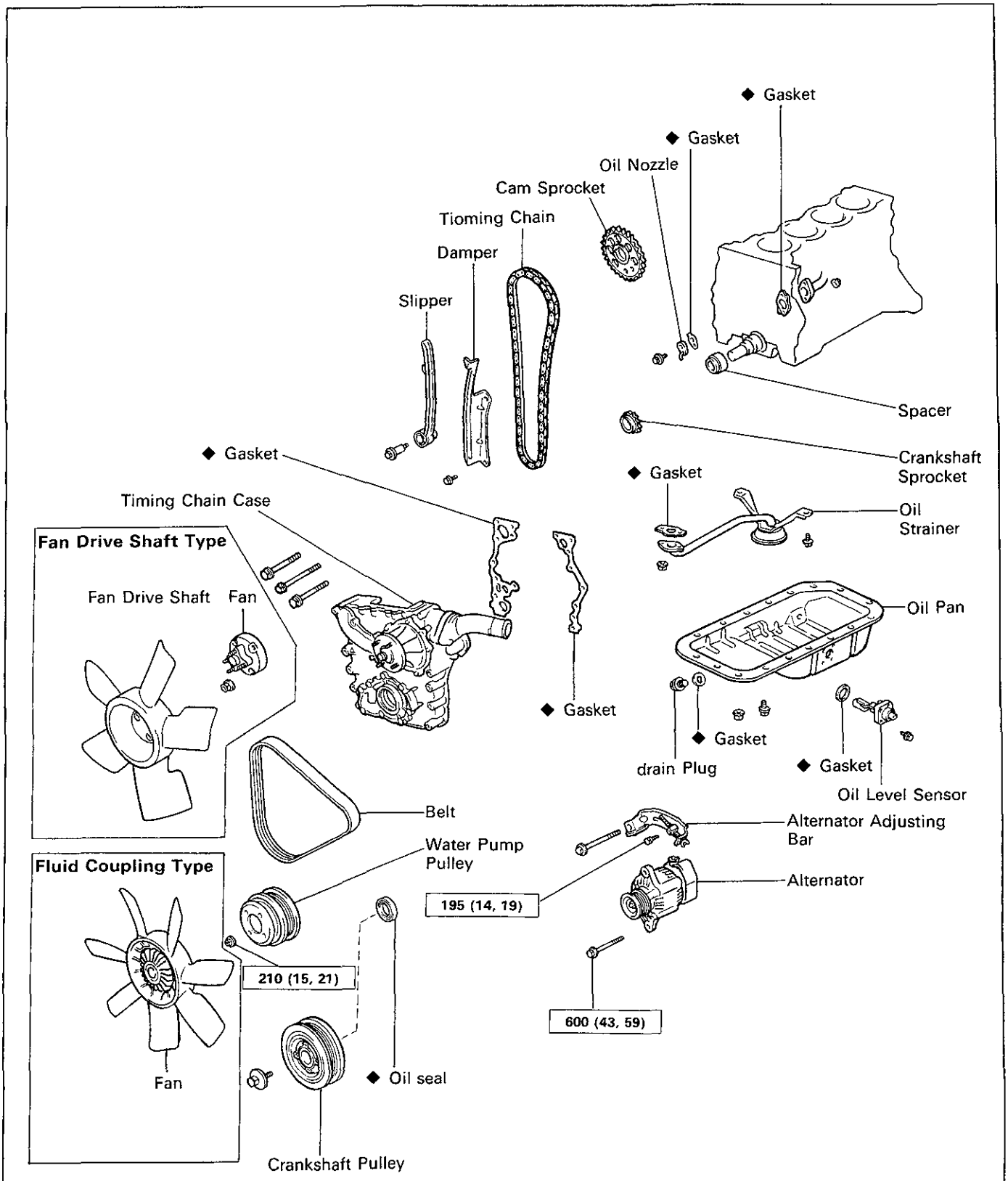
TIMING CHAIN

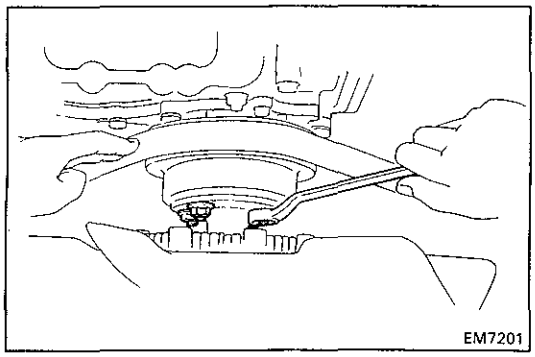
COMPONENTS

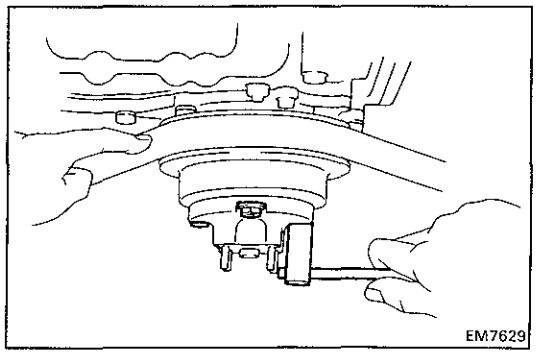


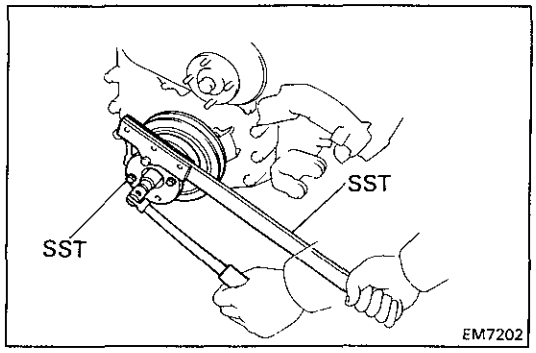
kg-cm (ft-lb, N·m) : Specified torque

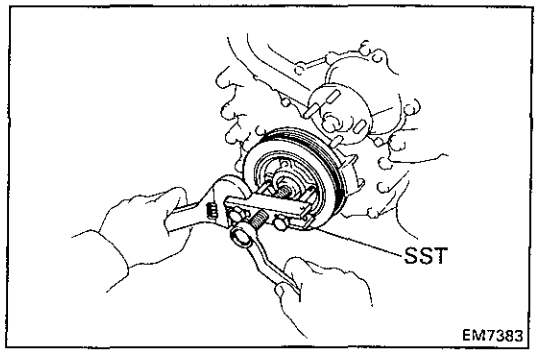
◆ Non-reusable part

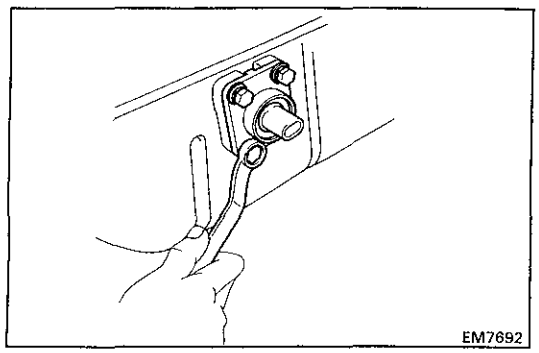
EM7681











REMOVAL OF TIMING CHAIN

1. **REMOVE CYLINDER HEAD**
   (1RZ, 2RZ: See steps 1 to 9 on pages EM-39 to 41)
   (2RZ-E: See steps 1 to 9 on pages EM-65, 66)

2. **(FLUID COUPLING TYPE)**
   REMOVE FLUID COUPLING WITH FAN AND WATER PUMP PULLEY
   (a) Loosen the four water pump pulley set nuts.
   (b) Loosen the belt adjusting bolt and pivot bolt of the alternator, and remove the drive belt.
   (c) Remove the four set nuts, fluid coupling with fan and water pump pulley.

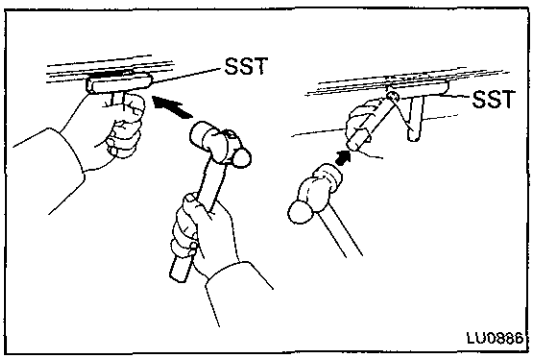
   (FAN DRIVE SHAFT TYPE)
   (a) Remove the four nuts and fan.
   (b) Loosen the belt adjusting bolt and pivot bolt of the alternator, and remove the drive belt.
   (c) Remove the four nuts, fan drive shaft and water pump pulley.

3. **REMOVE ALTERNATOR**

4. **REMOVE CRANKSHAFT PULLEY**
   (a) Using SSTs to hold the crankshaft pulley, loosen the pulley bolt.
   SST 09213-70010 and 09330-00021
   (b) Remove SSTs and pulley bolt.

   (c) Using SST, remove the crankshaft pulley.
   SST 09213-31021

5. **REMOVE OIL PAN**
   (a) Remove the four bolts, oil level sensor and gasket.
   CAUTION: Be careful not to drop the oil level sensor when removing it.

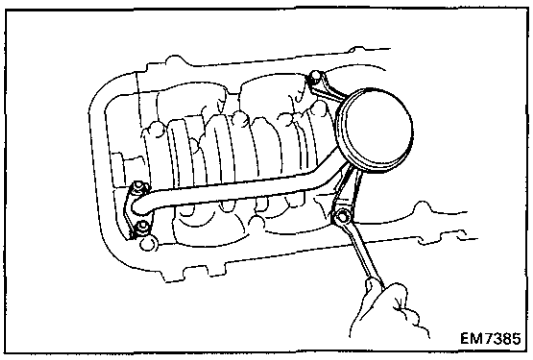


(a) Remove the sixteen bolts and two nuts.

(b) Using SST and a brass bar, separate the oil pan from the cylinder block.

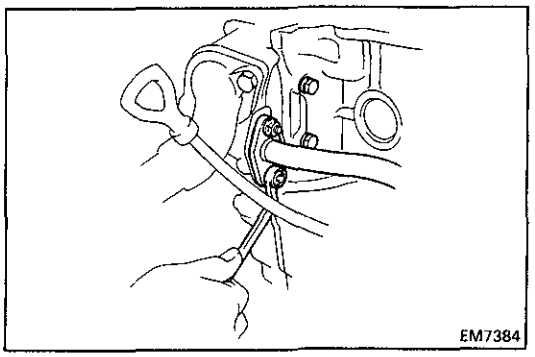
SST 09032-00100

HINT: When removing the oil pan, be careful not to damage the oil pan flange.



6. REMOVE OIL STRAINER

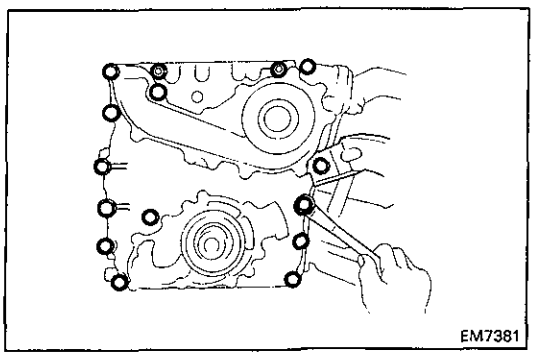
Remove the two bolts and two nuts, and remove the oil strainer and gasket.



7. REMOVE TIMING CHAIN CASE

(a) Remove the two water by-pass pipe mounting nuts.

(b) Remove the two bolts.

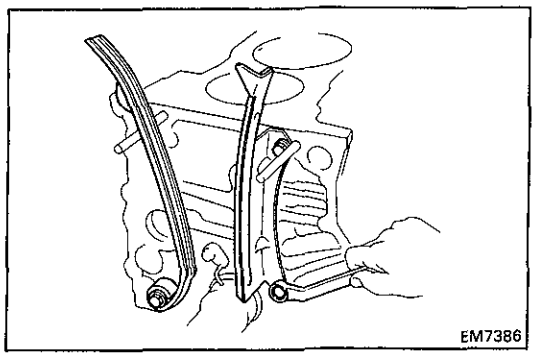


(c) Remove the two nuts, thirteen bolts and alternator adjusting bar.

(d) Using a plastic-faced hammer, loosen the chain cover and remove the timing chain case and three gasket.

8. REMOVE TIMING CHAIN AND CAMSHAFT SPROCKET

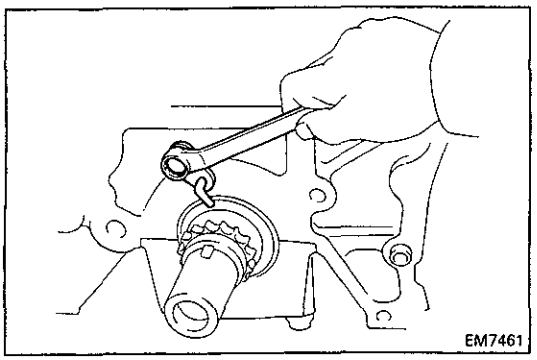
Remove the cam sprocket and chain together.



9. REMOVE CHAIN SLIPER AND DAMPER

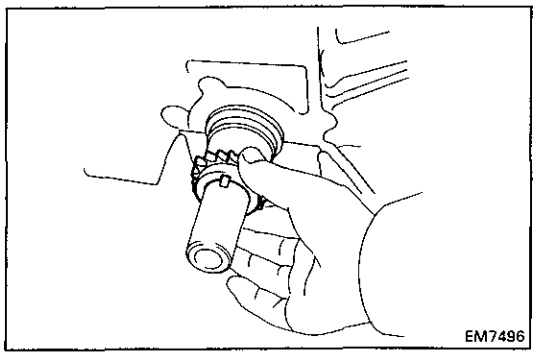
(a) Remove the bolt and chain sliper.

(b) Remove the two bolts and chain damper.

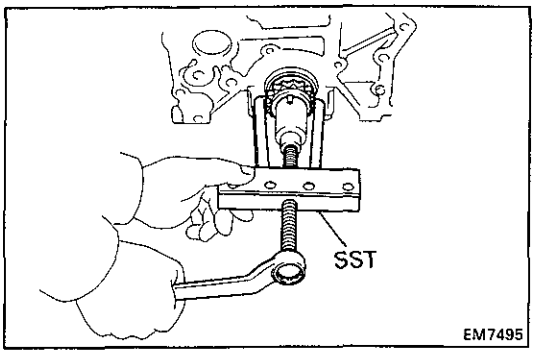


10. REMOVE OIL OIL NOZZLE

Remove the bolt, oil nozzle and gasket.

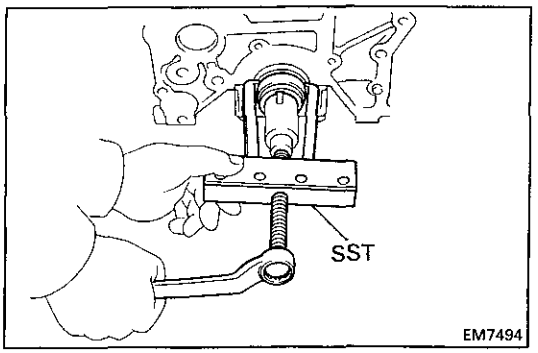


11. REMOVE CRANKSHAFT SPROCKET



HINT: If the sprocket cannot be removed by hand, use SST to remove them together.

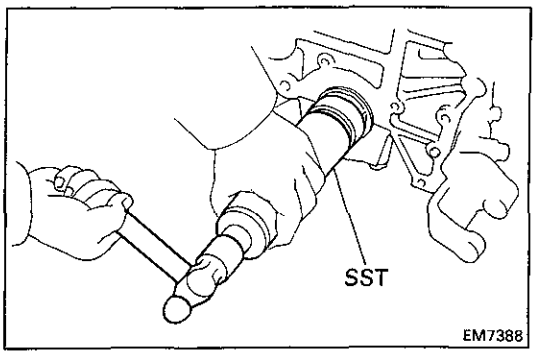
SST 09213-36020



12. IF NECESSARY, REPLACE SPACER

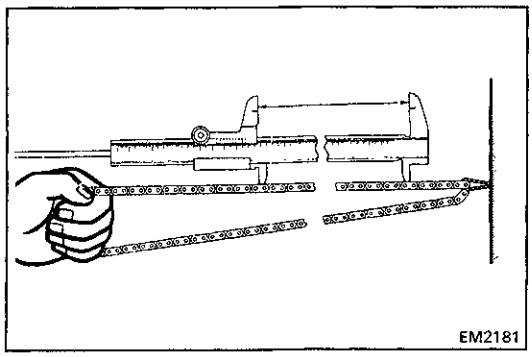
(a) Using SST, remove the spacer.

SST 09213-36020



(b) Using SST, install the spacer.

SST 09608-35014 (09608-06040)



INSPECTION OF COMPONENTS

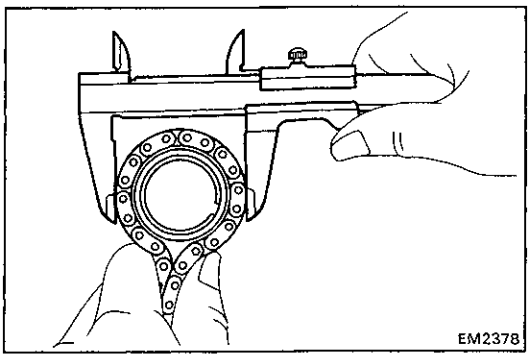
1. MEASURE CHAIN AND SPROCKET WEAR

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

(b) Make the same measurements at least three other places selected at random.

Chain elongation limit at 16 links:
146.6 mm (5.772 in.)

If over the limit at any place, replace the chain.

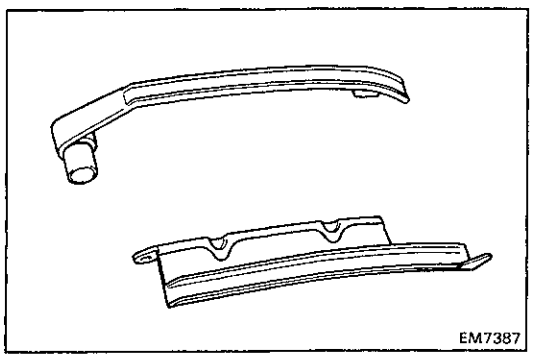


(c) Wrap the chain around the sprocket.

(d) Using calipers, measure the outer sides of the chain rollers as shown. Measure both sprockets.

Minimum crankshaft sprocket: 59.4 mm (2.339 in.)
Minimum camshaft sprocket: 113.8 mm (4.480 in.)

If the measurement is less than minimum, replace the chain and two sprockets.

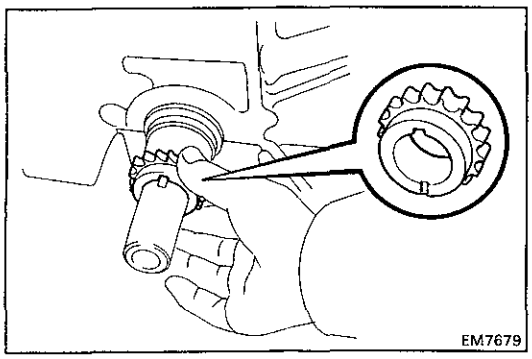


2. MEASURE CHAIN DAMPER AND SLIPPER

Using a micrometer, measure the damper and slipper.

Maximum wear: 1.0 mm (0.039 in.)

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



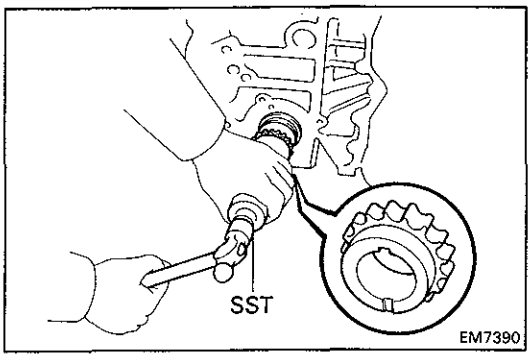
INSTALLATION OF TIMING CHAIN

(See page EM-72)

1. INSTALL CRANKSHAFT SPROCKET AND CHAIN

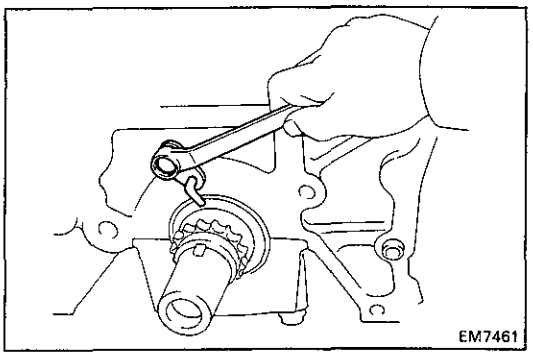
(a) Turn the crankshaft until the shaft key is on top.

(b) Slide the sprocket over the key on the crankshaft.



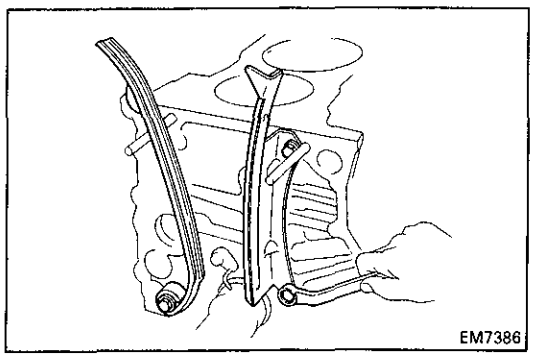
HINT: If the crankshaft sprocket is difficult to install by hand, install using SST.

SST 09608-35014 (09608-06040)



2. INSTALL OIL NOZZLE

Install the oil nozzle and a new gasket with the bolt.



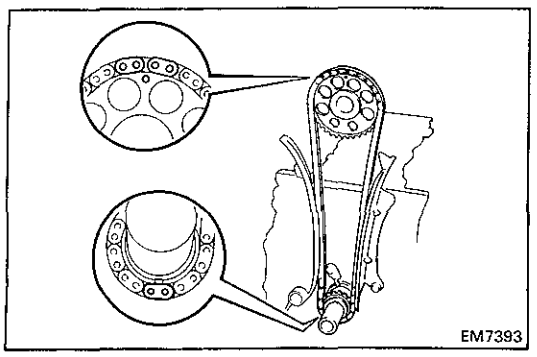
3. INSTALL CHAIN DAMPER AND SLIPER

(a) Install the chain damper with the two bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

(b) Install the chain sliper with the bolt.

Torque: 270 kg-cm (20 ft-lb, 26 N·m)



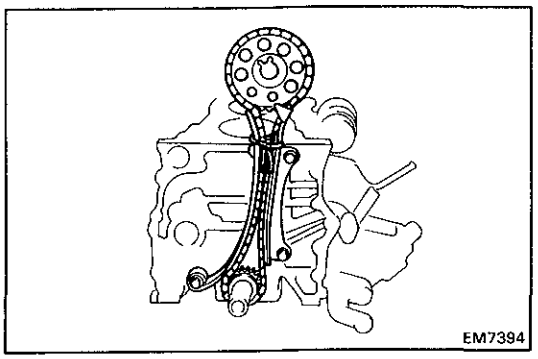
4. PLACE CHAIN AND CRANKSHAFT SPROCKET

(a) Place the timing chain on the camshaft sprocket so that the timing mark is bright chain links.

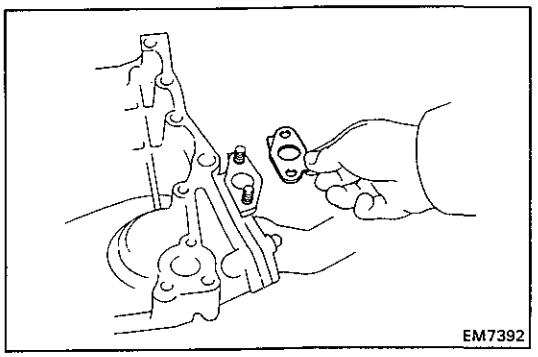
(b) Place the timing chain on the crankshaft sprocket with the single bright link aligned with the timing mark on the crankshaft sprocket.

(c) Make sure the chain is positioned damper and sliper.

(d) Turn the camshaft sprocket counterclockwise to take the slack out of the chain.


EM7394

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

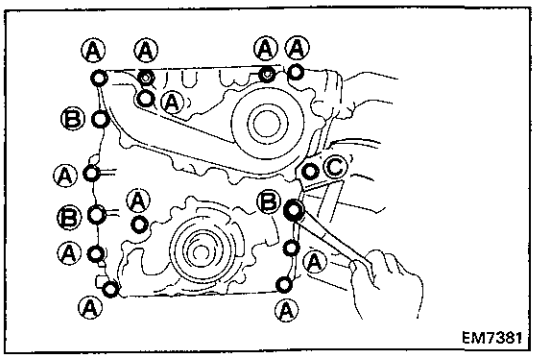

EM7392

5. INSTALL TIMING CHAIN CASE

(a) Clean the gasket surface.

(b) Install two new gaskets over the dowels.

(c) Install a new gasket for water by-pass pipe to the timing chain case.

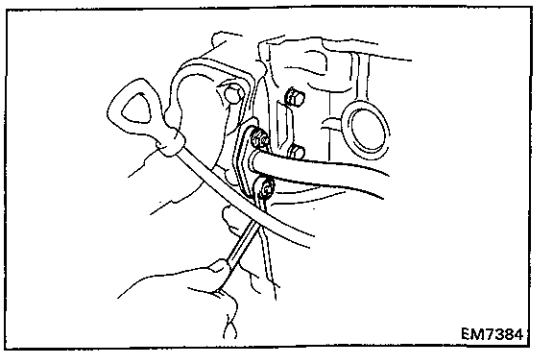


EM7381

(d) Slide the timing case over the dowels.

(e) Install the alternator adjusting bar and bolts and nuts as shown and torque them.

Torque: Ⓐ 200 kg-cm (14 ft-lb, 20 N·m)
Ⓑ 420 kg-cm (30 ft-lb, 41 N·m)
Ⓒ 440 kg-cm (32 ft-lb, 43 N·m)

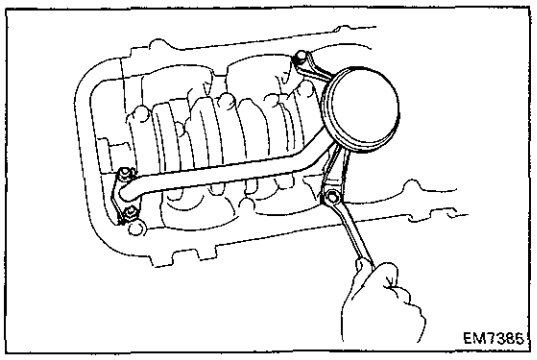

EM7384

(f) Install and torque the two bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

(g) Connect the water by-pass pipe, and install and torque the two nuts.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)



6. **INSTALL OIL STRAINER**

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

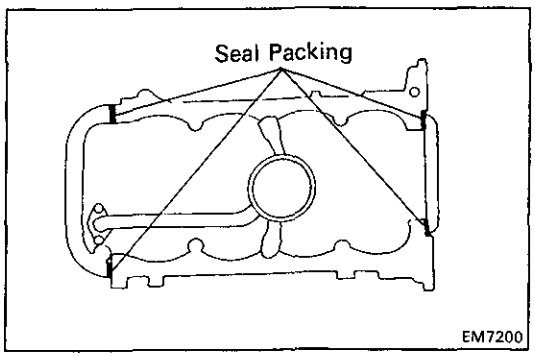
Torque: Bolt 185 kg-cm (13 ft-lb, 18 N·m)
Nut 200 kg-cm (14 ft-lb, 20 N·m)

7. **INSTALL OIL PAN**

(a) Remove any old packing material and be careful no to drop any oil on the contacting surfaces of the oil pan and cylinder block.

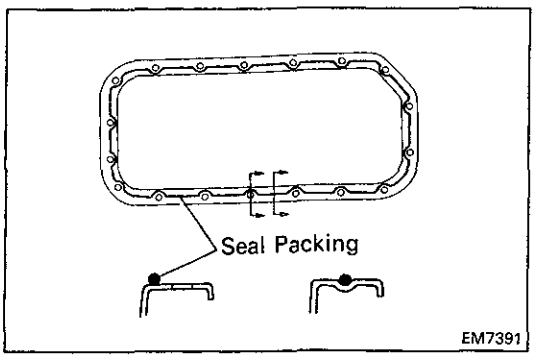
- Using a razor blade and gasket scraper, remove all the packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.
- Clean both sealing surfaces with a non-residue solvent.

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



(b) Apply seal packing to the joint part of the cylinder block and rear oil seal retainer.

Seal packing: Part No.08826-00080 or equivalent



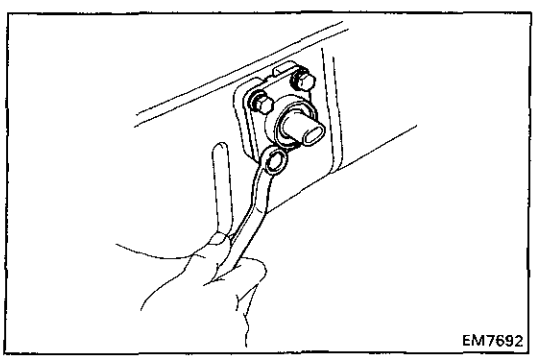
(c) Apply seal packing to the oil pan as shown in the figure.

Seal packing: Part No.08826-00080 or equivalent

- Install a nozzle that has been cut to a 5-mm (0.20 in.) opening.

HINT: Avoid applying an excess amount to the surface. Be especially careful near oil passages.

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

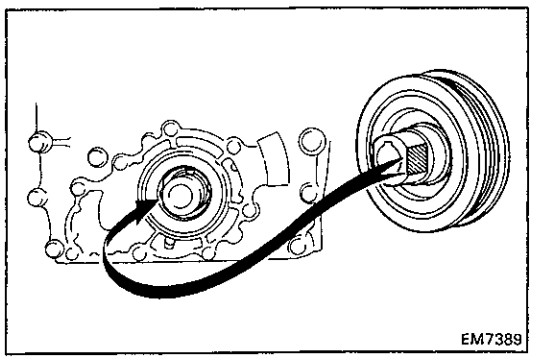


(d) Install the oil pan over the studs on the block with sixteen bolts and two nuts. Torque the bolts and nuts.

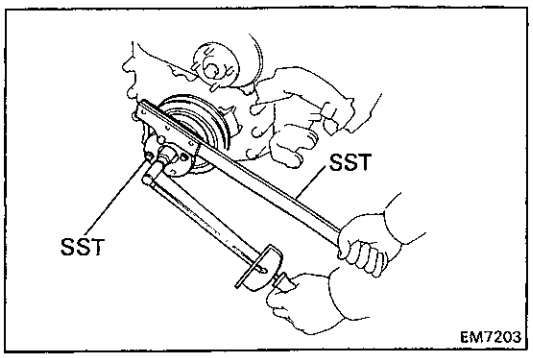
Torque: 130 kg-cm (9 ft-lb, 13 N·m)

(e) Install a new gasket and the oil level gauge with the four bolts.

CAUTION: Be careful not the drop the oil level sensor when installing it.



8. **INSTALL CRANKSHAFT PULLEY**
   (a) Install the crankshaft pulley to the crankshaft with the spline teeth of the crankshaft pulley engaged with the large teeth of the oil pump.
   (b) Rotate the crankshaft pulley to left and right and check that the key groove of the crankshaft pulley correctly fits the crankshaft key.
   (c) Install the crankshaft pulley bolt.

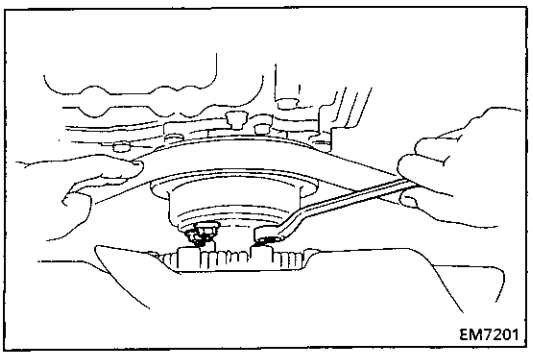


   (d) Using SSTs to hold the crankshaft pulley, torque the bolt.

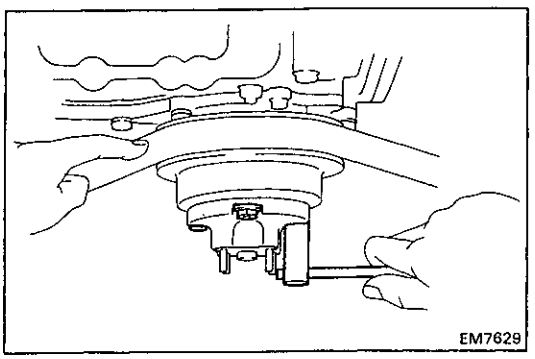
   SST 09213-70010 and 09330-00021

   Torque: 2,500 kg-cm (181 ft-lb, 245 N·m)

9. **INSTALL ALTERNATOR**



10. **(FLUID COUPLING TYPE)**
    INSTALL WATER PUMP PULLEY AND FLUID COUPLING WITH FAN
    (a) Temporarily install the water pump pulley and fluid coupling with fan with four nuts.
    (b) Place the drive belt on to each pulley.
    (c) Stretch the belt tight and tighten the four nuts.



    (FAN DRIVE SHAFT TYPE)
    (a) Temporarily install the water pump pulley and fan drive shaft with four nuts.
    (b) Place the drive belt on to each pulley.
    (c) Stretch the belt tight and tighten the four nuts.
    (d) Install the fan with the four nuts.

11. **REMOVE CORD FROM TIMING CHAIN**

12. **INSTALL CYLINDER HEAD**
    (1RZ, 2RZ: See steps 1 to 11 on pages EM-59 to 63)
    (2RZ-E: See steps 1 to 11 on pages EM-70, 71)

13. **ADJUST DRIVE BELTS**