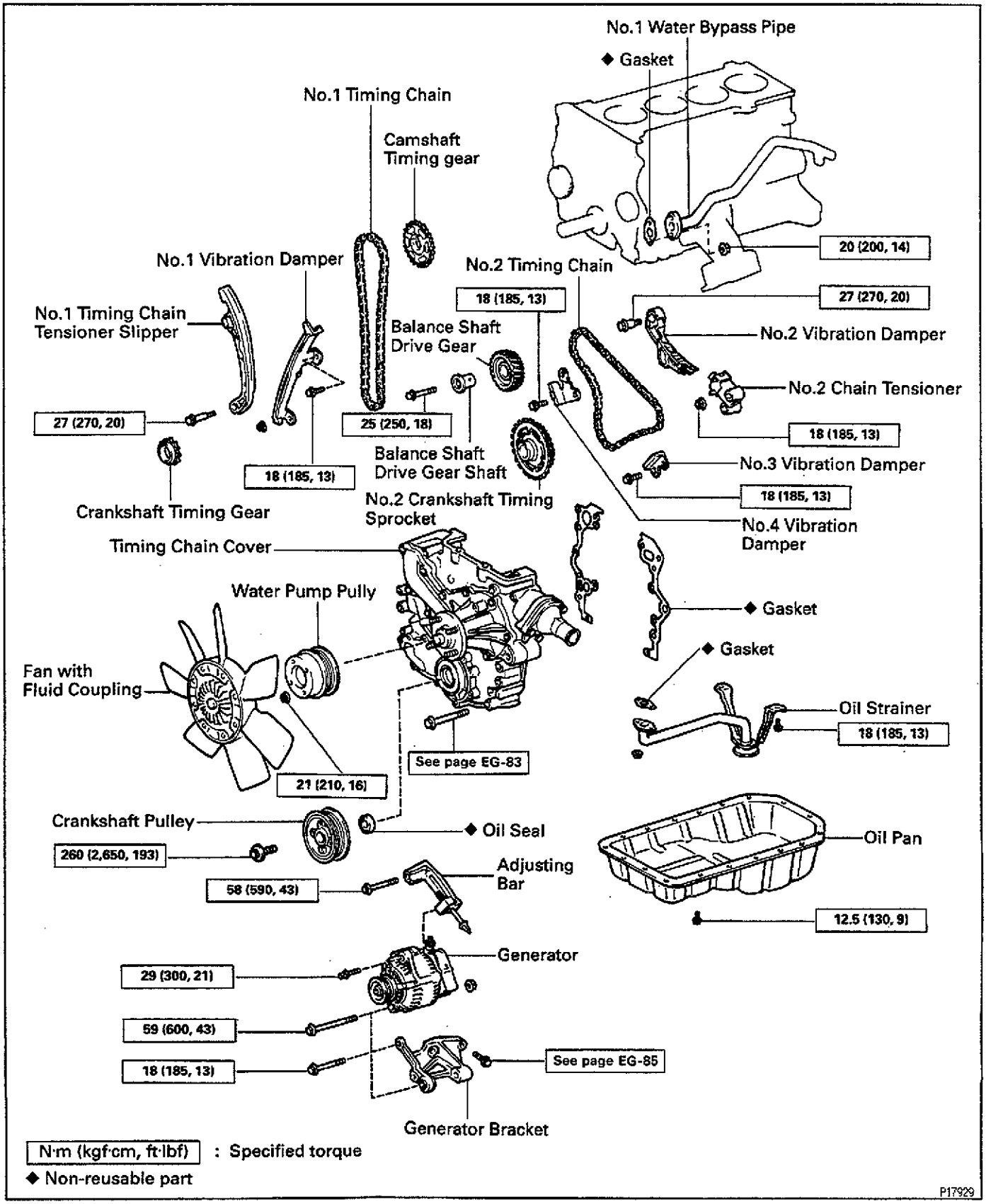
EG

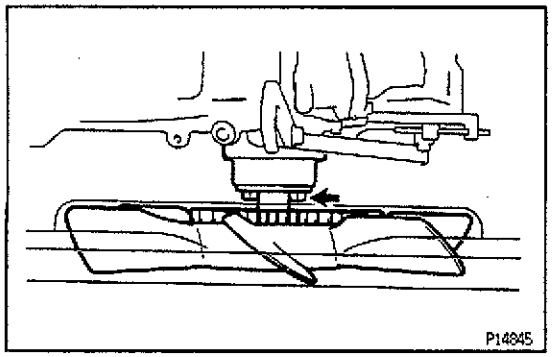
TIMING CHAIN

COMPONENTS FOR REMOVAL AND INSTALLATION



EG3WF-01

TIMING CHAIN REMOVAL



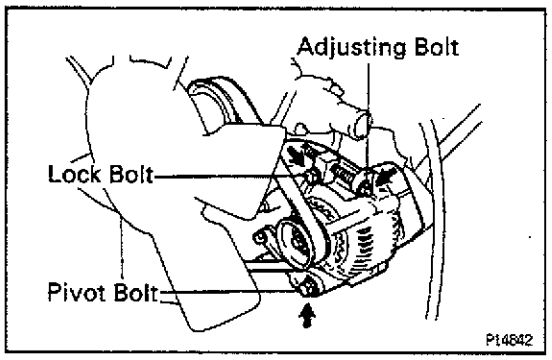
1. **DRAIN ENGINE OIL**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE CYLINDER HEAD**
   (See page EG–35)
4. **REMOVE DRIVE BELT, FAN WITH FLUID COUPLING AND WATER PUMP PULLEY**

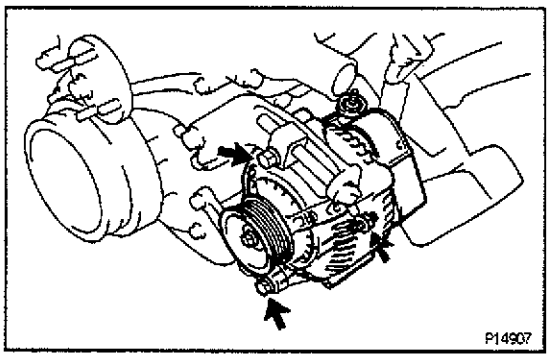
(a) Stretch the belt and loosen the water pump pulley mounting nuts.

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

(c) Remove the 4 water pump pulley mounting nuts.

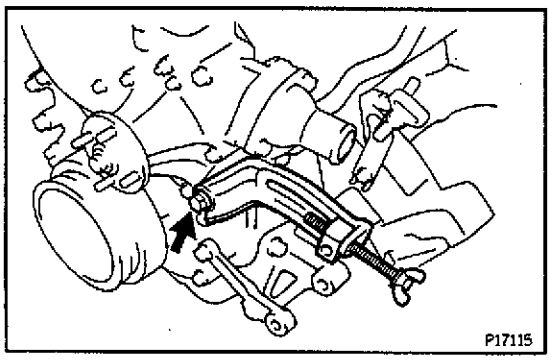
(d) Pull out the fan with fluid coupling and water pump pulley.



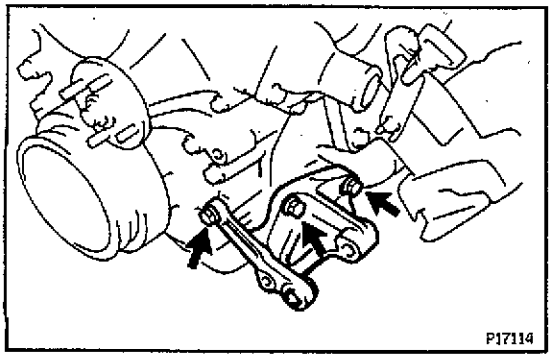


5. **REMOVE ALTERNATOR, ADJUSTING BAR AND BRACKET**

(a) Remove the lock, pivot bolts and the alternator.

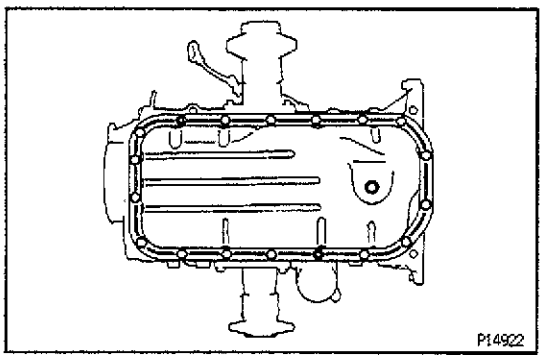


(b) Remove the bolt and adjusting bar.



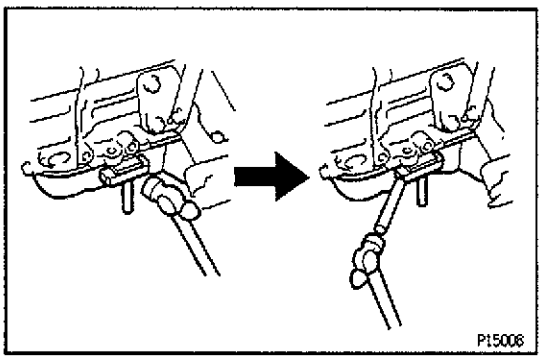
(c) Remove the 3 bolts and bracket.

EG

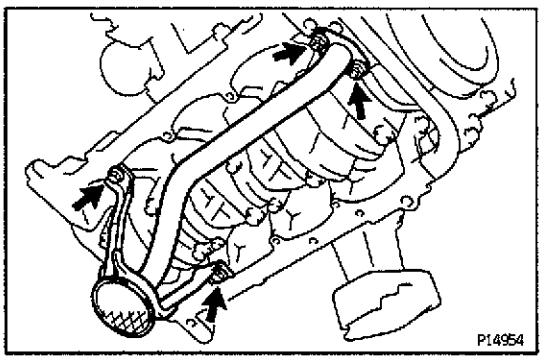


6. REMOVE OIL PAN

(a) Remove the 16 mounting bolts and 2 nuts.

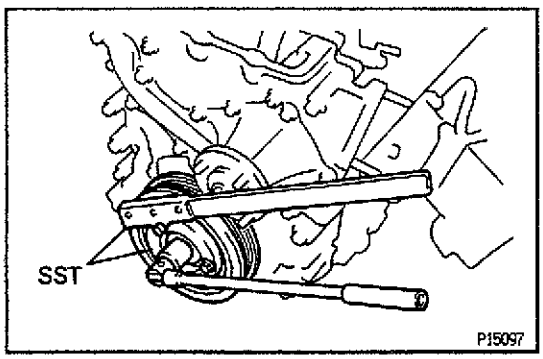


(b) Insert the blade of SST between the cylinder block and oil pan, cut off applied sealer and remove the oil pan.
SST 09032–00100
NOTICE: Be careful not to damage the oil pan flanges of the oil pan and cylinder block.



7. REMOVE OIL STRAINER

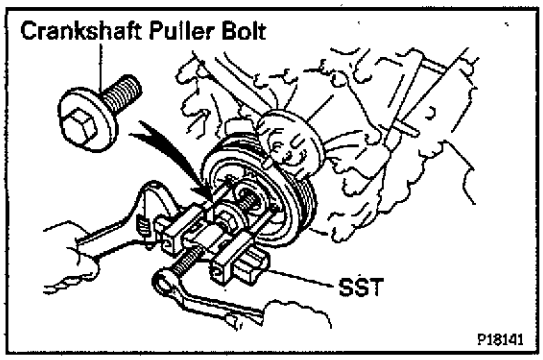
Remove the 2 bolts, 2 nuts, oil strainer and gasket.



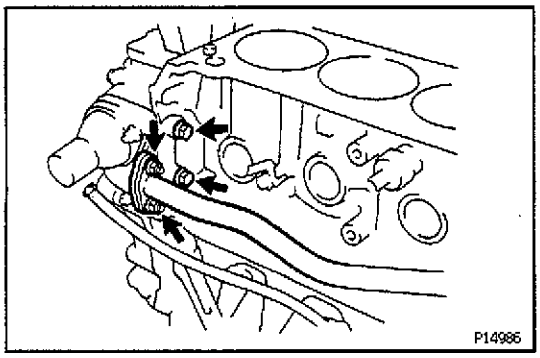
8. REMOVE CRANKSHAFT PULLEY

(a) Using SST, remove the pulley bolt.
SST 09213–54015, 09330–00021

(b) Remove the crankshaft pulley.



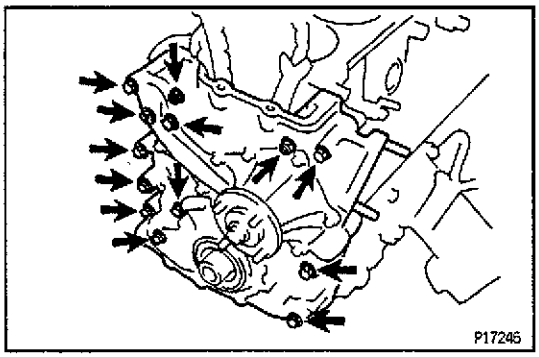
HINT: If necessary, remove the pulley with SST and crankshaft pulley bolt.
SST 09950–50010 (09951–05010, 09952–05010, 09953–05010, 09954–05020)



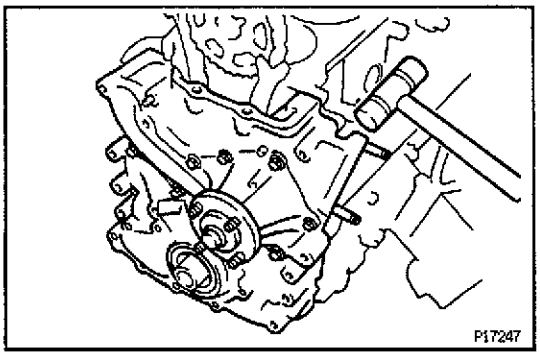
9. REMOVE TIMING CHAIN COVER

(a) Remove the 2 water bypass pipe mounting nuts.

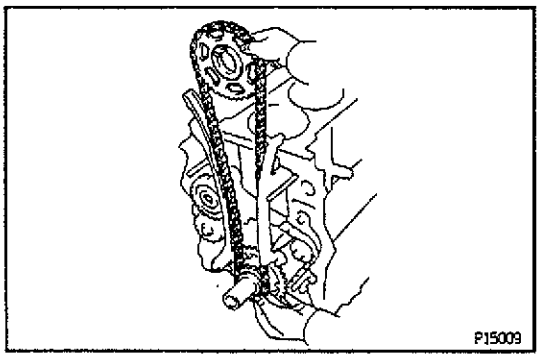
(b) Remove the 2 timing chain cover mounting bolts.



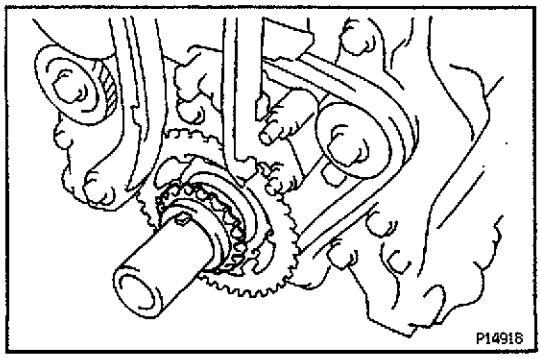
(c) Remove the 11 mounting bolts and 2 mounting nuts.



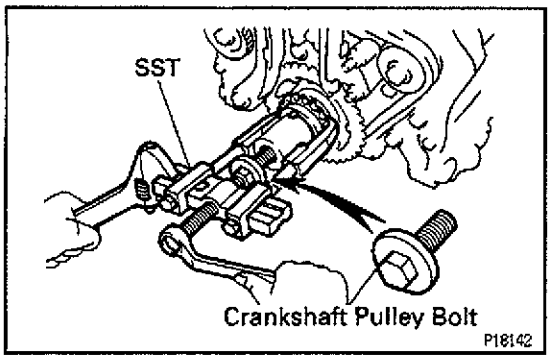
(d) Using a plastic – faced hammer, loosen the chain cover and remove the timing chain cover and 3 gaskets.



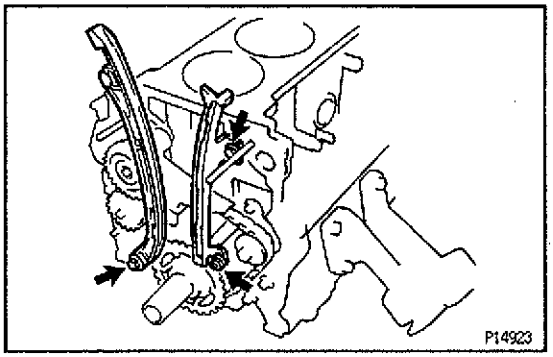
10. REMOVE NO.1 TIMING CHAIN AND CAMSHAFT TIMING GEAR



11. REMOVE CRANKSHAFT TIMING GEAR

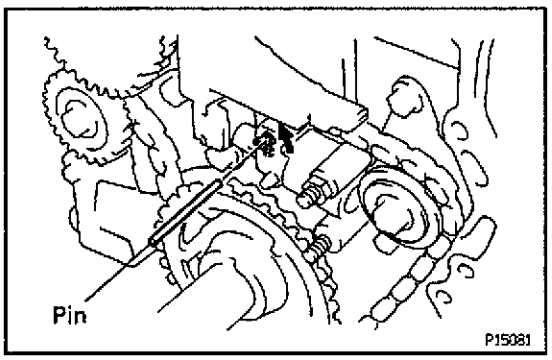


HINT: If necessary, remove the gear with SST and crankshaft pulley bolt.
SST 09950—40010 (09951—04010, 09952—04010, 09953—04010, 09954—04010, 09955—04060)



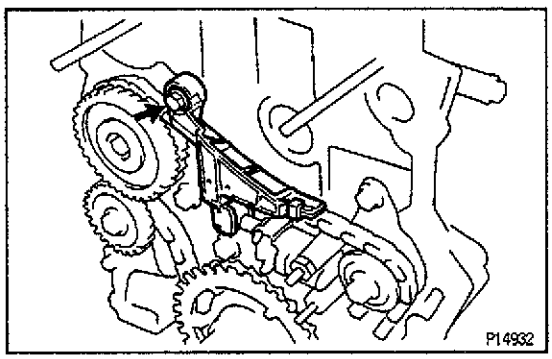
12. REMOVE NO.1 TIMING CHAIN TENSIONER SLIPPER AND NO.1 VIBRATION DAMPER

(a) Remove the bolt and slipper.
(b) Remove the bolt, nut and No.1 damper.

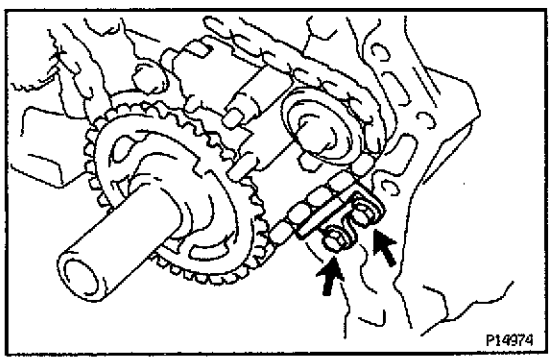


13. REMOVE NO.2, NO.3 VIBRATION DAMPERS AND NO.2 CHAIN TENSIONER

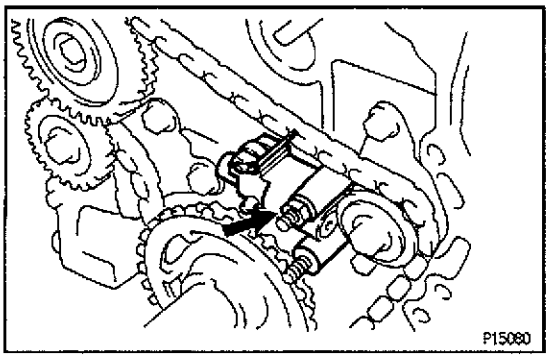
(a) Install a pin to the No.2 chain tensioner and lock the plunger.



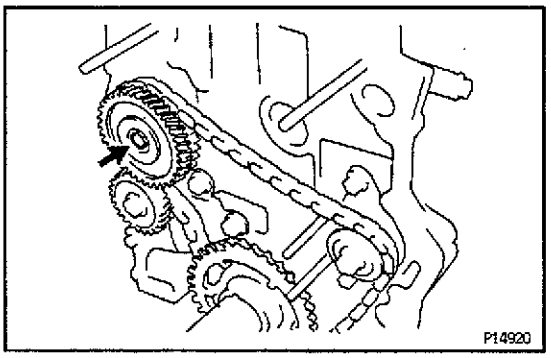
(b) Remove the bolt and No.2 damper.



(c) Remove the 2 bolts and No.3 damper.

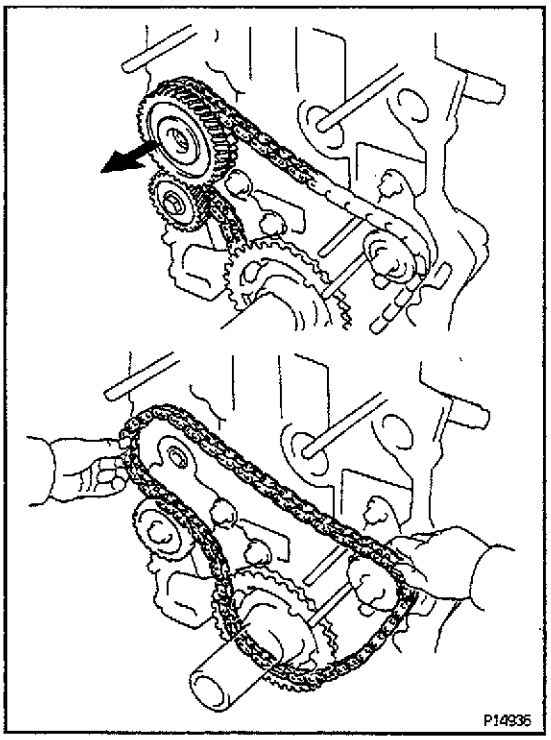


(d) Remove the nut and No.2 chain tensioner.



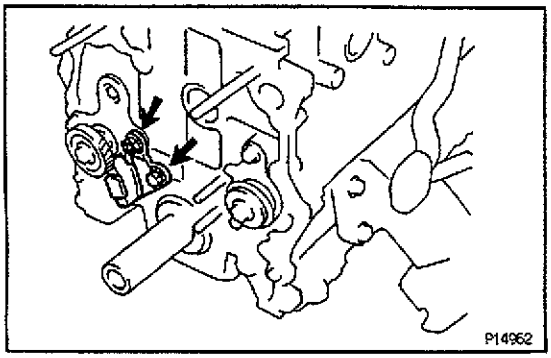
14. REMOVE NO.2 TIMING CHAIN

(a) Remove the bolt from the balance shaft drive gear.



(b) Remove the balance shaft drive gear with shaft.

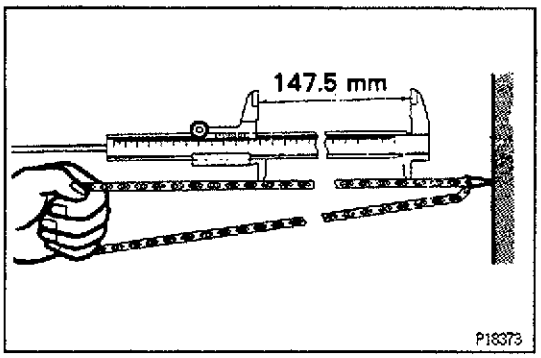
(c) Remove the No.2 timing chain with the No.2 crankshaft timing sprocket.

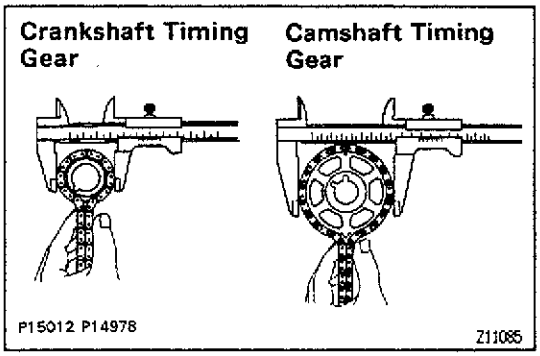


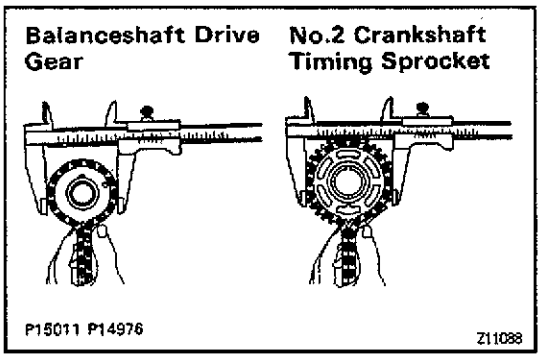
15. REMOVE NO.4 VIBRATION DAMPER

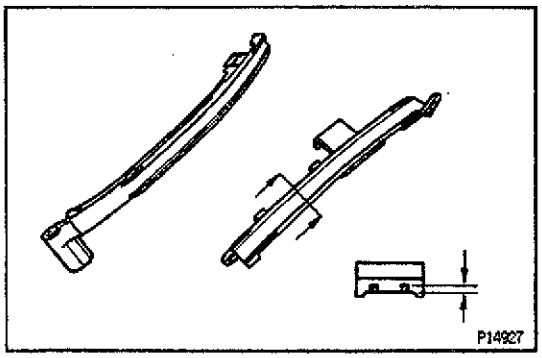
Remove the 2 bolts and No.4 damper.

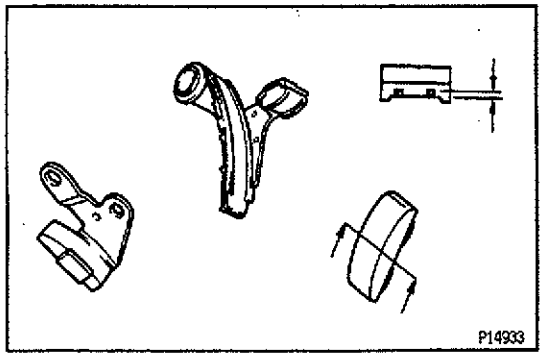
EG











TIMING CHAIN COMPONENTS INSPECTION

1. INSPECT TIMING CHAINS, TIMING GEARS AND TIMING SPROCKETS

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

Maximum chain length:

No.1 Timing chain

147.5 mm (5.807 in.)

No.2 Timing chain

123.6 mm (4.866 in.)

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

HINT: Make the same measurements pulling at 3 or more places selected at random.

(b) Wrap the chain around the timing gear and timing sprocket.

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

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

Minimum gear diameter (w/ chain):

Camshaft

113.8 mm (4.480 in.)

Crankshaft

59.4 mm (2.339 in.)

Balance shaft

75.9 mm (2.988 in.)

Minimum sprocket diameter (w/ chain):

No.2 crankshaft

96.7 mm (3.807 in.)

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

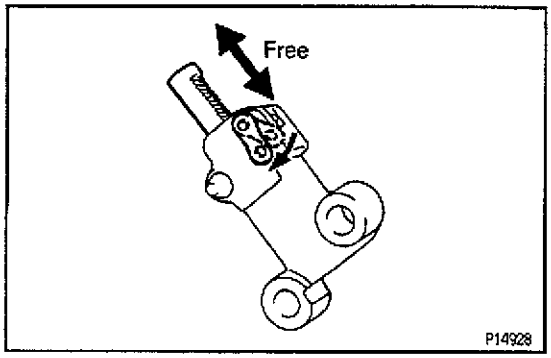
2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPERS

Measure the chain tensioner slipper and vibration damper wear.

Maximum wear:

1.0 mm (0.039 in.)

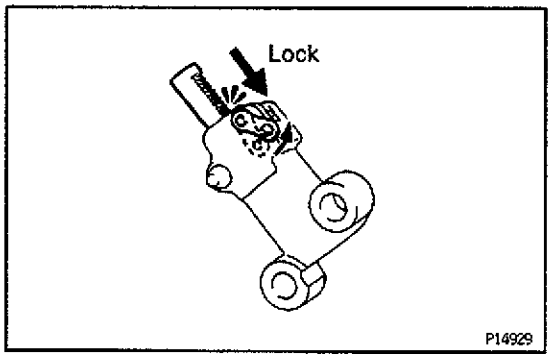
If the wear is greater than maximum, replace the slipper and/or dampers.



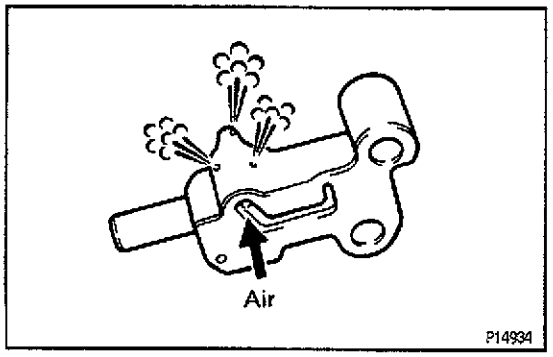
3. INSPECT NO.2 CHAIN TENSIONER

A. Inspect chain tensioner

(a) Check that the plunger moves smoothly when the ratchet pawl is raised with your finger.



(b) Release the ratchet pawl and check that the plunger is locked in place by the ratchet pawl and does not move when pushed with your finger.



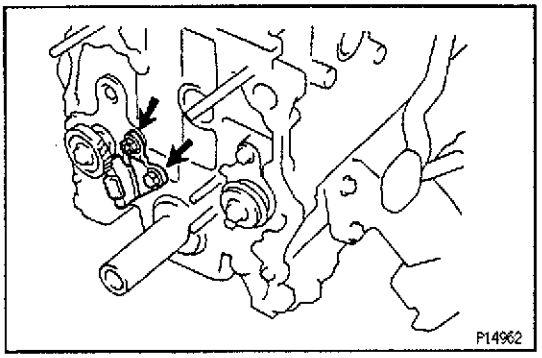
B. Inspect oil jet (No.2 chain tensioner).

Check the oil jet for damage or clogging.

If necessary, replace the oil jet (No.2 chain tensioner).

EG2WG-01

TIMING CHAIN INSTALLATION

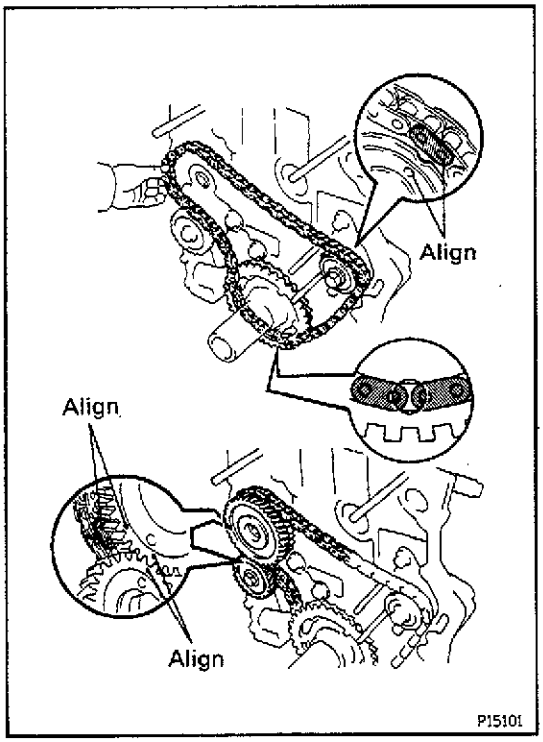


(See Components for Removal and Installation)

NOTICE: Check that No.1 cylinder is at TDC and that the weights of the No.1 and No.2 balance shafts are at the bottom side.

1. INSTALL NO.4 VIBRATION DAMPER

Install the No.4 damper with the 2 bolts.



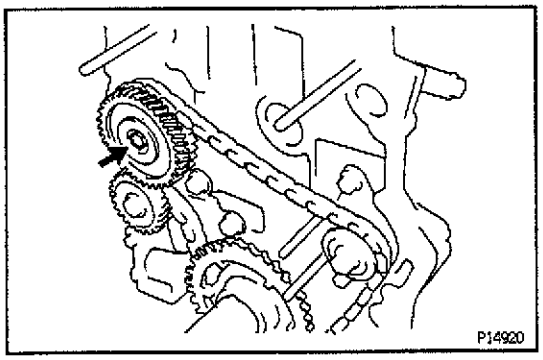
2. INSTALL NO.2 TIMING CHAIN

(a) Install the No.2 timing chain by matching its mark links with the timing marks on the No.2 crankshaft timing sprocket and balance shaft timing sprocket.

(b) Fit the other mark link of No.2 timing chain onto the sprocket behind the large timing mark of the balance shaft drive gear.

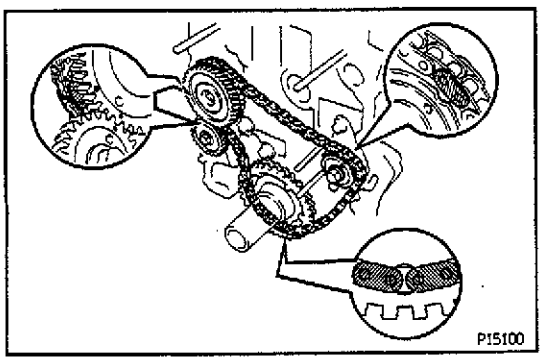
(c) Insert the balance shaft drive gear shaft through the balance shaft drive gear so that it fits into the thrust plate hole.

Then align the small timing mark of the balance shaft drive gear with the timing mark of the balance shaft timing gear.

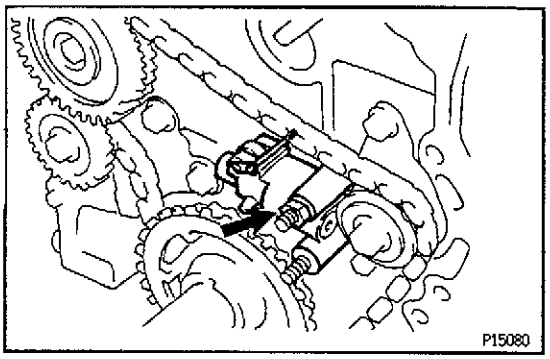


(d) Install the bolt to the balance shaft drive gear and tighten it.

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



(e) Check that each timing mark is matched with the corresponding mark link.

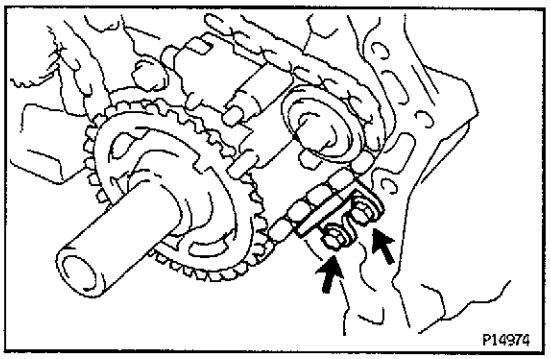


3. INSTALL NO.2, NO.3 VIBRATION DAMPERS AND NO.2 CHAIN TENSIONER

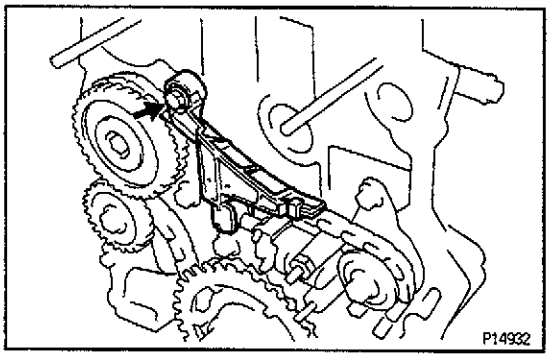
NOTICE: Assemble the chain tensioner with the pin installed, then remove the pin after assembly.
When doing this, avoid pushing the No. 2 vibration damper against the chain.

(a) Install the No.2 chain tensioner with the nut.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

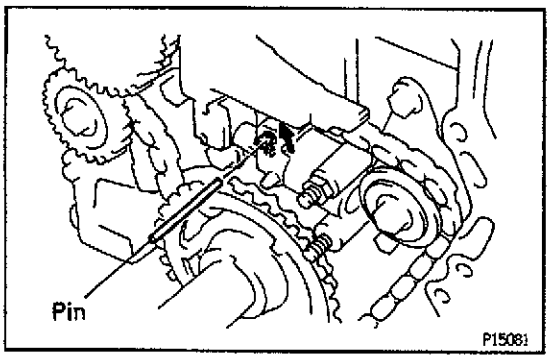
EG



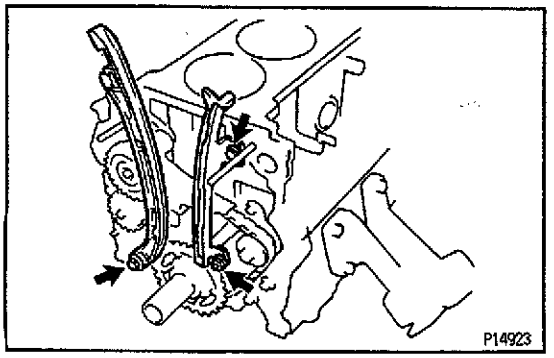
(b) Install No.3 damper with the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



(c) Install No.2 damper with the bolt.
Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)



(d) Remove a pin from the No.2 chain tensioner and free the plunger.

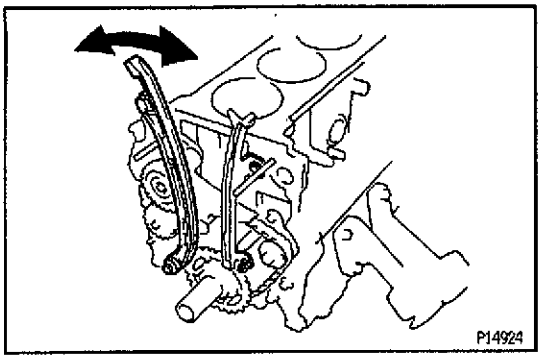


4. INSTALL NO.1 TIMING CHAIN TENSIONER SLIPPER AND NO.1 VIBRATION DAMPER

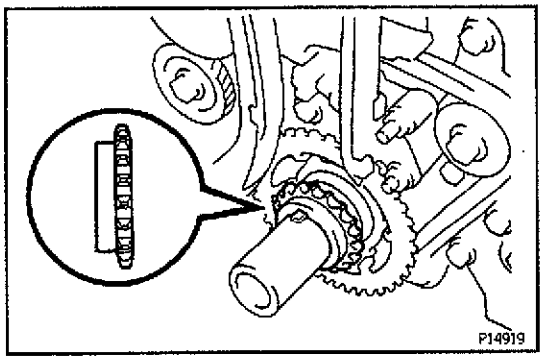
(a) Install the No.1 damper with the bolt and nut.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Install the slipper with the bolt.
Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)

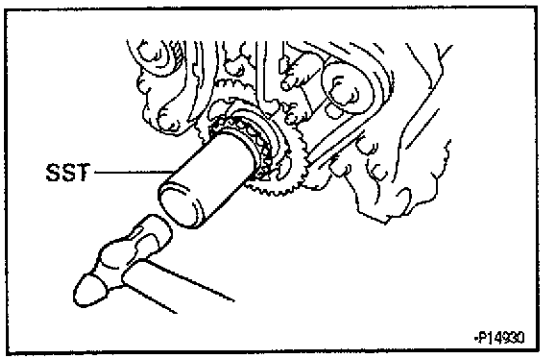
EG



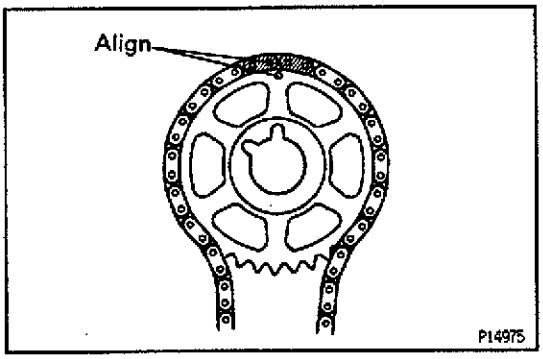
(c) Check that the slipper moves smoothly.



5. INSTALL CRANKSHAFT TIMING GEAR

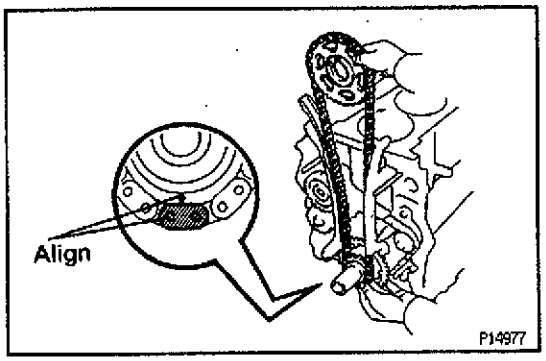


HINT: If necessary, install the gear with SST.
SST 09636–20010



6. INSTALL NO.1 TIMING CHAIN AND CAMSHAFT TIMING GEAR

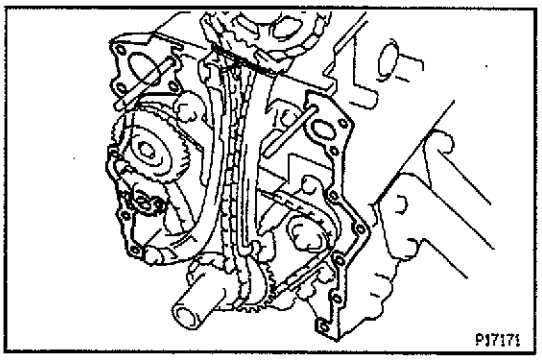
(a) Align the timing mark between the mark link of the No.1 timing chain, and install the No.1 timing chain to the timing gear.



(b) Align the timing mark of the crankshaft timing gear with the mark link of the No.1 timing chain and install the No.1 timing chain.

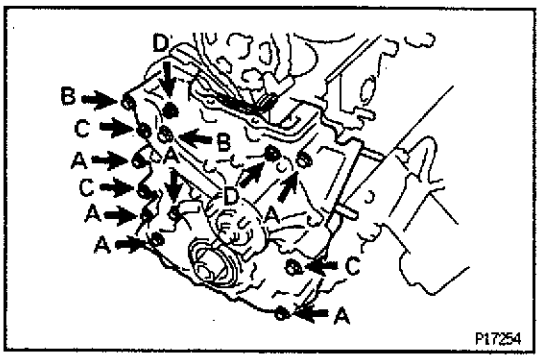


(c) Tie the No.1 timing chain with a cord as shown in the illustration and make sure it doesn't come loose.



7. INSTALL TIMING CHAIN COVER

(a) Install 3 new gaskets to the cylinder block and No.1 water bypass pipe.

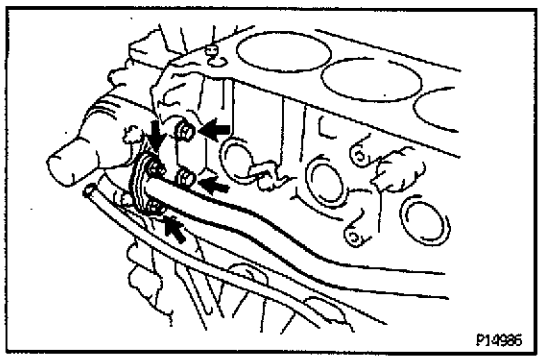


(b) Install the timing chain cover with the 11 bolts and 2 nuts.

Torque:

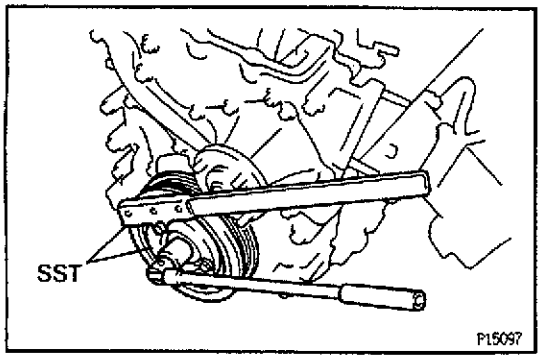
Bolt A 20 N·m (200 kgf·cm, 14 ft·lbf)
Bolt B 24.5 N·m (250 kgf·cm, 18 ft·lbf)
Bolt C 44 N·m (440 kgf·cm, 32 ft·lbf)
Nut D 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Remove the cord from the chain.



(d) Install the 2 timing chain cover mounting bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(e) Install the 2 No.1 water bypass pipe mounting nuts.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

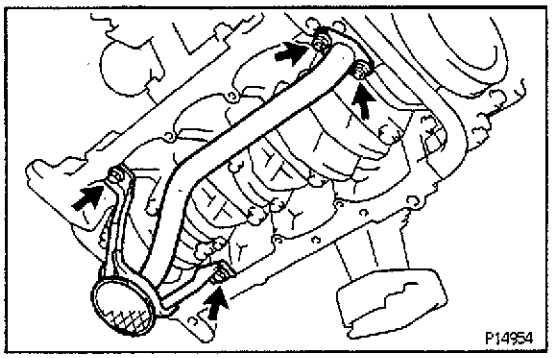


8. INSTALL CRANKSHAFT PULLEY

(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—54015, 09330—00021
Torque: 260 N·m (2,650 kgf·cm, 193 ft·lbf)

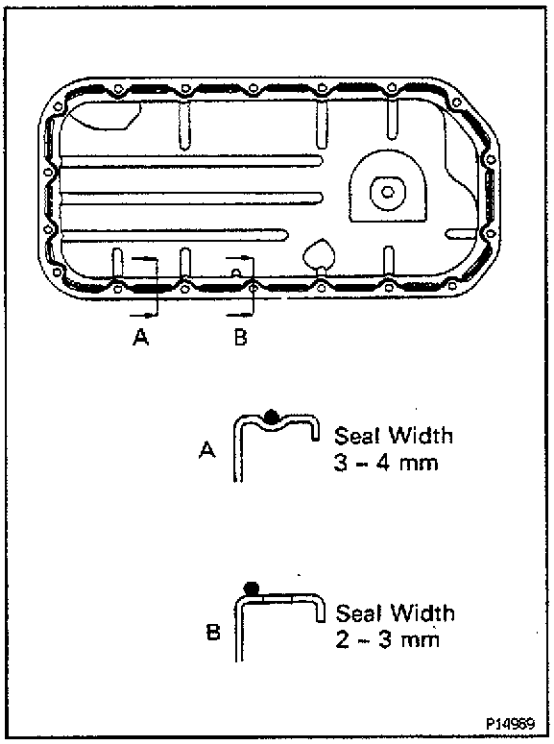
EG



9. INSTALL OIL STRAINER

Install a new gasket and oil strainer with the 2 bolts and 2 nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



10. INSTALL OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the 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.

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

(b) Apply seal packing to the oil pan as shown in the illustration.

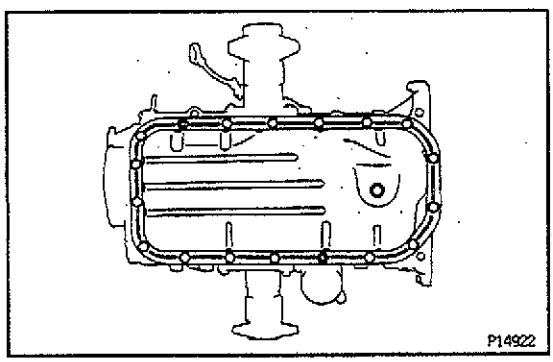
Seal packing:

Part No. 08826—00080 or equivalent

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

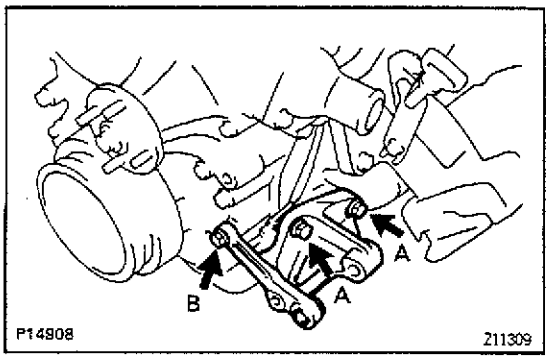
HINT: Avoid applying an excessive amount to the surface.

- 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 oil pan with the 16 bolts and 2 nuts.

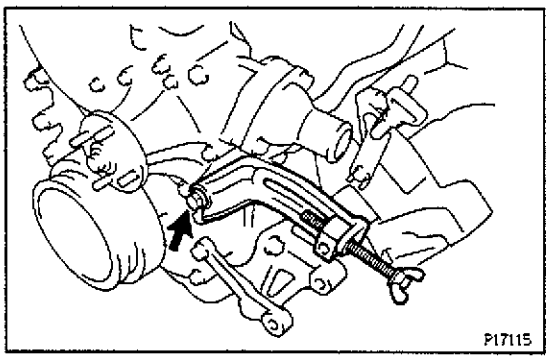
Torque: 12.5 N·m (130 kgf·cm, 9 ft·lbf)



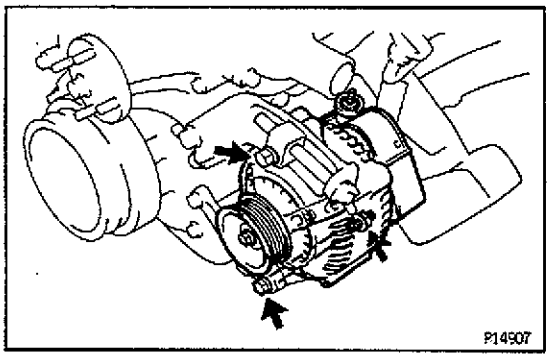
11. INSTALL ALTERNATOR, ADJUSTING BAR AND BRACKET

(a) Install the bracket with the 3 bolts.
Torque:
Bolt A 74.5 N·m (760 kgf·cm, 54 ft·lbf)
Bolt B 18 N·m (185 kgf·cm, 13 ft·lbf)

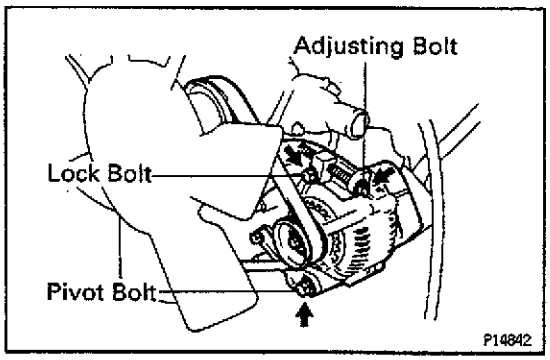
EG



(b) Install the adjusting bar with the bolt.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

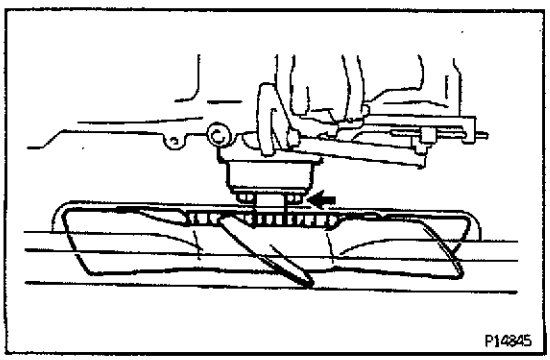


(c) Install the alternator with the pivot bolt and lock bolt.



12. INSTALL WATER PUMP PULLEY, FAN WITH FLUID COUPLING AND DRIVE BELT

(a) Place the fan with fluid coupling and water pump pulley in position.
(b) Temporarily install the water pump pulley mounting nuts.
(c) Install the drive belt, and temporarily tighten the adjusting bolt and pivot bolt.



(d) Stretch the belt tight and tighten the 4 water pump pulley mounting nuts.
Torque: 21 N·m (210 kgf·cm, 16 ft·lbf)
(e) Adjust the drive belt.
(See CH section)

13. INSTALL CYLINDER HEAD
(See page EG–59)

14. START ENGINE AND CHECK FOR LEAKS