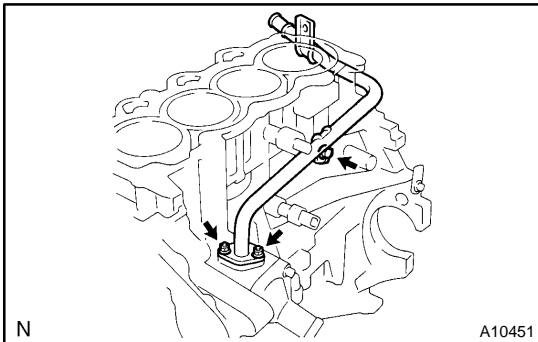


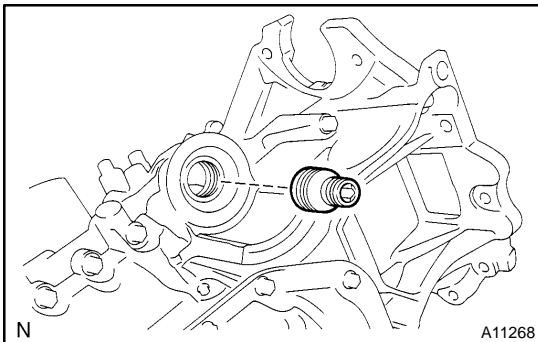
## DISASSEMBLY

1. M/T:  
REMOVE FLYWHEEL
2. A/T:  
REMOVE DRIVE PLATE
3. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY
4. REMOVE TIMING CHAIN (See page [EM-15](#))
5. REMOVE CYLINDER HEAD  
(See page [EM-28](#))
6. REMOVE ENGINE WIRE

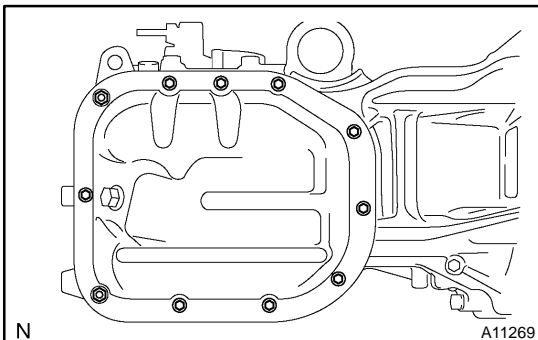


7. REMOVE WATER BYPASS PIPE  
Remove the 2 nuts, bolt and water bypass pipe.

8. REMOVE THERMOSTAT  
(See page [CO-8](#))
9. REMOVE KNOCK SENSOR (See page [SF-57](#))
10. REMOVE OIL PRESSURE SWITCH  
(See page [LU-1](#))
11. REMOVE ENGINE COOLANT DRAIN UNION
12. REMOVE OIL FILTER  
(See page [LU-2](#))



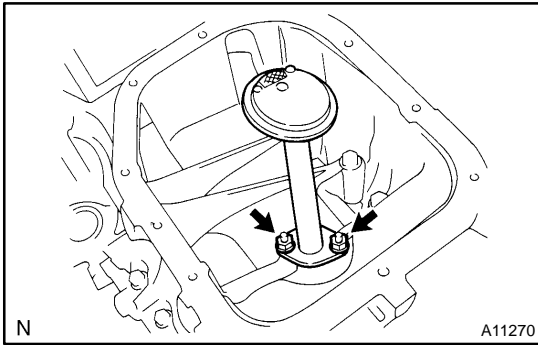
13. REMOVE OIL FILTER UNION  
Using a 12 mm hexagon wrench, remove the oil filter union.



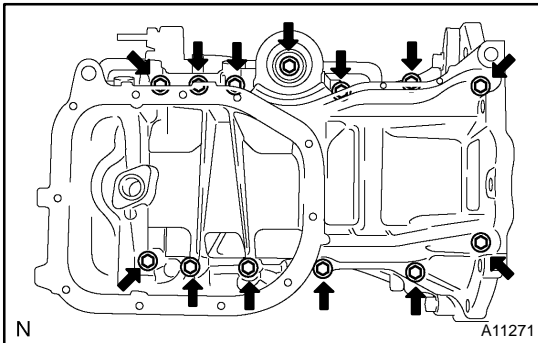
14. REMOVE OIL PAN NO. 2
  - (a) Remove the 9 bolts and 2 nuts.
  - (b) Insert the blade of SST between the oil pan No. 1 and oil pan No. 2, and cut off applied sealer and remove the oil pan.  
SST 09032-00100

### NOTICE:

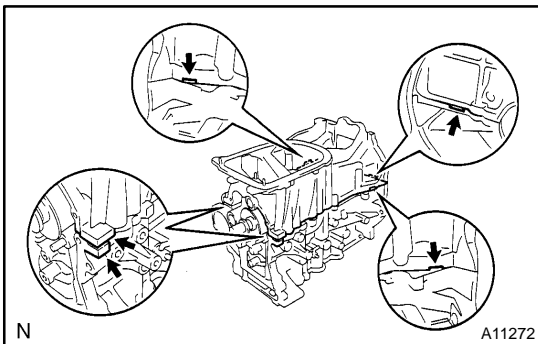
- Be careful not to damage the oil pan contact surface of the oil pan No. 1.
- Be careful not to damage the oil pan No. 2 flange.

**15. REMOVE OIL STRAINER**

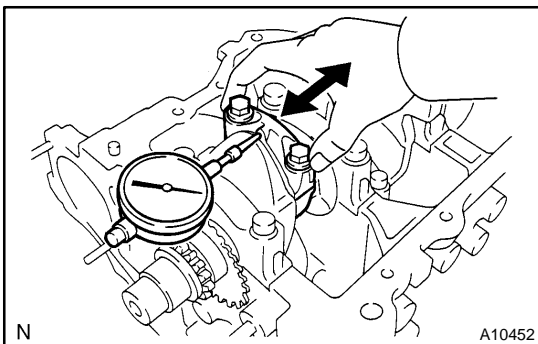
Remove the 2 nuts, oil strainer and gasket.

**16. REMOVE OIL PAN NO. 1**

(a) Uniformly loosen and remove the 13 bolts, in several passes, in the sequence shown.



(b) Using screwdriver remove the oil pan No. 1 by prying the portions between the cylinder block and oil pan No. 1.  
 (c) Remove the 2 O-rings from cylinder block.

**17. CHECK CONNECTING ROD THRUST CLEARANCE**

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

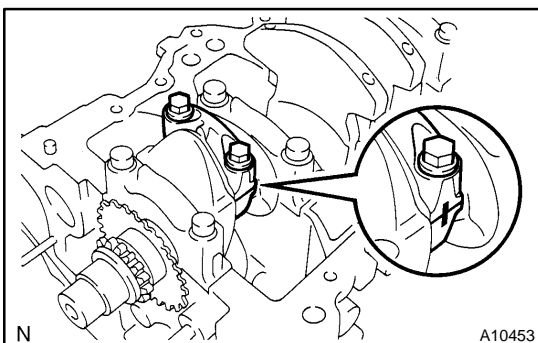
**Standard thrust clearance:**

**0.16 - 0.36 mm (0.0063 - 0.0142 in.)**

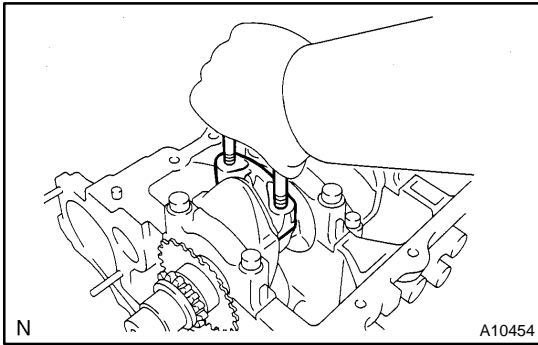
**Maximum thrust clearance:**

**0.36 mm (0.0142 in.)**

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

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

(a) Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.  
 (b) Remove the 2 connecting rod cap bolts.

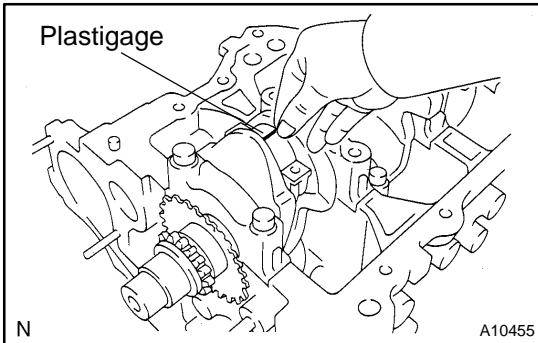


- (c) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

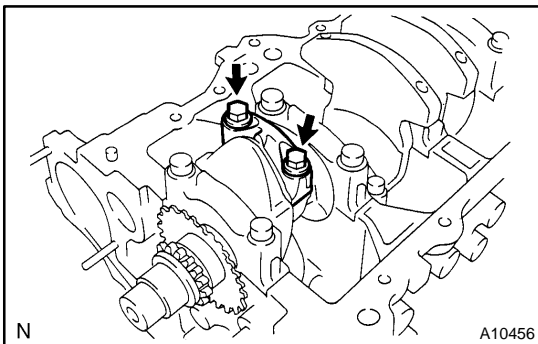
**HINT:**

Keep the lower bearing inserted with the connecting rod cap.

- (d) Clean the crank pin and bearing.  
 (e) Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



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



- (g) Install the connecting rod cap with the 2 bolts.

(See page [EM-78](#) )

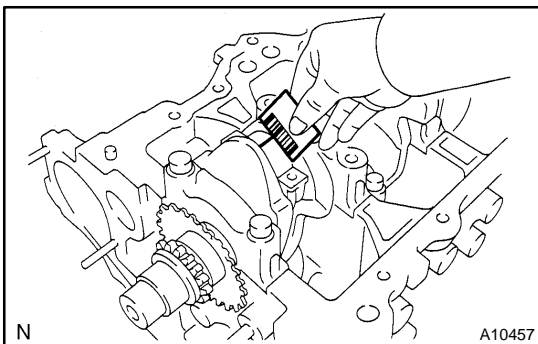
**Torque:**

**1ST 15 N·m (150 kgf·cm, 11 ft·lbf)**

**2ND Turn 90°**

**NOTICE:**

**Do not turn the crankshaft.**



- (h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)

- (i) Measure the Plastigage at its widest point.

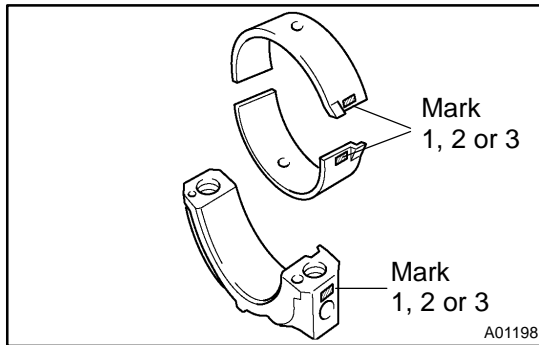
**Standard oil clearance:**

**0.016 - 0.040 mm (0.0006 - 0.0016 in.)**

**Maximum oil clearance:**

**0.06 mm (0.0024 in.)**

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

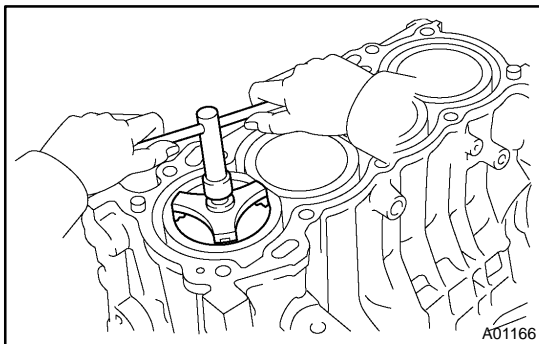
**HINT:**

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

**Reference****Standard bearing center wall thickness**

Mark	mm (in.)
"1"	1.488 - 1.492 (0.0586 - 0.0587)
"2"	1.492 - 1.496 (0.0587 - 0.0589)
"3"	1.496 - 1.500 (0.0589 - 0.0591)

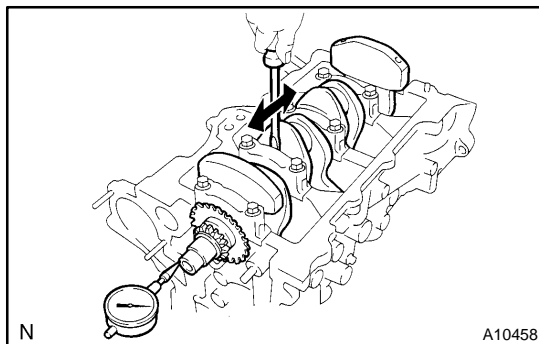
- (j) Completely remove the plastigage.

**19. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES**

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

**20. CHECK CRANKSHAFT THRUST CLEARANCE**

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

**Standard thrust clearance:**

**0.09 - 0.19 mm (0.0035 - 0.0075 in.)**

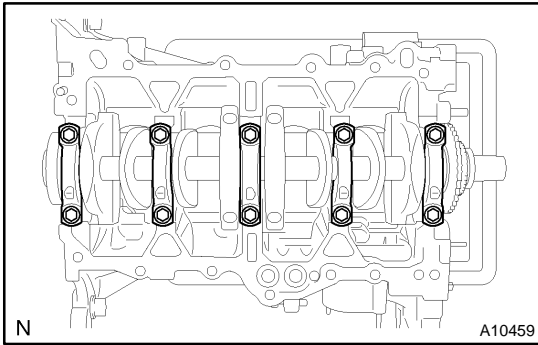
**Maximum thrust clearance:**

**0.3 mm (0.012 in.)**

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

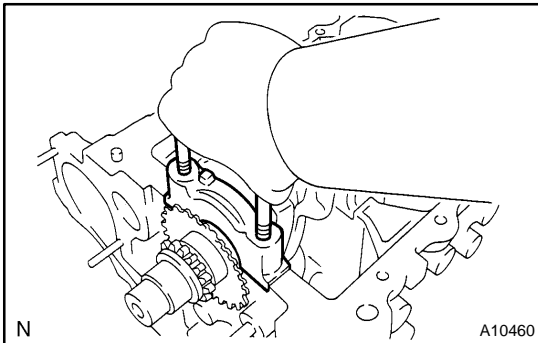
**Thrust washer thickness:**

**2.430 - 2.480 mm (0.09567 - 0.09764 in.)**



## 21. REMOVE BEARING CAPS AND CHECK OIL CLEARANCE

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



- (b) Using the 2 removed bearing cap bolts, remove the bearing cap and lower bearing by wiggling the bearing cap right and left.

### HINT:

Keep the lower bearing inserted with the bearing cap.

- (c) Lift out the crankshaft.

### HINT:

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

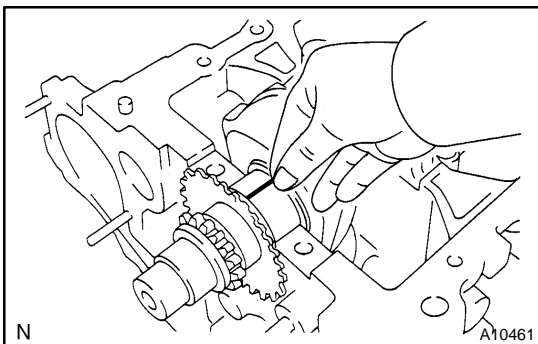
- (d) Clean each main journal and bearing.

- (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 bearing caps (See page [EM-44](#)).

### Torque:

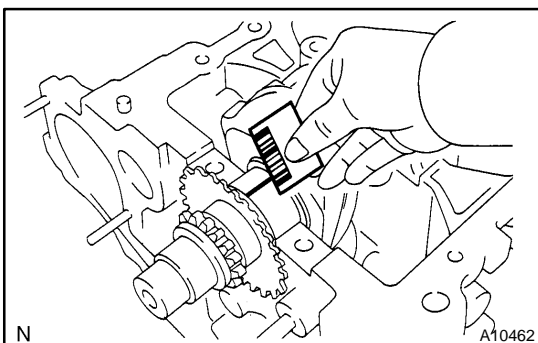
**1ST 22 N·m (220 kgf·cm, 16 ft·lbf)**

**2ND Turn 90°**

### NOTICE:

**Do not turn the crankshaft.**

- (i) Remove the bearing caps (See procedure (a) and (b) above).



- (j) Measure the plastigage at its widest point.

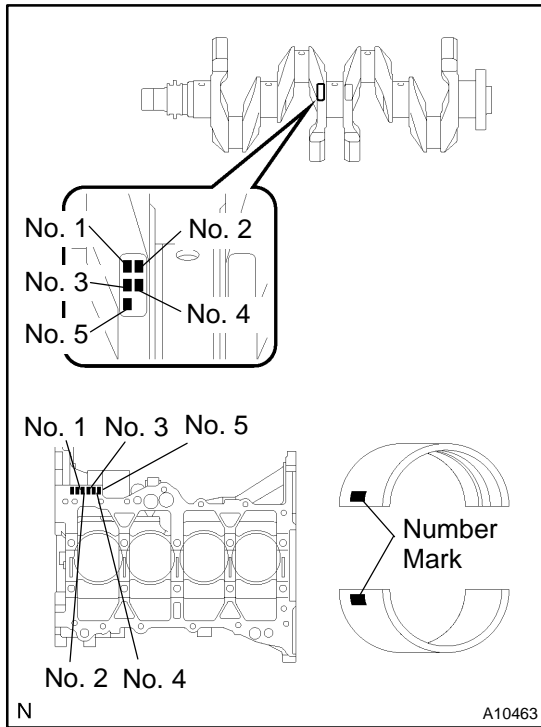
### Standard oil clearance:

**0.010 - 0.023 mm (0.0004 - 0.0009 in.)**

### Maximum oil clearance:

**0.07 mm (0.0028 in.)**

If the oil clearance is greater than maximum, replace the bearings. If necessary, 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 4 sizes of standard bearings, marked "1", "2", "3" and "4" accordingly.

	Total number				": Number mark
	0 - 2	3 - 5	6 - 8	9 -11	
Cylinder block (A) + Crankshaft (B)	0 - 2	3 - 5	6 - 8	9 -11	
Use bearing	"1"	"2"	"3"	"4"	

**EXAMPLE:** Cylinder block "4" (A)  
+ Crankshaft "3" (B)  
= Total number 7 (Use bearing "3")

**Reference**

Item	Mark	mm (in.)
Cylinder block main journal bore diameter (A)	"0"	50.000 - 50.003 (1.96850 - 1.96862)
	"1"	50.003 - 50.005 (1.96862 - 1.96870)
	"2"	50.005 - 50.007 (1.96870 - 1.96878)
	"3"	50.007 - 50.010 (1.96878 - 1.96889)
	"4"	50.010 - 50.012 (1.96889 - 1.96897)
	"5"	50.012 - 50.014 (1.96897 - 1.96905)
	"6"	50.014 - 50.016 (1.96905 - 1.96913)
Crankshaft main journal diameter (B)	"0"	46.000 - 46.002 (1.81102 - 1.81110)
	"1"	46.002 - 46.004 (1.81110 - 1.81118)
	"2"	46.004 - 46.006 (1.81118 - 1.81126)
	"3"	46.006 - 46.008 (1.81126 - 1.81133)
	"4"	46.008 - 46.010 (1.81133 - 1.81141)
	"5"	46.010 - 46.012 (1.81141 - 1.81149)
Standard bearing center wall thickness	"1"	1.992 - 1.995 (0.07843 - 0.07854)
	"2"	1.995 - 1.998 (0.07854 - 0.07866)
	"3"	1.998 - 2.001 (0.07866 - 0.07878)
	"4"	2.001 - 2.004 (0.07878 - 0.07890)

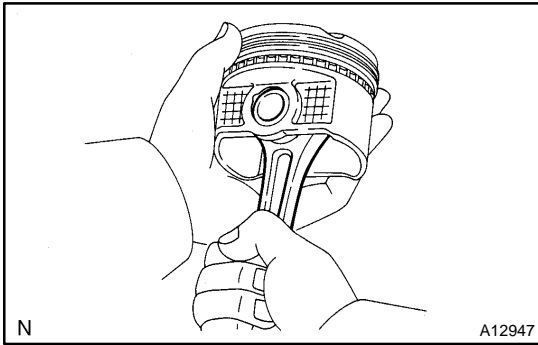
(k) Completely remove the Plastigage.

**22. REMOVE CRANKSHAFT**

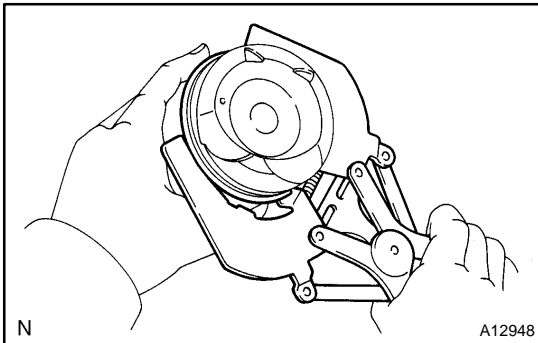
- (a) Lift out the crankshaft.
- (b) Remove the 5 upper main bearings and 2 thrust washers from the cylinder block.

**HINT:**

Arrange the main bearings and thrust washers in the correct order.

**23. 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.

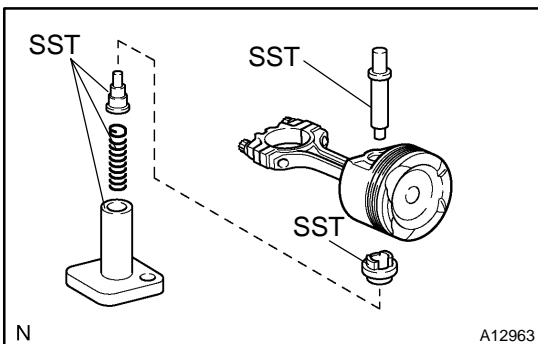
**24. REMOVE PISTON RINGS**

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

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

HINT:

Arrange the piston rings in the correct order only.

**25. DISCONNECT CONNECTING ROD FROM PISTON**

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

SST 09221-25026 (09221-00021, 09221-00030,  
09221-00190, 09221-00141, 09221-00150)

HINT:

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