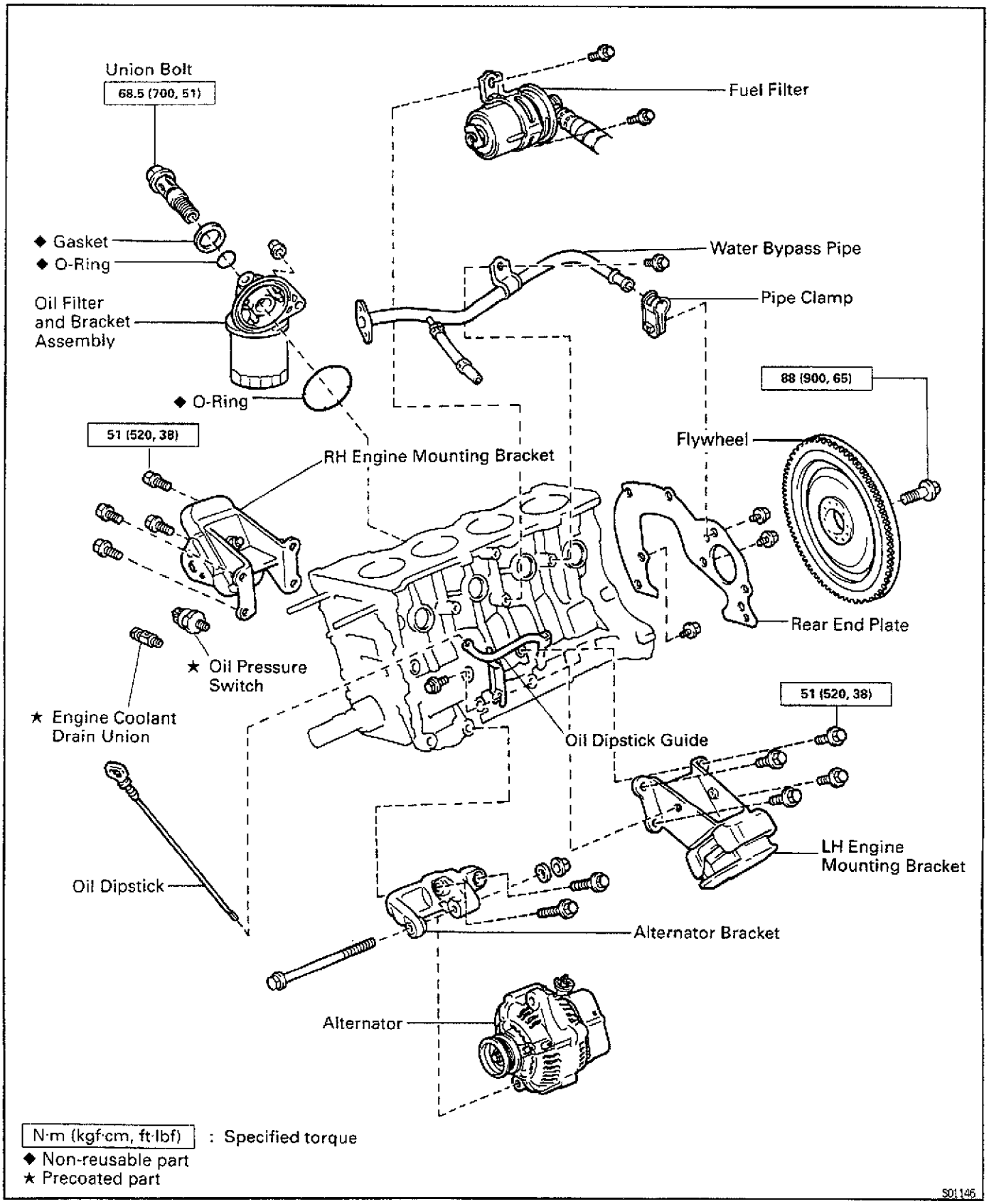
EG

CYLINDER BLOCK

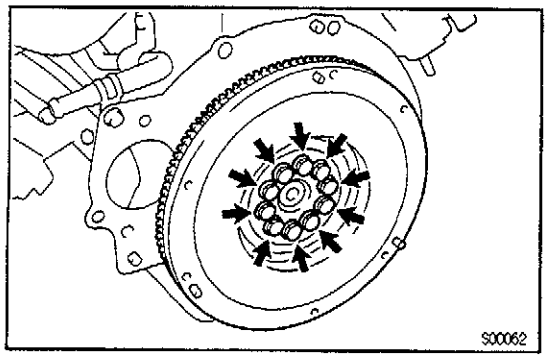
COMPONENTS FOR PREPARATION AND AFTER ASSEMBLY

EG580-05



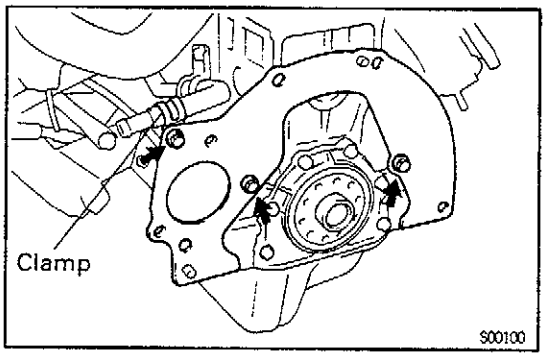
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part

S01146



PREPARATION FOR DISASSEMBLY

1. **REMOVE FLYWHEEL**
   Remove the 10 bolts and flywheel.



2. **REMOVE REAR END PLATE**
   Remove the 3 bolts, end plate and pipe clamp.
3. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
4. **REMOVE CYLINDER HEAD ASSEMBLY**
   (See cylinder head assembly removal)
5. **REMOVE OIL PAN AND OIL STRAINER**
   (See steps 5 and 6 in oil pump removal in Lubrication System)
6. **REMOVE TIMING CHAIN**
   (See steps 6 to 15 in timing chain removal)
7. **REMOVE WATER BYPASS PIPE**
   Remove the bolt and bypass pipe.
9. **REMOVE ALTERNATOR**
   Remove the nut, plate washer, pivot bolt and alternator.
10. **REMOVE ALTERNATOR BRACKET**
    Remove the 2 bolts and alternator bracket.
11. **REMOVE FUEL FILTER**
    Remove the 2 bolts and fuel filter.
12. **REMOVE OIL DIPSTICK**
13. **REMOVE LH ENGINE MOUNTING BRACKET**

(a) Remove the bolt holding the oil dipstick guide to the mounting bracket.
(b) Remove the 4 bolts and mounting bracket.

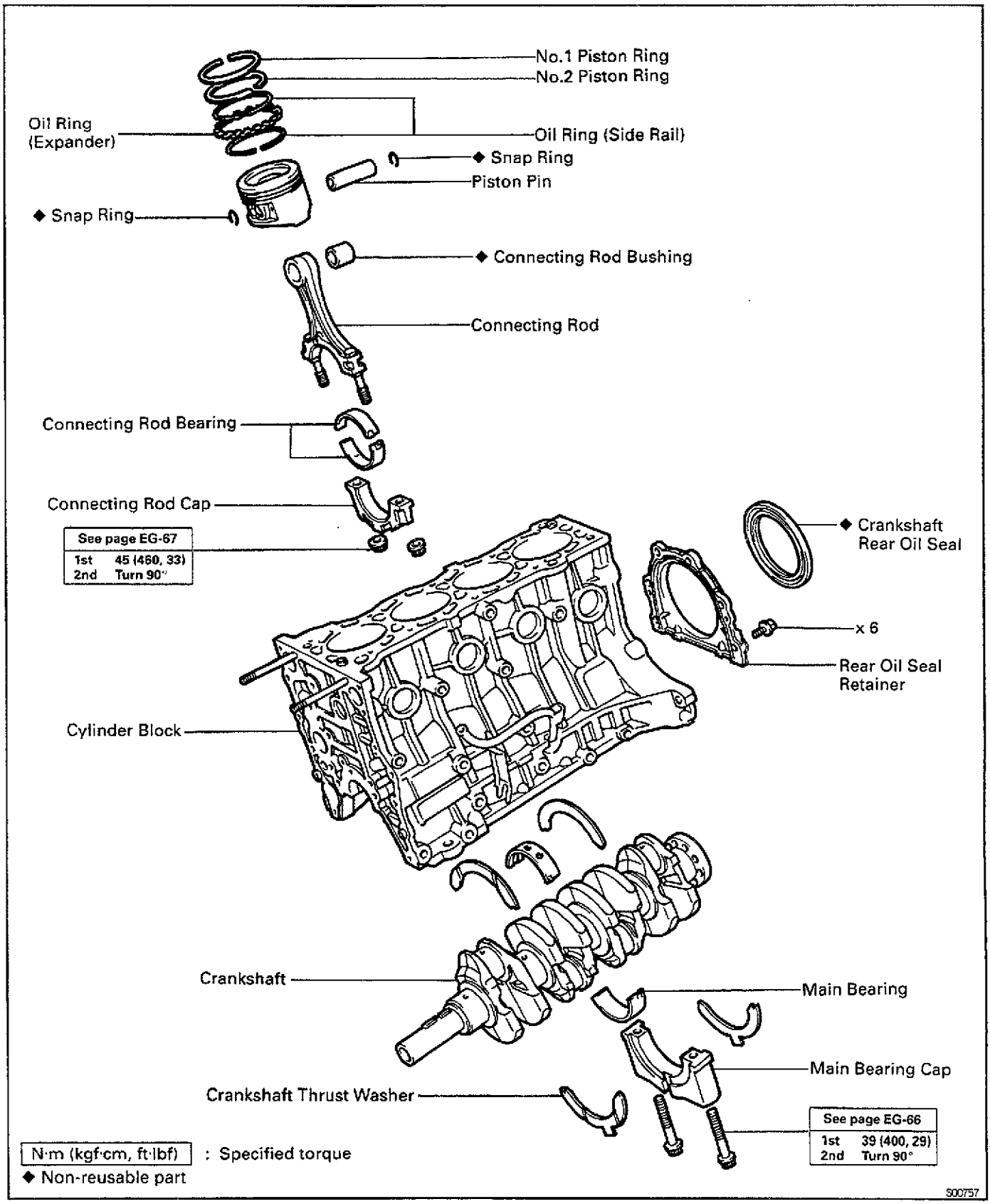
14. **REMOVE RH ENGINE MOUNTING BRACKET**
    Remove the 4 bolts and mounting bracket.
15. **REMOVE OIL FILTER AND BRACKET ASSEMBLY**

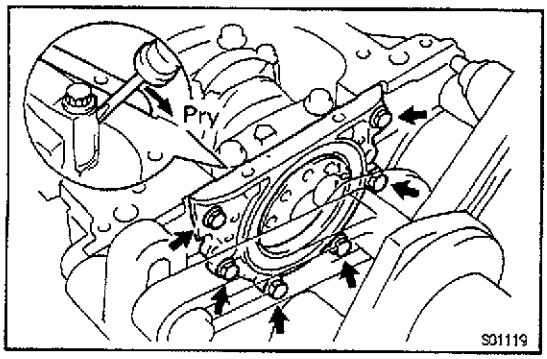
(a) Remove the nut, union bolt, gasket, the oil filter, bracket assembly and O—ring.
(b) Remove the O—ring from the union bolt.

16. **REMOVE OIL PRESSURE SWITCH**
17. **REMOVE ENGINE COOLANT DRAIN UNION**

COMPONENTS FOR DISASSEMBLY AND ASSEMBLY

EG





CYLINDER BLOCK DISASSEMBLY

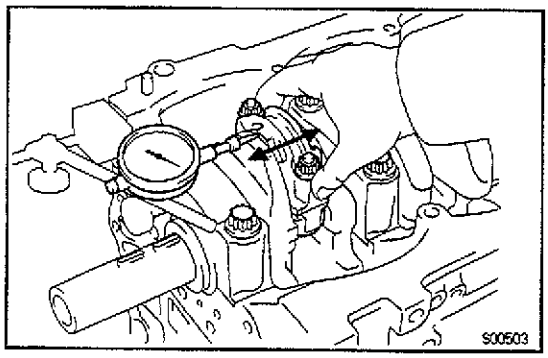
EG600-01

1. REMOVE REAR OIL SEAL RETAINER

(a) Remove the 6 bolts.

(b) Using a screwdriver, remove the oil seal retainer by prying the portions between the oil seal retainer and main bearing cap.

EG



2. CHECK CONNECTING ROD THRUST CLEARANCE

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

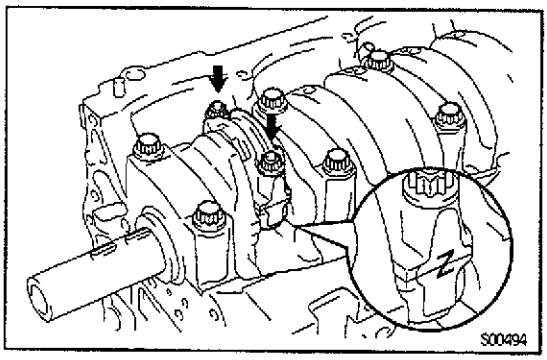
Standard thrust clearance:

0.160 — 0.312 mm (0.0063 — 0.0123 in.)

Maximum thrust clearance:

0.35 mm (0.0138 in.)

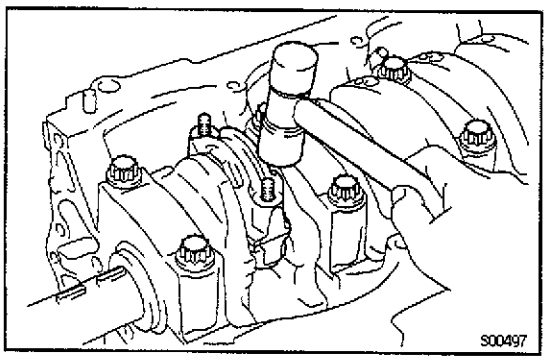
If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.



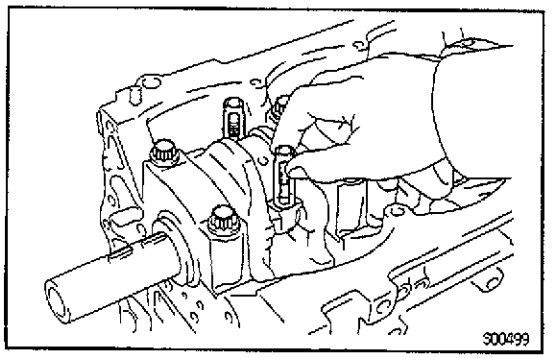
3. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

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

(b) Remove the 2 connecting rod cap nuts.

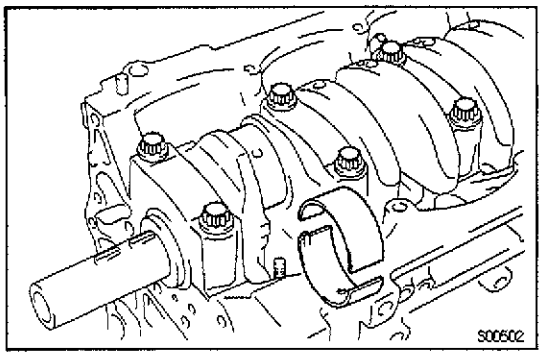


(c) Using a plastic—faced hammer, lightly tap the connecting rod bolts and lift off the connecting rod cap.
HINT: Keep the lower bearing inserted with the connecting rod cap.



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

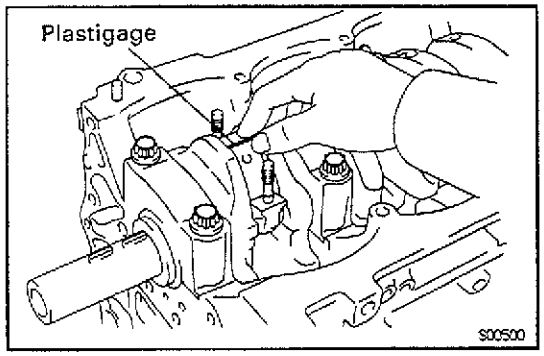
EG



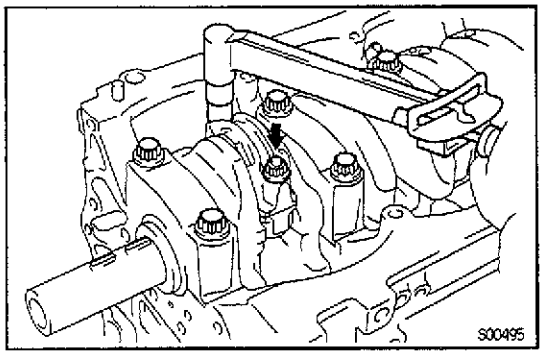
(e) Clean the crank pin and bearing.

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

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

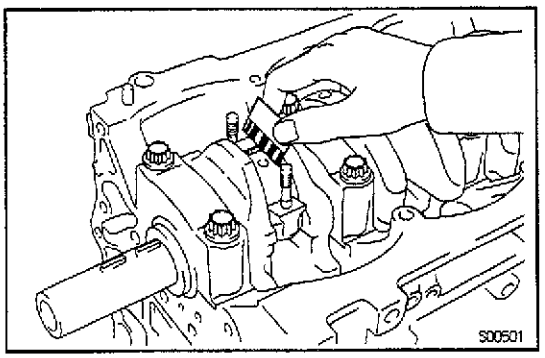


(g) Lay a strip of Plastigage across the crank pin.



(h) Install the connecting rod cap.
(See step 7 in cylinder block assembly)
NOTICE: Do not turn the crankshaft.

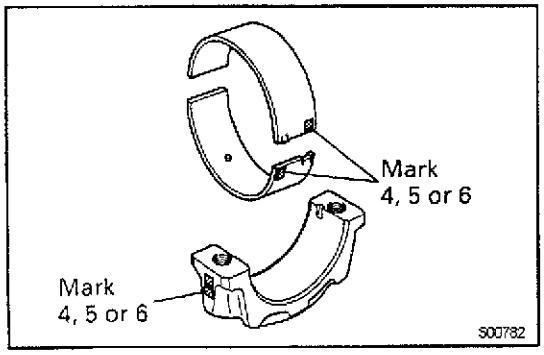
(i) Remove the connecting rod cap.
(See procedure (b) and (c) above)



(j) Measure the Plastigage at its widest point.
Standard oil clearance:
STD
0.030 — 0.055 mm (0.0012 — 0.0022 in.)
U/S 0.25
0.031 — 0.071 mm (0.0012 — 0.0028 in.)
Maximum oil clearance:
0.08 mm (0.0031 in.)

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

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

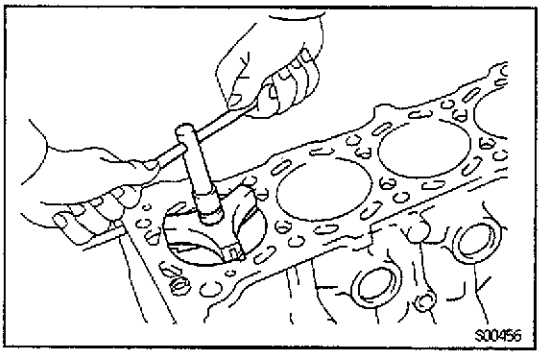


Reference

Standard sized bearing center wall thickness:

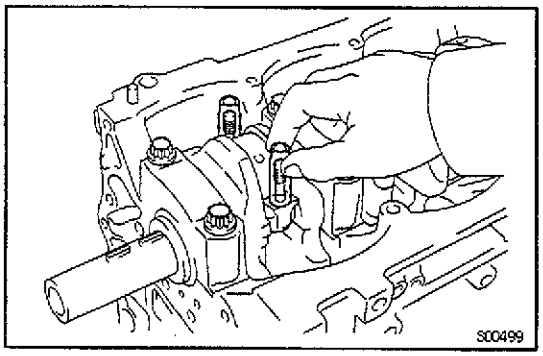
Mark "4"	1.482 – 1.485 mm (0.0583 – 0.0585 in.)
Mark "5"	1.485 – 1.488 mm (0.0585 – 0.0586 in.)
Mark "6"	1.488 – 1.491 mm (0.0586 – 0.0587 in.)

(k) Completely remove the Plastigage.



4. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

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

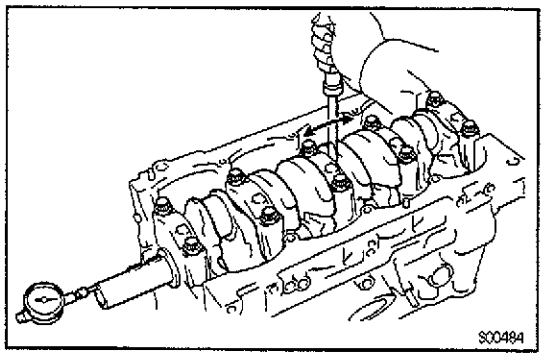


(b) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

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

HINT:

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



5. CHECK CRANKSHAFT THRUST CLEARANCE

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

Standard thrust clearance:

0.020 – 0.220 mm (0.0008 – 0.0087 in.)

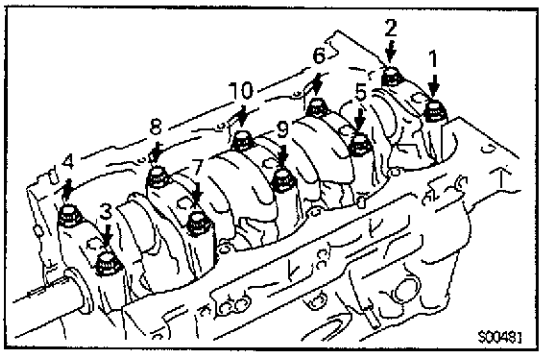
Maximum thrust clearance:

0.30 mm (0.0118 in.)

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

Thrust washer thickness:

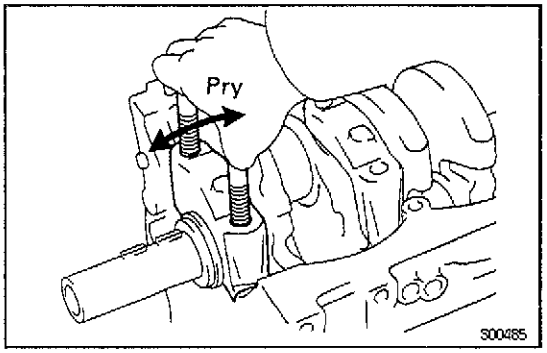
2.440 – 2.490 mm (0.0961 – 0.0980 in.)



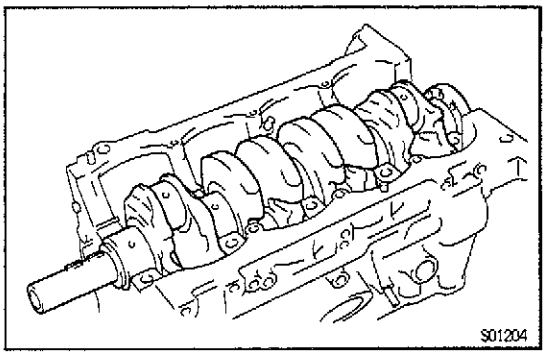
6. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

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

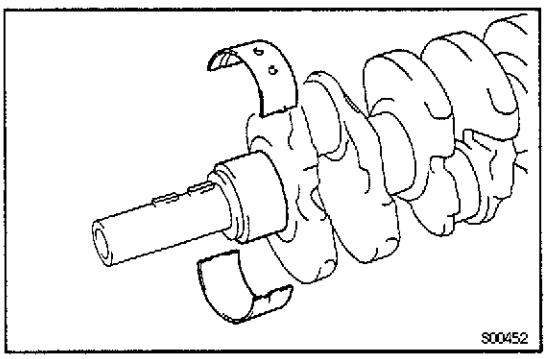
EG



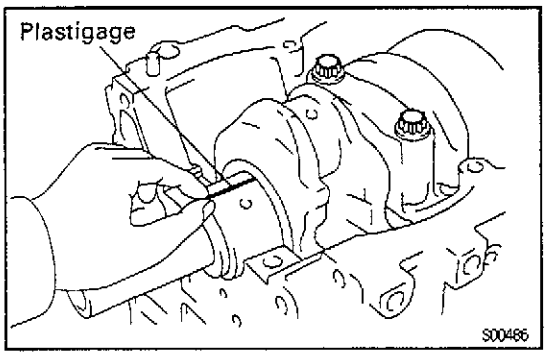
(b) Using the removed main bearing cap bolts, pry the main bearing cap back and forth, and remove the 5 main bearing caps, 5 lower bearings and 2 lower thrust washers (No.3 main bearing cap only).
HINT:
- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in the correct order.



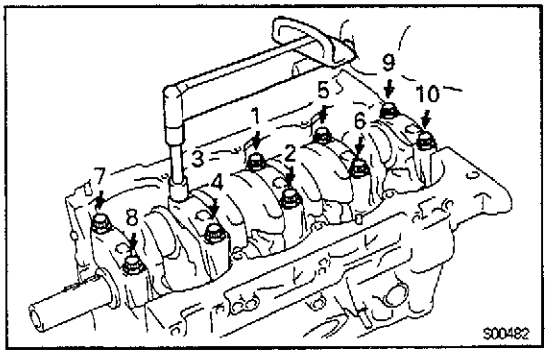
(c) Lift out the crankshaft.
HINT: Keep the upper bearing and upper thrust washers together with the cylinder block.



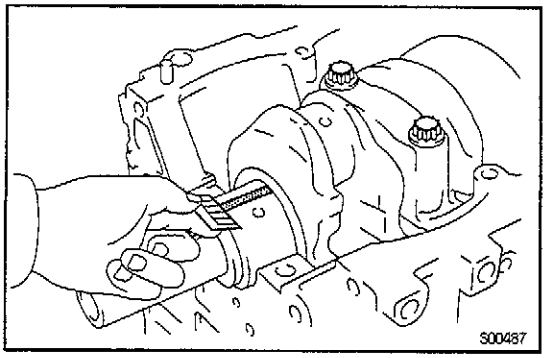
(d) Clean each main journal and bearing.
(e) Check each main journal and bearing for pitting and scratches.
If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

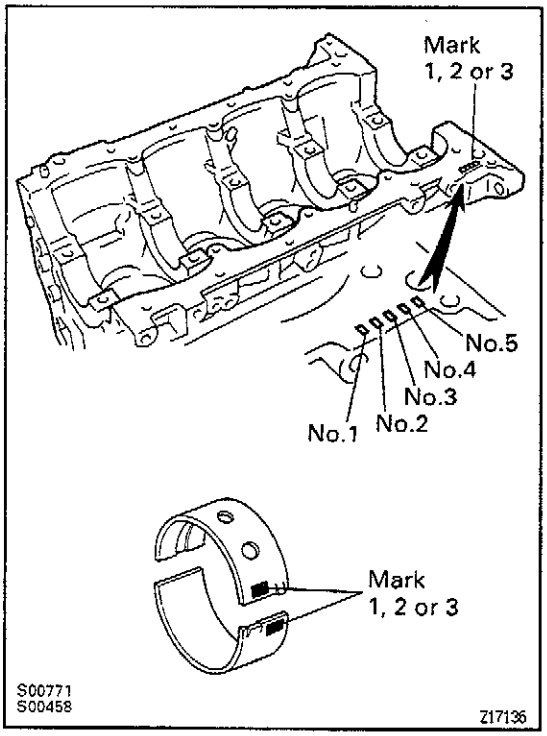


(f) Place the crankshaft on the cylinder block.
(g) Lay a strip of Plastigage across each journal.



(h) Install the main bearing caps.
(See step 4 in cylinder block assembly)
NOTICE: Do not turn the crankshaft.
(i) Remove the main bearing caps.
(See procedure (a) and (b) above)





(j) Measure the Plastigage at its widest point.

Standard clearance:

STD

No.3

0.030 – 0.055 mm (0.0012 – 0.0022 in.)

Others

0.024 – 0.049 mm (0.0009 – 0.0019 in.)

U/S 0.25

No.3

0.030 – 0.070 mm (0.0012 – 0.0028 in.)

Others

0.025 – 0.065 mm (0.0010 – 0.0026 in.)

Maximum clearance:

0.08 mm (0.0031 in.)

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

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

Reference

Standard sized bearing center wall thickness:

Mark "1"	1.987 – 1.990 mm (0.0782 – 0.0783 in.)
Mark "2"	1.990 – 1.993 mm (0.0783 – 0.0785 in.)
Mark "3"	1.993 – 1.996 mm (0.0785 – 0.0786 in.)

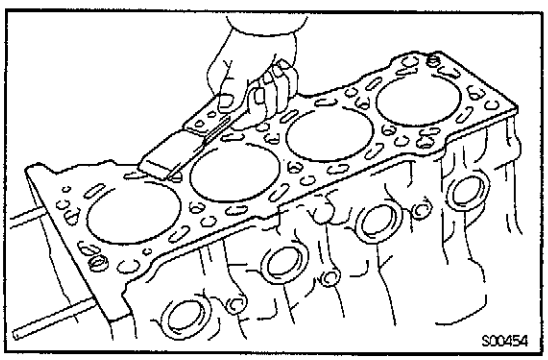
(k) Completely remove the Plastigage.

7. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the 5 upper bearings and 2 upper thrust washers from the cylinder block.

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



CYLINDER BLOCK INSPECTION

EG0BU-01

1. CLEAN CYLINDER BLOCK

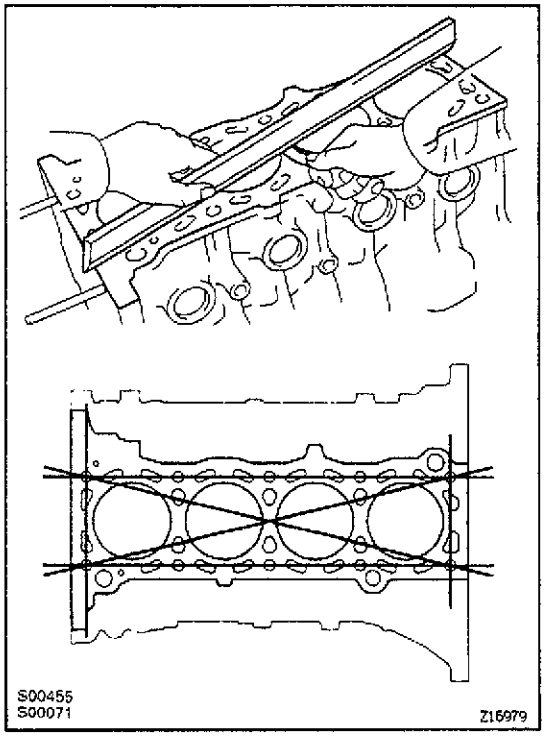
A. Remove gasket material

Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

B. Clean cylinder block

Using a soft brush and solvent, thoroughly clean the cylinder block.

EG



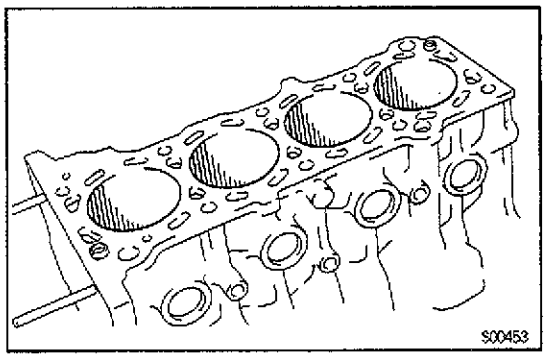
2. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS

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

Maximum warpage:

0.05 mm (0.0020 in.)

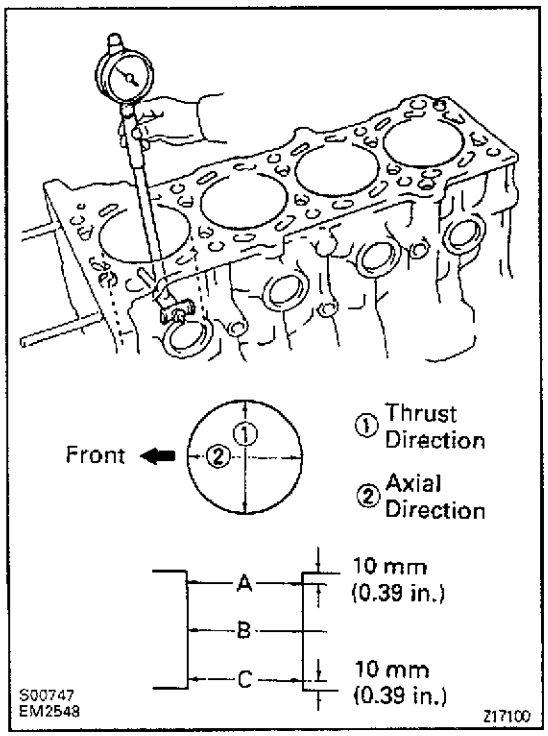
If warpage is greater than maximum, replace the cylinder block.



3. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

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



4. INSPECT CYLINDER BORE DIAMETER

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

Standard diameter:

STD

85.990 — 86.003 mm (3.3854 — 3.3859 in.)

Maximum diameter:

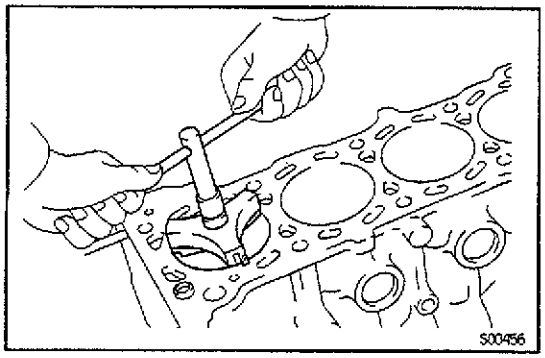
STD

86.203 mm (3.3938 in.)

O/S 0.50

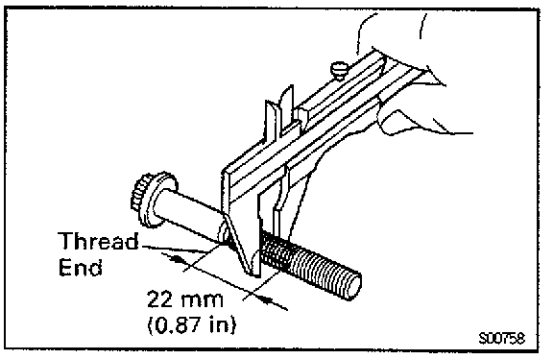
86.703 mm (3.4135 in.)

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



5. REMOVE CYLINDER RIDGE

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



6. INSPECT MAIN BEARING CAP BOLTS

Using vernier calipers, measure the thread outside diameter at the measuring point.

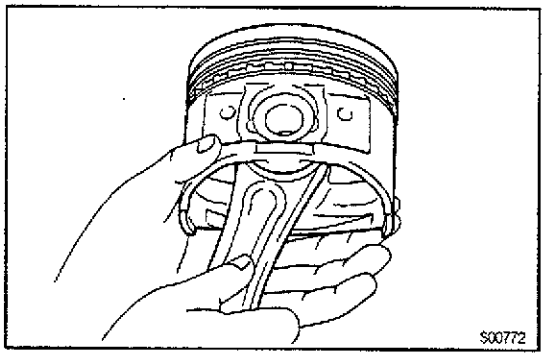
Standard diameter:

10.760 – 10.970 mm (0.4236 – 0.4319 in.)

Minimum diameter:

10.40 mm (0.4094 in.)

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



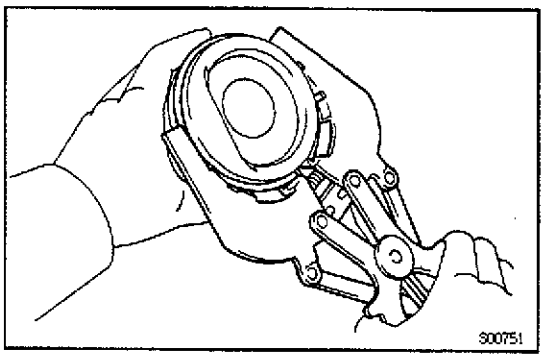
PISTON AND CONNECTING ROD DISASSEMBLY

EG0GR-01

1. CHECK FIT BETWEEN PISTON AND PISTON PIN

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.

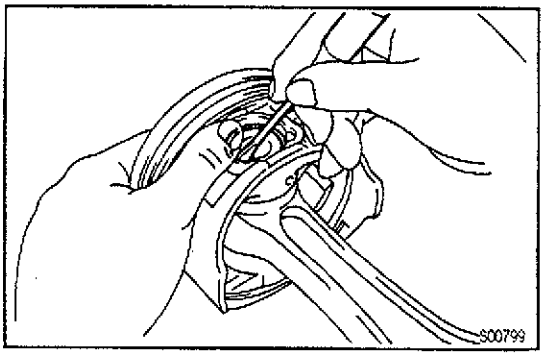


2. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the No.1 and No.2 piston rings.

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

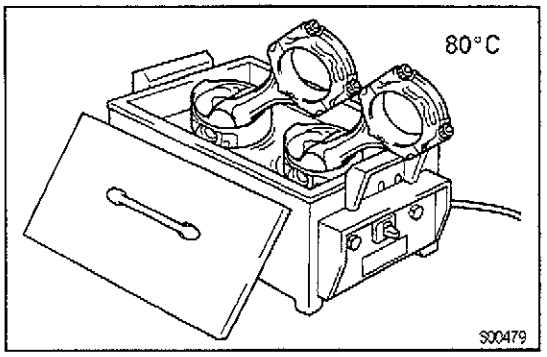
HINT: Arrange the piston rings in correct order only.



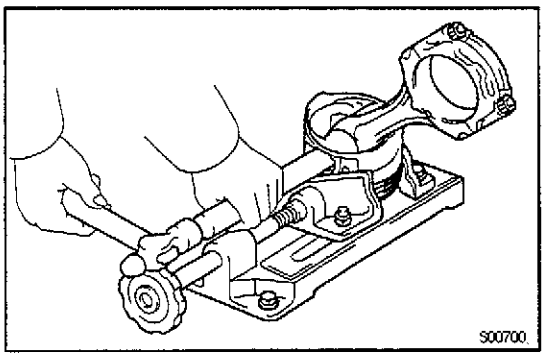
3. DISCONNECT CONNECTING ROD FROM PISTON

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

EG



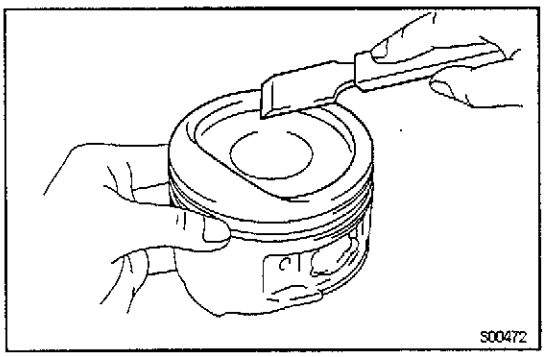
(b) Gradually heat the piston to approx. 80°C (176°F).



(c) Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.
HINT:
- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

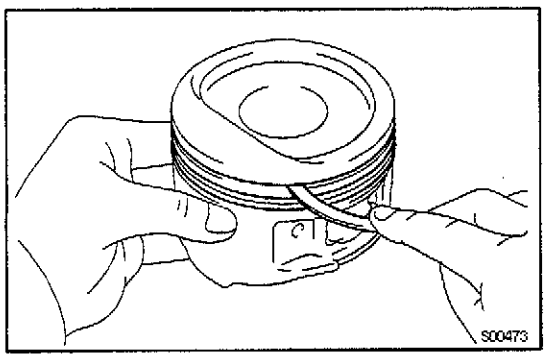
EG42K–02

PISTON AND CONNECTING ROD INSPECTION

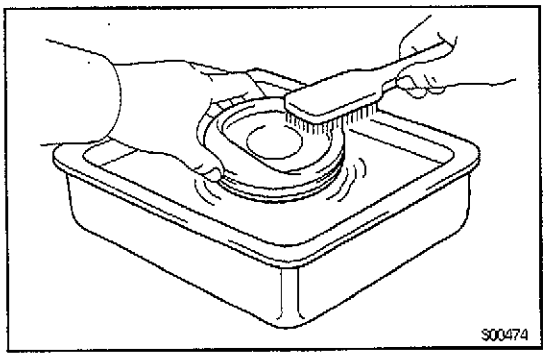


1. CLEAN PISTON

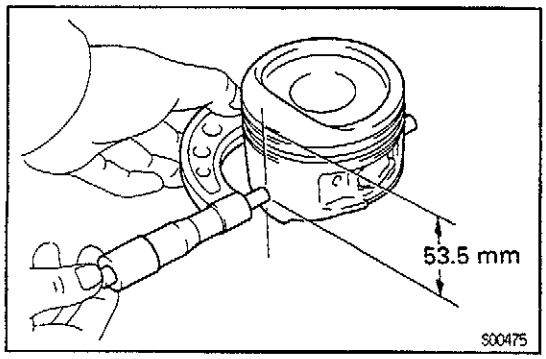
(a) Using a gasket scraper, remove the carbon from the piston top.



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



(c) Using a soft brush and solvent, thoroughly clean the piston.
NOTICE: Do not use a wire brush.



2. INSPECT PISTON

A. Inspect piston oil clearance

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 53.5 mm (2.106 in.) from the piston head.

Piston diameter:

STD

85.950 — 85.960 mm (3.3839 — 3.3842 in.)

O/S 0.50

86.450 — 86.460 mm (3.4035 — 3.4039 in.)

(b) Measure the cylinder bore diameter in the thrust directions. (See step 4 in cylinder block inspection)

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

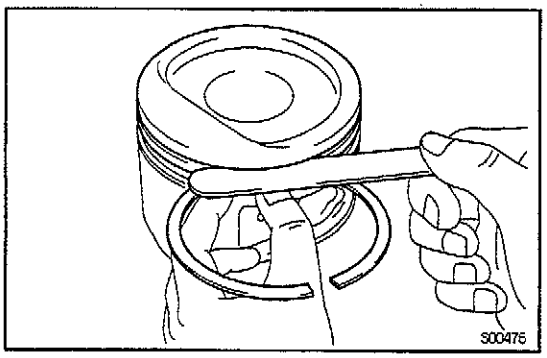
Standard oil clearance:

0.030 — 0.053 mm (0.0012 — 0.0021 in.)

Maximum oil clearance:

0.073 mm (0.0029 in.)

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



B. Inspect piston ring groove clearance

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

Ring groove clearance:

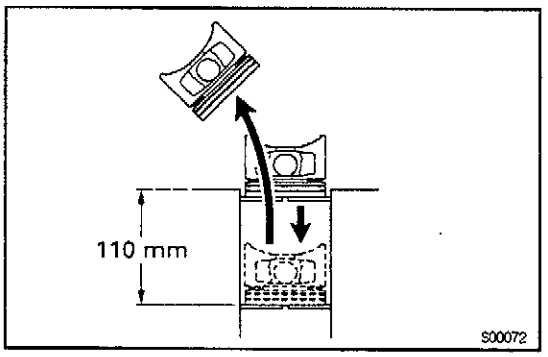
No.1

0.030 — 0.080 mm (0.0012 — 0.0031 in.)

No.2

0.040 — 0.080 mm (0.0016 — 0.0031 in.)

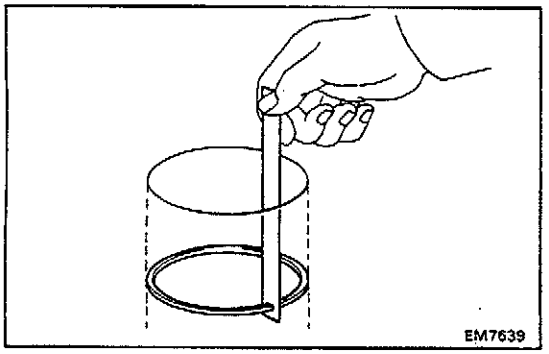
If the clearance is greater than maximum, replace the piston.



C. 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

0.220 — 0.350 mm (0.0087 — 0.0138 in.)

No.2

0.450 — 0.600 mm (0.0177 — 0.0236 in.)

Oil (Side rail)

0.130 — 0.380 mm (0.0051 — 0.0150 in.)

EG

EG

Maximum end gap:

No.1

0.95 mm (0.0374 in.)

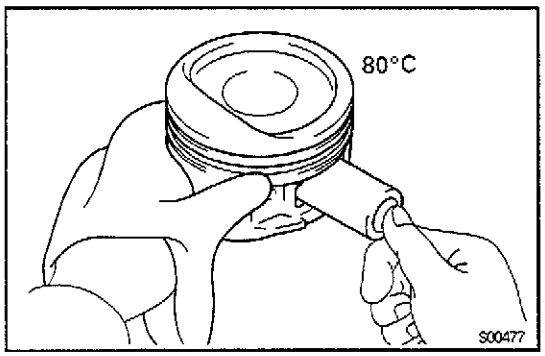
No.2

1.20 mm (0.0472 in.)

Oil (Side rail)

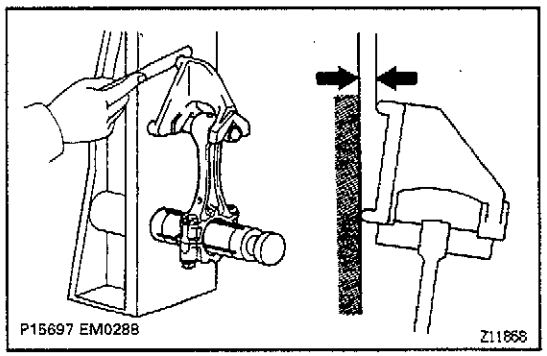
0.98 mm (0.0386 in.)

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



D. Inspect piston pin fit

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



3. INSPECT CONNECTING ROD

A. Inspect connecting rod alignment

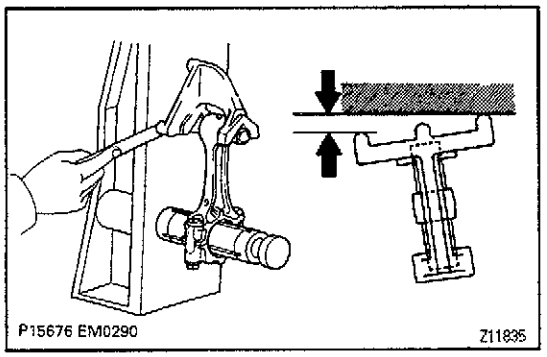
Using a rod aligner and feeler gauge, check the connecting rod alignment.

- Check for bend.

Maximum bend:

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

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

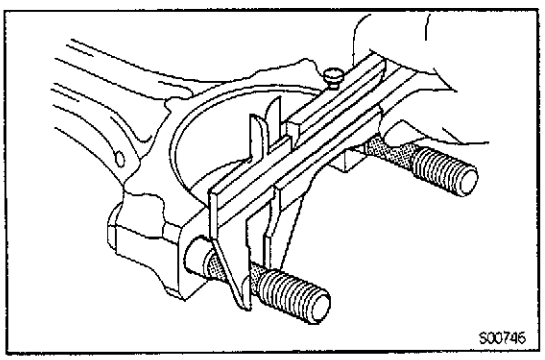


- Check for twist

Maximum twist:

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

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



B. Inspect connecting rod bolts

Using vernier calipers, measure the tension portion diameter.

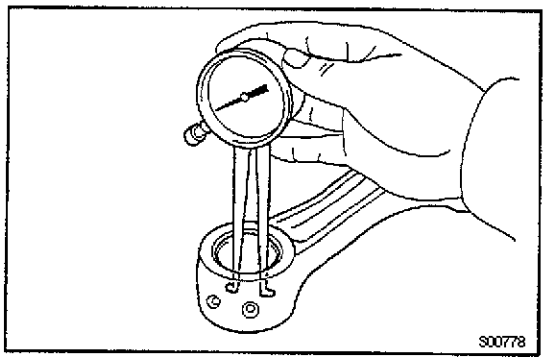
Standard diameter:

7.800 – 7.900 mm (0.3071 – 0.3110 in.)

Minimum diameter:

7.50 mm (0.2953 in.)

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

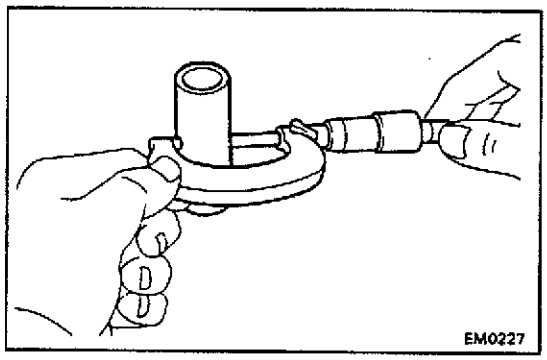


C. Inspect piston pin oil clearance

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

Bushing inside diameter:

24.008 — 24.017 mm (0.9452 — 0.9455 in.)



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

Piston pin diameter:

24.000 — 24.009 mm (0.9449 — 0.9452 in.)

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

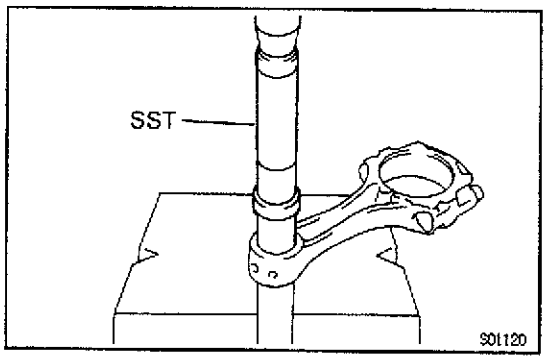
Standard oil clearance:

0.005 — 0.011 mm (0.0002 — 0.0004 in.)

Maximum oil clearance:

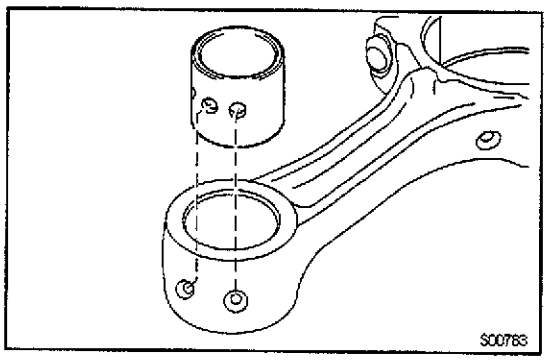
0.05 mm (0.0020 in.)

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

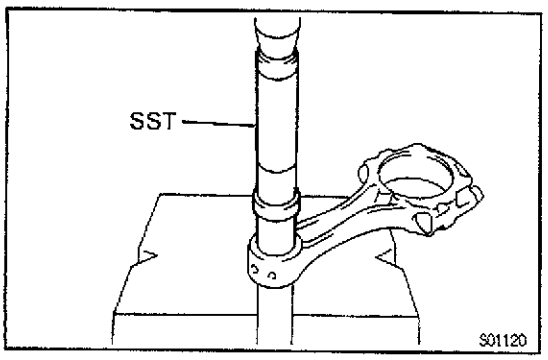


D. If necessary, replace connecting rod bushing

(a) Using SST and a press, press out the bushing.
SST 09222—40011

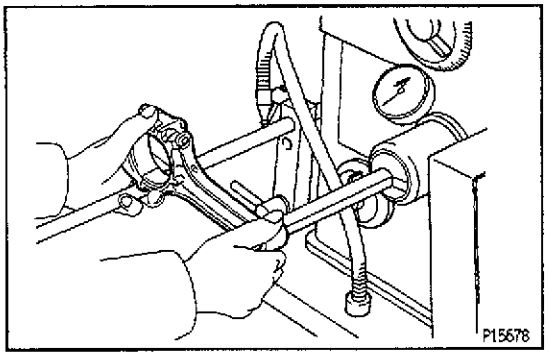


(b) Align the oil holes of a new bushing and the connecting rod.

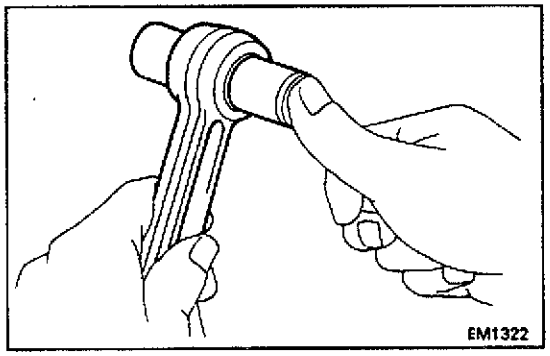


(c) Using SST and a press, press in the bushing.
SST 09222—40011

EG



(d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (see step C above) between the bushing and piston pin.

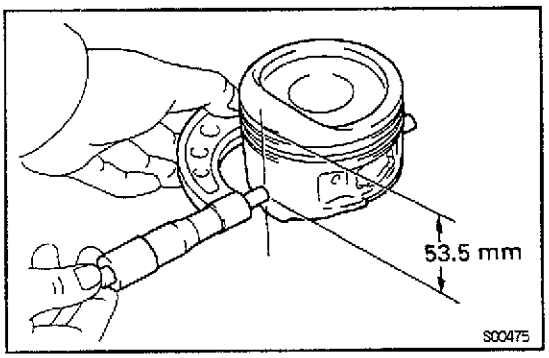


(e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

CYLINDER BORING

HINT:

- Bore all the 4 cylinders to the oversized piston outside diameter.
- Replace all the piston rings with ones to match the oversized pistons.



1. KEEP OVERSIZED PISTONS

Oversized piston diameter:

O/S 0.50

86.450 — 86.460 mm (3.4035 — 3.4039 in.)

2. CALCULATE AMOUNT TO BORE CYLINDERS

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 53.5 mm (2.106 in.) from the piston head.

(b) Calculate the amount each cylinder is to be rebored as follows:

Size to be rebored = P + C — H

P = Piston diameter

C = Piston clearance

0.030 — 0.053 mm (0.0012 — 0.0021 in.)

H = Allowance for honing

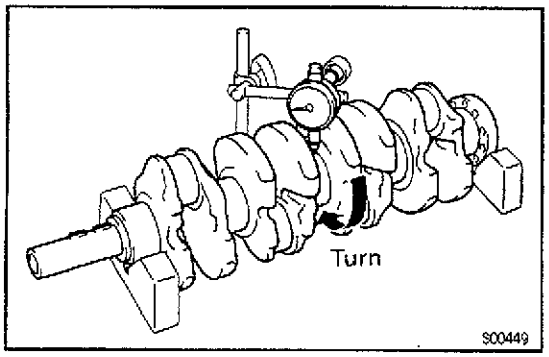
0.02 mm (0.0008 in.) or less

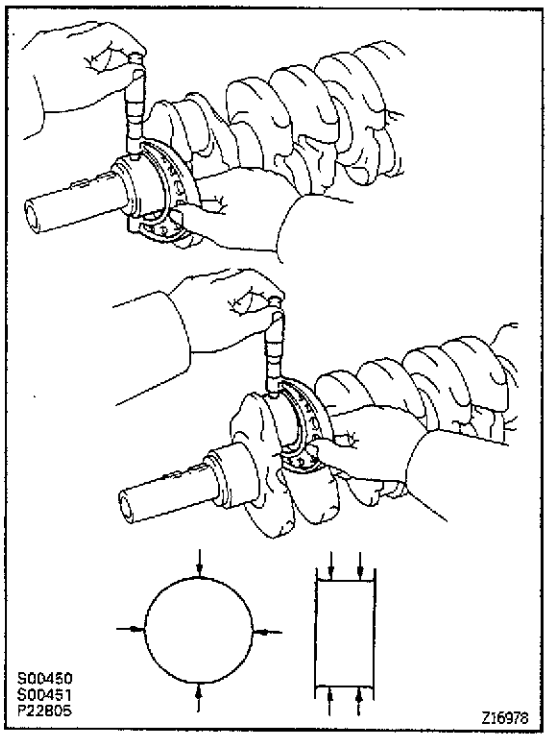
3. BORE AND HONE CYLINDER TO CALCULATED DIMENSIONS

Maximum honing:

0.02 mm (0.0008 in.)

NOTICE: Excess honing will destroy the finished roundness.





CRANKSHAFT INSPECTION AND REPAIR

EC69Y-10

1. INSPECT CRANKSHAFT FOR CIRCLE RUNOUT

(a) Place the crankshaft on V–blocks.

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

Maximum circle runout:

0.03 mm (0.0012 in.)

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

2. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

STD

No.3

59.981 – 59.994 mm (2.3615 – 2.3620 in.)

Others

59.987 – 60.000 mm (2.3617 – 2.3622 in.)

U/S 0.25

No.3

59.740 – 59.750 mm (2.3520 – 2.3524 in.)

Others

59.745 – 59.755 mm (2.3522 – 2.3526 in.)

Crank pin diameter:

STD

52.987 – 53.000 mm (2.0861 – 2.0866 in.)

U/S 0.25

52.745 – 52.755 mm (2.0766 – 2.0770 in.)

If the diameter is not as specified, check the oil clearance. (See steps 3 and 6 in cylinder block disassembly) If necessary, grind or replace the crankshaft.

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

Maximum taper and out–of–round:

0.02 mm (0.0008 in.)

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

3. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

Grind and hone the main journals and/or crank pins to the finished undersized diameter. (See procedure in step 2)

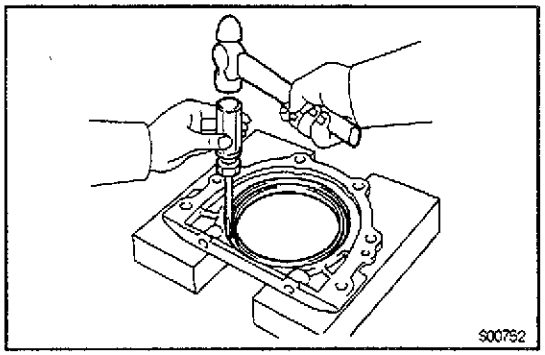
Install new main journal and/or crankshaft pin undersized bearings.

EG

EG

CRANKSHAFT FRONT OIL SEAL REPLACEMENT

(See oil pump in Lubrication System)



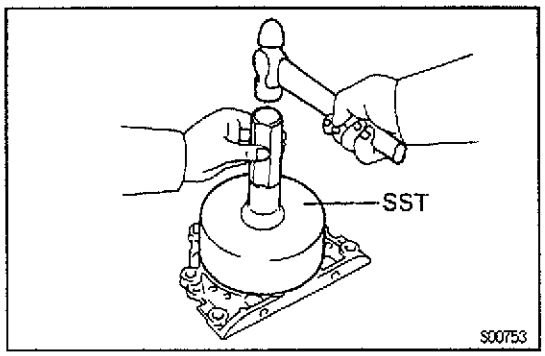
CRANKSHAFT REAR OIL SEAL REPLACEMENT

HINT: There are 2 methods (A and B) to replace the oil seal which are as follows:

REPLACE CRANKSHAFT REAR OIL SEAL

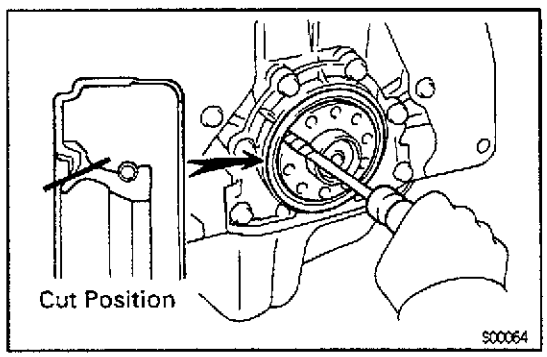
A. If rear oil seal retainer is removed from cylinder block:

(a) Using a screwdriver and hammer, tap out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223—56010

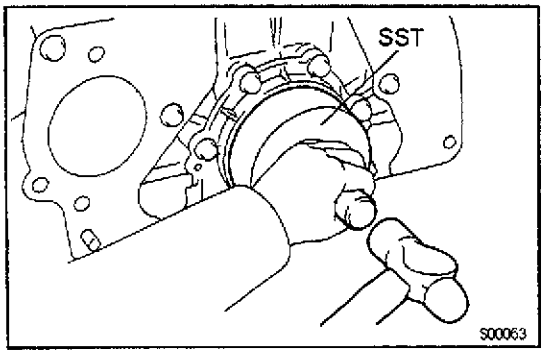
(c) Apply MP grease to the oil seal lip.



B. If rear oil seal retainer is installed to cylinder block:

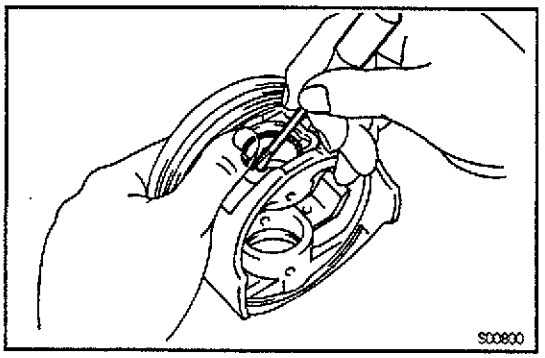
(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.
NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.



(c) Apply MP grease to a new oil seal lip.

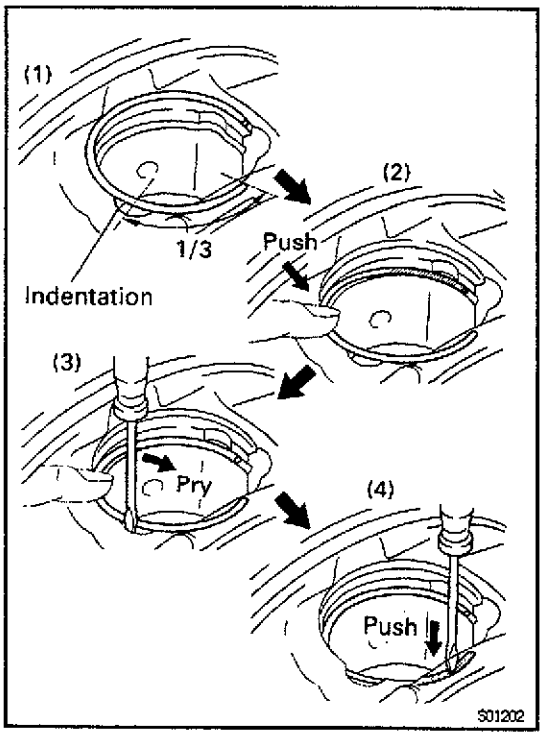
(d) Using SST and a hammer, tap in the oil seal until its surface is lush with the rear oil seal retainer edge.
SST 09223—56010



PISTON AND CONNECTING ROD ASSEMBLY

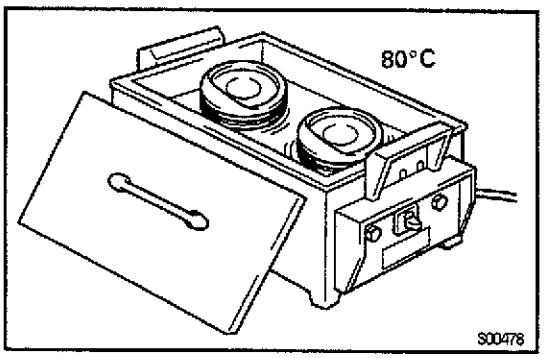
1. ASSEMBLE PISTON AND CONNECTING ROD

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

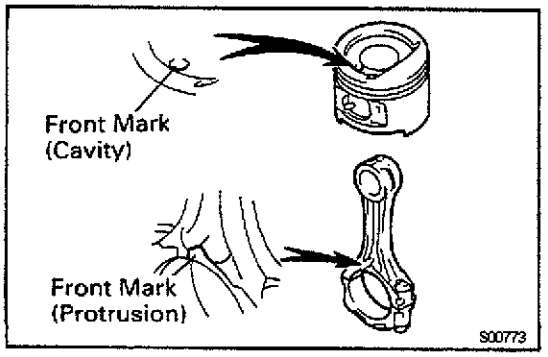


HINT:

(1) Align about 1/3 of the snap ring length with the indentation at the edge of the piston pin hole.
(2) Insert end E of the snap ring into the ring groove, and push in the snap ring with a finger.
(3) Insert the tip of a screwdriver between the indentation and snap ring, and insert the snap ring into the piston pin hole by prying the snap ring.
(4) Push end F of the snap ring with the screwdriver, and insert it into the ring groove.

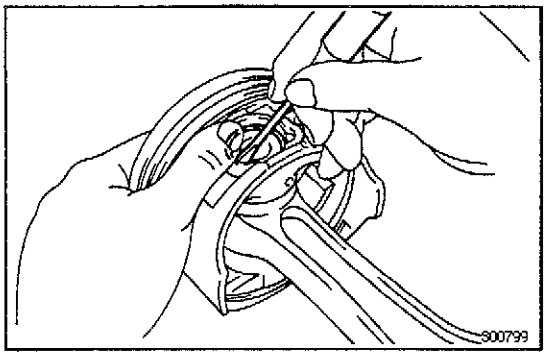


(b) Gradually heat the piston to approx. 80°C (176°F).

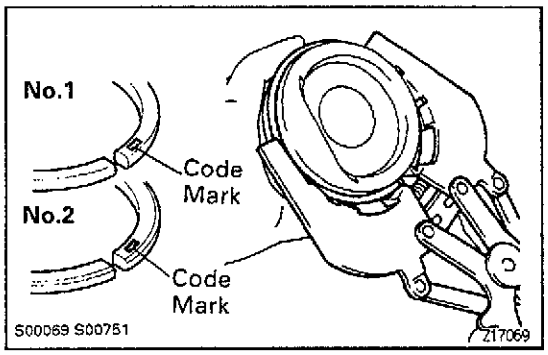


(c) Coat the piston pin with engine oil.
(d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.

EG



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



2. INSTALL PISTON RINGS

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

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

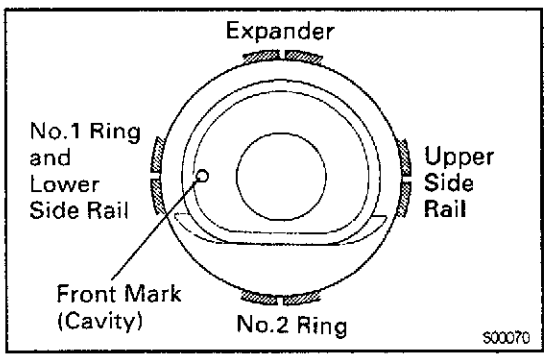
Code mark:

No.1

1N

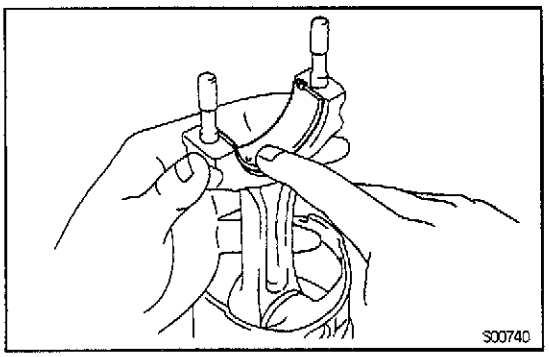
No.2

2N



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

NOTICE: Do not align the ring ends.



3. INSTALL BEARINGS

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

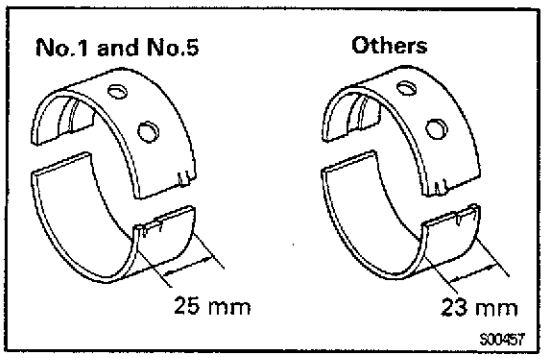
(b) Install the bearings in the connecting rod and connecting rod cap.

CYLINDER BLOCK ASSEMBLY

EG6QT–01

HINT:

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

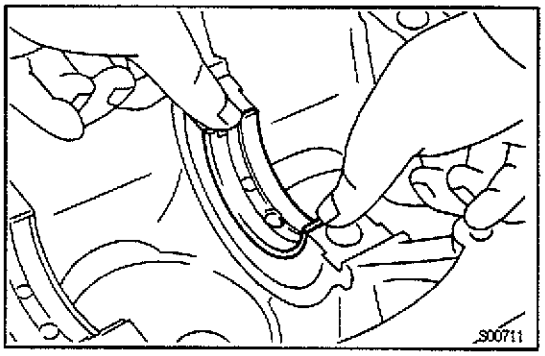


1. INSTALL MAIN BEARINGS

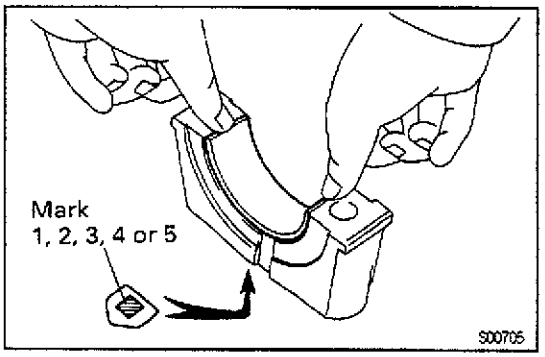
HINT:

- Main bearings come in widths of 23 mm (0.91 in.) and 25 mm (0.98 in.). Install the 25 mm (0.98 in.) bearings in the No.1 and No.5 cylinder block journal position with the main bearing cap. Install the 23 mm (0.91 in.) bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.

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



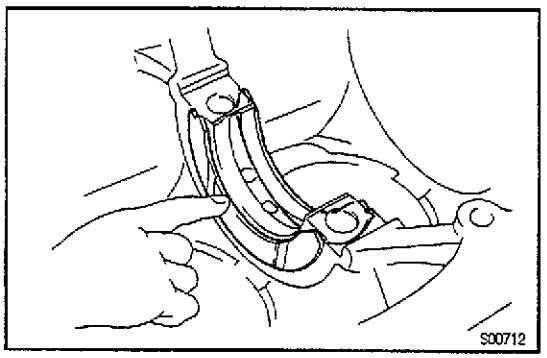
(b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 5 lower bearings.
HINT: A number is marked on each main bearing cap to indicate the installation position.



2. INSTALL UPPER THRUST WASHERS

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

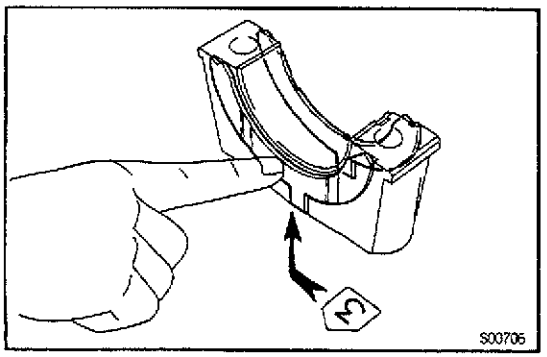
3. PLACE CRANKSHAFT ON CYLINDER BLOCK



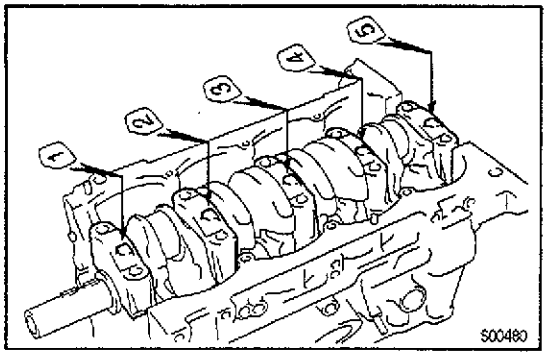
4. INSTALL MAIN BEARING CAPS AND LOWER THRUST WASHERS

A. Place main bearing caps and lower thrust washers on cylinder block

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



EG

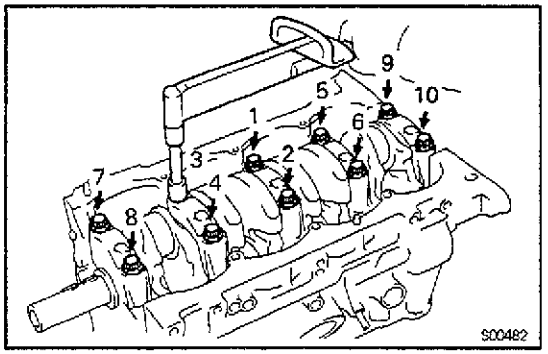


(b) Install the 5 main bearing caps in their proper locations.
HINT: Each bearing cap has a number and front mark.

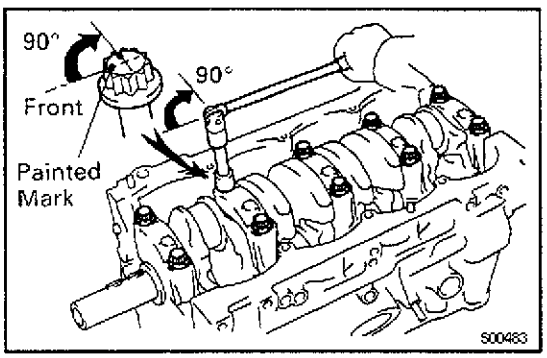
B. Install main bearing cap bolts

HINT:

- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any one of the main bearing cap bolts is broken or deformed, replace it.

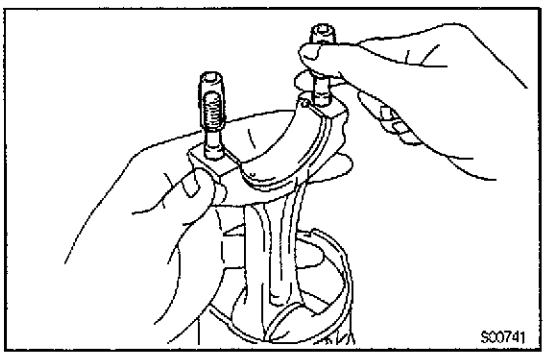


(a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.
(b) Install and uniformly tighten the 14 main bearing cap bolts in several passes, in the sequence shown.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



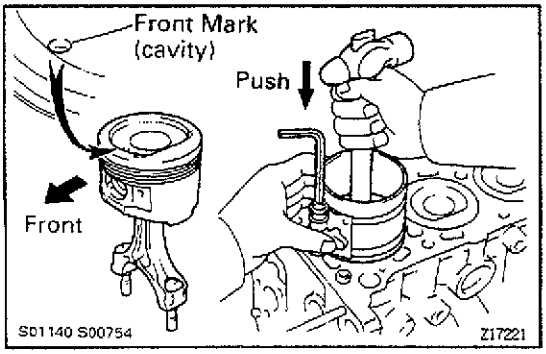
(c) Mark the front of the main bearing cap bolt with paint.
(d) Retighten the main bearing cap bolts 90° in the numerical order shown above.
(e) Check that the painted mark is now at a 90° angle to the front.
(f) Check that the crankshaft turns smoothly.

5. CHECK CRANKSHAFT THRUST CLEARANCE
(See step 5 in cylinder block disassembly)

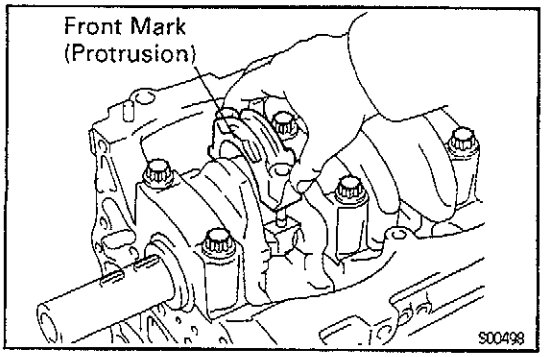


6. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

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



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



7. INSTALL CONNECTING ROD CAPS

A. Place connecting rod cap on connecting rod

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

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

B. Install connecting rod cap nuts

HINT:

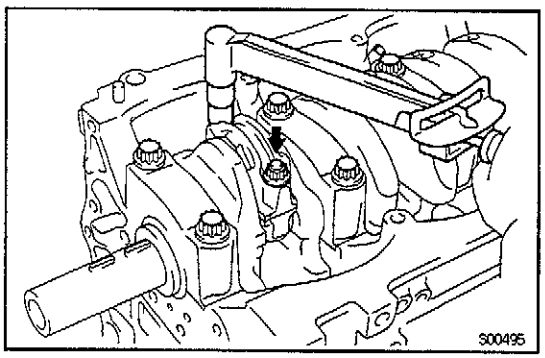
- The connecting rod cap nuts are tightened in 2 progressive steps (steps (b) and (d)).
- If any connecting rod bolt is broken or deformed, replace it.

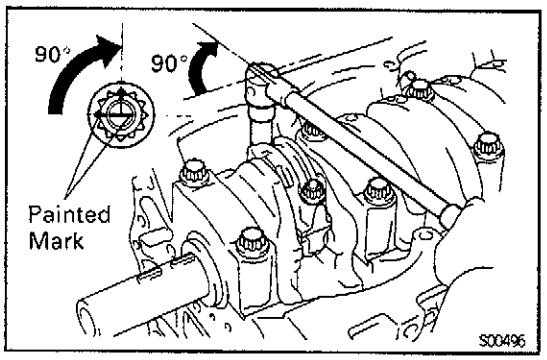
(a) Apply a light of engine oil on the threads and under the heads of the connecting rod cap nuts.

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

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

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





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

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

(e) Check that the painted mark on the nut is now at a 90° angle in relation to the mark on the left.

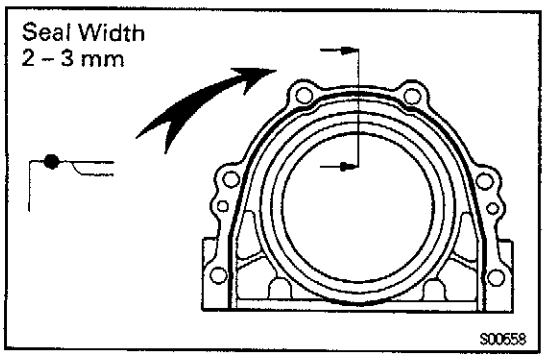
(f) Check that the crankshaft turns smoothly.

8. CHECK CONNECTING ROD THRUST CLEARANCE
(See step 2 in cylinder block disassembly)

9. INSTALL REAR OIL SEAL RETAINER

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil seal retainer and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non—residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the oil seal retainer as shown in the illustration.

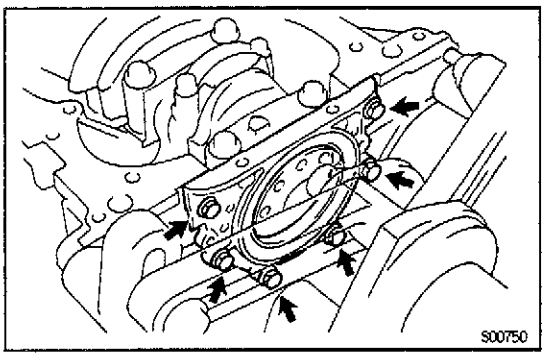
Seal packing:

Part No. 08826—00080 or equivalent

- Install a nozzle that has been cut to a 2 — 3 mm (0.08 — 0.12 in.) opening.

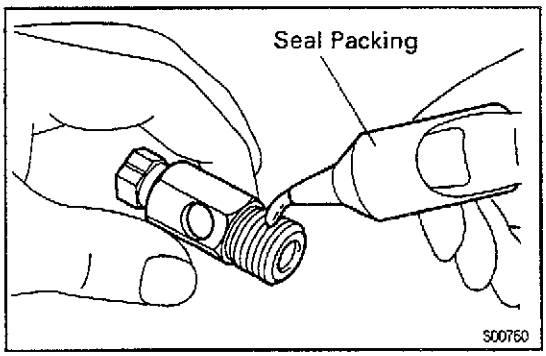
HINT: Avoid applying an excessive amount to the surface.

EG



- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall

(c) Install the oil seal retainer with the 6 bolts.
Torque: 13 N·m (135 kgf·cm, 10 ft·lbf)



E0000-01

AFTER ASSEMBLY

1. INSTALL ENGINE COOLANT DRAIN UNION

(a) Apply seal packing to 2 or 3 threads.
Seal packing:
Part No. 08826—00100 or equivalent

(b) Install the drain union.
Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

2. INSTALL OIL PRESSURE SWITCH
(See step 6 in oil pressure check in Lubrication System)

3. INSTALL OIL FILTER AND BRACKET ASSEMBLY

(a) Clean the oil cooler bracket contact surface on the cylinder block.

(b) Install a new O—ring to the oil filter bracket.

(c) Install a new O—ring to the union bolt.

(d) Apply a light coat of engine oil on the O—ring on the union bolt.

(e) Install the oil filter and bracket assembly with a new gasket, the union bolt and nut.
Torque:
Union bolt
68.5 N·m (700 kgf·cm, 51 ft·lbf)
Nut
12 N·m (120 kgf·cm, 9 ft·lbf)

4. INSTALL RH ENGINE MOUNTING BRACKET
Install the mounting bracket with the 4 bolts.
Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

5. INSTALL LH ENGINE MOUNTING BRACKET

(a) Install the mounting bracket with the 4 bolts.
Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

(b) Install the oil dipstick guide to the mounting bracket with the bolt.

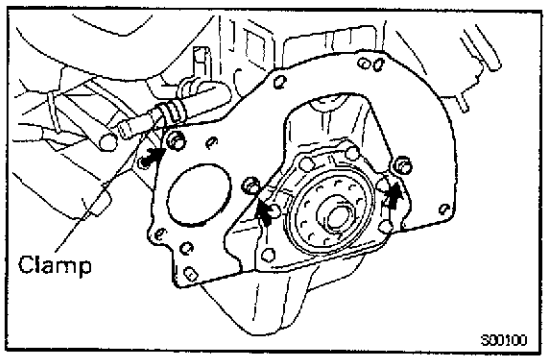
6. INSTALL OIL DIPSTICK

7. INSTALL FUEL FILTER
Install the fuel filter with the 2 bolts.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

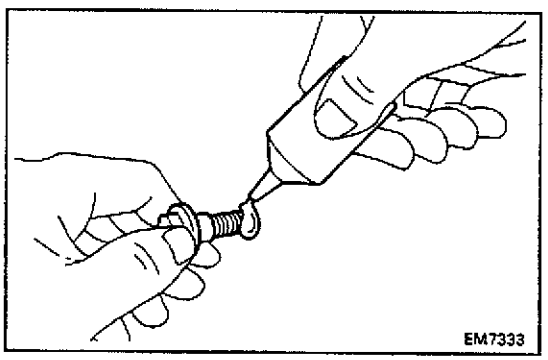
8. INSTALL ALTERNATOR BRACKET
Install the alternator bracket with the 2 bolts.

Torque: 74.5 N·m (760 kgf·cm, 55 ft·lbf)

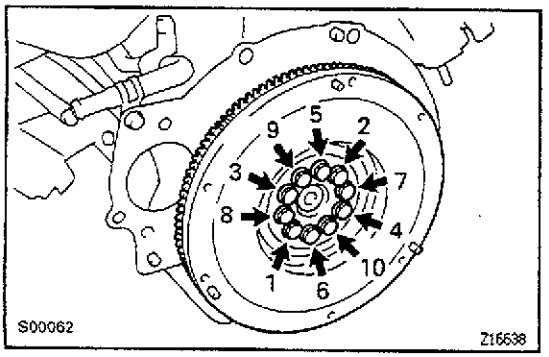
9. **INSTALL ALTERNATOR**
   Temporarily install the alternator with the pivot bolt, plate washer and nut.
10. **INSTALL WATER BYPASS PIPE**
    Install the water bypass pipe with the bolt.
11. **INSTALL TIMING CHAIN**
    (See steps 1 to 11 in timing chain installation)
12. **INSTALL OIL STRAINER AND OIL PAN**
    (See steps 4 and 5 in oil pump installation in Lubrication System)
13. **INSTALL CYLINDER HEAD ASSEMBLY**
    (See cylinder head assembly installation)
14. **DISCONNECT ENGINE FROM ENGINE STAND**



15. **INSTALL REAR END PLATE**
    Install the rear end plate with the pipe clamp and 3 bolts.
    Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



16. **INSTALL FLYWHEEL**
(a) Apply adhesive to 2 or 3 threads of the bolt end.
    Adhesive:
    Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Install the flywheel on the crankshaft.
(c) Install and uniformly tighten the 10 bolts in several passes, in the sequence shown.
    Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)