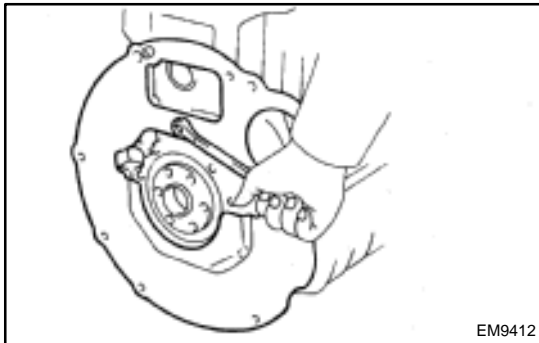
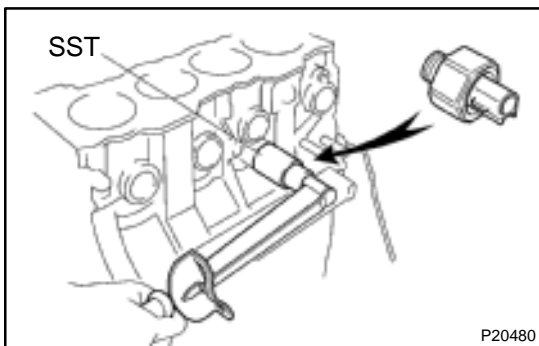


DISASSEMBLY

1. **M/T:**
REMOVE CLUTCH COVER AND DISC
2. **REMOVE FLYWHEEL (M/T) OR DRIVE PLATE (A/T)**

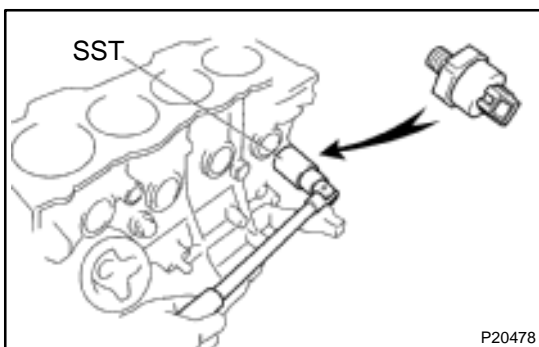


3. **REMOVE REAR END PLATE**
4. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
5. **REMOVE TIMING BELT AND PULLEYS**
6. **REMOVE CYLINDER HEAD**
7. **REMOVE OIL DIPSTICK GUIDE AND GENERATOR ADJUSTING BAR**
8. **REMOVE WATER PUMP WITH WATER INLET PIPE**
9. **REMOVE GENERATOR BRACKET**

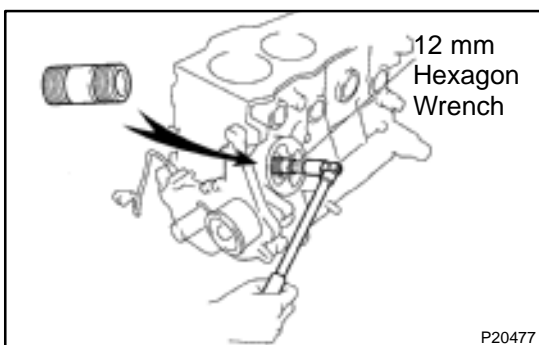


10. **REMOVE KNOCK SENSOR**
Using SST, remove the knock sensor.
SST 09816-30010

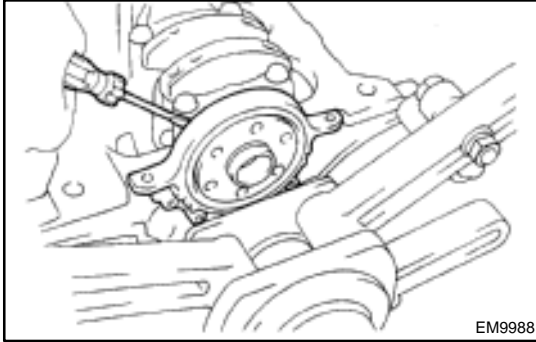
11. **REMOVE RH ENGINE MOUNTING BRACKET**
12. **REMOVE OIL FILTER**



13. **REMOVE OIL PRESSURE SWITCH**
Using SST, remove the oil pressure switch.
SST 09816-30010
14. **REMOVE OIL PUMP AND PRESSURE REGULATOR VALVE**

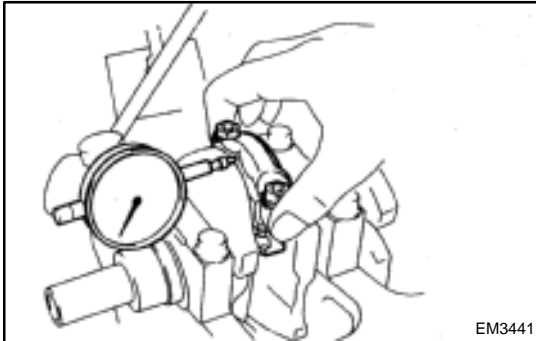


15. **REMOVE OIL FILTER UNION**
Using a 12 mm hexagon wrench, remove the oil filter union.



16. REMOVE REAR OIL SEAL RETAINER

- (a) Remove the 4 bolts.
- (b) Using a screwdriver, remove the oil seal retainer by prying the portions between the oil seal retainer and main bearing cap.



17. CHECK CONNECTING ROD THRUST CLEARANCE

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

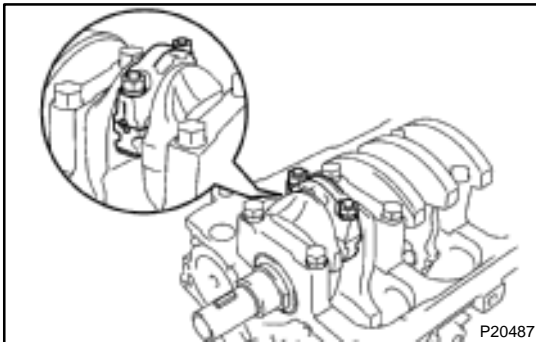
Standard thrust clearance:

0.15 – 0.35 mm (0.0059 – 0.0138 in.)

Maximum thrust clearance:

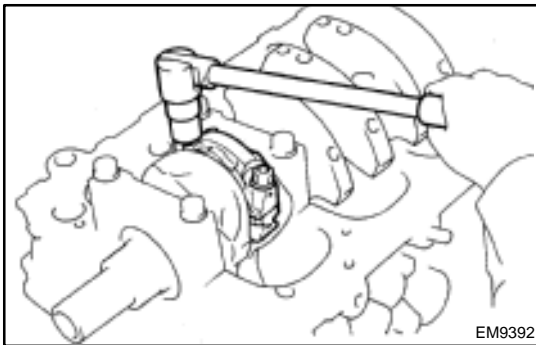
0.45 mm (0.0177 in.)

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

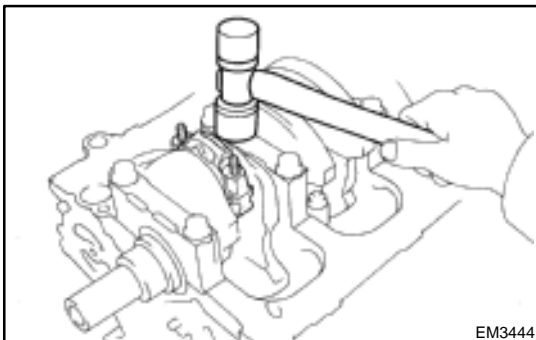


18. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

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



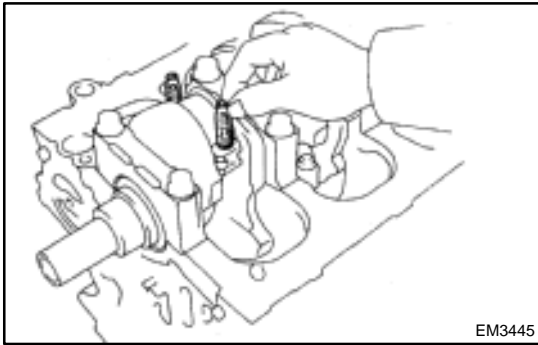
- (b) Remove the 2 connecting rod cap nuts.



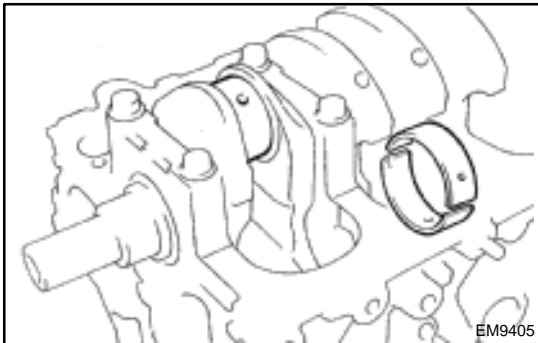
- (c) Using a soft-faced hammer, lightly tap the connecting rod bolt and lift the cap and lower bearing.

HINT:

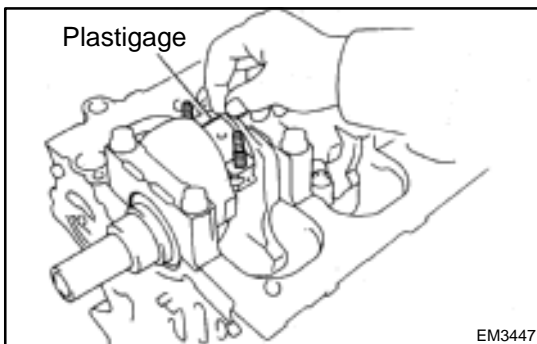
Keep the lower bearing inserted with the connecting rod cap.



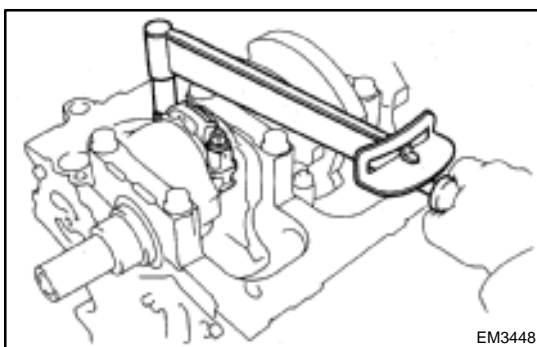
- (d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



- (e) Clean the crank pin and bearing.
 (f) Check the crank pin bearing is 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.

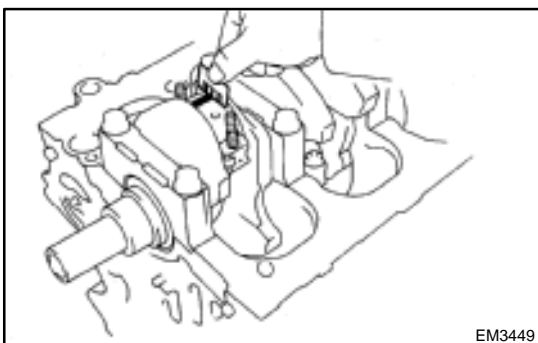


- (h) Install the connecting rod cap.
 (See procedure (b) and (c) above)
Torque: 40 N·m (400 kgf-cm, 29 ft-lbf)

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.

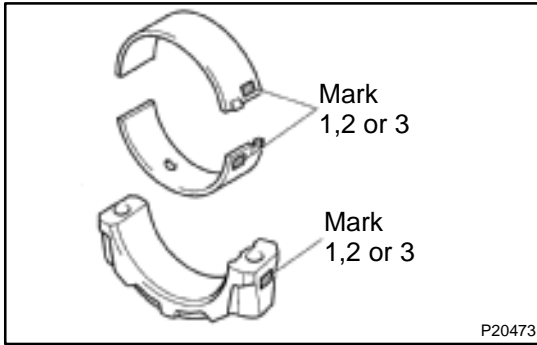
Standard oil clearance:

STD	0.016 – 0.048 mm (0.0006 – 0.0019 in.)
U/S 0.25	0.015 – 0.058 mm (0.0006 – 0.0023 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.



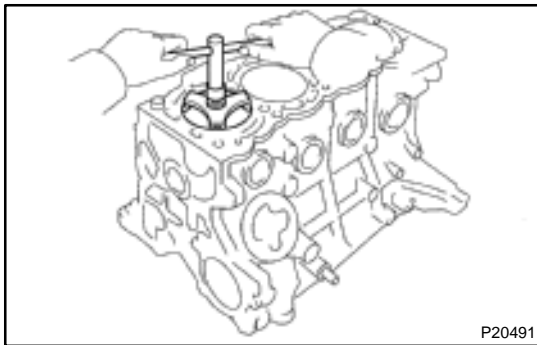
HINT:

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

Reference:

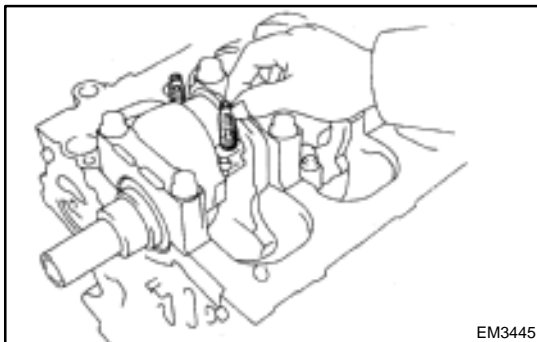
Connecting rod big end inside diameter Standard sized U/S 0.25	Mark 1	46.000 – 46.007 mm (1.8110 – 1.8113 in.)
	Mark 2	46.007 – 46.014 mm (1.8113 – 1.8116 in.)
	Mark 3	46.014 – 46.021 mm (1.8116 – 1.8118 in.)
	–	46.000 – 46.021 mm (1.8110 – 1.8118 in.)
Crankshaft crank pin diameter Standard sized U/S 0.25	–	42.985 – 43.000 mm (1.6923 – 1.6929 in.)
	–	42.745 – 42.755 mm (1.6829 – 1.6833 in.)
Bearing center wall thickness Standard sized U/S 0.25	Mark 1	1.487 – 1.491 mm (0.0585 – 0.0587 in.)
	Mark 2	1.491 – 1.495 mm (0.0587 – 0.0589 in.)
	Mark 3	1.495 – 1.499 mm (0.0589 – 0.0590 in.)
	–	1.609 – 1.615 mm (0.0633 – 0.0636 in.)

(k) Completely remove the Plastigage.



19. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

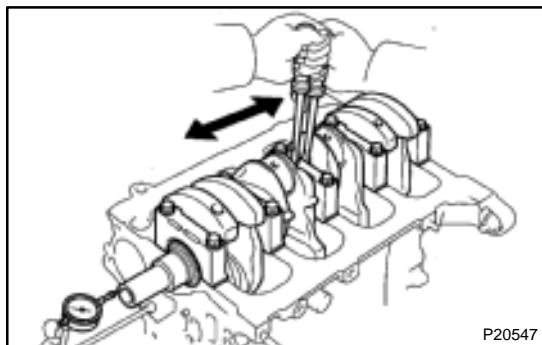
(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.



(b) Cover the rod bolts with a short piece of hose to protect the crankshaft from damage.
(c) Push out the piston and connecting rod assembly and the 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 correct order.



20. 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:

0.02 – 0.20 mm (0.0008 – 0.0079 in.)

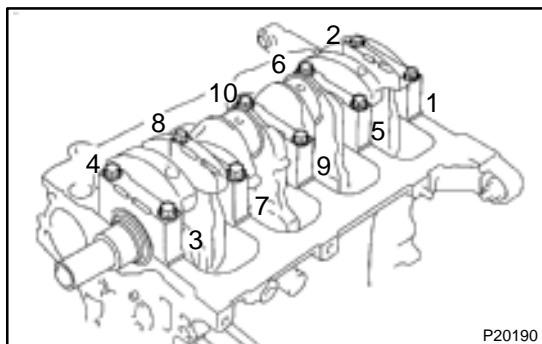
Maximum thrust clearance:

0.3 mm (0.012 in.)

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

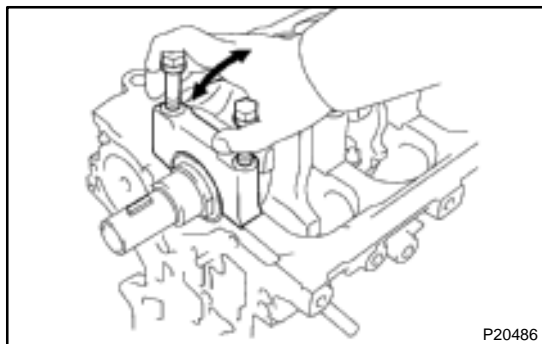
Thrust washer thickness:

STD	2.430 – 2.480 mm (0.0957 – 0.0976 in.)
O/S 0.125	2.493 – 2.543 mm (0.0981 – 0.1001 in.)



21. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

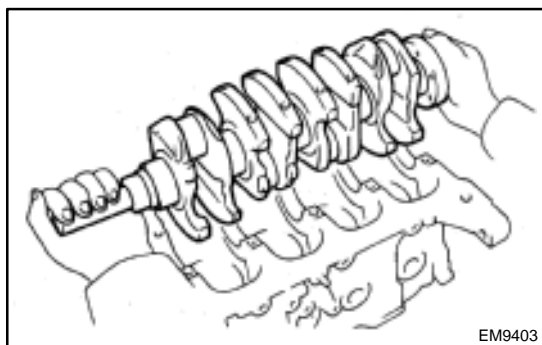
- (a) Uniformly loosen and remove the 10 main bearing cap bolts, in several passes, in the sequence shown.



- (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:

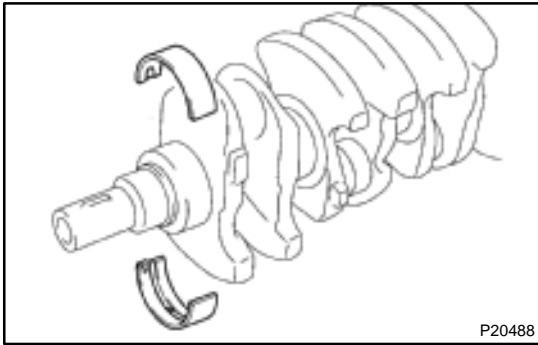
- Keep the lower bearing inserted together with cap.
- Arrange the main bearing caps and lower thrust washers in correct order.



- (c) Lift out the crankshaft.

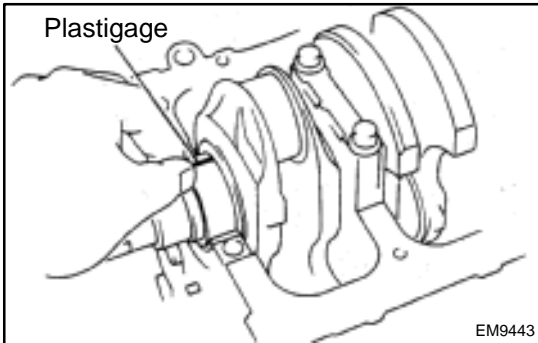
HINT:

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

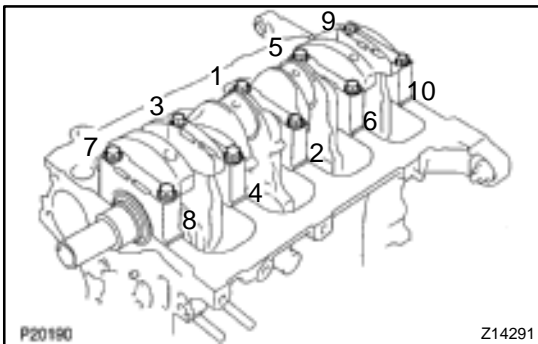


- (d) Clean each main journal and bearing.
- (e) Check each main journal and bearing for pitting and scratches.

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



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

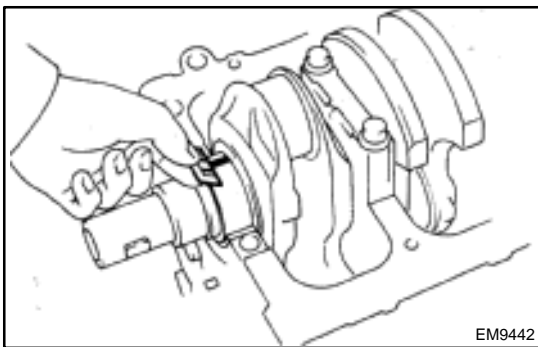


- (h) Install the main bearing caps.
(See step 7 on page [EM-83](#))
Torque: 58 N·m (580 kgf-cm, 42 ft-lbf)

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 oil clearance:

STD	0.016 – 0.035 mm (0.0006 – 0.0014 in.)
U/S 0.25	0.015 – 0.055 mm (0.0006 – 0.0022 in.)

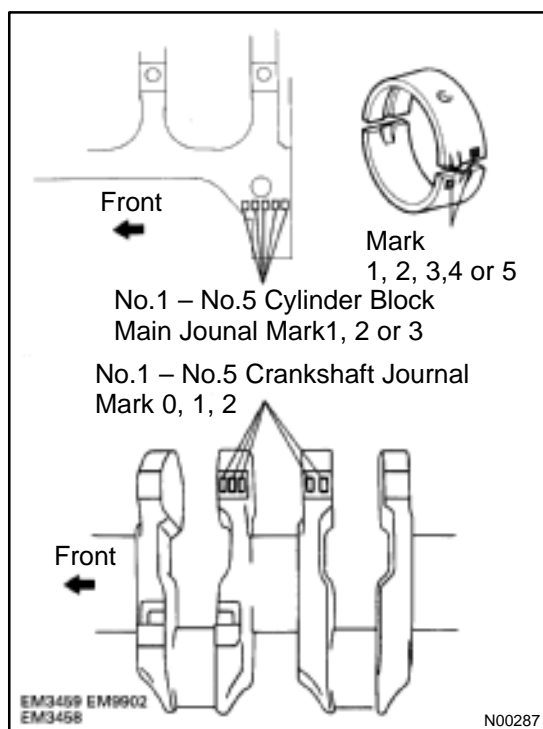
Maximum oil clearance:

0.08 mm (0.0031 in.)

HINT:

- If replacing the cylinder block subassembly, the bearing standard clearance will be: 0.018–0.045 mm (0.0007–0.0018 in.)

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



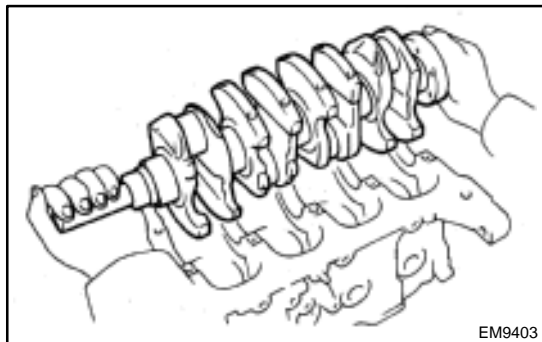
- If using a standard bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.

	Number marked								
Cylinder block	1			2			3		
Crankshaft	0	1	2	0	1	2	0	1	2
Use bearing	1	2	3	2	3	4	3	4	5

EXAMPLE: Cylinder block "2" + Crankshaft "1"
= Total number 3 (Use bearing "3")

Reference:

Cylinder block main journal bore diameter Standard sized U/S 0.25	Mark 1	54.018 – 54.024 mm (2.1267 – 2.1269 in.)
	Mark 2	54.025 – 54.030 mm (2.1270 – 2.1272 in.)
	Mark 3	54.031 – 54.036 mm (2.1272 – 2.1274 in.)
	–	54.018 – 54.036 mm (2.1267 – 2.1274 in.)
Crankshaft journal diameter Standard sized U/S 0.25	Mark 0	49.996 – 50.000 mm (1.9683 – 1.9685 in.)
	Mark 1	49.991 – 49.995 mm (1.9681 – 1.9683 in.)
	Mark 2	49.985 – 49.990 mm (1.9679 – 1.9681 in.)
	–	49.745 – 49.755 mm (1.9585 – 1.9589 in.)
Bearing center wall thickness Standard sized U/S 0.25	Mark 1	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
	Mark 2	2.001 – 2.003 mm (0.0788 – 0.0789 in.)
	Mark 3	2.004 – 2.006 mm (0.0789 – 0.0790 in.)
	Mark 4	2.007 – 2.009 mm (0.0790 – 0.0791 in.)
	Mark 5	2.010 – 2.012 mm (0.0791 – 0.0792 in.)
	–	2.118 – 2.124 mm (0.0834 – 0.0836 in.)



- (k) Completely remove the Plastigage.

22. REMOVE CRANKSHAFT

- Lift out the crankshaft.
- Remove the upper main bearings and upper thrust washers from the cylinder block.

HINT:

Arrange the main bearings and thrust washers in correct order.

**23. CHECK FIT BETWEEN PISTON AND 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.

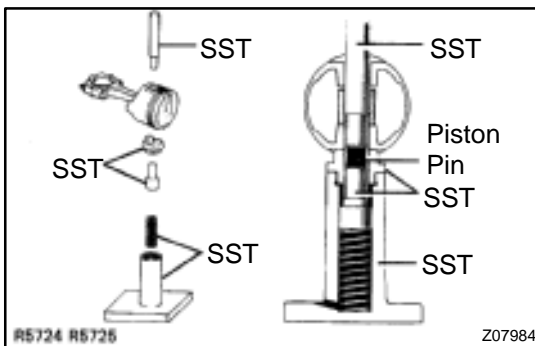
**24. REMOVE PISTON RINGS**

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

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

HINT:

Arrange the rings in the correct order only.

**25. DISCONNECT CONNECTING ROD FROM PISTON**

Using SST, press out the piston pin from the piston.

Remove the connecting rod.

SST 09221-25024 (09221-00020, 09221-00030,
09221-00130, 09221-00140, 09221-00150)

HINT:

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