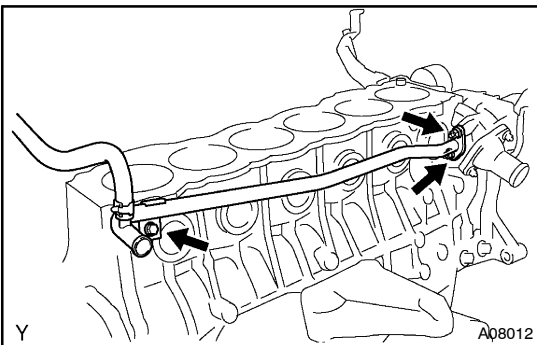


DISASSEMBLY

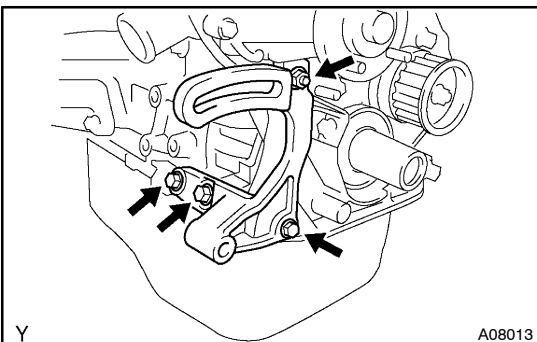
1. REMOVE DRIVE PLATE OR FLYWHEEL
2. REMOVE REAR END PLATE
3. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY
4. REMOVE TIMING BELT AND PULLEYS
(See page EM-20)
5. REMOVE CYLINDER HEAD (See page EM-36)
6. REMOVE KNOCK SENSORS (See page FI-63)
7. REMOVE OIL FILTER (See page LU-3)
8. A/T:
REMOVE OIL FILTER UNION
9. M/T:
REMOVE OIL COOLER (See page LU-17)
10. REMOVE ENGINE COOLANT DRAIN UNION
11. REMOVE OIL PRESSURE SWITCH
(See page LU-1)
12. REMOVE LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY
13. REMOVE OIL DIPSTICK GUIDE SUPPORT



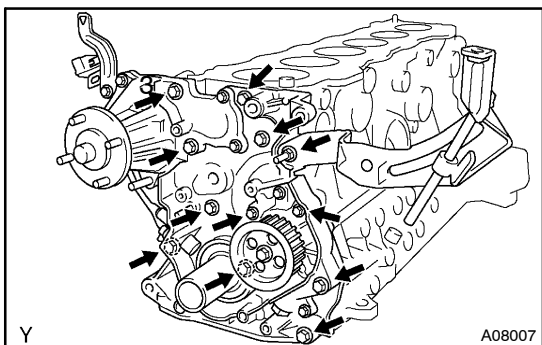
14. REMOVE NO.2 HEATER WATER OUTLET PIPE
Remove the bolt, 2 nuts, No.2 heater water outlet pipe and gasket.

15. REMOVE RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

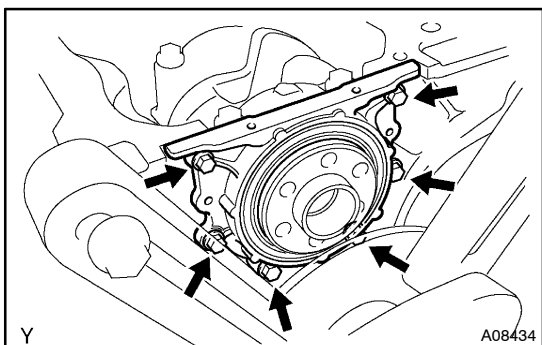
16. REMOVE OIL PAN AND OIL STRAINER
(See page LU-8)



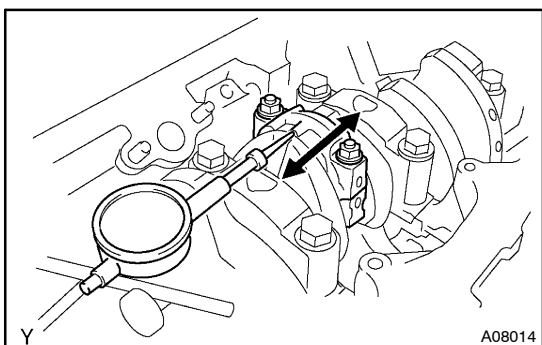
17. REMOVE PS VANE PUMP BRACKET
Remove the 3 bolts, nut and pump bracket.

**18. REMOVE TIMING BELT CASE**

Remove the 11 bolts, nut, timing belt case, alternator adjusting bar and gasket.

**19. REMOVE REAR OIL SEAL RETAINER**

Remove the 6 bolts, retainer and gasket.

**20. CHECK CONNECTING ROD THRUST CLEARANCE**

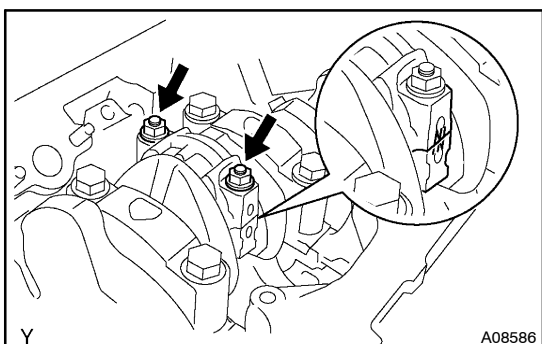
Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:

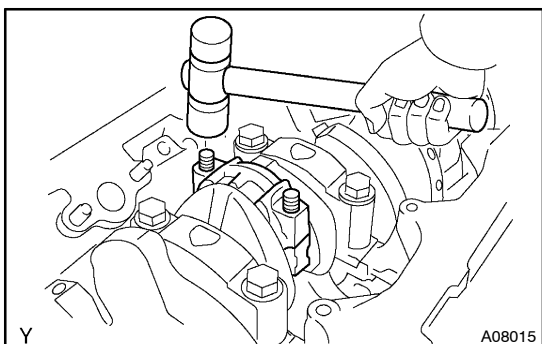
0.200 - 0.402 mm (0.0079 - 0.0158 in.)

Maximum thrust clearance: 0.45 mm (0.0188 in.)

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

**21. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE**

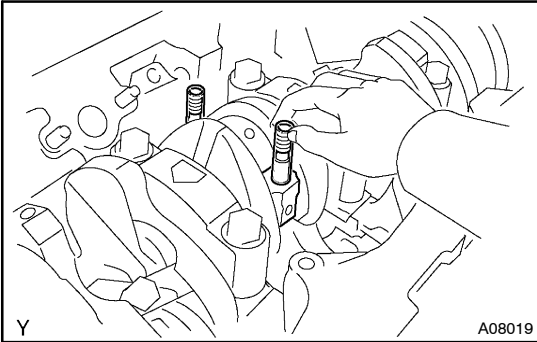
- (a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
- (b) Remove the 2 connecting rod cap nuts.



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

HINT:

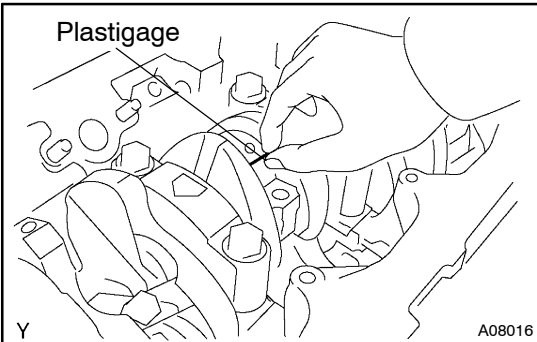
Keep the lower bearing inserted with the connecting rod cap.



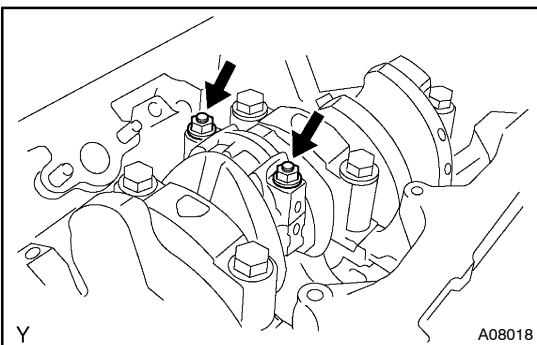
(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(e) Clean the crank pin and bearing.

(f) Check the crank pin 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.

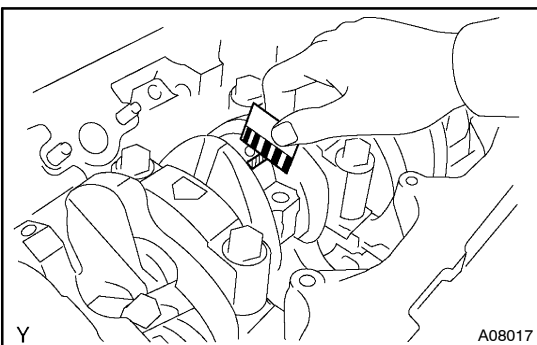


(h) Install the connecting rod cap with the 2 nuts. (See page EM-97)

NOTICE:

Do not turn the crankshaft.

(i) Remove the 2 nuts, connecting rod cap and lower bearing. (See procedure (b) and (c))



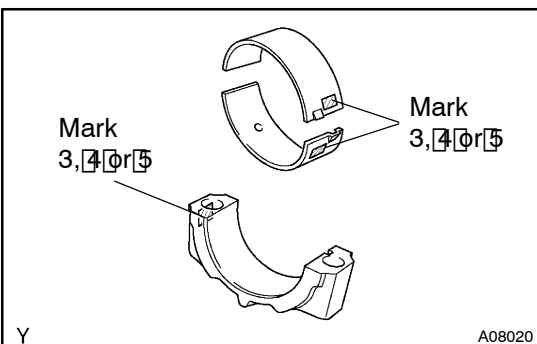
(j) Measure the Plastigage at its widest point.

Standard oil clearance:

STD size	0.016 - 0.047 mm (0.0006 - 0.0019 in.)
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Maximum oil clearance: 0.07 mm (0.0028 in.)

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



HINT:

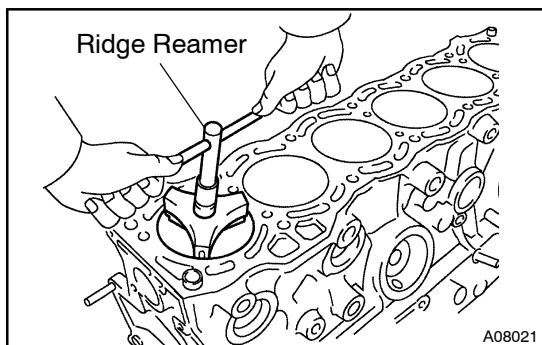
If using a standard bearing, replace it with one having the same number marked on the connecting rod cap. There are 3 sizes of standard bearings, marked "3", "4" and "5" accordingly.

Reference

Standard sized bearing center wall thickness:

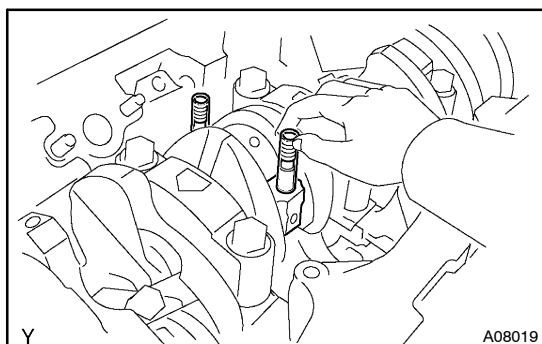
Mark "3"	1.488 - 1.492 mm (0.0586 - 0.0587 in.)
Mark "4"	1.492 - 1.496 mm (0.0587 - 0.0589 in.)
Mark "5"	1.496 - 1.500 mm (0.0589 - 0.0591 in.)

- (k) Completely remove the Plastigage.



22. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

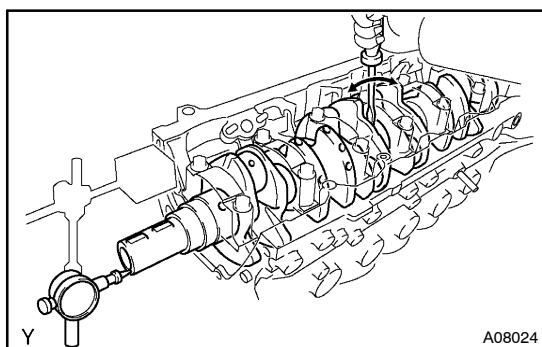
- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.



- (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.



23. 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 – 0.221 mm (0.0008 – 0.0087 in.)

Maximum thrust clearance: 0.30 mm (0.0118 in.)

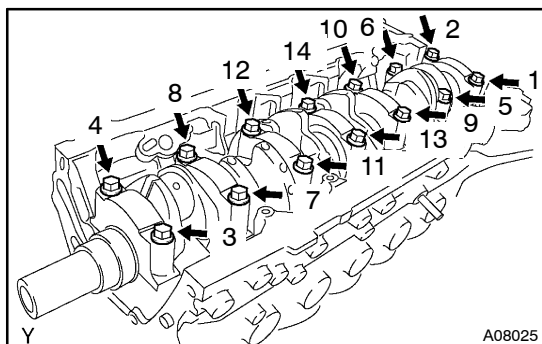
If the thrust clearance is greater than maximum, replace the thrust washer as a set.

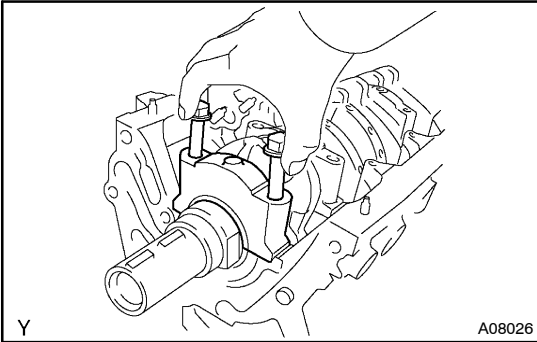
Thrust washer thickness:

1.940 – 1.990 mm (0.0764 – 0.0783 in.)

24. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

- (a) Uniformly loosen and remove the 14 main bearing cap bolts, in several passes, in the sequence shown.





- (b) Using the removed main bearing cap bolts, wiggle the cap back and forth, and remove the 7 main bearing caps, 7 lower bearings and 2 lower thrust washers (No. 4 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:

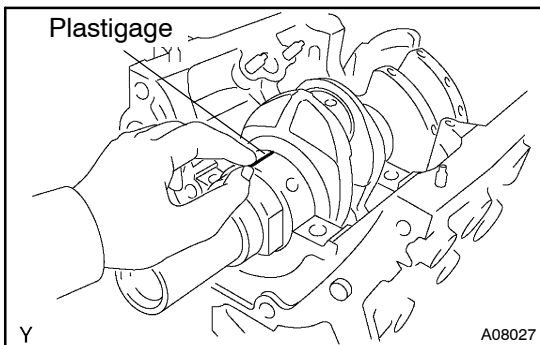
Keep the upper bearing and upper thrust washers together with the cylinder block.

- (d) Clean each main journal and bearing.

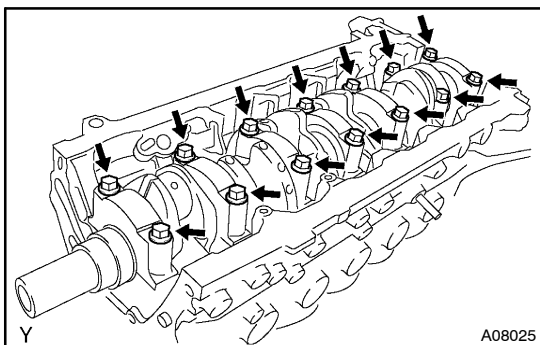
- (e) Check each main journal and bearing for pitting and scratches.

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.

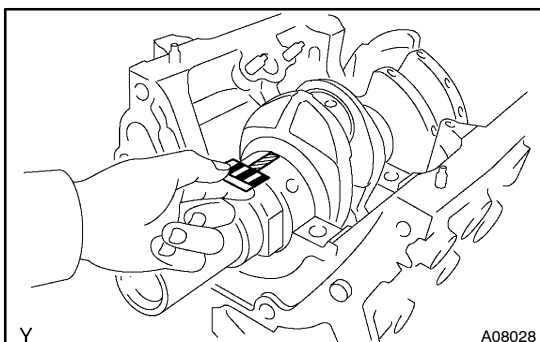


- (h) Install the main bearing caps. (See page EM-97)

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:

No.4	STD size	0.032 - 0.050 mm (0.0013 - 0.0020 in.)
Others	STD size	0.020 - 0.038 mm (0.0008 - 0.0015 in.)

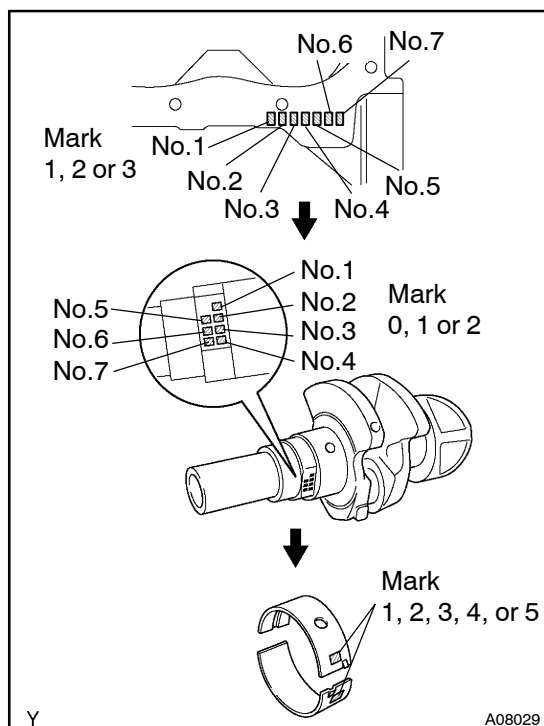
Maximum oil clearance: 0.08 mm (0.0031 in.)

HINT:

If replacing the cylinder block subassembly, the bearing standard clearance will be:

No.4	0.020 – 0.068 mm (0.0008 – 0.0024 in.)
Others	0.008 – 0.050 mm (0.0003 – 0.0020 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. 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								
	1			2			3		
Cylinder block									
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:**

Mark "1"	59.026 – 59.032 mm (2.3239 – 2.3241 in.)
Mark "2"	59.032 – 59.038 mm (2.3241 – 2.3243 in.)
Mark "3"	59.038 – 59.044 mm (2.3243 – 2.3246 in.)

Crankshaft main journal diameter:**No.4**

Mark "0"	54.982 – 54.988 mm (2.1646 – 2.1649 in.)
Mark "1"	54.976 – 54.982 mm (2.1644 – 2.1646 in.)
Mark "2"	54.970 – 54.976 mm (2.1642 – 2.1644 in.)

Others

Mark "0"	54.994 – 55.000 mm (2.1651 – 2.1654 in.)
Mark "1"	54.988 – 54.994 mm (2.1649 – 2.1651 in.)
Mark "2"	54.982 – 54.988 mm (2.1646 – 2.1649 in.)

Standard sized bearing center wall thickness:

Mark "1"	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
Mark "2"	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
Mark "3"	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
Mark "4"	2.009 – 2.012 mm (0.0791 – 0.0792 in.)
Mark "5"	2.012 – 2.015 mm (0.0792 – 0.0793 in.)

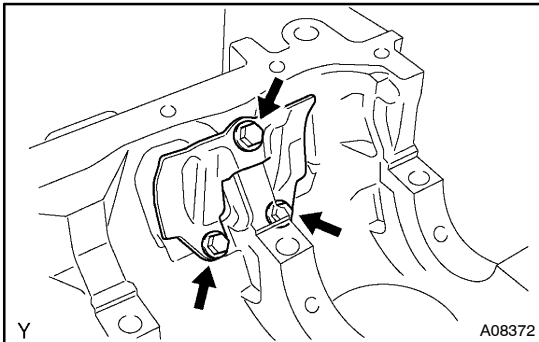
(k) Completely remove the Plastigage.

25. REMOVE CRANKSHAFT

- (a) Lift out the crankshaft.
- (b) Remove the 7 upper bearings and 2 upper thrust washers from the cylinder block.

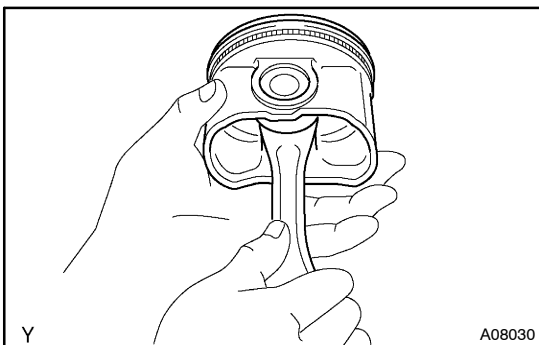
HINT:

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



26. REMOVE OIL SEPARATOR

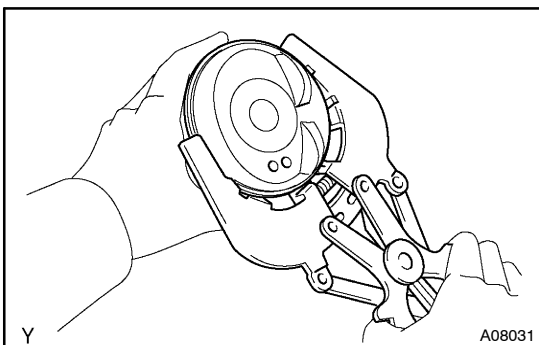
Remove the 3 bolts and oil separator.



27. 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.

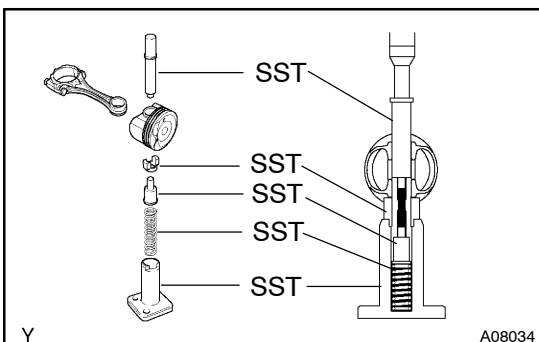


28. REMOVE PISTON RINGS

- (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.



29. DISCONNECT CONNECTING ROD FROM PISTON

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

SST 09221-25026 (09921-00021, 09221-00030, 09221-00061, 09221-00170, 09221-00210)

HINT:

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