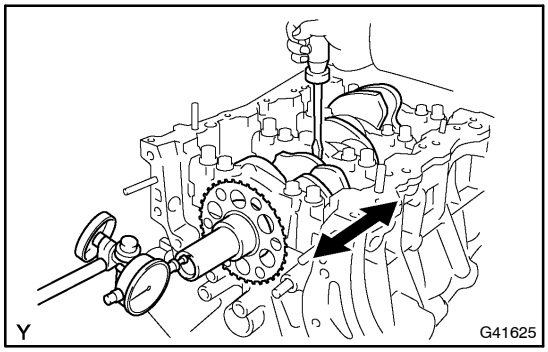
HINT:

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

4. REMOVE CONNECTING ROD BEARING

HINT:

Arrange the removed parts in the correct order.



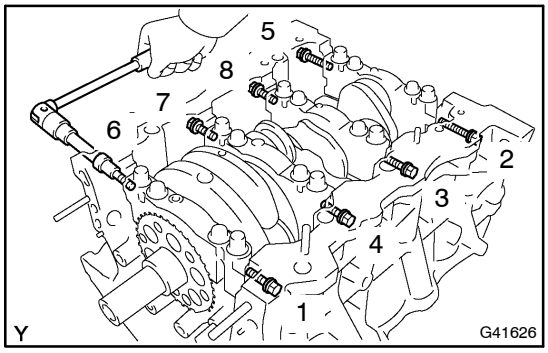
5. INSPECT CRANKSHAFT THRUST CLEARANCE

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

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

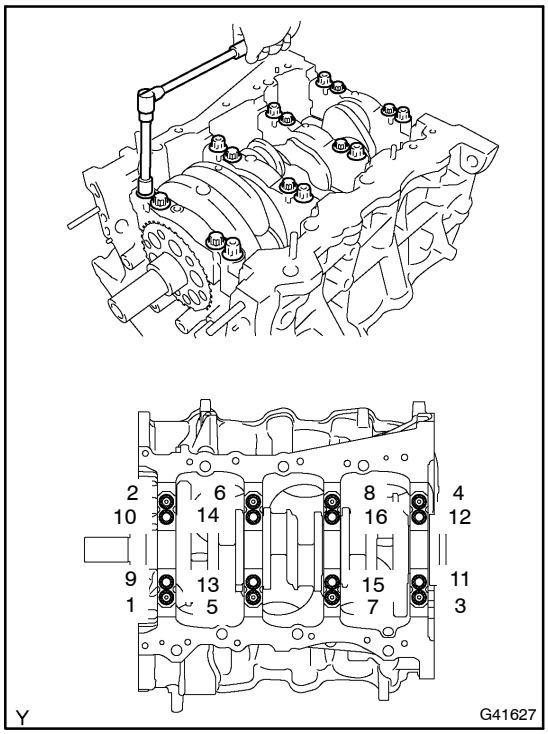
If the thrust clearance is greater than the maximum, replace the thrust washers as a set. If necessary, replace the crankshaft.

Thrust washer thickness:
2.43 to 2.48 mm (0.0957 to 0.0976 in.)

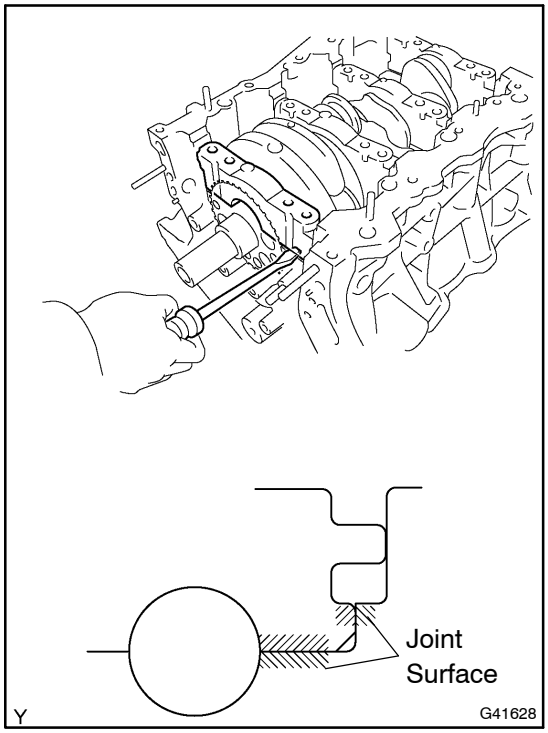


6. REMOVE CRANKSHAFT

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



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



(c) Using a screwdriver, pry out the main bearing caps. Remove the 4 main bearing caps and lower bearings.

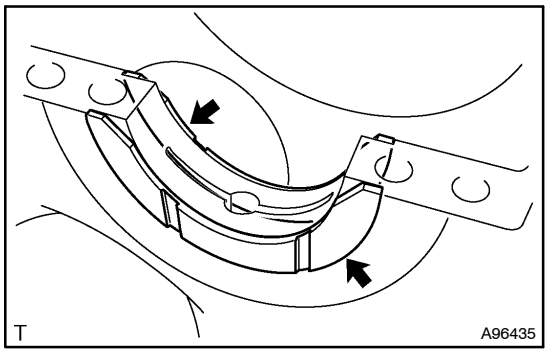
NOTICE:

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

7. REMOVE CRANKSHAFT BEARING

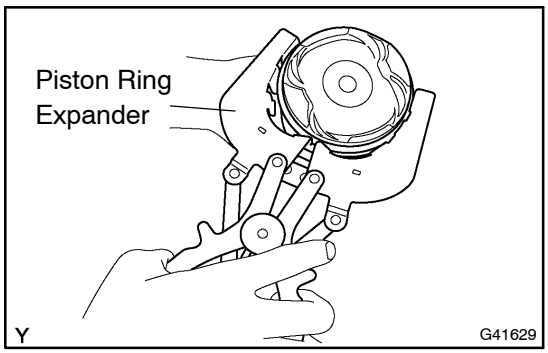
HINT:

Arrange the removed parts in the correct order.



8. REMOVE CRANKSHAFT THRUST WASHER SET

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



9. REMOVE PISTON RING SET

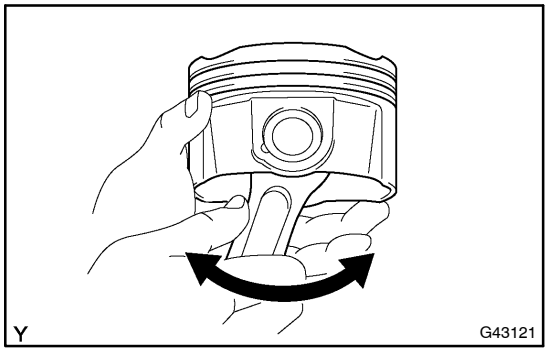
(a) Using a piston ring expander, remove the 2 compression rings.

(b) Using a piston ring expander, remove the 2 side rails.

(c) Remove the oil ring expander by hand.

HINT:

Arrange the piston rings in the correct order.

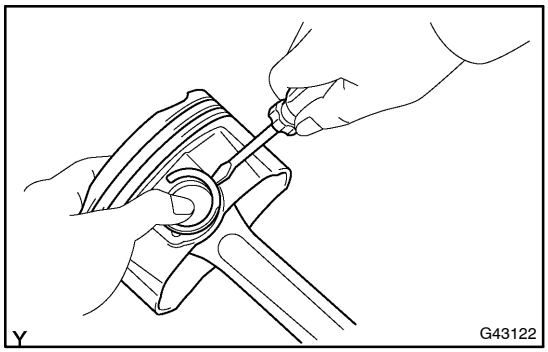


10. REMOVE PISTON SUB–ASSY WITH PIN

(a) Check the fitting condition between the piston and piston pin.

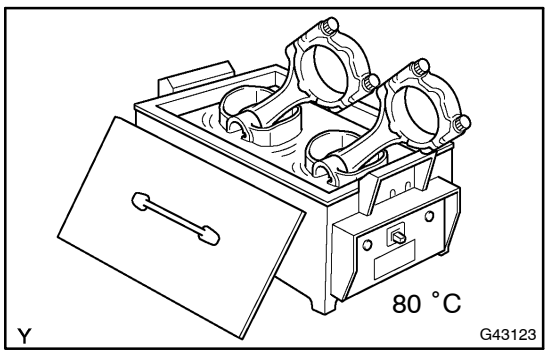
(1) Try to move the piston back and forth on the piston pin.

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

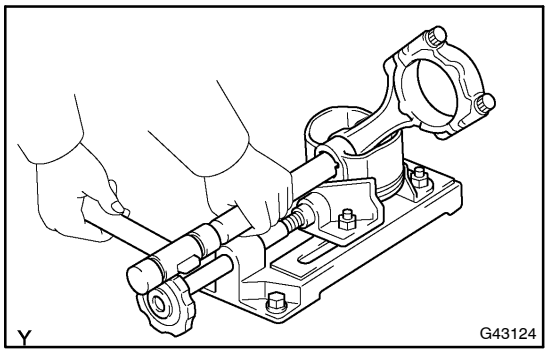


(b) Disconnect the connecting rod from the piston.

(1) Using a screwdriver, pry off the snap rings from the piston.



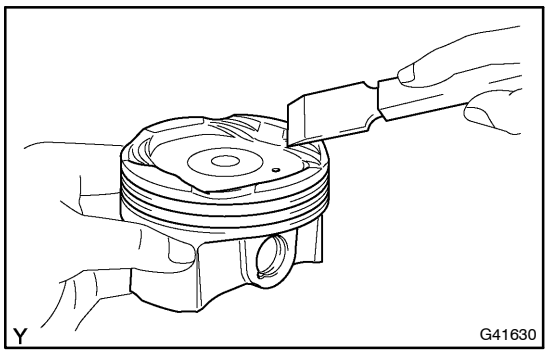
(2) Gradually heat the piston to approximately 80°C (176°F).



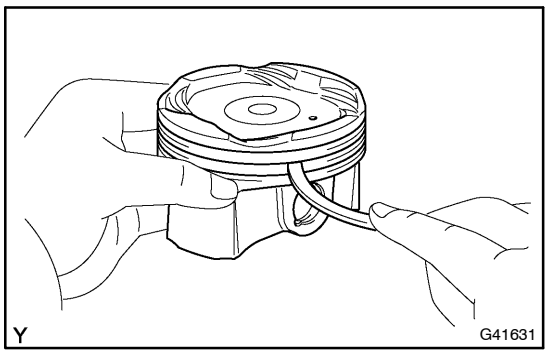
(3) Using a brass bar and plastic hammer, lightly tap out the piston pin and remove the connecting rod.

HINT:

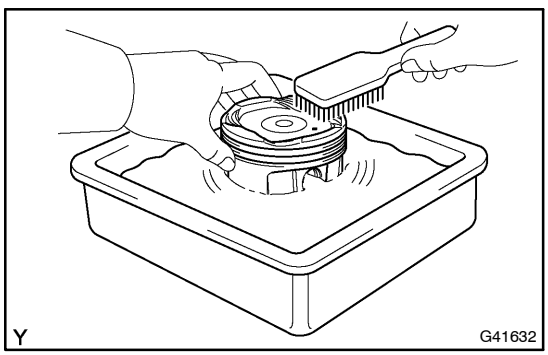
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.



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



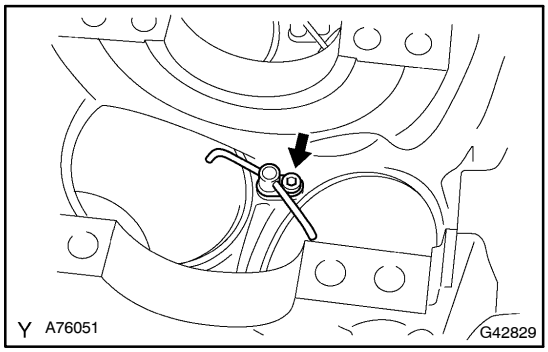
(d) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



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

NOTICE:

Do not use a wire brush.

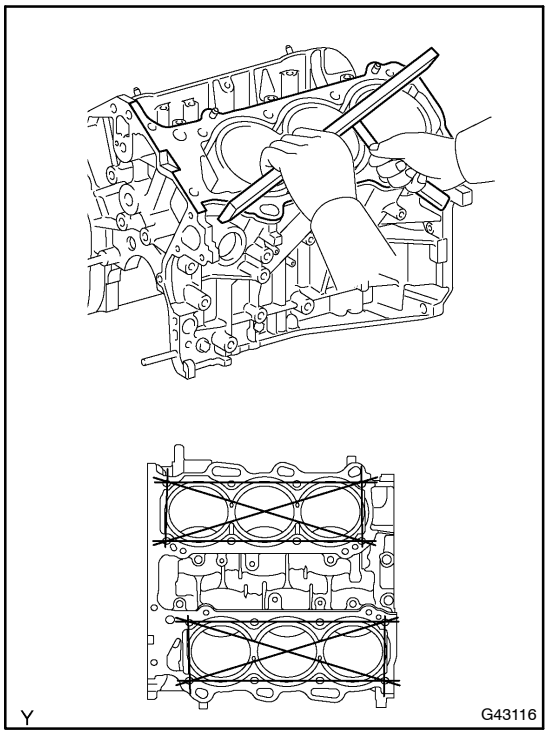


11. REMOVE SUB–ASSY OIL NOZZLE NO.1

(a) Using a 5 mm hexagon wrench, remove the 3 oil nozzles.

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

If necessary, replace the oil nozzle.

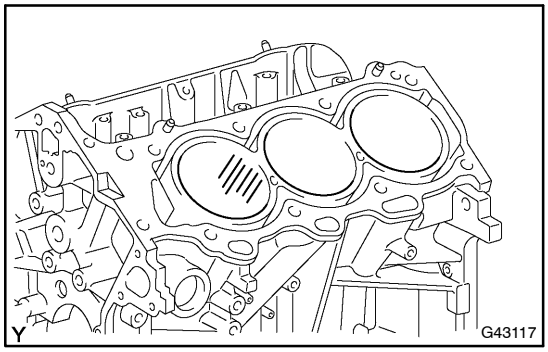


12. INSPECT CYLINDER BLOCK FOR WARPAGE

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

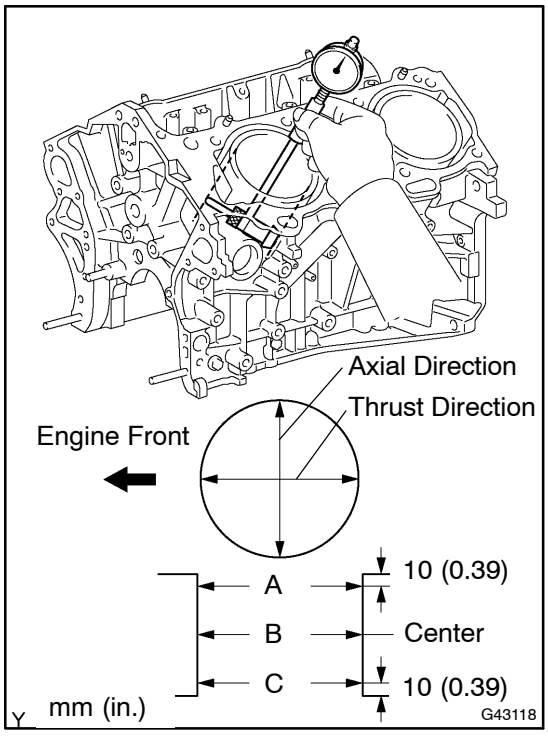
Maximum warpage: 0.07 mm (0.0028 in.)

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



(b) Visually check the cylinder for vertical scratches.

If deep scratches are present, rebore all the 6 cylinders. If necessary, replace the cylinder block.

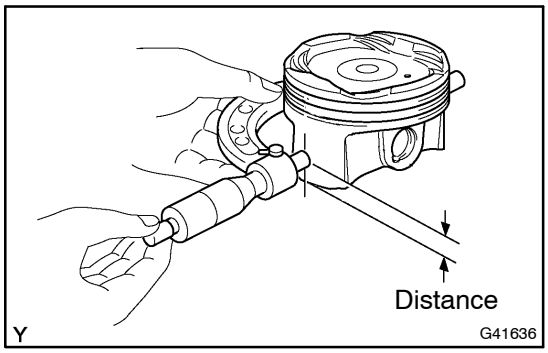


13. INSPECT CYLINDER BORE

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

Standard diameter:
94.000 to 94.012 mm (3.7008 to 3.7013 in.)
Maximum diameter: 94.200 mm (3.7087 in.)

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



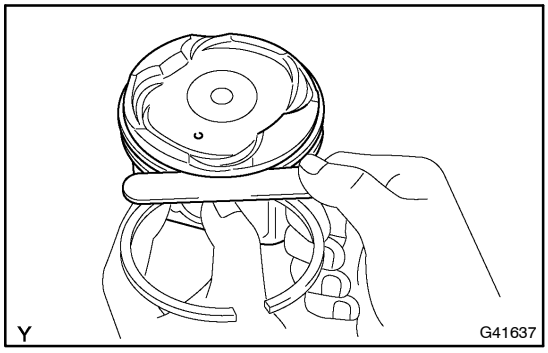
14. INSPECT PISTON SUB–ASSY WITH PIN

(a) Using a micrometer, measure the piston diameter at right angles to the piston center line where the distance from the piston end is as specified.
Distance: 9.8 mm (0.3858 in.)
Standard diameter:
93.960 to 93.980 mm (3.6992 to 3.7000 in.)
Maximum diameter: 93.830 mm (3.6941 in.)

15. INSPECT PISTON OIL CLEARANCE

(a) Measure the cylinder bore diameter in the thrust direction (see step 13).
(b) Subtract the piston diameter measurement from the cylinder bore diameter measurement.
Standard oil clearance:
0.02 to 0.052 mm (0.0008 to 0.0020 in.)
Maximum oil clearance:
0.06 mm (0.0024 in.)

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

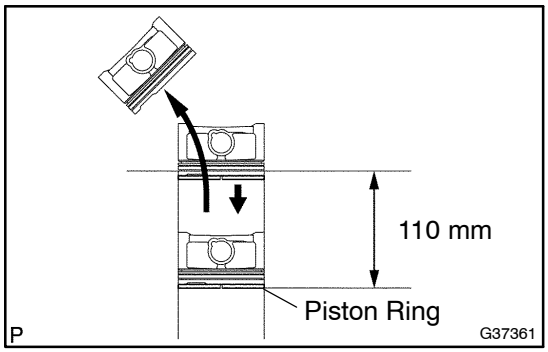


16. INSPECT RING GROOVE CLEARANCE

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

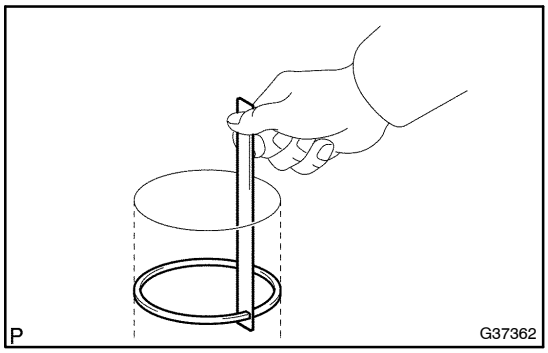
No.1	0.020 to 0.070 mm (0.0008 to 0.0028 in.)
No.2	0.020 to 0.060 mm (0.0008 to 0.0024 in.)
Oil	0.070 to 0.150 mm (0.0028 to 0.0059 in.)

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



17. INSPECT PISTON RING END GAP

(a) Insert the piston ring into the cylinder bore.
(b) 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.



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

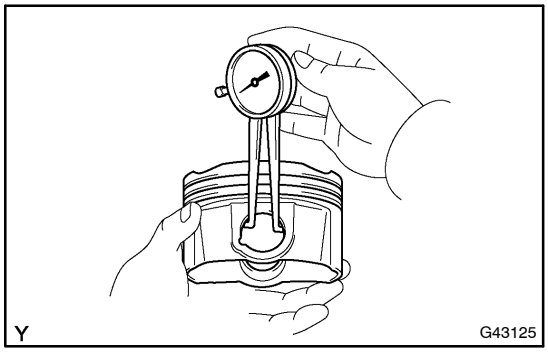
Standard end gap:

No.1	0.25 to 0.35 mm (0.0098 to 0.0138 in.)
No.2	0.50 to 0.60 mm (0.0197 to 0.0236 in.)
Oil (Side rail)	0.10 to 0.40 mm (0.0039 to 0.0157 in.)

Maximum end gap:

No.1	0.5 mm (0.0197 in.)
No.2	0.85 mm (0.0335 in.)
Oil (Side rail)	0.6 mm (0.0236 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.

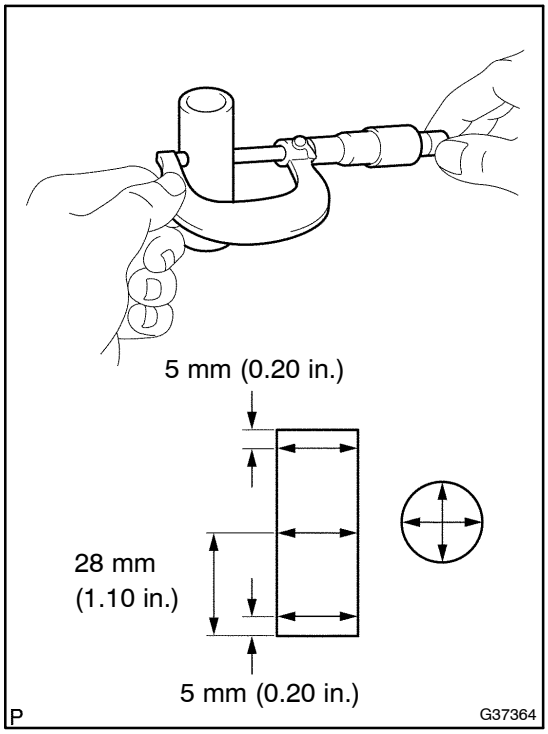


18. INSPECT PISTON PIN OIL CLEARANCE

(a) Using a caliper gauge, measure the inside diameter of the piston pin hole.

Piston pin hole inside diameter:

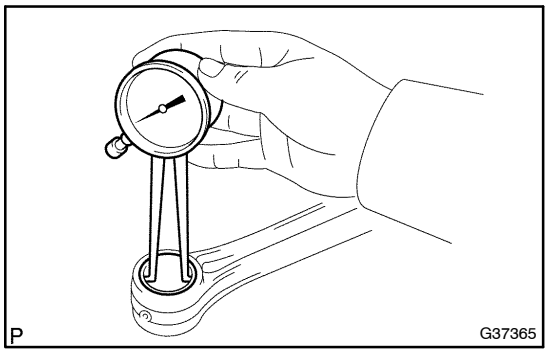
Mark	mm (in.)
A	22.001 to 22.004 (0.8662 to 0.8663)
B	22.004 to 22.007 (0.8663 to 0.8664)
C	22.007 to 22.010 (0.8664 to 0.8665)



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

Piston pin diameter:

Mark	mm (in.)
A	21.997 to 22.000 (0.8660 to 0.8661)
B	22.000 to 22.003 (0.8661 to 0.8663)
C	22.003 to 22.006 (0.8663 to 0.8664)



(c) Subtract the piston pin diameter measurement from the piston pin hole diameter measurement.

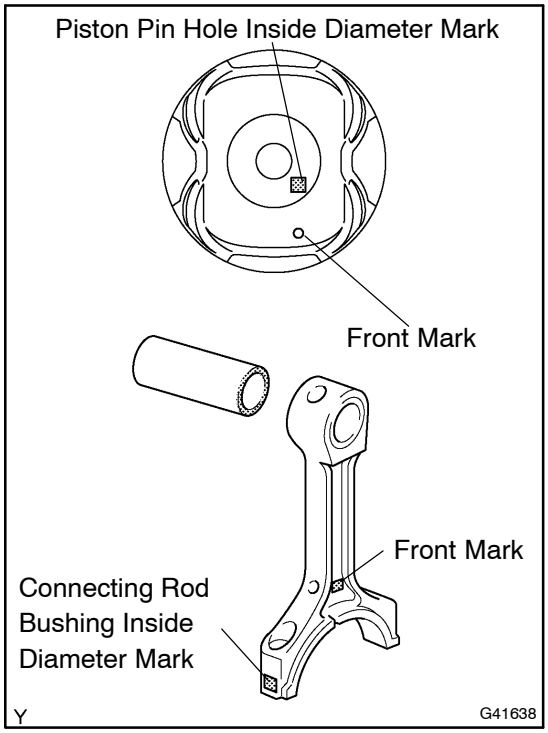
Standard oil clearance:
0.001 to 0.007 mm (0.00002 to 0.0003 in.)
Maximum oil clearance: 0.015 mm (0.0006 in.)

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

(d) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

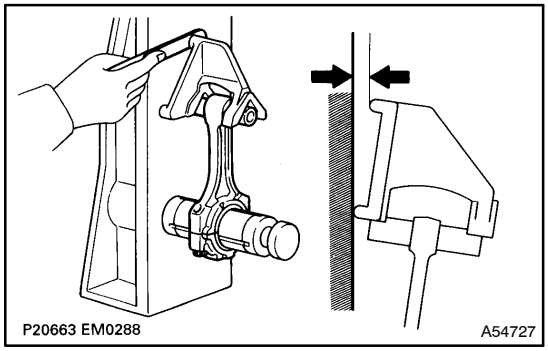
Mark	mm (in.)
A	22.005 to 22.008 (0.8663 to 0.8665)
B	22.009 to 22.011 (0.8665 to 0.8666)
C	22.012 to 22.014 (0.8666 to 0.8667)



(e) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Standard oil clearance:
0.005 to 0.011 mm (0.0002 to 0.0004 in.)
Maximum oil clearance: 0.03 mm (0.0012 in.)

HINT:
If the oil clearance is greater than the maximum, replace the bushing. If necessary, replace the connecting rod and piston pin as a set.



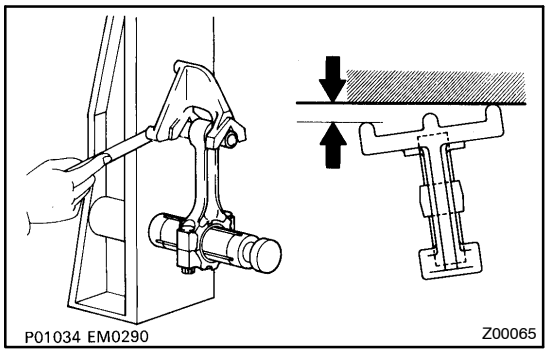
19. INSPECT CONNECTING ROD

(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 the maximum, replace the connecting rod assembly.

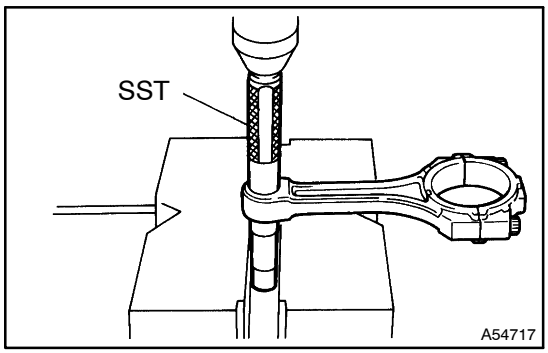


(2) Check for twist.

Maximum twist:

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

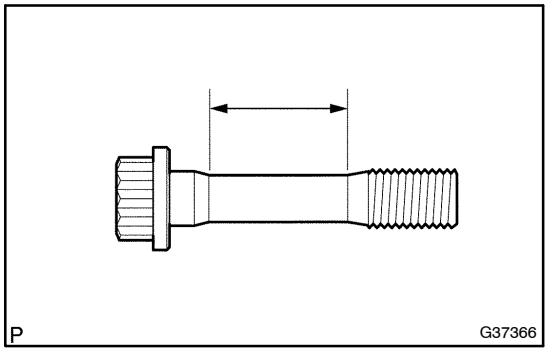
If twist is greater than the maximum, replace the connecting rod assembly.



20. REMOVE CONNECTING ROD SMALL END BUSH

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

SST 09222–30010



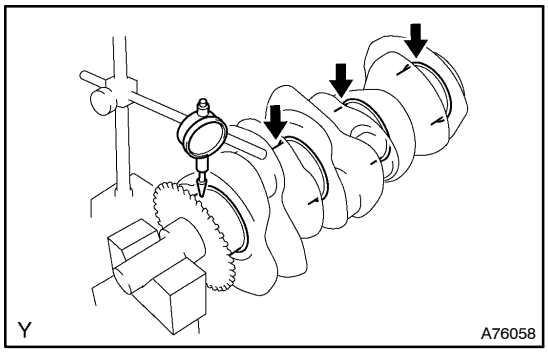
21. INSPECT CONNECTING ROD BOLT

(a) Using vernier calipers, 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.



22. INSPECT CRANKSHAFT

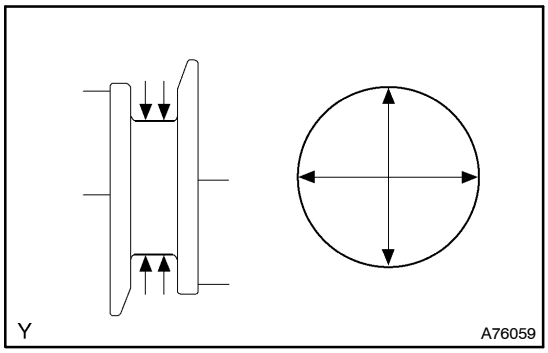
(a) Inspect for circle runout.

(1) Place the crankshaft on V–blocks.

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

Maximum circle runout: 0.06 mm (0.0024 in.)

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



(b) Inspect the main journals.

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

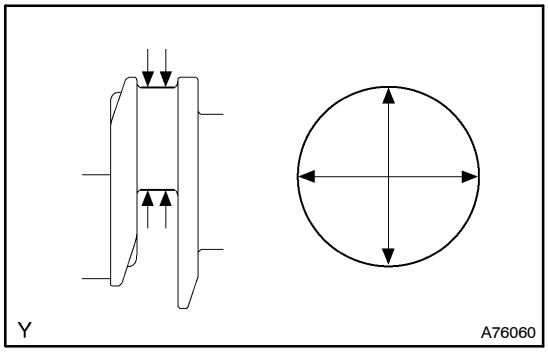
Standard journal diameter:
60.988 to 61.000 mm (2.4011 to 2.4016 in.)

If the diameter is not as specified, check the oil clearance (see step 23). If necessary, replace the crankshaft.

(2) 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.



(c) Inspect the crank pin.

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

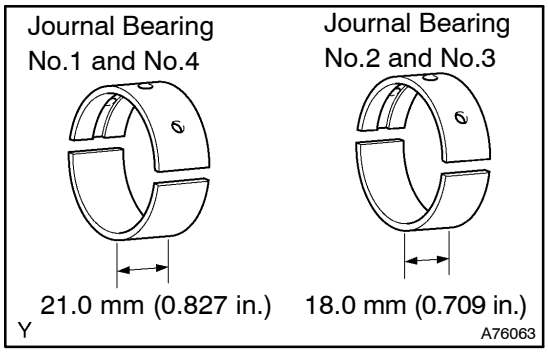
Diameter: 52.992 to 53.000 mm (2.0863 to 2.0866 in.)

If the diameter is not as specified, check the oil clearance (see step 2). If necessary, replace the crankshaft.

(2) 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.

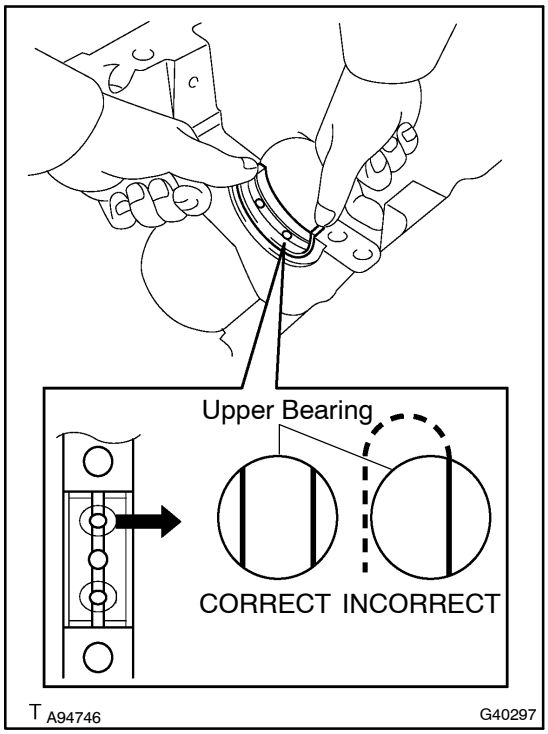


23. INSPECT CRANKSHAFT OIL CLEARANCE

NOTICE:

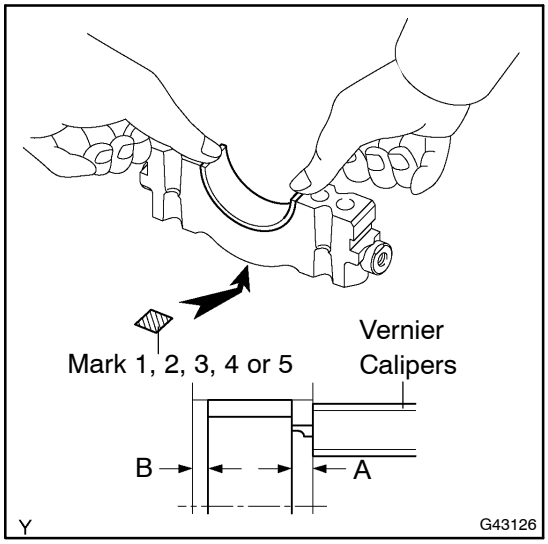
Main bearings come in widths of 18.0 mm (0.709 in.) and 21.0 mm (0.827 in.). Install the 21.0 mm (0.827 in.) bearings in the No.1 and No.4 cylinder block journal positions with the main bearing cap. Install the 18.0 mm (0.709 in.) bearings in the No.2 and No.3 positions.

(a) Clean the main journal and both surfaces of the bearing.



(b) Install the upper bearing.
(1) Install the upper bearing to the cylinder block as shown in the illustration.

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

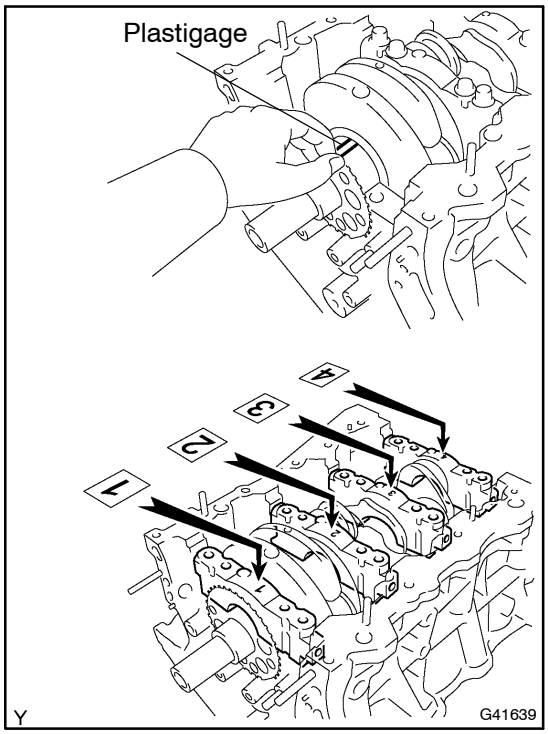


(c) Install the lower bearing.
(1) Install the lower bearing to the bearing cap.
(2) Using vernier calipers, measure the distance between the bearing cap's edge and the lower bearing's edge.

Dimension (A – B): 0.7 mm (0.0276 in.) or less

NOTICE:
Do not apply engine oil to the bearing's contact area and underside.

(d) Place the crankshaft on the cylinder block.



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

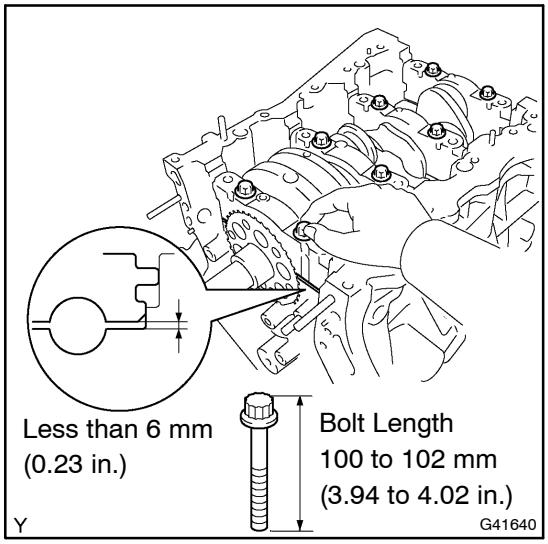
(f) Examine the front marks and numbers and install the bearing caps on the cylinder block.

HINT:

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

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

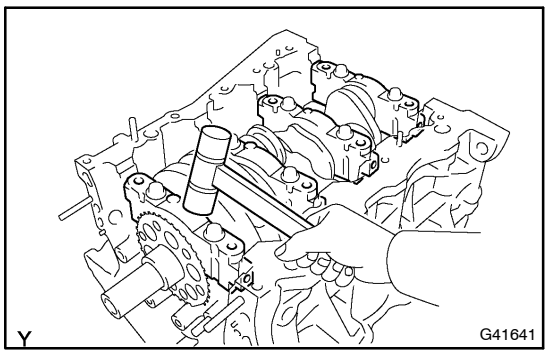
(h) Temporarily install the 8 main bearing cap bolts to the inside positions.



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

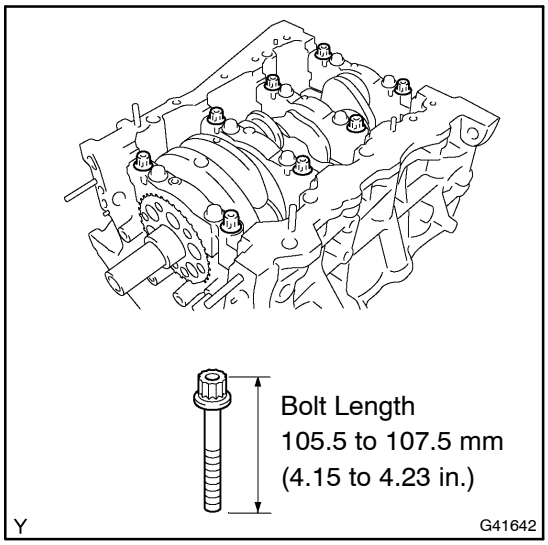
HINT:

Bolt length: 100 to 102 mm (3.94 to 4.02 in.)



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

(k) Apply a light coat of engine oil to the threads and under the heads of the 8 main bearing cap bolts.

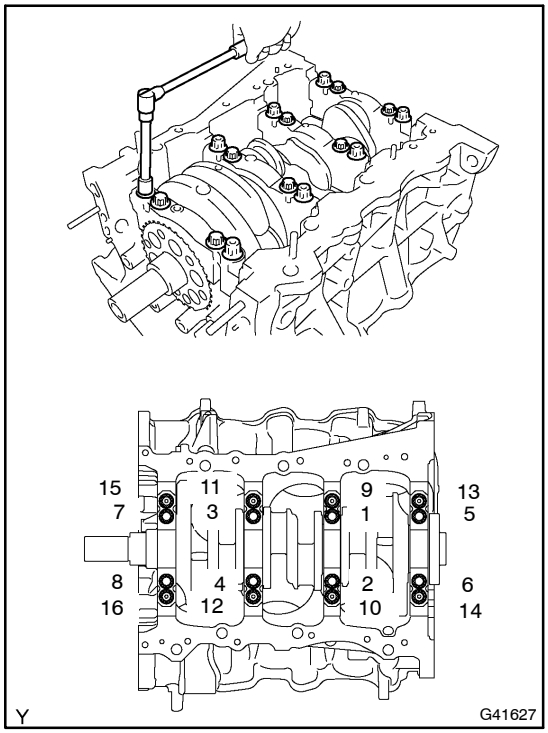


(l) Install the 8 main bearing cap bolts to the outside positions.

HINT:

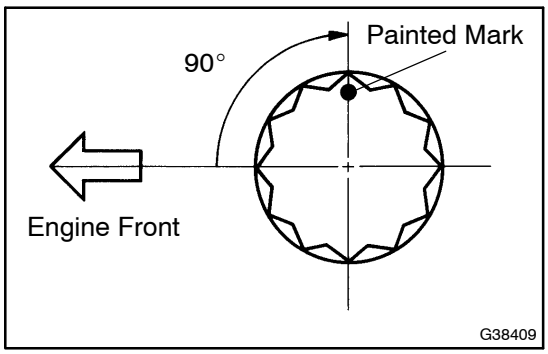
Bolt length:

105.5 to 107.5 mm (4.15 to 4.23 in.)



(m) Install and uniformly tighten the 16 main bearing cap bolts in several steps and in the sequence shown in the illustration.

Torque: 61 N·m (622 kgf·cm, 45 ft·lbf)



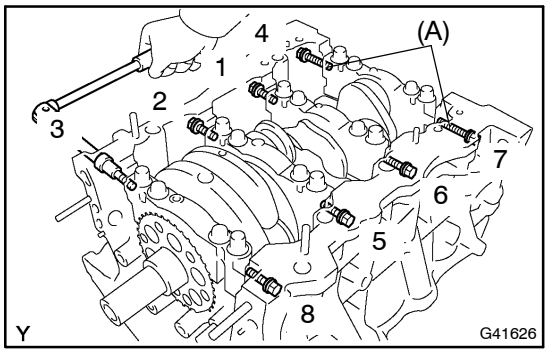
(n) Mark the front side of the bearing cap bolts with paint.

(o) Tighten the bearing cap bolts another 90° in the sequence shown.

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

NOTICE:

Do not turn the crankshaft.



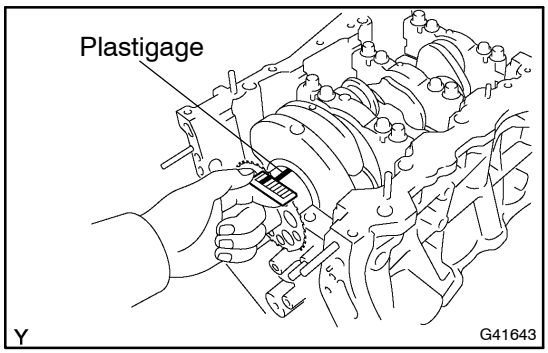
(q) Install and uniformly tighten the 8 main bearing cap bolts in several steps and in the sequence shown in the illustration.

Torque: 52 N·m (525 kgf·cm, 38 ft·lbf)

HINT:

- Bolt (A) length: 45 mm (1.77 in.)
- Except bolt (A) length: 30 mm (1.18 in.)

(r) Remove the main bearing caps (see step 6)

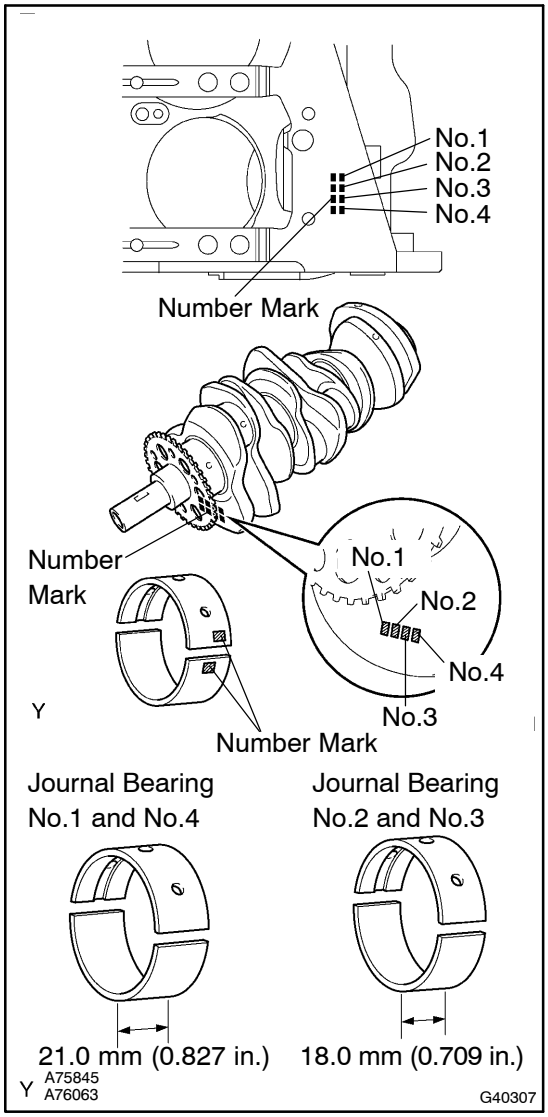


(s) Measure the Plastigage at its widest point.

Standard oil clearance:
0.026 to 0.047 mm (0.0010 to 0.0019 in.)
Maximum clearance: 0.050 mm (0.0020 in.)

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

NOTICE:
Completely remove the Plastigage.



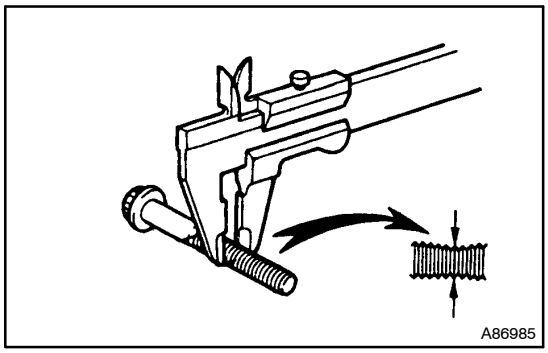
(t) If using a bearing, replace it with one that has the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly

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 ”11” + Crankshaft ”06”
= Total number 17 (Use bearing ”3”)

Item	Mark	mm (in.)
Crankshaft main journal diameter	”00”	60.999 to 61.000 (2.4015 to 2.4016)
	”01”	60.998 to 60.999 (2.4015 to 2.4015)
	”02”	60.997 to 60.998 (2.4015 to 2.4015)
	”03”	60.996 to 60.997 (2.4014 to 2.4015)
	”04”	60.995 to 60.996 (2.4014 to 2.4014)
	”05”	60.994 to 60.995 (2.4013 to 2.4014)
	”06”	60.993 to 60.994 (2.4013 to 2.4013)
	”07”	60.992 to 60.993 (2.4013 to 2.4013)
	”08”	60.991 to 60.992 (2.4012 to 2.4013)
	”09”	60.990 to 60.991 (2.4012 to 2.4012)
	”10”	60.989 to 60.990 (2.4011 to 2.4012)
	”11”	60.988 to 60.989 (2.4011 to 2.4011)
Standard upper bearing center wall thickness (No.1 and No.4 journals)	”1”	2.500 to 2.503 (0.0984 to 0.0985)
	”2”	2.503 to 2.506 (0.0985 to 0.0987)
	”3”	2.506 to 2.509 (0.0987 to 0.0988)
	”4”	2.509 to 2.512 (0.0988 to 0.0989)
	”5”	2.512 to 2.515 (0.0989 to 0.0990)
Standard lower bearing center wall thickness (No.1 and No.4 journals)	”1”	2.478 to 2.481 (0.0976 to 0.0977)
	”2”	2.481 to 2.484 (0.0977 to 0.0978)
	”3”	2.484 to 2.487 (0.0978 to 0.0979)
	”4”	2.487 to 2.490 (0.0979 to 0.0980)
	”5”	2.490 to 2.493 (0.0980 to 0.0981)
Standard upper bearing center wall thickness (No.2 and No.3 journals)	”1”	2.478 to 2.481 (0.0976 to 0.0977)
	”2”	2.481 to 2.484 (0.0977 to 0.0978)
	”3”	2.484 to 2.487 (0.0978 to 0.0979)
	”4”	2.487 to 2.490 (0.0979 to 0.0980)
	”5”	2.490 to 2.493 (0.0980 to 0.0981)
Standard lower bearing center wall thickness (No.2 and No.3 journals)	”1”	2.500 to 2.503 (0.0984 to 0.0985)
	”2”	2.503 to 2.506 (0.0985 to 0.0987)
	”3”	2.506 to 2.509 (0.0987 to 0.0988)
	”4”	2.509 to 2.512 (0.0988 to 0.0989)
	”5”	2.512 to 2.515 (0.0989 to 0.0990)

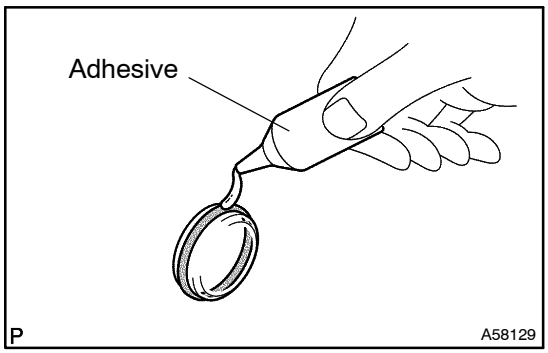


24. INSPECT CRANKSHAFT BEARING CAP SET BOLT

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

Standard diameter:
10.8 to 11.0 mm (0.4252 to 0.4331 in.)
Minimum diameter: 10.7 mm (0.4213 in.)

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



25. INSTALL TIGHT PLUG

NOTICE:

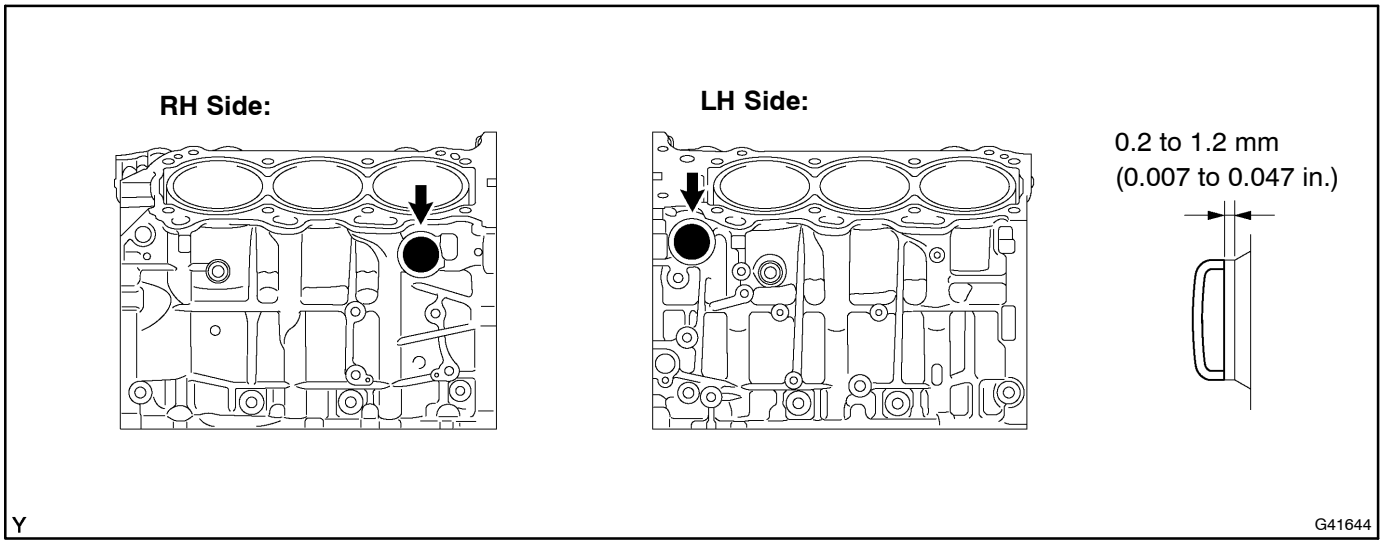
If water leaks from the tight plug or the plug corrodes, replace it.

(a) Apply adhesive around the tight plugs.

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

(b) Using SST, tap in the tight plugs.

SST 09950–60010 (09951–00340), 09950–70010 (09951–07100)

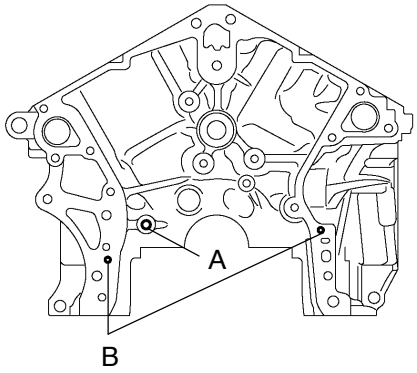


26. INSTALL STRAIGHT PIN

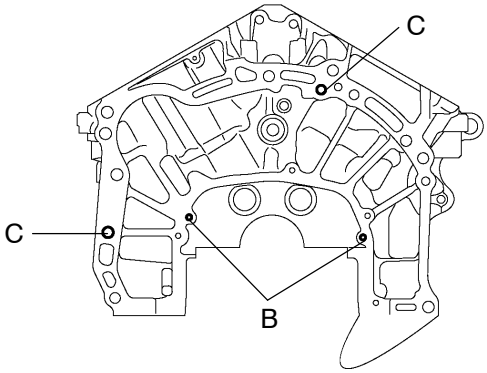
(a) Using a plastic hammer, tap in new straight pins to the cylinder block.

Standard protrusion:
Pin A: 23 mm (0.906 in.)
Pin B: 6 mm (0.236 in.)
Pin C: 11 mm (0.433 in.)
Pin D: 9 mm (0.354 in.)

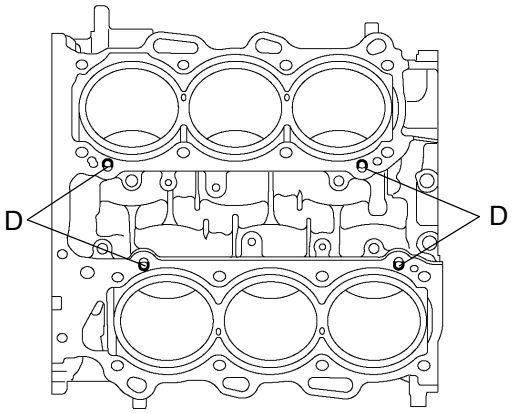
Cylinder Block Front:



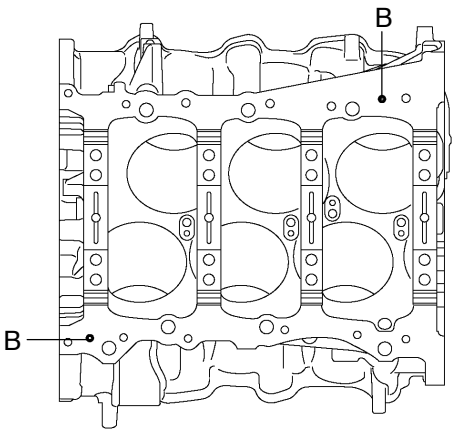
Cylinder Block Rear:



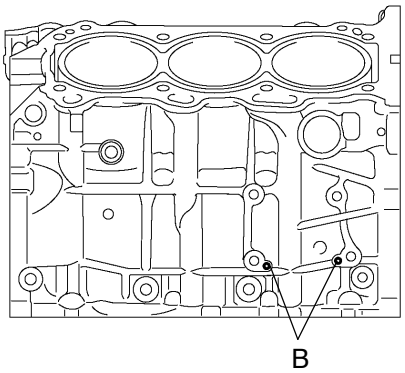
Cylinder Block Upper:

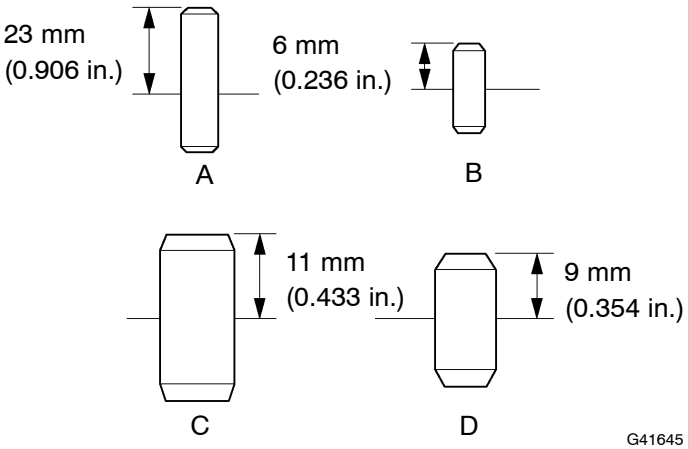


Cylinder Block Lower:



Cylinder Block RH side:





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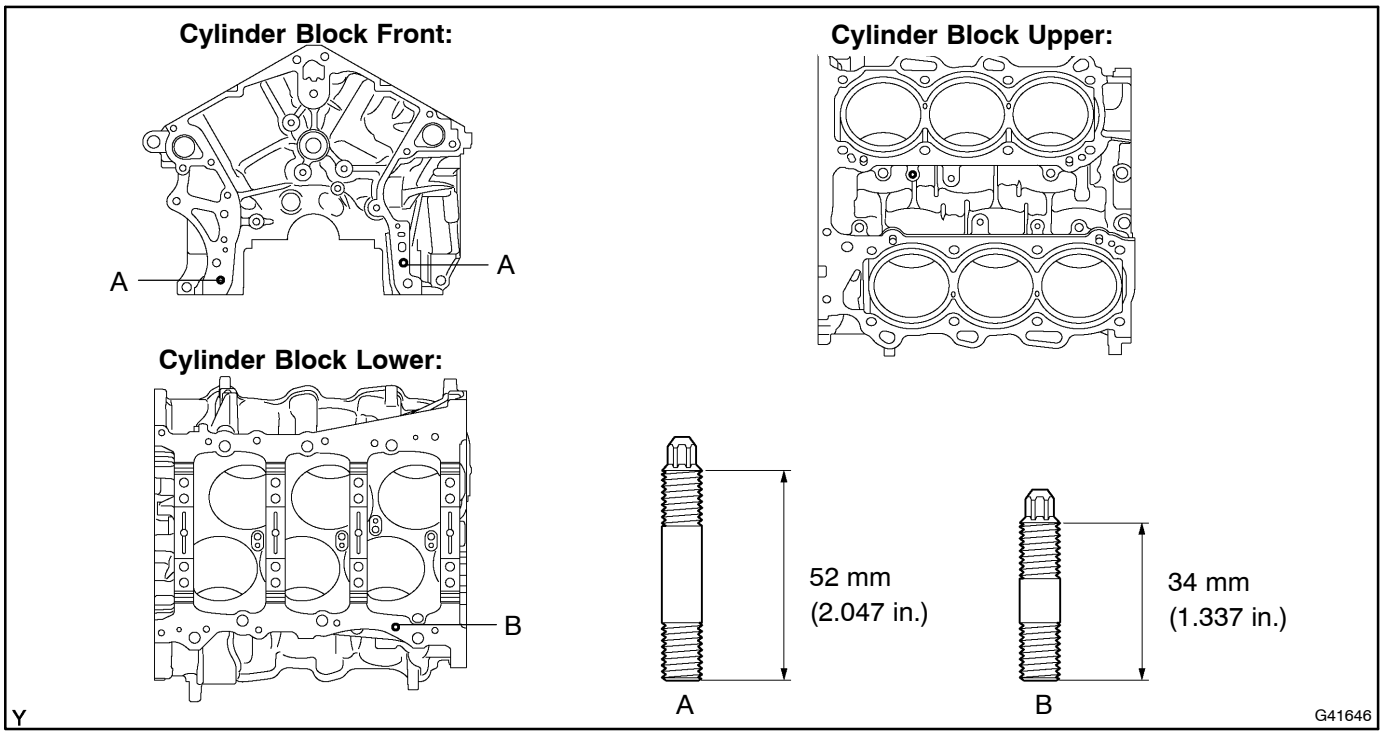
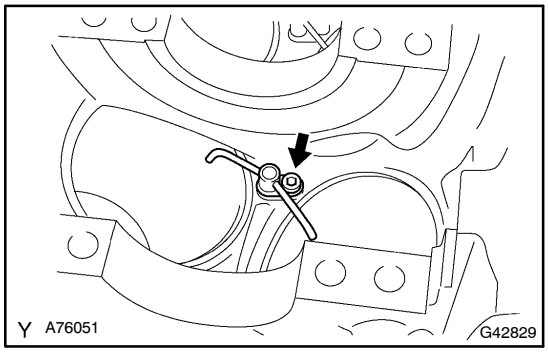
27. INSTALL STUD BOLT

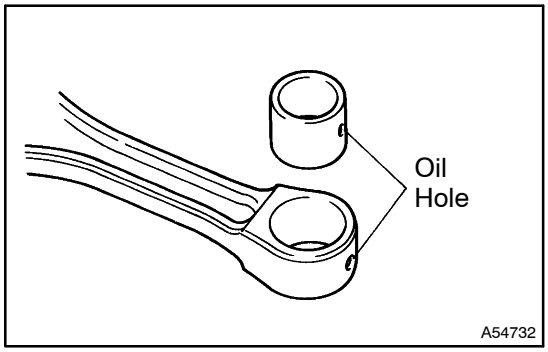
(a) Using an E8 Torx® socket wrench, install the stud bolt.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)





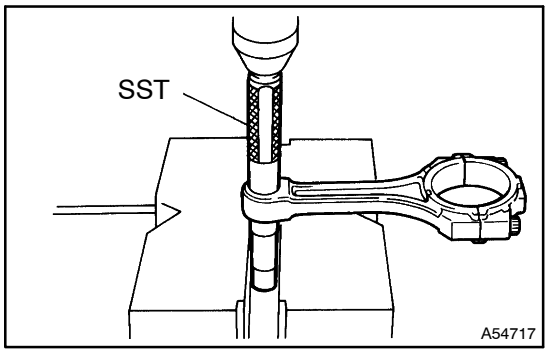
28. INSTALL SUB–ASSY OIL NOZZLE NO.1

(a) Using a 5 mm hexagon wrench, install the 3 oil nozzles with the bolts.
Torque: 9.0 N·m (92 kgf·cm, 80 in.·lbf)

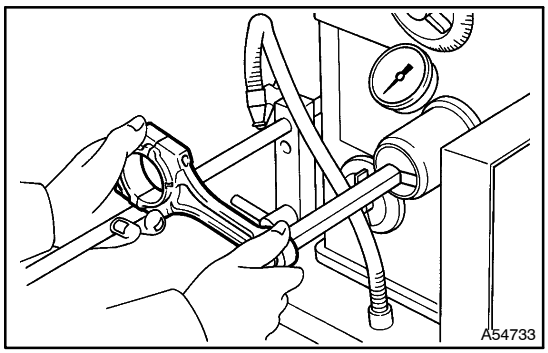


29. INSTALL CONNECTING ROD SMALL END BUSH

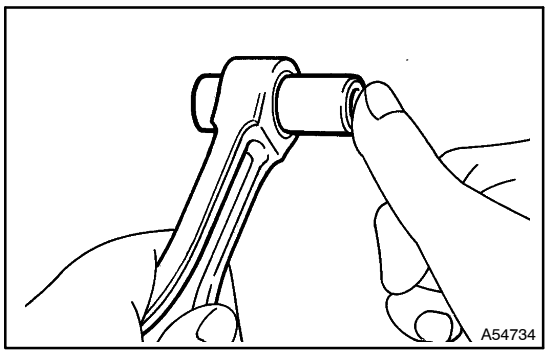
(a) Align the oil holes of a new bush and the connecting rod.



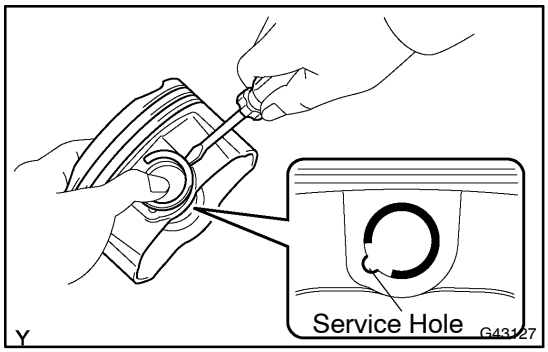
(b) Using SST and a press, press in the bush.
SST 09222–30010



(c) Using a pin hole grinder, hone the bush to obtain the standard specified clearance (see step 18) between the bush and piston pin.



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

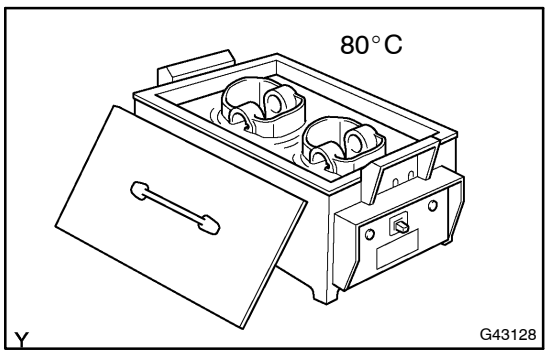


30. INSTALL PISTON SUB–ASSY WITH PIN

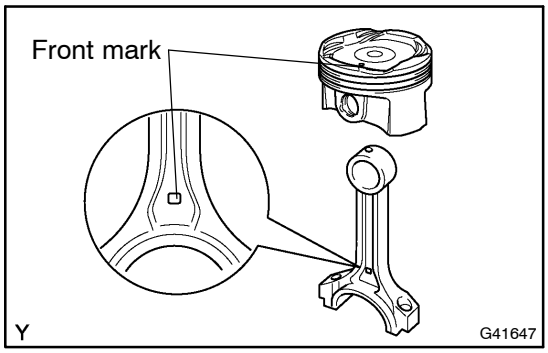
(a) Using a screwdriver, install a new snap ring at one end of the piston pin hole.

HINT:

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

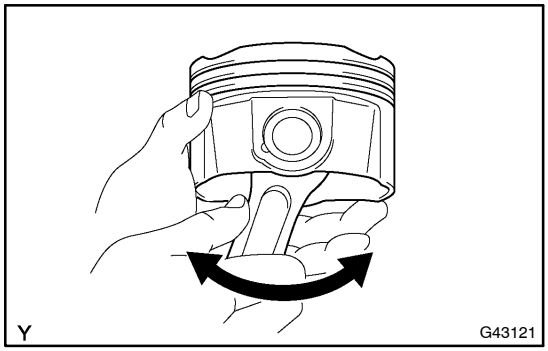


(1) Gradually heat the piston to approximately 80°C (176°F).

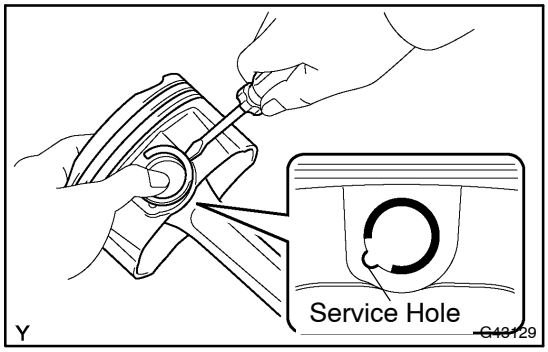


(2) Coat the piston pin with engine oil.
(3) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.

HINT:
The piston and pin are a matched set.

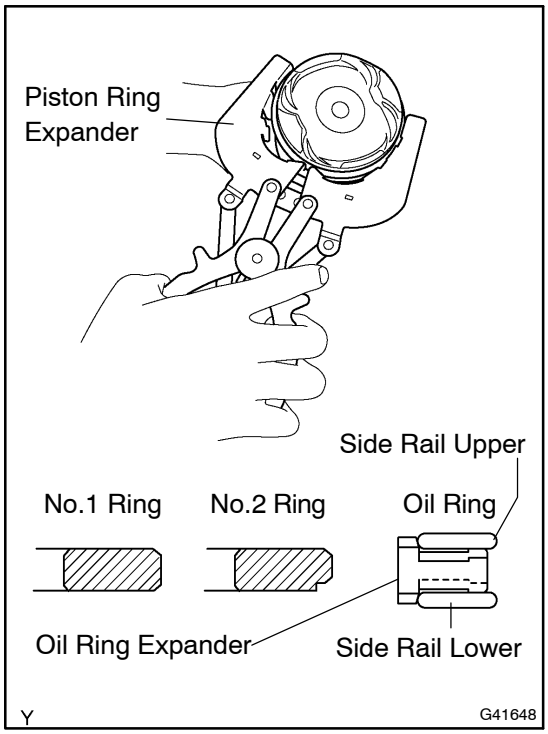


(4) Check the fitting condition between the piston and piston pin by trying to move the piston back and forth on the piston pin.



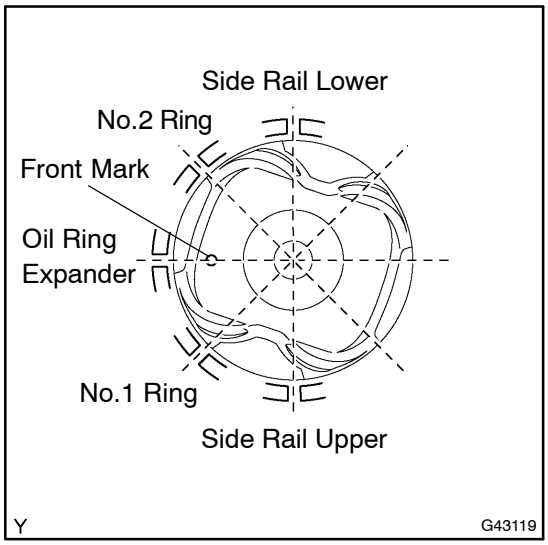
(5) Using a screwdriver, install a new snap ring at the other end of the piston pin hole.

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



31. INSTALL PISTON RING SET

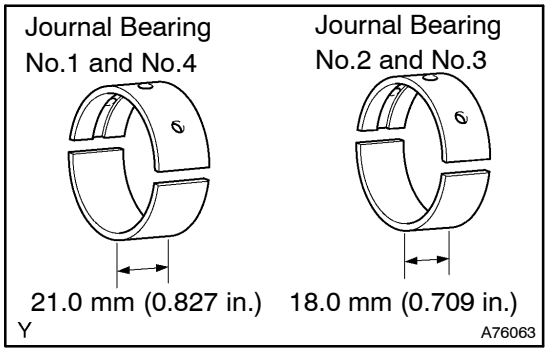
(a) Install the oil ring expander and 2 side rails by hand.
(b) Using a piston ring expander, install the 2 compression rings so that the painted marks are positioned as shown in the illustration.



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

NOTICE:

Do not align the ring ends.

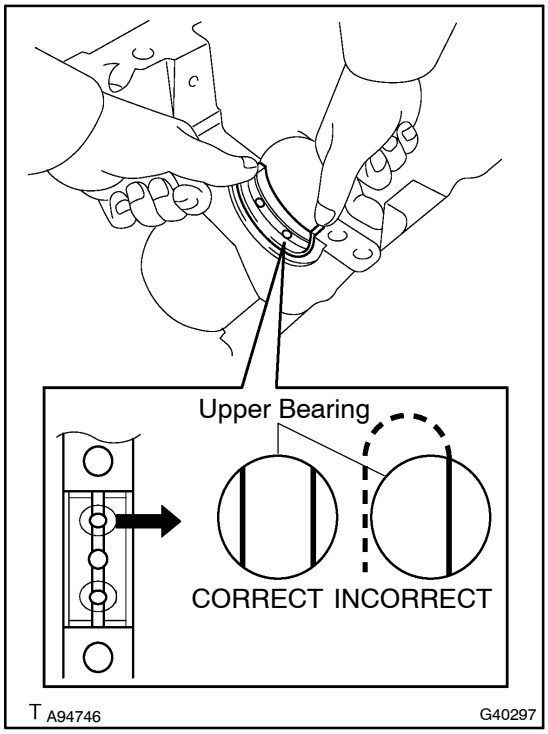


32. INSTALL CRANKSHAFT BEARING

NOTICE:

Main bearings come in widths of 18.0 mm (0.709 in.) and 21.0 mm (0.827 in.). Install the 21.0 mm (0.827 in.) bearings in the No.1 and No.4 cylinder block journal positions with the main bearing cap. Install the 18.0 mm (0.709 in.) bearings in the No.2 and No.3 positions.

(a) Clean the main journal, and both surfaces of the bearing.

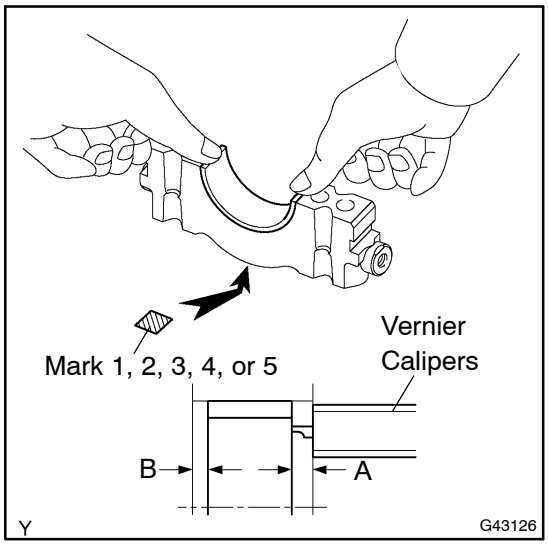


(b) Install the upper bearing.

(1) Install the upper bearing to the cylinder block as shown in the illustration.

NOTICE:

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

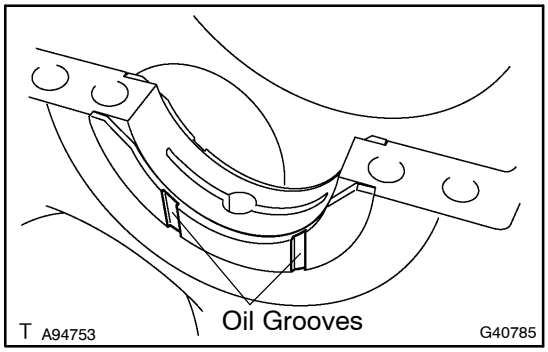


(c) Install the lower bearing.
(1) Install the lower bearing to the bearing cap.
(2) Using vernier calipers, measure the distance between the bearing cap's edge and the lower bearing's edge.

Dimension (A – B): 0.7 mm (0.0276 in.) or less

NOTICE:

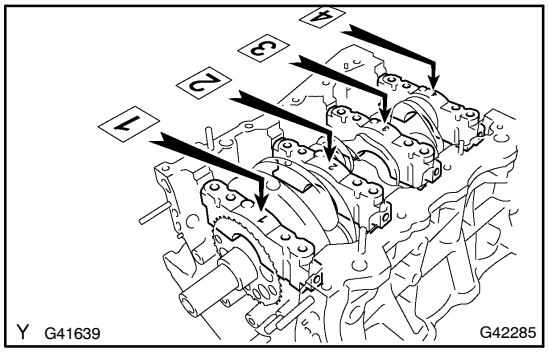
Do not apply engine oil to the bearing's contact area and underside.



33. INSTALL CRANKSHAFT

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

(b) Apply engine oil to the upper bearing, then place the crankshaft on the cylinder block.



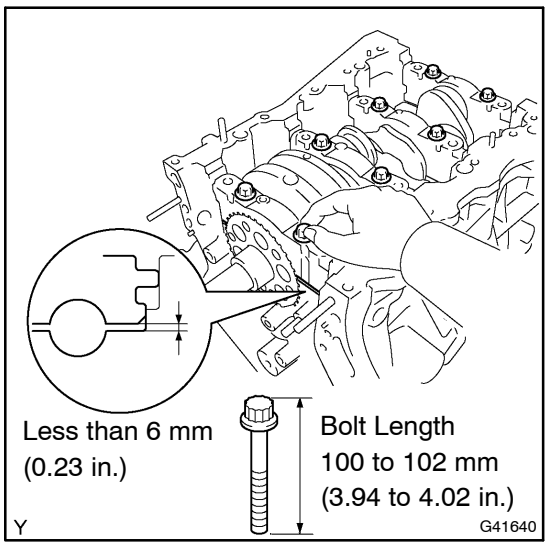
(c) Examine the front marks and numbers and install the bearing caps on the cylinder block.

HINT:

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

(d) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts.

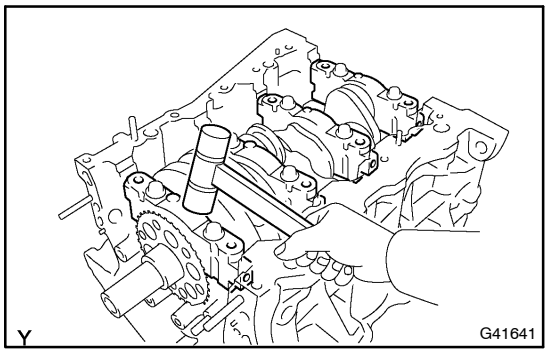
(e) Temporarily install the 8 main bearing cap bolts to the inside positions.



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

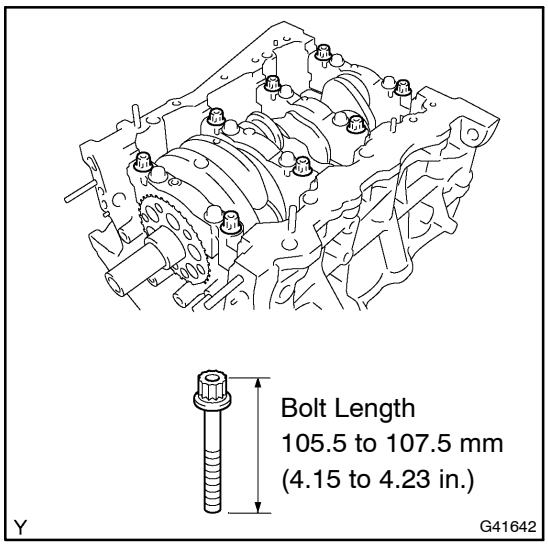
HINT:

Bolt length: 100 to 102 mm (3.94 to 4.02 in.)



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

(h) Apply a light coat of engine oil to the threads and under the heads of the 8 main bearing cap bolts.

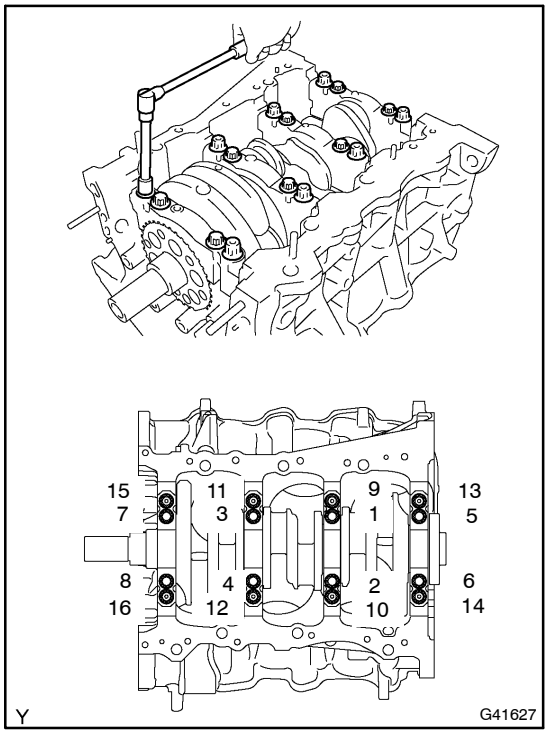


(i) Install the 8 main bearing cap bolts to the outside positions.

HINT:

Bolt length:

105.5 to 107.5 mm (4.15 to 4.23 in.)



(j) Install the crankshaft bearing cap bolts.

HINT:

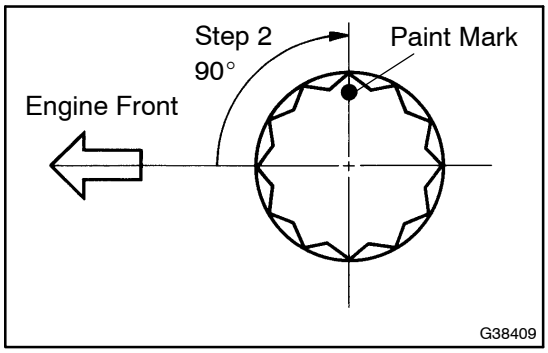
The main bearing cap bolts are tightened in 2 progressive steps.

(k) Step 1

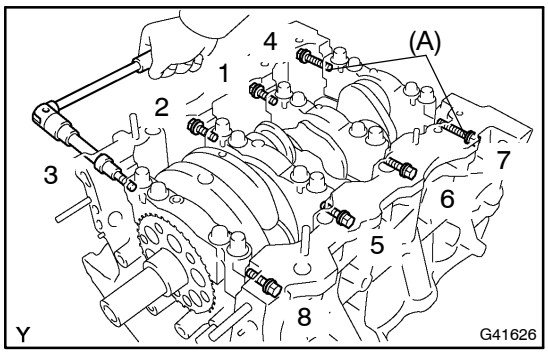
(1) Install and uniformly tighten the 16 main bearing cap bolts in the sequence shown in the illustration.

Torque: 61 N·m (622 kgf·cm, 45 ft·lbf)

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



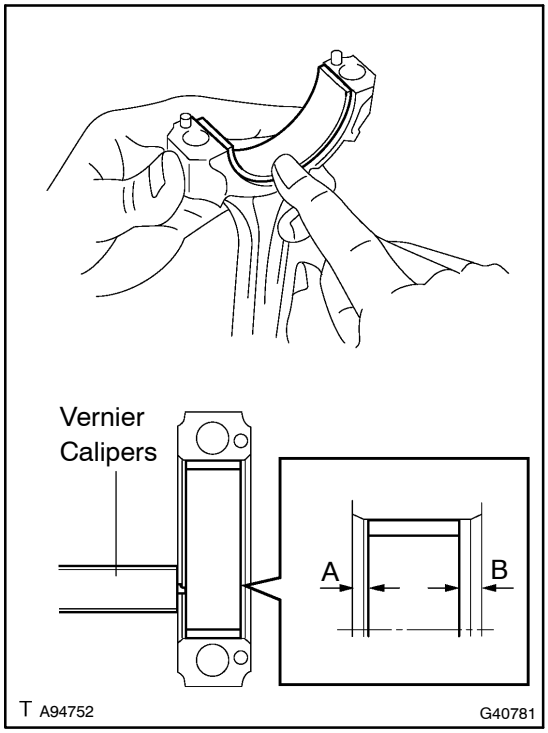
(l) Step 2
  (1) Mark the front of the bearing cap bolts with paint.
  (2) Tighten the bearing cap bolts another 90° in the order above.
  (3) Check that the painted mark is now at a 90° angle to the front.
(m) Check that the crankshaft turns smoothly.
(n) Check the crankshaft thrust clearance (see step 5).



(o) Install and uniformly tighten the 8 main bearing cap bolts in several steps and, in the sequence shown in the illustration.
Torque: 52 N·m (525 kgf·cm, 38 ft·lbf)

HINT:
- Bolt (A) length: 45 mm (1.77 in.)
- Except bolt (A) length: 30 mm (1.18 in.)

(p) Check that the crankshaft turns smoothly.
(q) Check the crankshaft thrust clearance (see step 5).



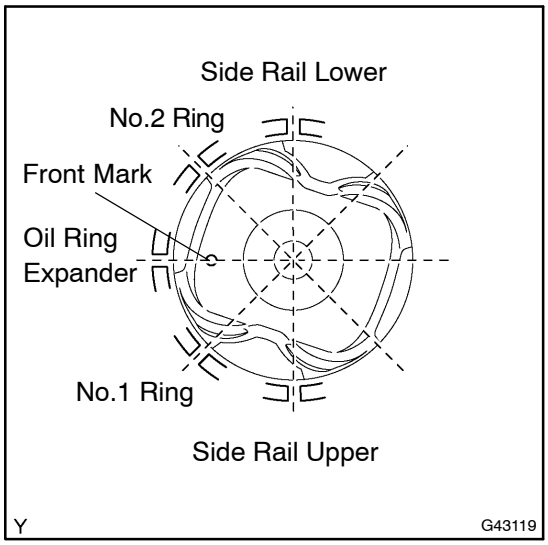
34. INSTALL CONNECTING ROD BEARING

(a) Install the connecting rod bearing to the connecting rod and bearing cap.
(b) Using vernier calipers, measure the distance between the connecting rod's and bearing cap's edges, and each connecting rod bearing's edge.
Dimension (A – B): 0.7 mm (0.0276 in.) or less

NOTICE:
Do not apply engine oil to the bearing's contact area and underside.

35. INSTALL PISTON SUB–ASSY W/CONNECTING ROD

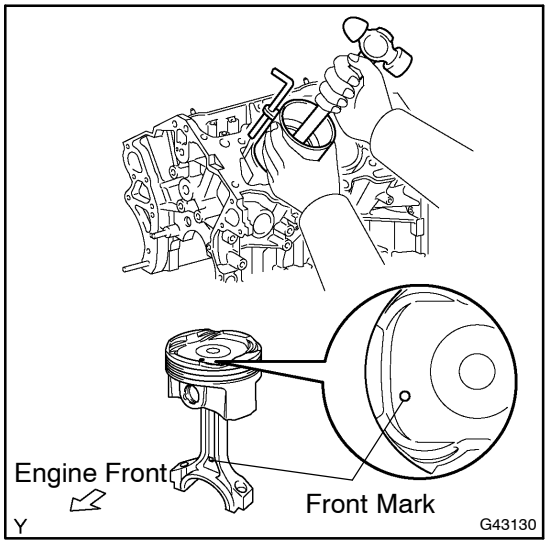
(a) Apply engine oil to the cylinder walls, the pistons, and the surfaces of the connecting rod bearings.



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

NOTICE:

Do not align the ring ends.

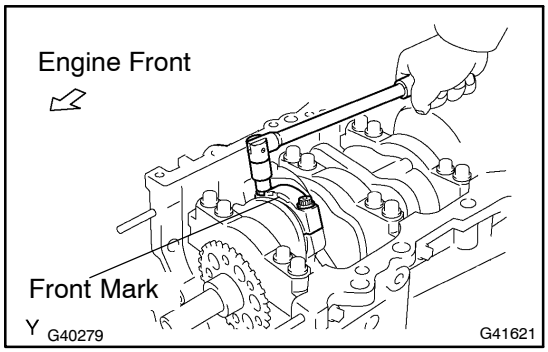


(c) Using a piston ring compressor, push the correctly numbered piston and connecting rod assembly into the cylinder with the front mark of the piston facing forward.

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

NOTICE:

Match the numbered connecting rod cap with the connecting rod.



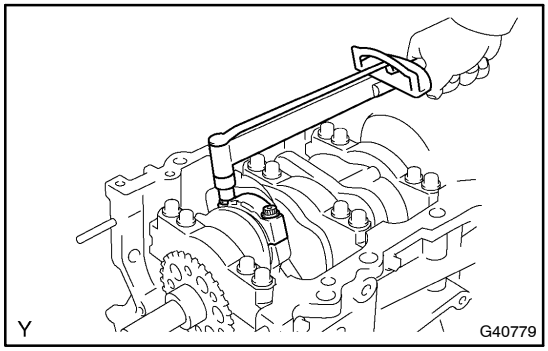
(e) Check that the front mark of the connecting rod cap is facing forward.

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

(g) Install the connecting cap bolts.

HINT:

The connecting cap bolts are tightened in 2 progressive steps.

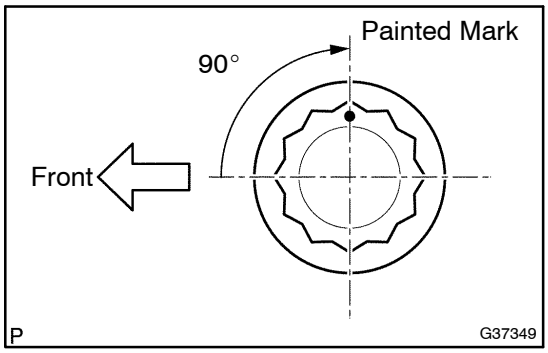


(h) Step 1

(1) Install and alternately tighten the bolts of the connecting rod cap in several steps.

SST 09011–38121

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)



(i) Step 2
  (1) Mark the front side of each connecting cap bolt with paint.
  (2) Tighten the cap bolts another 90° as shown in the illustration.
  (3) Check that the painted mark is now at a 90° angle to the front.

(j) Check that the crankshaft turns smoothly.

(k) Check the connecting rod thrust clearance (see step 1).