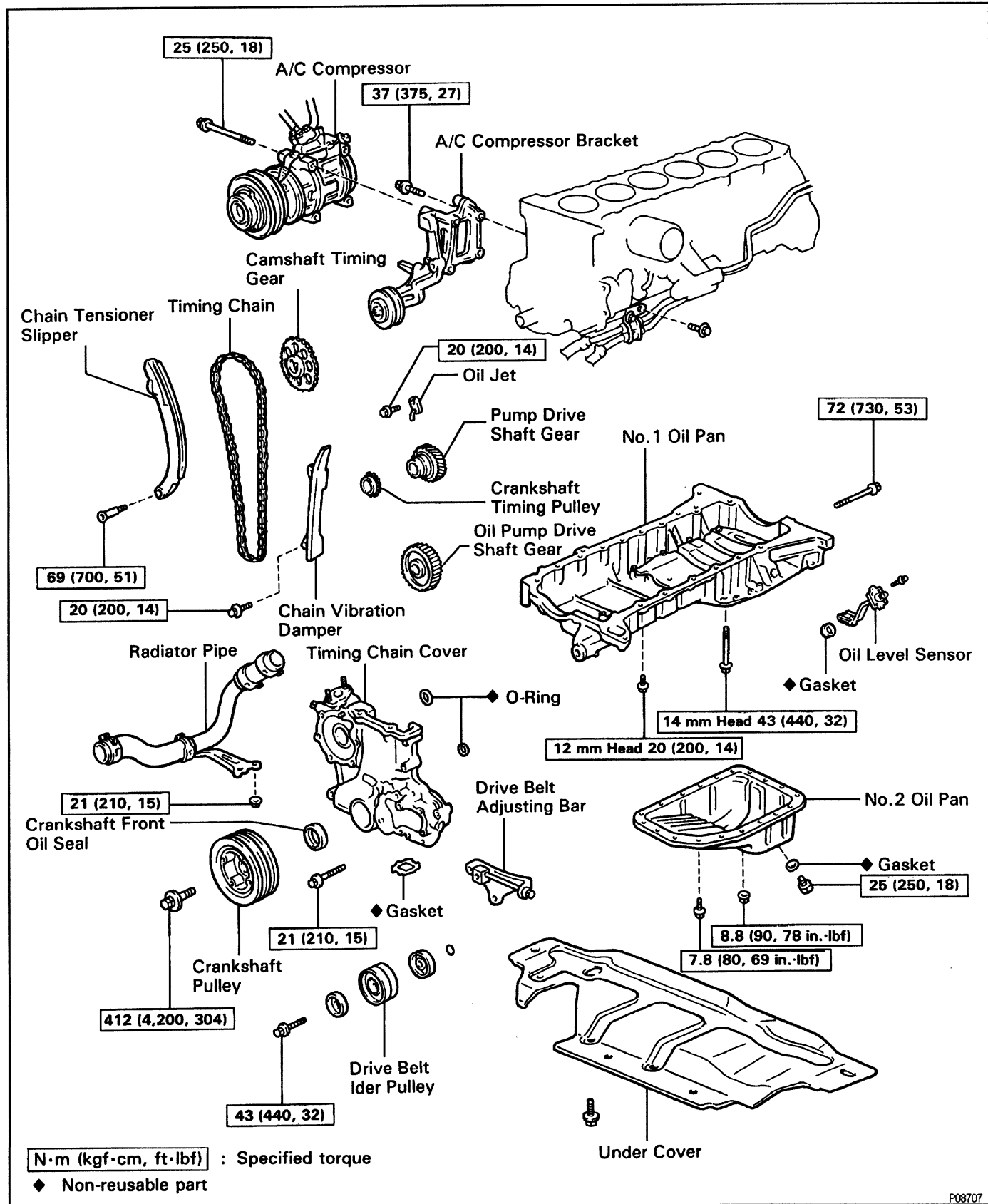
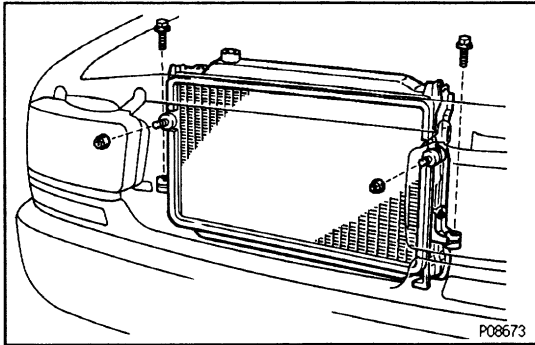


TIMING CHAIN COMPONENTS FOR REMOVAL AND INSTALLATION

EGOV6-02

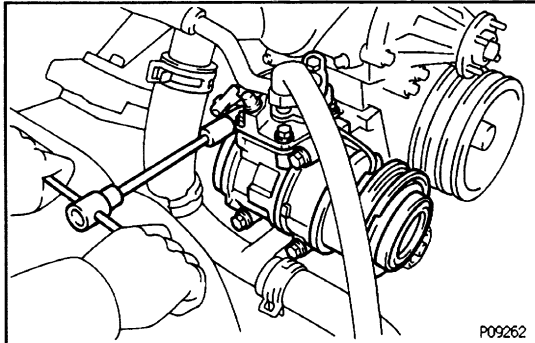




TIMING CHAIN REMOVAL

1. DRAIN ENGINE OIL
2. DRAIN ENGINE COOLANT
3. REMOVE ENGINE UNDER COVER
4. REMOVE RADIATOR

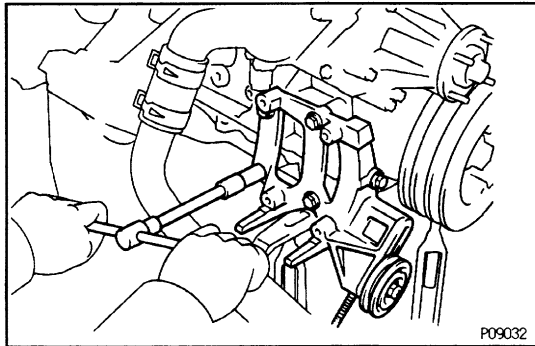
(See page [EG-363](#))



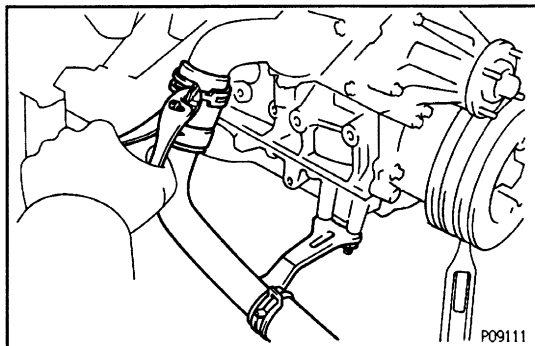
5. DISCONNECT A/C COMPRESSOR AND BRACKET

- (a) Loosen the drive pulley nut and adjusting bolt, and remove the drive belt.
- (b) Remove the four mounting bolts, and disconnect the compressor from the bracket.

HINT: Put aside the compressor, and suspend it.

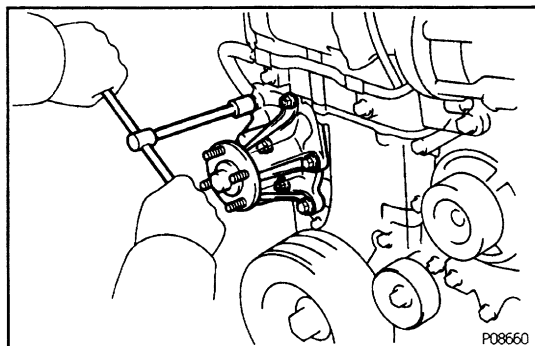


- (c) Remove the five bolts and A/C bracket.



6. REMOVE RADIATOR PIPE

- (a) Disconnect the No.2 radiator hose from the water inlet.
- (b) Remove the two nuts and radiator pipe.

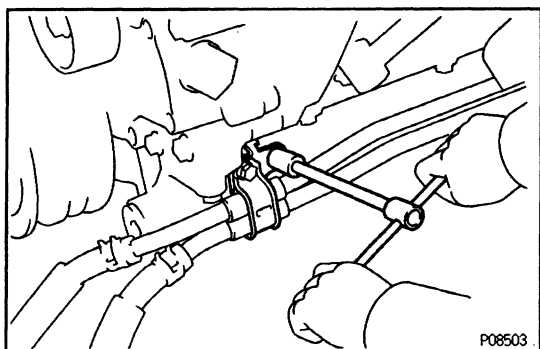


7. REMOVE WATER PUMP

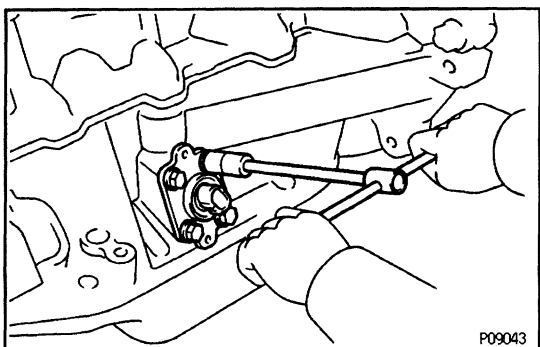
Remove the four bolts, two nuts, water pump and gasket.

8. REMOVE CYLINDER HEAD

(See page [EG-33](#))

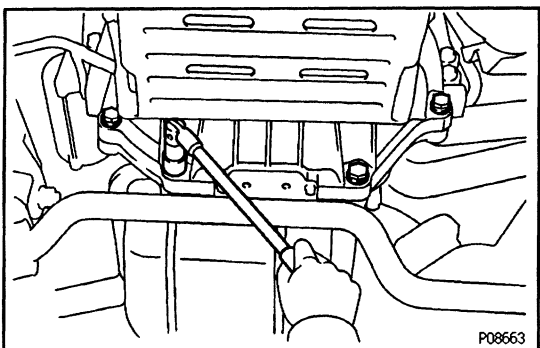


9. DISCONNECT OIL COOLER PIPE BRACKET FROM NO.1 OIL PAN



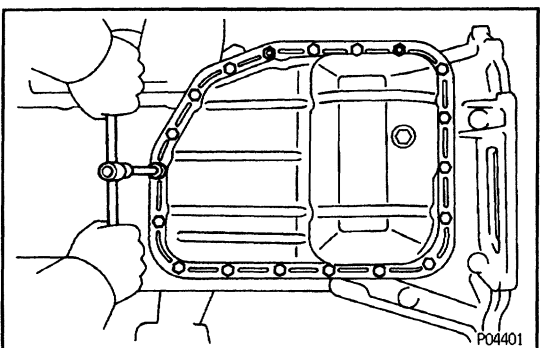
10. REMOVE OIL LEVEL SENSOR

- (a) Remove the four bolts and level sensor.
- (b) Remove the gasket from the level sensor.



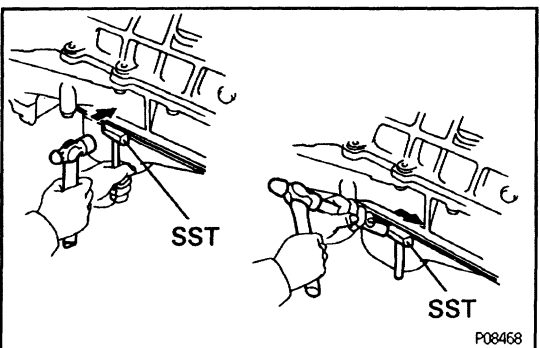
11. REMOVE BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION HOUSING

Remove the four bolts.



12. REMOVE NO.2 OIL PAN

- (a) Remove the 17 mounting bolts and two nuts.

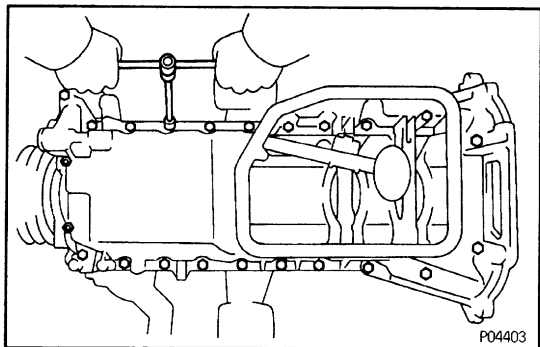


- (b) Insert the blade of SST between the No.1 and No.2 oil pans, cut off applied sealer and remove the No.2 oil pan.

SST 09032 - 00100

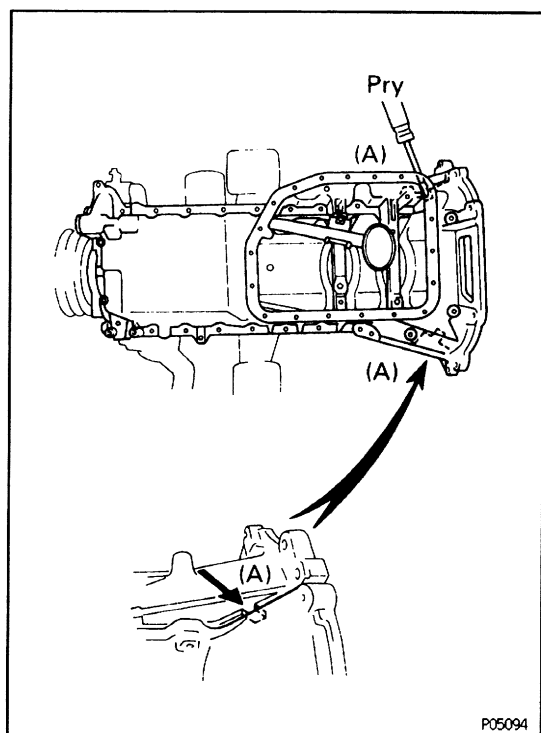
NOTICE:

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



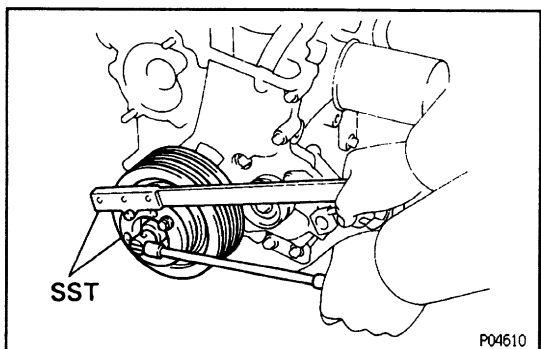
13. REMOVE NO.1 OIL PAN

- (a) Remove the 21 mounting bolts and two nuts.



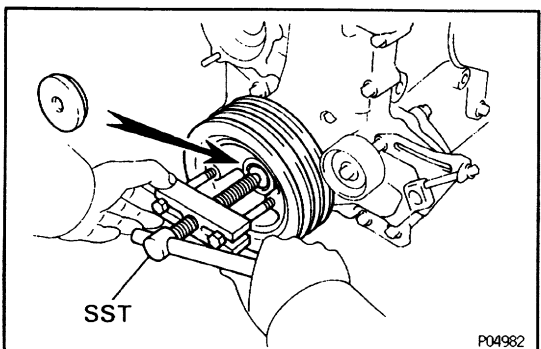
- (b) Remove the No.1 oil pan by prying the portions (A) between the cylinder block and No.1 oil pan with a screwdriver.

NOTICE: Be careful not to damage the contact surfaces the cylinder block and No.1 oil pan.

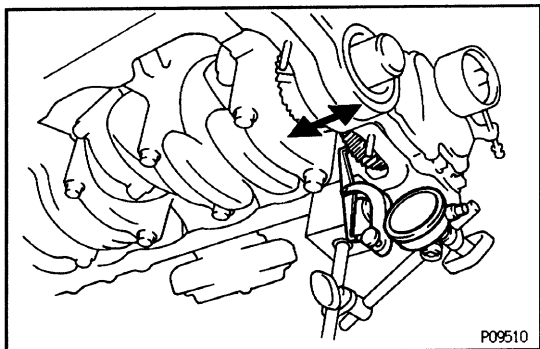


14. REMOVE CRANKSHAFT PULLEY

- (a) Using SST, remove the pulley bolt.
SST 09213-58012, 09330-00021
(b) Remove the crankshaft pulley.



HINT: If necessary, remove the pulley with SST.
SST 09213-60017 (09213-00020, 09213-00030, 09213-00060), 09950-20017



15. CHECK THRUST CLEARANCE OF OIL PUMP DRIVE SHAFT GEAR

Using a dial indicator with lever type attachment, measure the thrust clearance.

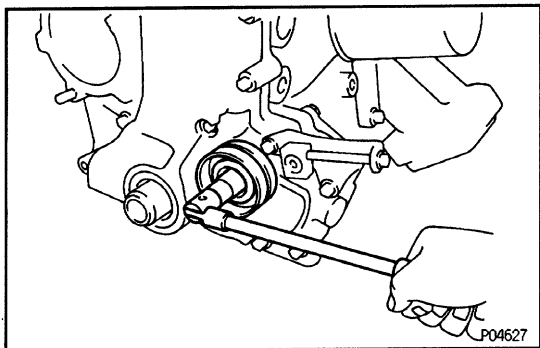
Standard thrust clearance:

0.050 – 0.150 mm (0.0020 – 0.0059 in.)

Maximum thrust clearance:

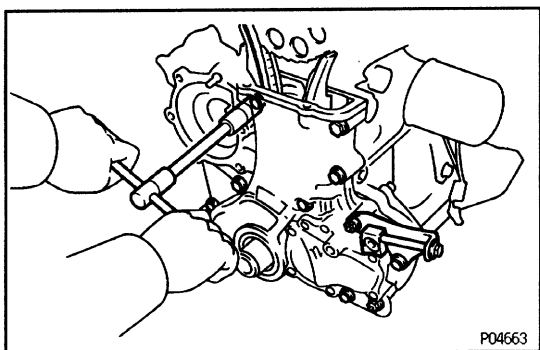
0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the oil pump drive shaft gear and/or timing chain cover.



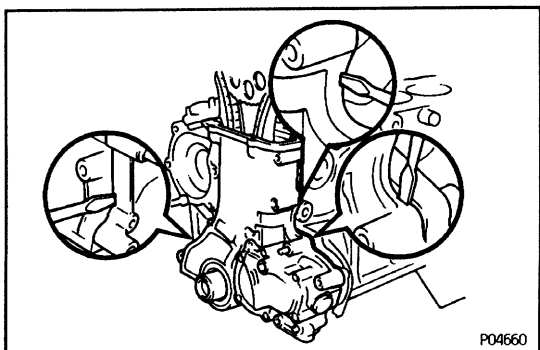
16. REMOVE DRIVE BELT IDLER PULLEY

Remove the bolt and idler pulley.



17. TIMING CHAIN COVER

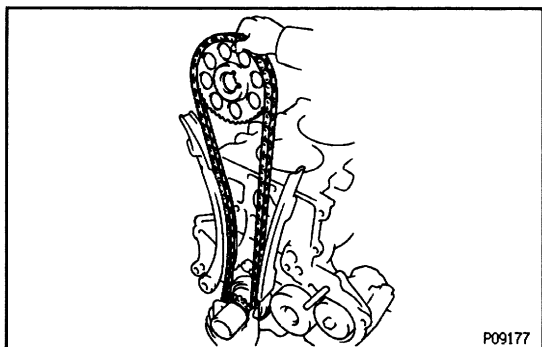
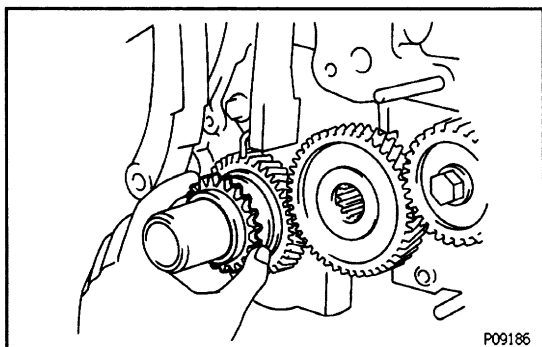
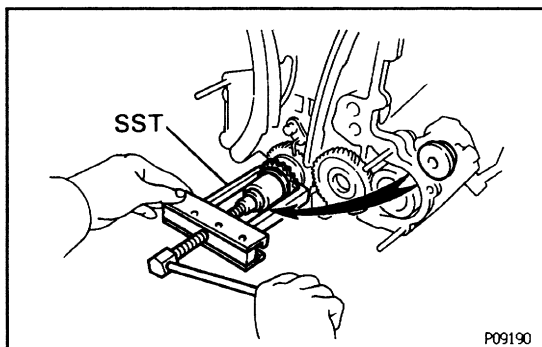
- (a) Remove the nine mounting bolts, two mounting nuts and drive belt adjusting bar.



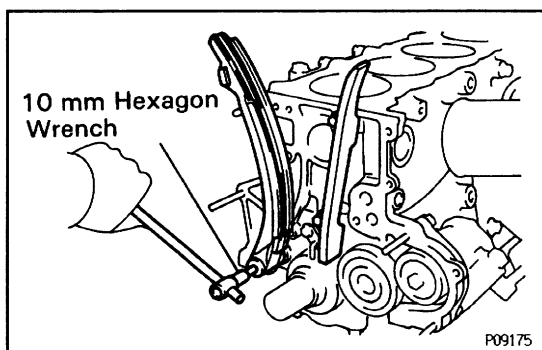
- (b) Remove the oil pump by prying the portions between the cylinder block and oil pump with a screwdriver.

NOTICE: Be careful not to damage the contact surfaces of the cylinder block and oil pump.

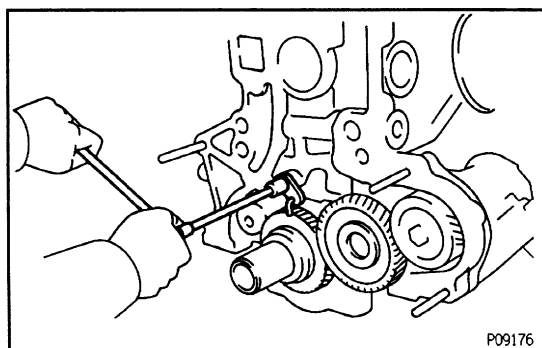
- (c) Remove the O-rings from the oil pump.
- (d) Remove the gasket from the oil pump.

**18. REMOVE TIMING CHAIN AND CAMSHAFT TIMING GEAR****19. REMOVE CRANKSHAFT TIMING GEAR**

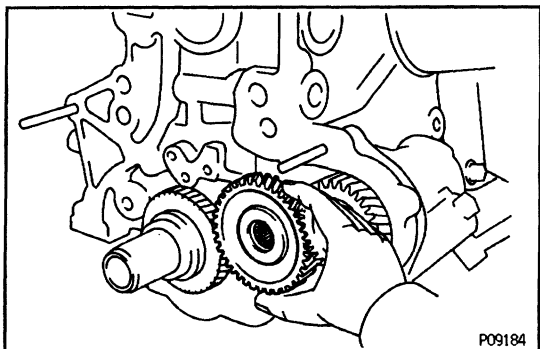
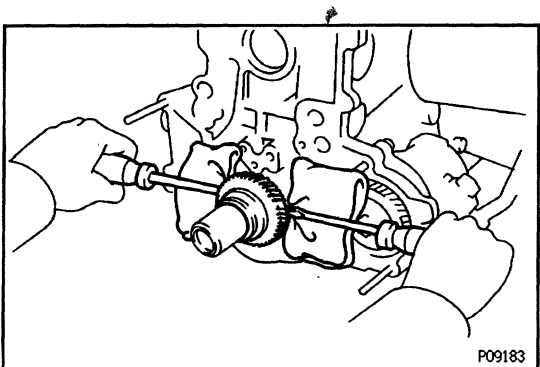
HINT: If necessary, remove the gear with SST.
SST 09213-36020, 09950-20017

**20. REMOVE CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER**

- (a) Using a 10mm hexagon wrench, remove the bolt and slipper.
- (b) Remove the two bolts and damper.

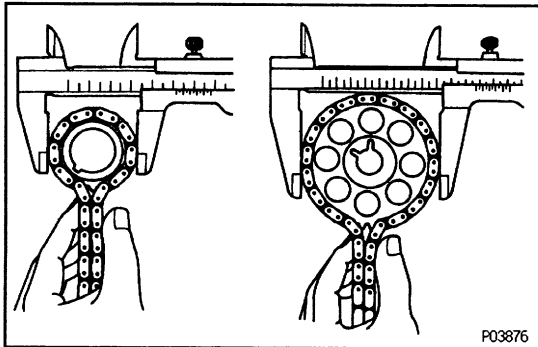
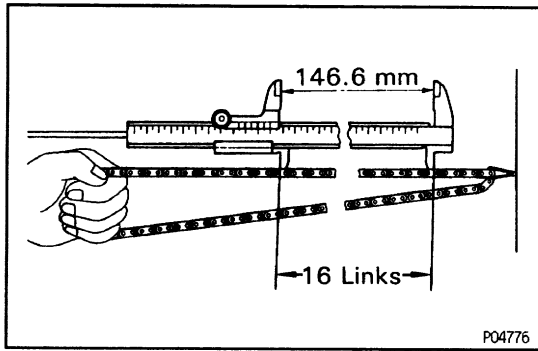
**21. REMOVE OIL JET**

Remove the bolt and oil jet.

**22. REMOVE OIL PUMP DRIVE SHAFT GEAR****23. REMOVE PUMP DRIVE SHAFT GEAR**

If the pump drive shaft gear cannot be removed by hand, use two screwdrivers.

NOTICE: Position shop rags as shown to prevent damage.



TIMING CHAIN COMPONENTS INSPECTION

1. INSPECT TIMING CHAIN AND TIMING GEARS

- (a) Measure the length of 16 links with the chain fully stretched.

Maximum chain elongation:

146.6 mm (5.772 in.)

If the elongation is greater than maximum, replace the chain.

HINT: Make the same measurements pulling at three or more places selected at random.

- (b) Warp the chain around the timing gear.

- (c) Using vernier calipers, measure the timing gear diameter with the chain.

NOTICE: Vernier calipers must contact the chain rollers for measuring.

Minimum gear diameter (w/chain):

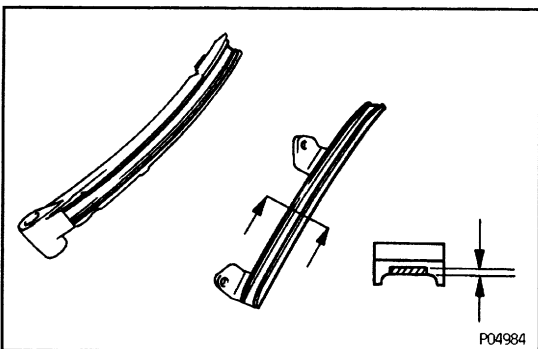
Crankshaft

126.0 mm (4.961 in.)

Camshaft

65.4 mm (2.575 in.)

If the diameter is less than minimum, replace the chain and gears.



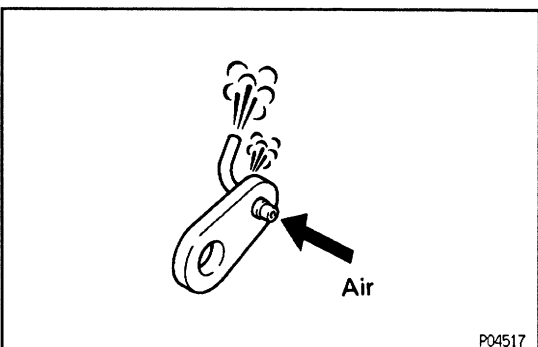
2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

Measure the chain tensioner slipper and vibration damper wears.

Maximum wear:

1.0 mm (0.039 in.)

If the wear is greater than maximum, replace the slipper and/or damper.



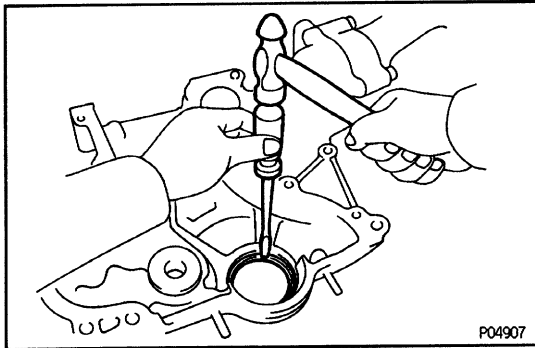
3. INSPECT OIL JET

Check the oil jet for damage or clogging.

If necessary, replace the oil jet.

CRANKSHAFT FRONT OIL SEAL REPLACEMENT

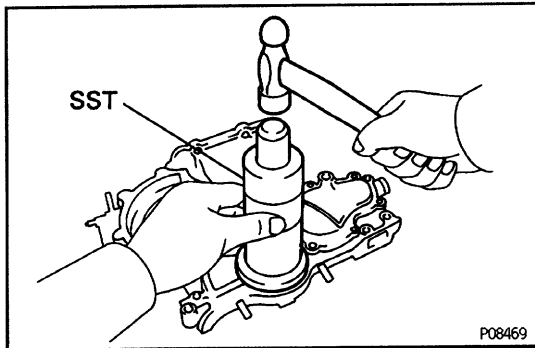
HINT: There are two methods (A and B) to replace the oil seal which are as follows:



REPLACE CRANKSHAFT FRONT OIL SEAL

A. If timing chain cover is removed from cylinder block:

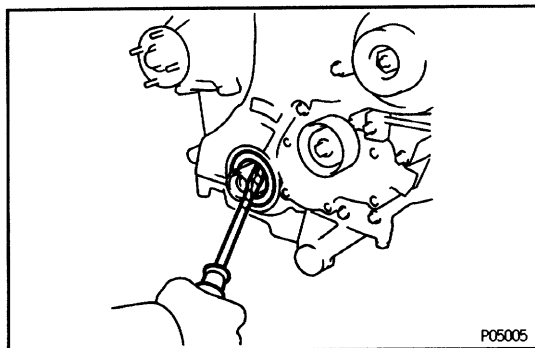
- (a) Using a screwdriver and a hammer, tap out the oil seal.



- (b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.

SST 09316-60010 (09316-00010, 09316-00050)

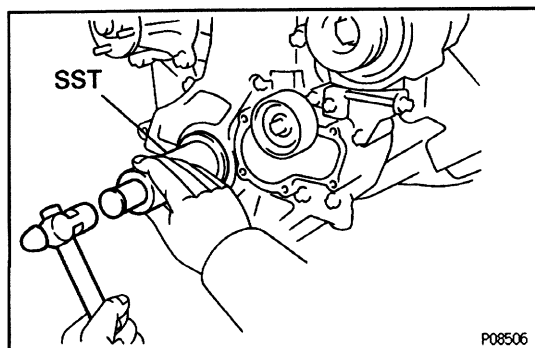
- (c) Apply MP grease to the oil seal lip.



B. If timing chain cover is installed to the cylinder block:

- (a) Using a screwdriver, pry out the oil seal.

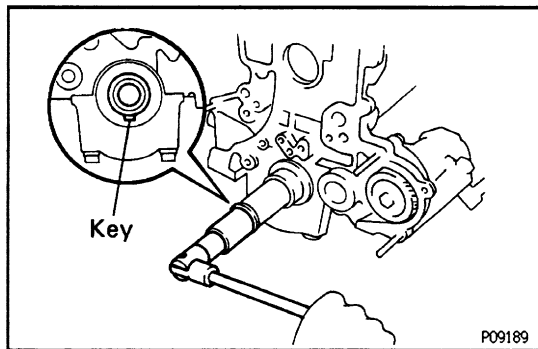
NOTICE: Be careful not to damage the crankshaft. Tape the screwdriver tip.



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

- (c) Using SST and a hammer, tap in the oil seal until its surface is flush with the timing chain cover edge.

SST 09316-60010 (09316-00010, 09316-00050)

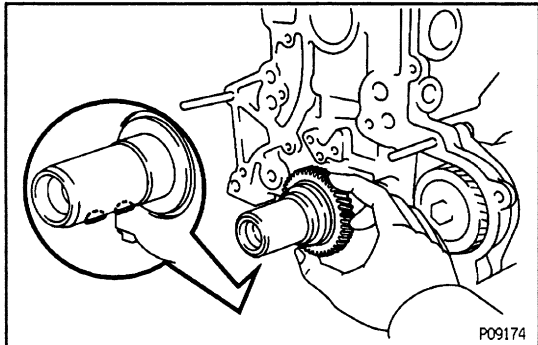


TIMING CHAIN INSTALLATION

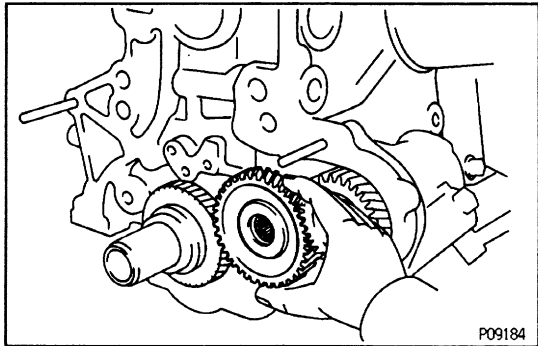
(See Components for Removal and Installation)

1. SET CRANKSHAFT

Turn the crankshaft until the set key on crankshaft facing downward.

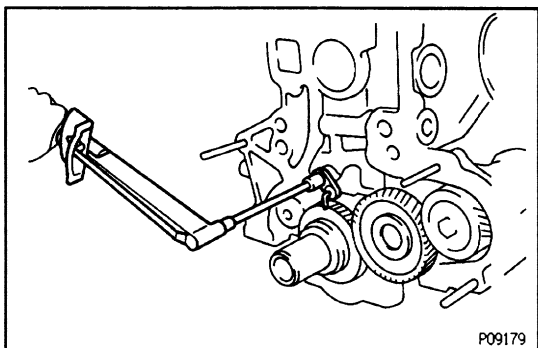


2. INSTALL PUMP DRIVE SHAFT GEAR



3. INSTALL OIL PUMP DRIVE SHAFT GEAR

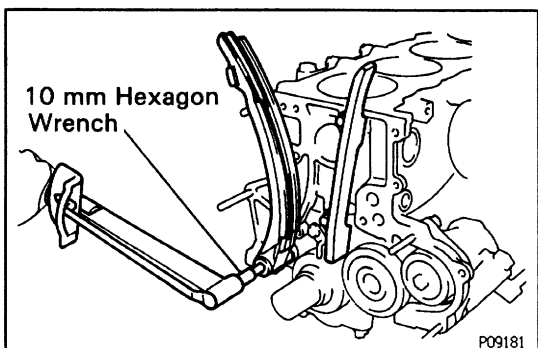
- Apply light coat of engine oil on the shaft portion of the gear.
- Install the gear.



4. INSTALL OIL JET

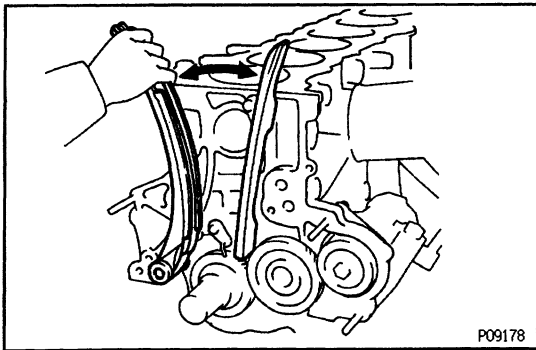
Install the oil jet with the bolt.

Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)

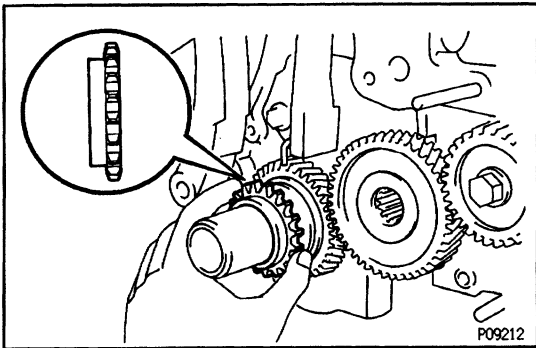


5. INSTALL CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

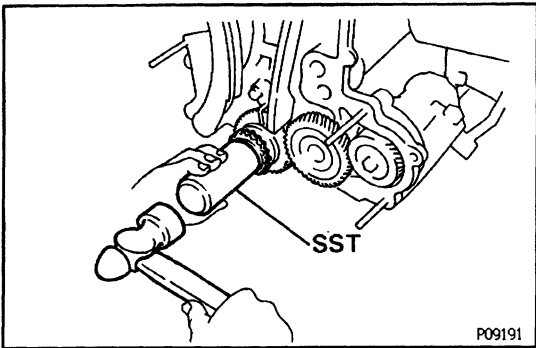
- Install the damper with the two bolts.
Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)
- Using a 10 mm hexagon wrench, install the slipper with the bolt.
Torque: 69 N-m (700 kgf-cm, 51 ft-lbf)



(c) Check that the slipper moves smoothly.



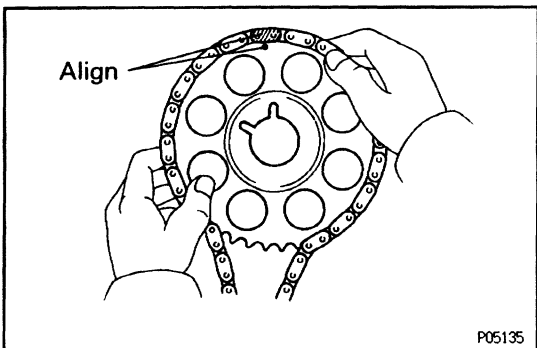
6. INSTALL CRANKSHAFT TIMING GEAR



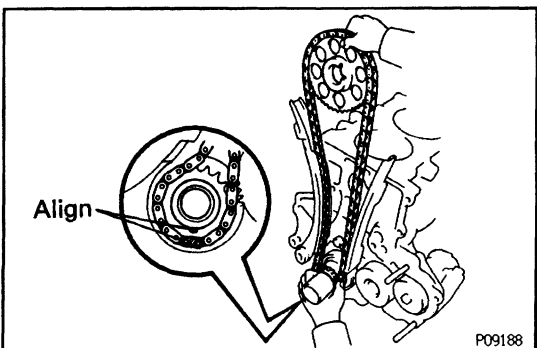
HINT: If necessary, install the gear with SST.
SST 09636 – 20010

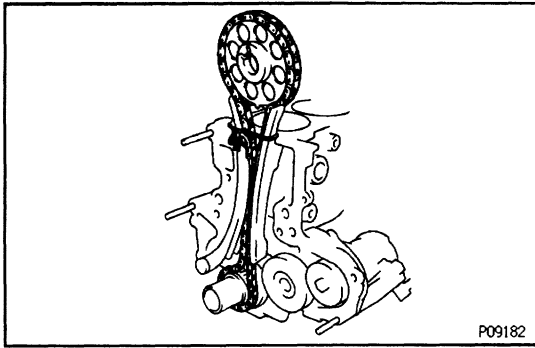
7. INSTALL TIMING CHAIN AND CAMSHAFT TIMING GEAR

(a) Install the timing chain on the camshaft timing gear with the bright link aligned with the timing mark on the camshaft timing gear.



(b) Install the timing chain on the crankshaft timing gear with the other bright link aligned with the timing mark on the crankshaft timing gear.





- (c) Tie the timing chain with a cord as shown in the illustration and make sure it doesn't come loose.

8. INSTALL TIMING CHAIN COVER

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the timing chain cover and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
 - 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 timing chain cover as shown in the illustration.

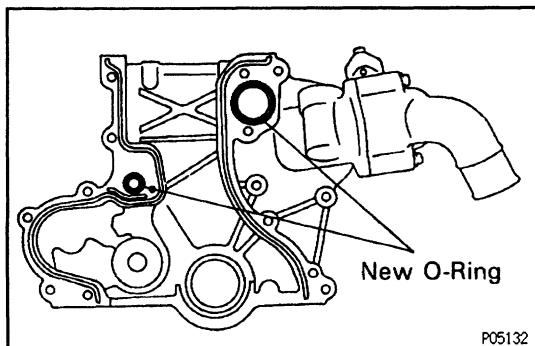
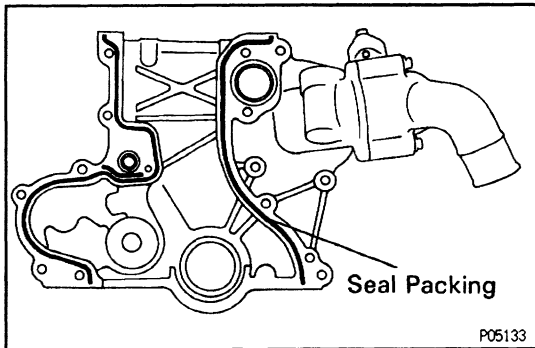
Seal packing:

Part No. 08826-00080 or equivalent

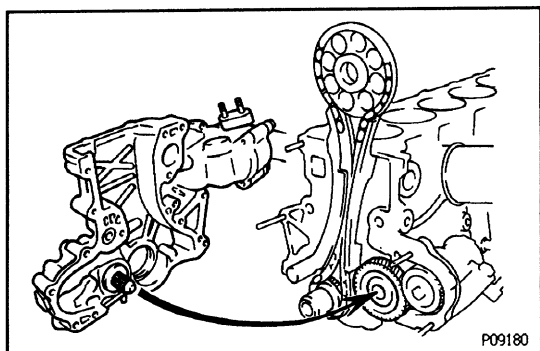
- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

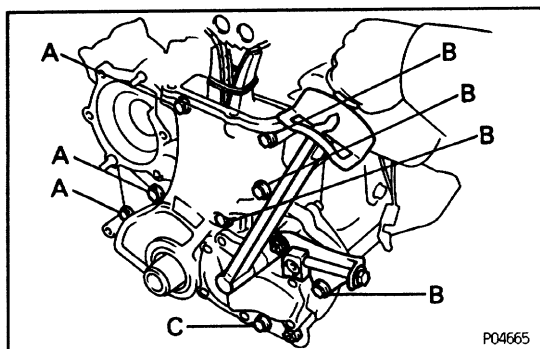
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



- (c) Place two new O-ring in position on the timing chain cover.



- (d) Engage the gear of the oil pump drive rotor with the gear of the oil pump drive gear, and slide the oil pump.



- (e) Install the oil pump and drive belt adjusting bar with the nine bolts and two nuts.

Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)

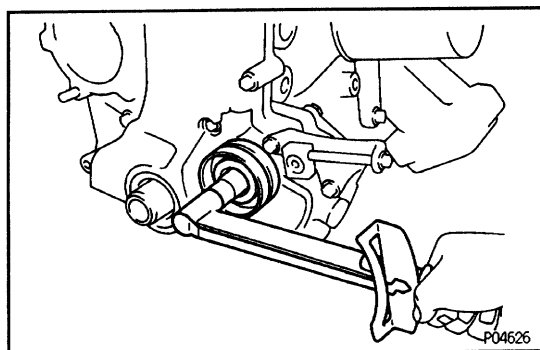
HINT: Each bolt length is indicated in the illustration.

A 30 mm (1.18 in.)

B 50 mm (1.97 in.)

C 60 mm (2.38 in.)

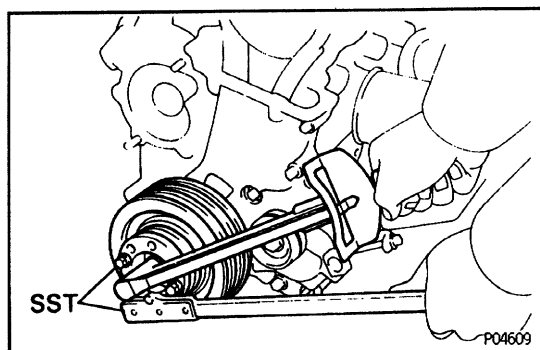
- (f) Remove the cord from the chain.



9. INSTALL DRIVE BELT IDLER PULLEY

Install the pulley with the bolt.

Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)



10. INSTALL CRANKSHAFT PULLEY

- (a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.

- (b) Using SST, install and torque the pulley bolt.

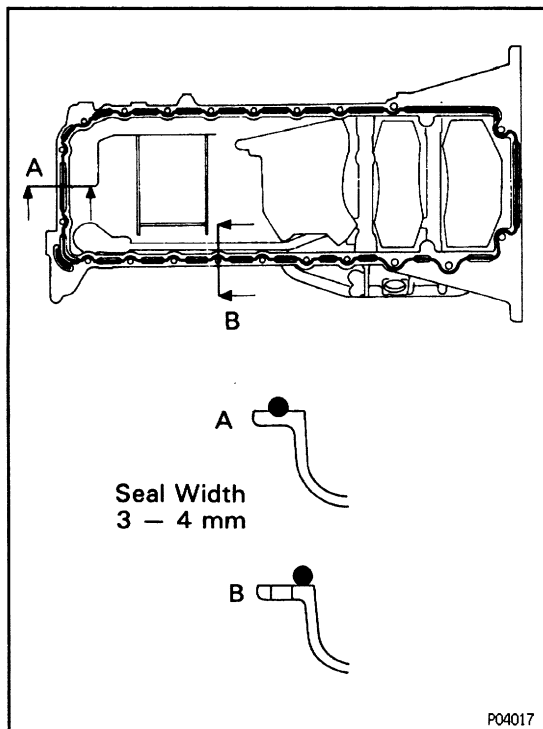
SST 09213-58012, 09330-00021

Torque: 412 N-m (4,200 kgf-cm, 304 ft-lbf)

11. INSTALL NO.1 OIL PAN

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

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- 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 No.1 oil pan as shown in the illustration.

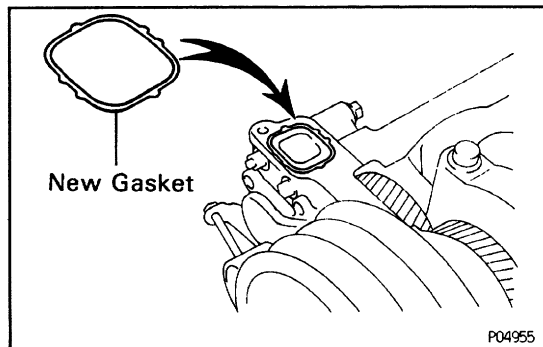
Seal packing:

Part No. 08826-00080 or equivalent

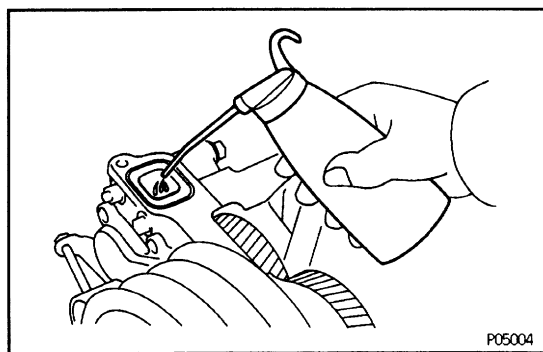
- Install a nozzle that has been cut to a 3 - 4 mm (0.12 - 0.16 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

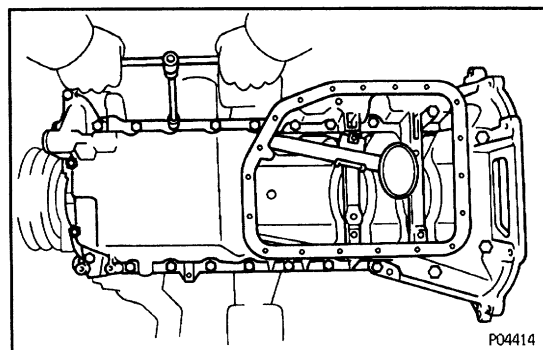
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install a new gasket in position.



(d) Pour in approximately 15 cm³ (0.9 cu in.) of engine oil in position.



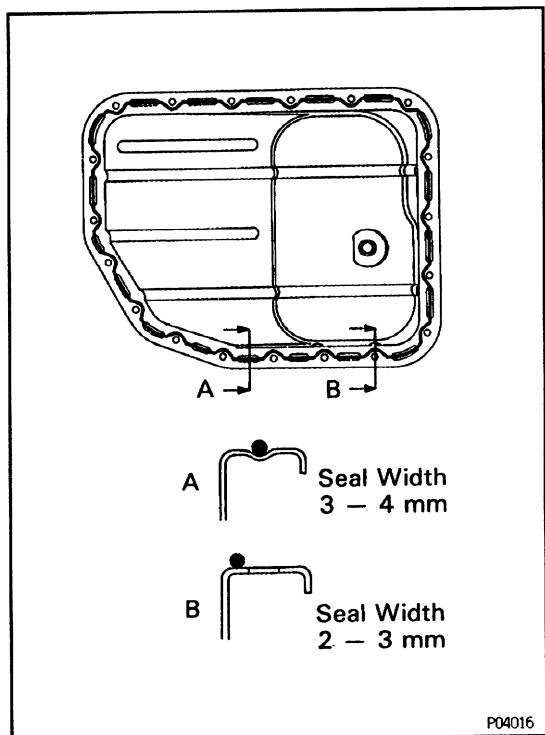
(e) Install the No. 1 oil pan with the 21 bolts and two nuts.

14mm head

Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)

12mm head

Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)



12. INSTALL NO.2 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the No.1 oil pan.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- 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 No.2 oil pan as shown in the illustration.

NOTICE: Do not use a solvent which will affect the painted surfaces.

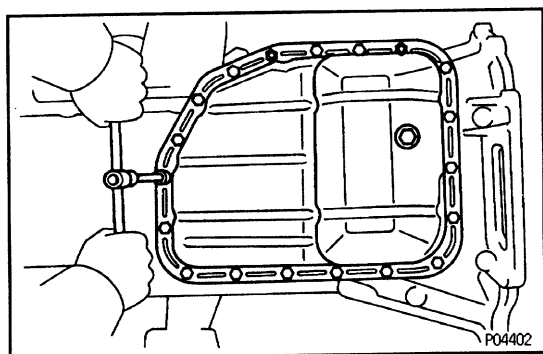
Seal packing:

Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening or 3 - 4 mm (0.012 - 0.016 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

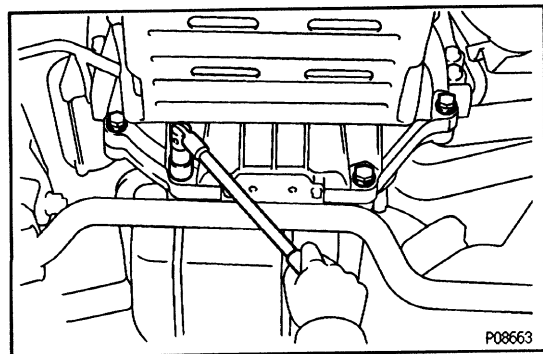
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install the No.2 oil pan with the 17 bolts and two nuts.

Torque: 7.8 N-m (80 kgf-cm, 69 in.-lbf) for Bolt

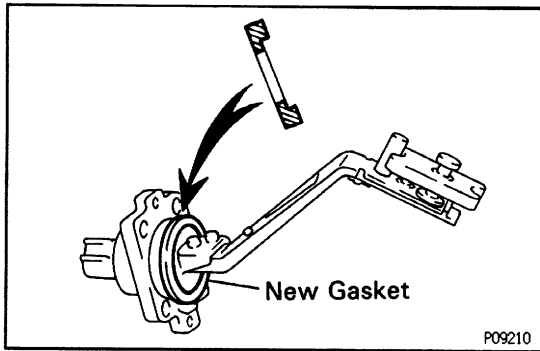
Torque: 8.8 N-m (90 kgf-cm, 78 in.-lbf) for Nut



13. INSTALL BOLTS HOLDING NO.1 OIL PAN TO TRANSMISSION HOUSING

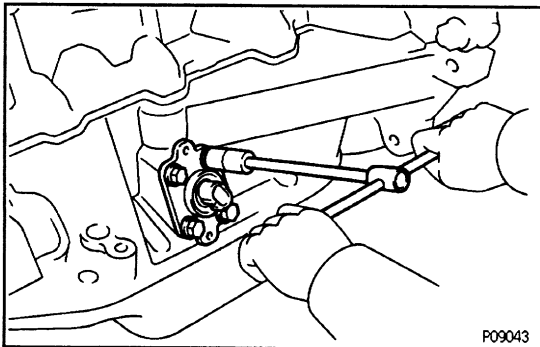
Install the four bolts.

Torque: 72 N-m (730 kgf-cm, 53 ft-lbf)



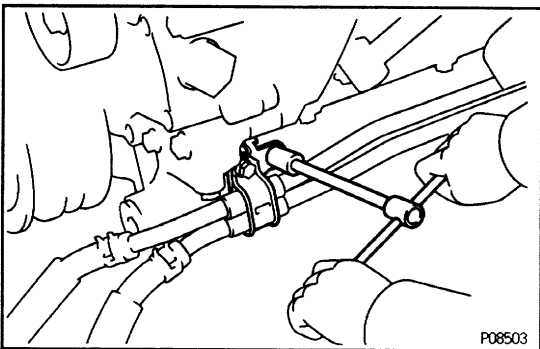
14. INSTALL OIL LEVEL SENSOR

(a) Install a new gasket to the level sensor.

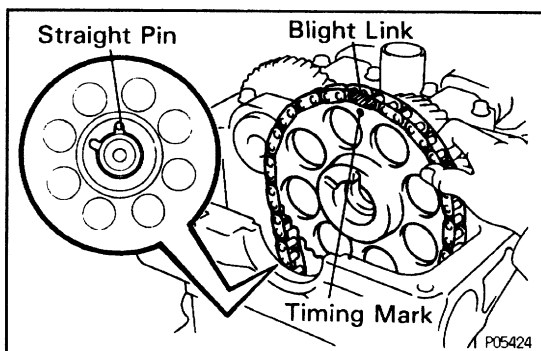


(b) Install the level sensor with the four bolts.

Torque: 5.4 N-m (55 kgf-cm, 48 in.-lbf)



15. CONNECT OIL COOLER PIPE BRACKET TO NO.1 OIL PAN

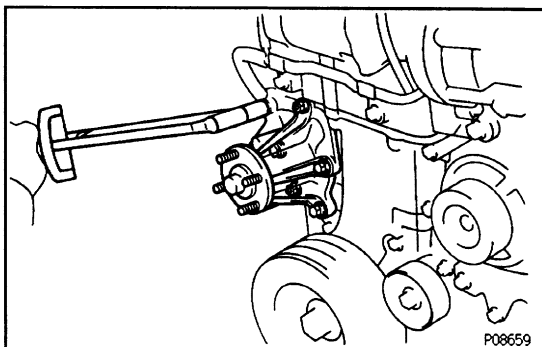


16. INSTALL CYLINDER HEAD

(See page [EG-65](#))

NOTICE: However, for the installation of the camshaft timing gear and timing chain, follow the blow procedure.

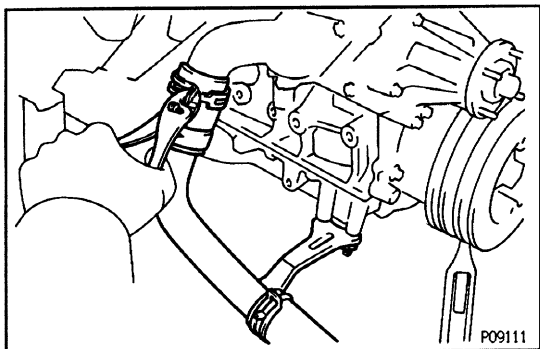
Align the blight link of the timing chain and camshaft timing gear mark, end install them to the camshaft.



17. INSTALL WATER PUMP

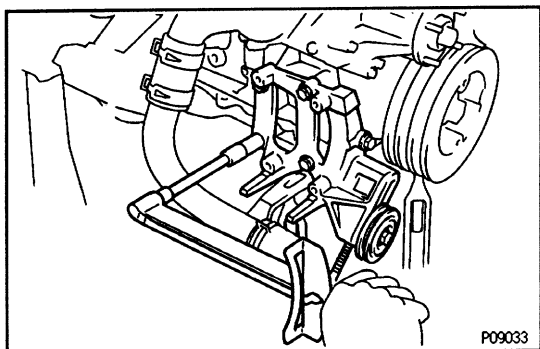
Install a new gasket and water pump with the four bolts and two nuts.

Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)

**18. INSTALL RADIATOR PIPE**

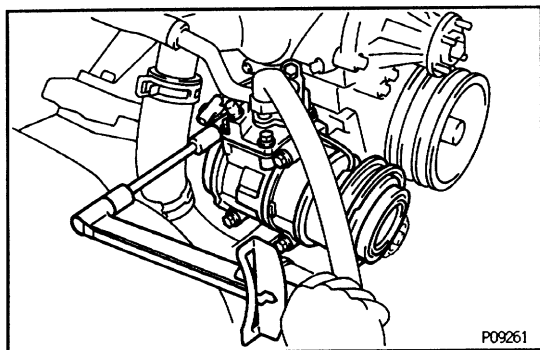
- (a) Connect the No.2 radiator hose to the water inlet.
- (b) Install the two nuts holding the radiator pipe to the No.1 oil pan.

Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)

**19. INSTALL A/C COMPRESSOR AND BRACKET**

- (a) Install the A/C bracket with the five bolts.

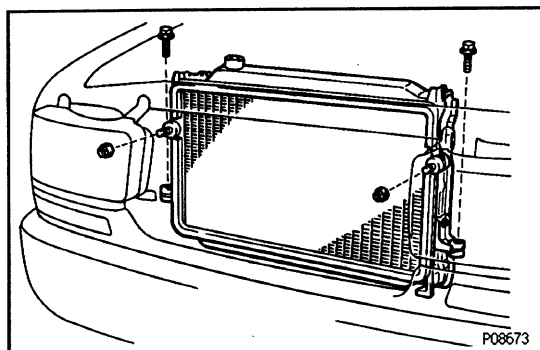
Torque: 37 N-m (375 kgf-cm, 27 ft-lbf)



- (b) Install the A/C compressor with the four bolts.

Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)

- (c) Install and adjust the drive belt.
(See AC section)

**20. INSTALL RADIATOR**

(See page [EG-370](#))

21. FILL WITH ENGINE OIL**22. INSTALL ENGINE UNDER COVER****23. START ENGINE AND CHECK FOR LEAKS**