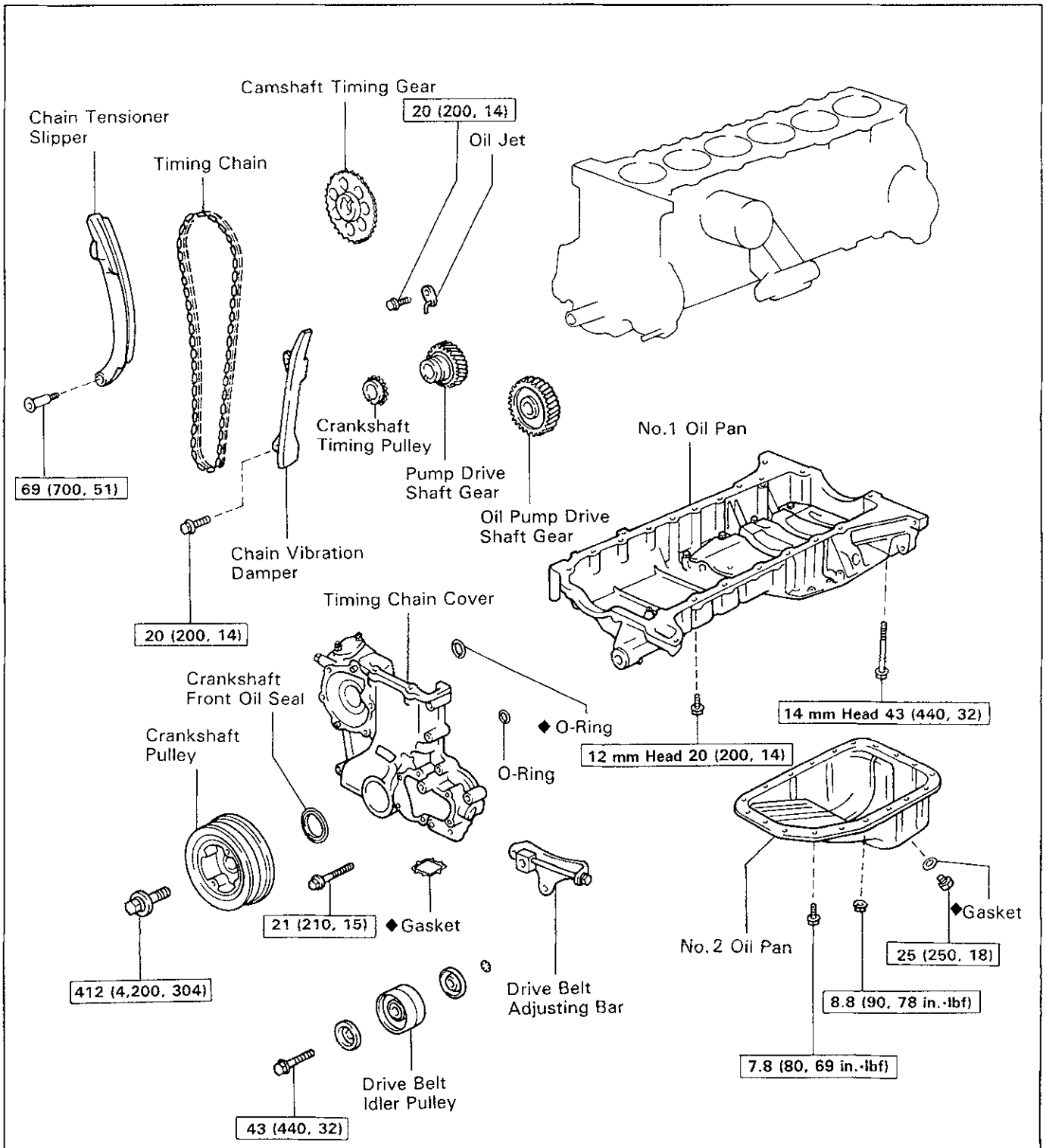
TIMING CHAIN

EG0VG-04

COMPONENTS FOR REMOVAL AND INSTALLATION

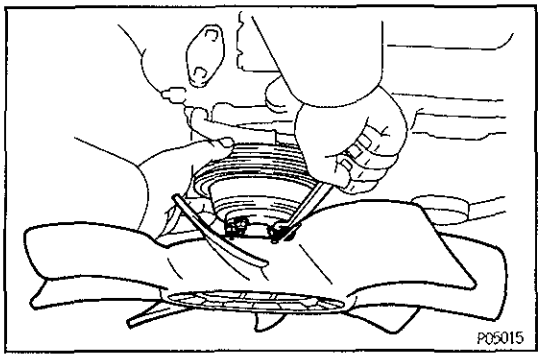


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

EG0VH-02

TIMING CHAIN REMOVAL

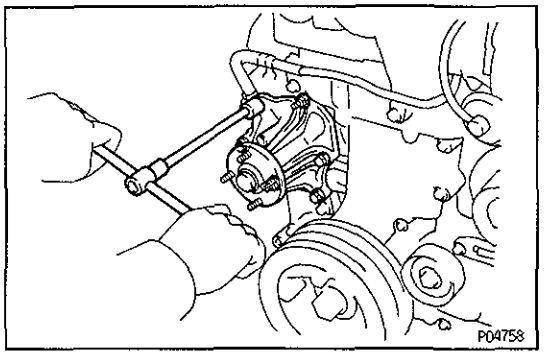


1. REMOVE WATER PUMP

(a) Stretch the belts and loosen the fan pulley mounting nuts.

(b) Loosen the pivot and adjusting bolts of the alternator, and remove the drive belts.

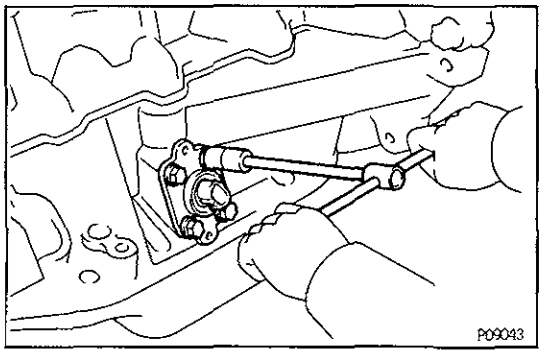
(c) Remove the four nuts, fan with fluid coupling and water pump pulley.



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

2. REMOVE CYLINDER HEAD

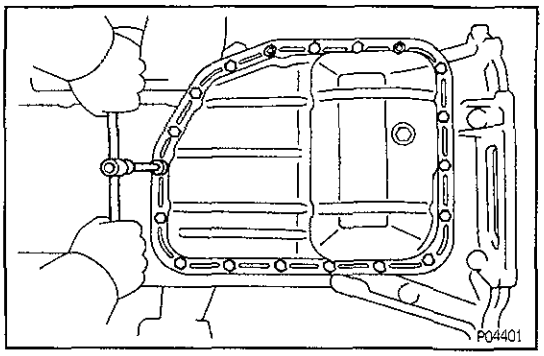
(See page EG–38 or 89)



3. (Europe)
REMOVE OIL LEVEL SENSOR

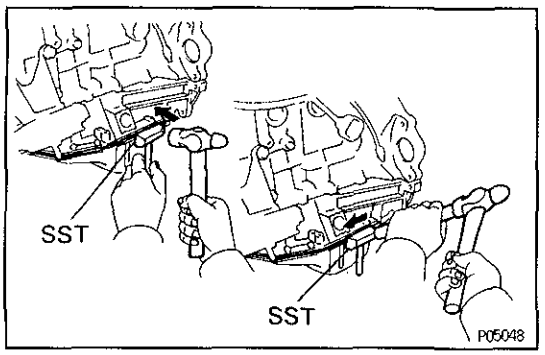
(a) Remove the four bolts and level sensor.

(b) Remove the gasket from the level sensor.



4. REMOVE NO.2 OIL PAN

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

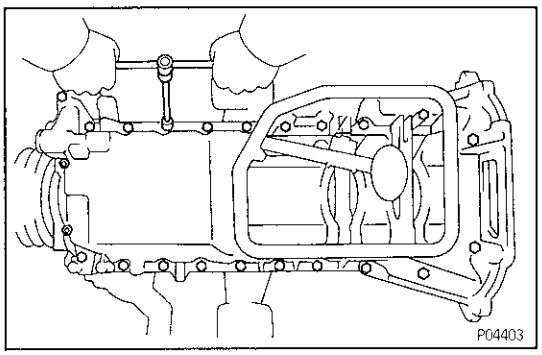


(b) Insert the blade of SST between the No.1 and No.2 oil pans, cut off applied sealer and remove the No.2 oil pan.
SST 09032–00100

NOTICE:

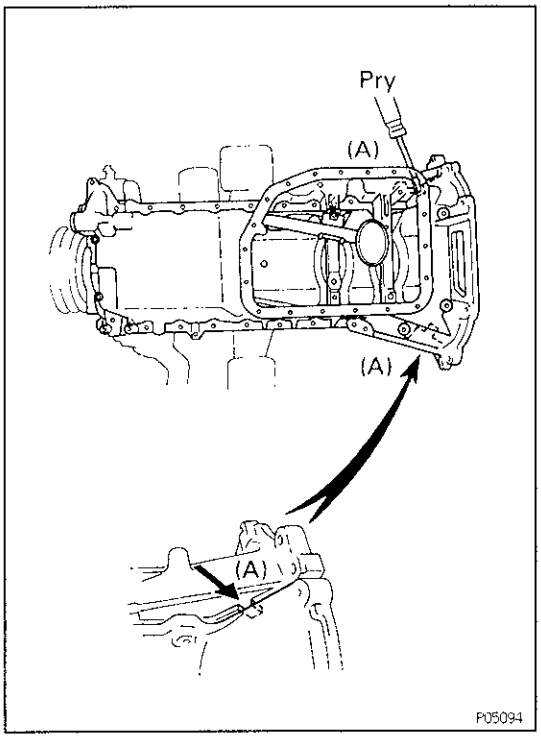
- ***Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan.***
- **Be careful not to damage the oil pan flange.**

EG



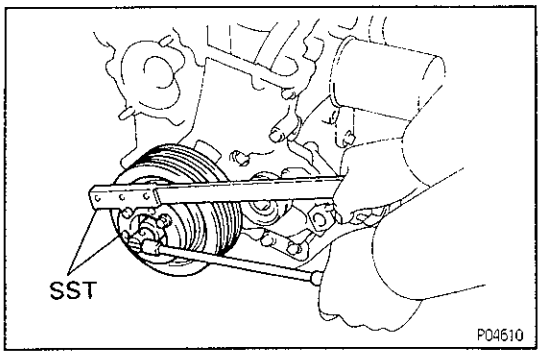
5. REMOVE NO.1 OIL PAN

(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.

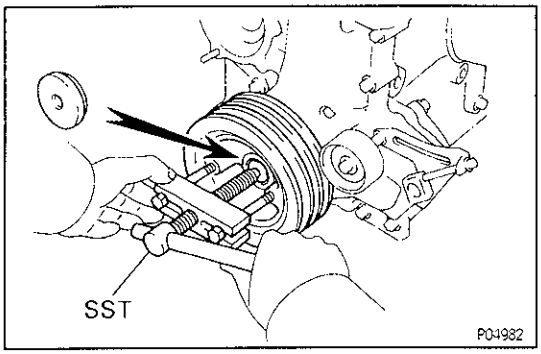
NOTICE: Be careful not to damage the contact surfaces of the cylinder block and No.1 oil pan.



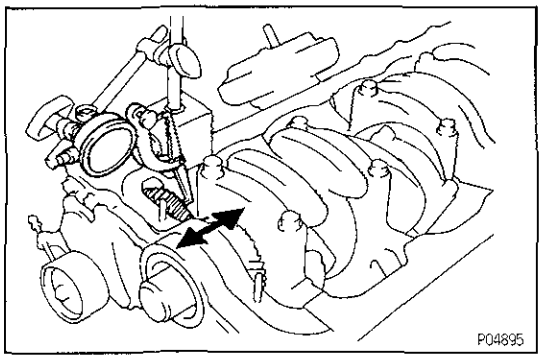
6. REMOVE CRANKSHAFT PULLEY

(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



7. CHECK THRUST CLEARANCE OF OIL PUMP DRIVE SHAFT GEAR

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

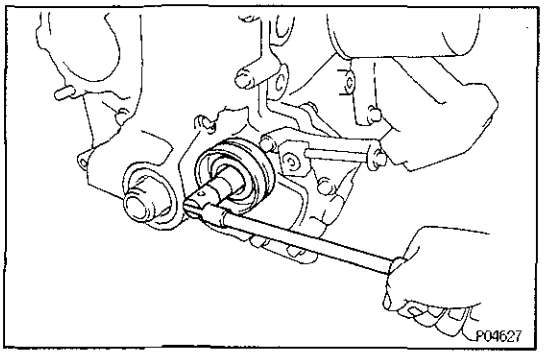
Standard thrust clearance:

0.050 – 0.150 mm (0.0020 – 0.0059 in.)

Maximum thrust clearance:

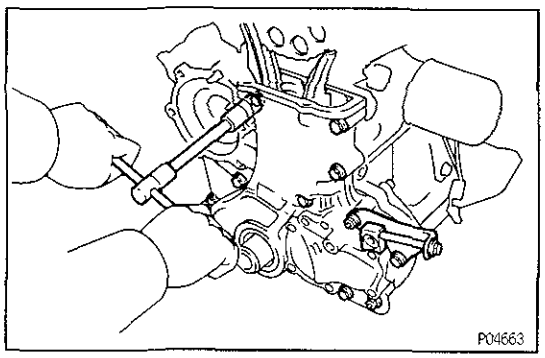
0.30 mm (0.0118 in.)

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



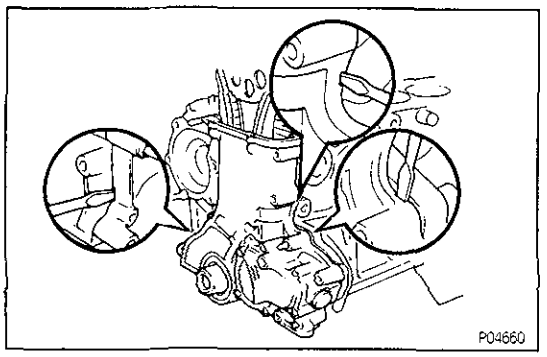
8. REMOVE DRIVE BELT IDLER PULLEY

Remove the bolt and idler pulley.



9. REMOVE TIMING CHAIN COVER

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



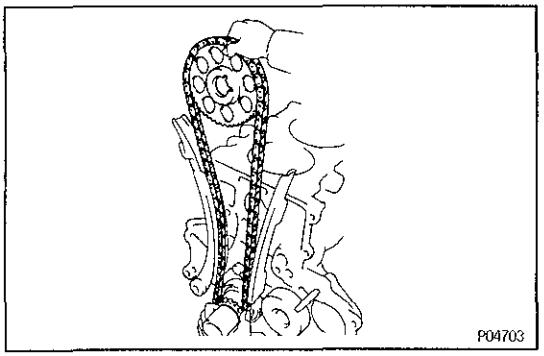
(b) Remove the timing chain cover by prying the portions between the cylinder block and timing chain cover with a screwdriver.

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

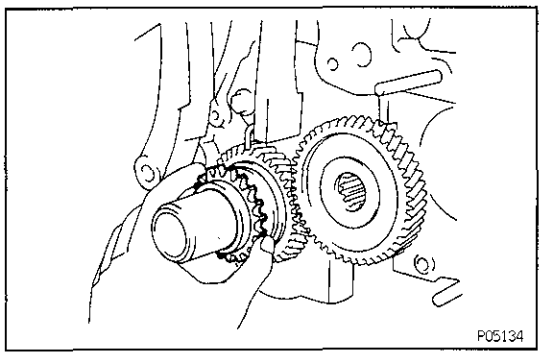
(c) Remove the O–rings from the timing chain cover.

(d) Remove the gasket from the timing chain cover.

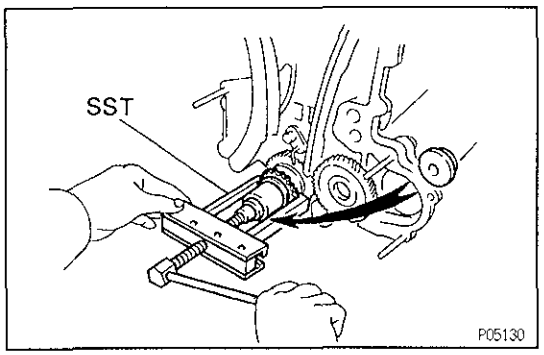
EG



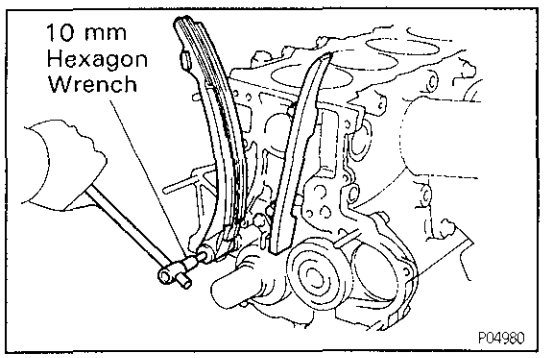
10. REMOVE TIMING CHAIN AND CAMSHAFT TIMING GEAR



11. REMOVE CRANKSHAFT TIMING GEAR



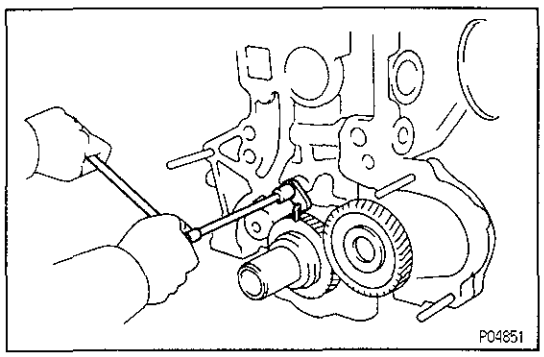
HINT: If necessary, remove the gear with SST.
SST 09213−36020, 09950−20017



12. REMOVE CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

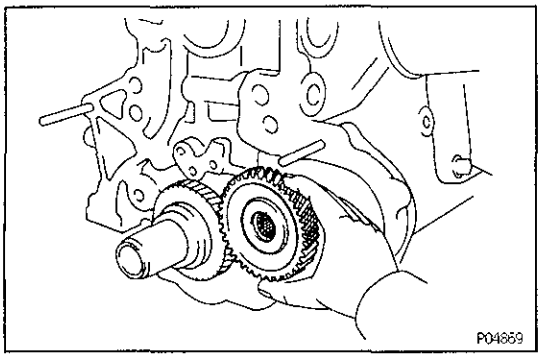
(a) Using a 10mm hexagon wrench, remove the bolt and slipper.

(b) Remove the two bolts and damper.

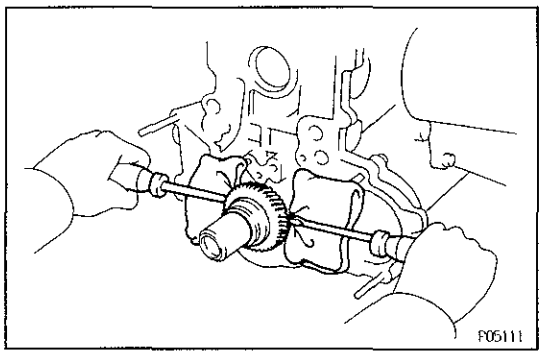


13. REMOVE OIL JET

Remove the bolt and oil jet.



14. REMOVE OIL PUMP DRIVE SHAFT GEAR



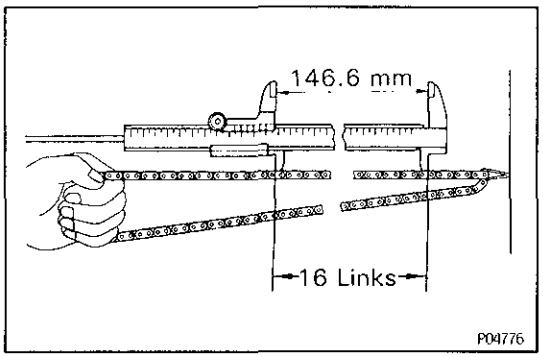
15. REMOVE PUMP DRIVE SHAFT GEAR

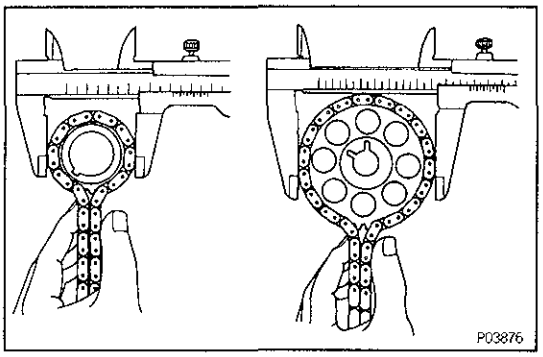
If the pump drive shaft gear cannot be removed by hand, use two screwdrivers.

NOTICE: Position shop rags as shown to prevent damage.

EG0VJ–02

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):

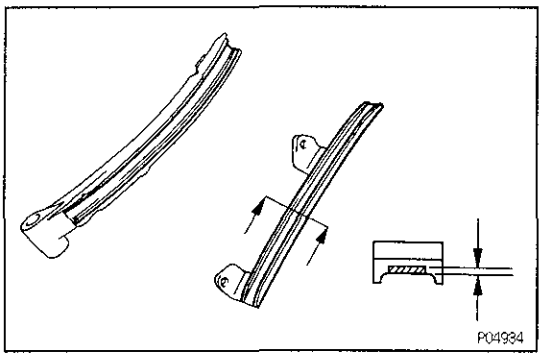
Crankshaft

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.



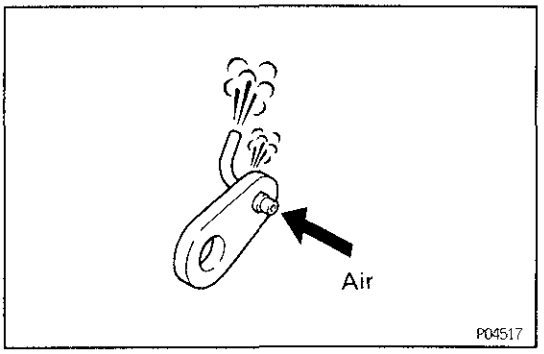
2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

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.

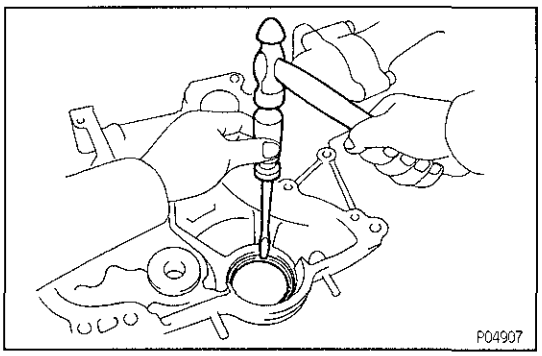
If necessary, replace the oil jet.

EG0KO-03

CRANKSHAFT FRONT OIL SEAL REPLACEMENT

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

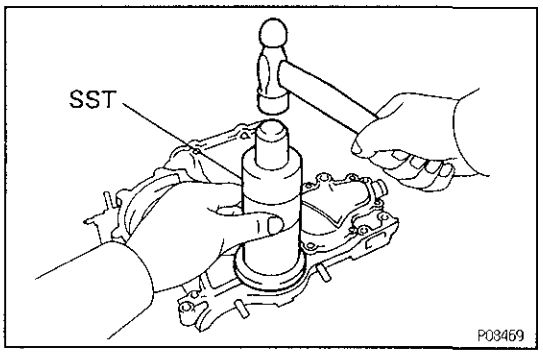
EG



REPLACE CRANKSHAFT FRONT OIL SEAL

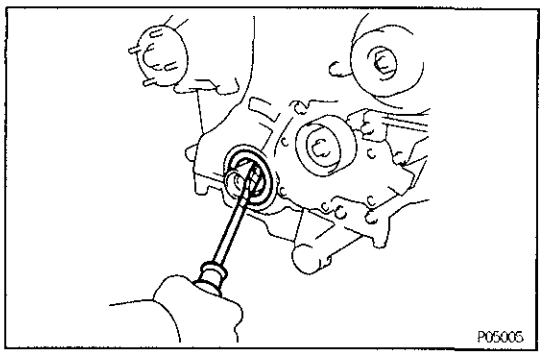
A. If timing chain cover is removed from cylinder block:

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



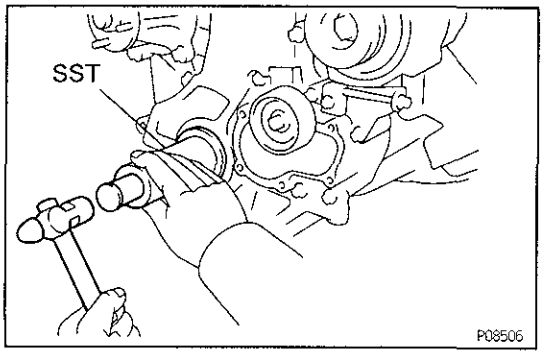
(b) Using SST and a hammer, tap in a new oil seal until its surface is flush with the timing chain cover edge.
SST 09316–60010 (09316–00010, 09316–00050)

(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.



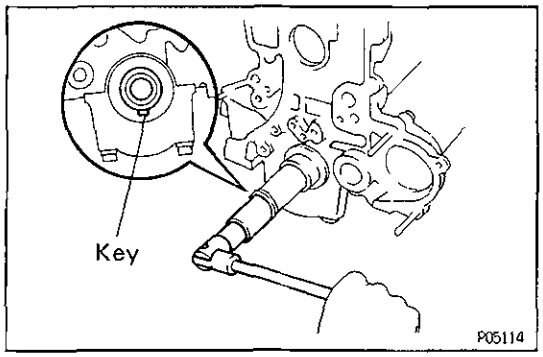
(b) Apply MP grease to a new oil seal lip.

(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)

EG27M–01

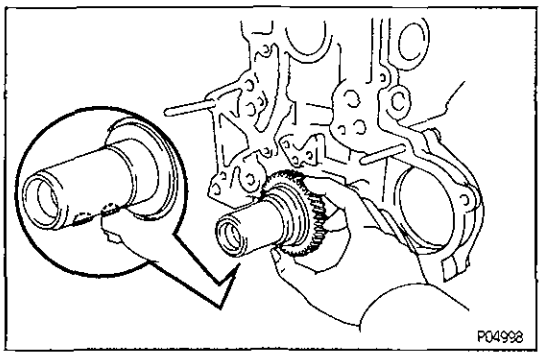
TIMING CHAIN INSTALLATION

(See page EG–120)

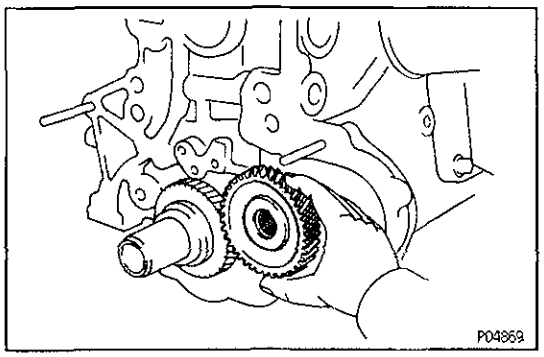


1. SET CRANKSHAFT

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



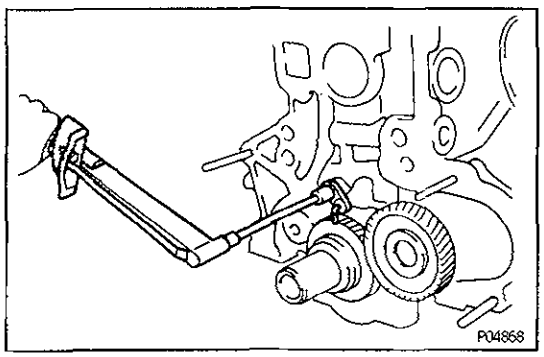
2. INSTALL PUMP DRIVE SHAFT GEAR



3. INSTALL OIL PUMP DRIVE SHAFT GEAR

(a) Apply light coat of engine oil on the shaft portion of the gear.

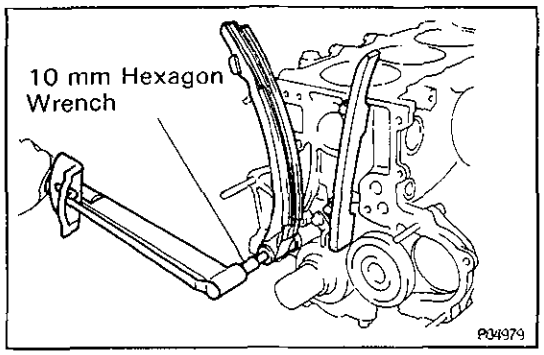
(b) Install the gear.



4. INSTALL OIL JET

Install the oil jet with the bolt.

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



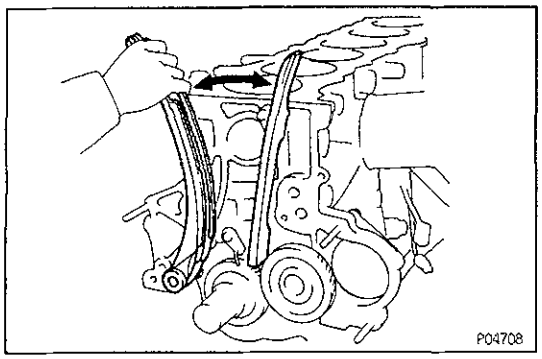
5. INSTALL CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

(a) Install the damper with the two bolts.

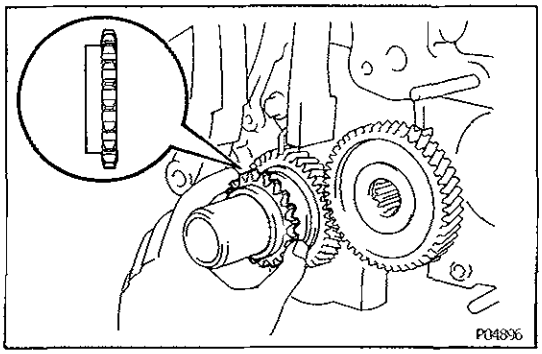
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(b) Using a 10 mm hexagon wrench, install the slipper with the bolt.

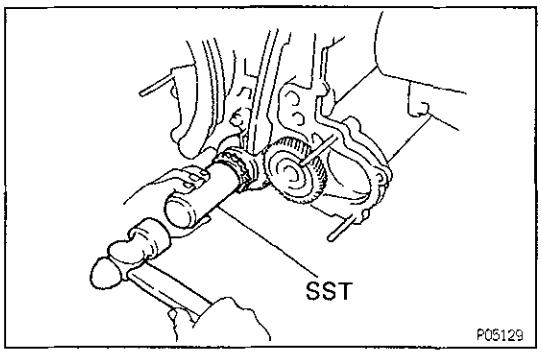
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)



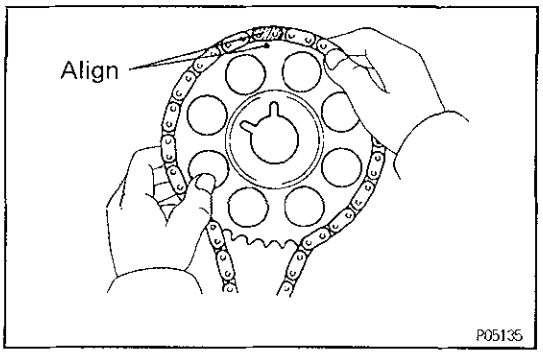
(c) Check that the slipper moves smoothly.



6. INSTALL CRANKSHAFT TIMING GEAR

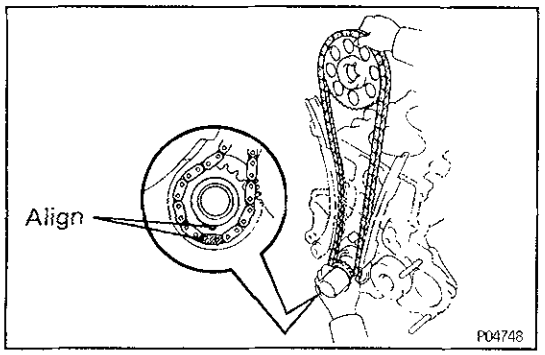


HINT: If necessary, install the gear with SST.
SST 09636–20010

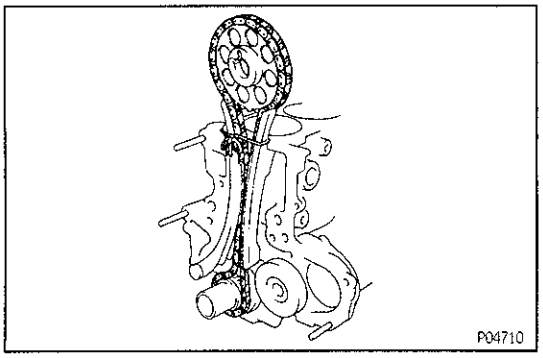


7. INSTALL TIMING CHAIN AND CAMSHAFT TIMING GEAR

(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.



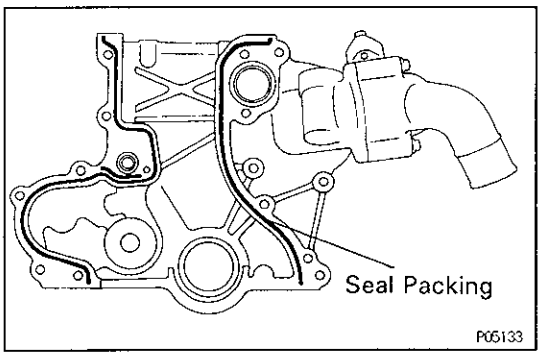
(c) Tie the timing chain with a cords as shown in the illustration and make sure it doesn't come loose.

EG

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.

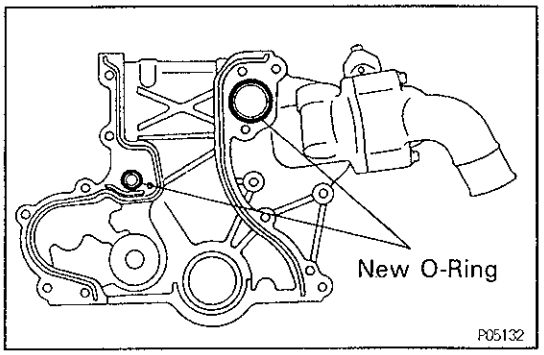
Seal packing:

Part No.08826—00080 or equivalent

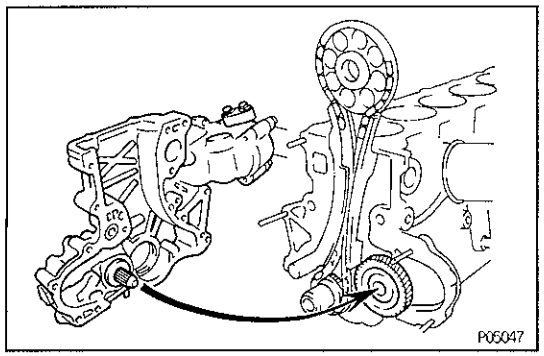
- Install a nozzle that has been cut to a 2 — 3 mm (0.08 — 0.12 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

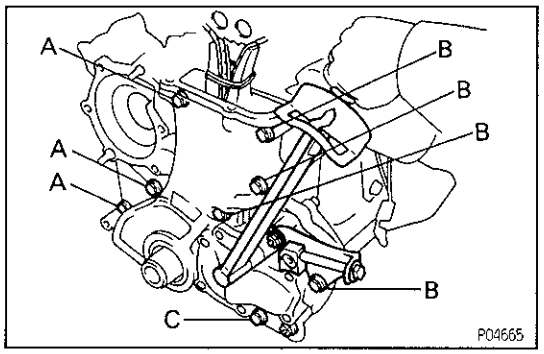
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



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

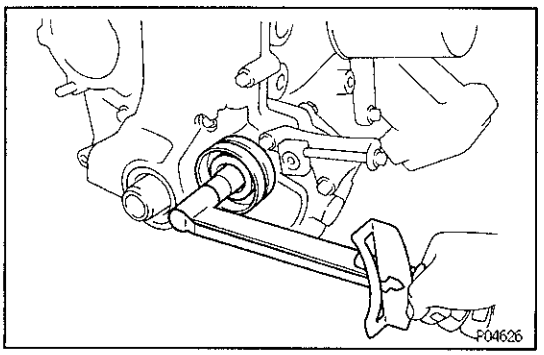


(d) Engage the gear of the oil pump drive rotor with the gear of the oil pump drive gear, and slide the oil pump.

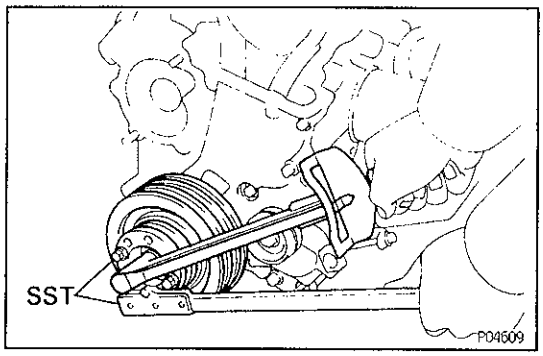


(e) Install the oil pump and drive belt adjusting bar with the nine bolts and two nuts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
HINT: Each bolt length is indicated in the illustration.

A 30 mm (1.18 in.)
B 50 mm (1.97 in.)
C 60 mm (2.38 in.)

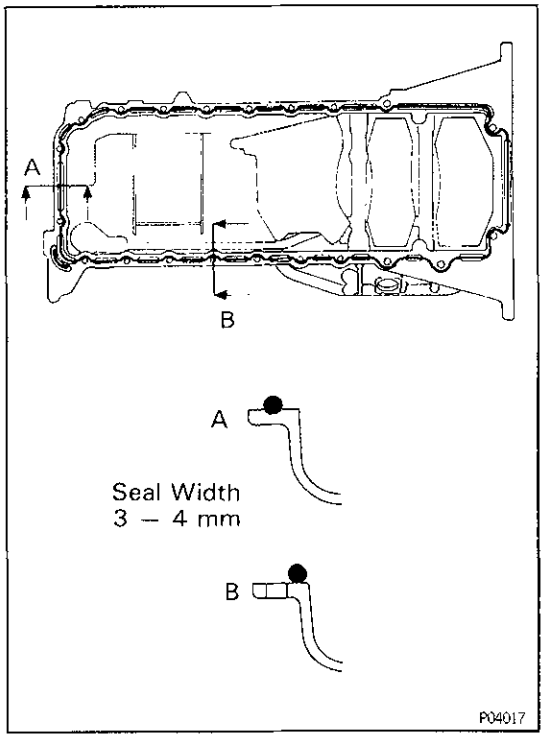


9. INSTALL DRIVE BELT IDLER PULLEY
Install the pulley with the bolt.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



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.

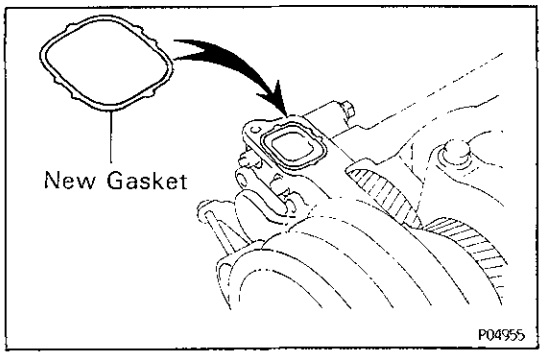
Seal packing:

Part No.08826–00080 or equivalent

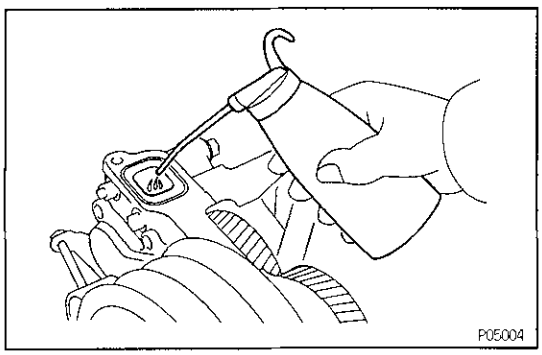
- Install a nozzle that has been cut to a 3 – 4 mm (0.12 – 0.16 in.) opening.

HINT: Avoid applying an excessive amount to the surface.

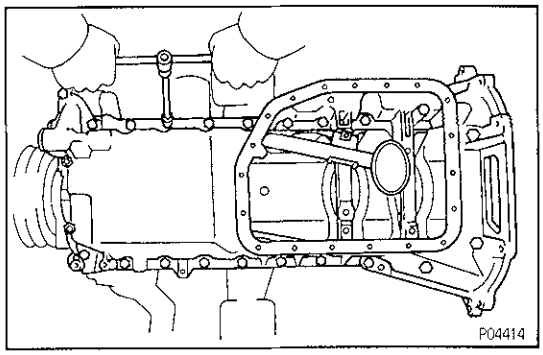
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Install a new gasket in position.

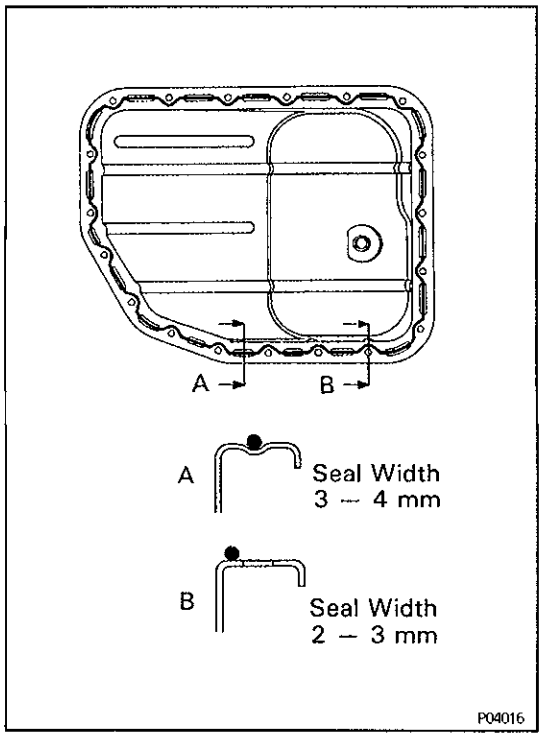


(d) Pour in approximately 15 cm^3 (0.9 cu in.) of engine oil in position.



(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.

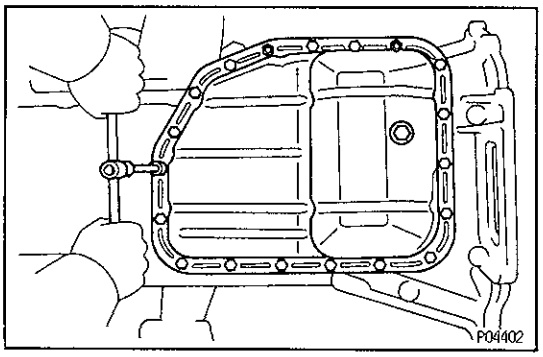
(b) Apply seal packing to the No.2 oil pan as shown in the illustration.

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.



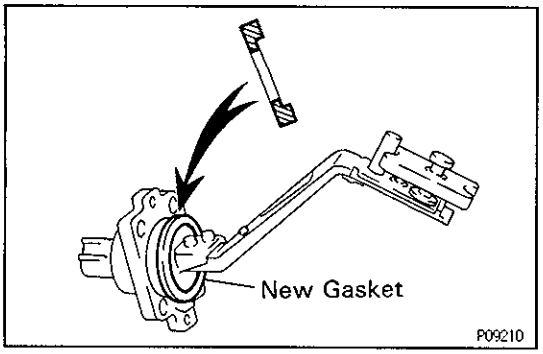
(c) Install the No.2 oil pan with the 17 bolts and two nuts.

Bolt

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

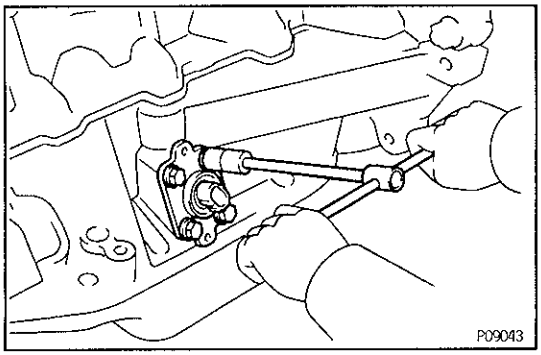
Nut

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

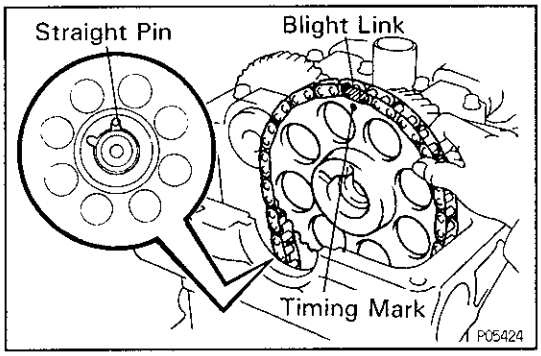


13. (Europe)
INSTALL OIL LEVEL SENSOR

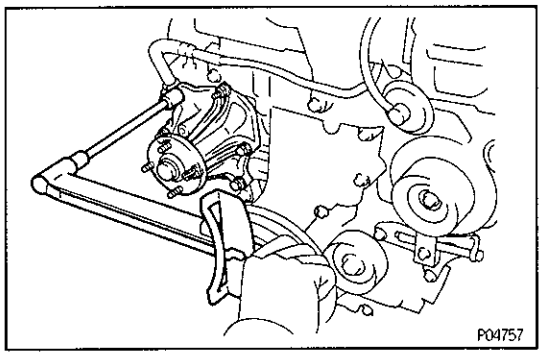
(a) Install a new gasket to the level sensor.



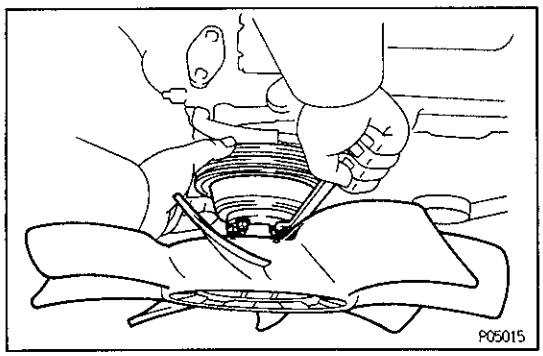
(b) Install the level sensor with the four bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



14. INSTALL CYLINDER HEAD (See page EG−70 or 106)
NOTICE: However, for the instllation 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, and install them to the camshaft.



15. INSTALL WATER PUMP
Install a new gasket and water pump with the four bolts and two nuts.
Torque: 21N·m (210 kgf·cm, 14 ft·lbf)



16. INSTALL WATER PUMP PULLEY, FAN WITH FLUID COUPLING AND DRIVE BELTS
(a) Install the water pump pulley and fan with fluid coupling with the four nuts.
(b) Place the drive belts on to each pulley.
(c) Stretch the belts tight and tighten the four nuts.
(d) Adjust the drive belts.