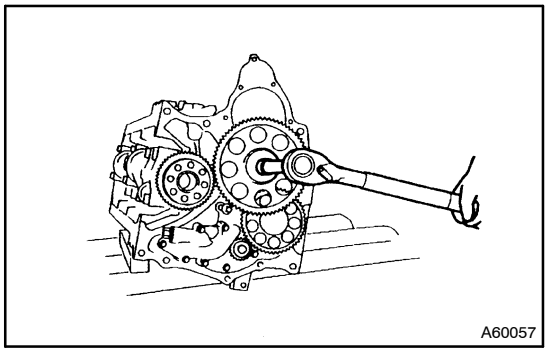
1417O–01

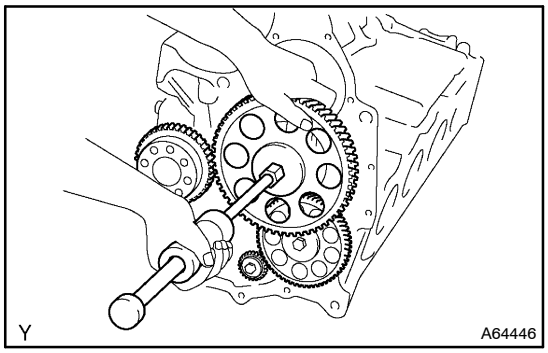
OVERHAUL



1. REMOVE MAIN IDLER GEAR

(a) Remove the mounting bolts of the main idler gear shaft.

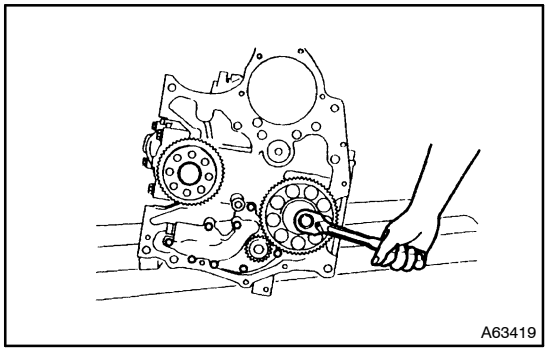
(b) Remove the main idler gear.



(c) Using a sliding hammer, drive out the main idler gear shaft.

(1) Check the teeth of each gear for wear and pitching.

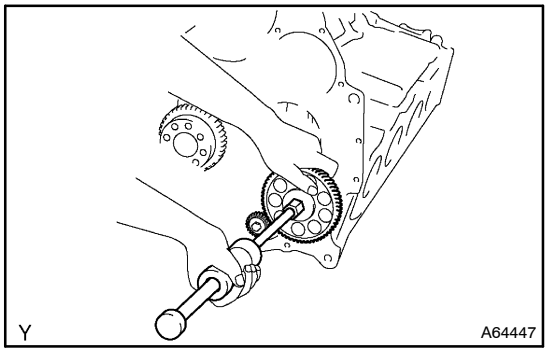
If there is damage, replace the gear.



2. REMOVE SUB IDLER GEAR

(a) Remove the mounting bolts of the sub idler gear shaft.

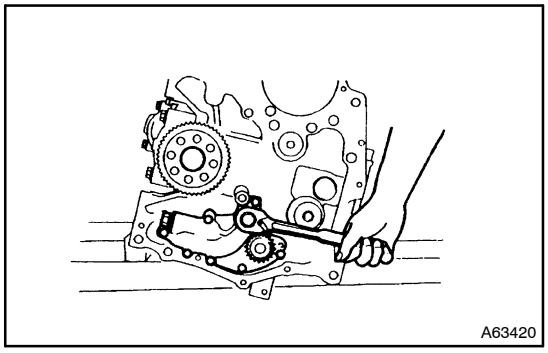
(b) Remove the sub idler gear.



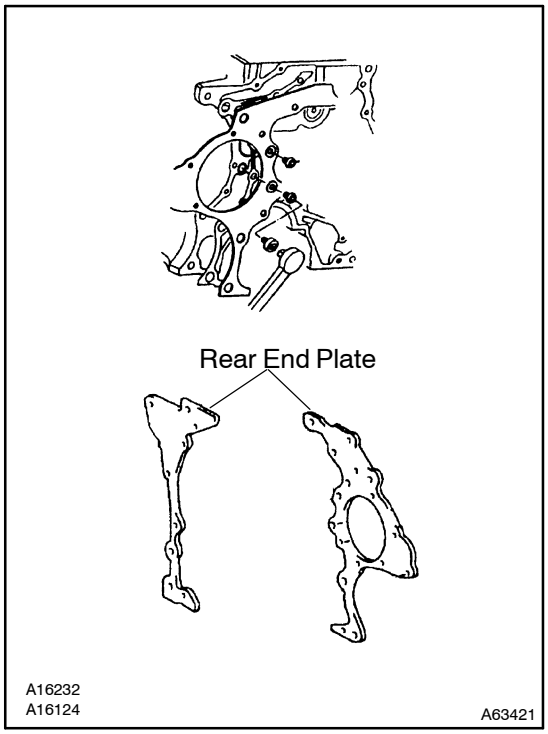
(c) Using a sliding hammer, drive out the sub idler gear shaft.

(1) Check the teeth of each gear for wear and pitching.

If there is damage, replace the gear.


A63420

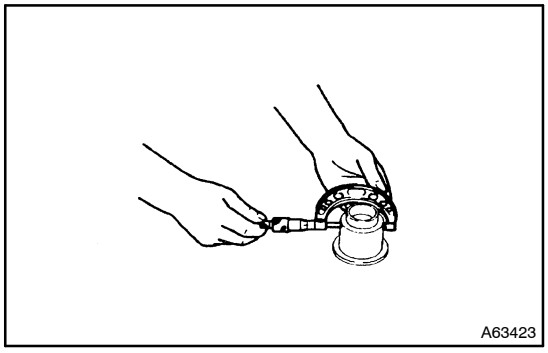
3. REMOVE OIL PUMP ASSY



A16232
A16124
A63421

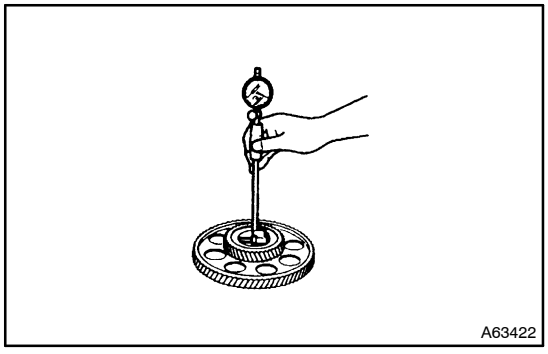
4. REMOVE REAR END PLATE

(a) Using a socket wrench, remove the 2 torx bolts adjacent to the supply pump drive shaft mounting section.


A63423

5. INSPECT OIL CLEARANCE BETWEEN MAIN IDLER GEAR BUSH AND SHAFT

(a) Using a micrometer, measure the diameter of the main idler gear shaft.
Standard shaft diameter:
56.94 – 56.97 mm (2.2422 – 2.2430 in.)

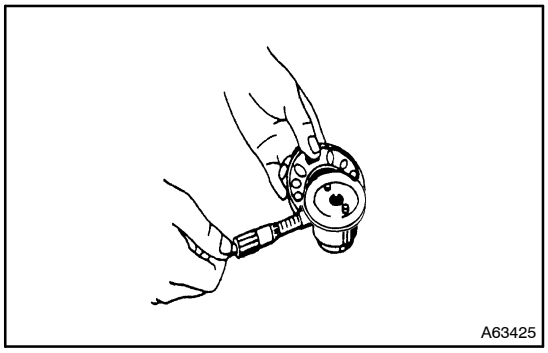

A63422

(b) Using a cylinder gauge, measure the inside diameter of the main idler gear bush.
Standard inside diameter:
57.00 – 57.03 mm (2.2441 – 2.2453 in.)

(c) Calculate the clearance from the above measurements.
Oil clearance:

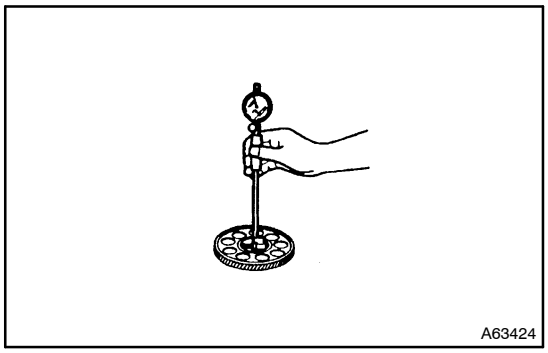
Standard	0.030 – 0.090 mm (0.0012 – 0.0035 in.)
Maximum	0.20 mm (0.0079 in.)

If the oil clearance is greater than the maximum, replace the main idler gear shaft and/or main idler gear bush.


A63425

6. INSPECT OIL CLEARANCE BETWEEN SUB IDLER GEAR BUSH AND SHAFT

(a) Using a micrometer, measure the outside diameter of the sub idler gear shaft.
Standard shaft diameter:
49.950 – 49.975 mm (1.9665 – 1.9675 in.)

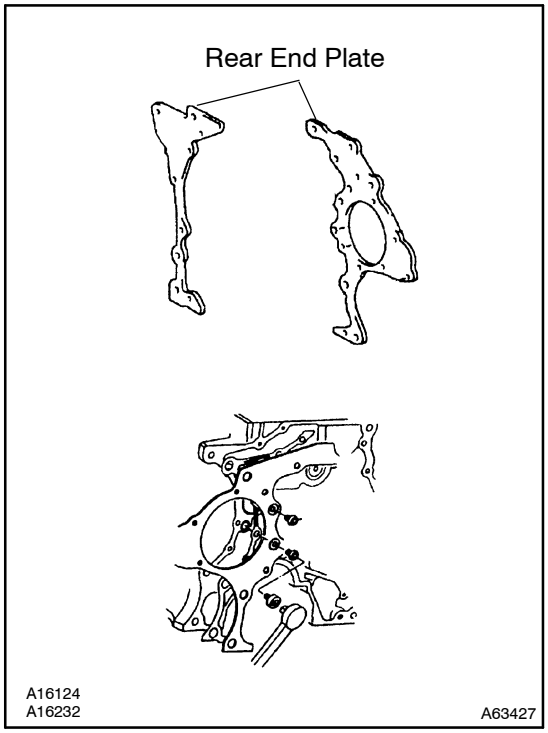

A63424

(b) Using a cylinder gauge, measure the inside diameter of the sub idler gear bush.
Standard inside diameter:
50.000 – 50.025 mm (1.9685 – 1.9695 in.)

(c) Calculate the oil clearance from the above measurements.
Oil clearance:

Standard	0.025 – 0.075 mm (0.0010 – 0.0030 in.)
Maximum	0.20 mm (0.0079 in.)

If the oil clearance is greater than the maximum, replace the sub idler gear shaft and/or sub idler gear bush.



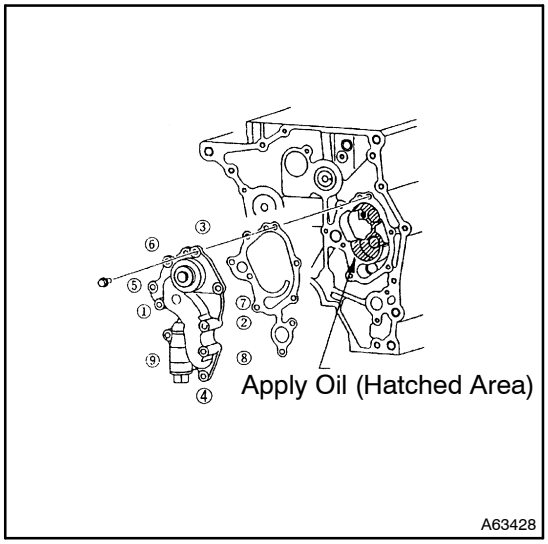
A16124
A16232
A63427

7. INSTALL REAR END PLATE

(a) Insert a new gasket between the block and plate.
(b) Apply adhesive to threads of the 2 torx bolts.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent.
(c) Using a wrench, tighten the 2 torx bolts adjacent to the supply pump drive shaft mounting section to the specified torque below.
Torque: 55 N·m (560 kgf·cm, 40 ft·lbf)
(d) Tighten the 3 bolts as shown in the illustration to the specified torque below.
Torque: 55 N·m (560 kgf·cm, 40 ft·lbf)

HINT:

- Be careful that the gasket should not be moved off the proper place.
- Always use a new gasket.



8. INSTALL OIL PUMP ASSY

(a) Apply oil to the pump case and bearings of the block (hatched area) before installing the oil pump.

HINT:

Not applying oil may cause oil suction failure at start up, resulting in seizure and abnormality.

(b) To prevent misalignment of the gasket, apply engine oil to the gasket matching face of the block. Then, place and fix the gasket.

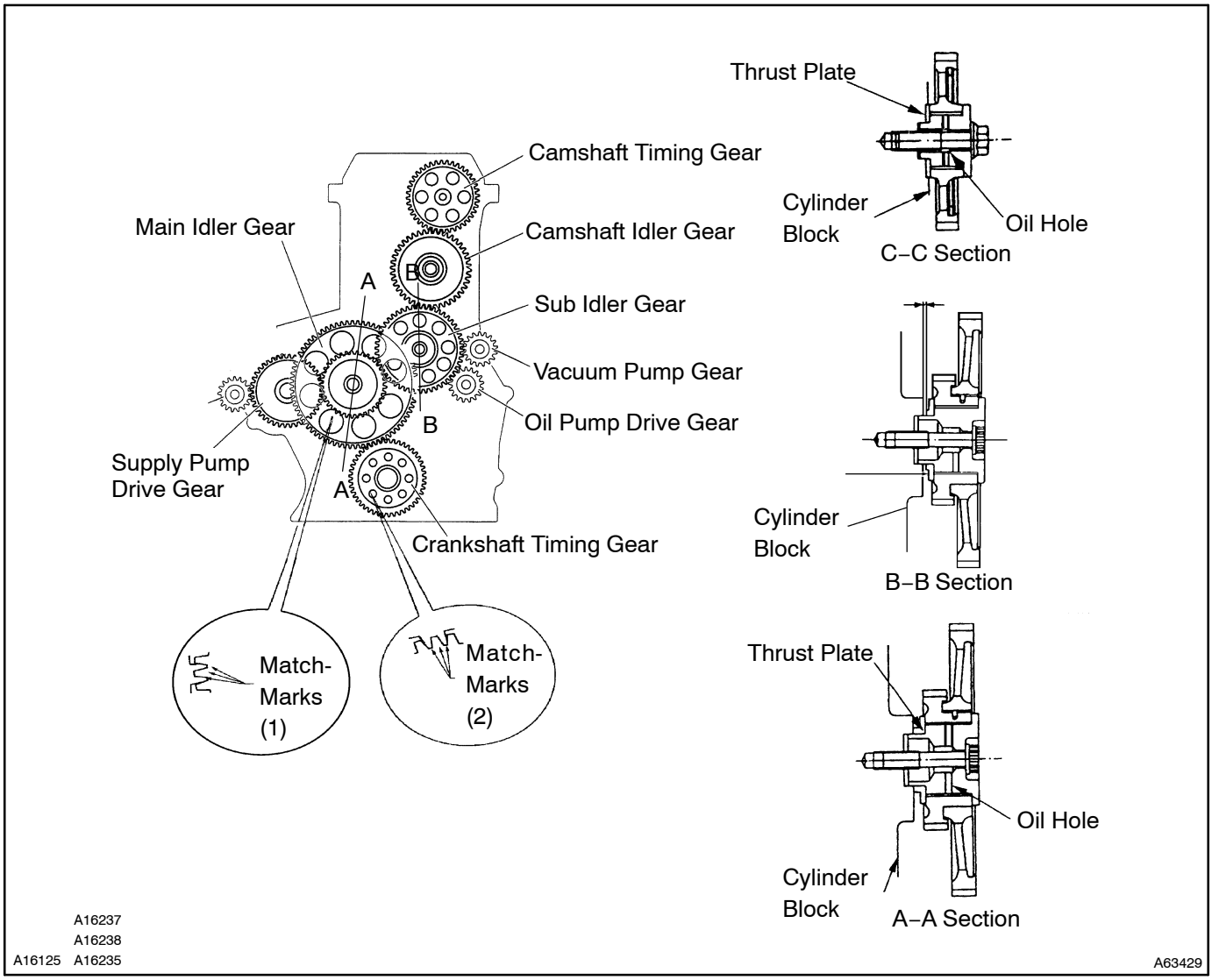
(c) Tighten the oil pump mounting bolts provisionally in the order as shown in the illustration. Then, retighten them.

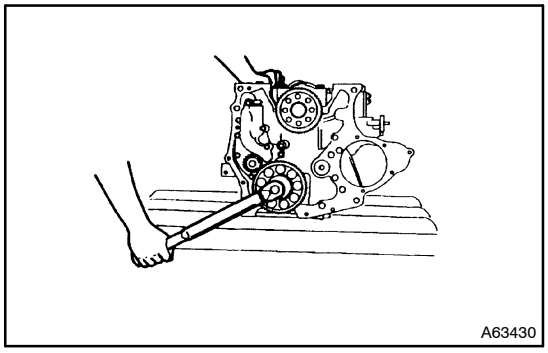
(d) Check that the gear rotates smoothly by hand after the installation.

HINT:

Be sure to observe the tightening order of the bolts, otherwise the oil pump will be damaged.

Torque: 28.5 N·m (290 kgf·cm, 21 ft·lbf)




A63430

9. INSTALL SUB IDLER GEAR

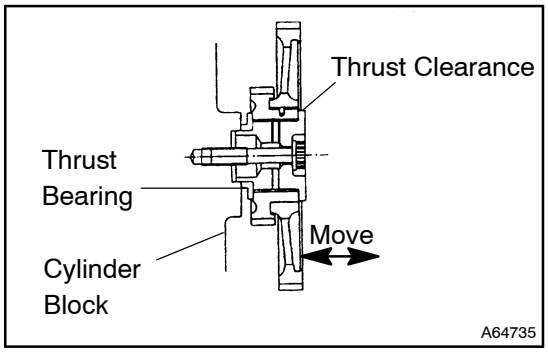
(a) Install the sub idler gear shaft through the thrust plate so that the lubrication hole faces downward.

(b) Install the sub idler gear.

(1) Apply engine oil to the seat and thread of the bolt.

(c) Tighten the mounting bolts of the sub idler gear shaft.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



A64735

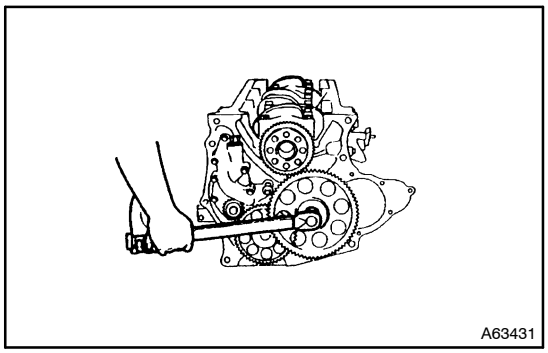
10. INSPECT SUB IDLE GEAR THRUST CLEARANCE

(a) Using a dial gauge, measure the clearance between the sub idler gear and thrust bearing.

Thrust clearance:

Standard	0.040 – 0.095 mm (0.0016 – 0.0037 in.)
Maximum	0.30 mm (0.0118 in.)

If the thrust clearance is greater than the maximum, replace the thrust bearing.


A63431

11. INSTALL MAIN IDLER GEAR

(a) Install the main idler gear shaft through the thrust plate so that the lubrication hole faces downward.

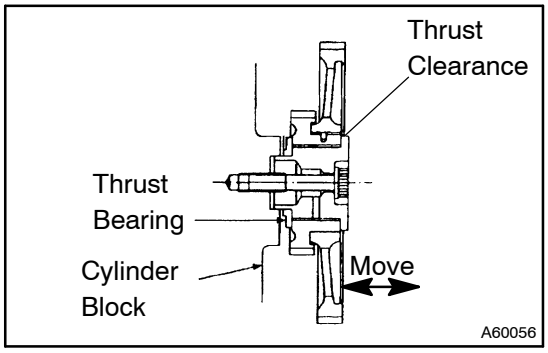
(b) Install the main idler gear.

HINT:

- Apply engine oil to the contact surface of the idler gear and idler gear shaft before the installation.
- Adjust the timing of the main idle gear to align it with the supply pump gear.

(c) Tighten the mounting bolts of the main idler gear shaft to the specified torque below.

Torque: 172 N·m (1,750 kgf·cm, 127 ft·lbf)



A60056

12. INSPECT MAIN IDLER GEAR THRUST CLEARANCE

(a) Using a dial gauge, measure the clearance between the main idler gear and thrust bearing.

Standard thrust clearance:

Standard	0.114 – 0.160 mm (0.0045 – 0.0063 in.)
Maximum	0.20 mm (0.0078 in.)

If the thrust clearance is greater than the maximum, replace the thrust bearing.

13. INSPECT TIMING GEAR BACKLASH

(a) Using a dial gauge, measure the backlash between the gears.

Backlash:

Item	Standard backlash	Maximum backlash
Crankshaft x Main idler	0.030 – 0.167 mm (0.0012 – 0.0065 in.)	0.30 mm (0.0118 in.)
Main idler x Injection pump or Supply pump	0.030 – 0.218 mm (0.0012 – 0.0085 in.)	
Injection pump or Supply pump x PS pump	0.030 – 0.183 mm (0.0012 – 0.0072 in.)	
Main idler x Sub idler	0.030 – 0.162 mm (0.0012 – 0.0063 in.)	
Sub idler x Oil pump	0.030 – 0.131 mm (0.0012 – 0.0051 in.)	
Sub idler x Camshaft idler	0.030 – 0.299 mm (0.0012 – 0.1693 in.)	
Camshaft idler x Camshaft timing	0.028 – 0.163 mm (0.0011 – 0.0064 in.)	
Sub idler x Vacuum pump	0.029 – 0.187 mm (0.0011 – 0.0073 in.)	

If the backlash is greater than the maximum, replace the gear.